

SHIOLOGY STUDY Vol.5

食学研究^⑤

A Holistic Approach to Addressing
Food System Challenges through Shiology
以食学整体解决食物系统问题



北京东方美食研究院
Beijing Shiology Research Institute

第五届世界食事论坛论文集
The Proceedings of the 5th World Shiology Forum

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中国气候变化事务特使，联合国前副秘书长刘振民宣读联合国秘书长古特雷斯的书面致辞



联合国前副秘书长吴红波宣读联合国第八任秘书长潘基文所撰报告前言



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联合国驻华协调员常启德在第五届世界食事论坛发表主旨演讲



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The Proceedings of the 5th World Shiology Forum

北京东方美食研究院



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卷首语

民以食为天。食事关乎人类生存、文明延续与全球可持续发展大局。在全球食物系统面临供需平衡、生态保护、健康保障、公平治理多重挑战的当下,构建系统性、整体性的食事治理体系,成为全人类共同的使命与追求。第五届世界食事论坛立足全球视野,凝聚国际共识,汇聚各界智慧,以食学为理论核心,直面全球食物系统挑战与难题,搭建起跨国家、跨领域、跨学科的高端交流合作平台,为破解全球食事问题、推动人类可持续发展探寻可行路径、贡献务实方案。

2025年7月8日,第五届世界食事论坛新闻发布会在香港首届世界品牌大会上隆重举行,香港特别行政区行政长官李家超出席会议。10月28-31日,第五届世界食事论坛在海口正式举办,联合国秘书长古特雷斯继第四届世界食事论坛后,再次向论坛发来书面致辞。海南省人民政府副省长谢京于28日出席欢迎仪式并致辞;29日,副省长李锋出席开幕式并致辞。中国气候变化事务特使刘振民,联合国前副秘书长吴红波,联合国驻华协调员常启德,联合国经社部公共机构和数字政府司司长、可持续发展司代司长朱巨望,巴西零饥饿组织副总干事Walter Belik,中国工程院院士尹伟伦,食品法典委员会前秘书长Tom Dietmar Heilandt等来自六大洲52个国家的政要、专家学者、企业家代表参加论坛。

10月29日,第五届世界食事论坛举办开幕式。论坛围绕“以食学整体解决食物系统问题”主题,设置了六个分论坛,分别为1.以食学推动全球治理,2.守护人类的餐桌:让80亿人享有充足、优质与安全的食物,3.食物系统转型:迈向健康与长寿,4.全球治理与制度创新:重塑可持续的食物系统,5.教育与文化:塑造可持续的食事行为,6.应对气候与生态挑战:构建更具韧性的食物系统。

论坛发布成果《全球食事系统与可持续发展(SDG)研究报告》,并递交联合国驻华协调员常启德,这份由全球115个国家专家学者共同编制的报告,标志着食学理论体系迈向实践新阶段,推动了全球食事治理从“共识”走向“行动”的关键一步。报告中文版由中国人民大学出版社出版,英文版由香港中华书局出版。10月30日,论坛举办慈善晚宴,10月31日,组织食业考察活动。论坛旨在推动食事问题的整体解决,促进人类的可持续发展。

第五届世界食事论坛论文集共收录文章55篇,设九大板块,涵盖中英两种语言。其中,论文45篇,采访10篇。语言分布为:中文11篇,英文44篇。文章未做直接翻译,保留了原语言的准确性和学术严谨性。所有文章紧紧围绕论坛主题,为推动全人类的可持续发展贡献良好的建议和对策。

食为民生之本,亦是全球治理之要。本届论坛的成功举办,搭建了全球食事治理的重要桥梁,这份论文集,将成为全球食事治理交流的重要载体,助力各国携手同行,以食学理论体系为指导,共筑韧性食物系统、共赴人类可持续发展的美好未来,让公平、充足、健康的食物惠及全球每一个人。

Preface

Food is the first necessity of the people. Shiance are fundamental to human survival, the continuation of civilization, and the overarching goal of global sustainable development. At a time when the global food system faces multifaceted challenges—balancing supply and demand, protecting ecosystems, ensuring health and nutrition, and achieving equitable governance—establishing a systematic and holistic shiance governance system has become a shared mission and pursuit for all of humanity.

With a global vision, the Fifth World Shiology Forum convened to build international consensus and gather wisdom from all sectors. Rooted in the theoretical framework of Shiology, it directly addresses the challenges and complexities of the global food system. The Forum serves as a high-end platform for exchange and cooperation across nations, disciplines, and fields, exploring viable pathways and contributing practical solutions to solve global food system issues and advance sustainable human development.

On July 8, 2025, the press conference for the Fifth World Shiology Forum was grandly held at the First Hong Kong World Brand Conference, with Lee Ka Chiu John, Chief Executive of the Hong Kong Special Administrative Region, in attendance. The main session of the Fifth World Shiology Forum officially took place in Haikou from October 28 to 31. For the second time, following the Fourth World Shiology Forum, United Nations Secretary-General António Guterres delivered a written message to the Forum. On October 28th, Xie Jing, Vice Governor of the Hainan Province, attended the welcome ceremony and delivered remarks. On the 29th, Vice Governor Li Feng attended the opening ceremony and delivered a speech. Participants included H.E. Liu Zhenmin, China's Special Envoy for Climate Change; H.E. Wu Hongbo, former UN Under-Secretary-General; H.E. Siddharth Chatterjee, UN Resident Coordinator in China; Zhu Juwang, Director of Division for Public Institutions and Digital Government, and Officer-in-Charge of Division for Sustainable Development Goals, UNDESA; Walter Belik, Deputy Director-General of the Zero Hunger Institute; Yin Weilun, Chinese Academy of Engineering; and Tom Dietmar Heilandt, former Secretary of the Codex Alimentarius Commission. In total, the Forum brought together government officials, experts, scholars, and corporate representatives from 52 countries across six continents.

The opening ceremony of the Fifth World Shiology Forum was held on October 29. Centered on the theme “A Holistic Approach to Addressing Food System Challenges through Shiology,” the Forum featured six sessions: 1. Advancing Global Governance through Shiology; 2. Safeguarding Humanity's Table—Ensuring Sufficient, High-Quality and Safe Food for 8 Billion People; 3. Food-System Transformation—The Path to Health and Longevity; 4. Governance Reform and Institutional Innovation for Sustainable Food Systems; 5. Education and Culture for Sustainable Food Practices; 6. Confronting Climate and Ecological Challenges—Building More Resilient Food Systems.

A key outcome of the Forum was the release of the Global Food Systems and SDGs Report. This report, jointly compiled by experts and scholars from 115 countries, was formally presented to H.E. Siddharth Chatterjee, UN Resident Coordinator in China. It marks a new phase in the practical application of Shiology theory and represents a critical step forward in advancing global shiance governance from “consensus” to “action.” The Chinese edition of the report was published by China Renmin University Press, and the English

edition was published by Chung Hwa Book Company (Hong Kong). On October 30, the Forum hosted a charity dinner, followed by an food industry visit on October 31. The aim of the Forum was to promote the holistic resolution of food system issues and foster sustainable human development.

The Proceedings of the 5th World Shiology Forum has collected 55 articles, organized into nine main sections and featuring both Chinese and English. It includes 45 research papers and 10 expert interviews. In terms of language, 11 articles are in Chinese and 44 are in English. The articles have not been directly translated from one another, preserving the accuracy of the original language and ensuring academic rigor. All articles closely align with the Forum's theme, offering valuable insights and strategic recommendations to advance sustainable development for all humanity.

Food is fundamental to people's livelihoods and central to global governance. The successful convening of this Forum has established a vital bridge for global shiance governance. This collection of papers will serve as an important medium for exchange in global shiace governance. It aims to assist countries in working together, guided by the theoretical framework of Shiology, to build resilient food systems and move towards a shared future of sustainable human development—a future where fair, sufficient, and healthy food benefits every person on our planet.

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01

A Holistic Approach to Addressing Food System Challenges through Shiology

以食学整体解决食物系统问题

2025年10月29日 9:20~10:00

[PT] MESSAGE FOR THE FIFTH WORLD SHIOLOGY FORUM

[KR] Sustaining Food Systems for Health and Peace

[CN] 全球食事问题的整体性治理——基于海南自贸港的探索

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MESSAGE FOR THE FIFTH WORLD SHIOLOGY FORUM

António Guterres

(United Nations Secretary-General)

I am pleased to send my warm greetings to the Fifth World Shiology Forum.

Global hunger is at last declining, after being driven up by a global pandemic, raging conflicts and faltering economies. This is a welcome sign of progress. Yet an estimated 673 million people still go to bed hungry each night.

In many regions, food prices are continuing to climb, and famine has taken hold in Gaza and Sudan.

In our quest for zero hunger, we must invest in agriculture that nourishes people without destroying the planet. That means farming in ways that safeguard water and biodiversity, reduce deforestation and pollution, and help us to mitigate the climate crisis.

With less than five years to achieve the 2030 Agenda, we must act together to create food systems that sustain both people and planet.

The holistic principles of Shiology can help light the way. By recognizing our interconnectedness, we can build resilience across communities, ecosystems, and economies.

Let us seize this moment to confront the root causes of hunger —and ensure healthy, affordable, sustainable food for all.



Sustaining Food Systems for Health and Peace

Ban Ki-moon

8th Secretary-General of the United Nations

The 5th World Shiology Forum is taking place at a crucial time, as the global community accelerates efforts to achieve the 2030 Agenda for Sustainable Development. I sincerely commend the outstanding contributions from collaborators in over 100 countries to the Global Food Systems and SDGs Report. This report reflects the spirit of multilateral cooperation and shared mission—qualities essential for addressing today's urgent food system challenges.

In recent years, our understanding of food systems has changed significantly. What began as a focus on agriculture and supply chains has expanded to include the needs, rights, and behaviors of people as food consumers. A key milestone came on November 18, 2021, with the first United Nations Food Systems Summit (UNFSS), marking a global shift in attention—from food itself to the systems that shape food. This historic shift signals a new phase of comprehensive problem-solving in the food system domain.

Public understanding of food systems has evolved through three main stages: first, from “farm to table”; then, from “farm to consumption”; and now, toward a broader view that includes human food needs and behaviors. This new perspective goes beyond production and consumption to include the full post-consumption cycle—digestion, waste processing, and the return of organic matter to the earth—creating a closed ecological loop between humans and nature.

Today, the world faces mounting food system challenges. Around 780 million people suffer from hunger, while more than 3 billion cannot afford a healthy diet. At the same time, one-third of all food produced globally is lost or wasted. Unsustainable food production, packaging, and transportation contribute to the climate crisis, generate significant greenhouse gas emissions, consume over two-thirds of the planet's freshwater, and accelerate biodiversity loss. Alarming, only 17% of the SDG targets are progressing on schedule, and over one-third are either stalled or regressing.

The problems within food systems are deeply complex. We face older issues such as insufficient food supply, along with newer ones like polluted soil and water. Visible problems like food waste coexist with hidden ones such as chronic diseases caused by overconsumption. To tackle these challenges, we need a comprehensive knowledge framework that covers the entire food system. Shiology offers

such a framework—integrating “eaters, food, and food order”—and provides a full-chain approach to understanding food system issues.

As the 2030 deadline draws closer, this report—developed as a three-year, three-phase global initiative—arrives at just the right moment. I call on governments, institutions, researchers, and civil society to join forces in building more resilient, fair, and sustainable food systems.

Looking ahead, let us move forward with strong commitment: a sustainable food system is not only a development goal—it is a vital link connecting peace, health, sustainability, and human dignity. I hope this report contributes meaningfully to our shared global efforts to build a more inclusive and sustainable food system community and to shape a new order for food systems worldwide.



全球食事问题的整体性治理 ——基于海南自贸港的探索

李锋

(海南省人民政府副省长)

摘要: 全球食物系统面临气候变化、供应链脆弱与营养不均等多重挑战,需以系统性思维寻求解决方案。本文以第五届世界食事论坛为背景,探讨全球食事治理的整体性路径,强调构建从生产到消费的全链条治理体系。本文以海南自贸港为例,分析其通过南繁育种、绿色生产、数字化监管与区域品牌建设等实践,探索以“大食物观”和开放政策为支撑的食物系统创新。研究认为,全球食事治理需强化国际协作与整体性框架,推动食物系统向安全、健康与可持续转型,助力人类命运共同体建设。

关键词: 食物系统;世界食事论坛;海南自贸港;食事治理

一、全球食物系统挑战与治理框架

纵观人类文明进程,食事问题始终是关系国计民生、影响社会稳定的重要基石。当前,全球食物系统正面临着前所未有的挑战:气候变化影响加剧、生物多样性丧失、粮食供应链脆弱、营养不均与浪费并存,这些问题相互交织,错综复杂,难以依靠单一学科或局部方案解决。

世界食事论坛创建于2017年,汇聚全球有可持续发展使命的政府官员、专家学者和企业家,致力于构建彻底解决食事问题的全球治理体系和方案。本届论坛积极响应习近平主席提出的“全球治理”理念,以“以食学整体解决食事系统问题”为主题,以系统性思维、整体性视角,重新审视从田间到餐桌的完整链条,必将为系统破解食事难题、推动人类可持续发展贡献智慧与力量。

二、海南自贸港的食物系统创新实践

海南作为中国唯一的热带岛屿省份和中国特色自由贸易港,正依托独特的资源禀赋和开放政策优势,探索通过大食物观与科技创新构建新型食物保障体系。在种植环节,坚持“向种图强”,大力发展现代种业,建设国家南繁科研育种基地,全国超过70%的农作物品种主要经过南繁基地培育;在生产环节,推行绿色生产方式,建立农产品质量安全追溯体系,全省绿色食品、有机农产品、农产品地理标志“两品一标”认证数量持续增长;在流通环节,积极构建现代化冷链物流体系,建设国际热带农产品交易中心;在监管环节,不断创新监管模式,运用大数据、区块链等技术提升食品安全治理能力,实现从田间到餐桌的全链条监管;在品牌创建环节,积极打造“海南鲜品”省级全品类农产品区域公共品牌,构建涵盖文昌鸡、糟粕醋、白莲鹅、深海鱼、山兰稻、黎族药膳等在内的特色美食认证体系,推动传统农耕智慧向现代健康食品产业链转化。

海南正屹立于中国改革开放的时代潮头,肩负着

建设具有世界影响力的中国特色自由贸易港的重大使命, 将于今年12月18日正式启动全岛封关运作, 实行“一线放开、二线管住、岛内自由”, 以“零关税、低税率、简税制”和“五个自由便利、一个安全有序流动”为主要特征的自贸港政策制度体系逐步构建, 为全球食品产业企业在海南发展提供了有力条件。

三、结论

全球食事问题的解决依赖于整体性治理与全球合作。期待通过世界食事论坛这个重要平台, 凝聚更多共识, 促成多项合作, 实现更大发展, 共同打造安全、健康、可持续的全球食品体系, 为构建人类命运共同体作出新的更大贡献!

Holistic Governance of Global Shiance Issues: A Case Study of the Hainan Free Trade Port

Li Feng

Vice Governor of Hainan Province

Abstract: The global food system faces multiple challenges, including climate change, supply chain vulnerabilities, and nutritional imbalances, which necessitate systematic thinking in seeking solutions. Against the backdrop of the Fifth World Shiology Forum, this article explores the holistic pathways for global shiance governance, emphasizing the establishment of a comprehensive governance system spanning the entire chain from production to consumption. Taking the Hainan Free Trade Port as a case study, it analyzes the port's practices in areas such as green production, digital supervision, and regional brand development, as it explores innovations in the food system supported by the all encompassing approach to food and open policies. The article concludes that global shiance governance requires strengthened international collaboration and a holistic framework to facilitate the transition of food systems towards safety, health, and sustainability, thereby contributing to the building of a community with a shared future for mankind.

Keywords: Food System, World Shiology Forum, Hainan Free Trade Port, Shiance Governance



Transforming Global Food Systems: Shiology and Collective Action for a Sustainable Future

H.E. Siddharth Chatterjee

(UN Resident Coordinator in China)

Abstract: The 5th World Shiology Forum addresses the critical global food systems challenges, characterized by rising hunger, food insecurity, and obesity, alongside food systems' severe environmental harm. Highlighting the urgency to transform food systems for the 2030 SDGs, it positions Shiology—centered on food as an interconnected nexus of health, ecology and social well-being—as a key solution, aligning with the UN's systems approach. Drawing on China's food security and agricultural innovation experience, the forum proposes four priorities: tackling the climate-food nexus, protecting food heritage, advancing food literacy, and fostering inclusive innovation. It also launches the Global Food Systems and SDGs Report, calling for collective action across sectors and nations to build food systems that nourish all, regenerate ecosystems, and secure a sustainable future.

Keywords: Food systems, Shiology, China, Collective action

This 5th world shiology forum convenes at a pivotal moment for humanity's shared future. After decades of progress, global hunger is once again on the rise. More than 735 million people go to bed hungry each night, while 2.4 billion experience food insecurity. At the same time, 2.5 billion adults are overweight or obese. These paradoxes reveal a painful truth: our food systems are failing to nourish people, and, in the process, they are also harming the planet.

Food systems today account for one-third of global greenhouse gas emissions, consume 70 percent of freshwater resources, and are among the primary drivers of biodiversity loss and land degradation. As the UN Secretary-General António Guterres has reminded us, "We must transform food systems urgently to make them more sustainable, equitable and resilient."

With just five years remaining until 2030, his words carry renewed urgency. We cannot achieve the Sustainable Development Goals without reimagining how we produce, distribute, and consume food.

This is precisely where the philosophy of Shiology offers a path forward. Shiology views food not merely as sustenance, but as the nexus of health, culture, ecology, and social well-being. It reminds us that every meal connects us to nature, to communities and to future generations.

In its essence, Shiology echoes the United Nations' own systems approach: recognizing that challenges cannot be solved in isolation. Food security, climate action, health, gender equality, and sustainable consumption are all interdependent. Shiology therefore calls for integration rather than fragmentation, harmony rather than extraction, and

a recognition that what nourishes the body must also sustain the planet.

China's experience offers powerful lessons for the world. In just four decades, it has lifted over 800 million people out of poverty and achieved dramatic improvements in food security. Guided by the vision of ecological civilization and a commitment to green and digital transformation, China is pioneering climate-smart agriculture, precision farming, and the preservation of agricultural heritage systems.

Through initiatives such as the Global Development Initiative and the China-FAO South-South Cooperation programme, China is also sharing knowledge and innovation with countries around the world – supporting them to build resilient food systems across Africa, Asia, and Latin America. This spirit of partnership is central to the multilateralism that underpins the Pact for the Future and our collective commitment to leave no one behind.

As we reflect on the theme of this Forum, four priority areas are identified to guide collective action:

1. Confront the climate-food nexus.

Climate change is both a driver and a victim of food insecurity. We must transition toward climate-resilient, low-emission agriculture, while ensuring smallholders – the backbone of global food production – have the resources and technology to adapt and prosper.

2. Protect and revitalize food heritage

Traditional knowledge – from China's rice-fish systems to the Andean terraces – embodies centuries of wisdom. Preserving and adapting these systems is not nostalgia; it is innovation rooted in resilience.

3. Advance food literacy and education

Transformation begins with awareness. From school curricula to consumer choices, education can reshape how societies value food, nutrition, and the environment.

4. Foster inclusive innovation

Technology must empower, not exclude. Digital tools, biotechnology, and sustainable finance must reach women, youth, and marginalized farmers: those most vital to, yet most often left behind in, the transformation journey.

This Forum marks the first release of the Global Food Systems and SDGs Report – a timely contribution as we implement the Pact for the Future, reinvigorate Our Common Agenda, and prepare for COP30.

Transforming food systems is not the task of one nation or institution—it is a collective responsibility. Governments, the private sector, academia, civil society, and the United Nations must work in synergy. In China, illustrative examples of progress exist: from community-based farming initiatives and digital agriculture pilots to national campaigns reducing food waste and promoting diverse, healthy diets.

The United Nations stands ready to continue supporting these efforts – linking local innovation with global frameworks, and connecting people, planet, and prosperity through partnership.

Forum discussions are intended to embrace bold, collaborative thinking, transcending idea exchange to inspire actionable change. This process affirms the shared understanding that food represents not merely a commodity, but a covenant with the Earth and humanity.

Together, we can build food systems that nourish everyone, regenerate ecosystems, and secure a sustainable future for generations to come.



Food System Challenges From a Global Perspective

Wu Hongbo

(Former UN Under-Secretary-General)

Abstract: Global food security is a core concern of the United Nations (UN) and the international community. However, on the occasion of the UN's 80th anniversary, the global food system still faces unprecedented challenges. Based on the interdisciplinary framework of Shiology, this article systematically analyzes the predicament of the global food system from three dimensions: eaters, food, and food order. Against the backdrop that only 35% of the SDGs are on track for 2025, the article proposes that reforming the global food system requires joint efforts from the UN, all countries, and the public. China's global initiatives and the theory of Shiology provide important support and theoretical reference for addressing food challenges, promoting sustainable development, and improving global governance.

Keywords: United Nations, food system, Eater, Food, Food order, Shiology, food system issues

The members of the United Nations marked 80th anniversary of the founding of United Nations on the 24th October. Now, the United Nations are the most representative and authoritative intergovernmental organization of the world.

The international community has attached great importance to the elimination of poverty and hunger. The first Millennium Development Goal, known as MDG, in year 2000, is to eliminate extreme poverty and hunger. The Sustainable Development Goals, SDGs in 2015 have also placed no poverty and zero hunger in the most prominent place. Over the past years, the United Nations has made significant progress in addressing poverty, hunger and malnutrition. However, the humanity is still confronted with unprecedented challenges.

The United Nations 2030 Agenda provides the human development a solution of economic

growth, environmental Protection and social justice combined. The global food system too needs a comprehensive solution. As Mr Ban Ki-moon pointed out, we need a comprehensive knowledge framework that covers the entire food system. Shiology offers such a framework, integrating eaters, food and food order and provides a full chain approach to understand food system issues. Let us review the real status of global food system from the three perspectives of eaters, food and food order.

I. Eaters

Hunger, obesity, and malnutrition are three major challenges. The UN Statistics review: First, hunger. There are as many as 820 million people suffering from hunger worldwide because of the wars and the conflicts, natural disasters and the failed administration. The tendency is not showing a sign of declining. In the following text, you may

see the differences of statistics that also shows how difficult to collect accurate information from international society. Second, obesity. There are more than 800 million people. They are obese, both adults and children. The number of obesity is still growing. The annual medical cost for treating diseases caused by obesity is as high as \$2 billion every year. Third, hidden hunger. Over 2 billion people in the world suffer from hidden hunger. What is hidden hunger? Hidden hunger normally caused by lack of vitamin and minerals in human food. They are not hungry crowds, but those who cannot have nutritious food regularly. Obviously, our 8 billion eaters are really not in good shape and the trend of development is worrying.

II. Food

First, crops. 80% of food come from agricultural crops. Our ancestors used to cultivate as many as 6,000 kinds of crops for food. Now, 66% of our total food production come from only nine kinds of crops. Our biodiversity is losing dramatically. Second, soil. The soil degradation has drastically reduced the nutrients in soil which support the growth of food crops. Soil pollution is hazardous to both plants, animals, and human beings. Every five seconds, a piece of land with the size of a football playground is either eroded or polluted. Third, safety. According to FAO and WHO statistics, every year over 600 million people fell ill with polluted food. 420,000 died as a result. Fourth, waste. Over 30% of the food produced worldwide are either being damaged and lost during the process of harvesting, transportation and storage or wasted at family homes, restaurants or retail shops. The disposal of the food wasted release 10% of the global greenhouse gas emission. Obviously, our agricultural activities and food consumption are not sustainable. And these global challenges require urgent solution.

III. Food order

The first challenge is social injustice. In last UN SDG report, it shows over 800 million people suffer from hunger to various degrees and 2.2 billion people lack of safe drinking water. And 3.4 billion people have no safe sanitary facilities. Although the food produced in the world is more than enough for everyone, however, there are still many people go to bed with empty stomach. Our food distribution system is wrong. The second challenge is insufficient financing. As the global development suffers from insufficient financial support, the global military spending last year reached alarming \$2.7 trillion. This amount of money is 750 times of that of United Nations regular budget and 13 times of OECD's developments assistance. However, the eradication of global extreme poverty needs only \$300 billion. The third challenge is right to food. The International Covenant on Economic, Social and Cultural Rights 1966 confirms the legal status of the right to food as a basic human right. However, thereafter, when a draft resolution containing the right to food is the basic human right is being debated in the United Nations, a few countries either vetoed or voted against the draft resolution. They did that on several occasions. A UN member state is imposing collective punishment on the Gaza people by cutting off the UN supply of food and drinking water to the refugees, thus committing antisocial and war crimes to deprive innocent people of food and drinking water is also used as means of war in regional conflicts. The antisocial and anti human act should be denounced by the entire international community.

The United Nations offered a comprehensive review of implementation of the 17 SDGs in the world by 2025. Only 35% of SDGs are being implemented on schedule or with a moderate

progress. Nearly half of SDGs are behind schedule, and some SDGs are in regress. Secretary General Antonio Guterres emphasized it is most urgent to change the way of production and the consumption to reduce greenhouse gas emissions.

The transfer and reform of world food systems will not only need efforts of United Nations and related agencies and organizations, but also collective support and efforts of all countries and the people. In recent years, President Xi Jinping put forward successively the concept of a human society community with a shared future, and four important global initiatives, offering Chinese wisdom and solution to address the current difficult and urgent issues that is facing in the fast changing world.

In 2021, President Xi put forward in the United Nations General Assembly, the global development initiative known as GDI, urging the global community to join efforts in implementing the SDGs. There are more than 80 countries which have joined the group of GDI friends in the UN. In 2022, President Xi proposed at the Bo'ao Forum for Asia, a the global security initiative known as DSI, offering a roadmap for actions to safeguard common security. DSI has been supported by more than 130 countries and international organizations. In 2023, President Xi put forward in Beijing, the

Global Civilization Initiative known as GCI, which was widely received. In 2024, the United Nations General Assembly designated International Day for a dialogue among civilizations upon the Chinese request. In 2025, President Xi Jinping proposed at the "Shanghai Cooperation Organization +" meeting in Tian Jin, the Global Governance Initiative known as GGI, offering Chinese suggestions for global governance. GGI has been welcomed and supported by over 140 countries and organizations.

Shiology, founded by Mr Liu Guang Wei, a brand new theory which is interdisciplinary and cross cutting, has broken academic limitations, offering a new perspective in reviewing the global food system and a new comprehensive solution to world food challenges. The improvement and implementation of Shiology will help the transformation and the reform of the global food system and thus contribute to the global sustainable development and effective global governance. The food shortage and health problems have been haunting the human beings for thousands of years. By working together, our generation might be able to put an end to this unjust and unreasonable dilemma and achieve the real sustainable development of human beings.



Synergistic Action for Food Security and Public Health: Advancing the SDGs Beyond 2030

Zhu Juwang

(Director, Division for Public Institutions and Digital Government, and Officer-in-Charge, Division for Sustainable Development Goals, United Nations Department of Economic and Social Affairs)

Abstract: The 5th World Shiology Forum focuses on the Sustainable Development Goals (SDGs) related to food and health. Based on the core topics of this forum, this article explores the solutions to hunger and public health issues. Despite global progress in implementing the UN 2030 Agenda for Sustainable Development, 673 million people worldwide still experience hunger, with cascading impacts on health, education, and livelihoods. Eradicating hunger requires a multidisciplinary, holistic approach that leverages synergies from integrated SDG actions. The holistic principle of shiology, emphasized by the UN Secretary-General, provides a guiding framework for advancing SDG implementation. Mobilizing new resources for synergistic action remains a critical priority for global collaboration.

Keywords: shiology, SDGs, synergistic action, food, health

The 5th edition of the forum focused on food and health related SDGs represents a continued effort to address critical global challenges aligned with the UN 2030 Agenda for Sustainable Development. The UN Department of Economic and Social Affairs (UN DESA) has supported this forum over successive years, and the convening of this session reinforces attention to the interdependencies between food security, nutrition, and public health—core pillars of the SDGs.

I. Holistic Approaches to Eradicating Hunger and Advancing Public Health

As the UN Secretary General highlighted in his message to this current forum. While there has been encouraging progress, an estimated 673 million people across the world still suffer

hunger, with multiple implications for their health, education, lives and livelihoods. To end hunger, we must implement a multidisciplinary, holistic approach, harnessing the potential synergies from integrated SDG actions and interfaces. This has been a critical lesson learned through a decade of implementation of the UN 2030 Agenda for Sustainable Development. Among other actions, this means investing in sustainable agriculture, improving diet and nutrition and enhancing water use efficiency, reducing deforestation and pollution, and supporting climate friendly farming practices. Furthermore, we must also advocate these through other incentives, from school meal plans to care of older persons, from better access to public health education to enhanced food nutrition and health interfaces.

II. Shiology and Implications for SDG

Implementation

This holistic principle of shiology, as pointed out by the UN Secretary General, can help light the way forward, as we at UN DESA support

member states in strengthening implementation of the SDGs, while also looking beyond 2030. We look forward to working with you all to identify and harness new and additional resources for synergistic action in combating hunger and poverty and in improving public health and well being.



Shiology as a Holistic Framework for Addressing Food System Complexity

Tom Heilandt

(Senior Advisor of World Shiology Forum, Former Secretary of the FAO/WHO Codex Alimentarius Commission)

Abstract: This article, based on one of the opening speeches to the fifth WFS, explores the value of Shiology in transforming global food systems: systemic understanding, holistic thinking, and a human-centered approach centered on “Eater Needs”. The Global Food Systems & SDGs Report provides a framework for designing optimized food systems which is evermore urgent as the 2030 deadline for the UN SDG approaches.

Keywords: Shiology, Food systems, Eater Needs, SDGs

Introduction

The 5th World Shiology Forum convened in Hainan provided a critical platform for advancing discourse on global food system reform. The United Nations have been dealing with food issues for over 8 decades ranging from hunger eradication to healthy diets and sustainable production and consumption. The experience of the successes and failures of this work underscore in my opinion three core tenets of food system management: the power of asking the right questions, the importance of enlightened standards, and the need to embrace complexity while never losing sight of the human being—the eater—at the center of all food systems. I continue to be convinced that Shiology is the way forward to serious food systems transformation because it triggers us to change the way we think about food as the Secretary General of the United Nations asked us to do when he first launched the United Nations

Food Systems Summit.

Global Food Systems & SDGs Report: A Tool for Food System Transformation

I have been involved in Shiology since the 4th Forum in 2023. The Hainan Initiative was a milestone in the furthering of Shiology in China and the world. In 2025, entering a new chapter in my professional life allows me the freedom to work across boundaries and to connect knowledge with action in fresh, creative ways. I am honored that one of my first contributions in this new phase was as an advisor to the Global Food Systems & SDGs Report, which we are launching together today. Many of you also took part in this work. The report is more than just an assessment—it is a tool for transformation, with the power to change food systems and the world. It takes seriously the idea that we cannot fix food systems unless we understand them—fully and systemically. It names five fundamental needs of people as eaters—what we call the Eater Needs, and it gives us a way to

design better food systems around them.

Shiology: A Holistic Response to Food System Complexity

We need these new concepts because now, we are a bit lost. Just as I was recently when I unsuccessfully tried to navigate Hong Kong. In retrospect I realized why: I had relied on two dimensions where the complexity of the space would have needed three. Food systems are complex—the United Nations and its different agencies, countries, NGOs and industry have been looking at different dimensions of these systems but not in a holistic way. In the words of the Secretary-General of the United Nations: ‘The holistic

principles of Shiology can help light the way.’ This is not just a message of encouragement—it is a recognition that what we are doing here matters at the highest level.

We are now five years from 2030. If we want to change food systems, we must change the way we understand them. Shiology has the tools for that and has just added a new one with the Global Food Systems & SDGs Report.

Let us work together to turn this understanding into action—in policy, in education, in our communities, and in practice in our existing networks and the networks we build through Shiology.

02

Advancing Global Governance through Shiology 以食学推动全球治理

2025年10月29日 10:00~11:30

[CN] “食事”治理需要“食学”支持

[IR] Perspectives on Agricultural Heritage Systems and Food Heritage

[CN] 食学视角下全球食物系统的生态治理路径

[CN] 食学引领下的全球食事治理体系构建

[CN] 共票:数字信任机制赋能全球食事治理的新范式探索

[BR] Poverty, Food Security and Health Promotion Policies in Brazil



“食事”治理需要“食学”支持

杨小波

(第十四届全国政协委员, 民族和宗教委员会委员)

摘要: 食学作为以人类食事问题为研究对象的完整知识体系, 整合了碎片化的食事认知, 实现了从区块化到整体化的认知升级。本文基于第五届世界食事论坛“以食学整体解决食物系统问题”的核心主题, 探讨食学理论在全球食事治理中的价值与实践路径。研究指出, 食学理论需落地实践。本届论坛依托食学框架, 联合百余个国家编制《全球食事系统与可持续发展(SDG)研究报告》, 梳理出89个与13项可持续发展目标相关的核心食事问题并提出治理建议, 为全球食事治理难题的系统解决提供了中国智慧与实践方案。

关键词: 食学, 食事治理, 食事问题, 实践, 可持续发展

10年前, 联合国193个成员国一致通过了《2030年可持续发展议程》, 从社会、经济、环境三个层面, 提出17个可持续发展目标, 展现了全球80亿人的共同愿景。现在, 距离实现这项全球行动计划, 还有不足五年时间, 却仍有许多问题没有得到解决。

继全球发展倡议、全球安全倡议、全球文明倡议之后, 今年9月, 中国习近平主席又提出了全球治理倡议。四大倡议分别从发展、安全、文明、治理四个维度, 为应对全球性挑战、推动构建人类命运共同体提供了中国方案。与此同时, 中国为助力实现联合国可持续发展议程, 不让一个国家掉队, 作出不懈努力和重要贡献。

在17个可持续发展目标中, 有13个目标与“食事”密切相关, 如果食事问题解决不好, 2030年可持续发展议程就难以实现。因此, 关乎人类生存发展大计的“食事”, 已成为全球治理的必须关注的重要领域。而全球治理倡议强调的“奉行主权平等”“遵守国际法治”“践行多边主义”“倡导以人为本”“注重行动导向”五个原则, 则为世界食事问题的全球治理指明了方向。

本次论坛的主题为“以食学整体解决食物系统问题”, 就此谈两点认识:

一、“食事”问题, 需要“食学”理论帮助解决。

“食学”, 是以人类的“食事”问题为研究对象、揭示人类食事客观规律的知识体系, 它将食物获得、食者健康、食为秩序三个方面统一起来, 把目前分属于不同学科的碎片化、割据化的“食事”认知整合起来, 形成一个能够覆盖所有相关“食事”问题的完整知识体系, 有助于推动人类的食事认知从“区块化”迈向“整体化”, 为实现世界食事的全局治理、实现人类食事问题的系统解决, 提供了来自中国、属于全球的公共知识产品。目前, “食学”学科的建立, 已得到中国教育部门的肯定和支持。

二、“食学”理论,需要付诸“食事”具体实践。

理论来自实践,指导实践,并在实践中得到检验。理论不是用来做装饰的,而是用来解决实际问题的。

两年前,在第四届世界食事论坛上,联合国秘书长古特雷斯先生在致辞中指出:“我们正面临全球性的食物危机。全球有7.8亿人在忍受饥饿,超过30亿人无法负担健康的饮食。与此同时,生产的食物中有三分之一丢失或被浪费。”“我们迫切需要变革我们的食物系统,使其更具可持续性、公平性和适应性”,需要“建立以人为本、利益次之的体系”。这些认识,很重

要。这些认识,需要转化为行动。

本届论坛直面问题,由“食学”到“食事”,将认识付诸实践,以“食学”理论框架为引领,与100多个国家合作,编制出《全球食事系统与可持续发展(SDG)研究报告》,统筹考虑“食者、食物、食序”三个方面,全面关注人类的食温饱、食丰富、食安全、食长寿、食持续需求,系统梳理出与13个可持续发展目标相关的89个重要“食事”问题,并从现象、原因、危害、应对四个维度进行分析,提出“国家问题与治理策略”“构建全球食事治理体系”等意见建议,为系统解决人类面临的重要食事问题提供有力支持,为破解世界食事治理难题贡献新的智慧。

“Shiance Governance” Requires the Support of Shiology

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Abstract: Shiology, as a comprehensive knowledge system focusing on human shiance issues, integrates fragmented shiance cognition, achieving a cognitive upgrade from fragmented to holistic perspectives. Based on the core theme of the 5th World Shiology Forum—“A Holistic Approach to Addressing Food System Challenges through Shiology”—this article explores the value and practical pathways of Shiology theory in global shiance governance. The article indicates that shiology needs to be translated into practice. Leveraging the shiology framework, this year’s Forum collaborated with over a hundred countries to compile the Global Food Systems and SDGs Report, identifying 89 core food issues related to 13 Sustainable Development Goals and proposing governance recommendations. This provides Chinese wisdom and practical solutions for systematically addressing the challenges of global shiance governance.

Keywords: Shiology, Shiance Governance, Shiance Issues, Practice, Sustainable Development



Perspectives on Agricultural Heritage Systems and Food Heritage

Parviz Koohafkan

(President of World Agricultural Heritage Forum)

Abstract: Global food systems today face unprecedented pressures that threaten both human well-being and planetary health, calling for holistic and culturally rooted solutions. Drawing on over 30 years of experience this article focuses on core challenges in the global food system, the value of the Globally Important Agricultural Heritage Systems, and the practical efforts of the World Agricultural Heritage Foundation. Featuring China as a key example, the article aims to provide insights for building a sustainable agriculture and food system.

Keywords: Globally Important Agricultural Heritage Systems, sustainable food system, dynamic conservation

Grounded in over three decades of experience on sustainable development and agricultural heritage initiatives at FAO, this article will delve into the systemic challenges plaguing the global food system, unpack foundational agricultural heritage frameworks and their implementation, and explore targeted practical efforts to build a sustainable future.

I. The Challenges of the Global Food System

Having worked in FAO for almost three decades and had been the task manager of Agenda 21 from the beginning of the UN's work on sustainable development—particularly on sustainable food systems—I would now like to address several points that were previously raised during the first session.

One of the key challenges facing the current global food system is the rapid increase in

population, which now exceeds seven billion, with nearly half of them living in urban areas. Many rural regions have experienced significant depopulation. According to FAO, in the cities, nearly one billion people have insufficient nutrition, too little to eat, while over 1.6 billion individuals who face food insecurity.

Public health problems are among the biggest challenges of the food system nowadays. The dietary shift among younger generations towards fast food, often replacing shared familial meals, correlates with escalating obesity rates. This trend is evident across diverse national contexts, including China, the United States, the United Kingdom, and Thailand. But as it was said this morning, we need an urgent work to do on a sustainable food system, including more human and in harmony with nature, biologically and culturally diverse, a smaller scale, family operated and economically viable for smallholder, small

scalefarmers, socially just and participatory decision making, local production with more direct farmer-to-consumer links, and community-based recognizing the rights of local and indigenous communities and farmers. This is a very important outline.

II. The Origin and Vision of GIAHS

The Globally Important Agricultural Heritage Systems (GIAHS)—which I established in 2000, at the time I was the task manager of Agenda 21 at FAO and one of the pioneering countries to collaborate with FAO on this effort was China. At that time, we worked particularly on the rice-fish system, which is one of the most unique traditional agricultural systems in the world.

The definition of the Globally Important Agricultural Heritage Systems (GIAHS) is remarkable landuse systems and landscapes which are rich in biological diversity evolving from the ingenious and dynamic adaptation of a community/population to its environment and the needs and aspirations for sustainable development (FAO, 2002). These systems include agriculture, forestry, fishery, and livestock. These systems are a result of the co-adaptation and co-evolution of humans and related landscapes under a specific environment, and are managed through adapted social, technical, and cultural practices. They are primarily family farming and smallholder systems. They are important at the local, national, and global levels.

The most important part of Globally Important Agricultural Heritage Systems is diversity—ecosystem diversity, biological diversity, socioeconomic diversity, cultural diversity, culinary diversity, and curative diversity. These are all part of our traditional systems. Globally Important Agricultural Heritage Systems bring culture into agriculture, and food culture is one of the very important parts of agriculture. They also

connect the global to the local and the local to the global—because now, there are a lot of farmers who actually sell their products and services directly at the global level. These are examples of agricultural heritage that we nominated very early; it's a big program of FAO now. And during the anniversary of FAO's founding, there has been a lot of discussion about agricultural heritage systems.

At this moment, there are 102 Globally Important Agricultural Heritage Systems recognized by FAO in 30 countries, with further expansions anticipated.

The strategic objectives of Globally Important Agricultural Heritage Systems are identification, selection, and recognition of Globally Important Agricultural Heritage Systems and their communities by FAO. At the national level, it involves capacity building in policy, regulatory, and incentive mechanisms to safeguard these systems. At the local level, it means empowering local communities to continue maintaining these systems.

III. WAHF Support to Promote Sustainable Food Systems

The World Agricultural Heritage Foundation—I created this after my retirement from FAO in 2013. Since then, the Foundation's mandate centers on supporting the promotion of the indispensable role of family farming and smallholder farming communities and all other stakeholders in promoting sustainable food systems, in particular about dynamic conservation of traditional, evolving agricultural heritage systems.. It is Globally Important Agricultural Systems. These are some of the examples around the world: Morocco Philippines, China, Chile, Peru, Iran. Ongoing initiatives prioritize food labeling, sustainable tourism, and niche markets—not only in China, Japan, Italy, and Chile, but also in other countries.

There are many products and services that are already labeled as Globally Important Agricultural Heritage System products and services.

After a couple of years at the World Agricultural Heritage Foundation, we continue our work to connect food and agriculture (both agricultural and food heritage). China is one of the most interesting and important examples of dynamic conservation of agriculture heritage in the world.

One of our works that we started some years ago and continue to do is geo-referencing and geo-tagging farmers' heritage through Ag Legacy—an application, which we use in many countries. It is essentially not only limiting the farmers, farmers' farm but the products and services. Now, Ag Legacy has been used in Italy and France for

working on food heritage systems. The platform enables farmers themselves to document their heritage, agricultural production, and related activities directly in the field. I have also written a book titled “Forgotten Agricultural Heritage: Connecting Sustainable Development,” which has been translated into Chinese and is available through digital platforms. This book provides a unique examples of forgotten agricultural heritage and is based on objective scientific evaluation and evidence of the value of these systems for present and future sustainable food and agriculture.

Finally, the future of sustainable agriculture and food system lies in necessitating an integrated approach paradigm that brings together nature, culture, and the communities where people live in.



食学视角下全球食物系统的生态治理路径

尹伟伦

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摘要: 本文基于习近平总书记“绿水青山就是金山银山”的生态文明理念与全球治理体系建设倡议, 聚焦食物系统失衡引发的生态与文明发展挑战, 提出以食学这一交叉学科为理论框架, 从重建生态导向的食物系统评估体系、强化国际协作网络、推动公众参与及共建食学学科体系四个维度, 构建“人—食—地球”共生的治理路径, 旨在为全球食物系统的可持续、公平与韧性发展提供理论支撑与实践方案

关键词: 食学, 食物系统, 生态文明, 可持续发展, 食事问题, 全球治理

第五届世界食事论坛围绕“以食学应对全球食物系统问题”这一核心议题, 探索全球治理下食物系统的核心挑战与破解路径。食物系统, 不仅关系到个体的温饱与健康, 更关乎文明的可持续与人类的未来。

正如联合国秘书长古特雷斯所言, 全球三分之一的温室气体排放、七成的淡水消耗, 以及超过六成的陆地生物多样性丧失, 都与食物系统密切相关。我们赖以生存的食物系统, 正在成为地球生态失衡的重要根源。

面对这一现实, 习近平总书记曾明确指出:

“绿水青山就是金山银山。”这不仅是中国生态文明建设的核心理念, 也是对全人类可持续发展的深刻启示。它告诉我们: 经济发展不能以破坏生态为代价, 人与自然的和谐共生才是真正的富裕与安全。

然而, 在当今全球范围内, 农业扩张、单一化种植、过度使用化肥与农药、以及大量食物浪费, 仍在侵蚀土地与水体, 削弱生物多样性, 破坏生态系统的自我修复能力。这意味着我们不仅面临“吃得够不够”的问题, 更面临“吃得是否可持续”的挑战。

要解决这一结构性难题, 我们需要新的思维框

架。习近平总书记提出了“全球治理体系”的倡议, 为食事问题的全球治理提供了方向, 也为推动人类食事科学与可持续发展指明了方向。

食事问题是全球治理的一个重要领域。如何全面认知食事问题, 是食事问题全球治理的关键前提。如何把治理原则转化为具体的行动体系, 正是食学科学体系努力探索的方向。

食学并不是要重新定义生态科学, 而是“以人为本, 以食立学”的系统性视角, 把生态保护、食物安全、人类健康与社会秩序重新连接起来, 建构了一个跨多个学科门类的交叉科学。它提醒我们: 保护生态, 就是守护人类的食物未来; 调整饮食结构, 也是减碳与恢复自然的过程; 追求食物与每一个肌体的耦合度, 就是人人健康长寿的法则; 食事问题的全球治理, 首先需要一个覆盖全球食事学科, 然后才能转化为具体的有效的行动, 这就是食学的价值所在。

因此, 推进食物系统的生态治理, 至少应从四个方面努力:

第一, 重建评估体系。

将生态指标纳入食物系统绩效, 不仅要“从田头

到餐桌”,还要“从餐桌到胃肠”,更要“从胃肠到厕所到田头”。衡量每一个国家、每一项政策的“生态盈亏”。这就是食物系统与人体肠胃、与物质的循环利用。这种物质的传递就是能量守恒、循环利用的典型模式。例如FAO官员提到的哈尼斯梯田上千年的文化、水稻养鱼等生物多样性共生的传统农业文明,就是可持续的优秀典范。中华民族农耕文明的历史延续到今天,经验值得我们借鉴和传承。

第二, 强化国际协作。

通过开放数据与规则衔接,推动绿色贸易、生态补偿与可持续投资,共建一个互信、互助、共赢的食事问题的全球治理科学网络。

第三, 推动公众参与

绿色转型离不开文化和教育,大力发展食学通识教育。让每一个人都能吃出健康和长寿,让“节约每一粒粮食、珍惜每一滴水”成为社会共识,也让“可持续饮食”成为一个科学的生活方式,得到大家的推崇。让

我们世代相传起来,让人类与地球生态系统永远和谐共生,使我们健康长寿的目标得以实现。

第四, 共建食学体系

积极参与食学的研究,以食学为理论,树立食者、食物、食序“三合一”的认知理念,把食者、食物、食序问题统筹起来治理。以食学为桥梁,推动生态、经济与社会协同治理,形成“人一食一地球”的共生结构。这就是生态与人可持续生存发展共同需要走的和谐之路。

生态出现问题的根本,是人与自然关系的失衡。当我们重新理解“吃”的意义,就会明白:饮食不仅是生存的行为,更是文明的选择。

让我们携手行动,以“绿水青山就是金山银山”的理念为底线,以“共商、共建、共享”的全球治理精神为方向,以食学为桥梁,推动一个更加可持续、公平、韧性的世界食物系统,让人类的餐桌与地球的生态,在同一个循环中永续共生。

Eco-Governance Pathways for the Global Food System from the Perspective of Shiology

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Abstract: Based on President Xi Jinping's ecological civilization concept that “lucid waters and lush mountains are invaluable assets” and the initiative for building a global governance system, this article focuses on the ecological and civilizational development challenges caused by the imbalance of the food system. It proposes taking Shiology, an interdisciplinary discipline, as the theoretical framework, and constructs a governance path for the symbiosis of “human-food-earth” from four dimensions: reconstructing an ecology-oriented food system evaluation system, strengthening the international collaboration network, promoting public participation, and jointly building the Shiology discipline system. This aims to provide theoretical support and practical solutions for the sustainable, equitable, and resilient development of the global food system.

Keywords: Shiology, food system, ecological civilization, sustainable development, shiance issues, global governance



食学引领下的全球食事治理体系构建

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摘要: 全球食事问题作为全球治理的核心议题, 深度关联联合国17项可持续发展目标(SDG)中的13项。本文围绕全球食事问题治理的核心议题, 论述了食事治理在全球治理体系中的重要地位。文章提出, 作为从整体视角认知食事问题的跨专业学科, 食学可为优化全球食事治理提供理论依据与实践框架。本文基于中国在食学领域的开创性研究与国际实践, 提出全球食事治理体系构建的具体建议: 推动食学纳入联合国教科文组织学科体系、推动建立国际食事治理标准化技术委员会、推动世界食事论坛成为联合国的相关会议。通过上述路径, 旨在构建科学高效、公正合理的全球食事治理新架构, 为实现零饥饿、健康膳食、环境可持续等全球发展目标提供重要支撑。

关键词: 全球治理, 食学, 食事治理, 世界食事论坛, 标准

第五届世界食事论坛以“以食学整体解决食物系统问题”为主题, 体现了世界食学研究不断深化, 食事交流不断升华, 食事合作不断发展。

2025年9月1日, 中国国家主席习近平在“上合组织+”会议上提出了全球治理倡议, 推动构建更加公正合理的全球治理体系, 携手迈向人类命运共同体。我理解, 食事问题是全球治理的重要内容, 推动食事治理的进程, 也是落实全球治理倡议的重要支点。

我们生活在同一个地球上, 食事是世界文明发展的基石, 是全球安全发展的保障, 更是人类可持续发展的前提。联合国可持续发展目标(SDG)共有17项, 与食事问题相关就多达13项, 其中, 零饥饿、消除贫困、减少不平等问题是关注的重点。吃饱吃安全是人类基本人权, 但是至今并未全面实现。现在依然有6.8亿人吃不饱, 20亿人吃出过食病, 30亿人受食品安全的威胁, 但同时又有三分之一的食物被浪费。因食物资源分配不均引发的冲突不断, 人与自然生态的矛盾日益加剧。这些食事问题始终困扰着世界。全球食事治理体系的构建, 包括食学科学研究、食事发展谋划,

以及与之相关的系统治理, 正在成为全球各国越来越重要的议题。

中国有一句历史名言, “洪范八政, 食为政首”。解决好食事问题, 是治国理政的头等大事, 也是全球治理的头等大事。食为政首, 就要科学严谨地做好食事治理的顶层设计, 要精准把握和循序推进食事治理的路径, 要兼顾公平与效率, 并惠及人类整体和每一个个体。围绕全球食事治理体系的构建, 我提出以下三点建议。

一、推动食学纳入联合国教科文组织学科体系

20世纪90年代, 中国学者刘广伟开启了食学研究的大门。食学是从整体视角认知食事, 并将理论与实践相融合的学科。它从食者需求、食物获取、食事秩序三个维度, 提出了整体治理的新理论, 在此基础上创建了食学科学体系, 以更有效地应对全球性粮食危机、营养失衡等问题, 更有力地推动粮食生产的绿色

转型和粮食贸易的通畅便利,更好地促进人与自然和谐共生,更科学地解决社会、经济、环境的协同发展。

食学对食事的整体观察、对食事问题整体解决的研究成果,引发了学界、科技界、产业界、教育界、社会媒体及国际组织的广泛关注。2015年,北京东方美食研究院率先成立了食学部;2017年,世界食学论坛(后更名为世界食事论坛)正式设立,并先后在中国北京、日本大阪、土耳其伊斯坦布尔、中国海口成功举办;2024年5月中国人民大学成立食学研究中心,同年8月中国教育部正式批复支持自主设置食学一级交叉学科。在本届论坛上,意大利比萨大学和中国人民大学还将签订在意大利联合开设食学中心的协议。

食学知识体系的构建与创新实践,需要持续开展系统性研究。基于食学在中国的创建与发展,以及世界不少国家的相关研究,需要加快推动使其成为全球公共产品,成为人类文明共同成果。为此,建议论坛组织方择时起草《将食事列入世界知识体系》的文稿,经过充分讨论形成共识,并以论坛名义报送联合国教科文组织。

二、推动建立国际食事治理标准化技术委员会

标准化是推动全球经济社会发展的重要支柱,是技术创新转化为生产力的最佳途径,是国际治理规则的重要组成。现阶段,标准化已从技术范畴快速拓展到经济管理、国际贸易、绿色低碳转型,乃至社会治理方方面面。运用好食学知识体系,推动产业发展和社会治理,需要充分发挥标准化的作用。

联合国粮农组织(FAO)和世界卫生组织(WHO)从食品供给和健康维度,制定了包括水果、蔬菜、鱼虾、饲料等部分食品的安全质量标准。国际标准化组织(ISO)设有食品安全管理标准(ISO 22000),明确了食品安全管理的共性要求。国际贸易与标准组织正在研制关于食学知识体系的技术标准。上述标准都很重

要,但从全局性、长远性、高效性的维度认知,我们更需要构建以食学知识体系为基础的,涵盖食物获取、反映食者需求、优化食事秩序的整体性、系统性标准体系,形成以体系化标准引导消费者对高品质饮食的追求,规范相关产业的高质量发展,支撑和引领全球食事治理的不断优化。

为此,建议以世界食事论坛秘书处为依托,在论坛机制下设立与食学知识体系创建相适应的国际食事治理标准化技术委员会。

三、推动世界食事论坛成为联合国的相关会议

迄今为止,世界食事(食学)论坛已经举办了五届。参与国家越来越多,参会专家越来越广,云集了学术研究、科技教育、企业产业、社会组织以及政府相关部门的代表。论坛正在成为传播先进知识、交流科技成果、推动食事治理的重要平台,获得了联合国有关部门的关注支持。第四届、第五届论坛,联合国秘书长古特雷斯都发出专门致辞,并委托联合国有关机构派出专门代表参会。联合国前秘书长潘基文还为本届论坛的主报告撰写了前言。

联合国是政府间国际组织,宗旨是维护国际和平与安全、发展国际合作,以解决经济、社会和文化建设等问题,并促进全球人权和基本自由的尊重。世界食事论坛与联合国宗旨全然契合。当前全球食事治理面临多重挑战,减缓饥饿、保护健康、增加产能、绿色转型、促进创新、协同治理等重大问题亟待凝聚更多共识,形成更多共同目标,产生更具效率的协调行动。为此,建议共同推动世界食事论坛成为联合国的相关会议。

食学是跨专业学科,需要跨领域合作研究;食事则是跨产业跨国界架构,需要跨域合作治理。让我们一起努力,共建全球食事治理的新局面,共创人类文明的新成果!

Constructing a Global Shiance Governance System under the Guidance of Shiology

Zhang Gang

Former Counselor of the State Council; Member of the National Manufacturing Strategy Advisory Committee

Abstract: As a core issue in global governance, the global shiance issues are deeply interconnected with 13 of the 17 United Nations Sustainable Development Goals (SDGs). This article discusses the central role of shiance governance within the global governance system, focusing on key issues related to the governance of global shiance issues. It proposes that Shiology, as an interdisciplinary field that provides a holistic perspective on shiance issues, can offer a theoretical basis and practical framework for optimizing global shiance governance. Based on China's pioneering research and international practices in the field of shiology, this article puts forward specific suggestions for building a global shiance governance system: promoting the inclusion of Shiology in the UNESCO disciplinary classification system, advancing the establishment of an International Technical Committee for Shiance Governance Standardization, and facilitating the recognition of the World Shiology Forum as a United Nations conference. Through these approaches, the aim is to establish a scientific, efficient, equitable, and rational new framework for global shiance governance, thereby providing critical support for achieving global goals such as zero hunger, healthy diets, and environmental sustainability.

Keywords: Global Governance, Shiology, Shiance Governance, World Shiology Forum, Standards



共票:数字信任机制赋能全球食事治理的新范式探索

杨 东

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摘要: 全球食事治理面临粮食安全、食品安全、可持续发展等多重挑战,传统监管模式存在激励不足、信息不对称等短板。本文立足食学“食者—食物—食序”三位一体理论框架,提出基于区块链技术的“共票(Coken)”创新机制,通过数据确权、价值激励、多中心共治,破解食事全链条治理难题。研究阐述了共票机制在食品溯源透明化、智能合约奖惩、跨域协同治理三大应用方向,结合中国人民大学食学研究中心的实践探索与浙江“中国数谷”等落地案例,验证了该机制在降低治理成本、提升治理效率中的核心价值。共票机制为全球食事治理提供了技术与制度融合的创新路径,助力落实全球治理倡议与可持续发展目标(SDGs)。

关键词: 共票;食事;区块链;治理

自2017年刘广伟先生创办世界食事论坛以来,他系统推动了食学学科体系的建立与发展,使其逐渐获得国际认可。作为一名主要从事区块链与法律交叉研究的学者,本人近十年也在中国率先开展区块链理论研究与实践探索,提出“共票”(Coken)机制,致力于推动数据要素市场化与区块链技术应用。

在与刘广伟先生深入交流后,我深刻认识到,食学作为一门以“食者—食物—食序”为框架的交叉学科,与我提出的“共票”交叉科学理念高度相通。在我担任中国人民大学规划处处长期间,有幸邀请刘先生到校交流,并共同推动成立了食学研究中心。此后,我们围绕区块链技术、全球治理法律框架以及“共票”机制,开展了持续而深入的合作。

我本身深耕法学领域,也是较早关注人工智能、区块链技术对全球治理及食品安全影响的学者。中国人民大学法学院是国家市场监管总局唯一的食品安全协同创新基地,我们曾举办多场食品安全国际会议,这些实践与刘广伟先生的食学理念高度相通。

一、共票食事创新的中国自主理论探索

当前,全球食事治理虽已形成较为完善的架构、政策框架与协作机制,但仍面临诸多挑战:粮食安全、营养健康、肥胖问题、可持续发展等议题亟待破解,各国也不断遭遇新的食品安全挑战。现有治理模式仍需新理论、新概念的突破,而共票机制正是基于这一需求提出的创新方案。

共票机制的核心逻辑,是利用区块链技术解决食品全链条数据资产的确权、定价、交易与可溯源问题,通过凝聚共识、优化价值创造与流通分配,尤其是权益分配机制,为食事治理注入有效激励。食品全链条治理周期长、成本高,需全生态各方投入,仅靠联合国经费与传统监管模式难以覆盖,而共票机制恰好弥补了激励不足的短板——它如同“数据股票”,将食品生产、检测、运输等各环节的多元数据视为重要资产,通过区块链技术对数据价值进行标识、溯源与防篡改处理。

对于参与食品生产全环节的各方主体,共票机制会对其付出的劳动(包括数字劳动)进行精准确权,并以“共票”这一票证形式给予激励,无需直接投入现金,即可降低治理成本,鼓励全球各方参与饥饿治理、食品安全保障等人类共同事业。这一机制吸收了比特币等数字货币的工作量证明原理,结合中国数据要素市场化需求与劳动价值分配论,创新形成数据价值激励体系,可推动食品相关数据的合法化流通与跨行业流动。

二、机制逻辑:共票如何介入食事治理体系

2019年,我关于共票机制的著作《区块链与共票经济学:新经济时代》(2019)已在英国出版,并获得部分国际认可。这一技术与制度模式在食事治理中的应用,主要聚焦三大核心方向:

一是食品溯源与信息透明化。为每一批次食品的生产、检测过程生成上链共票凭证,由生产者、检测机构、运输方共同写入区块链,实现全过程数据不可篡改;消费者通过扫描二维码,可实时查看产地、检测报告等信息,破解跨国食品交易中的信息不对称问题。

二是智能合约驱动的激励与惩戒。企业提交合格检测数据并通过验证后,可自动获得共票积分;违规者将被自动惩戒,有效激励各方提供真实数据,降低政府执法成本、提升治理效率,推动食事治理从外部监管转向内生激励与自我监管,实现企业信用与信任机制的融合。

三是多中心共治架构的构建。通过区块链共票建立全球性共享账本,由多方共同维护,多节点可发行、验证与记录共票,实现各国食品安全数据互通;消费者可作为社会节点参与监督评价,形成高效协同的全球食事治理网络。

三、共票理论指导下的食事治理实践应用

过去七八年,我们与刘广伟先生开展了诸多有益探索:中国人民大学已形成基于区块链共票的数据服务模式;杭州高新区(滨江)“中国数谷”已采纳共票理论与概念,启动数据收益凭证登记工作——浙江“中国数谷”中大量农业、农产品相关数据,正通过共票机制实现数据要素的开发与利用,尤其借助大模型推动数据可视化处理。我们还与中国移动、光大银行、工商银行等机构合作,探索数据资产化路径,例如基于区块链的农村产业链数据共享机制,已有效服务于三农领域的数据价值创造、流通及跨境支付问题。

四、涉外法制大模型在食事全球治理中的展望发展

此外,我们研发的涉外法大模型,已在10月3日全球法治大会上启动,联合国教科文组织、国际统一司法协会等机构均参与其中。该大模型将助力全球食品相关数据的跨境流动与共享,服务中国企业“走出去”,推动中外食品产业链协同应对饥饿、贫困与食品安全问题。此次全球法治大会被誉为“法律界达沃斯”,吸引了近200位全球院校长、国际组织负责人及前政要参与,我们在大会期间举办了食品安全国际论坛。未来,我们希望与世界食事论坛携手,建立跨学科全球合作模式,包括共同开展亚太国际食品安全治理论坛,搭建融合大模型与区块链技术的全球食事治理新平台。

本次论坛计划成立数字人研究院,我本人也与中国移动合作研发了相关数字人与智能体,期待未来能与论坛开展全方位合作。

Coken: Exploring a New Paradigm for Global Food Governance Empowered by Digital Trust Mechanisms

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Abstract: Global food governance faces multiple challenges, including food security, food safety, and sustainable development. Traditional regulatory models suffer from shortcomings such as insufficient incentives and information asymmetry. Based on the tripartite theoretical framework of Shiology—"Eater-Food-Order"—this paper proposes an innovative mechanism called "Coken," which leverages blockchain technology. By enabling data rights confirmation, value incentives, and multi-center co-governance, it aims to solve governance problems across the entire food chain. The study elaborates on three major application directions of the Coken mechanism: transparent food traceability, smart contract-based rewards and punishments, and cross-regional collaborative governance. Drawing on the practical explorations of the Research Center for Shiology at Renmin University of China and implementation cases such as the "China Data Valley" in Zhejiang Province, the core value of this mechanism in reducing governance costs and improving governance efficiency is verified. The Coken mechanism provides an innovative pathway integrating technology and institutions for global food governance, contributing to the implementation of global governance initiatives and the Sustainable Development Goals (SDGs).

Keywords: Coken, Food Issues, Blockchain, Governance



Poverty, Food Security and Health Promotion Policies in Brazil

Walter Belik

(Deputy Director-General, Zero Hunger Institute)

Abstract: This article traces the historical evolution of food and nutrition security in Western contexts over the past eight decades, analyzing key thematic shifts from “hidden hunger” to the multidimensional framework of modern food security. It examines critical contemporary issues and argues that addressing these challenges requires systemic transformation of food environments, with public policy and technological innovation playing pivotal roles in fostering sustainable and healthy diet.

Food and nutrition security have emerged as enduring global priorities, shaped by historical, economic, and environmental dynamics. This paper provides an analysis of the evolving discourse on food security in Western contexts since the 1940s, highlighting paradigm shifts in conceptualization and policy responses. It further investigates contemporary systemic food challenges. The aim is to synthesize key insights into the structural determinants of modern food insecurity and propose avenues for systemic reform.

Keywords: Brazil, Food system, food security

1. A short rescue of 80 Years of Debates on Food in Western World

Back in the 40s, the big idea introduced by Josué de Castro, a brilliant Brazilian who became the first president of FAO, was the concept of “hidden hunger”. For him, hunger wasn’t just about low weight or high on a chart; it was also about missing micronutrients, which could point to malnutrition even if someone looked normal.

In the 50s, the focus shifted to a new Malthusian view. With economic growth and urbanization, fewer people were working the land, and more people needed feeding in the cities. That raised concerns about food supply. By the 60s, the proposed solution was land reform in Brazil. That’s when the push for agrarian reform as public policy

really began. During the 70s, the spotlight moved from food supply to distribution efficiency. Feeding cities meant improving logistics and modernizing supply chains, and that was the primary goal for a developing society.

Then came the 80s. Economic crises hit hard, inflation skyrocketed, and food prices went through the roof. In Brazil and across Latin American countries, we saw hyperinflation of over 1000 percent a year. Suddenly, the cost of living became the hot topic in food discussions. The 90s brought a wave of new liberal reforms. Government and international finance organizations started deregulating food markets, privatizing supply infrastructure, and dismantling public policies. As we entered the 2000s, global commitments like the Millennium Development Goals made fighting

hunger the top priority. Goal 1 was to cut hunger indicators in half by 2015, but the goal wasn't met. So in 2015, the Sustainable Development Goals raised the bar, setting the target of eradicating hunger by 2030.

More recently, the conversation has broadened. Now we talk about food security in terms of obesity, healthy diets, food monotony, environmental impact, and more.

2. Contemporary Challenges in Global

Food Systems

This historical evolution brings us to the issue of the “triple monotony” in our food system. First, agricultural monotony: out of over 400 edible plant species, our diets rely heavily on just six—soy, corn, sugarcane, rice, potatoes, and wheat. Second, in animal production, we mostly consume a few improved breeds raised intensively: cattle, pigs, poultry, and fish. And third, dietary monotony: people around the world are eating more and more of the same stuff.

Ultra-processed foods dominate diets in China, Africa, Europe, and the Americas. As we can see and based on statistical data, food production is up and yields are improving, but we are still concentrating on just few crops. Rice, corn, soy, and wheat make up 90 percent of global grain production and cover 700 million hectares. This is bad news for the environment.

The concept of “food environment” addresses these issues and has four pillars: production, costs and prices, rules and regulations, and the social and cultural context. Changing the food environment means changing the entire system, and public policies play a fundamental role. They can shape choices and prices, influencing how people buy food and eat.

The United Nations Food and Agriculture

Organization (FAO) data shows three levels of diet: a sufficient diet, an adequate diet, and a healthy diet—which is diverse and rich in fresh foods. Globally, the healthy diet costs four times more than a sufficient one, and 60 percent more than an adequate one. In Africa, 70 percent of people cannot afford a healthy diet. It's a difficult situation. Oddly enough, the income elasticity of healthy foods is lower than for ultra-processed foods. When people earn more, they are more likely to buy junk food than fresh produce. This shift towards unhealthy eating is driving global obesity. As undernutrition drops, obesity rises. Worldwide Sixteen percent of adults are obese—not just overweight. In Brazil, undernutrition is below 2.5 percent, but obesity has hit a staggering 26 percent, higher than China and the global average. You see that shopping habits and access to fresh food play a role. With rapid urbanization, traditional food markets are disappearing. Authorities worry about food contamination in street markets, so most people shop at supermarkets where ultra-processed foods are cheaper and more appealing. Also, urban folks eat out more, and restaurant and fast-food meals are not always the healthiest.

Mass production created a mass market. Huge volumes of standardized food bring economies of scale. In a market, with tight margins, speed, and efficiency matter—but that leads to dietary monotony.

Luckily, new tech like digital platforms and communication tools is helping break that mold. Producers and sellers can offer better quality foods tailored to local cultures and social groups. With flexible production systems, we can imagine a healthy and more inclusive future.

3. Conclusion

To conclude, here are the key messages. First, access to food is the most important factor in a

world where we already produce enough. That means physical access—markets nearby—and economic access—affordable prices. Second, technology lets us build short supply chains, reconnecting people with their food. We need to

reinforce the idea that food is not just a commodity. Third, digital platforms can help improve diets, but we need investment in quality certification, public regulation, regional strategies, and broad nutrition education programs.

03

Safeguarding Humanity's Table— Ensuring Sufficient, High-Quality and Safe Food for 8 Billion People

守护人类的餐桌让80亿人享有充足、
优质与安全的食物

2025年10月29日 14:00~15:40

[HU] Sustainability Impacts of Digitalisation of European Agriculture

[CA] Major National Shiance Issues in Canada

[BO] From Double Nutritional Contradiction to Food Sovereignty: Reimagining Bolivia's Food Systems from the Eater's Perspective

[TT] Trinidad And Tobago Country Profile And Snapshot of the Food Ecosystem

[PE] Food and Nutrition in the Andes based on native crops

[BH/MV/KZ/WS/NP/MX] Multidimensional Solutions for Food Supply Chains



Sustainability Impacts of Digitalisation of European Agriculture

Attila Jambor

(Head of Institute of Sustainable Development Corvinus University of Budapest)

Abstract: This paper presents key findings from a recent European Economic and Social Committee-commissioned study exploring the linkages between agricultural digitalisation and sustainability in the EU. Employing a multi-method approach, the study establishes a conceptual framework linking digitalisation to sustainability pillars. Literature-derived results indicate digitalisation drives productivity gains and resource efficiency, has dual labor market impacts, and correlates positively with farm profitability. The critical challenges are also revealed by case study and interview insights. The study concludes with six targeted policy recommendations, contributing to the academic discourse on agricultural sustainability and digital transformation.

Keywords: digitalisation, sustainability, agriculture

The article will present some key findings from the recent research on the linkages between digitalization and sustainability in the European Union.

The framework of the study

This research was commissioned by the European Economic and Social Committee of the European Commission and conducted in 2025, making the findings quite current. A multi-method approach was employed to explore these interlinkages, yielding several key insights.

First, we have reviewed more than 200 articles, literature and datasets to obtain our results. Second, we did many types of different interviews with key stakeholders in different countries. Third, we were

also analyzing four different case study countries where we were interested in the different angles of digitalization. We were working together with the consultancy company KPMG.

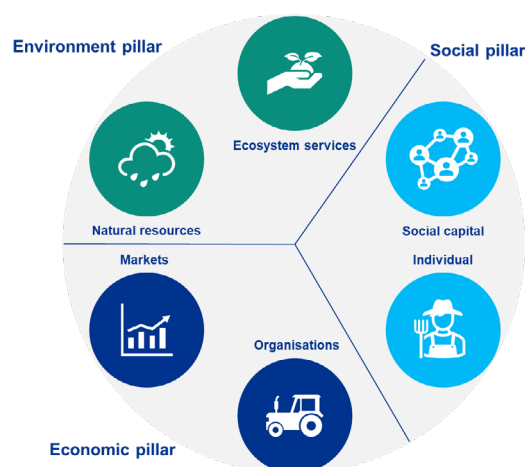


Figure 1 The assessed pillars of sustainability

The figure 1 shows the different dimensions of sustainability. It is kind of conceptual framework we used based on the literature review to conduct our studies. We actually identified two main topics under each pillar, which shows how sustainability and digitization are interlinked.

with each other. Digitalization is closely linked to higher return on investment and improved profitability, indicating a positive correlation between technological adoption and financial performance.

Table 1 The significant impacts of Digitalisation

	Crop production	Livestock	Horticulture	Irrigation
Productivity gains	•Yield increases by 10-15%	•Milk production 10-15% •Better weight gains and product quality in meat	•Higher yields •Increased quality and consistency	n/a
Input cost savings	•Reduced fertiliser and pesticide by 10-30% •Targeted spraying up to 90% •10% of fuel saving	•Feed waste reduced by 5-10%; •Energy use reduced by 35% with robotics	•Water saving by 20-30% •Reduced fertiliser use (between 18-33%)	•Commonly 20-40% less water usage, up to 50-75% water savings
Labour and efficiency	•Higher labour productivity	•Major labour reduction by automation (milking)	•Labour-intensive tasks partly automated (up to 20%)	•Automation reduces manual irrigation labour
ROI and profitability	•Positive in most cases, approx. +5%	•High, long-term ROI due to decreased labour saving and more and better output	•Generally positive and strong ROI, in some cases up to 78%	•High cost-effectiveness, typically full ROI in 1-3 years from water and energy savings

The table 1 shows the main results of the literature, which is actually highlighting a few important things.

Productivity gains and resource efficiency: Digitalization can lead to definite productivity gains. The literature indicates that adopting digital technologies is associated with higher yields and higher productivity, while also reducing resource use—a crucial advantage in our resource-scarce world.

Labor dynamics: The literature also shows that the impact of digitalization on labor is dual-faceted. While labor productivity may rise, overall labor demand could decline, which may pose challenges in rural areas.

Profitability: The literature shows that digitalization and profitability goes together in line

Key lessons learnt from case studies

Besides these basic issues, we have conducted some interviews with key European experts to better understand the background and the stories behind the literature, and we also found some interesting impacts and interesting conclusions.

First, data plays a vital role in modern agriculture. Yet in Europe, we still face a significant shortage of farm-level data. We are measuring lots of different things, but we even don't have the right data to make good policy conclusions. So digitalization should be developed. It is a valuable tool to enhance our data systems. Of course, these new technologies need to be told to farmers—a challenge on how to teach each and every farmer the advantage of digitalization, because some of them are very skeptical and some of them don't

want to use new technologies. However, if there are trainings or methods to teach them, including enough books and materials, farmers will recognize the advantages of digitalization.

Second, the difference between small and large scale farmers. In Europe, we have a high diversity of different farms. On the one hand, we have a large number of very small farms below a hectare. On the other hand, we have a small number of large farms. Therefore, in terms of agriculture policy, different types of farms need different policies. A one-size-fits-all approach would never work. Our case studies clearly show that context-specific policies are essential. The policymakers need to understand that they cannot create one single policy for digitalization in Europe. Policymakers must understand the context-specific issues, national conditions, and value-chain characteristics when designing digitalization strategies for agriculture.

Third, data access and trust emerged as further critical issues. Farmers in general, don't trust data providers. They do not know where they are, who will use their data, and for what reason they will use it. So trust is a very important thing here. If you want a mass amount of farmers to use digitalization, you have to understand that they need to trust you.

Key policy recommendations

Finally, the study led to six policy conclusions.

1. Establish and strengthen a dual investment approach targeting rural digital infrastructure.
2. Combine and promote synergistic investment incentives in digital technologies and renewable energy systems.
3. Design and strengthen tailored incentives schemes for smallholder farmers and young farmers to enable equal access to digital and green

innovations.

4. Tailor, strengthen and promote trainings, advisory support and digital capacity building activities for rural innovations.

5. Establish robust data governance frameworks to protect farmers' rights and ensure fair and transparent use of agricultural data.

6. Leverage agricultural data to strengthen CAP cross-compliance and quantify the environmental and economic impacts of digital agriculture measures.

In this article, I will highlight infrastructure development. There is a kind of public-private partnership which is needed. On the public side, there is a high need for a general infrastructure development at the countryside. At the farm level, farmers also have to invest into farms to modernize it with technology. Also, there are vulnerable groups in Europe, including small-scale and young farmers—only about 6% of European farmers are under 35. There is a high need for them to step up in this regard. In terms of the use of data, policymakers need to understand that they cannot make evidence-based policies without evidence actually. So there is a high need for more measurement and more indices at the farm level to understand how digitalization can contribute to sustainability.

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Major National Shiance Issues in Canada

Claude Caldwell

(Professor Emeritus, Faculty of Agriculture, Dalhousie University, Canada)

Abstract: This article outlines major agricultural and food issues in Canada, starting with its basic context. Key challenges include climate change, aging farming population, vulnerable food supply chains, and unhealthy dietary habits, along with corresponding national strategies. It also introduces Canada's New Food Guide (emphasizing balanced food choices and healthy eating behaviors). The conclusion notes U.S.-Canada trade tensions' impacts and highlights the role of convergent agroecology and shiology in achieving sustainable agri-food systems.

Keywords: Canada, agricultural and food issues, strategies, food guide

I. Canada's Basic Context

Canada is a fairly large country—the second largest by land area in the world. It has a very diverse landscape, much like China. But unlike China, Canada has a total population of about 41.5 million people, most of whom live near the United States border. Much of the northern area is sparsely populated, largely by Indigenous peoples.

II. Key Agricultural Challenges and National Strategies

1. Climate Change

The first is climate change. Its effects include droughts, wildfires, and unpredictable weather changes during growing seasons. As a country, we are taking a four-part approach to this:

On-Farm Climate Action Fund: helping farmers adopt more climate-smart management.

Agriculture Clean Technology Investment:

Funding to advance clean technology across our systems—from farm to consumer.

Living Labs Initiative: 14 living labs are set up across the country in cooperation with farmers, scientists, processors, and others to demonstrate the best ways to grow food sustainably with concern for the eater.

Federal Sustainable Development Strategy: considering clean water, soil conservation, healthy food, and more—quite a comprehensive approach.

2. Aging Farming Population

The second issue is that farmers are aging, and many people do not want to go into farming—due to the drudgery, hard work, and lack of perceived prestige. We are addressing this in the short term through a Temporary Foreign Worker Program to fill labor gaps. We are also running immigration initiatives to bring in skilled labor from around the world. At the same time, we have a large initiative to educate and inspire young people—both male

and female—to pursue careers in agriculture and the agri-food system. Lastly, we aim to get rid of drudgery through automation and innovation, making agriculture more business-oriented and people can see themselves as well respected.

3. Vulnerability of food supply chains

COVID-19 and trade issues have significantly impacted our food supply chains and value chains. Our three-part initiative includes:

Crucial Value Chain Resilience: Identifying critical value chains within the country to ensure they are resilient and they can take those stresses.

Federal Sustainable Development: Focusing on soil, air, water, and healthy food, making sure that the food is healthy and works for us.

Local Food Economy Strengthening: Strengthening local food economies, particularly in small communities and the North, to build resilience within domestic food systems.

4. Unhealthy Dietary Habits

Another issue is unhealthy dietary habits—what we eat and how we eat. We have introduced the Healthy Communities Fund, especially in rural areas, to promote anti-smoking, physical exercise, understand what healthy food is and how you should eat.

III.Canada's New Food Guide

The new good guide emphasizes both food choices and eating behaviors: half of your plate should be fruits and vegetables, a quarter of your plate should be protein foods, and a quarter of your

plate should be whole grains. Notice in the protein section: we no longer emphasize large portions of meat but include more diversity like legumes. The dairy industry was not pleased—milk and cheese are no longer prominently featured. It suggests water as the best drink, not Coca-Cola. Importantly, the new guide also emphasizes how you eat: be mindful of your eating habits, cook more often, enjoy your food, and eat meals with others. It's not just about what you eat, but how you eat. This is very much in tune with Shiology.

IV. Challenge and Opportunity

The Canada's former Prime Minister, Pierre Trudeau, who likened living next to the United States to a mouse living beside an elephant—every time the elephant rolls over, the mouse gets nervous. Right now, Canada is quite nervous due to extreme trade issues with the U.S. These pressures significantly impact the strategies I just mentioned—trade, immigration, even climate efforts like reducing greenhouse gases—often sidelining them due to immediate political and economic pressure.

A more positive note: Agriculture must integrate science, art, politics, and sociology to convert sunlight into happy, healthy people. Agroecology and shiology are convergent. The convergent agroecology is a big part of the solution as we move toward sustainable, healthy agri-food systems.



From Double Nutritional Contradiction to Food Sovereignty: Reimagining Bolivia's Food Systems from the Eater's Perspective

Jorge A. Rojas Beltrán

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Abstract: Bolivia faces a double nutritional burden, a complex transition where the coexistence of undernutrition and micronutrient deficiencies persists, alongside a steady rise in overweight and obesity in urban areas, driven by poor dietary practices, including the high intake of ultra-processed foods and sugary drinks. These widespread issues are rooted in structural determinants such as multidimensional poverty, inequality, deficient infrastructure in rural areas, and inadequate nutritional education. Moreover, efforts to address these challenges are hampered by the fragmentation of governance, as health, agricultural, and educational policies are often implemented in institutional silos. The path toward true food sovereignty requires a holistic transformation centered on the eater. This aligns with the integrated knowledge system of Shiology, which asserts that the eater is the most fundamental and critical element of the food system, and that health fundamentally depends on the food-body coupling. Confronting this crisis, the article proposes reimagining our food system from the perspective of the Bolivian eater, placing their specific needs at the core of the solution.

Keywords: Bolivia, Micronutrient deficiencies, Overweight, Obesity, Eater-centered

I. One country, two opposing nutritional realities

Bolivia is located in the center of Latin America. It has a very diverse geography, ranging from the majestic Andes Mountains on one side to the lowlands that extend into the Amazon basin on the other. This rich geography supports a wide variety of ecosystems, and they give rise to many diverse culture. In Bolivia, 36 indigenous languages are officially recognized, and this diversity is also reflected in our food culture. you might think that Bolivians enjoy a rich and varied diet. However, the reality is quite the opposite.

Our country is currently facing a double nutritional contradiction—two opposite nutritional

reality within one nation. On one hand, there are widespread micronutrient deficiencies, with millions lacking essential vitamins and proteins, especially in rural areas. On the other hand, we are witnessing a rising prevalence of overweight and obesity in urban areas, largely due to high consumption of ultra-processed products, particularly sugary drinks. This has led to sugar dependency among many and is contributing to the growth of related diseases.

II. The roots of the problem: why does it happen?

Many would point to poverty as a key factor. Others highlight that there is not enough education

for people. The globalization of unhealthy diets also plays a role. In my view, another significant cause is fragmented policymaking. There is often a lack of coordination among different government ministries and no coherent national strategy to address this issue.

III.The solution: an eater-centered system

The article will propose a solution: an eater-centered system. It highlights three key points: First, Revive the ancestral. Put quinoa, tarwi, amaranth, and other native foods back on the plate — for health, culture, identity, biodiversity. Second, Bridge knowledge. Unite ancestral knowledge with modern science to create stronger, more effective food practices. Third, Connect family farm to plate. Build direct links between family farmers and school/community meals — no middlemen,

just fresh, local food. Because in Bolivia, a family farmers contributed to 60% of what we eat— though it is declining each year.

However, in my opinion, the main contradiction we must resolve is not the double nutritional contradiction, but humanity can produce enough for everyone, but market rules prevent this abundance from becoming universal well-being. We have the land, water, knowledge, and tools to grow and cook healthy food. But food today is made and sold for profit, not for people's real needs. Farmers cannot sell their traditional crops because they don't bring profit to middlemen. Stores are full of cheap, processed foods that companies want to sell. Government policies often help big agribusiness, not small farmers or people's health. To resolve the main contradiction, we need an economy that puts people before profits, where what we produce is shared fairly and everyone can live well.



Trinidad And Tobago Country Profile And Snapshot of the Food Ecosystem

Saheeda Mujaffar

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Abstract: This presentation provides a country profile and snapshot of the agricultural and food ecosystem of Trinidad and Tobago. It examines the food system within its geographic, demographic, economic, cultural, and institutional context, and outlines the roles of key institutions and organisations across government, producer groups, the private sector, education and research institutions, and regional and international partners. The presentation describes key features of domestic agricultural production and food supply, alongside the role of education, research, and capacity building within the food ecosystem. It also frames the national food production and trade patterns within the context of food import dependence and regional initiatives such as the CARICOM “25 by 2025” framework. The presentation concludes by outlining a set of important considerations that influence how the current food ecosystem functions and provides a basis for informed discussion and continued engagement at national, regional, and international levels.

Keywords: Trinidad and Tobago, food ecosystem, national context, cultural identity, education and research, food systems governance

1. National Context: Geography, Population, and Economy

This presentation examines the structure and functioning of the food ecosystem of Trinidad and Tobago. As a starting point, it is useful to consider the country’s geographic, demographic, and economic context, which shapes production patterns, market organisation, and food system outcomes.

Trinidad and Tobago has an estimated population of approximately 1.51 million people (2025), with English as the official language and the primary language of governance, education, and formal communication. Trinidad is predominantly urbanised and accounts for the larger share of the population, with Port of Spain functioning as a key

administrative and commercial centre.

Trinidad and Tobago is a relatively high-income economy in Caribbean terms and remains structurally influenced by the energy sector, alongside manufacturing and services. Key sectors include oil and gas production (including Liquid Natural Gas (LNG), crude oil, and condensates), petrochemicals such as ammonia, methanol, and urea, as well as manufacturing activities spanning cement, iron and steel, and food and beverage production, alongside a growing services sector. Current-price GDP is estimated at approximately US\$26.5 billion (2024), with GDP per capita in the range of US\$18,000–19,000 in 2024/2025. While diversification efforts are ongoing, the economy remains structurally influenced by energy-sector dynamics.

2. Cultural Identity, Heritage, and Food Traditions

Meaningful transformation of food systems depends not only on technical and economic considerations, but also on a clear understanding of the social and cultural contexts that shape everyday food practices. Trinidad and Tobago exhibits a layered cultural composition shaped by historical, social, and migratory influences that inform foodways, consumption patterns, and social norms.

Trinidad and Tobago's population reflects a highly diverse ethnic and cultural composition, including Indo-Trinidadian, Afro-Trinidadian, mixed-heritage, European, Chinese, Portuguese and Middle Eastern communities. Cultural diversity in Trinidad and Tobago is deeply woven into everyday social life and national identity. Major religious and cultural festivals are celebrated nationally, often transcending ethnic and religious boundaries.

The cuisine of Trinidad and Tobago reflects a rich fusion of influences and contributes to a dynamic food culture that is both locally grounded and globally recognisable. The cuisine provides an important lens through which broader discussions of food systems, identity, and cultural continuity can be understood.

Trinidad and Tobago is well recognised for its tropical coastal setting and annual world-renowned Carnival celebrations. Musical and artistic traditions further reflect cultural diversity, with forms such as Calypso and Soca. The steelpan originated in Trinidad and Tobago in the 1930s and is widely recognised as the only new acoustic musical instrument to have been invented in the twentieth century. Together, these social and cultural expressions provide important context for understanding how food, identity, and social life are closely intertwined in Trinidad and Tobago.

Trinidad and Tobago is one of only eight countries recognized by the International Cocoa Organization (ICCO) as producing 100% fine or flavour cocoa beans, known for its rich, bold, and complex flavour, deep aroma, and smooth taste. Trinidad is home to the International Cocoa Genebank, Trinidad (ICGT), which is the largest (over 2,400 cacao varieties) and most diverse public collection of cacao germplasm in the world. It is designated as a Universal Collection by organizations like Bioversity International, making it a key resource for scientists worldwide to conserve the genetic diversity of cacao for future generations. The ICGT links local heritage to global food system sustainability.

3. Key Actors in the Food and Agriculture Space

Food and agriculture in Trinidad and Tobago are shaped by a network of government ministries, statutory bodies, research institutions, non-governmental organisations, farmer groups, private sector firms, and international partners. These actors operate across multiple domains, including agricultural development, food safety, marketing, social protection, education, trade, finance, and environmental management. Understanding their roles and interactions is essential for analysing how food systems function and how policy objectives translate into outcomes for producers and consumers.

3.1 Government and Regulatory Bodies

The Ministry of Agriculture, Land and Fisheries plays a central role in governance and sector development, supported by agencies involved in marketing support, research and innovation, quarantine and biosecurity, and financing (see Table 1). The National Agricultural Marketing and Development Corporation (NAMDEVCO) plays a

Table 1: Government and Regulatory Bodies and their Roles in the Food and Agriculture Ecosystem

Ministry	Agency / Role
Ministry of Agriculture, Land and Fisheries	
National Agricultural Marketing and Development Corporation (NAMDEVCO)	Marketing, post-harvest handling, and distribution support for farmers and agro-processors
Inter-American Institute for Cooperation on Agriculture (IICA)	Technical cooperation, capacity building, and policy support for agricultural development
Caribbean Agricultural Research and Development Institute (CARDI)	Agricultural research, technology development, and extension support
Plant and Animal Quarantine Services	Pest and disease surveillance, biosecurity, and quarantine control
Agricultural Development Bank (ADB)	Financing and credit support for agricultural and agro-processing projects
Livestock and Livestock Products Board	Support and regulation of the livestock and livestock products sector
Ministry of Health - Chemistry, Food and Drug Division	Regulation and enforcement of food safety and food standards
Ministry of the People, Social Development and Family Services - Food Support Programme	Electronic cash transfers via a Food Support Card to assist vulnerable households in purchasing basic food items
Ministry of Trade and Industry - Trinidad and Tobago Bureau of Standards (TTBS)	Development and enforcement of standards; coordination with regional agencies such as CARPHA
Ministry of Education - Youth Training and Employment Partnership Programme (YTEPP)	Technical and vocational skills training in areas including food processing, agricultural management, and food preparation
Ministry of Finance	Fiscal policy oversight and coordination with international development partners such as the Inter-American Development Bank (IDB)
Ministry of Planning - Environmental Management Authority (EMA); Caribbean Industrial Research Institute (CARIRI)	Environmental regulation, planning oversight, and applied research and industrial support

central institutional role in Trinidad and Tobago's agri-food ecosystem. Established by statute, the organization supports farmers and agro-processors through market information systems, post-harvest handling, value-added processing, cold chain management, storage, and marketing services. By strengthening linkages between producers, markets, and consumers, NAMDEVCO contributes directly to improved efficiency, competitiveness, and investment within the domestic agri-food sector.

In the last approved National budget (2025), the Ministry of Agriculture was allocated TT\$1.130 billion for the fiscal year 2025/2026. This budget

aims to continue agricultural transformation, support food security, and promote sustainable growth across the sector, including farmers and fishermen and promote sustainable growth. The allocation includes funding for infrastructure, irrigation, fisheries, land development, and agri-tech initiatives.

Food safety regulation is led by the Ministry of Health through its relevant food safety and standards functions. Social protection intersects with food access through programmes designed to support vulnerable households in purchasing basic food items. Additional ministries influence the

Table 2: Examples of NGOs

Organization / NGO	Focus / Activities
WHYFARM (We Help Youth Farm) – T&T	Youth-focused agricultural NGO based in Siparia, using ‘agriedutainment’ (e.g., the superhero AGRIman) to engage children & youth in sustainable agriculture, food security, and agribusiness.
Nourish TT – T&T	Non-profit/social enterprise tackling food waste and hunger by redistributing surplus food, supporting community gardens, and delivering monthly care packages and fresh produce.
Food For The Poor (Trinidad & Tobago) – T&T	Broad povertyalleviation NGO which also works in agriculture/food: shipping farming equipment, setting up aquaponics, and providing food relief to vulnerable groups.
Trinidad and Tobago Food Bank – T&T	A fooddistribution nonprofit ensuring access to nutritious food and reducing food waste by redirecting surplus food to people in need.
Agricultural Society of Trinidad and Tobago (ASTT) – T&T	Representative organization of farmers, advocating agricultural development, food security, and local production across the islands.
Tobago Agricultural Society – Tobago	Organized body on the island of Tobago promoting agricultural interests and support for farmers and producers in Tobago.
The Cropper Foundation – T&T	Works on sustainable agriculture and climatesmart farming practices via the ‘Making Agriculture Profitable and Sustainable (MAPS)’ project.
Caribbean Farmers Network (CaFAN) – Regional / includes T&T	A regional farmers’ network working on food & nutrition security, valuechain development, and farmer capacity building across the Caribbean.
4H Club (Trinidad & Tobago) – T&T	Youth agricultural organization (partnered with the Ministry of Agriculture) fostering interest and skills in agriculture among children and young people.

food ecosystem through standards, trade, education and training, finance, planning, and environmental management. These institutional arrangements mean that food ecosystem performance depends on cross-ministry coordination.

3.2 Non-Governmental Organisations (NGOs)

In addition to government ministries and statutory bodies, the food and agriculture system is shaped by a diverse set of non-governmental organisations, regional institutions, and international development partners (Table 2). These actors operate at different scales - local, national, regional, and global - and contribute to food systems through complementary roles including youth engagement, social protection, agricultural innovation, food distribution, research, financing, and policy coordination. These organisations often operate close to communities, enabling flexible

and context-specific responses to food system challenges.

3.3 Regional and International Development Partners

Regional and international organisations (Table 3) further support the food and agriculture sector through policy coordination, technical assistance, financing, research collaboration, and capacity building. Although these organisations differ in mandate and scope, their activities collectively reinforce national food system objectives by linking national priorities with regional strategies and global development frameworks.

3.4 Farmers’ Associations and Producer Groups

Farmer and producer groups represent a wide range of agricultural activities across Trinidad and Tobago, spanning different commodities and production systems. Through coordination and

Table 3: Regional and International Partners

Organization	Focus / Activities Related to Trinidad & Tobago
Food and Agriculture Organization of the United Nations (FAO)	Partners with the Government of Trinidad & Tobago to strengthen agrifood systems, promote climatesmart agriculture, biodiversity conservation, and sustainable land use. Implemented the Country Programming Framework 20232026.
Pan American Health Organization (PAHO) / World Health Organization (WHO) – T&T Country Office	Supports initiatives in food safety, nutrition, and the prevention of foodborne diseases. Collaborates with the Ministry of Health on diet quality, public health nutrition, and agriculturehealth linkages.
Caribbean Community Secretariat (CARICOM)	Coordinates regional agricultural policy and food security programmes. Assists T&T with integration in the CARICOM Single Market for agricultural goods and regional food and nutrition security strategy. (The Caribbean Community and Common Market)
Caribbean Development Bank (CDB)	Provides financing and technical assistance for agricultural projects, food production, and resilience building across the Caribbean, including Trinidad & Tobago.
Caribbean Public Health Agency (CARPHA)	Addresses food safety, nutrition, and food systems resilience through regional collaboration. Supports T&T and neighbouring states in implementing food security and healthrelated frameworks.
Organization	Focus / Activities Related to Trinidad & Tobago
InterAmerican Institute for Cooperation on Agriculture (IICA)	Regional partner supporting agricultural innovation, agribusiness competitiveness, and rural development in T&T. Provides training, technical support, and digital agriculture initiatives. Capacity building and technology transfer.
United Nations Development Programme (UNDP) – Trinidad & Tobago Office	Supports sustainable development goals related to agriculture, environmental management, and communitybased food projects. Promotes resilience and poverty reduction through agriculture.
World Food Programme (WFP) – Caribbean Office	Assists Caribbean governments, including T&T, in disaster preparedness, food security assessments, and emergency response planning for food systems resilience.
CARICOM Regional Organisation for Standards and Quality (CROSQ)	Develops and harmonises regional standards in food safety, agricultural production, and trade, supporting T&T's integration into CARICOM quality systems. (The Caribbean Community and Common Market)
Organisation of Eastern Caribbean States (OECS) – Commission (via collaboration)	Though T&T is not an OECS member, it collaborates on shared projects and capacitybuilding efforts in agricultural trade, climate resilience, and sustainable food systems across the region.
European Union (EU) Delegation	Development projects in agriculture.

collective engagement, these groups support interaction with markets, institutions, and support services. A sample of Farmers' Groups / Associations is given in Table 4.

3.5 Food Manufacturing, Processing, and Retail Actors

Food processing and manufacturing includes long-established firms and emerging enterprises

producing staples, beverages, condiments, and ready-to-eat products. These firms play a central role in value addition, employment, and domestic food availability, and some contribute to regional exports. Industry associations support coordination and market stability. From a food ecosystem perspective, this segment bridges primary production and consumption, enabling product consistency, shelf-life extension, and demand pull

Table 4: Selected Farmers' Group / Associations

Farmers' Group / Association	Island / Area
Tobago Agricultural Society	Tobago
Tobago Sheep Farmers Association	Tobago
Mt. St. George Farmers Association	Tobago (Mt. St. George)
Goldsborough Farmers Association	Tobago (Goldsborough)
Cunupia Farmers Association	Central Trinidad (Cunupia)
Todds Road Farmers' Association	Caroni / Todd's Road
Tableland Pineapple Farmers' Association	South Trinidad
Rio Claro Farmers Association	South-East Trinidad (Rio Claro)
Wallerfield Farmers & Allied Welfare Association	East Trinidad (Wallerfield/Arima)
Coconut Growers' Association (CGA)	North Trinidad
Aranguez United Farmers Association	North Trinidad (Aranguez)
Co-operative Citrus Growers' Association of Trinidad & Tobago (CCGA)	Various citrus-producing regions
Trinidad & Tobago Goat & Sheep Society (TTGSS)	Trinidad & Tobago
Caribbean Farmers Network (CaFAN) – T&T Members	Regional (includes T&T)

for local raw materials where procurement systems are aligned. A selection of food manufacturing companies and representative industry bodies operating within the national food system is given in Table 5. Additionally, the Supermarket Association of Trinidad and Tobago (SATT) represents retailers in the food and distribution sector, aiming to ensure reliable food access, protect consumers, and maintain supply chain stability. The Trinidad and Tobago Manufacturers' Association (TTMA) - key association representing a broad range of manufacturing interests.

3.6 Education and Research Institutions

Higher education institutions play an important role in supporting the food ecosystem in Trinidad and Tobago and the region through teaching, applied research, and technical training. In Trinidad and Tobago, The University of the West Indies (UWI), St. Augustine Campus is the region's premier university, with approximately 17,000 students. It is part of the wider UWI system, serving 17 Caribbean countries. The University

workforce development, applied research, and policy-relevant knowledge generation. Agricultural production, policy, and extension are traditionally supported through programmes within the Faculty of Food and Agriculture, while complementary contributions to food systems are provided through engineering, science, health, and social science disciplines.

Within this broader institutional landscape, advanced training (MSc, MPhil, PhD) is delivered through the Food Science and Technology postgraduate programmes housed in the Department of Chemical Engineering, Faculty of Engineering. These represent a distinctive pathway within the university that integrates food science, food processing, quality assurance, and engineering principles. The MSc curriculum is designed to combine rigorous theoretical instruction with practical, hands-on training in food analysis, product development, and laboratory- and pilot-scale processing environments. It spans core areas including Food Process Engineering, Food Quality

Table 5: Food processors / Manufacturers / Retail Actors

Company	Type of Food Processed
Albrosco Ltd	Canned foods, processed meats
SM Jaleel & Co. Ltd	Soft drinks, juices, bottled water
Kiss Baking Company Ltd	Bread, pastries, baked goods
Bermudez Biscuit Co. Ltd	Biscuits, crackers
Holiday Snacks Ltd	Snack foods (chips, nuts)
Carib Brewery Ltd	Beer and alcoholic beverages
Angostura Ltd	Rum, bitters
National Flour Mills Ltd	Flour, animal feed
Associated Brands Industries Ltd	Chocolates, confectionery
Flavorite Foods Ltd	Ice cream, frozen desserts
Vemco Ltd	Pasta, sauces, condiments
Solo Beverages Ltd	Soft drinks, juices
Chief Brand Products Ltd	Spices, seasonings, sauces
KC Confectionery Ltd	Confectionery, sweets
Universal Foods Ltd	Frozen foods, processed meals
Nutrimix Group	Flour, poultry, animal feed
Regal Products Ltd	Seasonings, sauces
Chatak Food Products Ltd	Spices, curry powders
Naisa Brand Products Ltd	Condiments, sauces
Happi Products Ltd	Snack foods
Vasha Foods Ltd	Vegetarian Frozen foods
Tai Pan Industries Ltd	Asian food products
A&J's Homemade Ice Cream Co. Ltd	Ice cream
Erin Meat Packers Ltd	Meat processing
Heat 'n Eat Limited	Ready-to-eat poultry meals

of Trinidad and Tobago (UTT), a state-owned institution with an estimated 10,000 -12,000 students, complements this role through a strong emphasis on technical education, applied research, and innovation. Together, these universities contribute to human capital development, technical capacity, and innovation relevant to the national food and agriculture ecosystem.

The UWI St. Augustine offers research and training relevant to agriculture and food systems across multiple faculties, including Engineering, Food and Agriculture, Medical Sciences, Humanities, Social Sciences, and Science & Technology, and contributes to

Assurance, Food Chemistry, Food Microbiology, Food Packaging, Food Processing Laboratories, Preservation and Processing of Meat, Poultry, Fruits and Vegetables, and Sanitation in Food Processing, culminating in an independent research project. Collectively, these resources support postgraduate training and research across the MSc, MPhil, and PhD levels, contributing to the development of technical expertise relevant to food production, processing, safety, innovation, and value addition within the national and regional food system.

From a food ecosystem perspective, the Food Science and Technology programmes function as

an important interface between higher education and industry, supporting applied research, skills development, and innovation relevant to the national food and agriculture sector. Industry engagement occurs through collaborative projects, sponsorship of student prizes, and formal interaction via an Industry Liaison Committee, reinforcing the relevance of training and research to real-world food system challenges.

4. Agricultural Production Landscape

Fruit and vegetable production has shown an upward trend in both value and volume over the last five years. This expansion is supported by moderate increases in the cultivation of key crops such as tomatoes, lettuce, pawpaw, and hot peppers, which remain staples of local diets and market demand. Livestock production trends reveal a poultry-dominated system. Chicken output consistently exceeds 30,000 metric tonnes annually and shows incremental growth since 2019.

Table 6: Production Estimates

Category	Item	Quantity (000 kg)
Vegetables	Tomatoes	536.1
	Lettuce	1,227.5
	Chives	666.8
	Ginger	46.2
	Hot Peppers	1,496.0
Fruits	Pineapple	819.7
	Pawpaw	1,261.3
	Watermelon	491.3
Livestock	Pork	1,341.8
	Beef	165.9
	Mutton	139.3
Poultry	Chicken	30,000
Other	Aquaculture	≈11.1 metric tons

Trinidad and Tobago is heavily dependent on food imports, with upward of 90% of its food needs met through imports. The food import bill reached TT\$7.3 billion (USD\$1.10 billion) in 2025, the

highest ever recorded, compared to TT\$7.2 billion (USD\$1.08 billion) in 2022 and an average of TT\$5 billion (USD\$750 million) in previous years. This reliance exposes the country to global supply chain disruptions, price fluctuations, and external shocks, undermining food security and sustainability. There is also an acquired preference for imported foods—a psychological dimension that may be difficult to shift. This places a shared responsibility on food system actors to ensure that locally produced foods are healthy, competitively priced, and match the quality and appeal of imported alternatives.

Trinidad & Tobago is a Member State of CARICOM (the Caribbean Community and Common Market). The 25 by 2025 initiative refers to the commitment by CARICOM Member States to reduce the region's large food import bill by 25 % by the year 2025. The intent is not only to cut imports, but to stimulate domestic production, intra-regional trade, value-addition, greater private-sector participation, and resilience in the agri-food system. Key areas include identifying priority commodities (e.g. poultry, meat, feed grains, niche vegetables, root crops) and establishing supportive policies (trade, finance, production, infrastructure) to enable substitution of imports and increased regional self-reliance. The initiative is guided by CARICOM organs (such as the Special Ministerial Taskforce on Food Production and Food Security) and involves Member States, private sector, producer groups, development partners and civil society. Because of external shocks (climate events, supply-chain disruptions) the original target timeline has been extended in some communications, for example to 2030.

5. Key Considerations for Strengthening the Food Ecosystem

The food ecosystem of Trinidad and Tobago is underpinned by an active and interconnected set of institutions, including agencies within the Ministry

Table 7: Key Considerations Affecting the National Food Ecosystem

Issue	Rationale
1. Insufficient Local Food Production and Reliance on Imports	Most critical; over 85% of food is imported, exposing the country to supply shocks and high import costs.
2. Impact of Climate Change on Agriculture	Droughts, floods, and storms disrupt production and threaten long-term sustainability.
3. Limited Arable Land and Water Resources	~ 11% of land is arable; competing uses for housing and industry restrict expansion.
4. Hunger and Malnutrition	For households that face food insecurity, particularly vulnerable populations.
5. Food Price Volatility & Supply Chain Vulnerability	Global inflation and logistics issues - sharp increases in food prices and reduced affordability.
6. Aging Agricultural Workforce	Median farmer age is around 55; youth participation low despite government initiatives.
7. Food Safety and Quality	Inconsistent enforcement of standards; limited testing capacity among SMEs and processors.
8. Agricultural Tech or AI Applications	Remain limited due to infrastructure and training gaps.
9. Overuse of Chemicals in Agriculture	Pesticide misuse contributes to soil degradation and potential health risks.
10. Food Waste	Estimated 30–40% post-harvest loss - weak cold chain systems and limited storage.
11. Unhealthy Dietary Habits	High consumption of processed foods linked to obesity, diabetes, and hypertension.
12. Vulnerability of Food Supply Chains	Limited transport and storage capacity increase risk of local disruptions.
13. Promotion of Organic and Local Food	Positive but still emerging; limited certification and market penetration.

of Agriculture, Land and Fisheries, other relevant ministries, statutory bodies, farmer and producer organisations, non-governmental organisations, and private sector stakeholders. These interactions support core functions across production, food safety, marketing, research, education, and social support, and reflect a system that is operational and engaged. Within this established framework, the possible challenges outlined in Table 7 are presented as areas for continued development. Trinidad and Tobago remains open to collaboration, knowledge sharing, and partnership with regional and international actors as part of ongoing efforts to strengthen food system resilience.

6. Conclusion

This presentation provided a concise, data-

anchored snapshot of the food ecosystem of Trinidad and Tobago, outlining the national demographic and economic context, the institutional and organisational landscape supporting food system functioning, and key features of domestic food production and supply. Taken together, these elements highlight a food ecosystem shaped by interacting entities across production, regulation, research, and distribution. Within this context, Trinidad and Tobago remains open to continued dialogue and strategic engagement with regional and international partners in support of ongoing efforts to modernise the food system and strengthen its sustainability and inclusiveness.



Food and Nutrition in the Andes based on native crops

Angel Mujica / Javier Mamani

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Abstract: The food and nutrition of the Andean population are insufficient, and there are problems of chronic malnutrition and anemia in children, despite having the greatest diversity and variability in grains (quinoa (*Chenopodium quinoa* Willd.); kiwicha (*Amaranthus caudatus* L.); cañihua (*Chenopodium pallidicaule* Aellen); corn (*Zea mays* L.); tarwi (*Lupinus mutabilis* Sweet)), tubers (potato (*Solanum* sp.); oca (*Oxalis tuberosa* Molina); olluco (*Ullucus tuberosus* R. and P.); mashua (*Tropaeolum tuberosum* Jut. et Buck)), roots (arracacha (*Arracacia xanthorrhiza* Brancoff); maca (*Lepidium meyenii* Walpers)); llacon (*Smilax sonchifolius* Poepp. and Endl.); sweet potato (*Ipomoea batatas* L. (LAM)), fruit (aguaymanto (*Physalis peruviana* L.); sachá tomate (*Ciphomandra betacea* Went); Andean papaya (*Vasconcellea pubescens* A. DC.); granadilla (*Passiflora pinnatistipula* Cav.)); and other native food products of high nutraceutical value considered megadiverse and ortho-molecular foods, mainly due to the decrease in yields caused by intense and prolonged droughts, floods, the presence of frosts, hailstorms, and snowfalls as a consequence of climate change, little attention and government support for the production of native foods, inadequate transformation, distribution and corruption of governmental entities responsible for the selection, acquisition, distribution, delivery and use of food in food support programs for the low-income population and residents of marginal areas in large cities; emphasizing the need for greater dissemination of their nutritional value, ways of consumption, and preparation, especially in large cities.

Keywords: Andean population, food, native crops, nutrition

Native crops and wild relatives are used as nutraceutical food (food and medicine) in Andean peasant communities. In the Andes, ancestral knowledge and wisdom about the nutraceutical uses of native crops and wild relatives are preserved. Native food preparations, the diseases they prevent and counteract, have been systematized; currently, they are being disseminated in cities. Adult men and women are the ones who know the nutraceutical use (medicinal, nutritional, and ritual) of native food crops. For the Andean man, food is the best medicine, which is why it is revered. The Yatiris/Laiccas are the ones who know the

medicinal properties of native crops and wild relatives. Native preparation methods and use in food are still maintained in Andean communities. Despite the enormous Andean agricultural biodiversity, food insufficiency and malnutrition still prevail. The causes are: decreased yields due to intense and prolonged droughts, floods, frosts, hailstorms and snowfalls as a consequence of climate change, little attention and government support for the production of native foods, inadequate processing and distribution.

Multidimensional Solutions for Food Supply Chains

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Abstract: Food security and sustainable development of supply chains have become global core issues facing multiple challenges such as food waste, climate change impacts, and vulnerability of smallholder farmers. This article takes Bahrain, Kazakhstan, Mexico, the Maldives, Nepal, Samoa and other countries as research cases, focusing on the diversified dilemmas in their food supply chains and corresponding innovative solutions. In addition, the article emphasizes that the future food system should adopt a multidimensional perspective instead of a single-chain thinking, and realize sustainable development through collaboration among producers, investors, ecologists and policymakers. It integrates the practical experience of multiple countries in different regions, provides diversified reference paths for addressing global food supply chain challenges, and enriches the theoretical and practical research on food security and sustainable supply chains.

Keywords: Vertical Farming, Agricultural Heritage, Food Loss, Food Science, Smallholder Farmers, Taro, Germplasm Resource Diversity

Bahrain: Vertical Farming Empowers Urban Sustainable Development and Cultivates Residents' Sense of Responsibility

From an urban perspective, vertical farming's core value lies in cultivating urban residents' sense of responsibility for food production and inheriting the traditional rural lifestyle concept of "no waste", as most urban residents are consumers who lack such a sense of responsibility. The promotion of vertical farming requires the coordinated advancement of policies, strategies, and actions. Whether it is small, medium, or high-rise buildings, it is feasible to introduce food production technologies and knowledge, enabling residential spaces to have dual functions of living and food production.

Indoor vertical farms contribute to urban sustainable development through three pillars of sustainability: social, economic, and environmental. Socially, encouraging residents to grow local crops helps them deeply understand the hardships of food production, establish a sense of "consumption as responsibility", and recognize the connection between hunger and food distribution. Economically, building a direct bridge between producers and consumers through intelligent tools can create employment opportunities and enrich urban lifestyles. Environmentally, vertical farms can increase urban vegetation coverage, effectively alleviate the urban heat island effect caused by "cement forests", and create a more friendly urban ecological environment. A small-scale research

case in Bahrain, a small island country with limited resources facing the impact of sea level rise and global warming, has achieved success. Relevant vertical farming practices not only enhanced public participation but also made people proud of transforming from “consumers” to “producers”. The successful implementation of demonstration projects and the active participation and recognition of the public are the most significant achievements of these practices. It’s a sense of responsibility.

Kazakhstan: Innovative Agricultural Production and Collaborative Loss Reduction in Supply Chains

In Kazakhstan, scientific research teams focus on cultivating vegetable oils and berries using innovative technologies. Their production project has received funding from a science foundation to transform research results into much-needed new products in the market, which confirms that government support for technological innovation and the transformation of scientific research achievements is one of the key driving forces for agricultural development.

Food waste occurs throughout the entire process of harvesting, processing, storage, transportation, and consumption. To reduce food loss, all supply chain participants, including farmers, distributors, and retailers, should work together to conduct collaborative planning, share data, and apply innovative technologies to accurately predict market demand and reduce overproduction.

Mexico: Exploring Local Agricultural Heritage and Food Science Contributing to Health and Longevity

Mexico faces a core contradiction in food security: 25 million people face difficulties in accessing food or cannot afford it, while children

aged 5 to 11 and adolescents aged 12 to 19 suffer from obesity and overweight. The solution lies in local agricultural heritage — Mexico’s pre-Hispanic diet includes corn, *Opuntia ficus-indica* (nopal), hot peppers (more than 54 varieties), pumpkin seeds, avocados, amaranth, tomatoes, and other crops that have benefited the world. Research shows that Mexican traditional homemade sauces, made by mixing onions, garlic, tomatoes, coriander, and green tomatoes, can modulate gut microbiota. Known as the “second brain” of humans, gut microbiota accounts for 1.5 kilograms of human body mass, affects personality, and produces 90% of serotonin. Therefore, exploring the agricultural heritage of various countries is crucial. Many local crops in Mexico are rich in dietary fiber, which can provide sufficient nutrition for gut microbiota and serve as an important resource for ensuring food security and human health.

Factors that are not directly related to the food supply chain but can affect core goals such as extending human lifespan include two key aspects. First, promoting a sports and exercise culture, as a healthy diet can only fully exert its benefits when combined with moderate exercise. Second, strengthening food traceability and information transparency — food science should strive to prove the consumption value of food and its impact on the human body, enabling people to understand “why to eat” and “the benefits of eating”. Additionally, Mexico is investigating fruit (the scientific name is *Byrsonima crassifolia*) and it is also cultivated in Brazil—which means we can use by-products such as peels and seeds of fruits, vegetables, and cereals. This can not only enrich food sources but also help extend human lifespan and promote the achievement of relevant core goals.

Maldives: Sustainable Fisheries and Fresh Product Distribution Guarantee Under the Island Dispersal Pattern

The Maldives consists of many small islands, with residential communities scattered on about 200 islands and some communities having fewer than 100 people. This scattered geographical pattern brings many challenges to food security and access to natural resources. Tuna is the core protein source of the Maldives, and the country has the highest per capita fish consumption in the world (over 100 kilograms per capita per year). However, the sustainable fishing and fresh distribution of tuna face multiple difficulties: climate change leads to frequent extreme weather, increasing the difficulty of fishing; the Maldives only uses pole and line fishing to ensure the sustainability of the stocks and that the product reaches its consumers in fresh condition.

To address these challenges, the Maldives has formed a collaborative model involving the government, fishermen, and consumers. Fishermen focus on sustainable pole and line fishing and ensure the freshness of catches through ice storage or Refrigerated Sea Water (RSW) systems. The government is responsible for providing relevant facilities, formulating policies for sustainable resource protection, and equipping fishermen with low-cost fishing technologies to help them maximize profits.

In my view, we should not regard food from a single-chain perspective; instead, we need to adopt a multidimensional approach that encompasses all relevant aspects. This includes the people engaged in harvesting food, the technologies applied in its production, the consumers who consume it, and the legislative frameworks established to support and ensure food security. Therefore, technologies must be developed and applied in collaboration with producers; investors must also listen to the insights of

ecologists; and policymakers must create a framework that facilitates such collaborations. In essence, the future of our food system is not a linear, one-dimensional process, but a vibrant, interconnected, and resilient network. Let us work together to make this vision a reality.

Nepal: Addressing the Dilemmas of Smallholder Farmers in the Global South and Cross-Border Seed Sharing Practices

Smallholder farmers contribute 30% of global agricultural output but are trapped in the vulnerability of food security, facing four core challenges. First, difficulty in accessing agricultural inputs, including the shortage of high-quality improved seeds (which can increase yield by 15%-25%), lack of affordable financial resources for agricultural production, and backward irrigation systems, which directly restrict yield improvement. Second, fragmented land holdings, with most smallholder farmers having less than 1 hectare of land, leading to high production costs, low economies of scale, and difficulty in competing in the market. Third, significant impacts of climate change, such as floods, droughts, and landslides, which not only damage crops but also destroy the livelihoods of smallholder farmers. Fourth, aging agricultural workforce, as young people in developing and least developed countries migrate overseas in large numbers to seek employment, resulting in labor shortages in agriculture, insufficient innovation, and further increasing production costs.

Key strategic solutions to improve the livelihoods of smallholder farmers include four countermeasures. First, strengthen the accessibility of agricultural inputs and promote the collaborative research and development of high-yield, climate-resilient high-quality seeds by academia and extension institutions. Second, promote climate-resilient agricultural solutions, including climate-smart irrigation systems and

nature-based agricultural models. Third, integrate fragmented land through cooperative models to enhance economic scale, reduce unit costs, and promote the collaborative development of climate-smart agriculture and the private sector. Fourth, formulate supportive policies to encourage young people to participate in agribusiness or agricultural entrepreneurship. A single strategy cannot work, and a comprehensive, composite plan is needed to achieve the sustainability of the food system. Shiology is the innovative framework to address food system challenges.

An innovative practice in South Asia is the “Seeds Without Borders” platform, which connects India, Nepal, Pakistan, Bangladesh, Vietnam, Bhutan, Cambodia, the Philippines, and other countries to realize the rapid cross-border sharing of high-quality crop varieties, avoiding the time and effort of repeated research and development in various countries. More countries are welcomed to join this platform. Meanwhile, food waste is a notable issue, with waste in the harvesting, post-harvest packaging and handling, and consumption links accounting for 30%. Reducing waste by improving harvesting technologies and optimizing packaging and handling is crucial to ensuring the safety of the food system.

Samoa: Experience in Addressing Taro Blight and Protecting Germplasm Resource Diversity

Taro is Samoa’s staple food. In July 1993, a fungal disease attacked taro crops in Samoa, spreading across the country within six months and destroying all traditional taro varieties within another year, leading to the suspension of taro exports and the depletion of domestic supplies.

After the crisis, international cooperation was launched immediately to find and screen resistant materials. In 1996, Samoa initiated a taro breeding program that went through nine breeding cycles, with approximately 45,000 progenies (5 per cycle × 9 cycles) distributed to farmers for screening. More than 30 years later, farmers are still cultivating new resistant varieties, and Samoa’s taro industry is gradually recovering, with the staple food supply restored.

This experience highlights the importance of germplasm resource diversity — having rich germplasm resources and ensuring their accessibility to farmers is the key to addressing crop crises. Samoa has also actively contributed to global germplasm resource protection by signing agreements with the international community to deposit these new resistant varieties in global germplasm banks, especially for materials resistant to the taro leaf blight encountered. This experience can be extended to various crops and has important reference value for relevant themes.

04

Food-System Transformation — The Path to Health and Longevity

食物系统转型：迈向健康与长寿

2025年10月29日 16:00~17:50

[IT] Transforming Food Environments

[PE] Uses of Llama Meat (*Lama glama* L.) in the Andes and Its Importance in Modern Food

[CN] 益生元食物通过肠菌促进健康长寿

[BN] Food, Flavor, and Human Well-being: Shiology and the Eater-centered Transformation of Food Systems

[VE] Bioinoculants: A Venezuelan Perspective on Advancing Safe Food Systems for Longevity

[IT/CN/AU] Mediterranean and East Asian Diets – Eating for Longevity and Vitality



Transforming Food Environments

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Abstract: The provision of healthy and sustainable food for all constitutes a pivotal challenge in contemporary society. This article adopts a holistic analytical framework centered on the food environment. It delineates three interconnected dimensions of food environments—lived food (everyday practices), perceived food (food-related knowledge), and conceived food (values and narratives)—and proposes targeted strategic directions for transformation across each dimension. Furthermore, the article identifies cultural diets as a potent lever for building consensus in food system transformation, highlighting their alignment with local ecological conditions and community identities. Diversity, encompassing biological, cultural, and economic dimensions, is emphasized as the cornerstone of transformative change, with Italian school canteen initiatives cited as a practical exemplar.

Keywords: Food environments, Cultural diets, Diversity, Food system transformation

Food and planetary boundaries

One of the most important issues of our time is to provide healthy and sustainable food for all. The most recent reports on the EAT-Lancet forum shows that 6.9 billion people live in countries where food is already enough in terms of quantity, but in most of the cases, they don't have the economic means to afford healthy diets. At the same time, the food production is not sustainable, whereas we have 3.7 billion people that have not enough food resources for their life. So it means that we really need a system transformation. The figure 1 shows the food system approach, advanced by the FAO.

It highlights that the holistic approach needs to have the concept of food environment at this core. The food environment is the system that helps to

understand how people choose food and eat food. Sometimes, the individual choice is something that less important than the influence that the environment provide to them. The reason, in some cases, related to structural change, mass production and consumption, brings to standardization of products, standardization of taste, loss of diversity, and unhealthy diets, for example, one of the outcomes is the growth of obesity.

Three Core Dimensions of Food Environments and Their Development

In order to transform food system and to diversify food system, we use a holistic approach to food environments, whereas we distinguish three components: The lived food—daily food practice. Perceived food—knowledge of food. Conceived

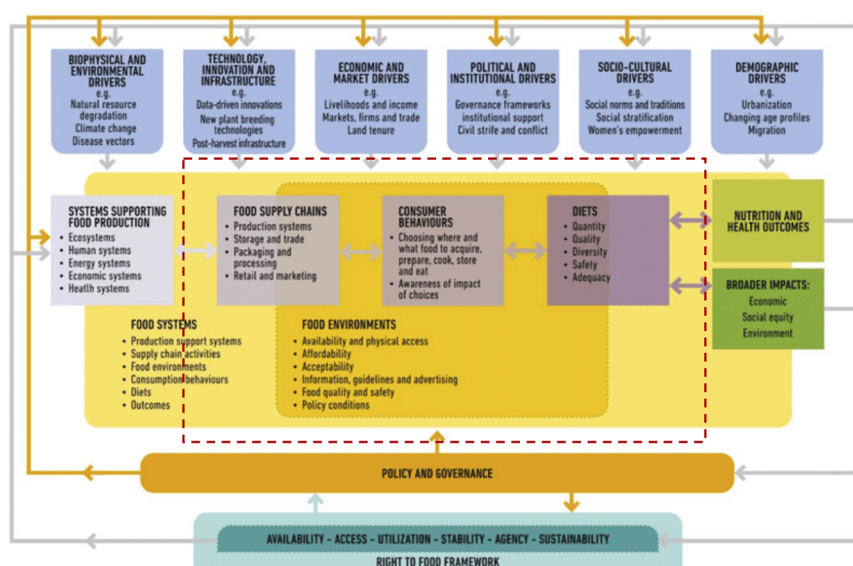


Figure 1 The advanced food system approach

food – values linked to food. The lived food (food environment) is based on six components: infrastructure, product mix, prices, symbols, rules, norms, and habits. Perceived food relates to types of knowledge, including scientific knowledge, practical knowledge, sensory knowledge, cultural & symbolic knowledge, critical & reflective knowledge, for example, fiber supports heart health. Conceived food relates to narratives and values linked to food.

The question then becomes: How to encourage transformation based on these three dimensions? We propose: in terms of conceived food, we should build narratives. In terms of perceived food, we have to work on knowledge. In terms of lived food we have to work on adapting food infrastructures and daily practices.

Building Consensus for Food System Transformation

However, a key challenge is how to build consensus around a framework for transformation. The cultural diets on this regard are powerful lever of transformation. Examples include the Mediterranean diet and the Nordic diet. Cultural

diets are something that bring narratives that reflect local climate, biodiversity and resources. They are rooted into collective memory, historical experience and local know-how. They link food to community. Cultural diets are powerful tool to motivate people to change their behavior and serve as heuristics, providing the principles to helps us make good choices, such as: Looking to minimally processed / natural foods, diversity, seasonal and limit excesses.

The key for transformation is diversity—diversifying the food system. The biological diversity, cultural diversity, and economic diversity reinforce each other, which is very important, because you cannot have only biological diversity if you don't have capacity to get economic value out of it. For example, in the case of Italian projects on food system transformation, we give a lot of effort in providing sustainable and local food meals to school canteens because they change the infrastructure of distribution. They link together caterers with food producers, and advance the schools to adopt new administrative approaches. The impact extends beyond children to teachers and parents as well.

While a series of solutions exist, they need to be turned into policies. In Europe—and even in Italy—a comprehensive national food policy is still lacking. However, the good news is the policies are coming from below, and especially from cities—Rome, Milan, Bergamo, and Lucca. There are food policies that had given attempt to integrate different type of policies, from health policies, education

policies, infrastructure policies, production policies or commerce policy. It means they have to link together different types of stakeholders, different types of administration in having a systemic approach to what is food and how food is distributed and eaten at the urban level—ultimately creating a new food environment which is conducive of healthy and sustainable diets.



Uses of Llama Meat (*Lama glama L.*) in the Andes and Its Importance in Modern Food

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Abstract: South America has four camelid species, with the llama (*Lama glama L.*) being a domesticated variety derived from guanacos by pre-Hispanic Andean cultures. This article explores the uses of llama meat in the Andes and its role in modern food systems. Adapted to high-altitude cold environments, llama meat is nutritionally superior, with high protein (26%), low fat (1.6%) and cholesterol, and rich in essential minerals. It has a mild flavor, is available fresh or dried, and is used in various traditional Andean dishes. Possessing nutraceutical properties, it benefits health (e.g., aiding anemia, obesity recovery) and its fat is used in traditional respiratory remedies. Currently, its nutritional advantages enhance its value in urban markets, making it a significant traditional staple and modern food alternative.

Keywords: llama meat, nutrition, Andes, modern food

In South America, there are four camelids. Of which, two are domesticated: Llama and Alpaca. The other two are wild: Guanaco and Vicuña. These American camelids are different from Asian camelids, such as camel, the dromedary.

I. Overview of Llama

The llama is an artiodactyl mammal belonging to the Camelidae family and was domesticated in South America. It was obtained and domesticated by pre-Hispanic Andean indigenous cultures through artificial selection of the guanaco, which is the wild ancestor of the Llama. There are two varieties of the Llama: Ch'aku, which is characterized by greater fiber availability, intended for fiber production, and K'ara, which has less fiber availability and is intended for meat production.

Llamas inhabit the high plains (Altiplano) of South America, thriving in cold and relatively cool

climates. They can be commonly observed in the grasslands of the Andes, even in high-altitude areas covered with snow.

II. Nutritional Characteristics and Culinary Uses of Llama Meat

The llama meat has varied uses in human nutrition. It is considered highly nutritious because it has more protein (26%) than other meats, little fat and cholesterol (1.6%), composed of oleic and linolenic acid. Llama meat provides important minerals such as Phosphorus, Magnesium and Zinc, vital at all stages of life. It has a special mild flavor and is culinary compatible with beef, pork and sheep. Llama meat is sold fresh and dried. The dried version is made through freezing or sun-drying, a product locally called charqui or jerky.

Llama meat is used to prepare exquisite dishes

with a pleasant taste, including: Llama steak with mashed potatoes, Llama barbecue, Dried llama meat (charqui), charquecan (a typical dish from the highlands, shredded dried meat with toasted corn and chuño), Llama meat stew with quinoa, Muccu (Potato stuffed with quinoa and Llama meat).

III.Conclusion

Llama meat has nutraceutical properties (nutritional and healing properties), important for the nutrition and health of people who live in the Andes.

1. Is rich in quality proteins, high iron content, low in fat and cholesterol.
2. Is an alternative for recovering people with anemia, obesity and overweight.
3. The fat from the Llama's breast (Untu or Tustuca) is used to rub the chest of patients with respiratory infections.
4. Llama fat contains unsaturated fatty acids.
5. Llama meat, has nutraceutical properties, it is now highly valued in the urban market, commanding a higher price.



益生元食物通过肠菌促进健康长寿

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摘要: 肠道微生物组作为人体“第二基因组”，其与健康和衰老的关系已成为生命科学领域的研究热点。本文系统阐述了肠道菌群的核心作用及其作为抗衰老靶点的机制。研究表明，肠道菌群不仅是人体最大的免疫器官和重要的神经-内分泌调节枢纽，更通过其代谢产物（如短链脂肪酸）和调控网络（如肠-脑轴、肠-免疫轴）深刻影响全身健康。益生菌作为肠道菌群的重要组成部分，已被证实具有改善肠道功能、调节代谢、增强免疫力、延缓认知衰退及皮肤抗衰等多重功效。长寿人群的菌群特征和动物实验进一步揭示了特定有益菌在抗炎、抗氧化及修复肠黏膜屏障中的关键作用。基于此，本文提出通过益生元饮食（如膳食纤维和多酚）培育健康长寿菌群是科学抗衰老的核心路径。结合个性化肠道菌群基因检测与精准营养干预，可实现对肠道菌群的有效调控，为延缓衰老、预防疾病提供了全新的策略。

关键词: 肠道微生物组；益生菌；益生元；抗衰老；健康

一、肠道微生物影响人体健康

早在19世纪末，诺贝尔奖得主Metchnikoff便在其研究中提出：肠道微生物具有逆转老化的潜能。这一观点推动了全球微生物研究计划的展开——从2007年启动的“人类微生物组计划”，到2010年开展的肠道宏基因组研究，再到2016年美国国家微生物组计划，及2017年中国启动的肠道宏基因组计划，科学家们逐步揭开了微生物与健康之间的深刻联系。

诺贝尔奖获得者Joshua Lederberg进一步总结道：人体是一个“超级生物体”，其中仅10%属于人类细胞，其余90%则是主宰健康与快乐的微生物。研究表明，约90%的疾病与人体微生物密切相关。在我们肠道中，栖息着约1-2公斤、总数达100万亿、1000多种的微生物，其数量约为人类自身的100倍。它们深度参与人体健康调控，因此被称为“人体的第二基因组”。

肠道不仅是营养吸收的核心器官，更是人体最

大的免疫器官——超过70%的免疫细胞及免疫组织分布于肠黏膜内；它也是最重要的“排污厂”，约80%的毒素经由肠道排出；同时，肠道被誉为“第二大脑”，拥有超过一亿个神经细胞，使我们能够自主运作与判断。如今，通过粪便检测肠道菌群，不仅可以评估肠道健康，更能反映全身健康状况。

二、益生菌调控全身健康

肠道菌群可分为有益菌（益生菌）、有害菌和中性菌。益生菌能够全面调节健康，包括改善肠道功能、促进营养吸收、缓解腹泻便秘、加速排毒；合成维生素B、维生素K及小分子氨基酸、短链脂肪酸等物质；调节代谢，管控体重、血压、血糖与血脂；增强免疫力，预防感染与过敏。一项重大的研究发现，益生菌还具有皮肤抗衰、延年益寿的作用，并能改善神经系统功能，有助于缓解抑郁、焦虑，延缓阿尔茨海默病及老年认知障碍。

科学家从衰老研究中发现几个关键现象:长寿老人肠道内富含特有的植物乳杆菌等有益菌,它们具有抗炎、抗氧化作用,能保护并修复肠黏膜屏障;而普通老年人肠道中这类有益菌则显著减少。动物实验中,移植年轻小鼠的粪便菌群可使老年小鼠多项年轻化指标提升,包括短链脂肪酸、免疫反应、神经细胞功能以及记忆认知能力。此外,一项随机化分析揭示了肠道菌群与年龄及14种年龄相关代谢指标之间的关联,发现肠道菌群与很多疾病相关,例如,心脏病、II型糖尿病、脑中风等疾病。其作用机制主要涉及三个方面:肠-脑轴与肠-免疫轴的调控网络;肠道菌群产生的小分子代谢物经血液循环影响全身健康;肠道菌群产生的短链脂肪酸,可通过血液输送至各器官,实现系统性调节。正所谓“健脑先健肠,健体先健肠”。

三、益生元饮食培育健康长寿菌群

益生元主要指膳食纤维和多酚等不可消化的膳食成分,是肠道有益菌的天然养料,能促进其生长与活性。通过调节菌群,益生元间接调控人体健康,实现“以菌养身”。

我们研究所及衍生企业目前已开展肠道菌群基因检测,通过绘制个人菌群图谱,为其提供个性化精

准营养管理方案。检测内容涵盖:1、综合评价。肠道菌群平衡与菌群多样性。2、菌群档案。量化有益菌、有害菌及其他菌群的详细构成。3、体质评估,包括肥胖,体型,便秘,腹泻,腹胀等胃肠道的疾病,以及过敏,皮肤状况等。4、健康评估。评估六大系统的疾病,包括消化系统,内分泌系统,心血管系统,精神类疾病,肺部疾病、资深免疫疾病。5、营养合成以及吸收能力。包括碳水化合物、蛋白质、脂肪、乳制品、膳食纤维、维生素、微量元素、氨基酸、短链脂肪酸。6、药物抗生素的抗性。分析菌群中抗生素抗性基因的存在与分布。基于检测结果,我们会提供定制化的健康管理方案,涵盖饮食、基因、居住环境、体育锻炼、伴发疾病及药物暴露等多个维度,并通过益生菌、益生元等干预手段给出具体建议。

四、结论:科学健康抗衰的肠道菌群路径

肠道菌群是抗衰老的核心靶点,而益生元是安全有效的干预手段。实践的关键在于优化饮食模式——增加多样性膳食纤维与富含多酚的食物摄入,并结合地中海饮食等健康模式,全面培育促进健康长寿的肠道菌群,以实现健康百岁人生。

Prebiotic Foods Promote Healthy Longevity Through Gut Microbiota

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Abstract: The gut microbiome, known as the “second genome” of the human body, has become a research hotspot in the life sciences due to its relationship with health and aging. This paper systematically elaborates on the core functions of the gut microbiota and its mechanisms as a target for anti-aging interventions. Research indicates that the gut microbiota is not only the body's largest immune organ and a crucial neuro-endocrine regulatory hub but also profoundly influences overall health through its metabolites (e.g., short-chain fatty acids) and regulatory networks (e.g., the gut-brain axis and the gut-immune axis). As a vital component of the gut microbiota, probiotics have been proven to possess multiple benefits, including improving intestinal function, regulating metabolism, enhancing immunity, delaying cognitive decline, and promoting skin health and anti-aging. The microbial characteristics of long-lived populations and animal experiments further reveal the key role of specific beneficial bacteria in anti-inflammation, antioxidation, and repairing the intestinal mucosal barrier. Based on this, this paper proposes that cultivating a healthy and

longevity-promoting microbiota through a prebiotic diet (e.g., dietary fiber and polyphenols) is a core pathway for scientific anti-aging. Combining personalized gut microbiota genetic testing with precision nutritional interventions enables effective regulation of the gut microbiota, offering a novel strategy for delaying aging and preventing diseases.

Keywords: Gut Microbiome, Probiotics, Prebiotics, Anti-aging, Health



Food, Flavor, and Human Well-being: Shiology and the Eater-centered Transformation of Food Systems

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Abstract: The article focuses on the interconnections between food, flavor, and human well-being, exploring the role of Shiology in advancing the eater-centered transformation of food systems. It first highlights the strains of the current global food system, characterized by widespread hunger, unhealthy diets, climate disruptions, supply chain fragility, and social inequity. The article proposes Shiology as an integrated knowledge framework that transcends nutrient- and market-centric perspectives to emphasize flavor, perception, and meaning in food. It advocates for holistic governance that empowers eaters as co-creators through education, transparency, and participation, nurturing responsible pleasure and mindful eating. Furthermore, the article underscores the intrinsic link between food systems and Sustainable Development Goals (SDGs), noting that flavor and pleasure serve as hidden drivers of sustainable dietary behaviors. It concludes that blending new technology with traditional food wisdom and repositioning eaters as core creators of well-being can foster food system transformation.

Keywords: Shiology, Food system transformation, flavor, eater- centered, sustainable development goals

The article is about food, flavor, and human well-being: Shiology and the eater-centered transformation of food systems. It explores how the science of flavor and human experience can reshape our understanding of food system, and how the understanding supports our collective progress to a sustainable development goals.

Challenges in Current Food Systems

The Global Food Systems and SDGs Report 2025 remind us that the world's food system is under strain. Over 700 million people remain hungry, while over 2 billion consume diets that lead to poor health outcomes. The climate disruptions, supply chain fragility and social iniquity makes our current system both

unsustainable and unjust.

Food is not just the product we buy. It is a system linking soil, society and self. True transformation requires food system literacy, helping citizens see how their daily choices ripple through environment, economy and emotion. In least developed nations, the issue is availability and access. In developing nations, the challenge becomes equitable nutrition amid rapid urbanization. In developed nations, it is excess and imbalance. A single global food system expresses itself through very different forms of vulnerability. An integrated knowledge system, using natural science with social and sensory sciences. This is where I introduced Shiology, the study of taste, life and harmony.

An Integrated Knowledge Approach:

Shiology

Shiology sees food, not only through nutrients and markets, but through flavor, perception and meaning. It connects chemistry with culture, data with desire. The analysis to governance is how we design systems that serve both people and planet. Traditional policy often treats consumers as passive. Holistic governance invites them to become co-creators empowered through education, transparency and participation. It is about nurturing responsible pleasure, eating with awareness and empathy.

The Order of Food Systems. The moral and organizational architecture holds everything together. A sustainable food order balances the freedom of choice and responsibility to others and the environment.

Food Systems and the SDGs

Food touches almost every goal, from hunger and health to gender, water and climate. Yet behavioral

change is different. It's difficult without emotional connection. This is where flavor and pleasure comes in the hidden drivers of sustainable diets. When good taste aligns with good values, transformation becomes irresistible, reducing waste, improving taste and supporting local farmers. These are examples that reflects the heart of Shiology, creating balance between science and human experience, and reminding us that local progress begins with the way we grow, the food we cook and how we share the food.

Communities and businesses are finding creative ways to blend new technology with traditional food wisdom. The report closes by reminding us that the future of food is ultimately the future of human being. If we view the eater not as a consumer, but a core creators of well being. Every meal becomes an act of care for ourselves, the community, for the planet. That is the vision of eater- centered transformation, guided by flavor, grounded in science and inspired by harmony.



Bioinoculants: A Venezuelan Perspective on Advancing Safe Food Systems for Longevity

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Abstract: Bioinoculants offer a transformative solution to the global food quality crisis caused by conventional agriculture's reliance on agrochemicals. From a Venezuelan perspective, this article demonstrates how plant-growth-promoting microorganisms enhance food safety and longevity through a "soil-to-health" pathway. Our research isolates and characterizes native strains, showing that their application in crops like pepper, lettuce and onion reduces inorganic fertilizer use by up to 50% while maintaining yield. Crucially, they increase nutritional content in edible produce and reduce chemical residues by suppressing pathogens. Supported by national research and international collaboration, bioinoculants emerge as key tools for building sustainable, health-centric food systems that bridge soil restoration, nutrient-dense food production, and human longevity.

Keywords: Bioinoculants, Food Safety, Longevity, Soil Health, Venezuela.

I. The Quality Crisis

From the shiology perspective, the food journey doesn't start in the kitchen, but in the soil. A healthy eater depends on healthy food, and healthy food depends on healthy soil. Our research addresses this fundamental link.

According to the FAO, by 2050, we must produce 50% more food. But here is a critical problem: we must deliver this food without compromising its quality and safety.

In Venezuela and globally, the case of conventional agriculture, driven by the massive use of agrochemical fertilizers and pesticides, has damaged our land. This dependence is a rupture of the shi-order. This rupture has a direct impact on the health and longevity of the eater, due to chemical residues in our fruits, vegetables, and grains. The

problem is not just how much we produce, but how safe and nutritious that food is for our families.

II. Bioinoculants: A Biological Solution for Health

Bioinoculants become a powerful natural tool. Bioinoculants are products containing living, beneficial microorganisms that restore the natural biological balance of the soil. They are microbial allies that allow us to step away from chemical dependence.

These microorganisms are known as Plant Growth-Promoting Microorganisms (PGPMs), and they primarily live in the rhizosphere—the area immediately surrounding the root. They function through different mechanisms of action: nitrogen fixation, phosphorus solubilization, and

phytohormone production, among others.

More importantly, our research highlights how these microorganisms directly benefit human health and longevity in two key ways:

First, enhancing nutrient content and quality. A healthy soil, supported and bound by inoculants, leads to crops with higher quality. Crucially, we have detected higher content of essential nutrients, like nitrogen and phosphorus, in the edible organs of our test crops, making them significantly more nutritious and of very quality for the consumer.

Second, improving safety and purity. By reducing or substituting chemical fertilizers and pesticides, we drastically reduce the chemical burden and toxic residues that end up in the food consumed by families. Bioinoculants, therefore, offer a bio-safe food system solution.

III. The Venezuelan Contribution and Evidence

Our work on bioinoculants in Venezuela, stemming from a valuable research initiative, focuses on isolating and characterizing the strengths of these beneficial microorganisms, especially from the Andean region. We apply rigorous physiological, biochemical, and molecular

tests to ensure their taxonomic identity and scientific validity.

Our research, under control and field conditions across the country, has consistently demonstrated key benefits in commercially important crops like bell pepper, lettuce, and onion, among others. We achieve significant yields comparable to conventional methods, but with up to 50% less reliance on inorganic fertilizers.

Furthermore, we have evaluated the effect of our bioinoculants as biocontrol agents against major plant pathogens. This means fewer crop losses and, critically, less need for chemical fungicides in the food system.

These images below show the tangible results of our national research efforts. It provides visual proof of high crop vigor and excellent yield under Venezuelan field conditions, confirming that bioinoculants deliver reliable economic performance alongside health benefits.

IV. Conclusion and Vision for Longevity

Our vision extends beyond our borders. In collaboration with colleagues from Mexico and Brazil, we are actively developing an international scheme for the bioprospecting of microorganisms, sharing our regional experience to scale up



bioinoculant production.

Currently, we are also working on the final stage of a project evaluating the effect of bioinoculants on soil enzyme activity and overall soil health—a project supported by the Ministry of Science and Technology of Venezuela. Our preliminary results suggest that these microorganisms can be key components in soil restoration plans.

To conclude, within the shiology framework, bioinoculants are not merely agricultural products.

They are powerful instruments of transformation and preventative health. They enable us to cultivate food that is not only abundant but also nutrient-rich and toxin-free. This contributes to a food system that actively supports human health, promotes longevity, preserves our land, and strengthens our cultural connection with safe food.

This is Venezuela's perspective, contributing to a global system that places health at the forefront.

Mediterranean and East Asian Diets – Eating for Longevity and Vitality

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Abstract: Diet is closely related to human longevity and vitality, and the Mediterranean diet and East Asian diet, as two typical healthy dietary patterns, have attracted widespread academic attention. This article systematically explores the historical background, core characteristics, practical significance and communication or development challenges of the two dietary patterns, and deeply analyzes the theoretical connection and common connotation between them. The Mediterranean diet, recognized as a UNESCO Intangible Cultural Heritage, takes dietary diversity and sustainability as its core concepts, with olive oil, whole grains and vegetables as key ingredients, and its popularization is affected by factors such as educational level and modern lifestyle. The East Asian diet, with a long history and profound theoretical foundation based on the Huangdi Neijing and Yin-Yang and Five Elements theory, is characterized by “following nature” and remarkable effects in promoting longevity, while it also needs to optimize the problems of high salt and high oil. In addition, the article introduces the dual cognitive theory of food (Food natures and Food elements) proposed in Shiology, which integrates Eastern and Western food cognition and provides a scientific theoretical basis for rational food selection. It also discusses the practical value of traditional Chinese medicinal cuisine based on the “Food and Medicine Homology” theory in human beauty and longevity. Finally, the article points out the current status of the food industry and the practical challenges facing dietary health and emphasizes that cherishing natural gifts, integrating Eastern and Western food wisdom, and breaking industrial monopolies are the key paths to realize dietary health, longevity and vitality.

Keywords: Mediterranean diet, East Asian Diets, Longevity, Health, Food

Historical and practical significance of the Mediterranean Diet

The Mediterranean diet was recognized as a special dietary pattern with positive effects on life expectancy as early as 1960 and was included in the UNESCO Intangible Cultural Heritage List in 2010. Over the past 50 years, agricultural production has transformed from a locally adapted model to modernization. The food environment on which the Mediterranean diet originally relied integrates five key elements “eating enough; eating with variety; food-safe eating;

eating for health and longevity; sustainable eating”. Its essence lies in people ensuring the stability of life through dietary diversity according to local production constraints and environmental conditions, forming a virtuous cycle of “you are what you eat, and the environment is also depending from what the people eat”.

The significance of “retro-innovation” is also emphasized: modernization once made people mistakenly believe that technology could break through natural limits, but current issues such

as climate change, declining soil quality, and pollution remain stark and pressing. Thus, we are engaging in what might be called “retro-innovation”—rediscovering pathways to healthier living even as public health systems face growing challenges. Ultimately, prosperity means achieving the coordinated development of high-quality life, environment, interpersonal relationships, and economic sustainability at a time when the public health system is facing challenges.

The core elements of the Mediterranean diet, such as no added sugar, less red meat, and more olive oil, have spread globally, and balancing diet, local environment, and production capacity is the key to its sustained value.

Policy support is crucial, as addressing economic monopoly forces in the food system requires coordinated policy efforts. Italy is advancing efforts within the frameworks of both the European Union and the Italian national context—distinct from the Australian model—where simplification processes are implemented to preserve diversity even at the farm level through differentiated policies. These efforts aim to better connect consumers with producers, establish food communities, and provide support for typical and traditional products, biodiversity, animal welfare, and antibiotic resistance management. The core is to rebuild the coordination of all subjects in the food system and promote the sustainable development of dietary health and the industry.

Core Characteristics and Communication Challenges of the Mediterranean Diet

Although there are differences in diets among countries in the Mediterranean region (Italy, France, Spain, Greece, etc.), the core ingredients are highly consistent, and the key lies in the way of food combination — there is no absolute “good food” or “bad food”, and reasonable dietary combination is the essence of the Mediterranean diet.

The core ingredients of the Mediterranean diet include olive oil, whole grains, vegetables, fruits, and an appropriate amount of animal products (meat, cheese, etc.). These ingredients not only provide basic nutrients but also are rich in nutraceutical components. Taking olive oil as an example, its main components are triglycerides and oleic acid, but its greatest value to human health does not come from oleic acid, but from polyphenols. Olive oils of different varieties and origins have different polyphenol compositions, among which Italian varieties have significant advantages in polyphenol content.

In terms of the spreading of Mediterranean diet, it is closely related to people’s educational level; for example, in southern Italy where the educational level is relatively low, people’s acceptance of the Mediterranean diet is also low. At the same time, the Mediterranean diet is mainly composed of raw food, but the modern pace of life is fast, and people are more inclined to consume processed and ultra-processed foods. The time-consuming and high cost of raw food have also become major challenges for its wide spreading. Furthermore, the health benefits of the Mediterranean diet are emphasized, with its greatest benefit to human health being its ability to regulate the intestinal microbiota, mainly due to the dietary fiber in whole grains and polyphenols in various ingredients.

Three Core Characteristics and Development Prospects of East Asian Diet

The core characteristics of East Asian Diet are summarized into three points in this section. Firstly, it has a long history. The East Asian diet has nurtured the continuous Chinese civilization, and this land, which has been cultivated for thousands of years, still supports billions of people today. Its sustainable development is inseparable from the local people’s dietary concept of “following

nature” — collecting fresh ingredients and using characteristic cooking methods to achieve a benign adaptation between diet, human body and the environment.

Secondly, the East Asian diet boasts a profound theoretical foundation. It relies on traditional classics such as the Huangdi Neijing (Yellow Emperor’s Inner Canon) and integrates the Yin-Yang and Five Elements theory to form a systematic dietary health theory. People classify food into Yin and Yang properties, corresponding to the Five Elements of wood, fire, earth, metal, and water, which are associated with the five internal organs of the human body — liver, heart, spleen, lungs, and kidneys. Combined with food colors and seasonal changes, it forms dietary principles of “four-season health preservation” and “constitution adaptation”, clearly explaining the scientific logic of food selection.

Thirdly, the East Asian diet has remarkable practical effects. From the perspective of global life expectancy data, the East Asian region performs prominently: Japan’s average life expectancy is 84.7 years, South Korea’s is 83.7 years, Singapore’s is 83.6 years, Hong Kong of China even reaches 85 years, and mainland China’s average life expectancy is 78.2 years, far exceeding the global average. This fully confirms the positive effect of the East Asian diet on prolonging life.

The development prospects of the East Asian diet note that although it has significant advantages, it also needs to optimize and adjust unreasonable aspects such as high salt and high oil content. In the future, it should be widely recognized and promoted globally like the Mediterranean diet, allowing the wisdom of the East Asian diet to contribute to human health.

The dual cognitive theory, an important theory, proposed by Mr. Liu Guangwei in Shiology. This theory is easily acceptable to people’s current cognition: as East Asians, we recognize the food

natures—the concept of “Food & Medicine Homology” is widely recognized among us. Food has Yin and Yang properties: we tend to eat hot food when it is cold (hot food belongs to Yang), and cold food when it is hot (cold food belongs to Yin). This understanding of food in Eastern culture is part of Food natures. The other aspect is Food elements, which is based on the cognition of Western nutrition. Western nutrition identifies seven major categories of nutrients in food, including carbohydrates, proteins, fats, vitamins, minerals, water, and dietary fiber. The dual cognitive theory integrates the Eastern and Western understandings of food, recognizing food from both Food natures and Food elements. By embracing both aspects, we can make more scientific and reasonable food choices and fully explore the value of food.

Relying solely on Western nutritional analysis methods cannot fully help us understand the composition, components, and effects of food. Laboratory tests can reveal the nutritional components of food (Food elements) but cannot reflect its nature (Food natures) — such as its cold, hot, cool, warm, or plain. Based on Shiology, the dual cognitive theory of food components guides people to choose different foods according to different times, physical constitutions, and seasons, which is the core of seasonal health preservation.

The common core of the Mediterranean diet and the East Asian diet is cherishing the gifts of nature, scientifically understanding the value of food, and consuming it in a reasonable proportion. Only by living in harmony with nature can we achieve human health, longevity, and happiness.

The Practical Path of Chinese food therapy for Human Beauty and Longevity

The Chinese food therapy has a history of more than 2,000 years, originating from the “Food and Medicine Homology” theory proposed by Sun

Simiao in the Tang Dynasty. It combines two great quintessences of the Chinese nation — traditional Chinese medicine and cuisine, integrating medicines into meals to retain the deliciousness of meals while exerting the regulating effect of medicines, achieving “the same effect of medicine and food”.

The core of Chinese food therapy relies on the four natures, five flavors, ascending-descending and floating-sinking properties of traditional Chinese medicines, adjusting the Yin-Yang balance of the human body through diet according to physical constitution to prevent diseases, treat diseases, and promote beauty and longevity.

The dietary wisdom of the Chinese nation is centered on “mainly vegetarian, with a combination of meat and vegetables”, namely the grain-grass nutrition theory of “five grains for nourishment, five vegetables for supplementation, five animals for enhancement, and five fruits for assistance”, which is significantly different from Western high-energy nutrition. Regarding the efficacy of food therapy, a large number of medicinal diet prescriptions are recorded in traditional classics such as the Huangdi Neijing (Yellow Emperor’s Inner Canon), Shanghan Zabing Lun (Treatise on Cold Pathogenic and Miscellaneous Diseases), and Jinkui Yaolue (Essentials of the Golden Cabinet). These prescriptions have been tested by thousands of years of practice and can effectively regulate human body functions, helping people achieve the goals of beauty and longevity.

Current Status of the Food Industry and Practical Challenges of Dietary Health

People’s current dietary choices are not only affected by scientific cognition but also constrained by factors such as cravings, economic interests, and government policies. Large enterprises and

monopolies control the food production and distribution system, with profit as their core driving force. Therefore, they influence consumers’ (especially young people’s) dietary choices in various ways, leading to the widespread popularity of high-sugar, high-fat, and high-salt processed foods.

East Asian food culture is highly recognized for its unique value. In East Asian culture, abalone, sea cucumber, shark fin, and swim bladder are listed as the “four great seafood treasures”, symbolizing health, wisdom, strength, and survival ability respectively. Behind this classification of food is 5,000 years of practical accumulation; although there is no clear scientific theoretical explanation, its practical effects are undeniable. Dietary patterns such as the East Asian diet, Mediterranean diet, and Japanese diet are highly valued for their core advantage of adapting to the local climate and environment to provide people with the nutrition needed for survival and development.

Another major challenge facing current dietary health is the disappearance of the social village structure. In the past, small shop owners were familiar with customers’ needs and could recommend fresh ingredients, but now large supermarkets dominate the market, making it difficult for consumers to obtain personalized healthy dietary guidance. A rational personal dietary principle is to follow the concept of “listening to one’s body”, mainly consuming wild seafood and vegetables, eating only when hungry, and avoiding blindly following fixed dietary rules. Promoting dietary health requires relying not only on scientific theoretical support but also on breaking industrial monopolies and rebuilding social food exchange scenarios to truly implement the concept of healthy diet.

05

Governance Reform and Institutional Innovation
for Sustainable Food Systems

全球治理与制度创新：重塑可持续的 食物系统

2025年10月30日 9:00~10:30

[GM] A Broken Food System

[CN] 中国粮食安全保障法律制度

[SA] Food Security in Saudi Arabia: Development Strategies for a Sustainable Future

[IN/CN/QA/SG] Global Governance in Food Systems



A Broken Food System

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Abstract: This article focuses on the crisis of Africa's broken food system, drawing on the author's 15 years of practical experience in food security work across Africa and collaboration with the African Union. It first reviews the failures of successive African food system frameworks and presents stark evidence of the worsening food insecurity crisis. The article identifies the root causes of the crisis, including three core governance gaps, soil degradation, and the disproportionate impact of climate change on Africa's food production capacity. It further elaborates on the necessity of restructuring the food system. To address these issues, the article proposes solutions such as strengthening institutional capacity, promoting science-driven policies, enhancing international collaboration, and adopting people-centered approaches. The article concludes with a call for increased agricultural investment, community empowerment, governance reform, and prudent use of technology. It provides practical insights for addressing Africa's food security crisis and offers a reference for global governance in the agri-food sector.

Keywords: Food System, Food security, Africa, Agriculture, Governance

Over the past 15 years, my work has focused on improving the lives and situations of farmers and people who are food insecure in the Gambia and also across the continent of Africa. I have worked very intensively with the African Union Commission in developing the Africa Food System framework, which is known as the AU CAADP framework. In my view, our food system is broken—not because we intended it to be, but because we have failed to ask the right questions. Let us examine some of the global efforts that have fallen short of achieving their goals in Africa.

Our food system is broken

In 2003, the African Union convened all heads of state and government to address the continent's

food crisis. At that time, an estimated 350 million people in Africa were food insecure and living on less than one dollar a day. To improve the situation, the leaders adopted the Maputo Declaration—a framework centered on agricultural development—in Nigeria and Maputo. It aims at investing 10% of national GDP in agriculture, growing the agricultural value at least by 6% in the next 10 years (by 2013), and halving poverty by 50%.

If these targets had been fully achieved, Africa's food-insecure population should have dropped to fewer than 200 million by 2013. The reason we failed is that after a decade of implementation, the African Union held a review summit in Malabo in 2014 (to assess progress up to 2013). During this meeting, leaders evaluated the achievements,

challenges, and next steps for supporting the 350 million vulnerable people. They acknowledged that the Maputo Framework was good and recommitted to it, but also admitted that many of its objectives had not been met. This led to the adoption of a new framework: the Malabo Declaration, with the goal of building a better food system in Africa by 2025 (spanning the period from 2003 to 2025).

In fact, the number has increased. The number of people who are food insecure in Africa has risen to 468 million today. This means Africa accounts for the majority of the world's 700 million food-insecure individuals. We also have some UN commitments, The 2021 UN Food Systems Summit also saw Africa present a unified position as part of the global agenda. For the past two years, my work has focused on supporting the African Union to develop the Kampala Declaration—a framework covering 2025 to 2036. Its core objectives are to strengthen Africa's food system, build community resilience, and improve the lives of those 468 million food-insecure people. So this is one of the reasons why I think our food system is broken.

The evidence is clear: 700 million people worldwide face hunger. The climate is one of the serious threats. Africa actually is one of the least contributors to climate change, but it is the most severely affected people and continent. The 1.5 or the 2.0°C increase will actually affect the ability of the continent to produce food. There will be a 50% decline in yields for staple crops like wheat, rice, maize, and millet across many African countries. Even in less severely affected regions, yield reductions will reach up to 30%, with only minimal declines (10%) in a handful of areas. The few countries projected to see modest yield increases—Lesotho and a small country between the eastern Africa, which actually will not be able to feed the millions of people who are hungry.

Why do we need to fix our Food System?

The reality remains the same. Africa actually holds 60% of the world's arable land. Africa is defined in most cases as the food basket of the world. We believe that if the continent is exploited or its natural resources are exploited, we can feed the entire globe. However, a critical bottleneck remains: 60% of African soils are degraded or are faced with productivity limitations. As a scientist, I understand what it takes to maximize food production sustainably. I know how it takes to produce food in the most appropriate way. This is actually causing the continent to lose our GDP of about 4 billion US dollars annually in crop losses alone.

The farmers harvest far less than the land's potential output. Soil actually can help bolster our food system. It can also help us to create employment for people in our continent and also in the world. It can help us ensure that fasting is a choice, not a necessity, for millions.

Africa actually stands at a crossroads. The root causes of our food crisis lie in three key areas: weak governance in the food system, a lack of innovation, and the failure to build resilient communities and a resilient continent. In this light, we need to fix our food system because our food system has all of this potential.

In the continent, 68% of young people in sub-Saharan Africa and 52% in Asia are actually employed in the agri-food system. If we improve this agrifood system, especially our soils, we can create jobs, reduce youth migration, and prevent a generation from being forced to leave their homes as refugees. No one wants to abandon their family, grow up in poverty, and struggle to put food on the table for their entire lives. Yet this is the reality driving migration across the continent.

The population of Africa is actually a huge

potential: 25% of our population are below the age of 25. However, every year we create less than 3 million jobs while we have about 11 million young people entering the labor market. This is a big challenge.

We have to ensure that agriculture is able to produce as it should. For many African countries, agriculture contributes about 30% to 50% of their GDP and also their employment. In the world, 20% of young people are not in education, employment, or training—leaving them without skills and opportunities. But if you make this better, we can actually improve the overall GDP by at least \$1.4 trillion. So this is why we need to fix our food system.

Now, the agri-food system is newly adopted, and we're trying to understand what it really means in practical. But these are some of the things that we have defined it, or this is some of the way that we have defined it in Africa.

We need to be able to know what are the policies, which policies work, which do not, and how to fix that? That will actually signal many opportunities for large-scale production, efficient food processing, and equitable distribution—ensuring food reaches those who need it most.

Food Waste and Loss is a critical issue that a redesigned agri-food system can solve. Also health begins with soil. Nutritious food grown in healthy soil is the foundation of good health. The medicine is sick care, but food is healthcare. So this is why we need to fix this agri-food system because it can produce enough healthy crops for everyone, ensuring access to nutritious food and better health outcomes. Further, storage and distribution are integral to the entire cycle—supporting production, processing, retail, and consumption.

Fixing, understanding, and transforming the agri-food system will yield immense social and economic benefits: it will improve people's quality

of life, reduce unemployment and crime rates, and allow governments to deliver on their food system commitments. When leaders sign frameworks like the Kampala Declaration, they must be able to stand before their people and demonstrate tangible progress—such as reducing food insecurity in The Gambia by 2036. Most importantly, a resilient food system will help Africa combat and adapt to climate change, fostering harmony with nature.

Governance gaps

The governance gaps in Africa's agri-food system: First, weak institutions. Government agencies and regulatory bodies lack capacity, resources or authority to enforce rules and monitor progress, or support sustainable food system practices effectively. We need to fix these big institutions. Second, fragmented policies. Policies across the food system, health and environment are often inconsistent or poorly coordinated, leading to inefficiencies and conflicting objectives—for example, policymakers in Ghana are often unaware of initiatives in The Gambia. Even within countries, rural and urban areas operate with disjointed policies. So this is why forums like this are very important. But it is not enough for us alone to come and have this forum here. This forum needs to move out from this room and begin to enter into the regions and nations to harmonize policies. Third, youth empowerment. Young people who are key to innovation and long-term food security are often underrepresented in decision making, policy design and leadership roles in the food system sector. We frequently talk about youth empowerment and employment, yet young people are excluded from high-level policy-making processes. How many young people are invited to participate in decision-making meetings? How many hold ministerial positions or key policy roles? Young people bring fresh perspectives and

innovative solutions—we must give them a seat at the table. The young people who are well educated and well experienced can bring a lot of change to the agri-food system. We cannot innovate food systems without reforming the systems that govern them.

The article brings some examples that we do at the African Union level and The Gambia. So the African Union has been very instrumental in the past years when it comes to the agri-food system. We have not really transformed the lives of many people, but we have a big transformation in terms of the processes of governing and defining what agri-food system means for the continent.

First, Investments. We have opened up doors for people to come and invest in the continent. We are thinking about taking the risk for people to be able to invest in agricultural system because it is risky and this is helping us build a resilient and sustainable agri-food.

Second, Science-Driven Policies. When we talk about science-driven Policies, we need to be able to make reference to scientific works and in the Gambia, we have collaborated with the Ministry of Agriculture to be able to do some nationwide soil fertility mapping, which is going to help the country make informed decisions. In terms of our soil management. We have also been able to do some soil mapping, which is a very specific characterization of the soil in order to be able to inform policy and action. And we also launched some innovative programs using AI trying to study how to use AI to analyze soil and to be able to make decisions of regenerating soil.

Third, international collaboration. Two years ago, I was in China in Shenzhen through my good friend Professor Fred, and the Chinese community supported us to launch a project we call the Africa Soil Strength Program. And this is like a continental movement where we build the

resilience of communities in the continent, but also helping them to be able to monitor, learn, and evaluate their soils, which is going to translate to improving production.

Fourth, People Centred & People Driven. we have to put people at the center of everything that we are bringing to them. Communities are very important and for us, when we want to design projects, we go to the community and talk to them, understand what their problem is, and let them to define the solutions that they want. And we put this in paper, mobilize resources, and come and implement the program together with them because they don't take ownership of it. And the sustainability is less if they are not involved. So these are some of the Models that I wanted to see in terms of helping us to govern our food system.

I want to call all of you: first, we need to invest in agriculture. China has made a lot of progress in the agri-food system, and I think they can support the continent of Africa in many ways, both financially and also in techniques. Second, I think we have to empower communities. And these have to be through training programs and also access to land, but also helping them to understand this land. It is very important. This can create not only healthy lives, but also dignified lives for these people. And third one is to reform our governance. Think about aligning a fragmented policies to have a better framework, which is going to help us define how do we feed these 700 million people? And in Africa, how do we feed these 468 million people who are food insecure and I also want to call all of you that today in this world and age, we have a lot of innovation and technology, but we need to be dubious about this technology. We need to be careful. We need to put in proper governance framework in order to ensure that this technology is better in the lives of the people and not harming their lives.



中国粮食安全保障法律制度

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摘要: 作为拥有14亿多人口的大国,中国始终将粮食安全视为治国理政的头等大事,构建了较为完备的粮食安全保障法律制度体系。本文所指“粮食”超越传统意义上的“谷物”范畴,指向“食物”概念,“安全”则兼具数量、品种保障(security)、质量安全(safety)与风险防控多重内涵。本文系统梳理了中国粮食安全保障法律制度框架,涵盖以《农业法》《粮食安全保障法》等为核心的综合性与专门性法律支撑,覆盖生产主体、经营体制、耕地保护、科技赋能、投入品管理、风险应对、质量安全、流通贸易等全链条的制度设计;进而分析了该制度体系贯穿绿色发展与节粮减损导向、立足“大国小农”国情保障农民权益、强化耕地保护基础地位、严守农业投入品安全底线等鲜明特色,并对绿色农业、智慧农业等法治化发展方向作出展望。研究表明,中国已形成多元协同的粮食安全治理框架,相关法律法规为保障粮食数量充足、品种多样、质量安全提供了坚实法治保障。

关键词: 粮食安全;法律制度;中国农业

在粮食安全领域,中国作为拥有14亿多人口的大国,始终将粮食安全视为治国理政的头等大事,高度重视运用法治手段保障粮食安全。经过多年不懈努力,中国已建立起一套较为完备的粮食安全保障法律制度体系。在内涵界定上,这里所说的“粮食安全”涵盖两方面内涵:其一,“粮食”不仅指传统谷物,更接近本次世界食事论坛所讨论的“大食物”概念;其二,“安全”则从单纯的数量保障,拓展到品种多样性及食物质量安全的维度,对应英文中“security”与“safety”的双重含义。

本文主要聚焦两方面内容:一是简要介绍中国粮食安全保障的法律制度框架;二是分析该制度体系的特色及未来发展方向。

一、日趋完备的法律制度框架——全方位夯实粮食安全根基

中国已构建起以综合性法律为统领、专门性法律为支撑较为系统的法律制度框架。《国家安全法》将粮食安全列为维护国家安全的重要任务。《乡村振兴促进法》将粮食安全提升至国家战略高度,明确了严格耕地保护等制度,并规定国家建立实施粮食安全责任制,完善粮食加工、流通、储备及应急保障体系,确保谷物基本自给、口粮绝对安全;《农业法》作为农业基本法,以专章形式确立粮食安全基本原则。《粮食安全保障法》作为核心支柱专门法,构建全链条的具体制度,落实粮食安全责任制。

在生产主体层面,《民法典》赋予农村土地承包经营户、农村集体经济组织、农民专业合作社民事主体

地位,为中国“大国小农”国情下的农业生产经营主体提供了坚实的权利保障。《农村集体经济组织法》《农民专业合作社法》则对这些组织的运行机制与政府扶持措施作出专门规定。

在经营体制方面,中国实行独具特色的“统分结合”双层经营体制,《农村土地承包法》《农村集体经济组织法》确立了以家庭承包经营为基础、统分结合的农村基本经营制度,在此基础上创设的所有权、承包权、经营权“三权”分置制度,在保护农民权益的同时,通过放活经营权,促进土地流转和适度规模经营,为现代农业发展奠定制度基础。

在耕地保护方面,《土地管理法》确立了最严格的土地用途管制制度,永久基本农田保护和耕地占补平衡制度。针对黑土地等优质稀缺资源,国家颁布实施《黑土地保护法》,守护“耕地中的大熊猫”。此外,《土壤污染防治法》等法律法规构筑起生态安全绿色屏障,确保良田沃土永续利用。目前,《耕地保护与质量提升法》的立法工作正在加快推进。在种植业之外,畜禽、水产等领域也建立了严格的资源保护与管理制度,近期《渔业法》修订更是将渔业资源保护作为重点内容。

在科技支撑方面,中国高度重视科技创新对农业提质增效的关键作用。《农业技术推广法》构建完善的农业技术推广体系,推动先进适用农业技术高效普及应用;《农业机械化促进法》通过财政补贴等扶持政策,鼓励和支持农业生产经营主体使用先进适用农业机械,加快推进农业机械化,提升生产效率。

在农业投入品管理方面,种子、农药、兽药、饲料、肥料等重点领域法律制度基本确立。《种子法》构建了涵盖资源保护、品种选育、审定登记、生产经营、进出口监管的全链条管理制度——对水稻、小麦、玉米等主要农作物实行品种审定,对蔬菜水果等非主要农作物实行登记管理。中国特别注重农业领域知识产权保护。植物新品种、地理标志等制度不断健全完善,新修订的《植物新品种保护条例》进一步激励育种创新,切实守护农业“芯片”。《农药管理条例》《兽药管理条例》《饲料和饲料添加剂管理条例》等行政法规,对农药、

兽药、饲料和饲料添加剂市场准入、生产经营、使用规范等实施严格监管,保障农业生产安全和农产品质量安全。

在质量安全方面,中国现行制度构建起“从农田到餐桌”全过程监管体系,严格落实“最严谨的标准、最严格的监管、最严厉的处罚、最严肃的问责”要求。以《农产品质量安全法》和《食品安全法》为核心基础,明确界定了相关部门的监管职责:食用农产品从养殖环节至进入批发零售市场或加工企业前(即“三前”环节)由农业农村部门监管;进入批发零售市场或加工企业后(即“三后”环节)则由市场监管部门承担监管责任。各相关部门建立高效协同工作机制,强化信息共享、联合执法、风险会商与应急处置。法律对违法使用禁用药物、农兽药残留超标等行为设定了严格的法律责任,形成全链条、无死角监管覆盖,零容忍打击,确保人民群众吃得安全、吃得营养、吃得放心。

在风险应对方面,法律体系构建了法治安全防护网。《生物安全法》对外来物种入侵作出明确规定;《出境动植物检疫法》建立了涵盖动植物出入境、携带邮寄、运输工具的检疫制度;《动物防疫法》明确动物及动物产品检疫要求;《防汛条例》《抗旱条例》针对自然灾害建立了从预防、抢险、减灾到灾后恢复的应对机制。《农业保险条例》则为农民提供灾后风险分散和金融支持,立法机关正在研究论证制定《农业保险法》。

当前,中国农业已从注重数量保障,进入数量、品种、安全并重的新阶段,并日益关注营养健康。从品种培育到风险防控,制度日益完善。最新数据显示,2024年农业农村部组织开展的三次国家农产品质量安全例行监测,覆盖蔬菜、水果、茶叶、畜禽产品、水产品五大类132个品种,监测136项参数,总体合格率达98%,较2023年提升0.2个百分点,农产品质量安全水平稳步提高。

标准体系持续健全,覆盖农兽药残留限量、绿色防控、产业升级与质量提升、营养品质与健康消费四大领域。“十四五”以来,新修订农兽药残留限量标准3782项,现行有效标准13780项,限量数量是国际食

品法典限量数量的近两倍。此外, 现行有效农业行业标准6471项, 农业生产技术规范和操作规程1.8万项, 设立标准化技术委员会31个, 建成部、省、市、县四级质检体系。

中国依据商标法设立“绿色食品”证明商标, 并建立严格规范的认证标准体系。截至2024年底, 获标企业已超3万家, 产品总数逾6万个。绿色食品产品不仅在国内市场广受认可, 还出口多个国家和地区, 有效提升了产品附加值和企业市场竞争力。

在流通领域, 中国持续深化市场化改革, 《粮食流通管理条例》《中央储备粮管理条例》等法规保障市场畅通有序运行。《畜牧法》全面规范畜禽资源保护、养殖、加工与流通; 《渔业法》建立了覆盖资源增殖、养殖捕捞等全链条的管理制度, 中国的水产养殖技术位居全球先进水平, 品种丰富, 在国际合作与对外援助中发挥着重要作用。

在投资贸易领域, 中国严格实施《外商投资准入特别管理措施(负面清单)(2024年版)》, 明确规定小麦新品种选育和种子生产中方股比不低于34%, 同时要求玉米新品种选育和种子生产须由中方控股, 以制度刚性守住种业安全底线, 切实维护关键领域国家利益。

二、立足国情与面向未来的制度特色

中国粮食安全保障法律制度立足基本国情, 顺应发展大势, 体现出以下鲜明特点:

一是贯穿绿色发展与节约导向。坚持源头治理、系统治理, 加强农业面源污染防治、投入品减量、清洁生产、废弃物资源化利用, 推动产业生态化, 引导社会形成节约适度、绿色低碳的生产生活方式。《反食品浪费法》明确各类主体的节约义务, 倡导简约适度、文明健康的消费文化。目前, 中国在种养结合、病虫害统防统治、农药化肥减量、农业面源污染治理等方面, 形成一系列制度创新和实践创新。

二是立足“大国小农”国情, 强化农民权益保障。《农业法》建立风险基金制度用于支持粮食储备、稳定市场、保护种粮农民利益; 《农民专业合作社法》等相关法律明确相应的扶持措施; 《粮食安全保障法》建立对粮食生产者的财政金融扶持制度, 切实保护和调动农民种粮积极性;

三是坚守耕地保护根本底线。严格落实最严格的耕地保护制度, 严守耕地红线, 强化管控耕地用途, 确保耕地数量不减少、质量有提升、用途不偏移。

四是严控农业投入品安全底线, 对种子、农药、兽药、饲料等实施严格监管。中国拥有专业的农业综合行政执法队伍, 持续常态化开展市场监督管理。

通过系统完备的法律制度安排, 中国已构建起多元协同的粮食安全治理体系, 并取得良好治理成效。展望未来, 中国将加快推进科技农业、绿色农业、质量农业、品牌农业高质量发展, 与全球粮食安全事业高度契合, 同向而行。农业是安天下、稳民心的基础产业, 期待未来加强与各国专家的交流合作, 更好发挥法治对食事业的重要保障作用。

Legal Framework for Ensuring Food Security in China

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Abstract: As a major country with a population of over 1.4 billion, China has always regarded food security as a paramount issue in national governance and has established a relatively comprehensive legal system for ensuring food security. The term “food” in this paper transcends the traditional scope of “grain” and refers to the broader concept. The “security” encompasses the multiple connotations: quantity and variety security, quality safety, and risk prevention and control. This paper systematically outlines the framework of China’s legal system for ensuring food security,

including comprehensive and specialized legislation such as the Food Security Law and the Agriculture Law as its core pillars. It further elaborates on the institutional design across the entire chain, covering production entities, operational systems, land protection, technological support, input management, risk response, quality and safety, and circulation and trade. The paper then analyzes the distinctive features of this system, including its integration of green development and food loss reduction principles, its protection of farmers' rights and interests tailored to the national condition of "smallholder farming", its reinforcement of the foundational role of cultivated land protection, and its strict regulation of agricultural inputs to ensure safety. Finally, it discusses future development of law-based governance in fields such as green agriculture and technology-driven agriculture. The study demonstrates that China has formed a diversified and synergistic governance framework for food security, with its relevant legal and institutional mechanisms providing a solid rule of law foundation for ensuring adequate quantity, diverse varieties, and quality safety.

Keywords: Food Security, Legal System, Chinese agriculture



Food Security in Saudi Arabia: Development Strategies for a Sustainable Future

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Abstract: This article systematically examines the food security challenges facing Saudi Arabia within its Vision 2030 framework, focusing on structural constraints such as water scarcity, limited arable land, and high import dependency, alongside domestic issues like underdeveloped supply chains and significant food waste. The analysis highlights the Saudi Arabia's strategic responses, including institutional reforms, investments in agricultural technology (e.g., vertical farming and precision agriculture), and the implementation of the national "Li Tadum" initiative to reduce food loss. Progress has been made in policy integration, technology adoption, and public awareness. Nevertheless, key challenges persist in modernizing logistics, ensuring equitable regional distribution, and enhancing climate resilience. Moving forward, sustaining innovation, strengthening policy coherence, and aligning more closely with global sustainability goals will be essential for building a resilient and inclusive food security system.

Keywords: Food security, Saudi Arabia, Vision 2030, Sustainable development

The article examines the Key challenges influencing food security in Saudi Arabia and propose strategic frameworks and development initiatives that advance national resilience, self-reliance, and sustainable food systems, focusing on innovative practices and adaptive solutions aligned with the Kingdom's Vision 2030.

I. General Framework and structural constraints in food production in Gulf countries (GCC)

Saudi Arabia is a part of the Gulf region. This region faces some challenges including weak soils in many areas, desertification of the land, scarcity of irrigable water and depletion of groundwater resources, heavy dependence on imports to cover food consumption needs, risks of external

dependence, and high agriculture costs of fertilizer, fuel, and operation compared to imported alternatives.

II. Key challenges influencing food security in Saudi Arabia for almost ten years

The key challenges, influencing food security in Saudi Arabia for almost 10 years or the previous decades, include lack of inland production resources with less domestic production, unequal access to food, population pressure, inadequate integration and social networks. The most important difficulty was the limited local production of some crops, distribution and storage infrastructure, price fluctuation and food prices, import dependence, institutional coordination and

governance, awareness and consumption behavior, food waste and loss.

These challenges promote the government to adapt reforms in management and institutional structure, stimulate some local production in the appropriate areas and develop infrastructures. Import and supply policies have also evolved to secure the essential supply chain.

III.Saudi Arabia Vision 2030's Food Security

Consequently, Saudi Arabia launched Vision 2030, and food security has an important role in this vision. Saudi Arabia is actively enhancing its food security through strategic initiatives under Vision 2030. These initiatives focus on sustainable agriculture practices, reducing food waste, using technology to improve food production, and enhancing food system resilience.

Integrating food management into the national strategy places significant emphasis on waste reduction. Waste reduction targets have been introduced into the national agenda, with a commitment to reduce the proportion of food wasted by 50% by 2030 as part of the Sustainable Development Goals (SDGs) aligned targets. The aim of Saudi Arabia's Vision is to enhance food security through self-sufficiency, investments in agriculture, technological advancement, reducing food waste, and enhancing global competitiveness.

IV.Developments and Improvements in Food and Food Security Administration

Currently, Saudi Arabia is implementing several programs:

1.Institutional Integration and Governance

Work has been done to unify the roles and responsibilities between the concerned authorities

(agriculture, environment, health, food) to reduce duplication and improve coordination.

A greater focus on quality control and food safety, through stricter legislation, improved inspection systems, product traceability, and greater regulatory pressure on food establishments.

Introducing new requirements such as appointing a certified food safety specialist in central kitchens and others.

Also, Saudi Arabia invested 10 billion dollars to tackle food security as a comprehensive approach, including technology, mechanics and smart farms, iFarm, everything. For example, for what they are doing now: they have urban farming in Saudi cities. They create farms in the middle, try to deal with the soil, make Riyadh community gardens — it's a program. Vertical farms in Jeddah and Riyadh use a smart system.



The above photo is Al Urubah Park in Riyadh. It is a 75 -hectare park located within the urban grid on the central East side of Riyadh. As the first park within the Green Riyadh Program, Al Urubah Park represents a milestone built under the goal of creating a true urban oasis where the local community can satisfy the universal desire to reconnect with nature.

Also, they focus on the neighborhood markets and the local markets to reduce the transportation and the emission, provide support, and make a regional farmers within the urban center.

2.Reducing food loss and waste

In a 2021 study, it was found that the rate of “Food Loss + Food Waste (FLW) in Saudi Arabia amounted to about 33.1% of the consumable production, of which 14.2% was lost in the supply chains before reaching the consumer, and 18.9% was wasted after consumption.

According to a recent press release, Saudi Arabia has succeeded in reducing this percentage approximately 16% compared to the base of 2019. This year, the food Loss and Waste Initiative “Li Tadum” (National Program for Reducing Food Loss and Waste), overseen by GFSA in alignment with its efforts to promote food sustainability and support the objectives of Saudi Vision 2030. It was launched by Ministry of Environment, Water & Agriculture (MEWA) to reduce food waste via awareness and digital tools.

Through this initiative, they try to focus on education, especially in primary schools and the new generation, to increase the awareness of the people and the residents in Saudi Arabia, and to start with the children.

Also, the second initiative was a Et'aam food bank. They collected surplus food from hotels/ restaurants and redistributes it to those in need across the country.

3.Promoting technology and smart agriculture

They used remote sensing, mobile apps, AI, smart farms, iFarms, vertical farms. There is an increasing focus on mechanized and improved agriculture, protected agriculture, and smart agriculture (adoption of the Internet of Things, remote sensing) to improve productivity and reduce losses. Recent research shows how the use of innovative technologies on the farm and logistics

helps promote sustainability and reduce losses.

Also, in Jeddah and Riyadh, smart vertical farms for strawberry and greens are currently under development and six smart farm projects are also underway in locations such as Riyadh, Tabuk, Kharj, Jeddah, NEOM, and Asir, often in collaboration with international partners.

V. Ongoing challenges and shortcomings

Despite the fact that Saudi Arabia has made a lot of progress, and they try to search for, or to reach, sustainability by 2030, there are still challenges and shortcomings, like distribution and the logistic infrastructure, geographical and social disparities. The international impact on food prices and global market volatility remains a significant threat, especially dependence on imports remains high and lack of a standardized food formula table that gives accurate data.

VI. Conclusion and Future

Recommendations

At the end, Significant progress has been made in reducing food loss and waste, improving efficiency in the supply chain, promoting awareness, and strengthening institutional organization. However, Saudi Arabia still has a way to expand on technology, improves its logistics infrastructure, ensures equitable food distribution, and deepens research in deficient areas.

It is important to continue monitoring and periodic measurement, linking policies to international goals (e.g., the Sustainable Development Goals), and focusing on vulnerable groups to promote comprehensive food security.

Global Governance in Food Systems

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Abstract: This article explores multi-dimensional solutions to global food system governance challenges. Taking India as a case, it analyzes its paradox of coexisting food surplus and scarcity, as well as the triple malnutrition burden, and elaborates on its five core governance measures to link food security with SDGs. It also explores the modern value of China's traditional "Tianxia View", noting that its sense of shared responsibility and systematic thinking provides a philosophical basis for global food governance. Furthermore, the article emphasizes the core coordinating role of international organizations in global food distribution amid climate and economic challenges, taking Sudan as an example. Using Singapore and China as cases, it discusses differentiated national strategies in response to over-reliance on global trade and the dominance of multinational corporations, highlighting the importance of formulating policies based on national conditions. Finally, it clarifies that individual behavior change and systemic reform are interdependent, and proposes restructuring the choice architecture to promote healthy and sustainable dietary choices.

Keywords: Food Systems, Governance, India, China, Sudan, Singapore

Linking Food Security with SDGs: India's Paradox and Governance Breakthrough

As an agricultural powerhouse, India faces a paradox of "coexistence of surplus and scarcity" in its food system—it has achieved self-sufficiency in staple foods and exports them, yet remains plagued by malnutrition, hunger, poverty and inequality. The proportions of stunting, wasting and underweight among children under five are relatively high; underweight and anemia are prominent among women; and obesity is also on the rise, forming a "triple burden of malnutrition". In response to this situation, India is promoting the transformation of food governance through a series of policy and program adjustments to accelerate the progress

of the SDGs.

Specifically, India's governance measures focus on five core directions: First, strengthen the National Food Security Act, expand coverage, reduce exclusion errors, and ensure that marginalized groups such as migrants and the urban poor have access to high-quality and healthy food; second, promote nutrition-sensitive interventions, combining safe drinking water, sanitation facilities and education (especially women's education) to improve family nutrition through behavioral changes and reduce food loss by upgrading infrastructure such as storage and cold chains to make full use of food surpluses; third, build resilience and a sustainable agriculture system. This involves advancing climate-smart agriculture,

promoting inter-cropping and agro-ecological practices, and integrating regenerative agriculture to ensure long-term sustainable production. Such an approach not only enhances agricultural output but also strengthens the livelihoods and incomes of smallholder farmers. fourth, India is working to establish relevant regulations to address the high levels of fat, sugar, and salt in food products—factors that significantly contribute to the rise of non-communicable diseases. Among these efforts is the implementation of front-of-pack labeling laws, aimed at raising consumers' awareness about what they are consuming. This means food packaging must clearly display nutritional information, enabling individuals to understand the calorie content and other components present in the product; fifth, rely on evidence-based data and transparency to accurately design intervention measures and achieve the safe and sustainable production and consumption of food.

The Modern Value of Traditional Concepts: The Enlightenment of China's "Tianxia View" on Global Governance

The section explored the practical significance of China's "Tianxia View" (All-under-Heaven View) for the global governance of the food system from the perspective of traditional concepts. China's 3,000-year-old "Tianxia View" has formed a sense of community with shared responsibilities from rulers to intellectuals and ordinary people, namely "taking the world as one's own responsibility". This concept is deeply consistent with the shiology system proposed by Mr. Liu Guangwei—from focusing on catering and cooking, to the diet of 1.4 billion Chinese people, and then extending to the food issues of 8 billion people around the world, forming a systematic thinking that transcends geographical limitations.

Food issues are not only about insufficient production, but also include the issues of eater, food, and shi-order. The holistic thinking and sense of responsibility contained in China's "Tianxia View" can echo and interact with the common problems faced by global food governance, providing a philosophical basis for promoting the synchronization of Chinese and foreign ideas and seeking systematic solutions to food issues.

The Role of International Organizations: Coordination and Support in Crises

The situation in Sudan's Darfur region—where conflict has left 800,000 people suffering from chronic hunger—serves as a stark illustration of the coordination failures within the international community regarding food supply chain governance and protection. Under the current dual challenges of climate and economy, international organizations should play a core role in the equitable global distribution of food.

Specifically, the role of international organizations is reflected in four aspects: First, provide key financial support to facilitate the development of agricultural and food-related projects and learn from China's development experience in agriculture and animal husbandry; second, conduct baseline research, go deep into the entire chain such as fields, bakeries and markets to accurately locate the crux of the food system; third, strengthen capacity building and provide farmers with training on technology, fertilization, irrigation and other aspects to improve local production capacity; fourth, build communication platforms to organize multi-stakeholder dialogues including government agencies, the private sector, smallholder farmers and non-governmental organizations to share practical experience and pool governance efforts. The on-the-spot research

practice of the Food and Agriculture Organization of the United Nations (FAO) in Gezira State, Sudan provides a vivid example for international coordination.

Local Production and Multinational Corporations: Exploration of Differentiated Governance Strategies

In response to the current trend of some countries relying more on local production to meet their food needs, the global food system is overly dependent on global trade, and the dominant position of multinational corporations has squeezed the space of local producers. This has made the food systems of many countries vulnerable to fluctuations in the global market, and the unequal global food order cannot guarantee local food security and sovereignty. Therefore, the excessive influence of multinational corporations should be weakened, and the self-sufficiency capacity of local production should be strengthened.

Singapore and China as cases are used to illustrate the differentiated governance paths of different countries: As a city-state with scarce land, Singapore cannot achieve complete self-sufficiency. It has improved local production capacity through the “30 by 30” plan (to develop the capacity to meet 30% of its nutritional needs locally by 2030) and enhanced system resilience through diversified imports (for example, egg imports have shifted from relying solely on Malaysia to 50% from Malaysia, 10% from Poland, and 10% from other countries). China, on the other hand, has taken food self-sufficiency as a core strategy. Relying on less than 10% of the world’s arable land, it has not only fed about 20% of the world’s population, but also become the world’s largest producer and exporter of many agricultural products. So China has been successful in pursuing this strategy. However, it has paid an ecological price, which resulted in all kinds

of ecological damages. Currently, it is promoting agricultural ecological transformation and exploring a new model of “sufficient production and green environmental protection”. Each country should formulate strategies for participating in the global food system based on its own national conditions and seek governance solutions that are in line with its own interests.

Individual Behavior and Systemic Change: Not Opposing Governance Choices

The section focused on the “core driving force for the realization of a sustainable food system” and responded to the controversy of “whether to focus on individual behavior change or systemic change”. The two are not mutually exclusive, but interdependent and co-evolving—if systemic barriers are not eliminated, individuals will find it difficult to make rational choices. For example, the subsidized advantage of junk food, the high price and insufficient accessibility of healthy food make it difficult for low-income families to choose healthy diets; and the misleading of massive commercial advertisements on consumers (especially children) further consolidates unhealthy dietary preferences.

The core of governance innovation should be to “restructure the choice architecture” to make healthy and sustainable dietary choices more economical, convenient and popular. This can be achieved through three specific measures: First, at the economic level, adjust the subsidy structure, shifting from supporting “unhealthy food” to “healthy food” to reduce the cost of healthy diets; second, at the physical level, improve public procurement standards to promote schools, hospitals and other public places to give priority to providing healthy food and enhance the accessibility of healthy diets; third, at the social level, use media publicity and educational

popularization (such as compiling Shiology textbooks for primary and secondary school students) to gradually change public perception. The good governance does not require consumers to be “perfect moral individuals”, but to build a default system that allows ordinary people to make the right choices almost without thinking.

This article brought together governance experiences from diverse civilizations and development stages, forming several consensuses:

The global governance of the food system needs to be based on the national conditions of each country, balancing local needs and international cooperation; it needs to integrate multiple forces such as policies, technology and culture, balancing production efficiency and ecological sustainability; it needs to balance systemic change and individual empowerment, building a governance pattern with multi-stakeholder participation and collaborative efforts.

06

Education and Culture for Sustainable Food Practices

教育与文化:塑造可持续的食事行为

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[GR] Mediterranean Cuisine: A Study Based on Practices in the South Aegean Region

[CN] Food System Transformation: A Filmmaker's Perspective on Legacy, Compassion, and Global Action

[ID] Harnessing Holistic Care: Communication Strategies and Herbal Nutrition for Global Mental Health—A Case Study in Bandung, Indonesia

[CN] 公益赋能食育——海南食学教室项目的实践路径与发展愿景

[CN] 抓好食育教育 促进校园食品安全和学生健康

[IL/PH/HN/EC/RO/CN] Education and Culture in Food Systems



Mediterranean Cuisine: A Study Based on Practices in the South Aegean Region

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(Head, Internal Audit Directorate; Inspector for Food Safety, Health and Environment, South Aegean Region, Greece)

Abstract: Mediterranean cuisine is a crucial carrier of cultural heritage and sustainable development. Taking Greece's South Aegean region as a case, this article explores its culinary-based practices for sustainable governance, drawing on its collaboration with IGCAT. Focusing on programs like "Aegean Gardeners", "Aegean Mamas Know Best" and household composter promotion, the article finds that IGCAT's "European Region of Gastronomy" certification boosted local culinary tourism and talent cultivation, while educational programs enhanced public awareness of sustainable diets and intergenerational cultural inheritance. Environmental initiatives provided localized solutions for food waste and ecological protection. However, the implementation of the projects has also exposed challenges such as an unstable volunteer participation mechanism and insufficient awareness of food system sustainability among educators and parents. This paper further points out that the key to the transformation of the food system lies in improving the capacity building of food education-related subjects, enabling them to guide the public, industries and policymakers to form sustainable food choices. The experience of the South Aegean provides a replicable governance paradigm and strategic reference for similar regions around the world to promote local sustainable development.

Keywords: Mediterranean Cuisine, IGCAT, South Aegean Region, Education, Gastronomy

Experience of collaboration with IGCAT

IGCAT is the Institute of gastronomy, culture arts and tourism. For IGCAT, food is more than eating. It is a way of life, a cultural treasure, and the beacon of health and sustainability.

In 2019, the South Aegean region in Greece was awarded the title of European Region of Gastronomy by IGCAT. It wasn't just a recognition of our food. It was a celebration of our commitment to sustainability, innovation, and cultural preservation. This award has amplified our voice on the global stage, attracting culinary tourism, encouraging local entrepreneurship, and inspiring young chefs to innovate while honoring tradition. The benefits have been visible

to all: the local producers have seen increased demand, educational institutions have expanded their gastronomy programs, and people have been motivated to recognize the opportunity in remaining or returning to their homeland. Most importantly, our communities have embraced a renewed pride in their culinary roots. The award will serve as a catalyst for economic growth, cultural exchange and public health awareness.

To this day, European region of gastronomy has expanded and the title is now open for every region around the world that wishes to apply. By applying, you will gain access to valuable tools, best practices, and membership in a worldwide network of people, companies and institution involved

in gastronomy. You will also be able to organize and mobilize your community and stakeholders to strengthen local gastronomy and enjoy the same benefits as we had from our experience and participation in this platform.

Mediterranean Table

It is widely known that the Mediterranean Table is a classroom in itself. It is a classroom where generation learn the values of moderation, variety and seasonality. It is a mosaic of traditions, an harmonious blend of fruits, whole grains, legumes, nuts, olive oil, and moderate consumption of fish and dairy.

Aegean Gardeners

Aegean gardeners is a project we run in the South Aegean region that involves elementary school students. The southeastern region is an island region, in the southeast Mediterranean in Greece. The project is called a Aegean Gardeners. It started 2017 when we applied for the European region of Gastronomy. It is still ongoing today. The mission was to cultivate children a love for good food from an early age. How Aegean Gardeners cultivate Good Food for Everyone? By creating and maintaining their own school vegetable gardens.

This hands-on approach fosters a deeper understanding of where food comes from. During one of our visits in schools, a child was asked where tomatoes came from, and the answer was the supermarket. That's why education is so crucial when it comes to culinary and gastronomy culture.

The project also includes visits to the regional plant nursery, where the children learn about organic farming, seed collection, the vital role of bees in pollination, and biodiversity of native species of plants and herbs. So the pupils learn the traditional cultivating methods, with the guidance of experts, They appreciate the value of food and

its impact on their health, the environment and the community. They also learned the importance of responsibility in food production and consumption, and they became more aware of their choices.

The Aegean gardeners project reaches 30 islands in the region, involves approximately 250 school units, impacts around 1000 pupils annually, and the plants are coming from the South Aegean plant nursery.

This year, the Atlantic Ministry of Education adapted our project and now it's running on a national level involving 1750 elementary schools through Greece. One of the main challenges we faced in implementing this project was that some school teachers weren't always available or willing to accompany and guide the students since the program was based on a voluntary participation.

Aegean mamas Know best

Another program that ran in parallel with the Aegean Gardeners for three years was Aegean mamas Know best. It targeted both children and parents, promoting the consumption of local products and highlighting their benefits not only for health and nutrition terms, but also for the local economy. Cooking lessons were held in schoolyards on weekends, taught by experts using local products and local recipes, parents learn how to cook healthier meals with local ingredients, while children became familiar with the art of gastronomy, cooking and eating well. At the same time, the project strengthened the bond between parents and children.

Through these two programs, we discover a lack of knowledge and awareness about the sustainability of food systems among educators and parents also. It is true that the food agenda has changed in today. Food must be more than safe, healthy, and tasty. It must also meet the environmental, economic and social criteria.

Regarding the environment, I would like to make a quick refer to a program that is starting this week in the South Aegean region. It involves the distribution of 35000 household composters to our residents, covering one third of the population of the South Aegean. The distribution of the composters will be accompanied by educational activities on reducing food waste and consequently on protecting the environment. The composters will be used to enrich household gardens. Food waste,

climate crisis, population growth, sea pollution, excessive use of chemical fertilizers and the strain of our natural resources are just some of the many factors that threaten access to sufficient and quality food for everyone. The educators and the food-related trainers are the first who must be trained in this new agenda so that through knowledge, they can support people, industry, and policymakers in making the right choices, which is to protect this invaluable legacy: our food.



Food System Transformation: A Filmmaker's Perspective on Legacy, Compassion, and Global Action

Sun Yali

(Founder, Sun Yat-sen Cultural Foundation)

Abstract: From a filmmaker's perspective, this article explores the challenges and pathways in transforming the global food system, emphasizing the critical role of education, values-driven advocacy, and cross-sector collaboration. Reflecting on personal experiences growing up in Hong Kong and later working in mainland China, the author highlights the longstanding neglect of food literacy in formal education and the resulting proliferation of junk food consumption among students. While concerning, current shifts—from governmental initiatives to platforms such as the shiology forum—signal growing awareness and actionable solutions. Drawing on 26 years of vegetarian practice and the work of the Sun Yat-sen Cultural Foundation, the author shares insights from multi-stakeholder projects. These experiences demonstrate how frameworks like the Sustainable Development Goals (SDGs) and the Global Development Initiative can integrate Chinese wisdom and international cooperation to address interconnected food, environmental, and climate crises. The article further introduces the philosophical principles of “Datong” (Great Togetherness) and “Bo'ai” (Universal Compassion) as guiding values for systemic change. Through initiatives such as the Bo'ai Award in film, the author illustrates how media and storytelling can amplify compassion, raise awareness, and inspire action beyond traditional education. Effective governance—spanning policy, regulation, enforcement, and daily practice—is underscored as foundational to lasting transformation.

Keywords: Food System, Education, Great Togetherness, Universal Compassion, film

I. The Failure of the Global Food System and the Educational Gap

Eating habits, food knowledge, food safety, and basic agriculture are fundamental life skills every child should learn. Yet our schools never teach them. I grew up in Hong Kong, where even sports and arts weren't given much importance, let alone cooking or food education. We never had the opportunity to learn these basics, and we grew up eating a lot of junk food. Unfortunately, nowadays many students around the world today — even in colleges—are still eating a lot of junk food. When I first came to China to work in the 1990s and early

2000s, I was very saddened that it was the same — university canteens, shops, even sports academies selling mostly junk food. It was really alarming.

However, I am greatly encouraged to hear that so much has changed. There's growing awareness now, and solutions are being offered at the governmental level — and also through platforms like shiology forum, which is offering global solution to tackle this problem.

I have been a vegetarian for 26 years, not for religious reasons, but out of concern for the environment and health. What I can do is share my thoughts as a concerned individual. One reason I started my foundation nine years ago was to use my

ancestor's platform to carry out cultural projects that inspire positive social change. So far, we've worked on projects in Africa focused on wildlife and environmental conservation, thanks to collaboration with many parties — both governmental and civilian — in China and Africa, which culminated in the banning of the ivory trade in 2018.

I believe that with collaboration of a lot of parties, we can also achieve a lot in transforming food systems. Initiatives like the Sustainable Development Goals (SDGs) and the Global Development Initiative provide frameworks where Chinese wisdom and experience can offer valuable insights in tackling not only food crises but also environment and climate challenges.

II.Philosophical Foundation: Datong, Bo'ai, and Holistic Food Systems

Dr. Sun Yat-sen frequently invoked the concept of "Datong," or "Great Togetherness"—an ancient Chinese concept of a harmonious society where all prosper, not just a privileged few. He also emphasized "Bo'ai," or universal compassion, a principle desperately needed in today's world. To actively promote this spirit, I instituted the Bo'ai Award within the film industry. This monetary prize supports films that embody compassion, having been awarded twice—in Iran and at the Asia Pacific Screen Awards in Australia. Notably, the Syrian filmmaker who received the second award later earned an Oscar nomination, illustrating the award's role in amplifying impactful narrative.

This brings me to another point: beyond education, the power of media is immense. We can't underestimate it today — through films, TV, the internet, short videos, TikTok. School is primary importance, but media is also very important. Through the Bo'ai Award, we work with major film festivals worldwide to promote these values — and

along the way, share ancient Chinese wisdom with audiences who may not have known about it before.

Beyond scientific and social solutions, I think the basic key beneath all the problems is a matter of governance— not just political, legal but administrative, on both macro and micro levels, from geopolitics and trade to food safety enforcement, labeling, pricing, and education.

III.Conclusion: Uniting for a Shared Future

I look forward to seeing how shiology can unite people worldwide to build a better future — not just for the Earers, but for humanity.

In Africa, for example, we worked with the African Wildlife Foundation, the Aspen Institute, and many parties from China and Africa on the "No Purchase, No Killing" campaign. That was another example of education in action.

We also run student programs. Just two months ago in Taipei, we taught primary school kids about the SDGs and environmental protection, using memorabilia themed on the great togetherness and universal compassion. The Vice Mayor of Taipei supported the project, and we placed postcards in libraries across the city to reach children. We also take students to visit high-tech companies with sustainable practices and farms.

As a filmmaker, I sometimes lecture at places like the Beijing Film Academy. Beyond film production, I talk about the social responsibility of cinema. The more influence you have, the more responsibility you carry. Films like *An Inconvenient Truth*, *Spotlight*, and *Green Book* show how cinema can drive positive social change. Many of us remember the films and documentaries we grew up with — they shape who we are. That's why it's so important to use media, including film, to spread awareness about the kind of work you're all doing here.



HARNESSING HOLISTIC CARE: COMMUNICATION STRATEGIES AND HERBAL NUTRITION FOR GLOBAL MENTAL HEALTH—A CASE STUDY IN BANDUNG, INDONESIA

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Abstract: Mental health disorders are one of the world's most complex problems that impact more than 1 billion people, and they have shown marked increase in developing countries such as Indonesia. Employing the Social Cognitive Theory (SCT), nutritional psychiatry, and classical herbal knowledge, this three-month case study assessed the effects of holistic interventions. Interactive communication significantly enhanced herbal intervention trust and alleviated anxiety while optimizing residents' sleep quality. The 'Herbal Relaxing Afternoon' program and the establishment of an on-site herbal garden provided occupational therapy while developing subjective norm supportive of mental health. The study concludes that communication and herbal nutrition can be effective as a low-cost model of an integrated disease management system when implemented in resource-limited settings. This paper recommends that Herbal Nutrition can facilitate such communication channels since it is interested in proven nutrition science but does not rely on highly technical ingredients that only a doctor/dietitian can prescribe/purchase.

Keywords: Herbal Nutrition; Mental Health; Communication Theory; Elderly Nutritional Psychiatry

1. INTRODUCTION

The world is grappling with bitter fact that nearly 1 billion people suffer from mental health disorder (WHO, 2022). Ironically in the midst of the crisis, only 25% are treated, while the rest are left with no access to proper treatment, mainly in low- and middle-income countries. The fact that there is huge amount of expenses to psychiatric services and chronic lack of mental health trained professional (Patel et al., 2018).

This crisis has been exacerbated by the COVID-19 pandemic, which alone accounts for a 25 percent rise in cases of depression and anxiety around the globe, including in Indonesia.

Therefore, its growing tide highlights the increasing need to shift from a hospital-centric clinical model to one that is focused around community or group care.

According to the Indonesian national health survey (Riskesdas 2018), there was a reported increase in emotional and mental disorders among Indonesian people aged 15 years or older. It can be shown in some of clinic center, many inhabitants are young people. Older people who live in nursing homes or at-home institutions are particularly susceptible to the disease. For these people, mental health problems are exacerbated by growing alienation from society, physical deterioration and loss of independence — not

the type of characteristics that emerge in younger or middle-age adults with similar chronic stress/depression responses. Compared to the complex relationships that develop between nutrition and mental and social engagement, however, much of Indonesia's institutional care sees to simple physical needs due to limited resources as well as knowledge.

Recent evidence in Nutritional Psychiatry underscore the importance of the "Gut-Brain Axis" and how they influence dietary patterns with a direct action on inflammation including neurotransmitters (key players of mood/cognitive symptoms) functions regarding mental health systems (Adan et al., 2019; Marx et al., 2021). In Indonesia, it translates to the long traditional practice of jamu (herbal medicine). Both widely available and culturally respected, common adaptogens like turmeric (*curcuma longa*), ginger (*zingiber officinale*) and lemongrass (*cymbopogon*) also pose yet another high-leverage opportunity for community-based care. However, despite their potential, formal integration of herbal remedies into mental health care remains limited and under-researched (Elfahmi et al., 2014).

Modern science in nutritional psychiatry now reveals the secret beyond what is known as "gut-brain axis", that there is relationship between what we eat and with our mental health and how diet and specific metabolites affect our inflammation and neurotransmitter activity ((Adan et al., 2019; Marx et al., 2021). It is interesting that long before these clinical terms gained mainstream recognition, Indonesian has long practicing a similar philosophy through "jamu" tradition. The utilization of local adaptogen like turmeric (*Curcuma longa*), ginger (*Zingiber officinale*), and lemongrass (*Cymbopogon*), are traditionally used as first aid and therefore prospective as the community-based care.

Social Cognitive Theory (SCT) emphasis on the interactional relationship of behavioral, individual and environmental factors (Glanz et al., 2015). In the absence of deliberate, incentive-relevant communication strategies (Dearing & Cox, 2018), whether they follow Rogers' Diffusion of Innovations or other information dissemination models, even the best nutrition interventions will face challenges with adoption and sustainability. This is the importance of understanding development communication when we deal with community.

This is the basic need for this issue, try to know a priori that integrated intervention model of herbal nutrition & effective communication strategies for promotion health elderly residents of nursing home as one which represent Bandung. The paper covers an "Herbal Relaxation Evening" program & establishment of herbal gardens to extend access and convert subjective norms to self-efficacy build sustainable & low-cost models at mental health care delivery in resource limited settings through interactive communication.

This study addresses the needs for this issue. Therefore, it is an effort to determine a priori that integrated intervention model of herbal nutrition and effective communication strategies are important for promotion health of elderly residents of a nursing home in Bandung. The paper covers an "Herbal Relaxation Evening" program & establishment of herbal gardens to extend access and convert subjective norms to self-efficacy build sustainable & low-cost models at mental health care delivery in resource limited settings through interactive communication.

2. LITERATURE REVIEW.

2.1. Nutritional Psychiatry and Gut-Brain Axis Concepts

As nutritional psychiatry develops, it is

growing increasingly apparent that mental health care is much more than bipedal brain chemistry. We are taught to see mental health challenges as more full-body experiences. The descriptive term for a bidirectional signaling system between the gut and nerve cells is called the “gut–brain axis” (Cryan et al., 2019). Jacka (2019) emphasized the necessity to understand diet as one of the modifiable lifestyle factors implicated in prevention of psychiatric disorders. Strong evidence has suggested high-fiber, polyphenolic and anti-inflammatory dietary patterns are associated with reduced anxiety and depression. On the other hand, hyper-consumption of ultra-processed food widely characterize Western diets, favors systemic inflammation which has been confirmed to elicit depressive episodes (Marx et al., 2021).

The gut-and-brain connection can be especially crucial for older adults. The process of aging often comes with something called “inflammaging” — chronic, low-grade inflammation that can hinder our cognition and emotional regulation. Probiotics and phytonutrients were mentioned in numerous meta-analysis (Cryan et al., 2019) as favorable agent for gut microbiota modification which later showed to induce production of short-chain fatty acid (SCFA), enhancing its tone, mood stimulus through modulation of neuroactive compounds like GABA or serotonin.

2.2. Ethnopharmacology and Herb-Based Adaptogens for Mental Health

The Indonesian jamu system is one of the valid sources of herbal therapies in relation to modern ethnopharmacology. The types of herbs most pertinent to mental health are adaptogens, a.k.a. those that increase the body’s resilience to stress. Turmeric (*Curcuma longa*) is one of the most widely used traditional medicinal agents, and curcumin, which is its active constituent, has

been well investigated in terms of antidepressant-like activities. All of those herbs are easily growing in Indonesia. In the same line, curcumin treatment enhances the inhibition of monoamine oxidase and modulates the HPA axis to alleviate depression and anxiety (Lopresti, 2022).

Likewise, ginger (*Zingiber officinale*) and lemongrass (*Cymbopogon*) are neuroprotective, as well as anxiolytic in nature. Ginger is rich in a bioactive compound called gingerol which exhibits extremely potent antioxidant activity and reduces oxidative stress in the hippocampus. They are known therapeutics with clinical benefits and yet their use, particularly in an institutional environment with established protocols is limited due to stigma surrounding Asian herbs as a lesser alternative to Western pharmacology.

Bridging the gaps between the clinic efficacy and people acceptance demand a communication strategy that is less considered important in practice of health development program. In this research we intervene three pillars of theoretical background to drive the change. At its core, Social Cognitive Theory (SCT) is used to map how the home care environment and the elderly personal factor shape their health behavior (Bandura, 1986; Glanz et al., 2015). Moving beyond individual factor, through the lens of Theory of Planned Behavior (TPB), we try to change the perception of jamu drinking, that previously oriented as strictly medical necessity, into a social ritual that drive to community-oriented mental health goals (Bandura, 1986; Glanz et al., 2015). To anchor this change for the long term, to ensure the sustainability of the program, Roger’s Diffusion of Innovation (DoI) framework is applied that trying to be more institutionalizing the practice that is important to guarantee long term sustainability (Dearing & Cox, 2018).

2.3. Well-Being of the Elderly using the

Therapeutic Nature

The Biophilia Hypothesis suggests biological motives of engagement with natural environment and therefore provides an understanding the reasons behind therapeutic landscapes for example herbal medicines as cheaper options for mental health therapy. Because of its nutritional contributions, but more so for occupational therapy — horticultural therapy (HT) gives older adults getting back their sense of independence.

Recent Study: Engaging in gardening activities reduces cortisol levels and promotes cognitive function among elderly risk group population (Zhang et al., 2022). In resource-constrained contexts such as home care in Bandung, this nutritional supplementation via gardening has direct links to therapeutic activity and is a relatively low-cost intervention, reducing not only psychological but also financial barriers to care.

2.4. Not Solving the Problem Holistically — Missing Comprehensive Care

Despite evidence of the biological benefits of herb consumption, and psychological effects from gardening interventions, no studies investigate how communicationally integrated strategies could affect established option-engagement in a nursing home context, especially in developing countries. The majority of studies are based solely in either a clinical pharmacology or social work setting.

Therefore, this study suggests transdisciplinary perspective that bridges nutrition psychiatry and communication perspectives to more effectively solve mental health problems in Indonesia by taking into account socio cultural perspective as its context.

3. METHODOLOGY

3.1. Research Design

This study, which is of a qualitative single-case kind with respect to mundane institutional

contexts, sought to investigate the interrelations between herbal nutrition as well as communication preconditions to support psychological wellbeing quality. Case studies most often seek to answer “how” and “why” questions (Yin, 2018); when events cannot be manipulated as in behavioral studies, but can only be observed in real time. This constitutes a phenomenological design, which allowed for sufficient exploration of the lived experiences of nursing home residents and the sociocultural context of traditional medicine practices within their nursing homes (Creswell & Poth, 2018).

3.2. Study setting and participants

This research was conducted in a private nursing home, which is located in Bandung, Indonesia between August–November 2024. This facility was chosen to represent everyday urban geriatric country in Indonesia where patterned access of psychiatric care is poor and a relatively high proportion of the elderly had experienced mild-moderate anxiety. Among the respondents being observed are:

Residents (n=15): Men and women, aged 60–85, who had been graded by the medical staff of experiencing mild mental health problems i.e.: chronic anxiety; sleep disturbed or light depression.

Caregivers/Staff (n=6): These participants assess both the communication strategies and overall program.

Nutritionists (n=2) : Responsible for safety and routine the herbal preparations

3.3. Intervention Framework

Overview of the holistic care intervention and its two components grounded in social cognitive theory (SCT) and theory of planned behavior (TPB):

a. In a local herbal garden, turmeric (*Curcuma longa*), ginger (*Zingiber officinale*) and

lemongrass (*Cymbopogon*) were all planted by the management of the home-care.

b. We centered our program on the ‘Herbal Relaxation Evening’ or we name it Sore Santai Herbal to reframe jamu is perceived in the home care environment.

3.4. Data Collection Methods

We used triangulation to ensure that our perceptions would be broader than the initial recognition. To document if and how residents everyday adjusts, we cross-verified—either confirming or contradicting other residents personal accounts—the social bonds being created within the facility which were later thematically coded (Kawulich, 2005). Talking to the elderly residents and staff, fifteen people all over sixty years old in Bandung home care, was like having open-ended conversations rather than structured Q&As.

This approach allows the participants to express with their own words how the herbal garden affected their sleeping pattern and reduce their anxiety. With these personal narratives we are able to record specific behavioral changes and to some extent emotional shifts specific behavioral changes and emotional shifts that may not able to reveal in pure quantitative survey.

Focus group discussions (FGDs): FGDs were conducted for residents and staff, mapping barriers to communication/implementation as well as identifying sustainability of the program (Nyumba et al., 2018).

3.5. Data Analysis

Thematic analysis was used to analyze the data as defined by Braun and Clarke (2021) along similar parameters as detailed in their guidance:

- Transcription of collected data.
- Theme coding in the early stages (including barriers for communication, perceived health benefit and social connectedness).

- Searching for broader themes.
- Reviewing and refining themes.
- Changing “medical compliance” to “social ritual,” for examples.
- Producing the final report.

The author tries to increase the credibility of the result through member-checking (Birt et al., 2016) of preliminary findings with influential staff and residents to validate portrayals of their lived experience.

3.6. Ethical Considerations

Written informed consent was obtained from all participants or their legal representatives. Older residents were an early cause for concern because the elderly is especially vulnerable. The context was stringent that the herbal treatment should exclusively be used as an adjunctive therapy to not replace any prescribed therapy so as to reduce the risk of side effects being active.

4. RESULTS AND DISCUSSION

This study itself lead us to the conclusion that types of herbal food supply and pathways of communication improved the mental well-being of aged person in old folk homes synergistically. Results and discussion: The results identified four major themes; therapeutic impact of the herbal garden, social normalization through Herbal Relaxation Evening program, knowledge standardized by digital communication and observed psychosocial outcomes.

4.1. Restructuring the system: Herbal Gardens & Self Efficacy

Our results show that the herbal garden served two purposes; those of providing adaptogens, on the one hand and reshaping the residents’ environment. In our observations, those who engaged in growing plants described it as a re-energizing change for their personal purpose, in contrast to the passive aspect of most nursing

home schedules. It opened up a spread of confidence; one resident succeeded, then another, and so on — literally catalyzing a community of self-efficacy.

What we saw at the Bandung facility showed that this ‘Herbal Garden for Mental Well-Being’ was much more than turmeric or lemongrass. It gave the elderly residents a rare chance to own something they could hold in their hands in an environment where they often feel powerless. It was a legit chain reaction: as one neighbour learned how to care for and produce a plant, everyone around him felt the motivation to do so as well. And it is not just a hypothetical concept; it stands as an actual case that can come to mind when thinking of Zhang et al. (2022), showing how lowering cortisol can be achieved through gardening. By focusing on garden beds rather than pharmacy counters, it also gave itself a financial buffer, relieving families in the Global South of an issue we know can be extremely expensive to treat (Patel et al., 2018).

4.2. Herbal Relaxation Evening

What really changed the mood in the Bandung space was moving from a strict medical setting to one of community. Before this shift, the administration of medication felt like a cold, top-down transaction — basically the order of a nurse that residents were meant to follow unquestioningly. However, following the introduction of a collective jamu ritual we observed that this ‘clinical’ barrier was broken. Residents described how, for the first time, they felt seen as human beings, not just patients. This move had the effect of breaking the silence and isolation of the ward. This observation is in accordance with Firth et al. (2020) that how food is delivered is as important as the nutrients themselves. These sessions were much more than administering herbs; they constituted a direct

and social intervention against the loneliness that tends to lead to depression in such places.

4.3. Standard and Sustainability

Perhaps the greatest barrier we faced at the Bandung facility was principal concern by staff about herbal dosages. To counter this, we decided against waiting and building a digital platform; instead, we started ongoing conversations — checking in verbally often and on the fly during the course of the study. These day-to-day exchanges are the real-world ‘testing ground’ for a formalized system of knowledge that we will aspire toward in the future. This was in keeping with Rogers’ idea of creating a low-risk environment where staff could play and explore without the fear of making a clinical mistake. Still, we should not lower the scientific standard. Standardization has to be systematic, especially for complex components such as curcumin, and it is still our top priority (Marx, 2021). Integrating traditional wisdom safely within a modern clinical structure is in the end what will create a sustainable care model.

4.4. Psychosocial Consequences: Anxiousness and Also Quality of Sleep

From our interviews at the Bandung facility, it was clear that the herbal ceremony was more than a beverage; it operated as a sleep cue. The warm tea in particular was cited by many residents as part of what was helping them ‘calm their minds’ after a long day. The sleep enhancements we measured provide what might be termed an empirical demonstration of the connection between digestive comfort and psychiatric quality. When the herbs soothed a resident’s digestion during our observation period, we consistently noted less evening restlessness in those cases. This prompts us to posit that for older adults, the basic physical experience of holding and drinking something warm is therapeutically meaningful

in a different way — more so than the chemical properties of the herbs themselves; soothing stress from life in an institution setting.

5. CONCLUSION AND RECOMMENDATIONS

Sustained improvements of mental illness, with no additional cost, provide evidence that a holistic health-care model of nutritional psychiatry and health communication will be a strategic program to implement. It can be an effective low-cost high-impact approach to ameliorate the mental health crisis common among the nursing-home resident population. As Indonesia (and many other countries in the world) are resource-constrained settings, community-based and culturally-grounded interventions are of utmost importance.

This research show that the biological benefit of herbs adaptogen like turmeric and ginger will optimally amplified when it is served integrated in community bonding context. A transformative consumption into a social ritual like evening herbal relaxation, this intervention successfully dismantles the stigma of mental health problems into pro-social behavior among residents. Furthermore, the practice of owning herbal gardens able to help a relatively low-cost treatment that resident face money constraints. The experience obtained from this Bandung nursing home case study provide an example for LMIC its scalability and sustainability to enhance mental health access through culturally resonant, holistic strategies.”

Short-Term Recommendations

To ensures safety, knowledge and avoid any possible negativity, staff certification is important. Staff certified as herbal nutritionist through the professional organization training programs

Quality Control: Collaborate with reputable

local farmers backed by university initiatives to ensure a steady supply of premium herbal materials.

Storytelling Participants: By engaging community leaders or faith-based individuals sharing their stories on benefits of herbal medicine, stigma will be mitigated and elderly people living in local communities and families would be motivated to consume herbs regularly.

Long-Term Recommendations

Integration into The System: Integration of evidence-based herbal medicine into Indonesia National Complementary Health Service System in such a way that it brought forth the incorporation and subsequent recognition of relevant policies. Benchmarking to other countries that has already implemented such approach would be beneficial.

Randomized Clinical Trials (RCTs): Large scale RCTs of common Indonesian herbs to elucidate clinical equivalence for specific geriatric mental health conditions.

Clinical Propagation: Establishing moderated teleconsultation services on herbal psychiatry as a model for propagation and family caregiver access to evidence-based expert advice in communities.

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公益赋能食育——海南食学教室项目的实践路径与发展愿景

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摘要: 本文以“海南食学教室”公益项目为研究对象,探讨在“大食物观”与可持续发展目标背景下,通过公益项目推动青少年食育的实践路径与价值意涵。该项目以海南32所小学为试点,整合政府、慈善组织、学术机构、行业协会及企业等多方资源,通过课本教育、实践教育与动手教育相结合的模式,旨在培养青少年的食学素养、节约意识与生态责任,并以此辐射家庭、社区与社会。本文提出项目发展的三点核心愿景,旨在推动食育与乡村振兴、生态保护深度结合,为全球食物系统治理和可持续发展贡献公益力量,为食育公益项目的落地实施与推广提供实践参考。

关键词: 食学教室; 食育; 公益; 慈善

海南食学教室公益项目启动,是落实习近平总书记关于“树立大食物观”重要指示精神的具体举措,也是助力联合国可持续发展目标、推动青少年全面发展的生动实践。

古人云:“民以食为天。”《汉书·酈食其传》中的这句箴言,道出了食物在人类文明中的根本地位。而今,面对全球气候变化、资源紧张、营养失衡等挑战,食物系统的可持续发展已成为全人类共同的责任。解决全球食物系统问题,不仅需要政策引导与科技创新,更需从基础教育,从娃娃抓起,培育全民的食学素养与责任意识。

青少年是国家的未来,也是饮食习惯和价值观形成的关键期。一个孩子从小懂得珍惜粮食、了解食物来源、尊重劳动成果,不仅能保护自身健康,更能带动家庭、社区,影响整个社会,形成节约光荣、浪费可耻的良好习惯,形成绿色低碳的良好风尚。这与慈善事业追求的“扶志育人、润物无声”的理念高度契合。

作为扎根海南的枢纽型慈善组织,海南省慈善总会始终坚守慈善初心,将保障民生福祉、推动可持续

发展作为核心使命。近年来,我们在助力乡村振兴、保障困难群众基本生活、推动公益教育向基层延伸,持续发力,我们深知,食育不仅是知识的传递,更是文化的传承与责任的培育。海南的饮食文化中,蕴含着“天人合一”的生态智慧与“海纳百川”的包容精神。我们希望通过这次,中国人民大学食学研究中心主任刘广伟教授,专门研制的食学教室这一载体及相关的课本,进入海南的小学校。这次,我们选定了32所小学,通过海南省教育厅,海南省饮食餐饮协会,海南省慈善总会几方面共同协作,以及社会爱心企业的赞助,把这32所学校作为小娃娃食学培训入门课堂的教学场景,做课本教育、实践教育、动手教育,让娃娃从小就知道食品的来之不易,从小就知道怎样合理科学的搭配膳食,来影响家庭、社区、学校、社会,这是一个非常有意义的事情。期待以此次论坛为契机,联动更多社会力量,将食育工作与乡村振兴、生态保护等议题深度结合,让慈善力量在食物系统建设中发挥更大作用。

本文就“海南食学教室公益项目”的高质量推进,

提出三点希望:

一是希望“海南食学教室”成为公益与教育融合的示范标杆。要坚持公益属性,确保项目资源真正用于青少年食育培养,创新教学模式,将食学知识与海南本土饮食文化、生态保护理念相结合,让食育课堂更具特色、更有温度,为海南乃至全国食育公益项目提供可复制、可推广的经验。

二是希望社会各界持续凝聚慈善合力。食育事业的发展离不开全社会的共同参与,期待更多企业、爱心人士加入我们的行列,以资金捐赠、资源支持、志愿服务等多种形式,为食学教室的建设与运营注入源源不

断的动力,让慈善之光照亮每一个孩子的成长之路。

三是希望以食为媒深化多方交流合作。本次论坛汇聚了全球100余国的学者代表,希望借助这一高端平台,分享更多食育公益的实践经验,借鉴国际先进理念与模式,推动“食学教室”走向更广阔的舞台,让成果惠及更多地区,为全球食物系统治理和可持续发展贡献公益力量。

食育兴则民生兴,民生兴则社会安。食物不仅是能量的来源,更是文化的载体、教育的契机、公益的支点。希望大家以此次活动为契机,全力以赴推进食育公益事业,用食育的火种点亮可持续发展的未来!

Empowering Shiology Education through Public Welfare: The Practice Pathway and Development Vision of the Hainan Shiology Classroom Project

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Abstract: This article takes the “Hainan Shiology Classroom” public welfare project as its research object, exploring the practical pathways and value implications of promoting shiology education for adolescents through public welfare initiatives, within the context of the comprehensive implementation of all encompassing approach to food and the Sustainable Development Goals (SDGs). The project, piloted in 32 primary schools across Hainan Province, integrates resources from multiple stakeholders including the government, charitable organizations, academic institutions, industry associations, and enterprises. By combining textbook-based education, practical activities, and hands-on learning, it aims to cultivate food literacy, conservation awareness, and ecological responsibility among adolescents, thereby radiating influence to families, communities, and society at large. This article proposes three core visions for the project’s development, aiming to deeply integrate shiology education with rural revitalization and ecological protection, contribute public welfare efforts to global food system governance and sustainable development, and provide a practical reference for the implementation and dissemination of public welfare projects focused on shiology education.

Keywords: Shiology Classroom, Shiology Education, Public Welfare, Charity



抓好食育教育 促进校园食品安全和学生健康

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摘要: 在全球化供应链深度融合及儿童青少年营养健康问题凸显的背景下,食育教育作为保障校园食品安全、助力学生健康成长的关键举措,其战略价值愈发突出。本文立足当前国内外食育教育发展态势,系统阐述了食育教育作为时代使命的核心内涵与重要意义。在此基础上,本文梳理了食育教育多元实践路径,包括课程融合构建知识体系、家校联动形成教育合力、社会支持拓展教育空间三个维度。同时,提出通过加强国际交流合作、共享教育资源、建立合作机制等方式共筑食育教育新未来,推动食育教育惠及每一位学生。本文旨在为推动食育教育高质量发展、筑牢校园食品安全防线、助力全球公共健康事业发展提供思路与参考。

关键词: 食育教育; 儿童健康; 食品安全; 营养

食育教育,作为关乎学生健康成长、校园食品安全战略的重要一环,在全球化供应链的今天,其重要性愈发凸显。中国与东盟国家在食品安全标准领域的合作已取得积极进展,这为我们进一步推动食育教育提供了宝贵的国际经验与广阔的合作空间。

一、关于食育教育:这是一个刻不容缓的时代使命

当前,世界各国儿童青少年营养健康问题依然严峻。肥胖率逐年攀升,挑食、偏食现象普遍存在,这不仅影响学生的身体发育,更可能引发一系列慢性疾病。与此同时,学生对食品安全知识的匮乏,使得他们在面对各类食品时缺乏辨别能力,容易陷入健康风险。

食育教育,是智育、德育和体育的基础,是培养学生健康饮食习惯、树立正确饮食观念的关键。通过科学的食育教育,我们能够引导学生了解食物的来源、营养价值,学会合理搭配膳食,预防营养失衡;能够增

强学生对食品安全的认知,让他们明白如何选择安全、健康的食品,远离食品安全隐患;更能够传承和弘扬中华饮食文化,培养学生的感恩之心和尊重劳动的美德,让他们懂得珍惜每一粒粮食,尊重每一位劳动者的辛勤付出。

二、实践探索方面:探索食育教育的多元路径

积极推动食育教育在学校的落地实施,我们探索了如下事情。

(一)课程融合,构建食育知识体系

将食育教育融入科学课程和劳动课程,通过生动有趣的教学活动,让学生深入了解食物的奥秘。例如,在科学课上,开展“五色食物”教学,引导学生认识不同颜色食物所蕴含的营养成分,鼓励他们尝试多样化的饮食搭配;在劳动课上,组织学生参与种植、烹饪等实践活动,让他们亲手种植蔬菜、制作美食,在实践中感受食物的来之不易,培养他们的动手能力和生活技能。

(二)家校联动,形成教育合力

家庭是学生成长的重要场所,家长是学生的第一任老师。我们通过开展“亲子厨房”等活动,鼓励家长与孩子一起参与烹饪,增进亲子关系的同时,也让家长成为食育教育的参与者和支持者。此外,我们还定期举办家长学校,向家长普及食品安全知识和营养健康理念,引导家长在家中为孩子营造健康的饮食环境,形成家校共育的良好局面。

(三)社会支持,拓展食育教育空间

要积极与社会各界合作,邀请营养师、食品安全专家走进校园,为学生开展专题讲座和咨询服务,解答学生在饮食方面的疑问。同时,组织学生参观农场、食品加工企业等,让他们亲眼目睹食物的生产加工过程,了解食品安全监管的各个环节,增强他们对食品安全的信任感和责任感。

三、国际合作方面:共筑食育教育新未来

在全球化的背景下,食育教育已不再是一个国家或地区的事情,而是需要各国携手共进、共同应对的全球性课题。中国与东盟国家在食品安全标准领域的

合作,为我们提供了宝贵的国际经验。我们倡议,各国之间进一步加强交流与合作,共享食育教育资源,共同研发适合不同国家和地区的食品教材和教学方法。

同时,希望能够建立更加紧密的国际合作机制,定期举办国际食育教育论坛和研讨会,共同探讨食育教育面临的问题和挑战,分享成功经验和创新做法。

通过国际合作,能够汇聚全球智慧和力量,推动食育教育事业的不断发展,为全球学生的健康成长和食品安全保驾护航。

四、未来展望方面:让食育教育惠及每一位学生

食育教育是一项长期而艰巨的任务,需要我们持之以恒、久久为功。未来,我们将继续加大投入力度,完善食育教育课程体系,加强师资队伍建设和提高食育教育的质量和水平。我们希望能够让每一位学生都能接受系统的食育教育,养成良好的饮食习惯,拥有健康的身体和美好的未来。

食育教育是一场关乎生命的长期投入,让我们携手共进,为孩子们播下健康的种子,筑牢食品安全防线,为全球公共健康贡献我们的力量!

Strengthening Shiology Education to Promote Campus Food Safety and Student Health

Meng Ziyang

Deputy Head of the Education Department of Hainan Province, China

Abstract: Against the backdrop of deep integration within globalized supply chains and the increasing prominence of nutritional health issues among children and adolescents, shiology education has become increasingly strategically significant as a key measure for ensuring campus food safety and supporting the healthy growth of students. Based on the current development trends in shiology education both domestically and internationally, this article systematically elaborates on the core connotations and importance of shiology education as a mission of our times. Building on this foundation, it outlines diverse practical pathways for shiology education, encompassing three dimensions: integrating curricula to build knowledge systems, fostering home-school collaboration to create synergistic educational forces, and leveraging social support to expand educational spaces. Furthermore, it proposes building a new future for shiology education by strengthening international exchanges and cooperation, sharing educational resources, and establishing collaborative mechanisms, with the goal of ensuring that shiology education benefits every student. This article aims to provide insights and references for promoting the high-quality development of food education, strengthening the reinforcement of campus food safety, and contributing to the advancement of global public health.

Keywords: Shiology Education, Child Health, Food Safety, Nutrition

Education and Culture in Food Systems

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Abstract: Focusing on global food system predicaments, this article incorporates shiology to examine the synergistic role of education and culture in advancing sustainable food systems. It addresses hidden food waste linked to dietary norms and obesity, proposing French-style standardized school meals to foster rational eating habits. For inclusive knowledge dissemination, it summarizes some media models (radio education, community co-created dramas, visual art integration) and highlights Hainan's pioneering shiology classrooms, emphasizing love and peace in shiology advocacy. The article verifies that targeted education empowers rural Honduran women in local food systems, boosting their economic and social agency. It also presents World Vision Ecuador's contextualized nutritional education, which effectively reduced childhood malnutrition via community workshops and native-language teaching. Additionally, the article argues food education should transcend rigid dietary formulas to embrace cultural, spiritual, and heritage dimensions. Taking Hainan's Miao five-color glutinous rice as a case, it also demonstrates interdisciplinary school-based food education that integrates cultural inheritance, scientific inquiry, and labor practice, constructing a systematic shiology education framework. The article concludes that integrating shiology into education, aligning practices with local contexts, and promoting multi-stakeholder collaboration can mitigate food dilemmas, inherit food culture, empower vulnerable groups, and advance sustainable food systems.

Keywords: Education, Culture, Food Systems, Women, Childhood

Addressing Food Waste: Rethinking Eating Culture Through Educational Systems

Overconsumption-induced hidden food waste is closely correlated with the global rise in obesity rates, including a significant upturn in China over the past decade. A fundamental contradiction exists between parents' expectations for the younger generation and the influence of the fast food industry, emphasizing that the surplus waste from

overeating and forcing children to finish their meals is a frequently overlooked form of food waste. Children, by nature, eat according to their actual needs before being exposed to processed and sugary foods, and the common social norm of "cleaning one's plate" often leads to unnecessary overconsumption.

To address this issue, it is proposed to learn from the practical experience of French schools,

which provide healthy lunches with scientifically formulated ingredients and portion sizes for students aged 3 to 18. Food is a cultural behaviors, and changing eating culture requires more than just theoretical teaching—it demands practical implementation through the education system. Governments, by prioritizing the provision of standardized healthy school meals, can shape children's eating habits from an early age and drive a systemic shift in societal food culture, making this the most effective way to instill a no-waste mindset among both students and communities. The single most critical skill to teach is learning to eat only when hungry and respect one's natural dietary needs.

Innovative Food Communication: Leveraging Diverse Media for Inclusive Education

Innovative communication strategies are critical for the inclusive dissemination of food systems and shiology knowledge to global audiences. Timely, accurate, and accessible information access serves as the cornerstone of community development and people's empowerment, and radio remains an irreplaceable educational tool in rural and remote areas with limited or no internet connectivity—complementing the reach of social media platforms.

Three replicable development communication initiatives implemented during the COVID-19 pandemic offer viable models for shiology advocacy: a 3-month Radio School on mental health, visual arts and environmental protection for middle and high school students; radio dramas on disaster preparedness co-created by community members, who wrote, produced and recorded their own narratives; and video-recorded visual arts modules paired with radio broadcasts to help young people express their emotions. For shiology education, such models can be adapted—for example, encouraging students to

express their understanding of shiology through visual arts and poetry, and developing shiology-themed radio dramas created by households and communities. Hainan has emerged as a pioneer in establishing shiology classrooms and expressed a willingness to share her project methodologies to facilitate collaborative shiology promotion. Such initiatives can be funded by NGOs, foundations and corporations as part of their Corporate Social Responsibility (CSR) programs.

Going beyond communication strategies, the holistic essence of shiology necessitates the integration of a message of love and peace into shiology advocacy. A critical question emerges: how can humans achieve longevity and vitality through healthy eating in a world plagued by conflict and destruction? The holistic core of shiology demands a commitment to healing the world, fostering love for all people—including children, women, the LGBTQIA+ community and the elderly—and for the planet itself. This commitment serves as the foundational premise for realizing shiology's benefits for the common good.

Women's Empowerment in Local Food Systems: Education as a Catalyst for Economic and Social Agency

Education plays a pivotal role in empowering women within local food systems, addressing the unique challenges and unlocking the untapped potential of women in Honduras' agricultural sector. Demographic data underscores women's centrality: women make up 63% of Honduras' population, 43% live in rural areas, and 39% are heads of households. Women are the backbone of agricultural activities, participating in planting, harvesting and packaging, yet they lack equal access to formal accreditation, collaborative partnerships, technological resources and educational opportunities.

Education acts as a transformative force for rural women: vocational training equips them with advanced farming and business skills, enabling them to grow higher-quality crops, market their products effectively and increase their income. Beyond economic benefits, education builds women's confidence, empowering them to voice their opinions, make independent decisions, participate in professional forums and business events, and emerge as community leaders. A key ripple effect is observed: when women receive education, their families and children learn alongside them, passing on sustainable food practices to the next generation. Through the Women Producers Program in Honduras, educated women have added value to their local products and even expanded into international markets—for example, exporting coffee to other countries. Aligning with regional perspectives, community empowerment and the localization of educational programs are critical, as 43% of food in Honduras comes from family and community networks. Ultimately, education unlocks the potential of women who are already a driving force in food systems, allowing them to reap the rewards of their labor and drive sustainable local food development.

Combating Childhood Malnutrition: Contextualized Nutritional Education for Vulnerable Families

Chronic childhood malnutrition is an urgent issue in Ecuador, with alarming statistics: 19% of children in Ecuador suffer from chronic malnutrition, a figure that surges to 40.1% for children under the age of two in Chimborazo Province. The root causes of this crisis are multifaceted, including poverty, lack of clean drinking water, poor sanitation and hygiene, inadequate or insufficient food, early childhood illnesses, and, most critically, caregivers' lack of nutritional

knowledge.

To address this, World Vision Ecuador has adopted informal education strategies tailored to the local context, with a focus on building caregivers' capacities. These strategies include community-based workshops for caregivers and pregnant women, one-on-one family mentoring, and peer learning initiatives. A key priority is raising awareness among families about the long-term consequences of chronic childhood malnutrition. Recognizing that rural areas—especially indigenous communities in Chimborazo—bear the brunt of malnutrition, the program delivers nutritional education in the local native language, ensuring cultural relevance and accessibility. Additionally, the initiative involves hands-on training in preparing highly nutritious meals using local ingredients such as quinoa, and identifies “guiding mothers” in each community who visit other families to teach and advise on healthy eating and hygiene practices.

The work requires strong partnerships with local and central governments, as well as academic institutions, which provide training and applied research support. This nutritional education is also accompanied by other actions such as children's health and nutrition monitoring, technical assistance for agroecological food production in rural communities. The project has significant achievements: 90% of children were born free of chronic malnutrition, 90% completed their full health and vaccination schedule, 60% of malnourished children recovered to a normal nutritional status, 60% of children recovered from anemia, 75% of mothers understood the causes and consequences of chronic malnutrition, 77% had adequate knowledge of nutrition for pregnant women and infants in their first year of life, and 68% adopted adequate hygiene practices. These results were shared with Ecuador's Vice President,

marking a critical step in advocating for national policy change to address childhood malnutrition.

Food Education and Cultural Heritage: Understanding Food as a Holistic Cultural Construct

Food education and cultural heritage are intrinsically intertwined, and the oversimplification of food systems into rigid formulas or prescriptive diets is problematic. There are no “magical” foods or diets that guarantee vitality and longevity, and that dietary practices—such as the Mediterranean diet—are deeply rooted in cultural and geographical contexts, making them irreplicable in isolation. A diet cannot be separated from the way of life it belongs to: just as veganism, vegetarianism and fasting have spiritual significance that cannot be overlooked, all food practices are a reflection of a community’s beliefs, values and spiritual expressions.

Historical and cultural examples illustrate the interdependence: tea, originating in China, Bhutan and India, became an iconic part of British culture with the “five o’clock tea”—a practice shaped by global commerce; gastronomy as a formal concept only emerged in the 19th century (1825), a product of specific historical and cultural contexts. Food education must go beyond teaching ingredients or dietary rules—it must foster an understanding of food as a holistic cultural construct that encompasses beliefs, mythology, heritage and tradition. Food can be a powerful tool for exploring literature, history and human culture—for example, connecting eating practices to epic works like the *Epic of Gilgamesh*.

Crucially, not all people are able to engage with abstract food concepts, so food education must prioritize practical, actionable guidance. While agricultural sustainability, climate change and food security are critical dimensions of food systems,

the cultural, spiritual and mythological layers of food should never be forgotten. Reducing food to mere ingredients or formulas results in a shallow understanding of food’s role in human life and society.

Practical Food Education in Primary Schools: Blending Culture and Practice in Hainan’s Ethnic Communities

Education is a vital carrier of cultural inheritance and development, and food culture is a unique bond connecting the past and the future—an idea that is particularly meaningful in the multi-ethnic communities of central Hainan.

Taking the Hainan Miao five-color glutinous rice as a core example, prepared by steaming high-quality glutinous rice with natural plant juices to produce red, yellow, blue, and purple hues, and symbolizing auspiciousness, happiness, and reunion in Miao culture—serves as a core case study for interdisciplinary food education integration. The school integrates this traditional food into Chinese language classes (by teaching the stories behind five-color rice), science classes (by exploring the scientific principles of plant dyeing), and labor education classes (by teaching students to plant, harvest, dye and steam the rice themselves). This series of hands-on activities transforms the ecological wisdom embedded in traditional food culture into sensory, practical and reflective learning experiences for students, awakening their awareness of food and its cultural roots.

The schools participating in the shiology classroom public welfare project are developing systematic shiology education frameworks, with shiology education series serving as the theoretical foundation and shiology classrooms as practical platforms. Adopting a dual-track education model, the school has incorporated shiology education into its official work plan, offering grade-specific

shiology courses that teach both scientific food knowledge and traditional food culture stories. The shiology classrooms provide a hands-on platform for students to “learn by doing and do by learning”, filling a critical gap in the school’s labor education program. The ultimate goal is to help

students establish correct food concepts, develop healthy eating habits and lifestyles, and lay a solid foundation for their lifelong development—nurturing well-rounded students with moral, intellectual, physical, aesthetic and labor literacy.

07

Confronting Climate and Ecological Challenges
— Building More Resilient Food Systems

应对气候与生态挑战：构建更具韧性的食物系统

2025年10月30日 14:00~15:30

[CN] 应对气候挑战 构建更具韧性的全球食物系统

[CL] A Multi-Circular Value Approach: The Strategic Core for Shiology

[RW] Confronting Climate & Ecological Challenges — Building more Resilient Food System

[RU] Climate Change and Food Security of Indigenous Peoples in the Russian Arctic

[PK/BB/FJ/MA/CN/PL] Pathways for Food System Development under the Global Climate Crisis



应对气候挑战 构建更具韧性的全球食物系统

刘振民

(中国气候变化事务特使)

摘要: 联合国2030可持续发展议程将消除饥饿、保障粮食安全等目标置于核心地位,而气候问题与食物系统挑战的相互影响使相关目标的实现面临严峻挑战。本文基于全球气候治理与粮食安全协同推进的现实背景,系统剖析了气候变化对粮食生产安全的多维影响及区域差异,阐释了农业粮食系统在气候变化减缓和适应中的双重作用。通过梳理全球气候谈判框架下农业议题的演进历程,揭示了发展中国家在农业气候应对中面临的资金短缺等核心困境。最后,结合中国在双碳目标引领下的农业低碳转型实践及南南合作经验,提出全球需秉持人类命运共同体理念,通过多边协作、资源整合与技术创新,推动气候与农业系统协同治理,构建更具韧性的全球食物系统,为落实联合国2030可持续发展议程提供支撑。

关键词: 气候变化; 食物系统; 可持续发展; 农业; 中国

消除饥饿,实现粮食安全、改善营养和促进可持续农业,是联合国《2030年可持续发展议程》17项可持续发展目标(SDGs)中的第二项,是发展中国家基本生存和福祉改善的第一步。此外,2030年议程还有12个目标与食事问题息息相关。在我本人担任联合国副秘书长期间,曾主管全球可持续发展目标的落实。五年内《2030年可持续发展议程》的落实有进展,但是也有很多差距。我本人曾高度关注目标2(消除饥饿)以及目标13(气候行动)这两大关键目标的落实进展。本文主要就应对气候与生态挑战,构建更具韧性的食物系统进行论述。

一、气候变化与食物系统挑战的相互影响

气候问题与食物系统的挑战相互影响。一方面,全球气候变化从以下四个方面影响着粮食生产和安全,一是全球气候变化加剧土地干旱,土壤资源枯竭,

养育力下降并危及到生态系统。二是全球温升导致海平面上升、冰川消融,海水倒灌减少农业用地,淡水资源紧缺导致农田灌溉不足。三是气候变化改变全球的降水模式,旱涝急转等极端气象频发,导致光、热、降水与作物生长周期的时空错位。四是气候变暖加速了病原菌繁殖与害虫的种群增长,且向高纬度、高海拔地区扩散,加剧了植物的受害风险。从区域来看,根据联合国有关报告,干旱影响到世界上40%的农业用地和23亿人口。到本世纪末,将有50亿人生活在干旱地区,干旱将导致野火加剧、农业崩溃和更大规模的移民。欧洲、美国西部、巴西、东亚和中非都将受到影响。非洲地区的饥饿状况还在持续加剧,北非地区2022至2024年连续三年谷物收成比此前五年平均水平下降了7%。74%拉美地区国家受到极端天气的影响,营养不良率在2019至2023年期间上升了约1.5%。印度河流域正因喜马拉雅冰川的干旱加剧,南亚的粮食生产面临着挑战。东亚以及中国的地表年均温度呈显著的上升趋势,极端气象事件冲击了农业的生产。2024年

中国因风暴、低温、冷冻和雪灾以及干旱导致农作物的受灾面积高达了331万余公顷。

另一方面,农业粮食系统是减缓和适应气候变化的重要领域。粮食种植和畜牧业作为人类最主要的土地利用活动,对碳排放和土地的碳汇功能产生深远影响。政府间气候变化专门委员会(IPCC)报告指出,1961年以来,全球人口规模持续扩大,叠加人类在食物、饲料、纤维、木材及能源领域消费需求的结构性变化,推动土地和淡水资源开发利用的强度达到了空前的水平。农业与林业的规模及生产效率的提高,保障了全球人口必要的消费和粮食安全,但也导致全球温室气体排放持续攀升,同时自然生态系统遭到破坏,生物多样性水平下降,给全球带来了显著的生态环境挑战。因此,推动农业领域和食物产业链的减排增汇,增强农业领域气候韧性并向可持续方向转型,已成为应对气候变化、破解当前生态困境的关键路径。可喜的是,全球应对气候变化多边进程始终把农业作为重要的内容,早在《联合国气候变化框架公约》谈判时,就将农业部门的减排及适应气候变化纳入其中,农业是气候变化公约确定的四大排放部门。

二、全球农业气候行动的进展与发展中国家困境

近年来,国际社会对农业和气候变化议题的关注也在日益高涨。2017年《联合国气候变化框架公约》第23次缔约方大会(COP23)达成了“克罗尼维亚农业联合工作组”。2022年COP27大会成立了为期四年的农业与粮食安全气候行动“沙姆沙伊赫联合工作组”,对于后续会议形成了路线图。2023年,包括中国在内的134个国家在COP28签署了《关于韧性粮食体系、可持续农业及气候行动的阿联酋宣言》,旨在推动农业减排的同时保护受气候变化影响地区的农民的生计。

然而,发展中国家农业领域应对气候变化所获得支持仍严重不足。据统计,农业领域仅获得全球气候资金的4.3%,农业系统转型仍面临巨大的压力。虽然全球饥饿人口呈现下降的趋势,但2024年全球仍有约7亿人处于饥饿现象。我们要努力帮助广大发展中国家

建设更具韧性、更加低碳的可持续农业系统。

三、中国的实践探索与国际贡献

作为负责任的发展中大国,中国政府高度重视可持续发展 and 应对气候变化的工作。习近平主席在第75届联合国大会宣布中国的“双碳”目标。五年来,中国出台了一系列战略规划和政策措施,在发展可持续能源、节能和提高能效、产业优化升级、提升生态系统碳汇等方面取得了显著的成效。

中国一贯坚持减排和适应并重,面对气候类型复杂、区域差异大、生态环境脆弱的基本国情,中国努力推动农业生产的低碳化,并努力适应气候变化的挑战。2024年,我国颁布了《气象灾害风险预警能力提升行动方案(2025—2027年)》,在多个省开始开展农业气候资源的普查和区划的试点。同时,中国也在通过南南合作为其他发展中国家提供力所能及的帮助。在绿色能源领域,为应对气候变化对农业的冲击,中国与联合国粮农组织在蒙古国开展了南南合作的项目,通过引进饲料栽培和玉米杂交技术,为蒙古的牧场提供更多的绿色草料,有效缓解了因过度放牧造成的土地退化,提升了当地农业的气候韧性。乌兹别克斯坦通过实践中国经验,实现了快速发展农业种植技术,有效的维护了乌兹别克斯坦和中亚地区的粮食安全。

今年10月16日,习近平主席向联合国粮食及农业组织成立80周年致贺信,强调中国政府高度重视粮食安全,坚持依靠自身努力解决好14亿多人口的吃饭问题,并向有需要的国家提供力所能及的帮助,为保障世界粮食安全贡献中国力量。中国将一如既往支持联合国粮食及农业组织在国际粮农领域发挥重要作用,愿同国际社会携手落实好全球发展倡议,推进联合国2030可持续发展议程,推动构建人类命运共同体,为增进各国人民福祉做出新的更大的贡献。

四、结论:共推气候与农业系统协同治理

气候变化是一项全球性的挑战,任何国家都不能

独善其身,需要国际社会携手共同应对。同时,由于全球食物资源分配的不均衡,全球195个国家没有任何一个国家能够为其国民提供全部的七大类食物。这两大议题不是单一国家的私事,而是需要全人类并肩共同应对的责任。农业系统的稳定和可持续发展事关全球的民生,也在应对气候变化进程中发挥着重要的

作用。这需要各国携手合作,整合资源,共享经验,更需要各国专家发挥专长,探索创新可应用的技术与方案,推动气候与农业系统的协同治理。世界食事论坛将提供良好的交流平台,汇聚全球智慧,为全球气候与农业协同治理注入新的动力。

Addressing Climate Challenges to Build a More Resilient Global Food System

Liu Zhenmin

China's Special Envoy for Climate Change

Abstract: The United Nations 2030 Agenda for Sustainable Development places the goals of ending hunger and ensuring food security at its core. However, the interplay between climate issues and challenges facing food systems has made the achievement of these goals increasingly difficult. Against the backdrop of advancing global climate governance and food security in tandem, this article systematically analyzes the multidimensional impacts of climate change on food production security and their regional variations. It also elaborates on the dual role of agrifood systems in climate change mitigation and adaptation. By reviewing the evolution of agricultural issues under the global climate negotiation framework, the article highlights key difficulties faced by developing countries, such as funding shortfalls, in addressing climate-related agricultural challenges. Finally, drawing on China's low-carbon agricultural transition practices under the guidance of its dual carbon goals and its experience in South-South cooperation, the article advocates for the global community to uphold the vision of a shared future for mankind. Through multilateral collaboration, resource integration, and technological innovation, it calls for coordinated governance of climate and agricultural systems to build a more resilient global food system, thereby supporting the implementation of the UN 2030 Agenda for Sustainable Development.

Keywords: Climate Change, Food System, Sustainable Development, Agriculture, China



A Multi-Circular Value Approach: The Strategic Core for Shiology

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Abstract: This paper articulates the conceptual and operational framework of Shiology — an emerging interdisciplinary field rooted in the Chinese conception of food and eating — and proposes the multi-circular supply chain as its strategic implementation pathway. Against the backdrop of a global food system in crisis, the article argues that linear food systems are structurally incompatible with planetary boundaries and human equity. Shiology demands zero-waste efficiency from soil to spoon; multi-circular systems realize this through interconnected loops of resource recovery, reuse, and cascading use. A case study on plastic packaging reveals systemic trade-offs between food preservation and waste generation. Scaling solutions requires cross-sector synergy and policies mandating industrial symbiosis, transforming linear chains into regenerative networks. Ultimately, integrating Shiology with multi-circular design reconciles human needs with ecological limits, offering a path toward resilient and equitable food futures.

Keywords: Multi-circular value approach, Shiology, Food System, Climate change, sustainability

Chile is a country very well known in China, because 95% of the production of sherry in Chile is exported to China, in particular for the Chinese festival.

I hope that together we can envision solutions to one of the most pressing challenges humanity is facing today: Climate change and sustainability. These issues are closely connected with hunger, poverty, and health. We are at a crossroads where our food system—feeding over 8 billion people—is fundamentally flawed. The solution demands a paradigm shift guided by the emerging discipline of shiology and put in practice through multi-circular supply chain. I have been working for the last 17 years in the intersection of climate change and sustainability, proposing solutions that integrates business

model, mathematical models and disruptive technologies such as blockchain and artificial intelligence. So let's explore how multi-circular supply chain can transform our food system into a sustainable reality.

The Crisis: The Urgency of the Numbers

Our linear food systems contribute about 26% of global carbon emissions. Nearly a quarter of the climate crisis stem from how we produce, transport and consume food. It used 70% of the world's freshwater and held its habitable land, pushing resource to the brink. Meanwhile, 2.3 billion people face food insecurity, yet we waste 1 million tons of edible food annually. This is a stark paradox of abundance and scarcity. It is not mere inefficiency; it is a systemic failure threatening

planetary stability.

Shiology is a new interdisciplinary field originating from the Chinese term, meaning food and eating, endorsed in universities and global forum, like the world shiology forum. It provide a unified knowledge system to uncover objective laws governing human food acquisition, utilization and equity. Shiology demands efficiency, zero waste and value maximization at every step from soil to spoon, because resources are finite. It integrates political, cultural and social factors to ensure food system respect planetary limit and human needs. But the question is, how do we apply it?

Our current linear food supply chain inherently creates waste and violates Shiology's laws of utilization. It's a one-way path designed for speed, not sustainability, resulting in inevitable waste. The solution is the multi-circular supply chain approach. This framework rejects the single□ simple recycling loops, Instead, it may be interconnected, diverse loops across multiple scales: resource recovery, component reuse, biological composting and cascading use—treating everything, even waste, as a high-value input. The goal of multi-circular supply chain is to maximize the utility of every molecule by closing multiple loops simultaneously where waste from one process fuels another.

In practice, multi-circular supply chain demands cross-sector synergy. Food doesn't exist in isolation—and that's the new point. It's linked to plastic for packaging, energy for processing and transportation for distribution. Shiology guides this integration, turning silos into symbiotic network.

Case study: Fresh Food, Plastic, and the Linear Trade-Off

A concrete fresh food packaging represent the

perfect linear trade off. We use plastic packaging because it extends shelf life, preventing food loss. But this short-term gain comes with a monumental multi-circular failure.

Persistent plastic waste from packaging accounts for approximately 40% of plastic waste, yet recycling rates remain stubbornly low—often below 10% in many places—creating eternal pollution. This creates a systemic contradiction, a flagrant violation of Shiology, where short-term consumer convenience overrides the objective law of long-term, efficient resource utilization. We cannot sustain a system where saving a piece of fruit means creating a piece of waste.

To scale this, we must enforce cross-industry laws. Plastics and food packaging must codify for infinite recovery standard to save formats, energy and construction, build renewable power recycling hubs. Furniture can be made from recycled plastic, and retail trade must make it possible to use domestic organic composting equipment. Policy must mandate symbiosis, as in the Kalundborg symbiosis, where food and fiber waste from Novo Nordisk and related industrial plants links into energy and water cycles for zero-waste efficiency. The main principle is that residual from one company becomes a resource in another, benefiting both the environment and the economy.

Conclusion: The Integrated Path

Forward

In closing, the crisis demands action. Shiology offers a key framework, and the philosophy of the multi-circular supply chain offers the roadmap. By designing interconnected systems—like burgeoning renewable or agri-protein waste into feed—we can reconcile human needs with planetary laws. This is our path to resilience and equity.



Confronting Climate & Ecological Challenges — Building more Resilient Food System

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Abstract: Rwanda, characterized by high population density, fragmented agricultural land, hilly terrain, a young population, and accelerating urbanization, relies heavily on rain-fed agriculture with diverse agro-climatic zones and predominantly acidic soils. This study focuses on the country's endeavors to build a more resilient food system amid intertwined climate, ecological, and food security challenges. It emphasizes that agricultural transformation necessitates corresponding educational reform to facilitate inclusive knowledge co-creation among farmers, students, and other stakeholders, enabling widespread participation in social and economic change. It further elaborates on the linkage between food system resilience efforts and Shiology, highlighting food's multifaceted significance as sustenance, medicine, a bond for togetherness, and a foundation for spiritual awareness and social cohesion. The research presents practical measures adopted in Rwanda and empirical findings from multi-year testing indicate that soil covering reduces disease incidence and increases yields, while the effectiveness of zero tillage is context-dependent—tillage with deep organic matter incorporation boosted potato yields. Additionally, polyculture was found to optimize the benefits of compost teas and plant extracts, resulting in higher yields compared to monocultures. The study concludes with the assertion that addressing these challenges requires collaborative efforts, reflective spaces, and the engagement of future generations.

Keywords: Food System, Rwanda, Food Security, Polyculture, Climate and ecological Challenges

I. Specific Context of Rwanda

Rwanda is a country with a very dense population, fragmented agricultural land, and hilly terrain — often called the “land of a thousand hills.” We also have a very young population and are experiencing accelerating urbanization. All of these factors come with their own issues. Our agriculture is largely rain-fed, and we have diverse agro-climatic zones. The soils are predominantly acidic; in fact, about three-quarters of our soils are acidic. Due to our high altitude, temperatures mostly range between 20 and 30 degrees Celsius and rarely exceed that.

II. Food Security and New Challenges

However, with rapid urbanization, we face new issues as not everyone is engaged in agriculture anymore. This has led to food price inflation and scarcity of some commodities. Whenever there is a shortage of agricultural products, we know we are always in a risk. We recall events like the Arab Spring time in Sudan and Tunisia, and even the French Revolution. Agriculture is truly a very key element for stability. In fact, I may say agriculture equal peace.

Now, because of the need to ensure food security — like in many countries — we have been pushing

for crop intensification. While this approach, similar to practices in Europe, has yielded some known results, it also creates new issues that we have been trying to address today. We face significant environmental challenges. Therefore, in our practice, we are exploring whether it is indeed possible to achieve both food security and environmental protection.

There are many terminologies we have today in agroecology — some mean almost the same thing, yet in different contexts, they can imply different practices. Let me emphasize this: if we aim to transform agriculture, we must also transform education and ensure that everyone has access to it. It relates to the paradigm shift, which is about ensuring that everyone, from farmers to students, can participate in the co-creation of knowledge. One of our major challenges is to ensure that the powerful instruments of social and economic change cease to be the exclusive patrimony of a few and become accessible to all, enabling widespread participation.

III.Linkage with Shiology

What is the link between our efforts and Shiology? It requires us to understand that food has deep roots — it is sustenance, medicine, togetherness and bonding, spiritual awareness and social cohesion .

IV.Our Practices and Findings

What we've been doing aligns with practices learned in many parts of the world: using biochar, vermicompost, rock dust, compost teas, and double-digging. We are also incorporating strategies like promoting pollination by beneficial insects through planting flowers in our fields, aiming to reduce pesticide use, which, while helpful, has also caused many issues.

Over the past few years of testing, we've observed that covering the soil (e.g., with mulch) can decrease disease incidence and increase yield. However, we've also seen that zero tillage does not work everywhere. For instance, in potato cultivation, yield increased when we tilled and incorporated deep organic matter.

Regarding polyculture, the evidence is clear: by associating plants (e.g., intercropping Irish potato with maize or beans), we can optimize the benefits of compost teas and plant extracts, leading to higher yields compared to monocultures. The same positive trend holds for beans and maize, especially when using compost tea. We could see that we have been using different crops and the trend seems to be the same. So tillage may not be the problem — the true question may be more about balance and context. Polyculture, in this case, can significantly enhance the benefits of compost and plant extracts.

We must learn to work together, collaborate, and create spaces for reflection. We have to make sure that future generations are engaged.



Climate Change and Food Security of Indigenous Peoples in the Russian Arctic

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Abstract: Climate change, with the Arctic experiencing the highest temperature rise rate, severely threatens the food security of indigenous peoples in the Russian Arctic. This paper explores the interconnections between climate change, industrialization, and the disruption of indigenous traditional livelihoods that underpin their food security. Climate-induced seasonal changes, permafrost thaw, and invasive species further exacerbate food insecurity and associated health risks. The article advocates for a capacity-building approach integrating indigenous intergenerational knowledge with scientific expertise, and highlights the successful Snowflake Project as a viable compromise. It emphasizes the indispensable role of indigenous experts in adaptive strategies, stressing the need for inclusive solutions balancing traditional livelihoods, living standards, and sustainability.

Keywords: Climate Change, Food Security, Indigenous Peoples, Arctic

Introduction: The Arctic Context

Climate change is a global matter, and there are three poles—the two traditional poles and another one, the “roof of the world,” which is the Qinghai-Tibetan Plateau. The article will introduce one of the poles: the Arctic.

The Arctic is experiencing the highest rate of rising temperatures, which has led to unimaginable natural disasters. In the Arctic, forest fires can break out. When the peat slowly heats up, it triggers terrible fires that are extremely hard to put out. Additionally, permafrost is rapidly disappearing. These natural challenges have put the indigenous people living there at the forefront of combating climate change.

It's important to explain that there are many different ethnic groups in the Russian Arctic, and all of them cherish their linguistic and cultural

heritage. When we speak to them, one of the key target for them is to preserve their cultural heritage to make sure that the next generations can continue living traditional lifestyle, which is quite difficult considering these new challenges.

The Core Problem: Interlinked Challenges

In the field of sustainable development, we use the term “wicked problem”. Here, indeed, we have several simultaneous challenges, including food security and health deterioration. I need to explain that several factors contribute: industrialization. Because the Russian Arctic is one of the richest oil fields for the country. It is unavoidable that oil companies will come there. However, we need to find a place for indigenous communities to continue their lifestyle and make their living. As I mentioned, they live a traditional lifestyle, which includes raising northern reindeer. They are

nomads who, for centuries, had routes allowing them to migrate to feed their animals. In fact, if we look at the number of herds, for many years they were quite numerous, and people were doing quite well. Now, because of climate change, seasons are changing. For example, in winter, instead of snow, it is rainy and then the rain gets frozen, so the poor animals get stuck in the ice and die. This is also a problem.

Another traditional activity is fishing. They use traditional ways to fish, and because they live in a very harsh climate, they can't be vegetarian. They rely on fats to maintain their bodies. This is why indigenous people, not only in Russia but in other countries, have special human rights that allow them special access and permission to use natural resources—like fish, or even whales. Hunting whales is generally prohibited, but indigenous people are sometimes given permits to fish whales.

Now, with climate change, many things are not as they used to be, and it's very difficult for these communities to adapt these changes. This nomadic lifestyle has already been an adaptation strategy to a difficult climate. Now, these communities stand at a crossroads to understand what they can do in the future to provide for their living, because what they have is not enough. But I believe it's possible to find not an ideal solution, but a working solution where there is a place for traditional activities, and yet these people can also have minimum life standards.

The Health Impact of Food Insecurity

When discussing climate change, I mentioned disrupted diets—people cannot hunt or raise animals as before. Also, these areas are very distant and don't always have appropriate medical care. For centuries, they created their own strategies: they rely on herbs. Indigenous people of the Arctic

have their own medicine, relying on Nordic herbs. Now, with climate change, we also have new invasive species, which means they might lose at least part of their natural pharmacy. This also needs to be addressed.

We also need to understand that these people, for generations, lived in this place, and some of their health characteristics are different. For example, blood circulation follows a different route because of very low temperatures for six months and lack of sunlight. Now, with new changes, it's very difficult for the human body to adapt so quickly, and there's a significant increase in diseases among these people.

But I'm happy that there were several projects funded by the Russian government and executed by the Russian experts to learn these changes and to find new tools to help these people.

Aggravating Factors and Measures

One more challenge is transport and infrastructure. Permafrost means you have stable soil; once it starts to melt, everything built on it will also move. You probably have heard about the oil spill in Norilsk. It happened mainly because of permafrost loss. For a few years, the company and the state had to work out how to remove the spill, and two tools were used: anthropological expertise—talking to people on the ground to understand how they can be compensated—and environmental assessment to understand the actual damage to the environment.

In terms of available measures, a capability-centered approach is essential when engaging with Indigenous communities. It is important to have a nuanced approach, and here I support the Canadian school of public policy with Michael Howlett, suggesting that there are several layers of community capacities: knowledge co-creation

(because indigenous people are holders of immense accumulated intergenerational knowledge), operational capacity (they are on the ground, know the locations, observe changes firsthand, and can suggest possible solutions), and political capacity (to communicate with policymakers about the real needs of the people).

This article concludes on an optimistic note, with an example of a successful project. It is called the Snowflake Project. The power of art is fascinating. Many writers and literators this community has

been produced. One of them is Anna Nerkagi. She is the only literator who writes the stories of her people, the Nenets, on the skins of reindeer, not on paper. She also managed to mastermind a project where a new scientific station was built close to her ancestral land, and they created jobs for the nomads while still allowing them to continue migrating in summer. So, it's a kind of compromise, but a working compromise, trying to bring together traditional knowledge and scientific knowledge.

Pathways for Food System Development under the Global Climate Crisis

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Abstract:Against the global climate crisis, food systems face multidimensional challenges in ecology, economy, society, and policy. This article examines the diverse challenges and adaptive pathways of food systems in key regions across Asia, Africa, Europe, the Americas, and Oceania — including Pakistan, Barbados, Pacific Island Nations, Morocco, China, and Poland. Findings reveal region-specific agricultural crises driven by climate change. The underlying causes of these crises include the disconnect between human activities and ecological systems, fragmented cross-sectoral policies, and inadequate climate responsibility among developed nations. The article highlights the effectiveness of traditional ecological resilience strategies and the potential of technological innovation, while emphasizing the integrative value of Shiology in redesigning global food systems. Shiology's tripartite framework — eater, food, and order — along with its discipline of Food Ecology, provides a holistic approach beyond agroecology. It supports cross-sector policy integration, balances agriculture's dual role as emitter and carbon sink, and harmonizes food production with ecological protection. To achieve sustainable food systems under climate change, the article calls for a return to ecological fundamentals, integration of traditional knowledge with modern science, establishment of a global climate responsibility mechanism, optimization of food trade and distribution, and the development of an integrated governance framework centered on Shiology — ultimately aligning ecological health, food security, and social equity.

Keywords: Global Climate Crisis, Food System, Shiology, Pakistan, Climate Injustice, Ecology, Food Security, Barbados, Morocco, Fiji, China, Poland

Pakistan: Dilemmas in Agricultural Transformation and Waste Management

Pakistan is an agricultural country where agriculture accounts for 70% of its economic output. A key challenge facing Pakistan's agriculture is closely linked to climate change, namely the improper management of agricultural waste. Despite the modern shift toward circular economy principles that emphasize resource

reuse, Pakistan's agricultural sector lacks sustainable procedures for utilizing agricultural waste effectively, even though it boasts extensive agricultural land.

Relevant research on banana cultivation in Pakistan reveals another critical impact of climate change: a significant climate shift in the region has altered its agricultural landscape. Historically, mango was the dominant crop in Pakistan, but over

the past three to four years, climate shifting has made mango cultivation unsustainable. Mangoes typically reach maturity in April and May, a period that once featured temperatures ideal for the fruit's development. However, rising temperatures driven by climate change have led to massive mango yield losses during this critical maturity stage. This disruption has severely affected the livelihoods and economic stability of local communities, prompting farmers to shift to banana cultivation as an alternative crop. Within just two years, 5,000 acres of farmland (equivalent to approximately 2,023 hectares, given that 2.47 acres equal one hectare) have been converted from mango to banana cultivation.

Moreover, the extensive disposal of agricultural waste has become a key issue exacerbating ecological pressure. Most farmers choose to burn or dump waste openly, which not only wastes resources but also pollutes the atmosphere.

Everyone should know this scientific principle in school—energy and matter are neither created nor destroyed, only transformed. This reminds us that nothing should be wasted. Through proper waste management, we can transform resources into what is needed to maintain ecological balance, sustain life, and protect our atmosphere.

Barbados: Three Core Crises in the Food System

Beyond a purely technical perspective, it was proposed that the construction of a global food system must confront three major crises, each posing fundamental challenges to its sustainability and resilience.

First is the crisis of trust. Trust serves as the cornerstone of human societal operation and the underlying logic of the food system—farmers trust that the land can nurture crops, consumers trust that producers can provide healthy food, and

cooperation between countries and regions cannot do without trust. Once the trust chain is broken, the entire food system will lose its foundation.

Second is the crisis of imbalance between empowerment and protection. Building a resilient food system requires clarifying the boundaries between empowerment and protection: it is necessary to empower households, individuals, and other entities to participate in food production, while also protecting ecosystems and vulnerable groups, and balancing the market orientation of healthy diets and low-cost junk food.

Third is the crisis of ecological interdependence. The core principle of nature is that all things coexist and thrive; humans cannot achieve self-sufficiency by separating from ecosystems. Development models that violate the principle of ecological interdependence will eventually lead to the collapse of the food system.

For Barbados, a small tropical island developing state with an area of only 166 square miles, small island nations need to face the reality of limited resources and find their position in the global ecological network.

Let's get back to basics and excel at the fundamentals. We must recognize our limited resources and develop a food commodity trade strategy grounded in this reality. This means importing what we cannot efficiently produce given our constraints, while focusing our limited resources on growing what we can produce best and most efficiently.

Pacific Island Nations: Policy Integration Demands Amid Existential Challenges

More than 2.6 million people in the Pacific region are bearing the direct brunt of climate impacts: some islands are at risk of being submerged by seawater, a single virus can destroy local staple food crops, and a single tropical

cyclone can plunge a country into food shortages and health crises lasting two to three years.

Unlike continental nations, which have options to relocate, shift cultivation, or adapt to climate change, the vulnerability of Pacific island nations stems from a “lack of choices” — Even “high islands” like Fiji, Vanuatu, and the Solomon Islands face severe risks: 70% of the population lives within 10 kilometers of the coast, making them highly dependent on ocean ecosystems—yet climate change is destroying these critical resources. Fiji, for example, relies on tourism for 40% of its GDP, but its small-scale food systems are collapsing, and non-communicable diseases (NCDs) are rampant (with standard BMI metrics failing to capture the region’s unique health challenges). At present, national policies are clearly fragmented; meetings and policies in agriculture, health, climate, and other fields operate in silos, making it difficult to form synergy. It was called for Shiology to serve as a link to promote cross-sectoral policy integration, integrating local culture into food system construction, and urging major countries to take more responsibility for emission reduction to give island nations time and space to adapt to climate change.

Morocco: Water Crisis, Food Security, and Climate Injustice

Drawing on experiences from the Mediterranean region of North Africa, the section stressed out that that drought is the core manifestation of climate change in this region. In 2023, Morocco experienced a record-breaking drought, and water scarcity directly triggered agricultural failures and food security issues. To alleviate water pressure, Morocco has had to increase investment in seawater desalination, but the high costs are unaffordable for ordinary people; at the same time, falling groundwater levels have led to seawater

intrusion, further worsening the water crisis.

Climate change is widening the gap between the rich and the poor: wealthy groups can afford rising food prices, while poor groups are struggling to survive. This is the significance of the establishment of the Loss and Damage Fund. Developed countries were called upon to honor their commitments and provide financial support for vulnerable nations to adapt to climate change. In addition, the interlinkage of the Sustainable Development Goals (SDGs) — SDG 13 (Climate Action) is a prerequisite for achieving other goals, and food security is a key node connecting climate, health, poverty reduction, and other goals.

Only when every individual begins to act can we collectively cross into that safe operating space. Then, policies and other measures can effectively support our efforts. The traditional practices have been passed down in the valleys of Morocco—such as water-sharing systems, food storage, and transportation methods—is remarkable and remain effective resilience strategies against climate change. This leads me to a key insight: We must return to our roots and enhance their efficiency with modern knowledge.

China: Agricultural Carbon Footprint and Pathways for Ecological Transformation

As we all know, humanity is currently facing numerous crises, with global climate change being the most severe among them. It has been conclusively proven that global climate change is closely linked to human activities, and agriculture, the core of food production, has played an unconstructive role in this issue.

Agricultural production releases 13.7 billion tons of greenhouse gases into the atmosphere each year, measured in carbon dioxide equivalents, accounting for 25% of the world’s total greenhouse gas emissions. If we include emissions from

the post-production consumption of agricultural products, this proportion will rise by an additional 6 to 8 percentage points. In other words, the entire agri-food system contributes 31% to 35% of the greenhouse effect.

Greenhouse gas emissions from the agri-food system stem mainly from three stages: pre-production, in-production and post-production. The pre-production stage involves the mass use and combustion of fossil fuels to manufacture industrial agricultural inputs such as chemical fertilizers and pesticides, resulting in substantial emissions; agricultural production activities themselves in the in-production stage are a major source of emissions; emissions in the post-production stage are concentrated at the consumption end, with food waste being the primary driver. Emissions from these three stages together account for 31% to 33% of the greenhouse gas contributions from the agri-food system.

Here is a typical example: nitrous oxide (N_2O) is a highly harmful greenhouse gas, and the application of nitrogen fertilizers in agricultural production is its main emission source. Agricultural sources contribute 70% of the world's total N_2O emissions. More alarmingly, the greenhouse effect of N_2O is 300 times that of carbon dioxide. The annual N_2O emission from natural soil is only 0.04 kilograms per hectare, while that from farmland reaches 5 kilograms per hectare, 125 times higher than that of natural soil. It is evident that agriculture has played a significant role in driving global greenhouse gas emissions and climate change.

The Paris Agreement adopted in 2015 clearly states that greenhouse gas emissions must be strictly controlled by 2030, limiting the global average temperature increase to well below 2°C above pre-industrial levels, and pursuing efforts to limit the increase to 1.5°C. However, to date, the

global average surface temperature has risen by 1.37°C compared with pre-industrial levels. The room for meeting the temperature control target is almost exhausted, and humanity has very limited time to address climate change.

As a populous country, China's agricultural production is also an important source of greenhouse gas emissions. Data shows that from 1990 to 2020, the proportion of greenhouse gas emissions from China's agricultural production, measured in carbon dioxide equivalents, in the country's total greenhouse gas emissions has risen from 9.7% to 13.8%. If no attention is paid, this proportion will continue to expand. Therefore, the work of greenhouse gas emission reduction in the primary agricultural industry and the food consumption sector is extremely urgent.

Fortunately, agricultural production has a dual nature: it is both a source of greenhouse gas emissions and has carbon sequestration potential. At present, the improper use of chemical fertilizers and pesticides has caused soil degradation and exacerbated carbon emissions; but from a scientific perspective, carbon sequestration in soil can be achieved by applying organic fertilizers, enabling soil to play a role as a carbon sink. This carbon sequestration potential of agriculture can make a tremendous contribution to China's fulfillment of its international commitment to the "dual carbon" goals.

Mr. Liu Guangwei's Shiology adopts a systemic view to examine the complexities of our food and agricultural systems. He proposes a Shiology triangular framework: the eater, food, and order. These three elements are inseparable. Food Ecology, as a discipline within Shiology examines the relationship between food and ecosystems, addresses problems arising from this relationship, and explores the balance between food yield and quality. Shiology provides a broader framework

than agroecology—which focuses primarily on agriculture—because food extends beyond farming to include natural sources. Therefore, the universities, especially agricultural institutions, should operate within the framework of Shiology to advance this holistic understanding.

Poland: Ecological Restoration, Food Distribution, and Lifestyle Innovation

From the perspective of ecological restoration, the core view that “healthy soil nurtures healthy food” was put forward. It was pointed out that 40% of global agricultural soil is facing erosion, and millions of hectares of land damaged by mining are in urgent need of restoration; ecological restoration will therefore become a key challenge for future agricultural development.

Taking Europe and Poland as examples, Taking Europe and Poland as examples, the contradiction between food surplus and land fallow in Europe — while needing to protect the ecology by

fallowing 30% of the land, it also has to meet the food demand brought by immigration. As a major agricultural country in Europe, Poland ranks 28th in Europe in terms of per capita water resources and even Scandinavia is affected—Norway recorded an unusually high 14°C temperature in September, disrupting local ecosystems. Additionally, Europe is grappling with the consequences of large-scale agricultural agreements, such as the Mercosur deal, which brings significant volumes of food from industrial agriculture into the region. Shiology is highlighted as a valuable tool for addressing these interconnected challenges.

Only through scientific collaboration and better food distribution can we secure a sustainable future for humanity. The restoration ecology serves as a vital and necessary tool for improving the environment—a healthy environment yields healthy food, and healthy food nurtures healthy people.

08

Key Outcome: Global Food Systems and SDGs Report

核心成果:《全球食事系统与可持续发展(SDG)研究报告》

2025年10月30日 15:30~17:00

[CN] 携手共治人类的“五食”问题

[IT] Guiding Food Systems Transformation: Global Food Systems and SDGs report

[TL] Food System in Timor-Leste

[TZ] Key Food-System Challenges and Situations from Africa/Tanzania

[CA] Global Food Systems and SDGs Report: Core Insights and Implementation Recommendations

[PG] PNG's Food Systems: Challenges and Shiology-Integrated Education



携手共治人类的“五食”问题

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摘要：“五食”问题是人类生存与发展的根本性议题，涵盖食温饱、食安全、食丰富、食长寿、食持续五个维度，“五食”问题的解决与联合国2030年可持续发展目标的实现高度关联。本文系统阐释“五食”问题的内涵与本质，提出“食事三角”的系统认知框架，构建横跨九大学科门类的食学(Shiology)交叉学科体系，突破传统农学范式局限，实现从食物生产中心向食者需求中心的转型。结合《全球食事系统与可持续发展(SDG)研究报告》的实践探索，本文指出“五食”问题的系统解决将推动全球食事可持续发展与人类文明范式深刻转型，为全球食事治理与可持续发展的实现提供系统性方案与理论支撑。

关键词：“五食”问题；食学；食事三角；食事全球治理；可持续发展目标

一、引言

人类的问题大都是因人的需求而产生，食事问题也不例外。食温饱、食安全、食丰富、食长寿、食持续是每一个人的本性需求，这些需求得不到满足便形成“五食”问题。纵观人类历史，从迁徙定居到文明演进，从文化形成到冲突更迭，“五食”问题始终伴随着人类生存与发展的全过程。今天，全球80多亿人生活在195个国家和地区，饥饿、食品安全、食物浪费、资源分配不均、慢性病等问题依然普遍存在。联合国可持续发展目标(SDG)中有13项与“五食”问题直接相关，这意味着“五食”问题得不到整体解决，全球可持续发展议程便难以实现。

联合国秘书长古特雷斯在第五届世界食事论坛致辞中指出：“在经历全球疫情、冲突动荡以及经济低迷的冲击之后，全球饥饿局势终于开始缓解——这是令人欣慰的进展。然而，仍有约6.73亿人每晚带着饥饿入睡。在许多地区，粮食价格仍在上涨，饥荒已在加沙与苏丹蔓延。距离实现《2030年可持续发展议程》不

足五年，我们必须携手行动，建立既惠及人民、又能守护地球家园的食物系统。¹⁾

在科技能力突飞猛进的今天，宏观上相对论能让我们“上穷碧落”，微观上量子力学能让我们“下探微尘”，为何中观领域的“五食”问题至今未能全面解决？我们不缺科技能力，缺的是全面认知“五食”问题，缺的是学科层面的反思与重构。

二、“五食”问题的内涵与本质

“五食”问题，是人类所有食问题的总和，包括食温饱、食安全、食丰富、食长寿、食持续五个维度(如图1所示)，事关80多亿人的根本利益，事关人类生存、发展、可持续。

“食温饱”指个体能够获取足以维持生命与基本生理活动的充足食物，其本质是食物的数量问题。尽管全球农业生产力已大幅提升，但地区冲突、气候异常与经济不平衡，仍让“零饥饿”的全球目标面临挑战。解决“食温饱”问题是实现社会稳定的基石。



图1 “五食”问题

“食安全”是食物质量符合人类健康生存的要求,对人体健康不造成任何急性、亚急性或者慢性危害。“食安全”涵盖了从土壤到胃肠的全链条,包括野获食物、驯化食物、加工食物、流通食物直到食入体内的所有环节。

“食丰富”是指食物种类的多样化,是食物供给从“够吃”向“吃好”的升级,其本质是食物种类问题。以Livewell 饮食指南中的七大主要食物类别(水果、蔬菜、豆类、淀粉类主食、肉类、鱼类和乳制品)²为参照,可衡量一国食物构成的多样性与自给能力。

“食长寿”又叫食健康,是指通过科学合理且与个体相适应的吃方法,预防疾病,促进身心健康,其本质是“肌食耦合”度的问题。“食长寿”追求的,不是单一的“群体平均值”,而是“个体趋准值”,只有依据个体差异,选择适合的食物与吃方法,才能实现科学合理进食。

“食持续”即食物供给的可持续,包括两个层面的内涵:一是个体一生的食物供给的持续保障;二是后代子孙的食物供给的持续保障。食持续超越了时间的局限,从更宏观、更长远角度,审视人类的食事如何与地球生态、社会经济和谐共处,旨在为今世后代构建一个更具韧性和公平性的未来。

人类有数百万年的历史,在应对“五食”问题中生存与进化。他们因应对“五食”问题而迁徙遍布六大洲,因应对“五食”问题而产生智慧与礼仪,因应对“五食”问题而形成农耕、游牧、渔猎三大种群文化。与此同时,许多族群冲突、朝代更迭也因“五食”问题而导致。可见,“五食”问题远在文明之前,文明进化与“五食”问题治理相向而行。

人类有1万余年的食物驯化史、约7000 年的文明史、近 300年的工业文明史。今天有80多亿人生活在

195个国家和地区。然而,“五食”问题依旧普遍存在,有约 1/10 的人面临饥饿、2/10 人患过食性慢病、约 3/10 人受食品安全威胁。与此同时,全球 1/3 的食物被损失与浪费,水土污染日益加剧,因食物资源与分配不均引发的冲突不断,挑战食物资源能力的人口激增等问题。这一严峻的现实展现出了“五食”问题的复杂性与顽固性。联合国第八任秘书长潘基文在《全球食事系统与可持续发展(SDG)研究报告》前言中写道:“我们既要应对粮食供应不足等长期存在的传统问题,又须解决土壤与水污染等新型挑战;既面临食物浪费等显性难题,也需关注过度消费引发的慢性疾病等隐性痼疾。要应对这些挑战,必须建立覆盖食事系统全链路的综合知识框架。”³

三、认知“五食”问题的系统框架

“五食”问题的全面认知与解决,离不开“食事三角”——食为系统、食母系统与食化系统之间的和谐运行(如图2所示)。

食为系统,是指人类食事活动的整体运行机制,是为满足人类食欲的种种行为的整体系统,包括食物采摘、狩猎、烹饪、食物相关经济、法律,等等。食母系统,是指食物的孕育系统,是从人类食物来源的角度进行表述的生态,可以分为两个方面:无机系统和

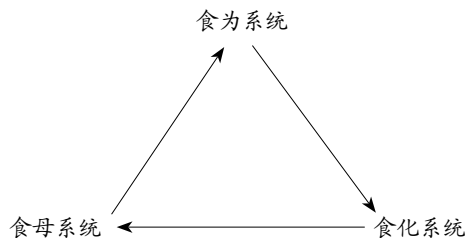


图2 食事三角⁴

有机系统。无机系统包括水、盐、温度、空气等;有机系统包括微生物、植物、动物等。食母系统的正常运转,是人类食物持续供给的保障,也是人类种群延续的基础。食化系统,是指食物转化为肌体构成和能量释放及废物排出全过程的整体机制。包括消化、吸收、利用、排泄、释放等过程。其中,食母系统、食化系统均属于自然界的运行机制,食为系统属于人类社会界的运行机制。从关系的角度来看,食为系统向食母系统索取食物,然后供给食化系统;食化系统将食物利用后,排出的废物及人的尸体又回归到食母系统内,三者之间相互影响,不可分离,构成一个完整的循环系统⁴。

从“五食”需求来看,食为系统向食母系统索取食物,关注的是“从田头到餐桌”,是解决“食温饱、食丰富、食安全”问题;食为系统将食物供给食化系统,关注的是“从餐桌到肠胃”,是解决“食长寿”问题;食化系统将食物利用后,排出的废物及人的尸体又回归到食母系统内,是解决“食持续”问题。食母系统是“五食”需求的物质根基,食为系统是“五食”需求的实现路径,食化系统是“五食”需求的终端检验。

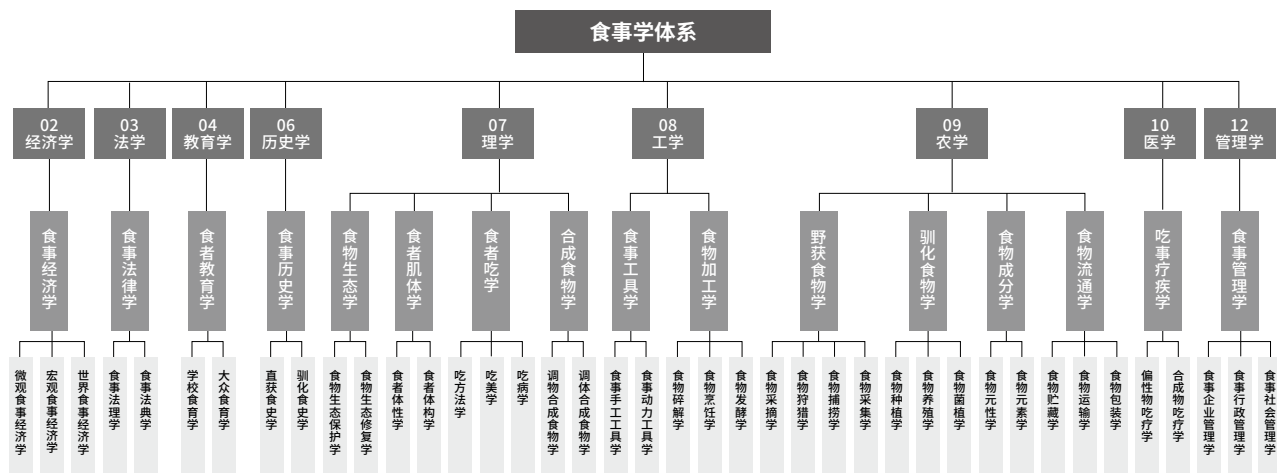
要全面解决“五食”问题,就要全面认知“五食”问题,也要构建覆盖“五食”问题的知识体系。联合国第八任秘书长潘基文称,“食学正是这样的知识体系——通过整合“食者、食物与食秩序”三大维度,为理解食事系统问题提供了全链条方法论³。”

四、跨九个学科门类的食事学

体系

长期以来,人类一直期待以农学的理论框架来解决“五食”问题,联合国粮农组织、国际农业发展基金等机构也是以农学为理论武器,这也折射出在面对“五食”问题时,人类普遍的方法论困境。现有的解决方案根植于“农学”范式,局限于食物生产,没有涵盖食者健康长寿与食序和谐。想要彻底解决人类的“五食”问题,根本出路在于全面认知“五食”问题,在于建构一个超越农学的学科体系。以“五食”需求立学,在农学学科门类的基础上,增加工学、医学、管理学、经济学、法学、理学、教育学、历史学等学科门类,形成一个横跨九个学科门类的交叉学科—食学(Shiology)⁵(如图3所示)。

食学研究的出发点是从食物获取回归到食者需求。以人为本,以食者需求为核心,满足食者需求是建构食学知识体系的唯一目的。研究对象从食物拓展为食事(食者、食物、食序)。通俗地说就是从“食温饱”拓展至“五食”,把人类的“五食”需求统筹起来认知。具体包括,把人口增长与食物资源统筹起来认知,把食物资源占有与社会冲突统筹起来认知,把食物生产与食物利用(食者健康)统筹起来认知,把获取食物与保护生态统筹起来认知,把食业者利益与食者利益统筹起来认知,把食物的生存属性与商品属性统筹起来认知,把食物成分的元性与元素统筹起来认知,把食物损失与浪费统筹起来认知,把食病与食疗统筹起来



认知,把食事效率与社会效率统筹起来认知,把食事问题系统治理与人类文明范式转型统筹起来认知,等等。只有如此全面认知,才能全面解决“五食”问题。联合国秘书长古特雷斯称:“食学的整体性原则,为探索人类共生之道指引了方向,唯有认识到社会、生态系统与经济之间的相互依存,方能在危机中培育韧性,在多元中凝聚力量¹⁾”。

食学,以食事为研究对象,以延长个体寿期、优化社会秩序、维持种群延续为任务,是开展对人类食事问题的整体性研究,从而建立起来的知识体系。食学,以应对食事问题为目的,揭示食事问题的形成规律,是一个具有新质内容的整体知识体系⁶⁾。食学通过整合9个学科门类的知识,构建覆盖食者、食物、食序的完整理论框架,为系统性应对人类“五食”问题提供了学科支撑。

五、“五食”问题全球治理年度报告的实践探索

为推动联合国《2030 年可持续发展议程》,以食学学科理论为基础,我们编制了2025年度《全球食事系统与可持续发展(SDG)研究报告》。立足 80 多亿人的“五食”需求,着眼 194 个国家(未含梵蒂冈)的“五食”问题,邀请 115 个国家的学者共同参与。本报告是一个跨年度的系统研究。2025 年报告的主题是:“五食”问题的盘点。首次对“五食”问题进行全面梳理分析和编码,并将问题与治理能力紧密关联,构建了“世界食事象限图”(如图4所示),以国家人均食物资源占

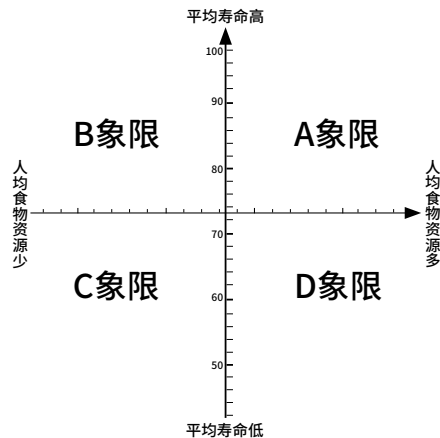


图4 世界食事象限图³⁾

有量与国家人均预期寿命为坐标轴,揭示了“五食”问题的普遍性和复杂性,强调整体认知、全球治理。报告中文版由中国人民大学出版社出版,英文版由香港中华书局出版。

2025年度报告共分七章,分别是第一章现状:有待全球治理的食物系统问题;第二章食学:覆盖食物系统问题的知识体系;第三章盘点:食者生存问题;第四章盘点:食者健康长寿问题;第五章盘点:食者可持续问题;第六章应对:国家问题与治理策略;第七章结语:构建全球食事治理体系。详见《目录》³⁾(如图5所示):

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图5《全球食事系统与可持续发展(SDG)研究报告(2025)》目录

“五食”问题全球治理年度报告(2026)的主题是:“五食”问题指数构建,旨在构建一套系统、可量化的评价指标体系,为不同国家与地区的食事问题诊断、进展监测与政策评估提供科学依据。通过对各地区“五食”问题指数的测算与比较,精准识别治理短板,推动差异化、系统化干预策略的落地实施。2027 年度报告的主题是:“五食”问题系统治理。在前期问题盘点与指数建构的基础上,聚焦于“五食”问题的整体性应对与治理。该年度报告将系统梳理各国在食事治理领域的实践探索与制度创新,探索跨部门、跨地区、跨学科的治理路径,推动“五食”问题全球治理从“碎片化应对”向“系统化治理”的范式转变。

“五食”问题的全面治理,不仅是对当前全球食事挑战的回应,更是人类文明转型的重要实践。通过系统性研究与行动推进,将为全球食事治理提供坚实的理论支撑、科学的分析工具与可操作的治理路径,助力联合国2030年可持续发展目标的实现。

六、结论

“五食”问题是人类生存与发展的根本性问题,其复杂性和顽固性要求我们必须超越传统的认知与学

科界限,建立全新的认知框架和治理范式。食学作为横跨九个学科门类的交叉学科,以“五食”需求为出发点,以“食事三角”为认知框架,为全面认知和系统治理食事问题提供了理论基础。

《全球食事系统与可持续发展(SDG)研究报告》的研编实践表明,食学理论体系具有重要的现实指导意义。“世界食事象限图”的构建、“食事指数体系”的探索,都为推动联合国可持续发展目标的实现提供了新的思路 and 工具。

“五食”问题的全面治理,不仅关乎80多亿人的福祉,更将推动人类文明范式的深刻转型。从以食物生产为中心到以食者需求为中心,从单一学科思维到交叉学科整合,从局部应对到系统治理——这一转型正在发生。

面对全球食事问题的共同挑战,没有哪个国家能够独善其身。全球各国应携起手来,超越地域与文化的差异,凝聚共识、整合资源、协同行动,以食学为理论指引,以可持续发展为目标,共同构建一个公平、韧性、与可持续的全球食事系统,为全面解决“五食”问题不懈努力。

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Jointly Addressing Challenges within Global Food Systems

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Abstract: The "Five Eater issues" represent a fundamental challenge for human survival and development, encompassing five dimensions: Eating Enough, Eating with Variety, Food-Safe Eating, Eating for Health and Longevity, and Sustainable Eating. The governance of the "Five Eater issues" is highly correlated with the achievement of the United Nations 2030 Sustainable Development Goals. This paper systematically elucidates the connotations and essence of the "Five Eater issues", proposes the Shiance Triangle as a systematic cognitive framework, and establishes an interdisciplinary academic system for Shiology that spans nine major disciplines. It breaks through the limitations of the traditional agriculture paradigm and achieves a transition from a food production-centered approach to a eater needs-oriented perspective. Drawing on the practical exploration of the Global Food System and SDGs Report, this paper discusses that the systematic governance of the "Five Eater issues" will promote the sustainable development of global shiance and transformation of human civilization paradigm, providing a systematic solution and theoretical support for global food governance and sustainable development.

Keywords: Five Eater Issues, Shiology, Shiance Triangle, Global Shiance Governance, Sustainable Development Goals



Guiding Food Systems Transformation: Global Food Systems and SDGs report

Alessandra Guidi

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Abstract:Shiology, a novel paradigm integrating economic development, social well-being, and human-centered values into the global food system, provides a foundational framework for this study. This article draws on the Global Food Systems and SDGs report—a comprehensive assessment covering 193 UN member states and 2 observer states, developed by over 120 experts from 115 countries—to explore the redefinition of food systems as living ecosystems rather than isolated economic sectors. The report adopts a holistic, three-in-one framework that links food production and consumption with culture, equity, nature, and responsibility. Taking Italy as a case study, the article examines the dual role of food as nutrition and cultural identity, exemplified by the UNESCO-recognized Mediterranean diet. It further analyzes the modern challenges confronting Italy's food systems. The article also discusses the policy responses at national and European levels aimed at fostering sustainable, innovative, and resilient food systems. Ultimately, it argues that transforming global food systems is not only feasible but imperative for protecting health, enhancing social cohesion, ensuring food equity, and preserving cultural heritage, with Shiology serving as a critical tool for this transformation. Such transformation requires cross-sectoral partnerships, shared commitment, and long-term vision, with the report acting as a starting point for translating scientific knowledge into concrete action.

Keywords: Shiology, Report, Food Systems Transformation, Italy

I. Holistic Framework of Global Food Systems and SDGs report

Shiology is a new paradigm that integrates economic development, social well-being and human-centered values into the global food system.

This Global Food Systems and SDGs report provides a comprehensive study and a practical tool to support countries in addressing global challenges. It is not just an academic exercise; it's a global assessment covering all 193 UN member states plus two observer states, developed with the contributions of over 120 experts from 115 countries. It analyzes people-centered food systems through a holistic, three-in-one framework—

a holistic, sustainable and circular approach to food that connects production and consumption with culture, equity, nature and responsibility. It redefines the food system not as an isolated economic sector, but as a living ecosystem that shapes society, health, fairness and sustainability.

This approach partly resonates with the One Health concept that guides Italian and European strategies, which recognizes that human health, animal health, and environmental health are deeply interconnected. To improve one, we must care for all three. It is not simply a collection of statistics, but a scientific compass to guide the transformation of food systems.

II. The Italian Case: Food, Culture, and Food System Challenges

For Italy, food is not only nutrition. It is culture and identity. It connects memories, traditions and communities. Italy is also one of the two countries where the Mediterranean diet was born. The other is Greece. Recognized by UNESCO as the intangible cultural heritage of humanity, it embodies this philosophy. It promotes health, longevity, biodiversity and social connection because food for us is not only about what we eat, it is about how we live and nurture our community.

Italy is a nation rich in culinary traditions and agricultural excellence, with high technology but also able to reconnect farms with local communities through agritourism and social farming.

Yet, we are not immune to the modern challenges that affect food systems worldwide. Like the rest of Europe, Italy still faces food loss and waste alongside food insecurity, rising levels of unhealthy diets and nutrition-related diseases with high impact on the public health system, social and economic inequalities that translate into unequal access to safe, nutritious food, pressure on small producers in rural communities, and the erosion of food culture towards ultra-processed products, the loss of biodiversity, and of course, the impact on the environment and climate change.

III. Policy Pathways for Transformation

At both national and European levels, several policies and regulatory instruments are being implemented to respond to these challenges, through coordinated action that supports sustainability, innovation and transition towards healthier and more resilient food systems. This combined effort reminds us that food is not only about production and markets. It is deeply connected to equity, health, sustainability and community.

The report provides not only an analysis, it provides understanding. It is not simply a collection of statistics, but a scientific compass that guides transformation. Transforming food systems is not only possible, it is necessary. It is necessary to protect health, to strengthen social cohesion and to ensure fair access to food for all. It is necessary to build resilience, reduce dependency and preserve cultural heritage while embracing innovation.

This report represents a starting point, not an arrival. Science must continue to inform policy, and policy must translate knowledge into concrete action. Because knowledge without responsibility is incomplete. Transforming food systems requires partnerships, shared commitment and a long-term vision. Shiology can be a tool for this transformation. No nation can achieve this alone, but every nation can contribute to this solution.



Food System in Timor-Leste

Delfim da Costa

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Abstract: As a small island country that gained full independence in 2002, Timor-Leste has faced arduous tasks of national construction and development. This paper focuses on the food system of Timor-Leste, elaborating on the country's basic national conditions related to agriculture, the current situation of its food system characterized by high dependence on imports, low agricultural productivity, and prominent post-harvest losses, as well as the multiple challenges such as climate change impacts, insufficient food preparation knowledge, and dietary inadequacy. In addition, the paper introduces the institutional construction, policy formulation, and international cooperation measures implemented by the Timor-Leste government to address food system issues, and points out that despite relevant efforts, challenges such as over-reliance on food imports and low agricultural productivity still persist. This study provides a basis for understanding the food security situation and development dilemmas of newly independent small countries, and offers reference for subsequent related policy optimization and international cooperation.

Keywords: Timor-Leste, Food System, Agriculture, Policies

I. National Development Background and Agricultural Conditions

Timor-Leste is a small island country located between Australia and Indonesia. Timor-Leste was colonized by Portugal for 450 years, occupied by Indonesia for 24 years, then became full independence in 2002.

When a small country like Timor-Leste gained independence with limited human resources, they had to build their nation in the 21st century, when every country had already moved forward. So, this is a big challenge that we faced at the time. We were not starting by talking about food security. In 2002, we began by building a state, followed by establishing institutions, schools, and health service centers, among others. After

our institution was established, we focused on human resources development. After those efforts, we tackled climate change, which every country was already focusing on before we became a country.

By 2006, we really pushed ourselves to adopt the three conventions from Rio de Janeiro: the UNFCCC, UNCBD, and UNCCD. We adopted those conventions as key tools for us to develop our country as we realized that development without considering the principles of the sustainability would lead us to the wrong way. The core of the three conventions mainly the principles of the sustainability development.

II. Current Situation and Challenges of Timor-Leste's Food System

Turning to our food system, In Timor-Leste, we have 66% of households relying on agriculture. We have a resource of 500,000 hectares land suitable for agriculture. But only 50% of this resource is currently utilized. The size of Timor-Leste is only half the size of Hainan province.

While the global discourse on food systems has been ongoing for five or ten years, Timor-Leste formally began its own national discussion on food system recently in 2023.

Our analysis of the food system highlights a primary focus on two main types of food in the country, dictated by our national conditions: limited rainfall, arid landscapes, and scarce human resources. As a low-income country, widespread agricultural mechanization remains a distant goal. The data reveals a heavy dependence on imports, with nearly 60% of national rice consumption being sourced from abroad. Rice production occupies about 7.6% of our total land area.

Maize serves as the second staple. Despite challenging growing conditions characterized by slow planting cycles and steep terrain, it is widely cultivated by farmers. Nevertheless, productivity remains low, with maize cultivation utilizing around 18% of the land. Overall, our agricultural output is insufficient. For instance, domestic rice harvests amount to only about 85,000 tons, necessitating imports to cover 50-60% of consumption needs. Even though we have low production, we still have significant post-harvest losses, estimated at a staggering 21%. This equates to effectively discarding the yield from one out of every three rice fields—a severe inefficiency we currently face.

Climate change is really affecting everything. It's not just affecting the productivity of crops;

it's affecting the productivity of farmers. Extreme heat limits productive labor to only a few hours in the early morning and late afternoon, drastically reducing time available for cultivation.

Furthermore, food preparation is one of the issues. The knowledge of food preparation is really important in the food system. Our knowledge to prepare food is limited for the diversity of meal preparation.

The situation is reflected in concerning dietary indicators, with an estimated 45% of households lacking access to adequate and diverse diets—a rate notably high within the Southeast Asian region. Timor-Leste remains a food-deficit country, importing approximately 60% of its food requirements, primarily from India, China, and Vietnam.

III. Policies and Practices for Addressing Food System Issues in Timor-Leste

To address these systemic issues, our government has undertaken several institutional and policy measures. In 2010 established the National Council for Food Security, Sovereignty and Nutrition (KONSSANTIL) followed by the National Action Plan for Hunger and Malnutrition in 2014. In addition, to bring the country to the world networks, Timor-Leste officially became a WTO member in 2024 last year. This is a good point for us so that we can build our vision.

The legislation developments includes: the National Policy of Food Security 2005, the National Food and Nutrition Policy 2014 and National Food and Nutrition Policy 2017, which is a minor revision after four or five years and directs intervention to farmers. We also have a regular development program from the Ministry of Agriculture and Fisheries and have improved market access for smallholder farmers, supported

from international agencies like the ILO.

Despite these efforts, formidable challenges persist. These include high reliance on food imports, low agricultural productivity and production, vulnerability to climate impact and natural resource degradation, and limited access to the market.

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Key Food-System Challenges and Situations from Africa/Tanzania

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Abstract: Against the backdrop of rapid urbanization and recurrent climate shocks, Africa's food systems are experiencing profound structural transformations. This study systematically examines the core challenges confronting Africa's food systems, including climate variability and environmental stress, post-harvest losses and market inefficiencies, as well as the dual burden of food safety risks and malnutrition. Drawing on the theoretical framework of "Shiology" and the Five Eater Needs (5E) proposed in The Global Food Systems & SDGs Report (2025), the research reframes food governance as an eater-centered, integrated system that integrates survival, health, and sustainability dimensions. Methodologically, the report introduces a hierarchical food-system issue framework to identify and categorize food system issues across 193 UN Member States and 2 Observer States. Furthermore, it emphasizes the necessity of integrated policy coordination across agricultural, health, environmental, and other sectors, and proposes a Fourteen-Dimension Solution Framework as a practical toolkit for cross-sectoral intervention. This study provides a comprehensive diagnostic basis and actionable guidance for transforming Africa's food systems, contributing to the fulfillment of the Five Eater Needs.

Keywords: Report, Food system, SDGs, Five Eater Needs(5E), integrated framework

I. Research Background

Africa's food systems are undergoing a profound structural transformation driven by rapid urbanization and recurrent climate shocks. Agriculture remains the cornerstone of its economy, contributing about 35% of GDP and employing over 60% of the workforce. However, systemic constraints persist, characterized by low productivity, fragmented markets, and inadequate food safety governance. These challenges are compounded by the policy fragmentation and weak coordination highlighted in The Global Food Systems & SDGs Report (2025).

II. Key Challenges

1. Climate Variability & Environmental Stress

Increasingly frequent droughts, floods, and erratic rainfall significantly threaten crop stability and food availability. These environmental pressures are further intensified by soil degradation, deforestation, and overfishing, which erode ecosystem resilience. This multi-layered challenge aligns with the Sustainability tier (Need 5) in the Five Eater Needs framework and requires climate-smart, integrated policies that connect environmental health with food security.

2. Post-Harvest Losses & Market Inefficiencies

An estimated 30–40% of food produced in Africa is lost before reaching consumers, primarily due to inadequate cold-chain infrastructure, limited processing capacity, and fragmented storage systems. These inefficiencies lead to significant economic losses for farmers.

3. Food Safety, Nutrition & Public Health

Food safety remains a critical public health issue, with contaminated foods causing an estimated 137,000 deaths annually in Africa. Fragmented food control systems struggle to manage this burden, directly compromising Food-Safe Eating (Need 3). Concurrently, the region faces a double burden of malnutrition—where undernutrition and overweight/obesity coexist—highlighting failures in the Eater Health tier (Need 4). This dual challenge exemplifies the need for coordinated policy action across health, agriculture, and regulatory sectors.

To build food systems that are fair, healthy, and resilient, Africa must invest in climate-smart, inclusive, and nutrition-sensitive agriculture, develop post-harvest infrastructure and regional market integration, strengthen national food safety governance and laboratory networks, empower youth and women in agribusiness innovation, and promote regional harmonization of standards.

III. Core Insights and Theoretical

Frameworks of the Report

The Global Food Systems and SDGs Report reveals that, globally, food production is actually sufficient. However, the core issue is that we still face hunger, malnutrition, and obesity. The report introduces the concept of a “Shiology”, which reframes food governance as an eater-centered, cognitive, and integrated framework, merging survival, health, and sustainability dimensions. It

become a vital strategy for achieving sustainable development.

The key point in the report is the need to establish a quantitative, evidence-based Food Systems Index, it transforms scattered data into an actionable global tool for benchmarking and accountability. The report also emphasizes that we cannot work with isolated policies. What we need is coordination—to organize these policies into a coherent whole. This means integrating not just cultural or nutrition policies individually, but all policies together.

There are three key takeaways from this report. First, apply the shiology framework to connect how people eat, how food is produced, and how it is governed. This is a crucial takeaway. The second takeaway is that we must evidence and data to guide actions that make food systems fair, healthy, and sustainable. The final takeaway is to joint efforts between consumers, producers, and policymakers to build stronger and more resilient food systems.

IV. Methodological Innovations and Practical Solutions

The report’s methodology is rigorous and designed for action. It establishes a hierarchical food-system issue framework, categorizing all challenges under the umbrella of the Five Eater Needs (5E): Eating Enough; Eating with Variety; Food-Safe Eating; Eating for Health and Longevity; and Sustainable Eating. These needs are further grouped into three tiers: Survival (Needs 1-3), Eater Health (Need 4), and Sustainability (Need 5). Each issue is given a unique code (e.g., SI-xxxxxx), creating a standardized, global taxonomy for diagnosing problems.

The report powerfully argues against isolated policy interventions. It demonstrates that issues like

child stunting (a Survival-tier issue), adult obesity (an Eater Health-tier issue), and soil degradation (a Sustainability-tier issue) are interconnected. Therefore, what is needed is integrated policy coordination—merging agricultural, health, environmental, trade, and economic policies into a coherent strategy. The proposed Fourteen-Dimension Solution Framework (spanning Legislation, Governance, Technology, Education,

Investment, etc.) provides a modular toolkit for this cross-sectoral approach.

In essence, the report is both a comprehensive diagnostic tool and a practical guide for transformation. It shifts the narrative from simply producing more food to governing better food systems—systems designed explicitly to fulfill the Five Eater Needs for all people, within planetary boundaries.



Global Food Systems and SDGs Report: Core Insights and Implementation Recommendations

Claude Caldwell

(Professor Emeritus, Faculty of Agriculture, Dalhousie University)

Abstract: This article focuses on the core content and practical implications of the Global Food Systems and SDGs Report, which is grounded in the United Nations Sustainable Development Goals (SDGs). The report, developed through international collaborative efforts, comprehensively explores cross-national food system challenges and solutions, integrating empirical data and innovative frameworks. This article first proposes a structured reading approach to facilitate in-depth engagement with the report, emphasizing the analytical and strategic significance of Chapters 6 and 7. It then highlights three pivotal insights from these core chapters and two targeted recommendations are put forward to translate the report's findings into actionable outcomes. The article concludes that the report constitutes a valuable contribution to global food system research, while emphasizing the need for further research, cross-cultural dialogue, and collaborative action to advance its agenda.

Keywords: Report, SDGs, Food systems, Shi

The global food systems and SDGs report, anchored in the United Nations Sustainable Development Goals (SDGs), constitutes a rigorous and comprehensive exploration of cross-national food system challenges and solutions. Developed through a collaborative global initiative that assembled experts from diverse regions, the report integrates empirical data, comparative analysis, and innovative conceptual frameworks to address pressing issues of food security, trade, and interdependent global nourishment. Its findings and recommendations hold significant implications for guiding policy formulation, cross-sector collaboration, and international governance in the food systems domain. To facilitate a more systematic and in-depth engagement with this pivotal document, a structured reading approach is recommended:

1. Foundational Stage: Prioritize the introduction and methodology sections, followed by the executive summary, to establish a clear understanding of the report's theoretical framework, research design, and core conclusions.

2. Contextualization Stage: Conduct a preliminary review of Chapters 1–5 to grasp the empirical background, theoretical underpinnings, and contextual factors that inform the subsequent analysis.

3. Core Analysis Stage: Undertake an in-depth study of Chapters 6 and 7, which constitute the analytical and strategic core of the report.

Chapter 6, Country Issues and Corresponding Solutions, and Chapter 7, Toward a Community with a Shared Future for Global Food Systems, contain several pivotal insights that warrant emphasis:

1. Trade and Food Security Nexus: As articulated on page 180, “This three-step ladder therefore clarifies why open, rules-based agrifood trade is a necessary condition for attaining population-scale diet adequacy while domestic policy focuses on addressing structural gaps.” This conclusion carries significant implications for current global trade dynamics, underscoring its timeliness and policy relevance.

2. Cross-National Food System Mapping: Table 6.4 (spanning pages 184–190) represents a monumental analytical tool. Rarely do tabular datasets extend over six pages, yet this table systematically maps country-specific challenges and food system configurations across all participating nations. While the table’s scope may appear formidable, the subsequent trend analysis yields illuminating findings, including the incisive observation that “Richer doesn’t mean better” and nuanced insights into the systemic constraints faced by landlocked countries.

3. Conceptual Framework of Interdependence: Page 230 formally introduces the concept of a “community of shared future”, which posits that the global community constitutes an interconnected and interdependent entity with respect to the fundamental human needs of sustenance and nutrition. This concept affirms that the collective actions of the global community will determine the trajectory of human food systems and, by extension, shared human destiny.

Following the articulation of this framework, the report issues a call for collective action, with a consistent emphasis on centering the needs and agency of the eater. A rigorous engagement with Chapters 6 and 7 is expected to motivate a more thorough re-examination of Chapters 1–5, thereby facilitating a holistic understanding of the report’s contents. It is important to emphasize that this report represents merely the inception of an

ongoing research and action agenda. Countless reports in academia and policy circles are consigned to archival obscurity, failing to translate into tangible action. Thus, it is incumbent upon all stakeholders to consider the critical question: what concrete steps can be taken to advance the agenda outlined in the report?

Against this backdrop, two targeted recommendations are proposed to transition from theoretical analysis to practical implementation:

1. Promote the Global Dissemination and Contextualization of Shi

The concept of shi provides a unique analytical framework for addressing global food system challenges that require both context-specific local interventions and coordinated global action. For me, a core challenge lies in the effective translation and cultural contextualization of shi for North American stakeholders. Linguistic fluency in a culture’s discourse is a prerequisite for cross-cultural understanding, yet culturally embedded terms such as shi carry connotations that resist direct translational equivalence. Currently, there is a dearth of cultural literacy regarding China in North America, particularly with respect to the nuanced cultural semantics of food and eating.

Conceptually, shi functions as both a noun and a verb in Chinese, encapsulating the tripartite relationship between food, eating behavior, and the eater. In contrast, English vocabulary related to food is predominantly nominal and static, lacking the dynamic, action-oriented dimensions inherent in shi. This linguistic characteristic is not unique to Chinese; for example, the Inuit people of northern Canada possess 10–50 distinct terms for snow (e.g., qanik snow falling, aputi snow on the ground, pukak crystalline snow on the ground, aniu snow used to make water), each of which embodies an action-oriented descriptive logic. Similarly, shi encapsulates a holistic, dynamic understanding of

food systems that transcends the simplistic English equivalent of “food”.

To realize the transformative potential of shi on a global scale, it is essential to foster its widespread understanding and adoption beyond linguistic and cultural boundaries. Reducing shi to the literal translation of “food” will dilute its conceptual richness and practical value. Therefore, a key strategic initiative should involve engaging stakeholders across the food value chain in the United States—a pivotal actor in global food systems—to facilitate the contextualization and localization of shi in Western discourse.

2. Formulate a Formal Succession Leadership Plan for the Global Advancement of Shi

Leadership succession is a critical determinant of the sustainability of international initiatives. It has been observed that a highly successful international project once faltered following the departure of its founding leader, due to the absence of a clear, actionable succession plan to ensure institutional

continuity.

As a foundational principle, women play an indispensable role in global food systems (“women hold up half the sky”), and youth represent the future of global food governance. Therefore, it is recommended that the formulation of a formal succession leadership plan for the global advancement of shi can be designated as a priority action item derived from this report, with explicit provisions to ensure the meaningful inclusion of women and youth in leadership roles.

In conclusion, this report represents a rigorous, valuable contribution to global food system research. However, the agenda outlined in the report is far from complete, and substantial further research, cross-cultural dialogue, and collaborative action are required to advance the global dissemination and implementation of its core insights, particularly with regard to the promotion of shi and the establishment of sustainable leadership mechanisms.



PNG's Food Systems: Challenges and Shiology-Integrated Education

Sinafa Robby

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Abstract: Papua New Guinea (PNG), a linguistically and culturally diverse Pacific island nation, relies heavily on agriculture as the cornerstone of its socio-economic stability. This article presents PNG's unique national perspective by examining the core challenges confronting its agricultural sector and food systems, as well as identifying potential pathways for sustainable development. Key challenges include low agricultural productivity, food waste in rural areas, and food distribution bottlenecks exacerbated by urbanization and insufficient road connectivity. While recent government initiatives targeting inter-provincial infrastructure have yielded modest improvements in food transport, structural constraints persist. Additionally, this article highlights a critical opportunity for PNG's national education system: the integration of Shiology into curriculum development. By exploring practical implementation pathways for Shiology in education, PNG aims to leverage educational reform to support the sustainable development of its agricultural sector and address prevailing socio-economic challenges.

Keywords: Papua New Guinea, Agriculture, Food Systems, Shiology, Education

I. Introduction: National Context and Significance of Agricultural Contribution

Papua New Guinea is a Pacific island nation located north of Australia, sharing a border with Indonesia. It is a country of diversity, with approximately 800 languages spoken among a population of 10 million. Agriculture is one of the main sources of our livelihood, supporting nearly 80% of our population through employment, food provision, and income generation. Therefore, our contribution to this report represents our unique national perspective and context.

II. Key Challenges Confronting Papua New Guinea's Agricultural and Food Systems

Despite the centrality of agriculture to PNG's livelihoods, the sector faces a suite of interrelated challenges that undermine its productivity, resilience, and ability to support national development. A primary constraint is the widespread reliance on traditional, low-input farming practices and simple hand tools. Unlike mechanized agricultural systems in many developed or emerging economies, PNG's smallholder farmers

lack access to modern machinery, improved seed varieties, and agrochemical inputs that could boost yields. This technological gap severely limits the sector's output potential: even for staple crops, productivity remains far below global averages, and cash crop yields are inconsistent. Consequently, while PNG's agricultural production is primarily oriented toward local consumption, the shortfall in domestic supply compels the country to import a range of food items to meet national demand. This reliance on food imports not only strains the national economy but also increases vulnerability to global commodity price fluctuations and supply chain disruptions, particularly in the context of climate change and global economic volatility.

Urbanization represents another significant and growing challenge to PNG's agricultural and food systems. In recent decades, there has been a steady migration of people from rural farming communities to urban centers and townships. This demographic shift has created two interconnected problems: first, the concentration of population in urban areas has increased demand for food supplies that must be transported from rural production zones; second, inadequate road infrastructure and poor inter-regional connectivity have hindered the efficient and timely movement of food from farms to urban markets. Many rural areas in PNG are accessible only via unpaved roads, which become impassable during the rainy season, further exacerbating food distribution bottlenecks. While recent government policies focused on enhancing inter-provincial connectivity—including road upgrading projects and investments in rural transport infrastructure—have shown modest improvements in facilitating food movement. These distribution challenges not only increase food prices for urban consumers but also reduce the profitability of farming for rural producers, discouraging investment in agricultural

productivity.

A third critical challenge is the high level of food waste in rural communities. Despite the fact that many rural households produce enough staple crops to meet their own consumption needs, surplus produce frequently goes to waste before it can reach markets or be consumed. This waste is driven by a confluence of factors, with the lack of downstream processing capabilities being a primary constraint. Additionally, inadequate storage infrastructure—such as cold storage for perishables or secure granaries for staple crops—leads to spoilage, pest infestations, and damage from extreme weather events. Limited access to market information and formal market linkages further compounds this issue: many smallholder farmers are unaware of demand for surplus produce in nearby townships or lack the means to transport small quantities of surplus to markets profitably. The loss of surplus produce represents a wasted opportunity to generate additional income for rural households, improve food security, and reduce reliance on food imports.

III.Opportunity: Integrating Shiology into National Education Curriculum

Amid these challenges, PNG identifies a critical opportunity for sustainable agricultural and socio-economic development through the integration of Shiology into its national education system. The national education system, which serves as a key vehicle for building human capital and driving social change, offers a platform to embed Shiology's principles into curricula at primary, secondary, and vocational levels.

Integrating Shiology into education could address several of the sector's key challenges by equipping future generations with the knowledge and skills. Shiology could emphasize the importance of eating enough; eating with variety;

food-safe eating; eating for health and longevity; sustainable eating, helping students understand how to eat healthier. Shiology could also foster a deeper understanding of the interconnections between agriculture, culture, and the environment, reinforcing the role of traditional land management

practices in promoting sustainability.

Moving forward, Embracing shiology into the curriculum development of PNG is one of the key opportunities to explore practical pathways for implementation.

09

Interview 专家采访

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- [PG] Interview with Sinafa Robby
 - [PL] Interview with Marcin Pietrzykowski
 - [MX] Interview with Alicia Paulina Cárdenas Castro
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 - [CL] Interview with Ernesto D. R. Santibanez-Gonzalez
 - [FJ] Interview with Philip Sagero
 - [NP] Interview with Rudra Bahadur Shrestha
 - [BR] Interview with Walter Belik
 - [KZ] Interview with Zhuldyz I. Satayeva
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Interview with Sinafa Robby

The following is an interview with Sinafa Robby, Lecturer in Animal Health and Biosecurity, Papua New Guinea University of Natural Resources and Environment (UNRE)

Q1: Please name or describe the top three Food System issues in your country.

A: The top three food system issues in my country are as follows:

1.Heavy reliance on imported food: Papua New Guinea imports many food items from overseas, creating significant dependency on global supply chains. This reliance not only strains national foreign exchange reserves but also exposes the population to price fluctuations and supply disruptions in international markets. Strengthening local food production is critical to reducing this vulnerability and building long-term food sovereignty.

2.Lack of access to and use of agricultural machinery for increased food production: A significant challenge facing Papua New Guinea's food system is the limited availability and use of appropriate agricultural machinery and mechanised tools. Many smallholder farmers continue to rely on basic hand tools, which severely limits the scale and efficiency

of food production. Without access to affordable and suitable machinery, farmers are unable to expand cultivation, improve yields, or reduce post-harvest losses. This gap in mechanisation directly constrains the country's capacity to increase domestic food output and achieve greater food self-sufficiency.

3.Lack of adequate government support to boost agricultural production: Even though most Papua New Guinea's population depends on agriculture for their livelihoods and food security, the level of government investment and policy prioritisation in the agricultural sector has not been proportionate to this need. Limited funding, insufficient extension services, and weak institutional support have hindered the development of a productive and resilient agricultural sector. Agriculture must be elevated as a national priority, with sustained commitments to infrastructure, research, and farmer support systems to meaningfully improve food production across the country.

Q2: How does your country deal with all those issues, and any new solutions?

A: We have implemented targeted measures to address each issue, with specific solutions as

follows:

1.For imported food dependence: The government has put in place multiple programs to support import substitution, aiming to reduce reliance on overseas food imports. These initiatives encourage local farmers to produce commodities that are currently imported, helping to retain economic value within the country and build resilience in the national food supply.

2.For the lack of access to agricultural machinery: The private sector has begun to respond to this gap, with businesses seizing opportunities to supply affordable hand tools and small-scale mechanised equipment suited to smallholder farming conditions. In addition, the technical and vocational education system has started incorporating agricultural machinery design and maintenance into its curriculum, empowering students to develop and repair simple machinery that farmers can afford and effectively use to increase food production. Expanding these initiatives will be essential to driving broader mechanisation across rural farming communities in Papua New Guinea.

3.For the lack of government support to boost agricultural production: Government organisations and research institutions, working alongside donor agencies, are progressively collaborating to support agriculture industries across the country. While progress has been gradual, these partnerships are steadily building the foundations needed to

achieve the long-term objective of increased agricultural production, greater domestic food supply, and improved food sustainability for Papua New Guinea's people. Continued investment and stronger inter-agency coordination will be critical to accelerating these outcomes.

Q3: Would you have any comments on the Global Food System & SDGs Report?

A: I believe the report is a must-have and extremely important. It is crucial for all of us to ensure that everyone has enough food to eat, and no one should go hungry. Therefore, it is essential that we share our resources to support people around the world, ensuring that everyone is well cared for and adequately fed. From Papua New Guinea's perspective, the report serves as a vital reference point that affirms the challenges many developing nations face and the urgent need for coordinated global action to address food insecurity at all levels.

Q4: What do you think of the “three in one” — Eater, Food and Governance approach?

A: I think this approach is a very valid “triangle” that connects all key points. It links eaters, food, and governance, and good governance is essential to ensure the success of addressing food system issues and moving forward effectively. This integrated approach deserves more recognition and promotion. In the context of Papua New Guinea, where food production, consumption patterns, and institutional capacity all interact in complex ways, the “three in one” framework offers a practical lens through which policymakers, researchers, and communities can work together to build a more equitable and sustainable food system.



Interview with Marcin Pietrzykowski

The following is an interview with Marcin Pietrzykowski, Professor, University of Agriculture in Kraków, Poland

Q1: Could you list the top three issues facing your country's food system?

A: I am from Poland, a member of the European Union. Agriculture and food production are very important in our region. One major issue is the impact of industrial agriculture on the European food system. Another key challenge is the underuse of degraded lands such as post-mining and post-industrial areas, which have great potential for sustainable food production.

Q2: How is Poland addressing these issues? Are there any new solutions?

A: In Poland, we believe the future lies in local production and the organic food market, rather than further industrialization of agriculture. New solutions will come from scientific research — including genomics, genetics, and sustainable production technologies. We also emphasize ecological restoration: disturbed and abandoned lands can be recovered and reused for food

production using sound ecological techniques. Local and traditional food systems support better public health, so we should return to these more sustainable models.

Q3: What are your views and suggestions regarding the Global Food Systems and SDGs Report?

A: The report is well-prepared, and this forum provides an excellent opportunity to discuss and develop real solutions. Globally, the planet has enough potential to feed a growing population, as shown by the Green Revolution in the 1960s.

Q4: What do you think of the “three in one” (Eater, Food and Governance) approach?

A: These three elements — eaters, food, and governance — must be closely connected and equally important in the food system. This balance is one of the most important challenges for the future. As a restoration ecology expert, I want to highlight that: Restoring degraded lands and reintroducing them to ecological food production will play a critical role in building sustainable, resilient food systems worldwide.



Interview with Alicia Paulina Cárdenas Castro

The following is an interview with Alicia Paulina Cárdenas Castro, Researcher, National Technological Institute of Mexico Technological Institute of Durango, Mexico

Q1: Please name or describe top three Food System issues in your country.

A:

1. Food insecurity

25 million people in Mexico suffer from food insecurity, meaning they cannot access or afford enough food to eat. This figure was reported in 2023 and remains unchanged today.

2. Food safety

Food is sometimes contaminated or toxic, mostly due to plastic packaging, which creates another major problem for Mexico's food system.

3. Climate change

It has damaged the production of fruits, vegetables, and cereals. Many fruits and vegetables die from lack of water, insufficient rain, or extremely high temperatures.

Q2: How does your country deal with all those issues, and any new solutions?

A: One of the strategy is that the government works together with food science and society. When these three parties collaborate, we can find real solutions. For example, many fruits in

Mexico can be eaten completely — including the peel, pulp, and seeds. However, most people only eat the pulp and throw away the peel and seeds as waste. Food science has now discovered that peels and seeds contain many compounds that can help prevent diseases. Mexico actually has a wide variety of fruits and vegetables that are accessible to everyone.

Q3: Would you have any comments on the Global Food System & SDGs Report? Any suggestions?

A: I believe the Global Food System and Sustainable Development Goals Report is urgent. The statistics are worrying not just for one country, but for the entire world. We must work together to find solutions. We need to educate people with scientific evidence, teaching them what is healthy and can prevent disease. When people become more conscious of their food and start demanding healthier options, they will realize that healthier food has always been available: fruits, vegetables, cereals.

Q4: What do you think of the “three in one” (Eater, Food and Governance) approach?

A: When we look at shiology, everything is connected: Eaters — all of us — need food to live. This connects directly to the UN 2030 Agenda and

the goal of zero hunger worldwide. Our planet's resources are not infinite, yet we keep wasting them. We must ask: what are we leaving for future generations? We need to stop being selfish and

start caring for others and for the planet. The governance is essential. Laws and policies are needed to support the food supply chain, so that food can reach everyone around the world.



Interview with Gianluca Brunori

The following is an interview with Gianluca Brunori, Full Professor of Agricultural Economics and Food Policy, University of Pisa, Italy

Q1: Please name or describe top three Food System issues in your country.

A: The top three food system issues in Italy are:

1. Sustainability and food security

We are losing a great deal of biodiversity, our soils are degraded, and large areas—especially hilly regions—are being abandoned by agriculture.

2. Farmers' income

Many farmers do not earn enough, so they either leave agriculture or are pushed into intensive farming, relying heavily on fossil fuels, fertilizers, and pesticides to increase productivity. This further damages soil and the environment.

3. Consumer health and dietary behavior

Italy has one of the highest obesity rates in Europe, especially among children. This shows that many families have lost their traditional food culture and are following unhealthy diets. Targeted interventions are needed to promote appropriate diets.

Q2: How does your country deal with all those

issues, and any new solutions?

A: Together with the European Union, Italy is implementing policies to support farmers in transitioning toward sustainability. Italy has one of the highest shares of organic farming in Europe. We protect biodiversity and promote typical, territory-specific food products, while also supporting the income of small and medium-sized farms.

To address obesity, we are promoting the Mediterranean diet—a simple, plant-based diet focused on fruits, vegetables, and low amounts of animal protein.

Q3: What do you think of the “three in one” (Eater–Food–Governance) approach to deal with food system issues?

A: I believe this integrated approach is the only effective solution. Focusing only on production or only on distribution will not create enough momentum to build a truly sustainable food system. We must work directly with eaters, strengthen education, and develop a clear public narrative that gradually and steadily motivates people to change their dietary behavior. Only in this way can we achieve a sustainable food system.



Interview with Claude Caldwell

The following is an interview with Claude Caldwell, Professor Emeritus, Faculty of Agriculture, Dalhousie University, Canada

Q1: Please name or describe top three Food System issues in your country.

A: Canada's food system grapples with multiple challenges, with three standing out most prominently.

1. Climate change

It is the most impactful issue, despite skepticism from some groups. Extreme weather events including droughts, wildfires and off-season torrential rains have severely disrupted the country's food production.

2. Human resource shortage

Fewer people are willing to engage in farming due to its poor reputation for glamour and profitability. The aging farmer population also leads to a critical lack of successors.

3. Resilience and fairness of the overall food system

The system needs to withstand shocks from economics, climate and other factors. More importantly, it should guarantee farmers a fair return on investment to achieve sustainability.

Q2: How does your country deal with all those issues, and any new solutions?

A: Targeted measures have been rolled out for each challenge, along with innovative approaches:

1. Tackling climate change

A comprehensive sustainability framework is being established. It includes education initiatives, investment in ecological remediation, and greenhouse gas reduction. Programs for sustainable crop cultivation are also promoted to avoid soil and air pollution. Additionally, "living labs" have been set up nationwide. These labs bring together farmers, communities, scientists and processors to demonstrate sustainable food system models.

2. Alleviating labor shortages

Talented immigrants are recruited to fill labor gaps in large-scale farming operations, despite public pushback against immigration. Agricultural education is boosted to reshape the profession's image. In some provinces, 80% of farmers hold bachelor's degrees in science or above, highlighting the sector's growing professionalism.

3. Enhancing system resilience and fairness

Collaboration is focused on key value chains. Stakeholders including processors, distributors and farmers are consulted to co-develop solutions, as one-sided mandates prove ineffective.

Q3: Would you have any comments on the Global Food System & SDGs Report? Any

suggestions?

A: As one of the report's authors, I was impressed by the team's dedication to driving global solutions, which are essential for food system improvement alongside local actions. Two areas need improvement:

1. Insufficient focus on poverty and inequality

A well-constructed food system will fail if

people lack the purchasing power to access food. Addressing poverty is therefore a key prerequisite.

2. Low acceptance of relevant concepts in Western countries

Better communication is needed to clarify that these concepts are rooted in food culture rather than food science.



Interview with Ernesto D. R. Santibanez-Gonzalez

The following is an interview with Ernesto D. R. Santibanez-Gonzalez, Professor, Circular Economy and Sustainability 4.0 Initiative (CES4.0), University of Talca, Chile

Q1: Please name or describe top three Food System issues in your country.

A: Chile is a major exporter of fresh fruits, vegetables and other fresh foods. The top three food system issues are:

1. Logistics, transport and storage challenges

Long-distance exports to markets such as the U.S., Europe and China involve lengthy transportation and high carbon emissions.

2. Food waste and organic waste

Waste is a significant problem across the food system.

3. Water scarcity

The food system uses huge amounts of water, and Chile faces serious water availability issues.

In addition, as a major food exporter — for example, 95% of Chilean cherries are exported to China — long-distance transportation creates strong carbon emission pressures.

Q2: How does your country deal with all those issues, and any new solutions?

A: Chile is addressing these problems mainly through two approaches:

1. Transition to renewable energy

To reduce fossil fuel use, carbon emissions and energy consumption in transport and storage, Chile is expanding renewable energy: Solar energy in the north, Wind energy in the south, A mix of solar and wind in central areas

2. National strategic plans

The government, together with the private sector, is developing strategic plans for the food system that aim to lower water and energy use. The plans are still improving how to tackle food waste more clearly.

Q3: Would you have any comments on the Global Food System & SDGs Report, any suggestions?

A: The global food system faces very serious pressures: It accounts for about 25% of global carbon emissions. One-third of food is wasted. It uses 70% of global freshwater.

I think shiology is very interesting concept and the report emphasize a systemic, integrated approach. The food system does not exist alone. It is closely connected to energy, water, logistics, transport and the plastic industry. Current policies are often too vertical (only looking at food), but we need cross-system solutions.

Q4: What do you think of the “three in one”

(Eater, Food and Governance) approach?

A: I think the the “three in one” (Eater, Food and Governance) approach is the right approach to solve food system challenges. We must look at consumption behavior, including food waste and how waste can be reintegrated into the supply

chain. Shiology is an approach that can integrate this different system related to the food, and new technologies such as blockchain can also support this framework by tracing food, packaging, water use, energy consumption, carbon emissions and waste across the entire system.



Interview with Philip Sagero

The following is an interview with Philip Sagero, Lecturer in the School of Agriculture, Geography, Environment, Ocean and Natural Sciences, University of The South Pacific, Suva, Fiji

Q1: Please name or describe top three Food System issues at your country.

A: Fiji is a small island country that heavily depends on root crops as one of the main staple foods—for example, cassava, which is also exported to Australia and New Zealand. Another staple is rice, which is seasonal, but now there is a lot of dependency on imports due to climate change impacts.

In terms of other food systems, we have livestock, particularly chicken, and also marine food—both fisheries and other marine resources. Marine food is especially important for local communities within Fiji.

So the three main areas I would highlight are: our traditional root crops (which are both for local consumption and export), imported staples like rice that are affected by climate, and our marine food systems that support local livelihoods.

Q2: How does your country deal with all those issues, and any new solutions?

A: For issues related to climate change—for

example, rice is grown during the wet season but flooding is becoming more frequent—the main strategy now is diversification.

During good weather, such as the dry season, farmers cultivate more vegetables. In areas that are prone to flooding, they focus more on root crops like taro, which are more resistant to extreme weather. When tropical cyclones hit, root crops tend to survive better than vegetables, which are more vulnerable to climate impacts.

Coastal regions have been affected by seawater intrusion, sea level rise, and other climate impacts. Fortunately, Fiji is a high island, so one solution has been to move cultivation inland, away from the coastal regions, where the land is more suitable for farming.

Q3: Would you have any comments on the Global Food System & SDGs Report, any suggestions?

A: The report effectively captures key global food system issues, including those affecting small Pacific island countries, especially the rise of non-communicable diseases linked to food systems.

The report also looks beyond the 2030 SDGs. Everyone needs to read and understand the key messages of the report, so that we can work toward having sustainable food systems in the future, by

2030 and beyond.

Q4: What do you think of the “three in one” (Eater, Food and Governance) approach?

A: Food system governance is complex, especially for small island developing states like Fiji:

1. Interdependence and vulnerability

Small island nations are highly interdependent in global markets. A food system collapse or crisis in one country can raise food insecurity, affect prices, and worsen non-communicable diseases elsewhere. Events such as the Ukraine conflict have directly driven up food prices and impacted Fiji.

2. Key governance priority: national food self-

sufficiency

Countries must be proactive in improving self-sufficiency to reduce import dependency. Fiji is already self-sufficient in chicken and eggs, with no external reliance. However, dependence on imported meat and other foods reduces accessibility and affordability.

3. Linking governance, food, and eaters

Governance should focus on: Ensuring food is accessible, affordable, and nutritious. Promoting healthy eating to reduce obesity and non-communicable diseases. Building sustainable domestic food systems so that communities can eat healthily and reduce reliance on external supply chains.



Interview with Rudra Bahadur Shrestha

The following is an interview with Rudra Bahadur Shrestha, Visiting Professor, Purbanchal University, Nepal

Q1: Please name or describe the top three Food System issues in your country.

A: Thank you very much. I am from Nepal. There are three major food system issues in my country:

1.Low agricultural productivity due to inefficient input use, which limits production potential.

2.Aging agricultural workforce: many young people are migrating out, leaving agriculture dependent on the elderly.

3.Severe impacts of climate change on agricultural production.

Q2: How does your country deal with all those issues, and any new solutions?

A: We are addressing the three issues in the following ways:

1.For low productivity: we integrate research, academia, and extension services, with a focus on developing high-yielding, climate-resilient varieties.

2.For aging workforce: the government provides

policy incentives to encourage and retain youth in agriculture.

3.For climate change: we are implementing climate-resilient agricultural systems.

Q3: Would you have any comments on the Global Food System & SDGs Report? Any suggestions?

A: I have been working on this topic with the Shiology team for a long time, so I am very familiar with it. The Global Food System & SDGs Report is highly prioritized in the Sustainable Development Goals (SDGs).It is extremely important for global food security and sustainable development.

Q4: What do you think of the “three in one” — Eater, Food and Governance approach?

A: I fully support this approach.The framework is built on three very important pillars:

Eater: focusing on how to consume safe, nutritious food and meets consumer preferences.

Food: ensuring sufficient production and reducing post-harvest loss.

Governance: creating enabling policies and incentives for sustainable food production and consumption.



Interview with Walter Belik

The following is an interview with Walter Belik, Deputy Director-General, Zero Hunger Institute.

Q1: Please name or describe top three Food System issues in your country.

A: As a professor in food and agriculture with long experience in food security and nutrition, I focus on political approaches to these subjects. My contribution is to compare different food systems, identify what works and what does not, and propose how to improve systems to support good health and quality of life for all.

In Brazil, key food system challenges include:

1. High poverty and food access barriers for large parts of the population.
2. Dual burden of malnutrition: undernutrition and obesity coexisting as failures of the same dysfunctional food system.
3. Unsustainable globalized food systems that weaken local food cultures and environments.

Q2: How does your country deal with all those issues, and any new solutions?

A: Brazil has fought hunger very efficiently: We implemented cash transfer programs so people in poverty have money to buy food. We developed strong public policies such as school meals, popular restaurants, and communal kitchens that provide free or affordable food to people who

cannot access enough food through markets. These policies successfully expanded food access for vulnerable groups.

Q3: Would you have any comments on the Global Food System & SDGs Report? Any suggestions?

A: We are in a very difficult situation because our current food system is failing. It cannot properly address undernutrition or obesity—these two problems seem contradictory, but they come from the same flawed system. We must reform the food system toward: More sustainable production and Better access to healthy food for all people. Simply providing commodity-based foods is not enough, especially with the harms caused by ultra-processed foods.

Q4: What do you think of the “three in one” (Eater, Food and Governance) approach?

A: I support this integrated approach strongly. We must encourage more local food systems and short food supply chains. Global supply chains are environmentally costly and erode food cultures, since every population has its own relationship with food. Reducing everything to a global, uniform model of production, purchase, and consumption creates serious problems. The top priority is to restore the healthy relationship between eater and food — which is exactly what the eater–food–governance framework supports.



Interview with Zhuldyz I. Satayeva

The following is an interview with Zhuldyz I. Satayeva, Associate Professor, Seifullin Kazakh Agrotechnical Research University

Q1: Please name or describe top three Food System issues in your country.

A: In Kazakhstan, the food system is structured around three key sectors, which also represent its main challenges:

1. Agricultural complex: including crop production, processing, and livestock.

2. Food industry issues: mainly covering the production of milk and dairy, meat, canned goods, and plant-based products.

3. Transportation, storage and innovation: food storage and logistics are critical and weak points for the national food industry.

Q2: How does your country deal with all those issues, and any new solutions?

A: Kazakhstan is addressing these issues through several approaches. We focus on policy, market collaboration, and innovation.

For example, we emphasize policy support and private collaboration, along with investment in new technology and research. A key step is the implementation of research findings into production, which means integrating science with business. Additionally, we promote public-private

partnerships and sustainability initiatives.

One of the most modern developments right now is digitalization. We are implementing digital technologies in agriculture, in the processing of raw materials, and throughout food production.

Q3: Would you have any comments on the Global Food System & SDGs Report? Any suggestions?

A: This report reflects the work of a wide range of scientists and specialists. It provides important big data on food systems and will serve as a key reference for improving, adjusting, and further developing food systems around the world.

Q4: What do you think of the “three in one” (Eater, Food and Governance) approach?

A: I believe the “food and governance” approach can be a compelling strategy to address food system issues. There are several key concepts involved here.

Firstly, we need a holistic perspective, looking at the entire system rather than just parts of it. Secondly, it requires community involvement in judgment and policy-making. Thirdly, we must focus on enlightenment, innovation, and adaptation to keep improving. Finally, education and awareness are essential to ensure that everyone understands their role in the food system.



第五届世界食事论坛现场



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海南食学教室公益项目启动



《全球食事系统与可持续发展（SDG）研究报告》共同起草人代表合影



《全球食事系统与可持续发展（SDG）研究报告》发布并递交联合国驻华协调员常启德



可持续发展目标 17

消除贫困
零饥饿
良好的健康与福祉
优质教育
性别平等
清洁饮用水
经济适用的清洁能源
体面工作和经济增长
产业创新
减少不平等
可持续城市和社区
负责任消费
应对气候变化
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食事问题不能全面解决, 可持续发展就不能实现!