White Paper

AMBER ECONOMY

Conceptual and Doctrinal Formulation of the Amber Economy

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Executive Summary

The ***Amber Economy*** may be defined as an applied economic framework for the transformation of agrifood systems that recognizes food as a strategic asset generating economic, nutritional, social, territorial, and environmental value. Its central thesis holds that the deepest failure of contemporary food systems lies not exclusively in deficits of production, logistics, or access, but rather in the structural inability to preserve, redirect, recover, and maximize the integral value of food throughout the system. From this perspective, food loss and waste, malnutrition, food insecurity, territorial fragility, and hidden costs do not constitute isolated problems, but rather convergent expressions of the same incomplete rationality of evaluation and governance within the food system (FAO, 2014, 2023a; HLPE, 2014; UNEP, 2024).

This white paper proposes a more rigorous conceptual and doctrinal formulation of the ***Amber Economy***. Its purpose is not to present an additional discursive label within the repertoire of color economies, but rather to consolidate a specialized analytical architecture that is epistemologically delimited and methodologically translatable into applied research, public policy, business innovation, and impact investment. In this sense, the Amber Economy is not formulated as a general economic theory, but as a meso-theoretical framework of articulation that organizes contributions from agrifood systems studies, food security, resilience, food-related circular economy, bioeconomy, and true cost accounting under a common logic of integral food value (Ingram, 2011; OECD, 2019; Tendall et al., 2015; Zurek et al., 2022).

Its intellectual contribution is threefold. At the conceptual level, it repositions food as a strategic unit of economic analysis. At the doctrinal level, it establishes a coherent set of theses on value, loss, hierarchy of use, resilience, and systemic performance. At the methodological level, it opens a path for operationalization through a modular battery of indicators that avoids the premature simplification of a single index and makes it possible to connect theory, measurement, and decision-making more robustly (FAO, 2023b, 2023c; Hanson et al., 2016; Hehenberger et al., 2015; Nicholls et al., 2012).

Consequently, the Amber Economy should be understood as a correction of rationality applied to the agrifood system. Where conventional frameworks privilege volume, price, or profitability, this approach redirects attention toward the preservation of integral food value and toward the institutional capacity of the system to translate that value into food security, nutrition, resilience, inclusion, and intergenerational sustainability (FAO, 2023a; Hobbs, 2024; WFP, 2021).

1. Introduction

For decades, the performance of agrifood systems was assessed primarily in terms of their ability to produce, supply, trade, and generate profitability. Although these variables remain relevant, they are now insufficient to capture the complexity of the system. International literature has increasingly shown that the analysis of food systems must incorporate food loss and waste, food security, nutrition, resilience, sustainability, and hidden costs that are not adequately reflected in market prices (FAO, 2023a; HLPE, 2014; UNEP, 2024). This broadening of the analytical field has made a decisive limitation visible: food continues to be frequently treated as an ordinary commodity or as an undifferentiated physical flow, when in fact it constitutes a material infrastructure of well-being, productivity, social cohesion, and sustainability.

The Amber Economy emerges precisely in response to that insufficiency. Its premise is that food should not be considered solely as the output of a production chain or as an object of commercial exchange, but as a carrier of multidimensional value. This conceptual move makes it possible to reinterpret agrifood systems not only as structures of production and circulation, but also as structures of creation, preservation, destruction, and redistribution of food value. Herein lies its novelty: it introduces a broader rationality of analysis and evaluation, in which food appears as a strategic asset and not simply as a commodity, input, or waste product (FAO, 2023a; Ingram, 2011; Zurek et al., 2022).

2. Theoretical Problem and Conceptual Gap

The central theoretical problem that gives rise to the Amber Economy is the absence of a sufficiently robust integrative category for analyzing the multidimensional value of food and the avoidable destruction of that value throughout the agrifood system. Specialized literature has developed highly relevant contributions on food security, food loss and waste, resilience, sustainability, bioeconomy, and the accounting of real costs; however, these approaches tend to operate as partially connected fields rather than as a convergent analytical architecture centered on food as a strategic asset (FAO, 2014, 2023a; OECD, 2019; Tendall et al., 2015).

This fragmentation has both epistemological and practical effects. Epistemologically, it prevents an understanding of hunger, malnutrition, waste, territorial exclusion, and environmental degradation as expressions of common failures in the preservation and allocation of food value. In practical terms, it leads to partial institutional responses: food security policies disconnected from loss-reduction strategies; circular economy agendas indifferent to the specific hierarchy of food; and business decisions that continue to treat surpluses as secondary externalities instead of understanding them as underutilized or destroyed value (HLPE, 2014; UNEP, 2024).

The Amber Economy seeks to close this gap by means of an ordering principle: the agrifood system must be analyzed as a structure of production, conservation, destruction, recovery, and valorization of food as a strategic asset. With this, the focus shifts away from how much is produced or traded and moves toward how much integral value is preserved, amplified, or lost throughout the system (FAO, 2023a; Hobbs, 2024).

3. Epistemological Positioning

In order to endow the framework with academic rigor, it is essential to specify its epistemological status. The Amber Economy does not constitute a general economic theory or an autonomous school comparable to ecological economics, institutional economics, or welfare economics. Its status is that of an applied economic framework of meso-theoretical scope. This means that its function is not to replace the major explanatory paradigms, but rather to articulate contributions from different traditions around a specific object insufficiently addressed by conventional frameworks: food within the agrifood system (Ingram, 2011; OECD, 2019; Zurek et al., 2022).

This delimitation is crucial for at least three reasons. First, it prevents an undue inflation of the theoretical scope of the proposal. Second, it makes it possible to understand that its originality lies in the specificity of the object and in the logic of conceptual articulation, rather than in any claim to universality. Third, it facilitates the translation of the framework into operational categories, measurement instruments, and institutional arrangements without losing analytical consistency.

In this sense, the Amber Economy functions as a specialized conceptual architecture that brings together contributions from sustainable agrifood systems, food security, food-related circular economy, bioeconomy, resilience, and true cost accounting under a common logic of integral food value (FAO, 2023a, 2023b, 2023c; OECD, 2019; Tendall et al., 2015).

4. Conceptual Definition of the Amber Economy

In its synthetic formulation, the Amber Economy is a conceptual framework for the transformation of agrifood systems that recognizes food as a strategic asset generating economic, nutritional, social, territorial, and environmental value, and that seeks to reduce food loss and waste, valorize recoverable food surpluses, and internalize hidden costs in order to orient the system toward food security, territorial resilience, inclusion, and intergenerational sustainability.

In its expanded analytical formulation, the Amber Economy proposes a reading of economic development in which food ceases to be understood exclusively as a commodity and comes to be conceived as a vital infrastructure of well-being, productivity, social cohesion, and sustainability. From this perspective, agrifood systems should be evaluated not only by their ability to produce, exchange, and monetize food, but by their ability to preserve, redistribute, recover, and maximize the integral value that food generates in nutritional, social, territorial, economic, and environmental terms (FAO, 2023a; HLPE, 2014).

In its extended doctrinal formulation, the Amber Economy constitutes an emerging proposal for economic analysis that shifts the usual performance criterion away from volume, price, or profitability and toward the system's capacity to preserve and amplify integral food value. This reformulation implies recognizing that every lost food item represents not only a physical or monetary loss, but also the simultaneous erosion of nutritional, social, territorial, and environmental value. Therefore, food loss and waste cease to be read merely as operational inefficiencies and instead come to be understood as systemic value destruction (FAO, 2014; Lipinski et al., 2013; UNEP, 2024).

5. Doctrinal Core

The doctrinal core of the Amber Economy may be organized into six interdependent theses.

The first thesis holds that food is a strategic asset. Its management produces effects that far exceed the food market and reverberate across health, productivity, social cohesion, territorial stability, and long-term sustainability (FAO, 2023a; WFP, 2021).

The second thesis affirms that the value of food is integral and multidimensional. It is not exhausted by price, nor can it be reduced to its condition as a tradable good, because it simultaneously incorporates nutritional, social, territorial, ecological, and economic dimensions (FAO, 2023a, 2023b).

The third thesis establishes that food loss and waste constitute systemic value destruction. They are not simply logistical failures, but manifestations of a system that fails to preserve and allocate a critical resource appropriately (HLPE, 2014; Lipinski et al., 2013; UNEP, 2024).

The fourth thesis holds that recoverable food surpluses must be managed under a hierarchy of value. Priority corresponds to human consumption, then to high-value food transformation, and only subsidiarily to destinations of lower social or economic value. This point differentiates the Amber Economy from a generic circular economy, since not all recirculation has the same value when the resource under analysis is food (FAO, 2014; Hanson et al., 2016).

The fifth thesis proposes that food resilience depends on the system's capacity to produce, preserve, coordinate, allocate, and govern food under changing conditions. Resilience is not an external variable, but an emergent property of the way the system preserves food value in the face of shocks, disruptions, and territorial vulnerabilities (Béné, 2020; Hobbs, 2024; Tendall et al., 2015; Zurek et al., 2022).

The sixth thesis concludes that the economically relevant performance of an agrifood system must be measured by its capacity to maximize integral food value and not solely by volume, price, or profitability. This thesis redefines the evaluative criterion of the system and opens the door to new metrics, business models, and policy instruments (FAO, 2023a, 2023c).

6. Distinctive Analytical Categories

The consistency of the framework depends on the stabilization of its own analytical lexicon. The first category is integral food value, understood as the set of economic, nutritional, social, territorial, and environmental benefits associated with a food item or food flow. The second is recoverable food surplus, which distinguishes between irreversible loss and food that is still susceptible to redistribution, transformation, or strategic use. The third is systemic food efficiency, defined not as the mere optimization of costs or time, but as the system's capacity to convert resources into nutrition, well-being, and sustainability with minimal destruction of value. The fourth is territorial food resilience, referring to the capacity of a territory to sustain food supply, access, and utilization under conditions of disruption. The fifth is hidden food cost, understood as the sum of non-internalized impacts derived from production, distribution, consumption, loss, and waste. The sixth is amber governance, conceived as the set of normative, organizational, logistical, financial, and political arrangements aimed at preserving and maximizing integral food value (FAO, 2023a, 2023b; Hobbs, 2024; Zurek et al., 2022).

7. Methodological Basis and Operationalization

One of the most relevant contributions of the Amber Economy is that it does not remain confined to a normative plane. It can be translated methodologically through a sequence of observation, comparison, and intervention. This sequence includes, at a minimum, the systematic mapping of actors, flows, and critical nodes; the identification of irreversible losses and recoverable surpluses; the measurement of integral food value by dimensions; the hierarchy of valorization alternatives; the estimation of impacts on food security, resilience, and inclusion; and the design of governance arrangements capable of sustaining those priorities (FAO, 2023b, 2023c).

From the standpoint of measurement, the most robust route does not consist in prematurely constructing a single amber performance index, but rather in developing a modular battery of indicators by dimensions. This option is methodologically superior because it preserves the complexity of the framework, improves comparability across scales of analysis, and reduces the risk of excessive simplification.

Among the most relevant indicators are the rate of avoidable loss by stage, the proportion of recovered surplus over estimated recoverable surplus, the proportion of flow assigned to the highest-value destination, the preservation of nutritional value, full traceability of flows, average surplus allocation time, the rate of effective matching, and the integral value recovered per unit of investment. At a more advanced level, this architecture makes it possible to engage with impact investment approaches and SROI methodologies without replacing the operational battery with a single synthetic ratio (Hanson et al., 2016; Hehenberger et al., 2015; Nicholls et al., 2012).

8. Explanatory Scope and Programmatic Projection

The strength of the Amber Economy lies not only in its terminological novelty, but also in its capacity to explain empirical problems that are often addressed in fragmented ways. The framework makes it possible to reinterpret persistent food insecurity in contexts of abundance, the coexistence of surpluses and deprivation, the underutilization of recoverable foods, territorial fragility in the face of shocks, and the invisibilization of hidden costs as manifestations of the same failure: the incapacity of the system to preserve and govern the value of food adequately (FAO, 2023a; HLPE, 2014; UNEP, 2024).

In public policy, this approach can be translated into models centered on the preservation of food value, territorial resilience, the hierarchy of recoverable surplus, expanded cost accounting, and multi-actor governance. In the business sphere, it makes it possible to distinguish among food recovery and redistribution enterprises, high-value food transformation enterprises, amber governance platforms, integrated corporate surplus strategies, and territorial food resilience models. In impact investment, it opens the possibility of constructing specific amber investment theses that measure nutritional, social, territorial, and environmental outcomes simultaneously. This capacity for programmatic translation is what makes the Amber Economy a more robust proposal than a merely discursive formulation (Brest & Born, 2013; FAO, 2023c; Hehenberger et al., 2015).

9. Conclusion

The Amber Economy constitutes a conceptually defensible and programmatically promising formulation for the transformation of agrifood systems. Its value does not lie in adding a new color to the global economic repertoire, but in introducing a specialized rationality for understanding food as a strategic asset and for reorganizing the analysis of the system around the preservation, destruction, recovery, and maximization of its integral value. In this shift lies its deepest contribution: turning food into a strategic unit of economic analysis and integral food value into the guiding criterion of systemic performance.

Its future consolidation will depend on four simultaneous processes: the establishment of a stable conceptual lexicon, the empirical validation of comparable indicators, the demonstration of its explanatory power in relation to real-world problems, and the derivation of concrete models for public policy, business, and investment. If these processes mature consistently, the Amber Economy may evolve from a solid conceptual formulation into an analytical and institutional architecture capable of guiding research agendas, international cooperation, multi-actor governance, and the structural transformation of agrifood systems.

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