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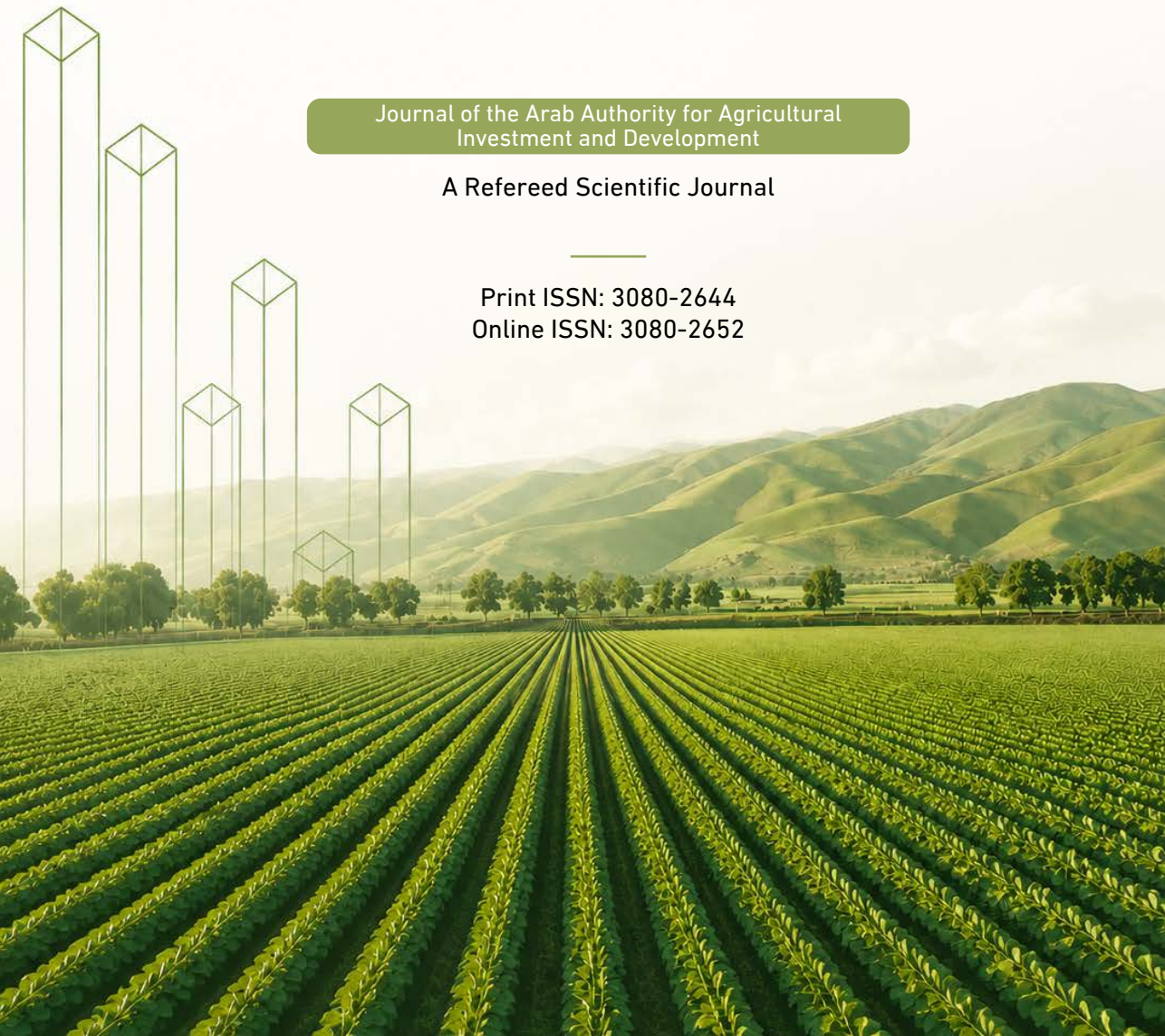
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Building Sustainable Arab Food Systems through Eco-friendly Innovations, Green Technologies, Local Products Valorization, and Food Tourism

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Abstract:

Food security remains a critical challenge in the Arab world, where population growth, climate change, import dependency, conflicts, and limited natural resources exert unprecedented pressure on food systems. In this context, novel approaches should be implemented to transform existing systems, guarantee sustainability, catalyze economic growth, and meet consumer needs. In this study, a scoping review methodology is employed to map relevant literature on recent advances in green technologies and innovative practices. Data are categorized based on eco-friendly innovations, local or *terroir* products valorization, and green policies. This review investigates the role of local products in the Arab region and how the application of green technologies can strengthen sustainable food security. Particular attention is given to circular economy approaches, technological advances in food processing, and community-driven initiatives that reduce food waste and enhance nutritional availability. Findings show that local products and by-products constitute a natural reservoir of valuable bio-resources. However, many of these resources remain underutilized due to insufficient marketing, limited compliance with quality standards, limited processing capabilities, and the digital divide. To resolve these issues, it is essential to pave the way for functional green innovations and establishment of Arab policies that bolster creativity, environmental preservation, and economic growth. By drawing attention to

food tourism, organizations are encouraged to support *terroir* products valorization and deploy sustainable practices. Green technologies, including the Internet of Things (IoT), Artificial Intelligence (AI), and data analytics, play a pivotal role in mitigating carbon emissions and minimizing environmental impact. The combined integration of eco-friendly innovations, local product valorization, and food tourism offers a promising pathway to empower communities, strengthen regional economies, and build resilient food systems across the Arab world. Furthermore, multidisciplinary alliances, stakeholder involvement, and policy coherence are vital for promoting equitable and significant development and investment in Arab food systems.

Keywords: Arab region, food system, local product, eco-friendly innovation, valorization, food tourism.

Introduction:

Global population growth is driving a significant rise in food demand (FAO, 2018). With the world's population expected to surpass 9.8 billion by 2050, the global food system is under increasing pressure (FAO, 2017a), which could result in an increase of approximately 0.5 °C in global temperature only due to a high demand for food (Ivanovich *et al.,* 2023). Consequently, the growing demand for food is constrained by resource scarcity, climate change, food waste, conflicts, and environmental degradation, making it essential to develop resilient, responsible, and sustainable food systems (Bell *et al., 2018*). In this regard, several national and international policies have been established to achieve food security and sustainability, like geographical origin and *terroir* products labels for local products whose quality is linked to their origin (Seyfang, 2006). Consequently, strengthening sustainable and diversified food systems is fundamental for safeguarding food security, particularly in regions which are rich in local and traditional products. Accordingly, food security is often defined in terms of food availability, utilization, and access (FAO, 1996). For food access, it is ensured when all individuals within a household have adequate income to obtain appropriate products (Rivera and Qamar, 2003). In the Arab world, local products valorization and by-products upcycling offer a promising pathway to enhancing the sustainability of food systems, empowering small-scale actors such as cooperatives, reconciling tradition with modernity, satisfying consumer needs, ensuring economic growth, and aligning community livelihoods with the principles of the circular economy and eco-friendly innovations.

Indeed, the Arab region encompasses a wide range of local products that reflect its agro-ecological diversity and cultural heritage. Building on this diversity of local products, it is important to note that the Arab countries are a group of 22 countries that fall under the umbrella of the Arab League. These countries extend over an approximate area of 13.13 million square kilometres, with an aggregate population of around 356.8 million. Geographically, these countries extend from the northern and eastern parts of Africa to the Middle East in Asia (Wilson, 2017). They exhibit a remarkable diversity of local products. These products — such as traditional dairy derivatives, olive oil, dates, aromatic and medicinal plants, and other products — are not only emblematic of geographical identities but also serve as vectors for sustainable development. These *terroir* products are distinguished by intrinsic natural attributes that underscore their close linkage to the territory. Their production is further characterized by the reputation and expertise mobilized in the process, drawing upon historical, cultural, and innovative references. Moreover, the family-based dimension remains predominant in their elaboration (Harrak, 2018). Despite their recognized value, Arab local products and their eco-friendly valorization have received relatively limited attention in the scientific literature and research, particularly when compared to the extensive diversity present within each country. Few studies have explored the link between local Arab products and their considerable potential in fostering sustainability, boosting green innovations, and scaling by-products upcycling. Therefore, this review highlights the importance of advancing discourse on Arab food systems by examining the interconnectedness between eco-friendly innovations and local products valorization, while exploring circular economy approaches, technological advances in food processing, and community-driven initiatives that reduce food waste, stimulate economic growth, and upgrade product quality. It further identifies key challenges — namely the digital divide, low awareness of marketing strategies, and branding — while also seizing potential opportunities, including food tourism. The research questions that this review seeks to address are:

What obstacles and opportunities arise when integrating sustainable technologies into Arab local product valorization?

How does digitalization contribute to the valorization of local products while integrating eco-friendly innovations and cultural heritage in Arab food systems?

In what ways can food tourism enhance the competitiveness of Arab local products while promoting sustainability?

(4) How do green practices, local product valorization, and food tourism collectively contribute to Arab food security?

Methods:

A scoping review approach was employed to map relevant literature on recent advances in green technologies and innovative practices. This methodology was chosen to provide a comprehensive overview of research, identify key opportunities, and point out gaps in the field. The literature search was conducted using the following databases: Scopus, Web of Science, ScienceDirect, PubMed, Google Scholar.

The search covered publications from 2010 to 2025 to collect recent developments in sustainable food systems, eco-friendly innovations, green technologies, local product valorization, and food tourism. The review included scientific reports, books, research articles, and online resources. Keywords and Boolean operators were used to extract the intersection of key themes.

The collected information was classified according to the criteria outlined in Figure 1. These criteria represent the key dimensions used to organize and analyze the data in the scoping review. They include:

- Economic impact: Assessing how local products and circular economy practices contribute to economic growth, job creation, and market development.
- Environmental sustainability: Evaluating the use of green technologies, waste reduction, resource efficiency, and overall ecological benefits.
- Product valorization: Considering the processes that enhance the value of local products, such as innovation, processing, quality improvement, labeling, and the implementation and application of quality standards.
- Social and cultural relevance: Accounting for local traditions, community engagement, and promotion of regional identity.
- Technological integration: Examining the role of digital tools and technologies in promoting, tracking, and improving local products.

These criteria were designed to retrieve high-quality, peer-reviewed publications and literature that directly highlight the role of green practices and eco-friendly innovations in ensuring sustainability and economic growth. Studies focusing on the potential of local products, food tourism, and by-products valorization were also considered. Preference was given to studies employing clear methodological frameworks, including empirical research, case studies, systematic and scoping reviews, for ensuring pertinence of

findings. In parallel, exclusion criteria were established to refine the scope of the review, whereby publications that focused solely on innovations — without reference to green practices, sustainability impacts, or direct relevance to Arab food systems — were not considered. Studies were excluded if they lacked full-text availability, consisted of editorials or opinion papers, were duplicate records, or addressed food systems issues without considering environmental, social, economic, or sustainability dimensions.

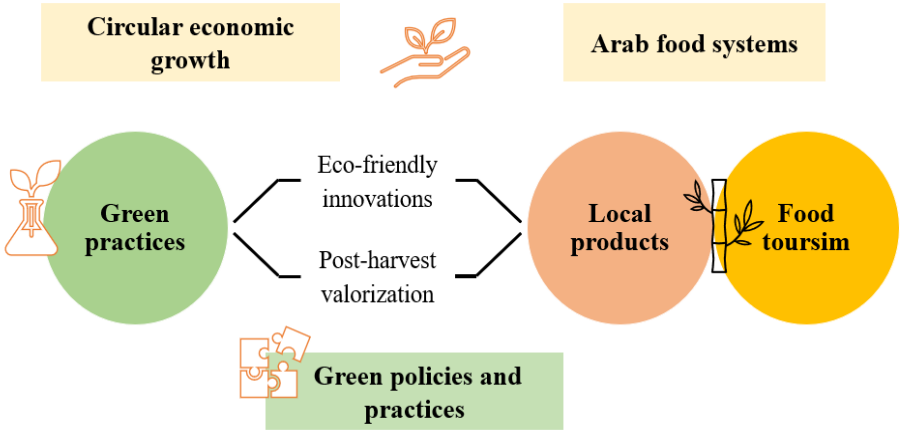


Figure 1. Criteria of data selection for the review study.

By applying these criteria, the review sought to highlight the interconnections between eco-friendly innovations, food tourism, and local products valorization, emphasizing their collective contribution to the sustainability of Arab food systems and the advancement of circular economic growth.

Results and Discussion:

Green Innovation: A Pathway to Sustainable Food Valorization

The findings suggest that innovation serves not only as a mechanism to satisfy consumer needs but also as a fundamental pillar in strengthening circular economy systems and promoting the development and attractiveness of tourism regions. Innovations are generally defined as new or improved products, processes and services, or policy and institutional arrangements that intend to produce value (Nagji and Tuff, 2012). They can be of a technological nature (new machine, new product, new process, new seed variety, digital tool, or device, etc.) or a non-technological nature (capacity

development approach, policy, business model, changing gender norms, etc.) (Geldes Felzensztein and Palacios-Fenech, 2017). It is often the combined availability and use of technological and non-technological innovations that allow for change or transformation to happen, which is referred to as an innovation package (Sartas *et al.,* 2020) or innovation bundle (Barrett *et al.,* 2022). Many innovations undergo a maturation process, evolving from an initial idea into a fully developed product or service. Maturation often happens as a result of basic research, design, rigorous testing, and adaptation in both controlled and uncontrolled environments. Once there is sufficient confidence that an innovation is proven to work, there is usually an aspiration to make it available to more clients or in other geographies. This is also referred to as innovation scaling – an important precondition for achieving impact (Woltering *et al.,* 2019; Schut *et al.,* 2020).

Over the past few years, a global innovation paradigm has evolved to respond to food demand and consumer needs while simultaneously preserving the environment and promoting economic growth. This approach is commonly referred to as green or eco-friendly innovation. This innovation is an element that leads to green innovative products (e.g., products made from recycled or plant-based materials) (Widodo and Wahid, 2020), which is an organizational strategy that emphasizes the development and production of new products that consider aspects of technologies and sustainability. While green products refer to the production process designed to reduce resources and recycle them at the end of their life cycle, green innovative products take a broader environmental perspective throughout every step of the production, making the process more sustainable worldwide (Dagher and Itani, 2012; Widodo and Wahid, 2020). The results clearly demonstrate that green technologies are critical to promoting environmental resilience and sustainability. They offer original answers to interconnected issues of climate change, environmental degradation, and resource scarcity. By utilizing green technologies, societies can lessen their impact on the environment and become more resilient to shocks from it (van Zanten and van Tulder, 2021).

Studies have pointed out that the application of green technologies is crucial for managing, reducing, and upcycling food waste in a sustainable manner. Green technology also goes under the names *environmental technology* and *clean technology* (Madaleno *et al.,* 2022). It is reasonable to define "green technology" as the creation and implementation of tools, machinery, and systems meant to preserve the environment and natural resources while minimizing and reducing the negative impacts of human activity. Another way to define "green technology" is technology that meets present

needs without compromising the ability of future generations to meet their own (Islam, 2023).

Food Waste: Impacts and Opportunities for Sustainable Development

Globally, food waste accounts for about 8–10% of greenhouse gas emissions (Mbow *et al.*, 2019), necessitating its reduction (FAO, 2017b). In this situation, developments driven by global technological advancements and a competitive environment can enhance innovations in products, processes, and services in the food industry (Albertsen *et al.,* 2020; Talwar *et al.,* 2020). One type of innovation is upcycling, which is transforming food lost during the production process into new products, thereby reducing food waste (Aschemann-Witzel *et al.,* 2022).

From this perspective, the adoption of green technology becomes particularly relevant for addressing food loss and waste. Indeed, food waste has become a major concern and a top priority at both the global and Arab levels. Food waste occurs at various steps within the food supply chain, including production, processing, distribution, and consumption (Raak *et al.,* 2017). Such losses not only waste resources like water, energy, and labor but also contribute significantly to greenhouse gas emissions, worsening climate change. Countries like Egypt, Pakistan, Sri Lanka, and Iraq have the highest food waste levels, indicating inefficiencies in their consumption and waste management systems. The transition to sustainable Arab food systems depends heavily on effective innovative approaches, green practices such as waste management policies that encourage the transformation of by-products and agro-industrial residues. In contrast to the traditional "linear economic model" of "take, make, and dispose," the circular economy emphasizes resource efficiency, waste minimization, and the continuous use of materials and products (Pal *et al.,* 2024).

The valorization of agricultural waste is critical to environmental sustainability, and multiple strategies can be followed for obtaining value-added products from food waste, such as animal feed, composting/vermicomposting, anaerobic digestion, and thermal treatments to produce charcoal, oils, and gases. Alternatively, novel valorization techniques include the extraction of bioactive compounds, the production of enzymes, exopolysaccharides, the synthesis of bioplastics, biopolymers, and the production of biofuels with significant potential in critical economic sectors such as food, pharmaceuticals, chemicals, fuels, and medicine (Esparza *et al.,* 2020).

Plant-derived waste and by-products, such as peel, leaves, seeds, bran, kernel, pomace, and oil cake, can be obtained from a wide variety of fruit, vegetables, cereals, oil crops, roots and tubers, and other legumes during the primary production and the

subsequent processing and distribution stages (Jin *et al.,* 2018; Difonzo *et al.,* 2021; Pathania and Kaur, 2022). Growing research shows that such waste and by-products can be valorized by the extraction of valuable nutrients and compounds, such as proteins, vitamins, fatty acids, amino acids, dietary fibers, flavonoids, and phenolic compounds, among others (Ali *et al.,* 2021; Joshi *et al.,* 2022; Nirmal *et al.,* 2023; Hadidi *et al.,* 2024).

Local Products: Driving Sustainable Consumption Trends

Food is one of the three main consumption areas that contribute the most to the environmental impacts in the household context (European Environment Agency, 2023), and several studies have highlighted the need to change to more sustainable food consumption patterns (Reisch, 2013; Willett *et al.,* 2019). Thus, when developing new products from a sustainable perspective, it is important to know which ingredient, technique, or process is the most convenient to apply from an environmental point of view. Considering this, the valorization and promotion of local products constitute a key element in enhancing the sustainability and resilience of Arab food systems. Findings highlighted that the consumption of local or *terroir* products emerges as a pivotal factor in promoting global sustainability, strengthening regional economies, and preserving cultural identities (Bannor and Abele, 2021; Emile *et al.,* 2021; Vargas *et al.,* 2021). This trend toward geographical origin has also generated positive environmental impacts by reducing fuel use and minimizing the environmental impact linked to global food transport (La Trobe, 2002; Seyfang, 2006; Karner *et al.,* 2010; Işik *et al.,* 2024). This paradigm shift becomes even more relevant when we consider that exports have been identified as a crucial factor in environmental pollution patterns (Işik, 2010). Both energy and natural resources used in the various stages of the production of internationally traded goods can cause environmental pollution (Işik, 2013; Işik and Turk, 2018; Chaturvedi *et al.,* 2024). Moreover, unsustainable consumption and production patterns, particularly prevalent in industrialised economies, represent one of the main drivers of continued environmental degradation on a global scale (Sijtsema *et al.,* 2020). Consumers, through their food choice decisions, have a central role in the transition toward a more sustainable food system. Thus, for an effective change, it is essential to understand the demands and expectations of consumers when promoting local products or developing new products or services that seek to contribute to more sustainable consumption patterns (Martinez *et al.,* 2010; Guinė *et al.,* 2020).

Consumer demand for sustainable, nutrient-rich, and clean-label products is rapidly increasing, which is driving the need for innovative eco-friendly formulations. Within this framework, the Arab world region has the potential to invest smartly in the promotion and valorization of its diverse local products as a strategy to ensure food

security. This approach enhances availability and access to diverse, nutritious foods by reducing reliance on imported or industrially processed products, thus improving dietary quality. Additionally, valorization fosters economic empowerment of local producers and cooperatives, ensuring stable livelihoods that reinforce local supply chains and reduce vulnerability to market shocks. Based on the selected studies, a key barrier impeding the promotion and expansion of local products is the limited use of appropriate marketing strategies and digital tools to enhance product quality and increase market visibility. The review revealed that consumers who consider both quality and environmental impact are inclined to invest more in locally produced food. Several studies have explored consumer preferences for locally produced food. Motives for "buying local" include perceived quality and freshness of local food and support for the local economy. Consumers who are willing to pay higher prices for locally produced foods place importance on product quality, nutritional value, sensory attributes (aroma, flavor, texture, etc.), production methods, their effects on the environment, and support for local farmers and cooperatives (Caro *et al.,* 2018).

Digital Transformation as a Catalyst for Local Product Promotion and Food Security

To satisfy consumer needs, guarantee sustainable Arab food systems, and respond effectively to these challenges, the Arab countries can leverage digital transformation to bridge existing gaps. Findings demonstrated that digitalization offers opportunities through e-commerce platforms, social media marketing, and digital storytelling, which can expand market reach and strengthen consumer awareness of the cultural, historical, and ecological significance of local products. For instance, blockchain technology helps to solve problems of traceability, food safety, and quality, thereby benefitting the "Farm to Fork" strategy in the context of globalisation and multiple intermediaries (Zeng *et al.,* 2017; Kamilaris *et al.,* 2019). The use of social networks and digital platforms to share information expedites contact between actors. In this regard, e-commerce constitutes an important digital service that contributes to cost reduction, market access, and demand stimulation, principally for small farmers and cooperatives (Zeng *et al.,* 2017).

Green products, places, and promotions significantly influence green purchase intentions. In several intriguing ways, environmental attitude modifies this connection. Customers' education level and income affect their desire to make green purchases (Kaur *et al.,* 2022). Consumers' environmental consciousness and awareness levels may vary, influencing their sensitivity and reactivity to green marketing methods. Personal benefits, such as health and safety, may be more motivating for certain consumers than environmental benefits (Sharma, 2021). However, consumers' views and expectations of

green products and marketing promises may differ, influencing their trust and satisfaction. Some customers may need clarifications about the legitimacy and reliability of green labels, certifications, and promotions (Sharma, 2021; Kaur *et al.,* 2022). Digital transformation is a prerequisite and enabler for improving local products, as well as the management of operations, making them more efficient. It also offers the potential to boost food tourism, which represents an asset for Arab countries.

Context-specific training, tailored support programs, eco-friendly initiatives such as agrotourism, and practical affordable methods play an indispensable role in bridging the gaps related to digitalization, boosting the awareness concerning green practices, and enhancing the cooperatives' performance and market integration. Accordingly, strong collaboration among stakeholders, including public institutions, researchers, consultants, and cooperatives, in parallel with establishing digital support hubs is fundamental to guarantee access to effective support, knowledge-sharing, and scalable solutions (Alami *et al.,* 2025).

Food Tourism: A Channel to Strengthen Economic Growth and Enhance the Visibility of Local Products

Studies suggested that growing demand for authentic culinary experiences has fuelled the growth of this sector within the tourism industry. This trend does not only attract tourists but also stimulates local economies in various ways (Badu-Baiden *et al.,* 2022; Putri and Wijoyo, 2023). It emphasizes that one crucial aspect of food tourism is its ability to showcase local or *terroir* products through events, fairs, festivals, and culinary tours. It serves as a platform to present eco-friendly local products produced by local farmers and cooperatives (Badu-Baiden *et al.,* 2022). Such experiences provide tourists with immersive opportunities to engage with the local culture and traditions (Yüksel, 2017). When combined with green practices, it contributes to the economic growth of local communities. It must be noted that Italy stands out as a prime example of a country renowned for its culinary offerings and food tourism experiences (Banerjee, 2015; Yüksel, 2017). This European country attracts food enthusiasts from around the world with its diverse and flavorful cuisine, including iconic dishes like pasta, pizza, and gelato (Yüksel, 2017). If Arab countries prioritize their authentic local products, strategically invest in gastronomy as well as natural landscapes, and integrate these efforts into policies promoting food security and sustainability, they can accelerate the transformation of food systems and maximize their potential. By focusing on food tourism, they can promote local products and implement strategies to enhance market visibility and regional economic development. Food tourism is increasingly recognized as a key contributor to both travel experiences and economic development worldwide.

Illustrating the Interplay between Food Tourism and Sustainable Promotion of Arab Local Products

An exemplary case of how the intersection of valorization of local products, green practices, and food tourism contributes to regional economic growth is argan oil. Whereas argan oil has been traditionally used for nutritional purposes in Central-West Morocco, nowadays, it is particularly prized by the cosmetic industry because of its broad spectrum of functional properties including skin hydration, hair revitalizing, antioxidant, anti-aging, and antiradical (Guillaume and Charrouf, 2011). Argan oil is the first Moroccan *terroir* product to benefit from the Protected Geographical Indication (PGI), a label obtained in accordance with the Moroccan law No. 26-05 of Distinctive Signs of Origin and Quality (SDOQ). When ingested, argan oil is endowed with pharmacological properties such as blood-cholesterol stabilization, hypertension, and diabetes prevention; moreover, it possesses antibacterial activity (El Monfalouti *et al.,* 2010). Preparing argan oil involves the elimination of the external parts of the fruit (pulp and nutshell), to free cold-pressed argan kernels. Through eco-friendly innovations, these by-products can be used and generate income for the cooperatives. Biorefining of argan biomass can help reduce waste and create jobs in rural areas, a key factor given that the unemployment rate is currently 19.7% in the Sous Massa region, where the argan tree mainly grows (Charrouf and Guillaume, 2018; MEO, 2024). It can also increase the added value of argan by-products, particularly for women's cooperatives. Oil, proteins, fibers, and other useful components could be extracted from the argan oil by-products and recycled or utilized in various industries, including food, cosmetics, and pharmaceuticals. In this context, digitalization and food tourism act as strategic allies in promoting local products and strengthening food systems, without overlooking the crucial role of product labeling and quality certifications. Currently, Morocco has 84 local products labeled under SDOQ1. These products have been labeled under three distinctive signs: Protected Geographical Indications, Protected Appellations of Origin, and Agricultural Labels. These labeled products mainly include local *terroir* products such as olive and argan oils, fresh and dried fruits (including dates and almonds), aromatic and medicinal plants (e.g., rosemary, rose, and saffron), as well as animal-origin products (e.g., honey and cheese) (MAMFRDWF, 2019). The establishment of such labels and protective legislation is essential for the recognition and valorization of Arab local products. They not only preserve traditional know-how but also promote sustainable and equitable economic development for local communities. Moreover,

[1] Personal communication. Labeling Division, Ministry of Agriculture, Maritime Fisheries, Rural Development, and Water and Forests, March 12th, 2026.

these initiatives strengthen the competitiveness of products in national and international markets, ensuring consumers the authenticity and quality of the products they purchase. The example of argan oil illustrates the importance of legal protection for *terroir* products in supporting their development and long-term sustainability. This model can be extended to other Arab local products, taking into consideration their diversity.

The studies included in the scoping review indicate a substantial growth in scientific publications, highlighting the interrelated roles of economic growth, green technologies, and the valorization of local products within the framework of the circular economy. As illustrated in Figure 2, the interconnectedness between eco-friendly innovations, green technologies, local product valorization, and food tourism contributes to the development of sustainable Arab food systems. This figure also demonstrates the pivotal role of the circular economy, which aims to establish closed-loop systems where materials and products remain in continuous circulation within the economy. When integrated into the value chain of local products and their valorization, it contributes to extending product lifespan. Eco-friendly products are intentionally designed to be durable, reusable, and repairable, thereby reducing the need for new resource extraction. At the end of their lifecycle, components are recovered and reintegrated into the production process, preventing them from becoming waste. Green technologies and digitalization further enhance the system's circularity while simultaneously creating new business and employment opportunities in sectors such as remanufacturing, repair, resource recovery, and upcycling. In addition, this model decreases reliance on virgin resources, minimizes waste and pollution, and plays a vital role in mitigating climate change. By maintaining materials in circulation, it reduces dependence on volatile global supply chains and alleviates pressures linked to the scarcity of finite resources.

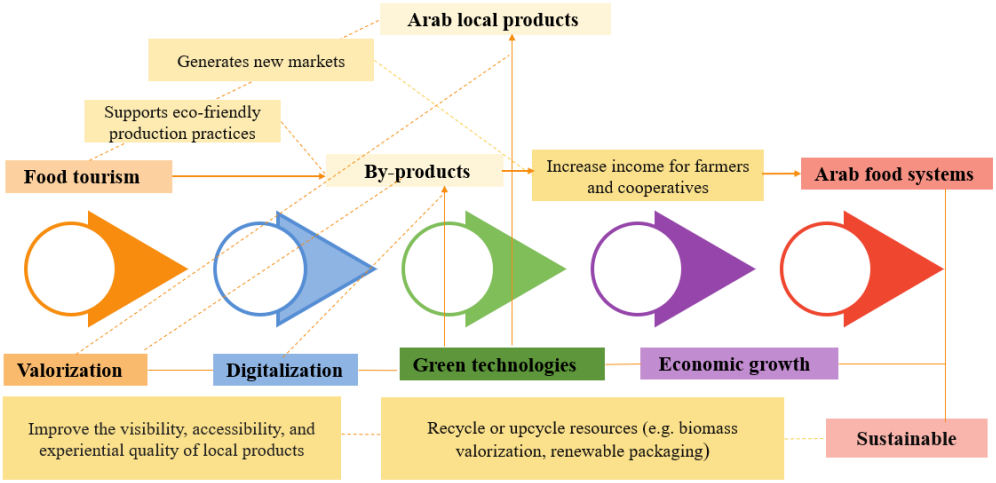


Figure 2. Interconnected Pathways Toward Sustainable Arab Food Systems.

Conclusions:

This review has made a key contribution by illustrating the challenges and opportunities at the intersection of eco-friendly innovations, green technologies, local product valorization, and food tourism. Building on these insights, it has further explored the essential components required for the sustainability and transformation of Arab food systems, linking them directly to the opportunities identified above and applying them specifically to the local food sector. To advance sustainability of Arab food systems and mitigate environmental impact related to food, a potential solution lies in the valorization of local products and their by-products, supporting eco-friendly innovations and empowering cooperatives to adopt digitalization and green technologies. These two tools play a capital role in improving the quality of local products and strengthen their visibility in the market. The goal is to build resilient sustainable Arab systems that satisfy consumer needs, protect the environment, honour territorial heritage, and develop local economies. To fasten this switch, food tourism emerges as a catalyst. It leverages traditional know-how, opens opportunities for locals — including cooperatives — to access new markets, and encourages them to step out of their comfort zones and innovate sustainably. This review concludes that by adopting a system thinking perspective, digitalization benefits the entire organization by improving workflows, reducing costs, and enhancing customer experiences. This approach considers long-

term sustainability, scalability, and collaboration with partners and stakeholders to create a networked digital ecosystem. It also allows organizations to remain agile and adaptable, responding quickly to market changes and technological advancements.

Recommendations:

This review lays the baseline for the future debate by recommending a system or ecosystem approach towards merging eco-friendly innovations with local products valorization while using food tourism and green technologies as strategic allies and resilient tools to ensure sustainable success of Arab food systems. These concepts provide Arab countries with opportunities to promote their local products and enhance their competitiveness. It is important to strengthen the link between terroirs and cooperatives by increasing awareness of the value and potential of local products and by integrating them into tourism services through the development of compelling storytelling narratives. In addition, leveraging digitalization can support the documentation, promotion, and traceability of local products, while also facilitating market access, enhancing visibility, and enabling more efficient communication between producers and consumers within sustainable food and tourism systems.

These opportunities can position local products as catalysts for green innovation, sustainability, and socio-economic growth within Arab food systems. Indeed, bolstering the adoption of labels linked to the geographical origins and quality certifications is essential to protect local products and improve their quality, enhance their credibility, and facilitate their access to diverse markets. In this regard, implementation and training on relevant standards are crucial. Moreover, collaborations among researchers, cooperatives, local chefs, food artisans, and restaurateurs constitute a cornerstone for advancing food tourism, fostering the valorization of local products, and promoting innovative sustainable formulations. Additionally, strategic alliances between public and private structures establish a concrete connection between knowledge, resources, and practical implementation of eco-friendly solutions, enriching the overall promotion of local products. Furthermore, the transition toward sustainable resilient Arab food systems requires a seamless integration of creativity, innovation, cultural elements, and collective intelligence supported through cooperation among Arab countries.

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بناء أنظمة غذائية عربية مستدامة من خلال الابتكارات الصديقة للبيئة، والتقنيات الخضراء، وتثمين المنتجات المحلية، والسياحة الغذائية

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الملخص:

يُشكّل تغيّر المناخ، والاعتماد على الاستيراد، والنزاعات، ومحدودية الموارد الطبيعية المتاحة ضغوطًا غير مسبوقة على النظم الغذائية. في هذا السياق، ينبغي تطبيق مناهج جديدة لتحويل النظم القائمة، وضمان استدامتها، وتحفيز النمو الاقتصادي، وتلبية احتياجات المستهلكين. تعتمد هذه الدراسة على منهجية البحث الموسع للمراجع العلمية للتركيز على أهم الدراسات المنجزة سابقًا والمتعلقة بالتطورات الحديثة في التقنيات الخضراء والممارسات المبتكرة. تُصنّف البيانات بناءً على الابتكارات الصديقة للبيئة، وتثمين المنتجات المجالية، والسياسات الخضراء. تهدف هذه المراجعة إلى استكشاف وتحليل إسهام المنتجات المحلية في دعم المنظومة الغذائية والتنموية في المنطقة العربية وكيف يُمكن لتطبيق التقنيات الخضراء تعزيز الأمن الغذائي المستدام. يُولى اهتمام خاص لنهج الاقتصاد الدائري، والتقدم التكنولوجي في تصنيع الأغذية، والمبادرات المجتمعية التي تُقلّل من هدر الطعام وتعزّز من الاستفادة من قيمته الغذائية. تُبيّن النتائج أن المنتجات المحلية ومشتقاتها الثانوية تمثل رصيدًا طبيعيًا استراتيجيًا من الموارد الحيوية ذات القيمة العالية. مع ذلك، لا يزال الكثير من هذه الموارد غير مُستغلّ بشكل كافٍ بسبب ضعف التسويق، وعدم توفر معايير الجودة أو عدم مطابقة معايير الجودة للمستوى المطلوب، ومحدودية قدرات التصنيع، وكذا الفجوة الرقمية. لحل هذه المشكلات، من الضروري تمهيد الطريق أمام الابتكارات الخضراء الفعّالة ووضع سياسات عربية تدعم الابتكار والحفاظ على البيئة والنمو الاقتصادي. ومن خلال تسليط الضوء على

السياحة الغذائية، تُشجَّع المنظمات على دعم تثمين المنتجات المحلية وتطبيق الممارسات المستدامة. تُظهر أن التقنيات الخضراء، بما في ذلك إنترنت الأشياء والذكاء الاصطناعي وأنظمة تحليل البيانات، تلعب دورًا محوريًا في الحد من انبعاثات الكربون وتقليل الأثر البيئي. ويُوفر التكامل بين هذه الابتكارات وتثمين المنتجات المحلية والسياحة الغذائية مسارًا واعدًا لدعم التمكين المجتمعي وتعزيز الاقتصادات الإقليمية وبناء أنظمة غذائية مرنة في جميع أنحاء العالم العربي. علاوة على ذلك، يُعتبر العملُ المشترك بين مختلف التخصصات وإشراكُ الفاعلين ركيزة أساسية للدفع بالتنمية والاستثمار العادل والفعّال في النظم الغذائية العربية.

الكلمات المفتاحية: المنطقة العربية، النظام الغذائي، المنتجات المجالية، الابتكار الأخضر، التثمين، السياحة الغذائية.