



## Sustainable Development Report (ODD 2) Zero Hunger

2023





The State of Food Security and Nutrition in the World highlights a troubling global trend, showing that millions of people are still unable to access a healthy diet, exacerbated by ongoing challenges like conflict, climate change, economic slowdowns, and growing inequality.

Food security in Morocco faced several challenges due to a combination of environmental, economic, and global factors. Here's a detailed overview:

*Drought and Water Scarcity;* Morocco experienced one of the worst droughts in decades in 2022. Rainfall was significantly below average, affecting agricultural productivity, particularly for staple crops like wheat and barley. Water scarcity, a longstanding issue in Morocco, was exacerbated, impacting irrigation systems and rural communities dependent on farming.

**Dependence on Imports;** Morocco imports a significant portion of its wheat, primarily from Russia and Ukraine. The disruption of supply chains due to the Russia-Ukraine conflict led to increased food prices and concerns about supply stability. Rising costs of imported fertilizers and other agricultural inputs also affected local farming operations.

*Rising Food Prices;* Global inflation and disruptions in supply chains contributed to increased food prices in Morocco. Many households, particularly in rural areas, faced difficulties in affording basic food items, worsening food insecurity among vulnerable populations.

*Rural Vulnerability;* Rural areas, where agriculture is the primary source of income, were disproportionately affected by the drought and rising input costs. Livestock farmers also faced difficulties due to the lack of pasture and the high cost of animal feed.

*Climate Change Resilience;* Morocco has made strides in promoting sustainable agriculture and adapting to climate change. The Green Morocco Plan (Plan Maroc Vert) and its successor, Generation Green 2020-2030, aim to enhance agricultural productivity, improve rural incomes, and ensure food security. However, the implementation of these plans faced challenges in 2022 due to the compounded effects of global and local crises.

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## **Overview of Moulay Ismail University (UMI)**

## **Dining Services at Moulay Ismail University (UMI)**

Dining services at Moulay Ismail University are managed in collaboration with the National Office for University Social and Cultural Services (ONOUSC), ensuring affordable meals tailored to students' budgets. In the university's dining halls, a complete meal is offered at a cost of 1.40 DH (approximately \$0.14), with students having the option of two meals per day: lunch and dinner.

Meals are not served on Sundays or public holidays. The dining halls operate during the following hours:

- Lunch: 11 a.m. to 2 p.m.
- **Dinner:** 6 p.m. to 9 p.m.

Since 2017, ONOUSC has fully implemented the outsourcing of dining services across all university facilities. Professional caterers craft menus, ensuring a variety of balanced and nutritious meal options for the student community.

## **Commitment to Hygiene and Food Quality**

UMI is dedicated to maintaining high standards of hygiene and food quality in its dining halls. Several initiatives have been adopted to enhance dining services and improve student satisfaction:







- 1. Development of a Guide on Best Sanitary Practices: This guide ensures consistent hygiene standards in all dining facilities.
- 2. **Training Programs for Supervisors:** Hygiene and food quality supervisors, including those in outsourced services, receive specialized training to oversee dining operations effectively.

To further promote student well-being, UMI has installed drinking water fountains across the campus. These fountains, available to students, faculty, and staff, are strategically placed in high-traffic areas such as cafeterias, libraries, and restrooms. Eleven electric filtered water fountains have been installed in administrative and academic buildings, ensuring access to clean drinking water for all.

## **Dining Options at UMI**

## **University Restaurant**

The university restaurant at Moulay Ismail University operates in partnership with ONOUSC to provide affordable and nutritious meals to students. For just 1.40 DH per meal, students can enjoy high-quality food prepared with fresh, locally sourced ingredients.

The restaurant offers two meals daily: lunch and dinner. Each meal includes three courses—an appetizer, a main dish, and a dessert crafted to ensure nutritional balance and variety. Meals are prepared on-site by a team of qualified professionals, allowing for adjustments to menus based on the dietary preferences and nutritional needs of the university community.

The university restaurant is designed to be a welcoming space where students can share affordable and balanced meals. This initiative underscores UMI's commitment to student well-being and academic success by providing consistent access to nutritious food.

### Cafeterias







UMI provides several cafeterias across its campuses to cater to the diverse dining needs of students and staff. These cafeterias offer a broad selection of food options, allowing individuals to customize meals to fit their preferences and budgets.

Designed as comfortable and welcoming spaces, these cafeterias offer flexibility for students and staff to relax and eat between classes or university activities. They provide both on-site dining and takeaway options, including sandwiches, salads, pasta, and other convenient meal packages.

Menus are crafted to accommodate diverse dietary preferences, including vegetarian and vegan options, with a strong focus on nutritional balance. Fresh ingredients are used to prepare meals, ensuring both quality and variety.

Whether for a quick bite between classes or a longer meal break, UMI's cafeterias meet the diverse needs of the university community. Affordable pricing ensures that everyone has access to quality dining options, supporting healthy and sustainable food choices.

Through its dining services, Moulay Ismail University demonstrates its commitment to enhancing the student experience and fostering a healthy, inclusive campus environment.

The university also prioritizes food accessibility through subsidized meal programs provided in partnership with the National Office of University Social and Cultural Works (ONOUSC). To further support vulnerable students, UMI is developing a centralized food bank that will offer direct assistance to those in need.







## Activities of Moulay Ismail University (UMI) Contributing to Sustainable Development

The global goal of "Zero Hunger" aims to eradicate hunger, achieve food security, improve nutrition, and promote sustainable agriculture. Hunger and malnutrition remain critical challenges worldwide, affecting millions of people and hindering development. Moulay Ismail University (UMI) is actively contributing to this goal through innovative solutions, awareness programs, targeted initiatives, and academic research. One of the notable contributions is its support for doctoral projects focusing on sustainable agriculture and food systems, including food waste valorization, which is essential for achieving long-term food security and reducing resource wastage.

UMI has implemented a variety of strategies to address hunger and promote sustainable food systems. A key focus is on reducing food waste by monitoring waste on campuses, identifying causes, and implementing effective solutions. This initiative raises awareness and promotes responsible resource use within the university community.

In addition to these initiatives, UMI emphasizes the importance of education and research. It promotes sustainable food choices through balanced and environmentally friendly meal options in its cafeterias. Its academic programs foster innovation in agriculture, with approximately 4.3% of graduates specializing in fields such as agriculture and aquaculture. This focus ensures that UMI contributes to building expertise and capacity in sustainable farming practices.







Nombre total des diplômés	9714
FS	237
BIO-ACTIFS, SANTE ET ENVIRONNEMENT : PRODUITS BIO-ACTIFS ET SANTE	7
Sciences de la Terre et de l'Univers	42
Sciences de la Vie	158
SCIENCES DE L'EAU ET DE L'ENVIRONNEMENT	17
SCIENCES DES ALIMENTS ET BIOPRODUITS	13
FST	187
Biodiversité et Gestion des Ressources Végétales	12
Biologie végétale appliquée	52
Chimie Appliquée, option Chimie des Substances Naturelles	9
Chimie et Environnement	1
Physiologie et Santé	78
Santé Humaine et Ressources Naturelles Oasiennes	10
Sciences de la Vie et de l'Environnement	3
Technologie Solaire et Développement Durable	22
Total général	424

One of the university's most impactful contributions is its support for doctoral research projects that align with the "Zero Hunger" goal. These projects tackle critical issues such as sustainable agriculture, food waste valorization, climate resilience, and nutrition.

A notable area of focus for UMI's doctoral students is the valorization of food waste. Research topics include <u>the physicochemical and</u> <u>functional characterization of pectin extracted from citrus peels</u>. This work highlights the potential of repurposing food waste into valuable products for use in the food and pharmaceutical industries, contributing to a circular economy and reducing the environmental impact of food systems.

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#### Physicochemical and functional characterization of pectin extracted from Moroccan citrus peels

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#### 1. Introduction

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Pectin is a class of complex and multifunctional polyasccharides. It represents 20-35% of the plant cell wall and is located mainly in the middle lamella and the primary barrier. Pectin is a heteropolyasccharide, mainly composed of residues of galacturonic acids (GalA) linked in  $o(1 \rightarrow 4)$ . It also includes a significant quantity of neutral sugars such as rhamnose, ambinose, and galactose (Scholl & Voragen, 1996).

Depending on the molecular structure of the pectin, three main access can be distinguished: homogalacturonan (HG), rhannogalacturonan I (RG-I), and tharmogalacturonan II (RG-II). The homogalacturonan region is composed of a-galacturonic acid. It can be found in an acidic form or enterlified by methanol at CG of the carboxyl groups and/ce by acetic acid at O2 and/or O3 of the hydroxyl groups and/ce by acetic acid at O2 and/or O3 of the hydroxyl groups and/ce by acet acid at O2 and/or O3 of the hydroxyl groups (Vorngen, Coenen, Venhoef, & Schols, 2009). According to the esterification degree, pectins are characterized by a degree of methyl esterification (DM) and neerlylation (DA). From a functional point of view, there are two cateposies of pertinx: highly methylated pectins (DM > 50%), which can form a gel under acidic conditions in the presence of sugar, and low methylated pectins (DM < 50%), which can create a gel in the presence of drivulent ions (mainly Ca<sup>2</sup>-) and can be used for low-sugar products (Thakar, Singh, & Handa, 1997). In contrast, a high degree of acetylation in a pectin sample may hinder its gelling calculty but improve its emulativity properties (Yapo, Robert, Etienne, Wathelet, & Paquot, 2007; Phink & Vozagen, 1992). The gelling oblity of pectin in also dependent on its myerage nolecular weight, which impacts its visconity and gelling capacity (Ginz & Audan, 1999).

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<sup>6</sup> Industrially, peetin in extracted from by-preducts of the foult processing industry, mainly citrus peels, and less quantity from apple pomace (May, 1990). Various techniques are used to extract peetin from plant manices, such as microwave and ultranound-assisted extraction. However, the addic extraction process is still the primary process used.

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Other doctoral projects explore precision agriculture techniques to optimize water and nutrient use in the Fes-Meknes region, as well as the cultivation of climate-resilient crop varieties to address the challenges of water scarcity and soil degradation. These projects not only address pressing local and regional issues but also contribute to global efforts to ensure sustainable food systems.

Moulay Ismail University (UMI) continues to reinforce its role as a catalyst for sustainable development by organizing events, workshops, and training programs tailored to the needs of the Fes-Meknes region. These initiatives aim to empower local farmers, industry professionals, and researchers with the knowledge and tools necessary to enhance agricultural practices, ensure environmental sustainability, and foster innovation. Below are highlights of recent notable activities.



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Pratiques d'approvisionnement en fruits et légumes dans la région Fès-Meknès : constats et enjeux



## Workshop on Fruit and Vegetable Supply Practices

On Thursday, March 16, 2023, the Faculty of Legal, Economic, and Social Sciences of Meknès (FSJES) hosted a workshop entitled <u>"Fruit and Vegetable Supply Practices in the Fes-Meknes Region: Findings and Challenges."</u> This event brought together academics, policymakers, and agricultural professionals to address pressing issues in the supply chain of fruits and vegetables in the region.

Key objectives included:

- Analyzing the current state of fruit and vegetable supply chains in the Fes-Meknes region.
- Identifying bottlenecks, inefficiencies, and areas for improvement.
- Exploring strategies to enhance food supply resilience, reduce waste, and meet regional demand sustainably.

The workshop served as a platform for knowledge-sharing and highlighted actionable solutions, including the importance of collaboration between stakeholders to address regional agricultural challenges.

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## **Training Program on Beekeeping Practices**

UMI also organized a free training program to support beekeeping practices in the Fes-Meknes region. This initiative aimed to:

- Teach the best practices for improving bee health and boosting honey production.
- Explore the latest technologies and techniques in modern apiculture.

This program provided hands-on training for local beekeepers, emphasizing methods to combat threats to bee populations, such as diseases, pesticides, and climate change. By introducing participants to innovative tools and techniques, the training aimed to enhance the region's honey production and promote sustainable beekeeping as a vital agricultural practice.

UMI is actively engaged in organizing training and awareness events for farmers and industry professionals across the Fes-Meknes region. These events cover a wide array of topics, from sustainable agriculture to technological advancements in food systems. Among the flagship events is **the International Congress on Food and Environmental Sciences (ICFES 24')**, announced on December 20, 2023.

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## The International Congress on Food and Environmental Sciences (ICFES 24')



ICFES 24' provided a platform for a diverse community of researchers, industry experts, and practitioners to explore the potential of bioresource valorization through environmental biotechnology.

The International Congress brought together scientists, leading experts, stakeholders, and policymakers from around the world to engage in a comprehensive exploration of the diverse facets of bioresources valorization using environmental biotechnology. The event focused on harnessing the untapped potential of value-added processes and products, serving as a dynamic platform for knowledge exchange, collaborative discussions, and the presentation of cutting-edge research in the field. This congress fostered a multidisciplinary dialogue, emphasizing innovative approaches and solutions to address pressing challenges in bioresource management and environmental sustainability.

ICFES 24' served as a catalyst for innovation and knowledge sharing, promoting interdisciplinary approaches to tackle complex issues in food systems and environmental management. This event reinforced UMI's role as a hub for academic excellence and its commitment to addressing critical challenges in agriculture and the environment.

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Through these initiatives, Moulay Ismail University demonstrates its dedication to fostering innovation, supporting sustainable practices, and empowering the Fes-Meknes region's agricultural community. The university's proactive approach strengthens its contributions to regional development while addressing global challenges in food security and environmental sustainability.

Moulay Ismail University demonstrates its commitment to the "Zero Hunger" goal through its multifaceted approach, which includes food waste reduction, improved accessibility, and cutting-edge research. Its support for PhD projects, particularly in the area of food waste valorization, represents a significant step toward addressing the root causes of hunger and ensuring sustainable food systems.

By combining academic excellence with practical solutions, UMI is paving the way for a sustainable and equitable future, not only for its community but also for the broader region. Through continued innovation, education, and collaboration, the university is contributing meaningfully to the global fight against hunger.

