

# Context-based Technologies to Enhance the Efficiency and Resilience of Agri-food Systems in Lebanon

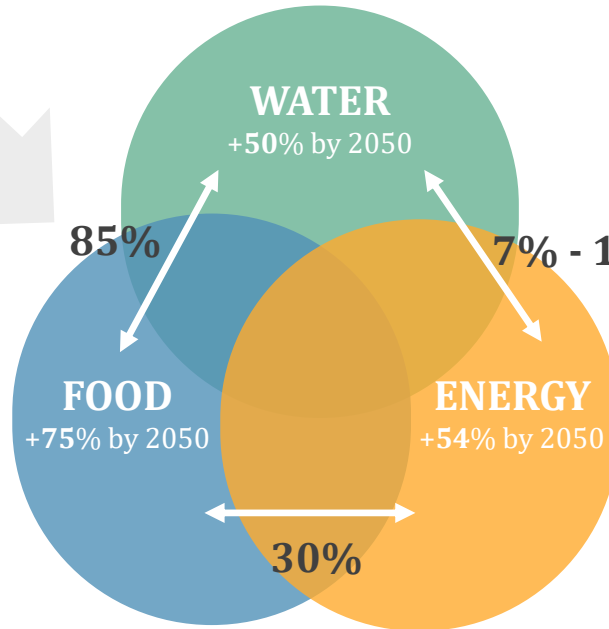
*The role of the agriculture faculties in directing their research and programs to promote technology development in the agriculture sector*

August 26, 2019  
American University of Beirut



## Regional Challenge of Today's Water Allocation Model and Interconnected Primary Resources

**Population**  
598 million  
by **2050**



**Climate Change Impact- Situational Analysis**

- River flow reduction impacts **water supply and hydropower generation**;
- Rainfall and Stream flow reduction impacts **soil moisture** availability and **food production** and increased **irrigation demand**

### Challenges

- Inequity & variability in distribution
- Non-sustainable consumption
- Extremes and non-stationarity
- Non-sustainable business model

### Opportunities

- New Values – Based Business Model
- Resilient/Sustainable Communities

## how can we improve health and livelihood of people and small land owners to be sustainable: economically, socially and environmentally?

1 The challenge is in developing **systems-based solutions** and **technologies** including:

**Design** of in-country novel technologies to produce and process: artificial lighting, hydroponic, vertical farms, organic products, etc..

**Facilitate** capital to invest in precision technologies

**Help** open local and international markets

**Design** multipurpose landscapes for human and ecosystem health

**Develop** culture specific solutions to tackle the burden of diet related diseases in the region

**Improve** food safety and reduce food losses and waste across the value chain

**This is a challenge FAFS can rise up to.**



**FAFS 2025**

## FAFS Strategic Goals

### Goal 1

Integrate research in support of water, energy and food security, resilient environments and health and nutrition

### Goal 2

Deliver outstanding student experience

### Goal 3

Improve student enrollment relevant to local and regional needs

### Goal 4

Establish a regional multidisciplinary research, education and community service hub for Water and Food Security at AREC

### Goal 5

Effectively engage with FAFS stakeholders and communities at large in Lebanon and the region

### Goal 6

Advance faculty and staff wellbeing

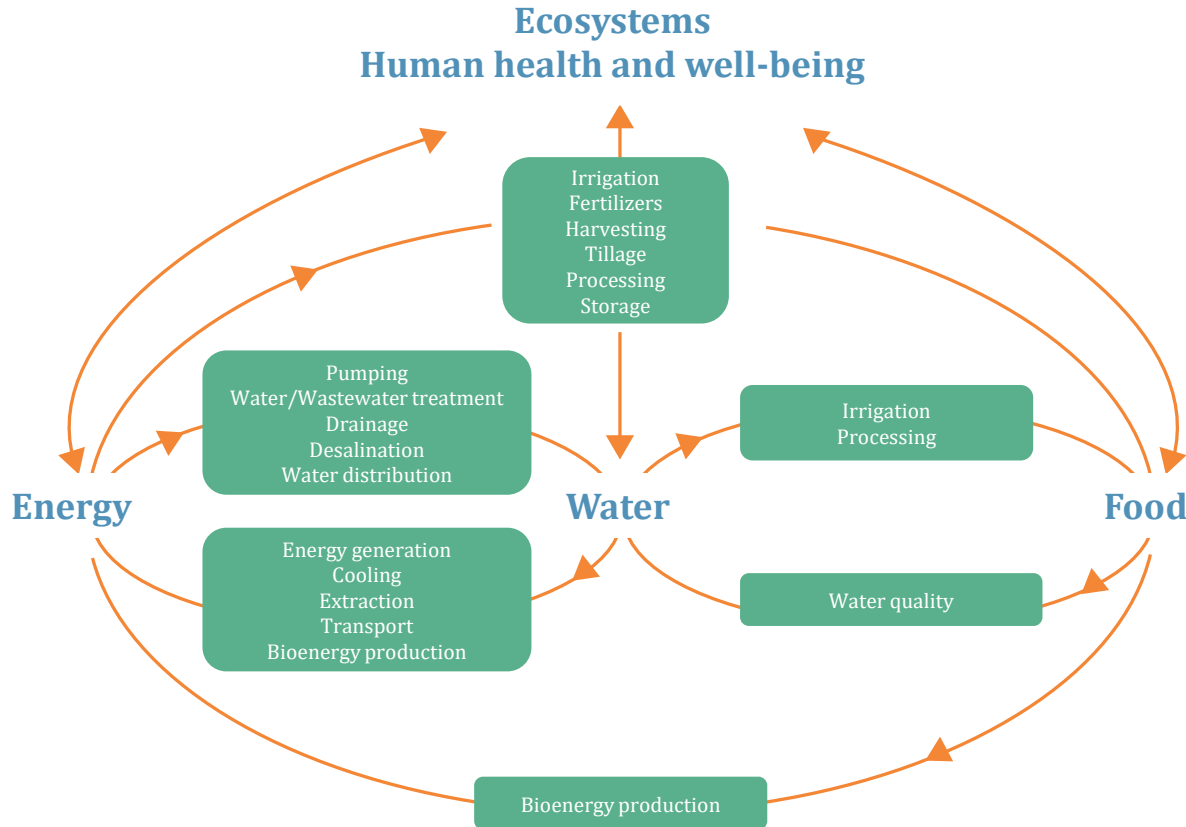




FAFS 2025

# Strategic Initiatives

## Newly Launched Strategic Initiatives (Water – Energy – Food – Health Nexus)



### Goals:

1. Understand complexities
2. Reduce interdependencies
3. Increase resilience
4. Promote ecosystems and human health and well-being

## WEFRAH Funded Research Clusters (2019-21)

**1**

### Smart Farming

Machine Learning approaches to reduce water and energy consumption in field irrigation

Artificial Intelligence (AI) powered arable farming service

**2**

### Renewable Energy

for Climate Control towards Sustainable Poultry Production

**3**

### The Fate of Antibiotics

in Soil and their Uptake by Vegetable Crops: Study on Production Quality, Soil Microbiology, and Antibiotics Removal using Advanced Oxidation

**4**

### The Sheep from the Future

Steps to a new coupling of pastoralism, ecosystems and consumers in an age of environmental degradation

**5**

### Improving Water and Energy Use

and Recycling Food Waste for better production of Healthy Food

**6**

### A Food System-Based Prototype

for Healthy, Sustainable and Safe Diets (HeSSaD): The case of school-aged children in the Beqaa Valley, Lebanon

**7**

### Reduce, Recover, Recycle (3Rs)

Food Waste Management Initiative

**8**

### Integrating the WEFRAH Nexus

into Humanitarian Engineering: Capacity Building and Field Deployment



## AREC: Innovation and Engagement Center for Water-Energy-Food-Health (WEFH) Sciences in Lebanon and MENA Region





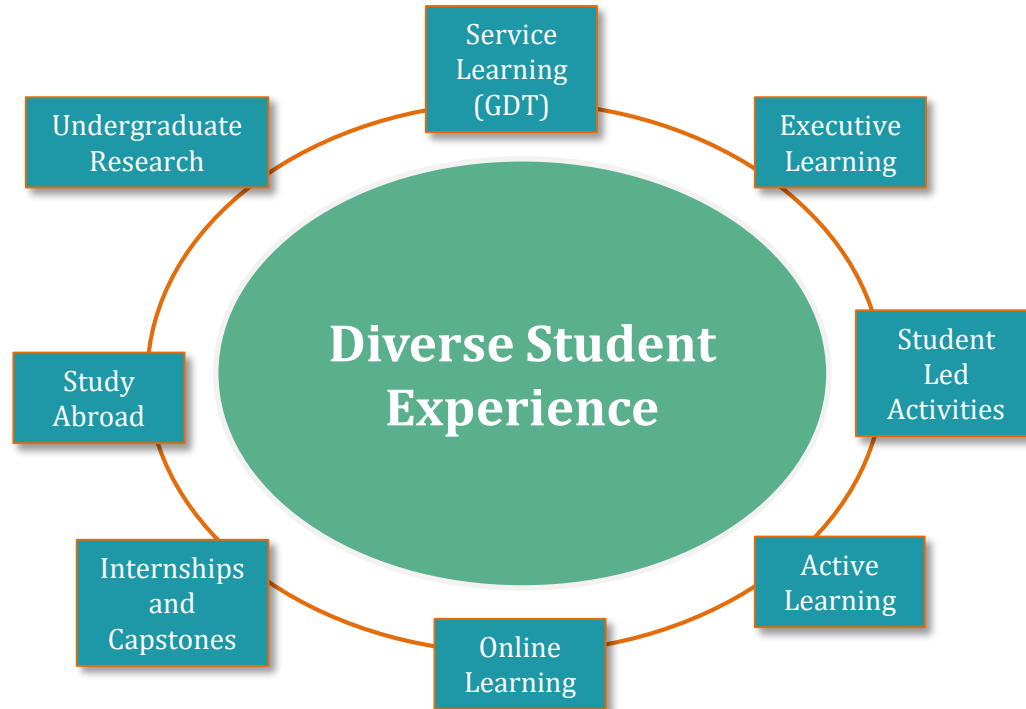


A team of AUB professors (FAFS, MSFEA and FAS) awarded a highly competitive \$1,000,000 Google's AI Impact Challenge grant for their project proposal in the field of applying AI to improve irrigation water management.



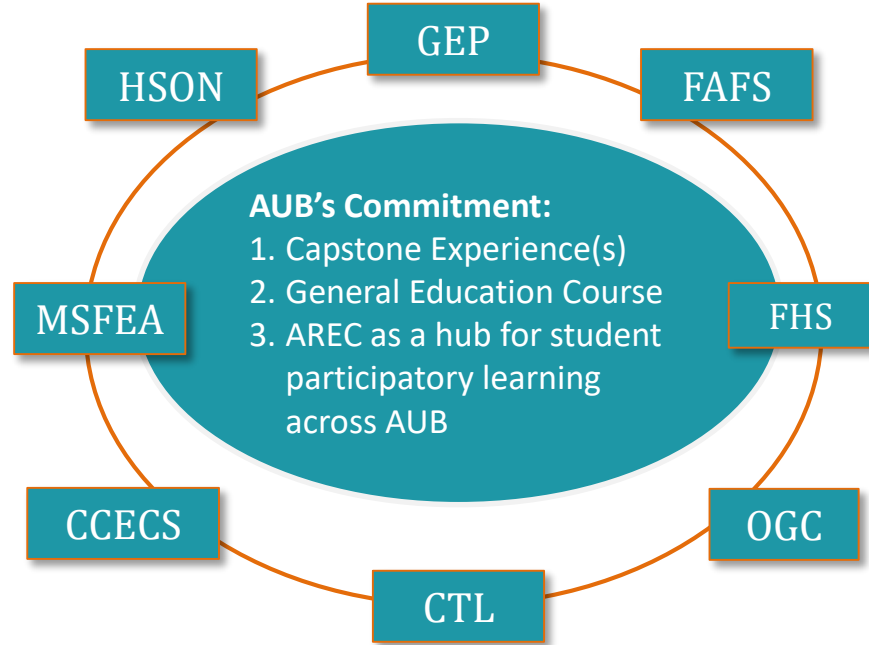


## Outstanding Student Experience



## Transforming Higher Education Project

### Transformative Educational Model Components





## Orientation Workshop at EARTH University – Launch of Activities for Transforming Higher Education Project

### Main Outcomes

1. Learning about EARTH's Educational Model
2. Commitment to participation in the project
3. Commitment to Key Elements of Success
4. Plan for Change Agenda

### Participants

#### *Pilot Universities:*

1. AUB (Lead Institution)
2. University of Quisqueya, Haiti
3. Technological Institute of Conkal, Mexico
4. Technological Institute of Higher Education of Calkini, Mexico

#### *GCHERA Members and Other Institutions*

1. Zamorano Pan-American Agricultural School, Honduras
2. Purdue University, USA
3. Iowa State University, USA
4. UniLaSalle University – Beauvais, France
5. Australia National University, Australia
6. RUFORUM, Uganda
7. Ashesi University, Ghana
8. Wageningen University, The Netherlands
9. University of Costa Rica, Costa Rica
10. University of Commercial Sciences, Nicaragua





## FAFS Engagement Strategy

### 1 Infuse

the culture and practice of engagement among FAFS faculty, students, and staff



### 2 Promote

faculty engagement in community service research and outreach



### 3 Serve

the most disadvantaged communities through research and development



### 4 Educate

students to become positive agents of change in their communities and its development

## A CENTER OF EXCELLENCE FOR EMERGENCY ENVIRONMENTS

**Objective:** To make AREC the **go-to place** for all issues related to **sustainable agriculture, nutrition, health education, natural resources, and landscapes** associated with **emergencies and crises**.







**Enabling Partnerships**

## Influence the Food, Agriculture and Environment Sectors through Partnerships

### Academic Institutions

Coordination and Promotion of Discipline



### Public Institutions

Policy Advice and Advocacy



### Industry

Financing & Entrepreneurship



### NGO & Partnerships

- Align research agenda and promote sector and Financing
- Partnerships to Enhance Student Learning and research Experiences

### National Stakeholders

### Regional and International Partners



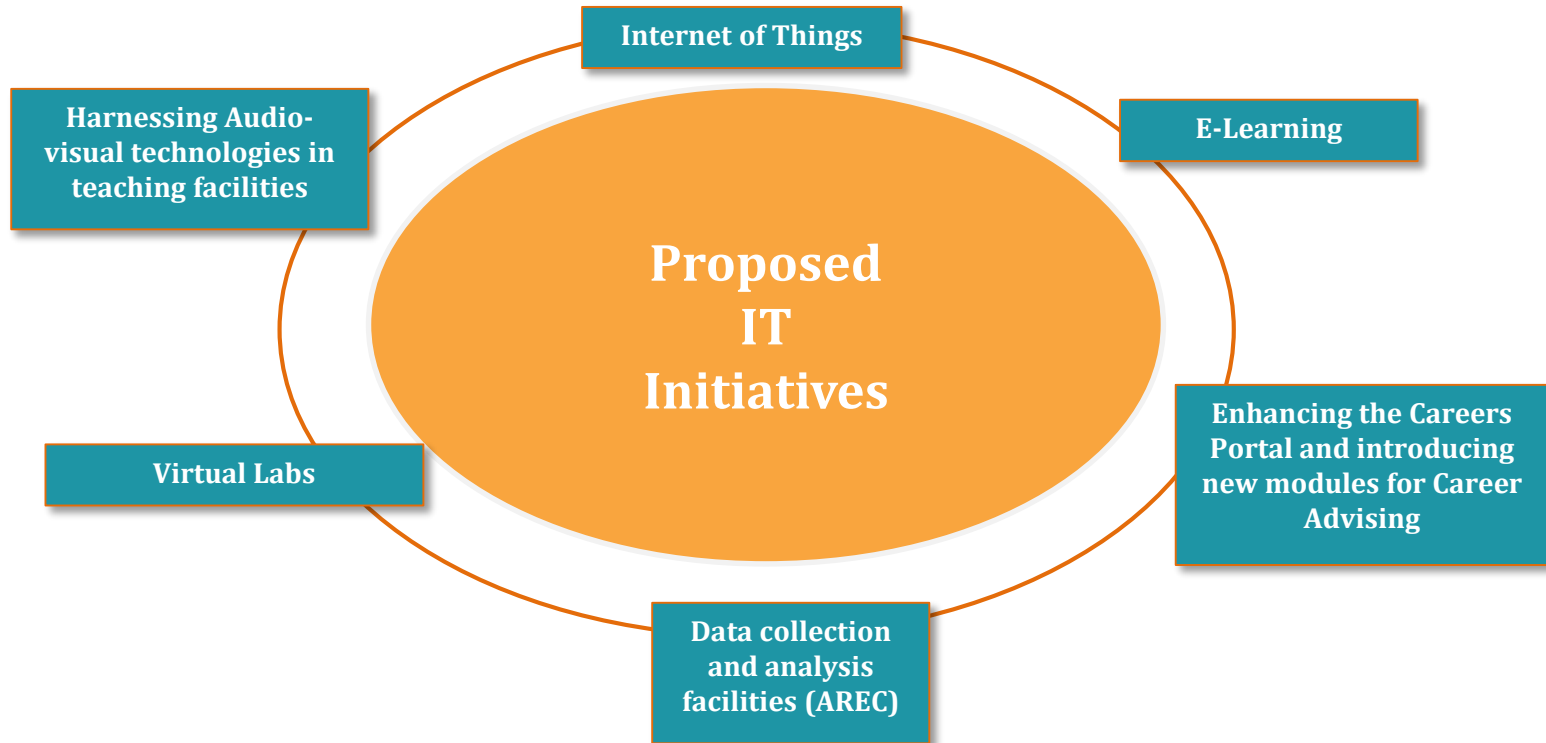
### Initiative: Mashreq Digital Transformation of the Agricultural Sector

- FAFS collaborating with World Bank Group, UN-ESCWA, FAO, CMI
- Knowledge-sharing process between Iraq, Jordan, Lebanon
- Objectives:
  - Revitalize agricultural sector
  - Boost digital agriculture innovation
  - Raise profile of agriculture among non-agricultural sectors
- Outputs include background paper and ministerial-level event



**IT: Partners and Enablers**





# Thank You!