

Prima Nexus 2020 Innovation Action – NEXUS-NEXUS Nature Ecosystem Society Solution 2021-2025

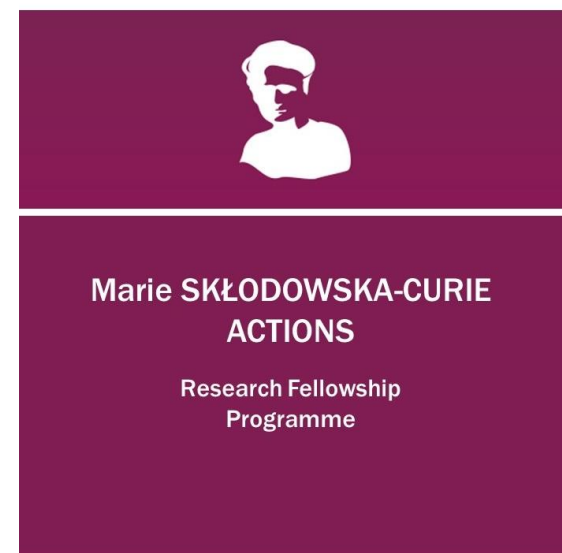


Fair and Sustainable Resource Allocation Demonstrator of the Multiple WEFE
Nexus Economic, Social and Environmental Benefits for Mediterranean Regions
GRANT AGREEMENT NUMBER 2042



JustWATER : mid-term results of virtual water exports from Italy and vulnerability of water bodies

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NEXUS-NESS by PRIMA
Project Final Conference
Rome, 10 April, 2025



POLITECNICO
DI MILANO



Sant'Anna
School of Advanced Studies - Pisa





SUMMARY

1. JustWATER : project overview / how trade affects the vulnerability of water bodies in Italy through virtual water exports (blue water only)
2. Gender component : Women in Water in Italy project component
3. Methodological challenges
4. Stock taking on NEXUS-NESS outputs for JustWATER
5. Co – creating viable solutions with farmers and not imposing prescriptions
6. Providing informed decision making for policy makers: the GEOSPATIAL output of JustWATER

PROJECT OVERVIEW

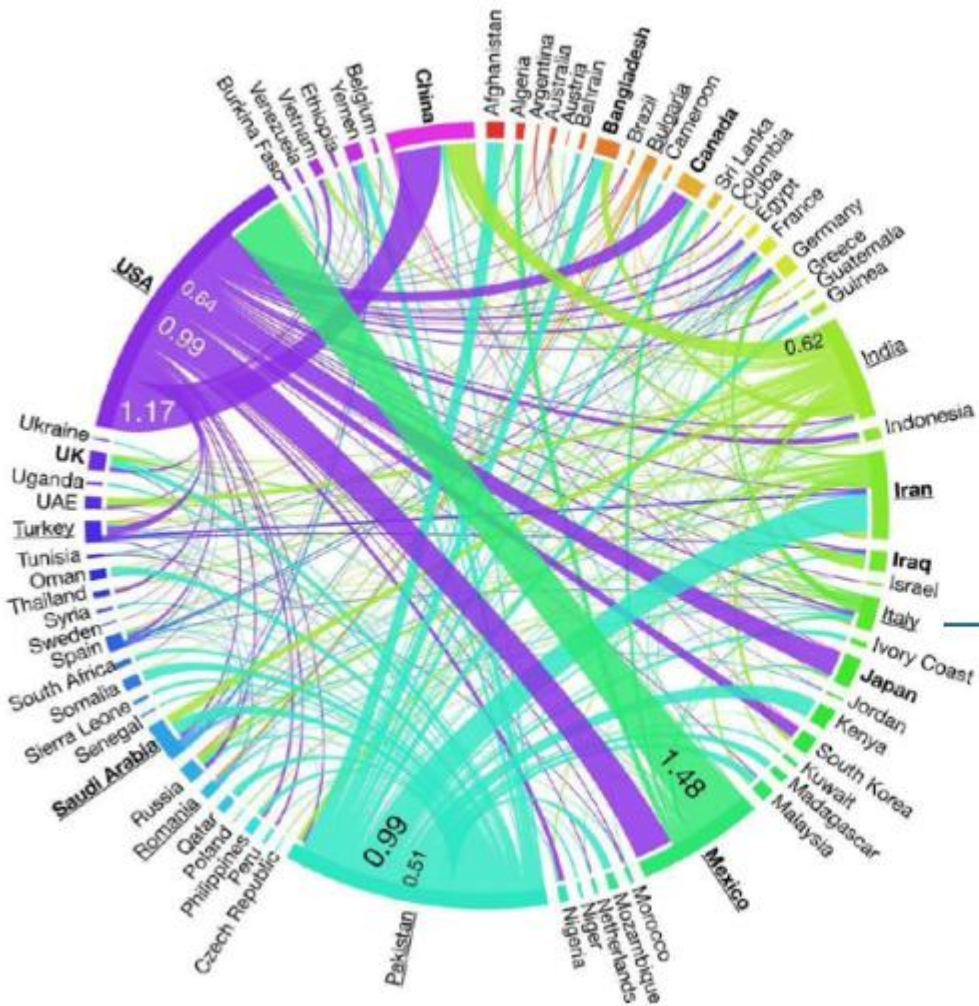
IN A FEW WORDS



- This project is about how trade affects
1. the vulnerability of water bodies
 2. in Italy
 3. through virtual water exports
 4. Using GIS mapping and geo Python large dataset processing
 5. Creating open access maps of virtual water outflows from vulnerable Italian water bodies

PROJECT OVERVIEW

THE PROBLEM



Esaurimento delle acque
sotterranee nelle
esportazioni agricole
internazionali nel 2010

Groundwater depletion
due to agricultural exports
in 2010 (Nature, 2017)

L'Italia si colloca tra i
10 esportatori più grandi

Italy is among the 10° largest
exporters of vulnerable
groundwater

Source: Dalin et al. 2017

Methodological challenges



EXTERNAL DATASET

PCR-GLOBWB 2.0

PCRaster GLOBal Water Balance model: version 2.0



Data from the database Aqueduct WRI (**3.0**)
(original data from the dataset GLOBWB 2.0
Water Balance Dataset) , Water Footprint Network
Dataset, FAO Cropwat dataset, regional export and
Trade data (UN TradeMap). Copernicus (European
Dataset)

VARIABLES:

- WATER STRESS
- GROUNDWATER TABLE DECLINE
- DROUGHT RISK
- BASELINE WATER DEPLETION (4.0)
- BASELINE WATER STRESS (4.0)

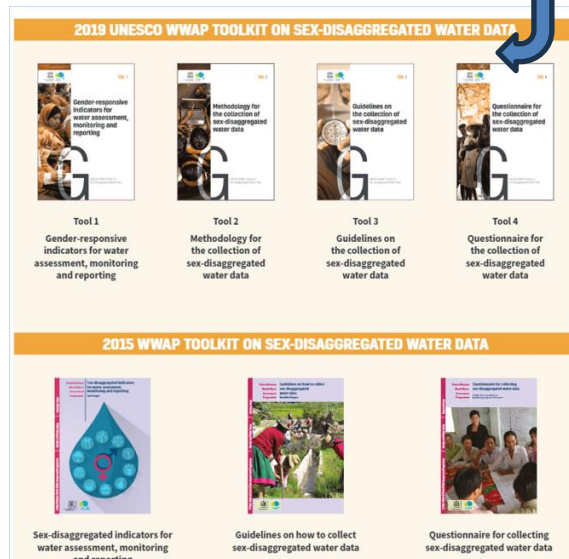


- OLD DATA
- MISSING DATA
- ITALIAN DROUGHT
2022 2023
NOT COVERED
- GROUNDWATER
NOT ENOUGH
EXPLORED

GENDER COMPONENT: LITERATURE REVIEW & SEX DISAGGREGATED INDICATORS for the topic “WATER AND GENDER IN ITALY”



Method: UNESCO WWAP



TOPIC COVERED BY THE SURVEY :

- Agriculture / agricultural extension services for women and men
- Women in water policy and politics in Italy
- Women in water related STEM / education
- female immigrant work in the agricultural sector

JANUARY 2025: PRESENTED at PISA UNIVERSITY AT THE INTERNATIONAL WORKSHOP ON WATER AND GENDER / WWAP UNESCO

- member of the Scientific Committee of the conference
- Papers undergoing peer reviews for publication with UNESCO



Stocktaking on NEXUS-NESS outputs, useful for JustWATER and potential cross-fertilization for the gender component



Aquifer Vulnerability Maps
Virtual Water Trade
Rivers and lakes droughts
Gender&sex-disaggregated data
Co-creation of policies and practices

NEXUS-NESS outputs

TOOLS & PLATFORMS DEVELOPED

3 new WebGIS & dashboards:

- **NEXUS-NESS Geo-Service** (developed and deployed across all 4 NELs)
- **WATNEEDS** (crop irrigation demand and water availability)
- **FREEWAT** (hydrological simulation and stakeholder-informed modelling)
- **WEFE Nexus Indicators & Index** (including SDG-based indicators)



THE ITALIAN GENDER & WATER
LITERATURE REVIEW, METHODOLOGY
AND SURVEY ON WATER COULD BE EXPANDED FOR WEFE



USEFUL TOOLS
THAT CAN
BE APPLIED
FOR JUSTWATER

THE TRADE COMPONENT OF VIRTUAL WATER : GEOPOLITICS OF VIRTUAL WATER, agri-food trade, Ukraine and Egypt crisis/ 1

Let's think about the Ukraine crisis:

Egypt began to fear for its grain supplies from Russia and Ukraine, just after the outbreak of the war.

If the war does not end soon and other agri-food supplies from these two countries are not guaranteed with the naval corridor, Egypt's food import policies will have to change.

Russia and Ukraine cover almost 85% of Egypt's wheat demand.

More than 3 million tons of wheat per year are imported from Egypt.

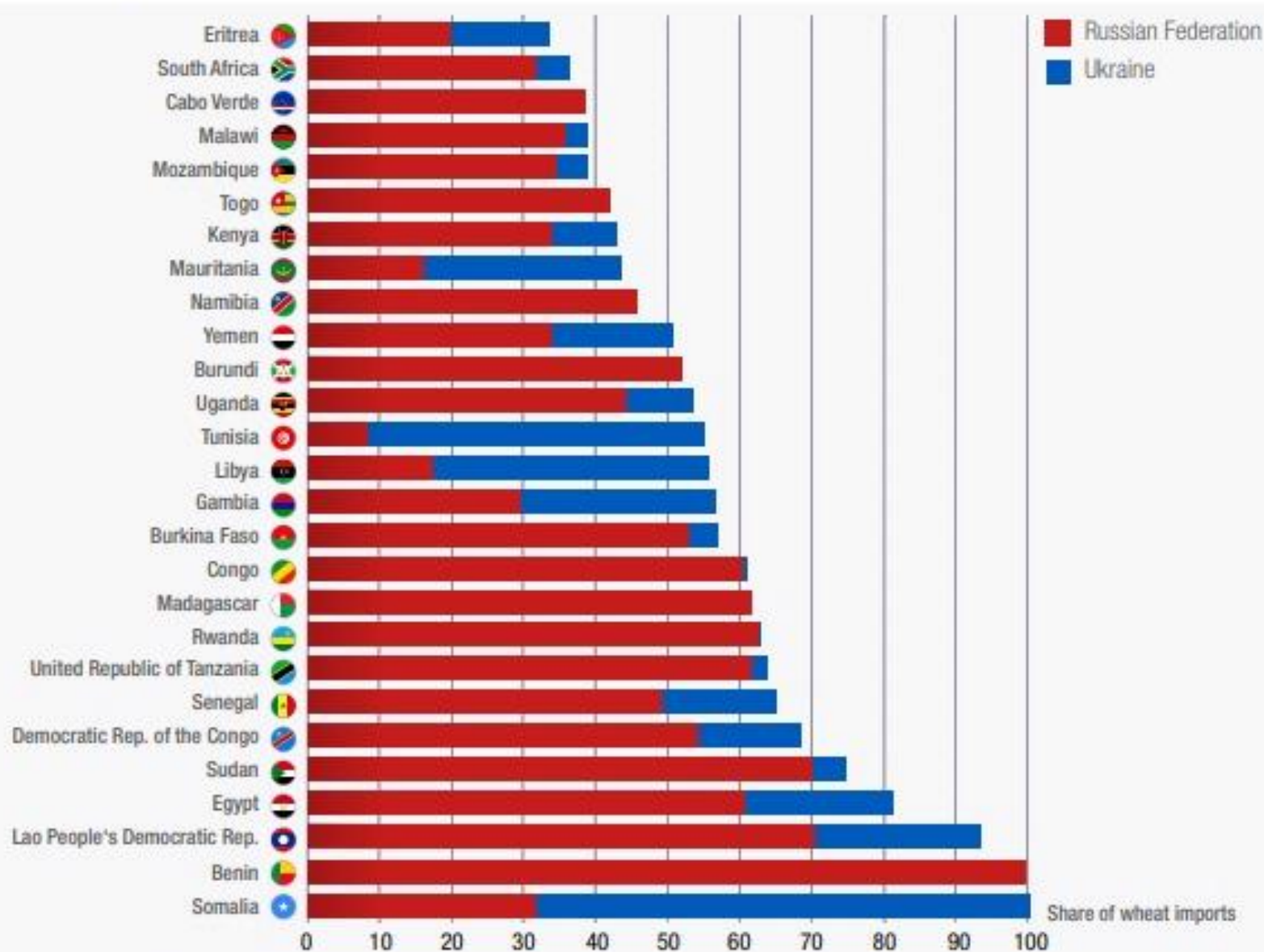
14% of Ukraine's total grain production goes to Egypt, which normally buys 8.9 million tons from Russia as well (FAO 2020 data).

GEOPOLITICS OF VIRTUAL WATER, agri-food trade, Ukraine and Egypt crisis/ 2

IMPORT SUBSTITUTION: l'Egitto infatti, visto il prolungarsi della guerra, ha adottato una sostituzione dell'import, che ha comportato cambiamenti non solo nella spesa , nel prezzo e nella capacità logistica di importare grano del paese, ma anche in termini di **ACQUA VIRTUALE**: il grano dell'emisfero nord è meno irrigato perché cresce anche grazie alle piogge.

Un cambiamento nel rifornimento di grano implicherà anche un cambiamento nella sostenibilità del tipo di grano importato.

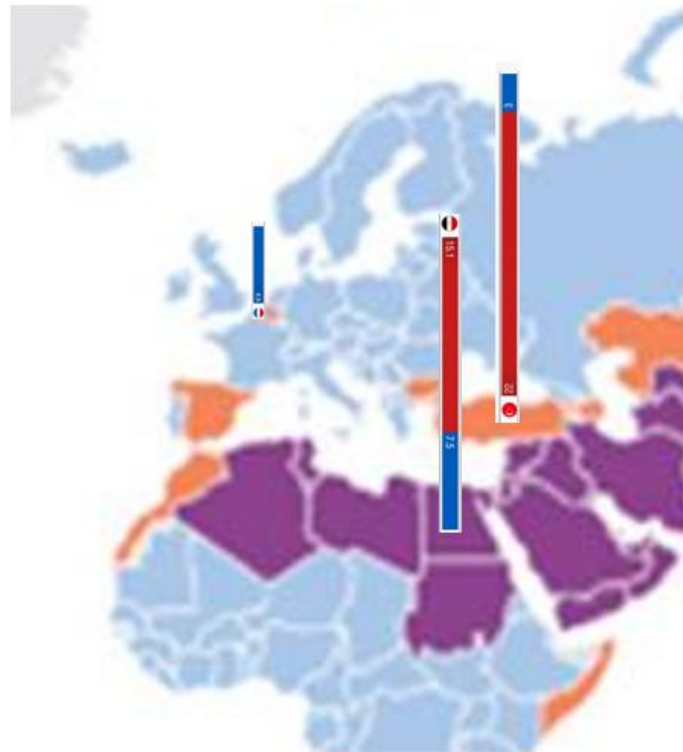
Figure 3. Wheat Dependence in African and Least Developed Countries
(Percentage)



Source: UNCTAD calculations, based on data from the UNCTADstat database (accessed 4 March 2022).

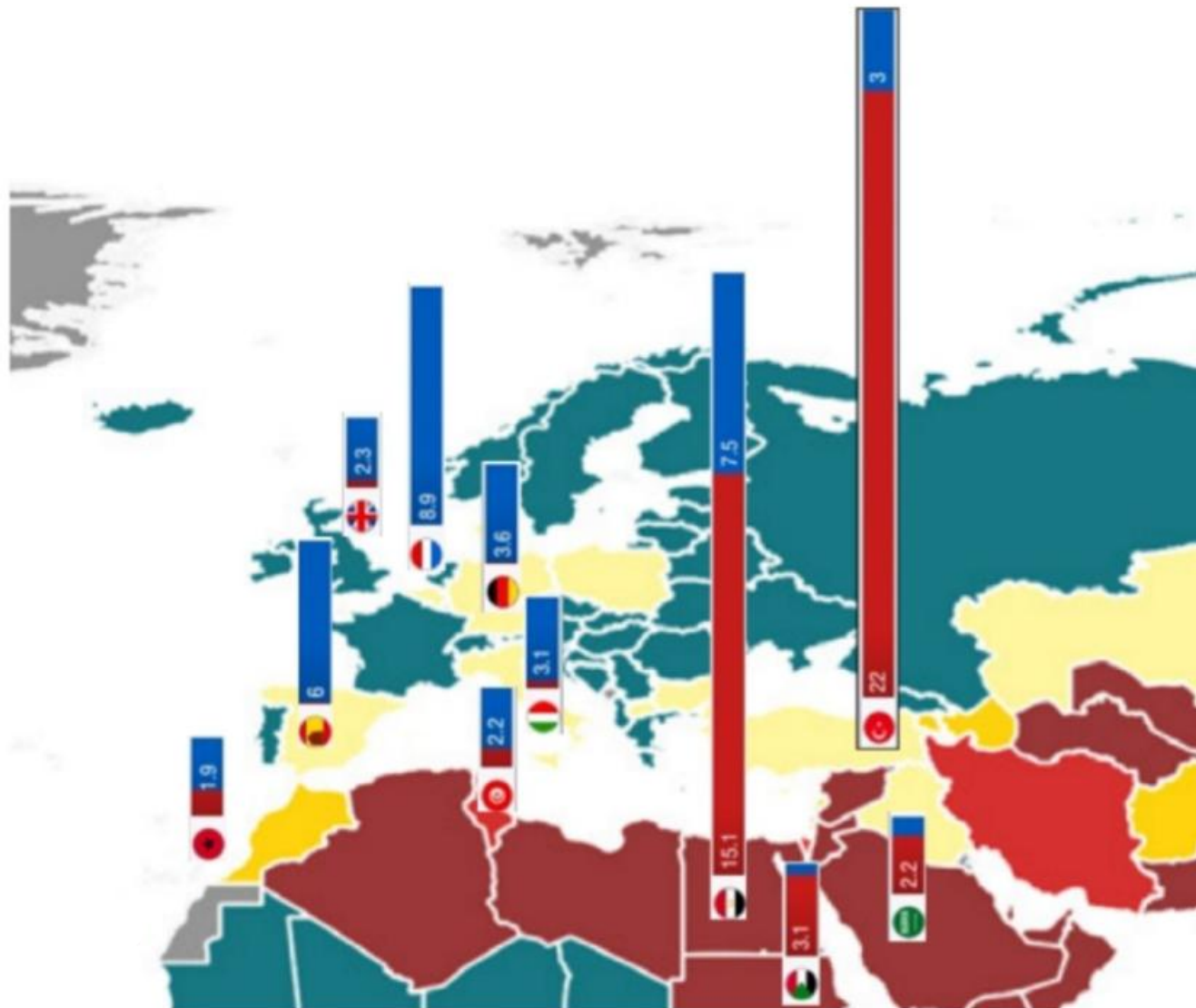
Dependency
of various African
countries
from RUSSIA
(Red)
AND UKRAINE (blue)
in terms of AGRI-FOOD
IMPORT
Data for 2022

PHYSICAL WATER SCARCITY AND AGRI-FOOD IMPORTS FROM RUSSIA AND UKRAINE



Physical water scarcity score





Source: Greco 2022 on FAO map and UNCTAD 2022 data

MAPPA WATER STRESS FAO E IMPORT DEPENDENCE FROM UKRAINE AND RUSSIA UNCTAD

La mappa illustra i gradi stress idrico secondo l'ONU (FAO¹⁰ 2021¹¹) e, per i paesi di cui è disponibile il dato UNCTAD del Marzo 2022, ne mostra la dipendenza in termini di percentuali totali sulle derrate importate, da Ucraina e Russia, per un selezionato paniere con le seguenti tipologie di derrate: grano, mais, orzo, semi di colza, semi e olio di girasole.

Egypt imposes three-month export ban on cooking oil, corn, green wheat

Ahram Online , Saturday 12 Mar 2022

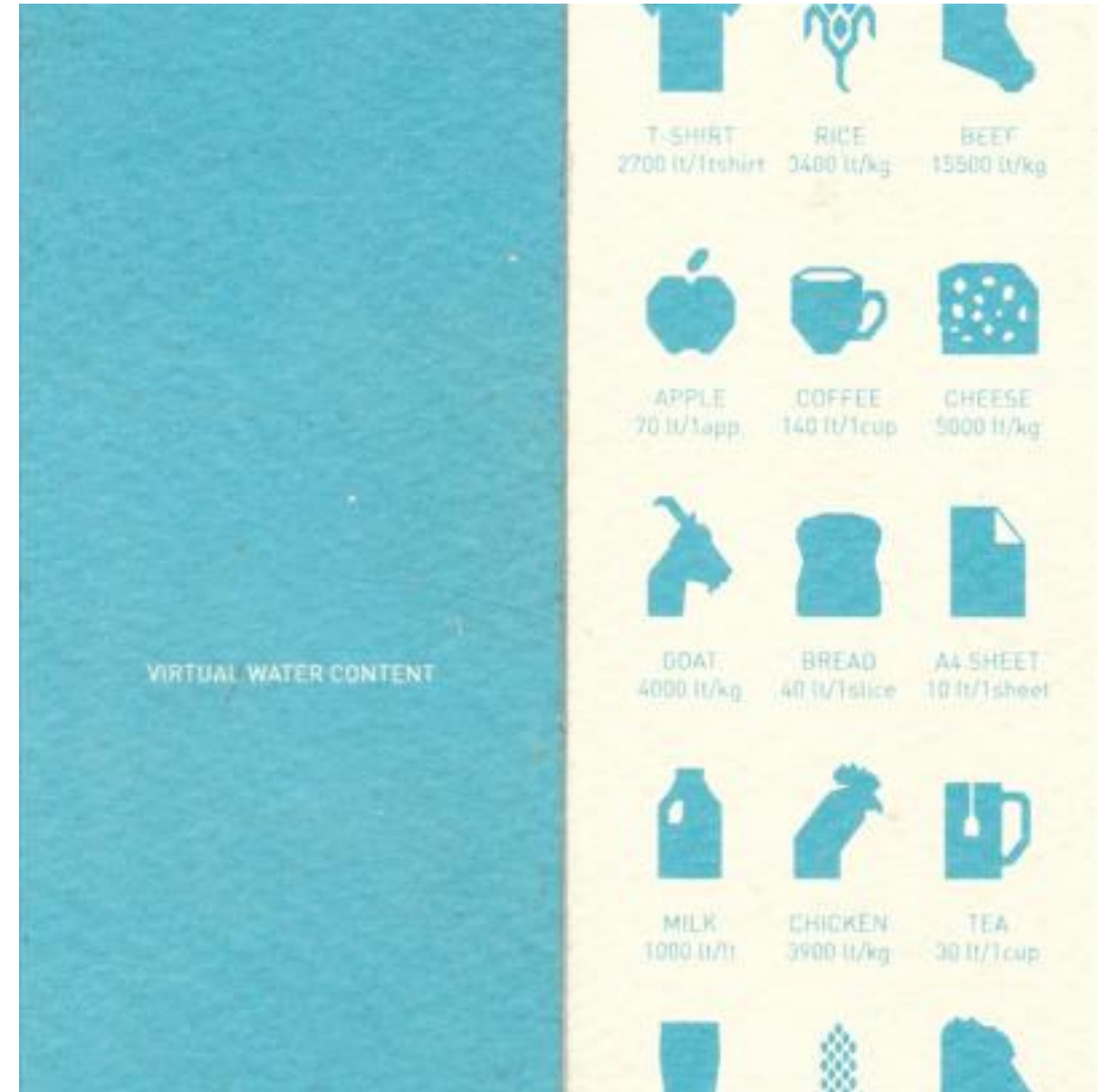
Egypt has imposed an export ban on cooking oil, corn, and all kinds of cracked green wheat (fereek) for three months, Minister of Trade and Industry Nevine Gamea announced on Saturday, according to Ahram Arabic news website.



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Co – creating
viable solutions
with farmers
and not imposing
prescriptions to farmers





**FARMERS
WILL
SAVE THE
WORLD !
(Tony Allan)**

VIRTUAL WATER CONTENT

		
T-SHIRT 2700 lt/tshirt	RICE 3400 lt/kg	BEEF 15500 lt/kg
		
APPLE 70 lt/app	COFFEE 140 lt/cup	CHEESE 5000 lt/kg
		
GOAT 4000 lt/kg	BREAD 40 lt/slice	A4 SHEET 10 lt/sheet
		
MILK 1000 lt/l	CHICKEN 3900 lt/kg	TEA 30 lt/cup
		



JUST WATER PROJECT IS FUNDED BY THE EU UNDER THE MARIE CURIE FELLOWSHIP ACTION

Call: **HORIZON-MSCA-2022-PF-01** (MSCA Postdoctoral Fellowships 2022)

Topic: **HORIZON-MSCA-2022-PF-01-01** Type of Action: **HORIZON-TMA-MSCA-PF-EF** (HORIZON TMA MSCA Postdoctoral Fellowships - European Fellowships) Project number: **SEP-210874497** Project acronym:

JustWATER

<https://justwater-0cb8db74bf24.herokuapp.com/>



Marie SKŁODOWSKA-CURIE
ACTIONS

Research Fellowship
Programme



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JustWATER

<https://justwater-0cb8db74bf24.herokuapp.com/>



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