

A photograph of a space station in orbit over Earth, with the station's complex structure and solar panels visible against the blue and white of the planet. The image is overlaid with a semi-transparent teal and blue gradient.

UNOOSA/EUSPA Joint Report
Contribution to the "Space2030" Agenda
EU SPACE Supporting a World of 8 Billion People

Tuesday 15 April 2024



UNITED NATIONS
Office for Outer Space Affairs

Jorge Del Rio Vera
Space Applications Section

What is this about?



Long standing cooperation with EUSPA



#EUSpace



SPACE4SDGS
#space4sdgs

What is this about?

UNITED NATIONS
OFFICE FOR OUTER SPACE AFFAIRS

CONTRIBUTION TO THE "SPACE2030" AGENDA
EU SPACE
SUPPORTING A WORLD OF
8 BILLION PEOPLE



UNITED NATIONS

United Nations

A/RES/76/3



General Assembly

Distr.: General
28 October 2021

Seventy-sixth session
Agenda item 30
Space as a driver of sustainable development

**Resolution adopted by the General Assembly
on 25 October 2021**

[without reference to a Main Committee ([A/76/L.3](#) and [A/76/L.3/Add.1](#))]

**76/3. The “Space2030” Agenda: space as a driver of
sustainable development**

The General Assembly,

Recalling its resolution [73/6](#) of 26 October 2018,

Adopts the following document:

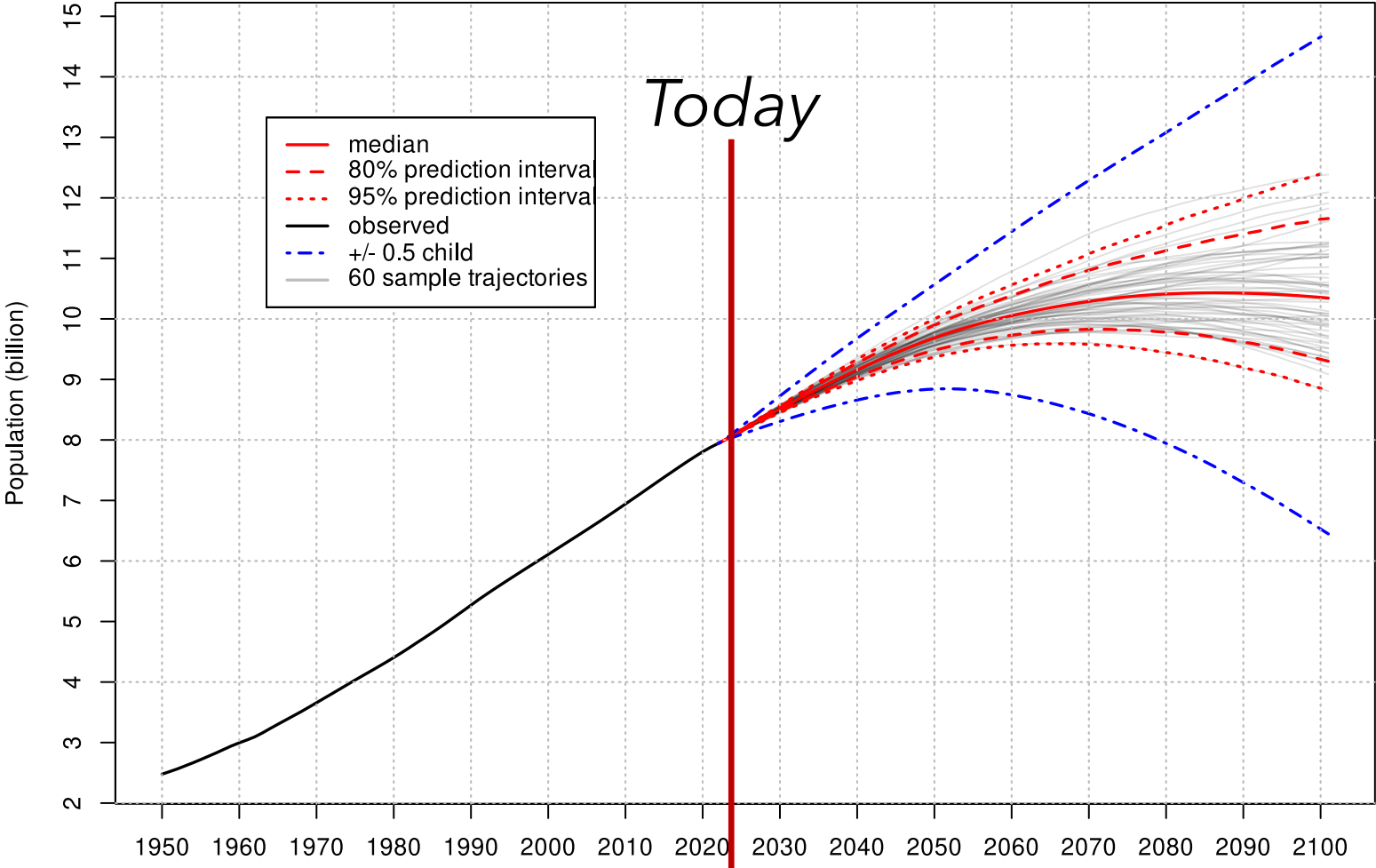
**The “Space2030” Agenda: space as a driver of
sustainable development**

Part A. Agenda

I. Introduction

Population

World: Total Population



© 2022 United Nations, DESA, Population Division. Licensed under Creative Commons license CC BY 3.0 IGO.
United Nations, DESA, Population Division. *World Population Prospects 2022*. <http://population.un.org/wpp/>

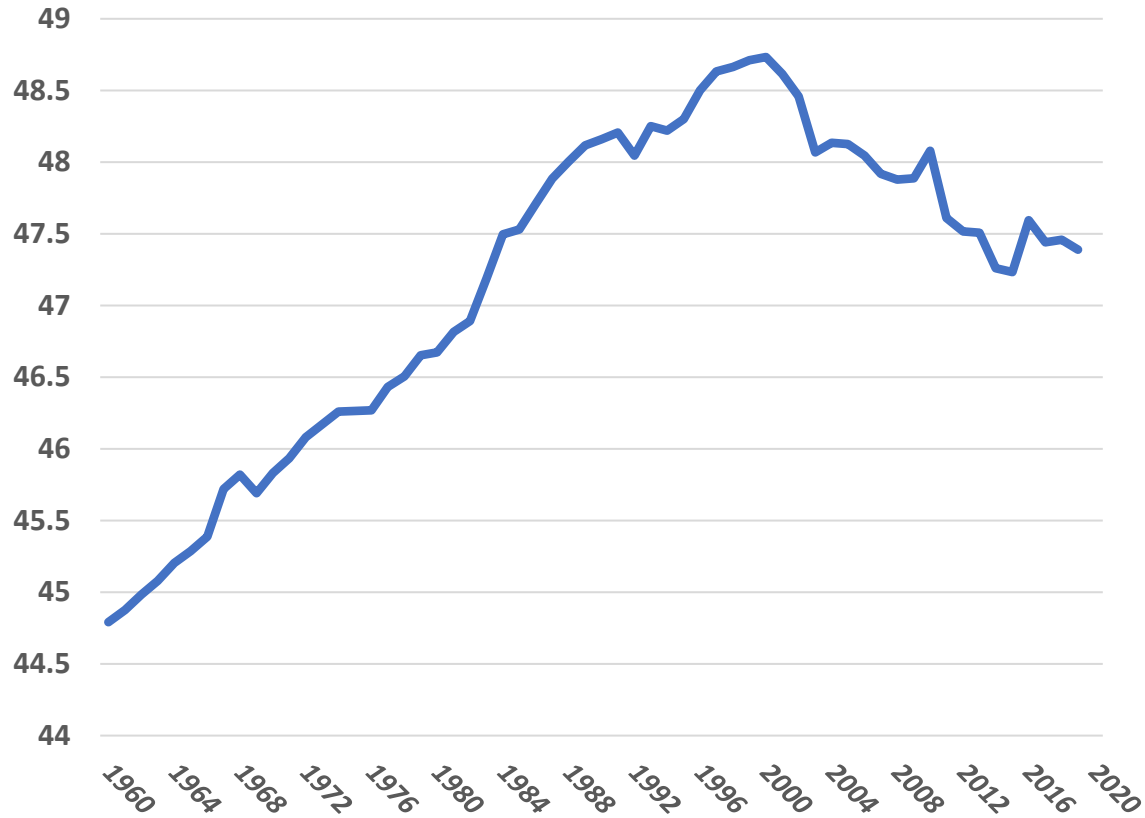
Challenges from the "Space2030" Agenda

CHALLENGE	LINK TO THE SPACE2030 AGENDA		
Food security	<p>Overarching objective 1 Action 1.7: Strengthen the contribution of space technologies and their applications to sustainable fisheries management, agriculture, food safety and security, and nutrition.</p>	Disaster management and emergency response	<p>Overarching objective 2 Action 2.5: Promote the use of space-based technologies in all phases of the disaster management cycle, applicable to both natural and man-made disasters, including prevention, mitigation, preparedness, response, recovery, reconstruction and rehabilitation; monitor and assess elements such as exposure, hazards, disaster risk and damage in different regions of the world; and promote the sharing of disaster monitoring data.</p>
Water management	<p>Overarching objective 2 Action 2.2: Promote the use of space technologies and their applications to enhance scientific knowledge of the natural environment, including oceans and seas, mountainous regions, water cycles and resources, forestry, biodiversity, desertification and land degradation, as well as urbanization, with a view to contributing to the preservation of the natural environment, sustainable resource management and the protection of ecosystems.</p>	Urbanization	<p>Overarching objective 2 Action 2.6: Strengthen the use of space technologies and their applications to support the development of socially and environmentally sustainable human settlements and infrastructure, both urban and rural; improve livelihoods; study urbanization and migration patterns; and monitor cultural heritage sites and contribute to their preservation</p>
Environmental and climate change	<p>Overarching objective 1 Action 1.1: Promote the use of space-based solutions in global efforts to ensure sustainable forest and ocean economies.</p> <p>Overarching objective 2 Action 2.2: Promote the use of space technologies and their applications to enhance scientific knowledge of the natural environment, including oceans and seas, mountainous regions, water cycles and resources, forestry, biodiversity, desertification and land degradation, as well as urbanization, with a view to contributing to the preservation of the natural environment, sustainable resource management and the protection of ecosystems</p> <p>Action 2.3: Strengthen the use of integrated space applications to facilitate the observation of the climate and the assessment of disaster risks, improve early warning disaster systems and provide data for the indicators used to track progress in the implementation of the 2030 Agenda for Sustainable Development, the Sendai Framework and commitments by States parties to the Paris Agreement.</p> <p>Action 2.4: Advance the role of space technologies in highlighting, analysing and addressing climate change and facilitating the transition to low-emission societies, and promote international collaboration in that regard, in line with existing and recognized international mechanisms and organizations.</p>	Migration	<p>Overarching objective 2 Action 2.7: Strengthen the use of space technologies and their applications to support the development of socially and environmentally sustainable human settlements and infrastructure, both urban and rural; improve livelihoods; study urbanization and migration patterns; and monitor cultural heritage sites and contribute to their preservation.</p>
		Energy	<p>Overarching objective 2 Action 2.4: Advance the role of space technologies in highlighting, analysing and addressing climate change and facilitating the transition to low-emission societies, and promote international collaboration in that regard, in line with existing and recognized international mechanisms and organizations.</p>
		Health	<p>Overarching objective 2 Action 2.6: Strengthen space-related cooperation in support of global health; improve the use and application of space medicine, science and technology, innovations in the global health domain, cooperation and the sharing of information and tools to improve the timeliness and effectiveness of public health and health-care interventions; and enhance capacity-building in space medicine, science and technology.</p>

8 Selected Challenges from the "Space2030" Agenda

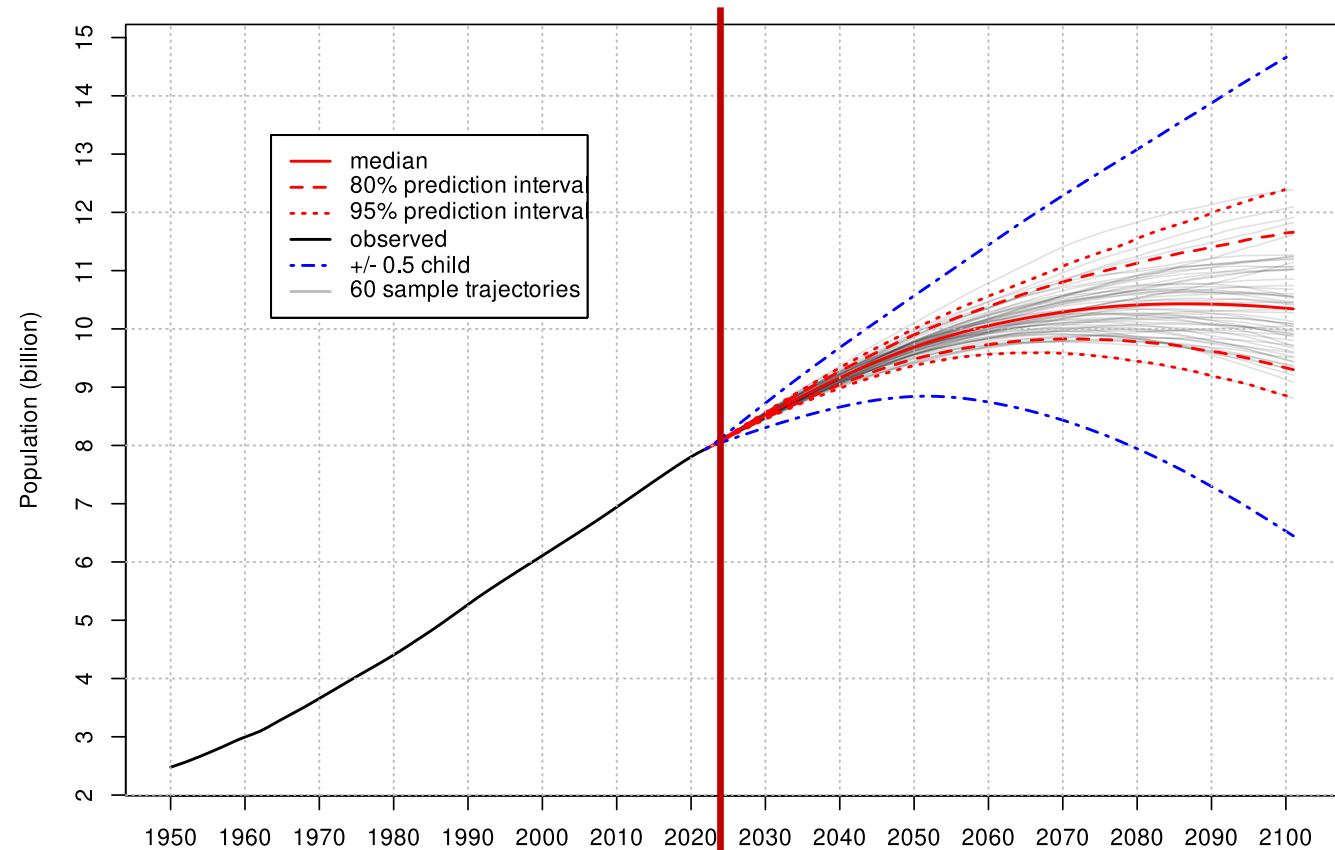
Challenge: Food Security

Agricultural Land (M sq. km)



Source: World Bank

World: Total Population



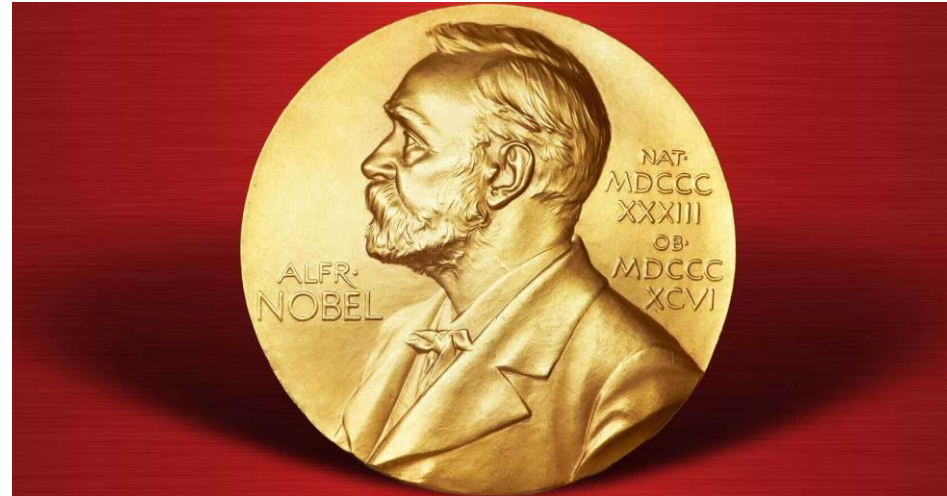
© 2022 United Nations, DESA, Population Division. Licensed under Creative Commons license CC BY 3.0 IGO.
United Nations, DESA, Population Division. *World Population Prospects 2022*. <http://population.un.org/wpp/>

Today

Challenge: Food Security



Fritz Haber to help!



Nobel Prize in 1918 - only received in 1919

Prize motivation: "for the synthesis of ammonia from its elements"

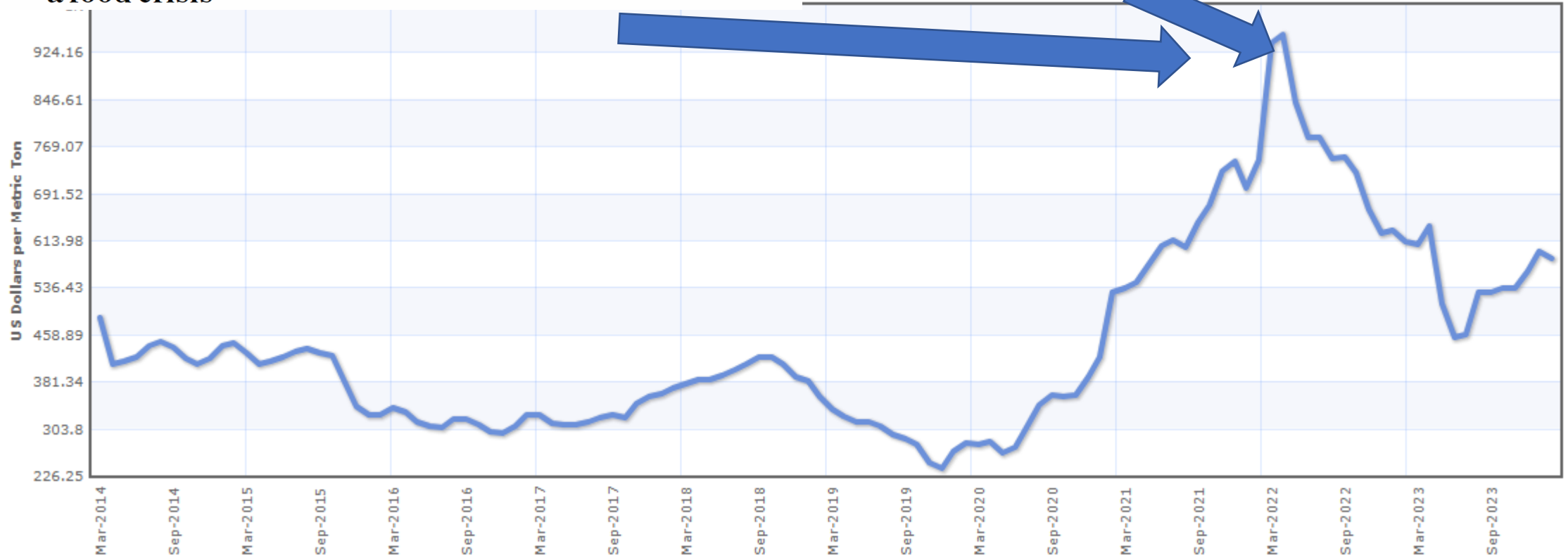
Challenge: Food Security

FINANCE · FERTILIZER

**‘A perfect storm for the whole food system right now’:
One of the world’s largest fertilizer companies warns
that every country—even those in Europe—is facing
a food crisis**

‘Enormous’ fertilizer shortage spells disaster for global food crisis

The high cost of fertilizers will likely keep the cost of food dangerously high.



What is Ammonia?

Ammonia is one of several forms of nitrogen that exist in aquatic environments. Unlike other forms of nitrogen, which can cause nutrient over-enrichment of a water body at elevated concentrations and indirect effects on aquatic life, ammonia causes direct toxic effects on aquatic life.

Where does Ammonia Come From?

Ammonia is produced for commercial fertilizers and other industrial applications. Natural sources of ammonia include the decomposition or breakdown of organic waste matter, gas exchange with the atmosphere, forest fires, animal and human waste, and nitrogen fixation processes.

Ammonia can enter the aquatic environment via direct means such as municipal effluent discharges and the excretion of nitrogenous wastes from animals, and indirect means such as nitrogen fixation, air deposition, and runoff from agricultural lands.

ENVIRONMENTAL RESEARCH LETTERS

PAPER • OPEN ACCESS

The Haber Bosch–harmful algal bloom (HB–HAB) link

Patricia M Glibert¹, Roxane Maranger², Daniel J Sobota³ and Lex Bouwman^{4,5}

Published 6 October 2014 • © 2014 IOP Publishing Ltd

[Environmental Research Letters, Volume 9, Number 10](#)

[Focus on Nitrogen Management Challenges: From Global to Local Scales](#)

Citation Patricia M Glibert et al 2014 *Environ. Res. Lett.* 9 105001

DOI 10.1088/1748-9326/9/10/105001

THE CONTROL OF NATURE MARCH 6, 2023 ISSUE

PHOSPHORUS SAVED OUR WAY OF LIFE—AND NOW THREATENS TO END IT

Fertilizers filled with the nutrient boosted our ability to feed the planet. Today, they're creating vast and growing dead zones in our lakes and seas.

By Elizabeth Kolbert

February 27, 2023

Food Challenge and Water/Environmental Impact

OUR OCEAN

THE PLANET'S LARGEST ECOSYSTEM
IS ENDANGERED



FOR AT LEAST
3 BILLION PEOPLE,
THE QUALITY OF THE WATER
THEY DEPEND ON IS
UNKNOWN DUE TO A LACK
OF MONITORING

733+ MILLION PEOPLE



LIVE IN COUNTRIES
WITH HIGH AND
CRITICAL LEVELS
OF **WATER STRESS**
(2019)

6 CLEAN WATER
AND SANITATION



According to IPCC, roughly 50% of the world population experiences severe water scarcity for at least part of the year

Challenges and global agendas

2030 AGENDA FOR SUSTAINABLE DEVELOPMENT	PARIS AGREEMENT 2015	SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015–2030	NEW URBAN AGENDA
---	----------------------	--	------------------

SUSTAINABILITY CHALLENGE	2030 AGENDA FOR SUSTAINABLE DEVELOPMENT	PARIS AGREEMENT 2015	SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015–2030	NEW URBAN AGENDA
Food security	SDG 2: Zero Hunger	Preamble Article 2, paragraph 1 (b)	Guiding principles, paragraph 19 (h) Priority 2, Paragraph 28 (b) Priority 3, Paragraph 30(j) Priority 4, Paragraph 33 (h)	
Water management	SDG 6: Clean Water and Sanitation	No mention	Priority 4, paragraphs 33 (c) and (h)	Paragraphs 13 (a), 13 (h), 34, 64, 70, 71, 72, 73, 74, 88, 119, 120, 123
Environmental and climate change	SDG 1: No Poverty Target 1.5 SDG 2: Zero Hunger Target 2.3 Target 2.4 SDG 3: Good Health and Well-Being: Target: 3.9 SDG 8: Decent Work and Economic Growth Target 8.4 SDG 9: Industry, Innovation and Infrastructure Target 9.4 SDG 11: Sustainable Cities and Communities Target 11.6 Target 11.a SDG 12: Responsible Consumption and Production Target 12.4 Target 12.c SDG 13: Climate Action SDG 14: Life Below Water SDG 15: Life on Land	The topic of the agreement is to strengthen the global response to the threat of climate change.	Preamble Expected Outcome, 16 Guiding Principles, 19 (h) Priority 1, paragraphs 25 (b) (c) Priority 2, paragraphs 28 (b) (c) Priority 4, paragraph, 33 (a) Priority 4, paragraph 34 (c) Means of implementation, paragraph 47 (d)	Paragraphs 2, 3, 5, 10, 13 (h), (g), 14 (c), 15 (c) iii, 24, 35, 44, 50, 51, 54, 55, 58, 88, 94, 101, 106, 109, 111, 114 (d), 115, 119, 143, 144, 151, 165 A whole section on Environmentally sustainable and resilient urban development.
Disaster management and emergency response	SDG 1: No Poverty Target 1.5 SDG 2: Zero Hunger Target 2.4 SDG 11: Sustainable Cities and Communities Target 11.5 Target 11.b SDG 13: Climate Action Target 13.1 Target 13.3	Article 7, paragraph 9 (b) (c) (d) Article 8, paragraph 4 Article 10, paragraph 2	The topic of the framework is disaster risk reduction	Paragraphs 14 (c), 19, 29, 63, 65, 67, 77, 78, 101, 119, 144, 165

SUSTAINABILITY CHALLENGE	2030 AGENDA FOR SUSTAINABLE DEVELOPMENT	PARIS AGREEMENT 2015	SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015–2030	NEW URBAN AGENDA
Migration	SDG 10: Reduced Inequalities Target 10.7	Preamble	Preamble Priority 2, paragraph 27 (h) Role of stakeholders, paragraphs 36 (a) (vi)	Paragraph 20, 28.34, 42, 57, 59, 104, 157, 159
Urbanization	SDG 11: Sustainable Cities and Communities	Article 8, paragraph 4	Preamble Priority 2, paragraph 27 (d) Priority 3, paragraph 30 (b) (f) Means of implementation paragraph 47 (d)	The topic of the agenda is around urbanization
Energy	SDG 7: Affordable and Clean Energy SDG 12: Responsible Consumption and Production Target 12.c	Indirect link to Emissions	No mention	Paragraphs 13 (a), 14 (c), 34, 44, 54, 66, 70, 71, 74, 75, 88, 111, 121
Health	SDG 3: Good Health and Well-Being SDG 5: Gender Equality Target 5.6	Preamble	Preamble Expected outcome and goal, 16, 17, 18 (d) Guiding Principles 19 (c) (h) Priority 1, Global and regional levels, paragraphs 24 (d), 25 (b) (d) Priority 2, Global and regional levels, paragraphs 27 (b) (d), 28 (b) Priority 3, Paragraphs 29, 30 (i) (j), 31 (e), Priority 4, paragraphs 33 (c) Means of implementation, 43, 44	Paragraphs 2, 5, 11, 13 (a), 14 (a) (c), 32, 34, 36, 37, 39, 43, 54, 55, 67, 75, 88, 100, 108, 111, 113, 115, 118, 119, 123

Challenges and Global Agendas

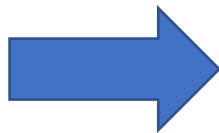
Challenges and EU Space

Legend:

- Low relevance/contribution
- Significant relevance/contribution

- EO application
- GNSS application
- GOVSATCOM application
- Synergetic application
(combined use of EO and GNSS)

What can space do?



SUSTAINABILITY CHALLENGE	Galileo	EGNOS	Copernicus	GOVSATCOM	Synergies	EXAMPLE OF MAIN APPLICATIONS USING EUSPA MARKET REPORT TAXONOMY
Migration	●	●	●	●	●	<ul style="list-style-type: none"> ● Disaster management including preparedness, rapid mapping and post-event analysis ● Monitoring and management of refugee camps ● Telematics for humanitarian aid ● Earth observation human displacement monitoring ● Dark vessel monitoring ● Used as a common communication channel for various actors (e.g., land and sea border surveillance)
Environmental impact and climate change	●	●	●	●	●	<ul style="list-style-type: none"> ● Earth observation ● GNSS-based climate modelling ● Ecosystems monitoring (terrestrial, coastal, snow and ice) ● Environmental impact monitoring ● Climate change mitigation and adaptation ● Environmental resources management ● Air quality and renewables ● Biomass monitoring ● Maritime surveillance and ship detection ● Support to multiple crisis management zones
Energy	●	●	●	●	●	<ul style="list-style-type: none"> ● Support for renewable energy: site selection, planning and monitoring ● Power plant design optimization, assessment potential and forecast, ● Energy network conditions monitoring ● Phasor measurement units (PMU) timing in systems providing frequent measurements relevant to the network status ● Remote control of renewable energy plants ● Energy network operation and (conditions) monitoring for grid operators or renewable energy
Disaster management and emergency response	●	●	●	●	●	<ul style="list-style-type: none"> ● GNSS-enabled ocean monitoring buoys ● Beacons for SAR operations in aviation, land and sea ● Support for civil protection, emergency management and humanitarian aid: <ul style="list-style-type: none"> ● Disaster [e.g., landslides, floods, wildfires] preparedness, ● Disaster early warning ● Disaster rapid mapping ● Post-event analysis ● Coordination of emergency response actors in communications-denied environment

3.2 THE FOOD SECURITY CHALLENGE AND THE ROLE OF EU SPACE

3.2.1 Introduction

3.2.2 Food security and space

3.2.3 EU Space specific support

3.2.4 Use cases

Meteorological assimilation from Galileo and drones for agriculture

FaST – a tool to increase the sustainable use of nutrients

Fact

In 2021, the prices of fertilizers rose 80%.
In 2022, from January until April, fertilizer prices rose nearly 30%.

3.2 THE FOOD SECURITY CHALLENGE AND THE ROLE OF EU SPACE

3.2.1 Introduction

After remaining unchanged since 2015, the prevalence of malnutrition jumped from 8.0 to 9.3 per cent from 2019 to 2020 and rose at a slower pace in 2021 to 9.8 per cent. Between 702 and 828 million people were affected by hunger in 2021. The number has grown by about 150 million since the outbreak of the COVID-19 pandemic – 103 million more people between 2019 and 2020 and 46 million more in 2021. Projections are that nearly 670 million people will still be facing hunger in 2030 – 8 per cent of the world population, which is the same as in 2015 when the 2030 Agenda was launched. The numbers show persistent regional disparities, with Africa bearing the heaviest burden. One in five people in Africa (20.2 per cent of the population) was facing hunger in 2021, compared to 9.1 per cent in Asia, 8.6 per cent in Latin America and the Caribbean, 5.8 per cent in Oceania, and less than 2.5 per cent in Northern America and Europe. After increasing from 2019 to 2020 in most of Africa, Asia and Latin America and the Caribbean, the prevalence of undernourishment continued to rise in 2021 in most subregions, but more slowly.

As the world population continues to grow, much more effort and innovation will be urgently needed to sustainably increase agricultural production, improve the global supply chain, decrease food losses and waste, and ensure that all who are suffering from hunger and malnutrition have access to nutritious food. Land, healthy soils, water and plant genetic resources are key inputs into food production, and their growing scarcity in many parts of the world makes it imperative to use and manage them sustainably. Boosting yields on existing agricultural lands, including restoration of degraded lands, through sustainable agricultural practices would also relieve pressure to clear forests for agricultural production. Wise management of scarce water through improved irrigation and storage technologies, combined with the development of new drought-resistant crop varieties, can contribute to sustaining drylands productivity.

In low-income countries but also in some lower-middle-income countries agriculture is key for the economy, jobs and livelihoods. Support for agricultural production

“Ending hunger is within our reach. There is enough food in our world now for everyone, if we act together.”

António Guterres,
Secretary-General of the United Nations

largely concentrates on staple foods, dairy and other animal source protein-rich foods, especially in high- and upper-middle-income countries. Rice, sugar and meats of various types are the foods most incentivized worldwide, while fruits and vegetables are less supported overall, or even penalized in some low-income countries. There are many elements of traditional farming knowledge that, enriched by the latest scientific knowledge, can support productive food systems through sound and sustainable soil, land, water, nutrient and pest management, and the more extensive use of organic fertilizers.

In the fight to reduce food insecurity, space technologies can be an extremely helpful ally.

Fact

In 2021, the prices of fertilizers rose 80%.
In 2022, from January until April, fertilizer prices rose nearly 30%.

Thank you



UNITED NATIONS
Office for Outer Space Affairs