



food4future



Food for the Future

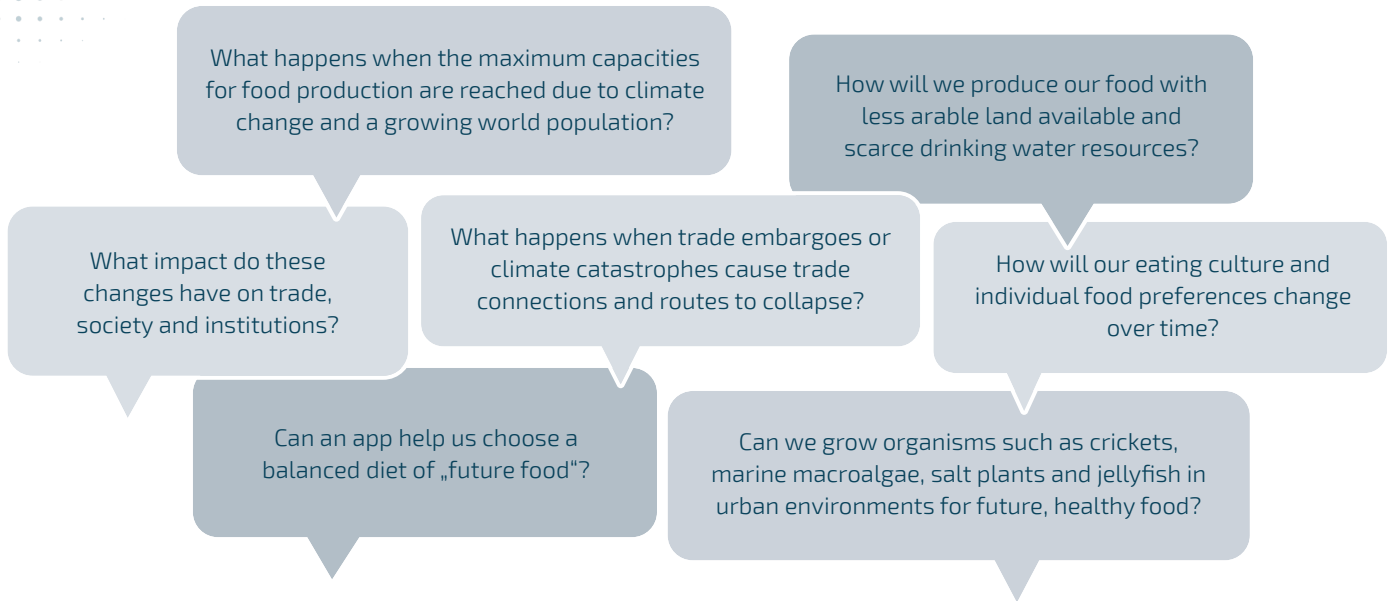
 **Agrarsysteme
der Zukunft**

Agricultural Systems of the Future

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“food4future – food for the future” (f4f) is a joint project funded by the German Federal Ministry of Education and Research (BMBF) as part of the »Agricultural Systems of the Future« programme. We investigate radical innovations for a sustainable and healthy nutrition.

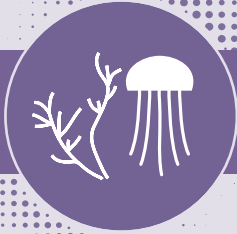
food4future researches macroalgae, salt tolerant plants (halophytes), crickets and jellyfish as possible alternative food sources. These will be cultivated for food production in urban areas in flexible and modular systems, so-called “Urban Bio Spaces”. Innovative key technologies - (UV) LEDs and lightweight composite materials - are being combined to develop these closed production units.

A health app is being developed for consumers to capture their nutritional status to give users individual nutritional suggestions with the help of artificial intelligence, i.e. machine learning.

food4future conducts sociological and anthropological studies and explores extreme future scenarios. These help to identify possible challenges to future food supply and to drive innovation.

The four food4future Research Fields work together in an interdisciplinary approach:





Organisms

1 | **ORGANISMS:** Research Field I develops saline indoor production systems for marine and terrestrial organisms. The four model organisms in food4future are macroalgae, halophytes (salt-tolerant plants), jellyfish, and crickets, which serve as healthy, but to date neglected alternatives for human nutrition. These organisms will be sustainably in an urban setting in conditions which enhance their nutritional composition - either in mono- or in co-culture.

Project partners: ATB, IGZ, ZMT



Salicornia europaea, a halophyte.
Photo: M. Fitzner, IGZ



Cricket on Wheatgrass
Photo: N. Schwab, ATB



A medusa of the jellyfish species
Cassiopea andromeda
Photo: A. Meyer, ZMT



Urban Bio Spaces



Marine macroalgae *Ulva* and *Palmaria*
Photo: J. Vogt, IGZ



Plant for the production of complex fibre composite parts
Photo: WFBB / Photographer: Büssemeier & Jungblut

2 | URBAN BIO SPACES: In Research Field II, the aim is to develop Urban Bio Spaces using innovative polymer-based lightweight composite materials, i. e. fibre reinforced synthetic materials, in which (UV) LED lights can be integrated. In future, the flexible bioreactors for the four food4future model organisms can be used in private households as well as in larger production scale. Importantly, the Urban Bio Spaces do not compete with already limited living spaces, but rather focus on unused areas, such as urban wastelands or underground tunnels.

Project partners: PYCO, pmp



Urban Bio Spaces in underground tunnels
Illustration: food4future



Smart Nutrition & Sensor Technology

3 | SMART NUTRITION & SENSOR TECHNOLOGY:

In Research Field III, studies with individuals are conducted in which health and nutrition parameters are tracked via non-invasive sensors. Suggestions for dietary scenarios and a mobile health app will be developed with the data obtained using artificial intelligence. The app will give recommendations based on the individual nutritional status.

Project partners: DIFE, TH Wildau



Spoonwort, a halophyte, contains secondary plant metabolites such as carotinoids.





Social Science Analysis



4 | SOCIAL SCIENCE ANALYSIS: Research Field IV addresses the possible consequences of the two f4f scenarios "No Land" and "No Trade" scenarios on our society, institutions and individuals. The consequences for German agricultural production and tipping points with regard to institutional evolution for aquatic food will be analyzed. We employ behavioral economic experiments to examine consumer's food choices and the social impact of new forms of nutrition. The cultural technique of eating and food intake is researched ethnographically and experimentally. food4future includes different social groups in our research through participatory approaches. In addition, transfer of (food) innovations is supported and options for "Future Food" are determined and evaluated during the project

Project partners: FUB, HUB, IRI THESys, IGZ, ZMT

How will we
eat in future?



Recipe

Wholegrain Spaghetti with Samphire Pesto and vine tomatoes



Serves 4 people

400 g wholegrain spaghetti, 80-100 g samphire*, 80 g almonds (ground), 100 g Parmesan cheese, 2-3 Tbsp lemon juice, 75 ml olive oil (plus oil for frying), 150 ml water, 300 g vine tomatoes, pepper.



1 Cook the wholegrain pasta according to the instructions on the package. Wash and chop the samphire. Roughly grate the Parmesan cheese. Wash and cut the tomatoes in half.



2 Finely grind two thirds of the samphire together with the Parmesan, oil, almonds and water in a blender and season with lemon juice. Add the remaining samphire bit by bit and season in between**.



3 Fry the sliced tomatoes with a teaspoon of oil over medium heat and season with pepper to taste. Because of the natural salt content of the samphire the tomatoes do not require extra salt.



4 Once the spaghetti are *al dente*, drain the water and serve the pasta with the pesto and tomatoes.

food4future wishes „Bon Appétit“!

* Find samphire, also known as salicorne or salicornia, at the fresh fish counter in supermarkets

** Salt content of samphire varies depending on its cultivation conditions (irrigation, soil etc.)

Food for the Future

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