MITI - Germany

Capacity Building in Education, Climate Protection and Environment

Meeting on June 06th 2022 / Tbilisi, Georgia

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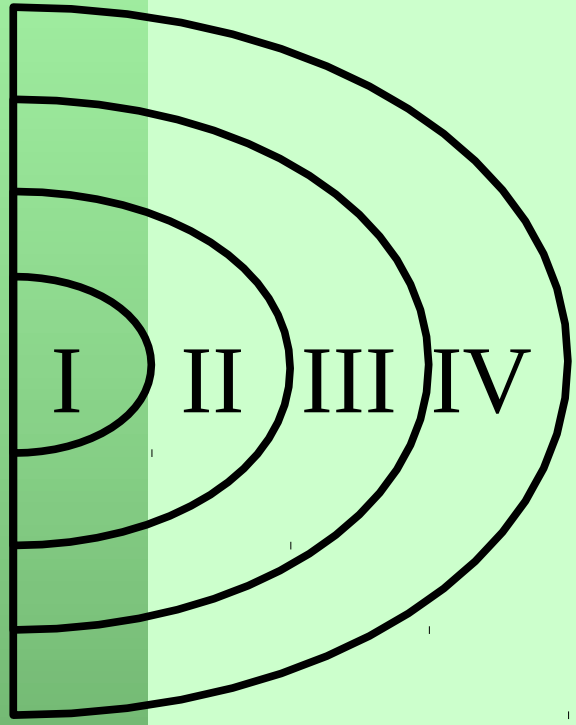
MITI Structure

Nonprofit Organistion



I Advisory Board and Secretary

II Personal Members

III Legal Members, Communities

IV Cooperation partners

Currently: – 82 MITI members and 29 signed Cooperation agreements with foreign organizations (June 2022)

Main Task of MITI

Cooperation for mutual benefit.

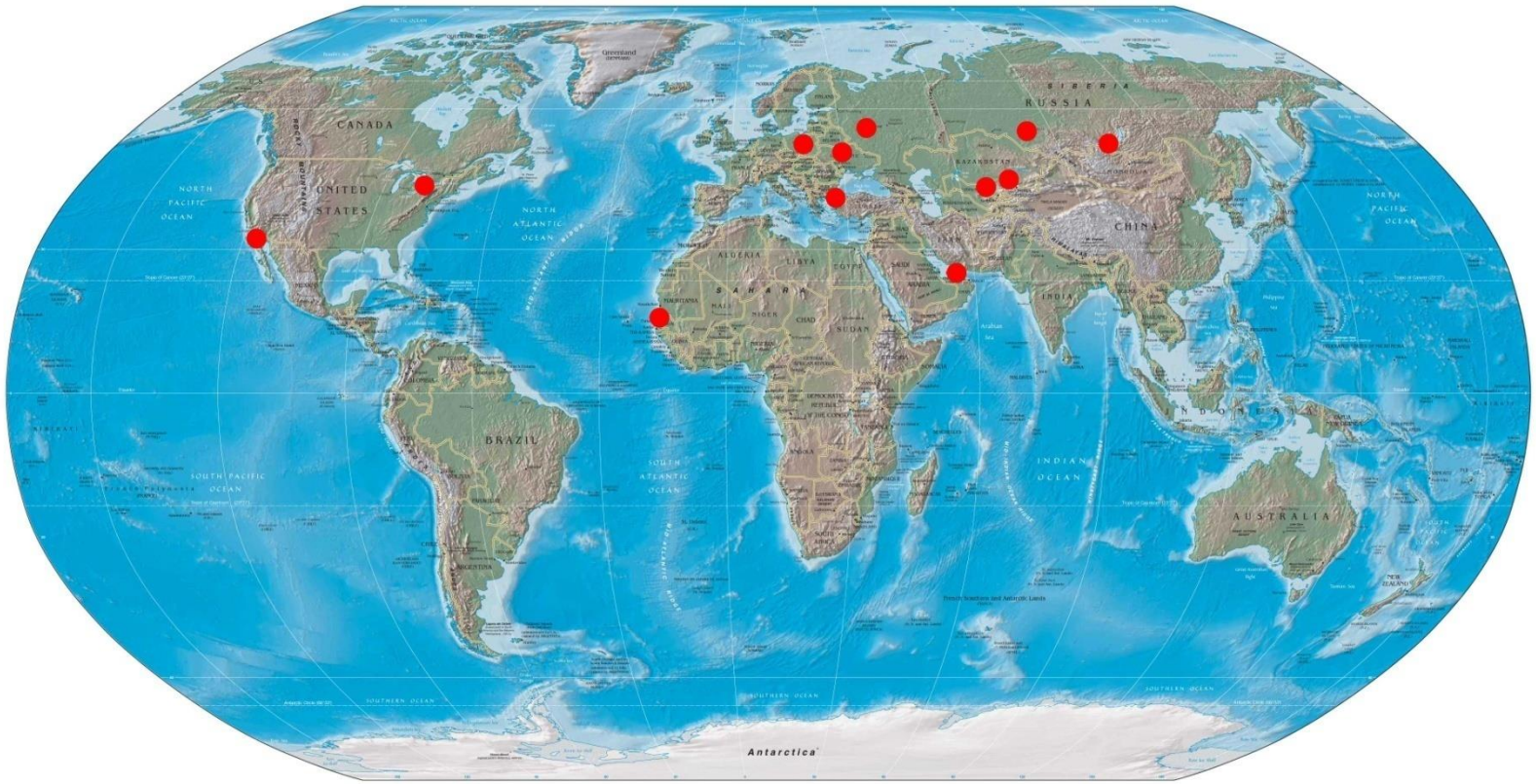
Networking to enlarge quality of cooperation.

Increase the area of activities.

Common use of mental and technical resources.

Complete the education of young scientists under interdisciplinary and multi-cultural conditions.

Area of Activities I

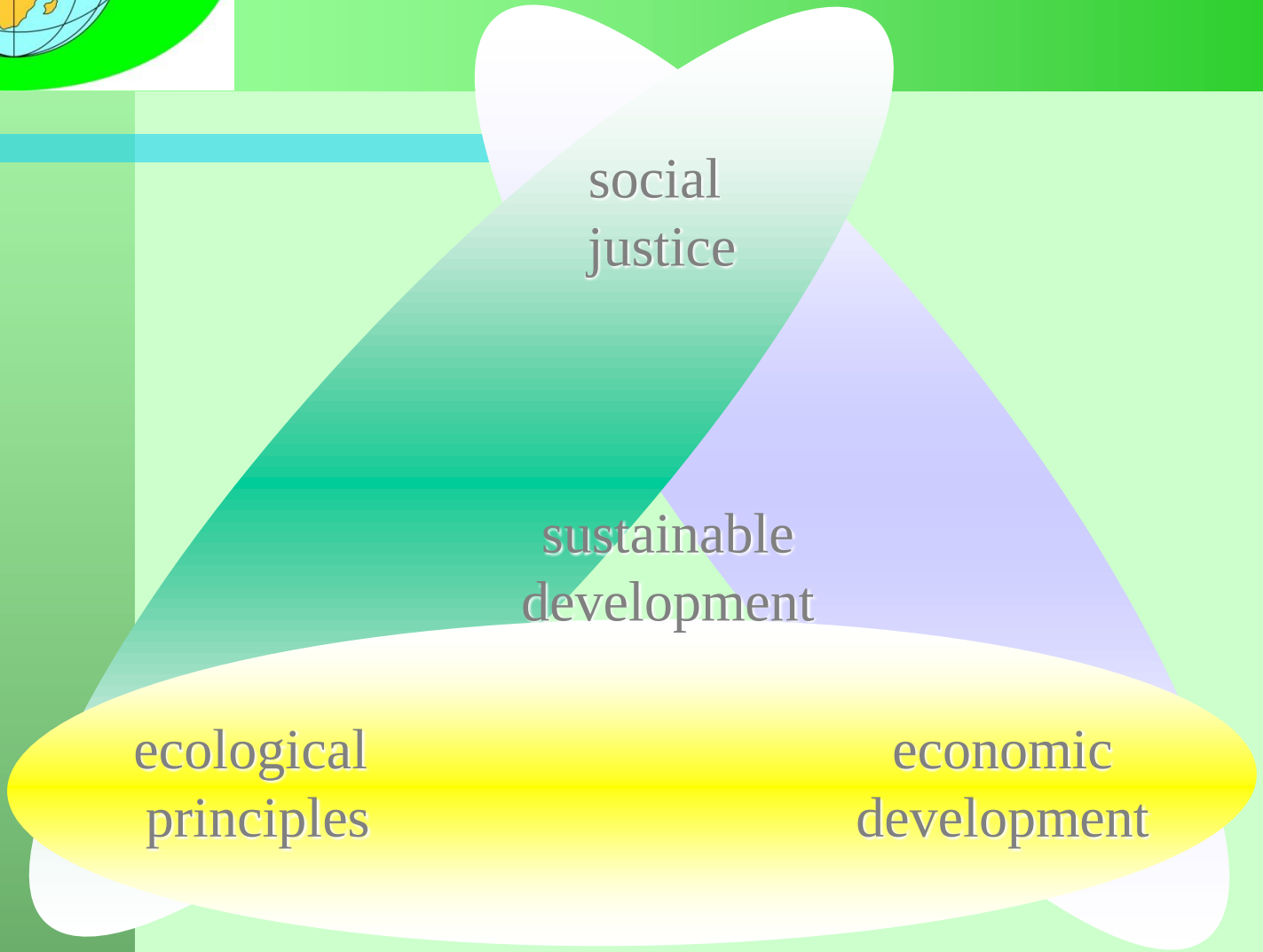


Area of Activities II

Purpose and Task

- Strictly oriented to the principles of „Sustainable Development Goalsof the UN“
- Mainly oriented to Rural Areas.
- Promotion of Science, Technology and Innovation.
- Promoting the national and international Cooperation in Industrial Applied Research.
- Promoting the High School Education in Natural Sciences and Technology.

Sustainable Development



Sustainable Development

To meet the principles of „Sustainable Development“ – That means balanced development in the following directions:

- **Economy**
- **Ecology**
- **Social Justice**

Sustainable Development

- ***Economy***: Benefit optimisation, not looking for the maximum of benefit.
- ***Ecology***: **Man and nature in good equilibrium** (Maximum of departure from the equilibrium = 10%).
- ***Social justice***: Gender principle, material recycling on site, development of income alternatives for residents also in rural areas.

Sustainable Development

Sustainable Development in Agriculture, Forestry and Horticulture

Nutrition ⟷ **Energy**

(Importance of Plants) (C-based material; Sun irradiation; $E=mc^2$)

↙ ↘

Climate/Environment

(Soil, Water, Air, Atmosphere)

Complete Recycling in Nature

Branches in Technology and Education

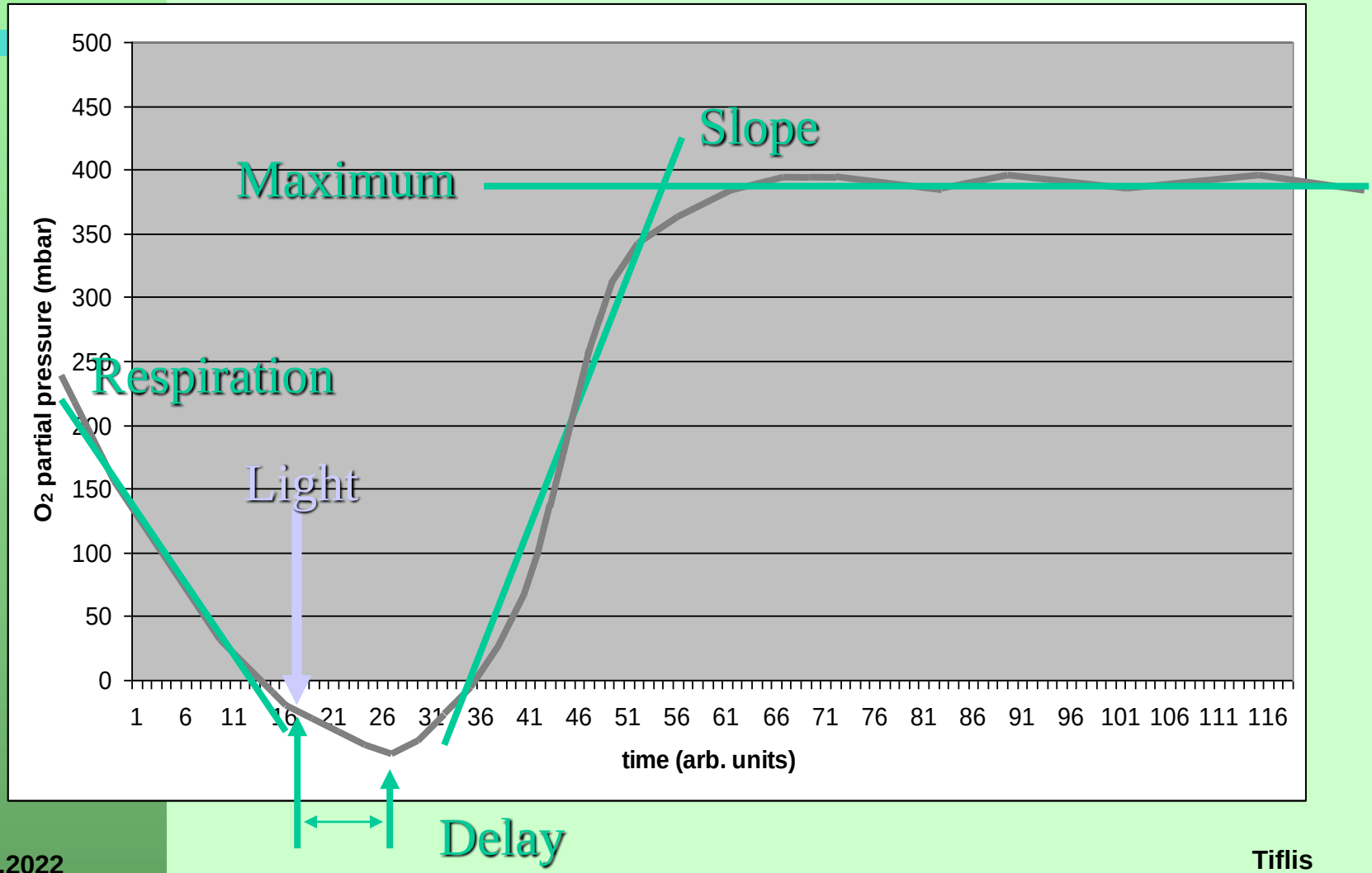
- Sustainability in Agriculture, Gardening.
- Sustainability in Forestry.
- Technologies for Renewable Energy Sources and their reasonable application.
- Technologies in Climate Protection.
- Alternative Medicine (Medicine Physics).
- Motivating high school students for technology and innovation. Motivation through enthusiasm for these subjects (PlantVital 5000).

Branches in Technology and Education

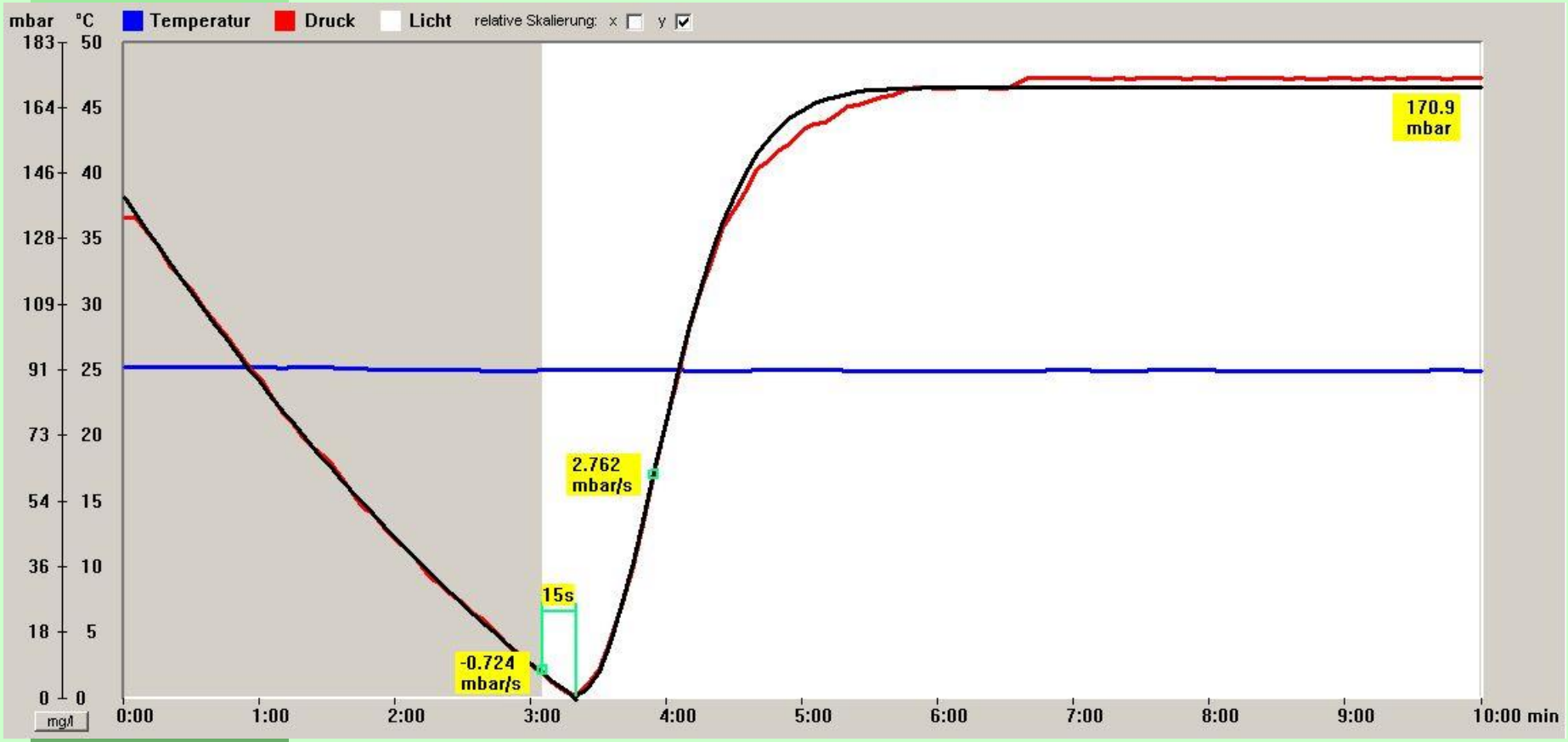
Field experiments to grow corn using a new developed tilling method (no gene technology) in cooperation of INNO.Concept GmbH, Strausberg (MITI-Member) with the Moscow institute NIOPIK under the scientific leadership of the former mayor of the city of Moscow, Yu. M. Lushkov. (Here the year 2010, Serpukhov, Moscow region).
Photo: 20.07. 2010.
Harvest: 20.09.2010
Result: 72 t/ha
Classic method: 32 t/ha

PlantVital®50X0 (X=1,2,3)

PlantVital® 5000



PlantVital® 5000



Village Pond Rehabilitation

– a globally required method for environmentally friendly Renaturation of water bodies in populated areas.

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The three largest dead zones in the oceans are in the Baltic Sea (up to 84,000 km^2), in the Black Sea (up to 40,000 km^2) and in the Gulf of Mexico (up to 22,000 km^2). Along with fishing, eutrophication is therefore one of the greatest threats to the global marine environment.

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Every year, 43.2 megatons of nitrogen and 8.6 megatons of phosphorus enter the world's oceans via rivers. Untreated wastewater is still a major source of nutrient inputs. 10% of the wastewater in the North Atlantic reaches the sea untreated. 14% in the Baltic Sea. 53% in the Mediterranean. 85% in South Asia.

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Still and slow-moving bodies of water also euthanize over time!!!

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The term "eutrophic" comes from the Greek (eutrophos) and means "well nourished". Eutrophication leads to an accumulation of nutrients in nutrient-poor waters. Algae and aquatic plants then grow excessively and deprive other plant species, many small creatures and animals of their livelihood.

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The increasing nutrient content leads to increased growth of the unicellular algae, the phytoplankton. These prefer to stay in the exposed part of the water column, as only there can they convert sunlight for the photosynthesis. The high algal biomass allows less light to penetrate to the large algae (macrophytes).

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Because of the shading, the plants in the pond can gradually die off, or less sensitive species will prevail against them. The increased nutrient supply also promotes organisms that can grow on the leaves of the pond bottom vegetation and thus have a negative impact. There may be a decrease in biodiversity.

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The phytoplankton also gradually sinks to the bottom of the pond. Bacteria break it down by consuming oxygen. The Fauna living on the ground - such as mussels and others - dies because of the strong oxygen consumption. Fish kills can be another consequence.

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Eutrophication has numerous other ecological and economic impacts: Large-scale algal blooms – some consisting of species that produce toxins – can occur. In addition, the water quality deteriorates: With the decomposition of algae and other inputs of organic material (tree leaves, etc.), sludge is formed.

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With the increasing amount of sludge and the degradation of the photosynthetic components of the pond, the oxygen production decreases and with it the proportion of aerobic bacteria in the water and the anaerobic processes get the upper hand.

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There are unpleasant odors and a reduction in the quality of life in the vicinity of standing water.

What to do? Removal of the contaminated sludge and restoration of the water body to its original condition. There are two fundamentally different methods:

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1. **The mechanical removal of the sludge by dredging with the following characteristics:**

   1.1 Dredging is expensive, a pond of 1 ha area for 700..800 T€

   1.2 The excavated material is hazardous waste and must be disposed of as such (transport costs).

   1.3 After dredging, the same process will start again and additional costs will be incurred.

   1.4 The local population cannot carry out the process.

   1.5. The process is not sustainable in (UN SDGs).

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2. **A natural, sustainable method of breaking down the sludge into its natural components:**

   2.1 The substances forming the sludges are organic material.

   2.2 Due to the anaerobic processes that prevail in water, only traces of aerobic bacteria are present. However, these are required to break down the organic material in the sludge into its molecular and atomic components, which then enable the natural aerobic processes in the pond again.

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2.3 By means of chlorophyll in the plant material and the energy of the sunlight, water was broken down into its components hydro-gen and oxygen, with the hydrogen forming the hydrocarbons sugar, starch and cellulose with the CO2 in the air and the oxygen being released.

2.4 Care must be taken to ensure that suitable, non-toxic aerobic bacteria prevail within the water body and progressively break down the sludge and bring it down to its component parts. The effect is therefore due to an aerobic microbiological metabolism of organic material. The microorganisms convert the substances to be broken down into dissolved, biologically usable aqueous carbon compounds and water.

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The most important effect:

As the result of the steadily advancing aerobic processes, the basis for the anaerobic processes is withdrawn.

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2.5 This process is possible and the relevant procedures have been developed and are well tested. The procedural steps were followed chronologically by state authorities and the results were certified.

2.6 These processes are sustainable in terms of the UN SDGs.

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2.7 Once this procedure has been success-fully carried out in a standing body of water, the local population can, by perma-nently cultivating bacteria suitable for this body of water and - if necessary - other microorga-nisms and their targeted introduction into the respective body of water, ensure repeated eutrophication of the body of water on their own and prevent by their own means.

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8. How do you get the necessary bacteria and microorganisms suitable for the specific body of water? (Details of the extraction are company property and will not be disclosed!)

Stem cultures are obtained from the Edaphon surrounding the water body and other biological structures from traditional agriculture, forestry and water management, which represent a mixture of different microorganisms tailored to the respective case.

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Depending on the progress of sludge degradation and thus a possible change in the degradation products, it may be necessary to slightly adjust the composition of the parent cultures. The stock culture, i.e. used at the end of the degradation process, is then made available to the client (owner of the water body) for further treatment to avoid further eutrophication.

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9. It is ruled out that harmful microorganisms such as salmonella or streptococci are used.
10. Sludge is broken down in this way up to 100%.
11. Zeolite is used as carrier material for the microorganisms, which optimally supports the process of microbiological conversion of the sludge due to its structural properties.

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Test report pilot project from 07/13/2020 to 06/26/2021

Date of water inspection/sampling		13.07.20	05.10.20	27.11.20	01.06.21
PH value	ohne	6,43	6,16	7,06	6,95
Oxygen	mg/l	2,39	4,43	3,52	7,55
Odor status 1 – 2 – 3		2 - putrid	1	1	1
Microbiological parameters					
Coliform germs	1/100 ml	20	950	0	40
Escherichia coli	1/100 ml	20	70	0	5
Enterococci	1/100 ml	210	50	1	7
Colony count 22 degrees C	1/ml	2130	> 5000	2900	160
Colony count 36 degrees C	1/ml	3250	> 5000	6000	> 300

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Many thanks for your attention

www.miti-ev.de