



THE GLOBE PROGRAM

Europe and Eurasia 2021 Country Reports



GLOBE Program

Europe and Eurasia Region Coordination Office



The GLOBE Program Europe and Eurasia Region Coordination Office

The GLOBE Program network is represented by Region Coordination Office (RCO) in each of the world's region. The Europe and Eurasia RCO fosters the program in 45 countries with over 5100 schools and nearly 39 000 citizen scientists. The office is located in Prague, Czech Republic and hosted by TEREZA, Educational Centre.

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Special thanks for the cooperation in the year 2021 belong to

Members of the Board Europe and Eurasia

- Laura Altin - Chair (Country Coordinator, Estonia)
- Anthony Purcell – Co-Chair (Country Coordinator, Ireland)
- Sanja Klubicka (Assistant Country Coordinator, Croatia)
- Vladimir Ribičić (GLOBE Alumni, Croatia)
- Marcella van Steenbergen (Assistant Country Coordinator, teacher, Netherlands)
- Danielle de Staerke (Country Coordinator, France)

Members of Working Groups (WG)

- Marina Pavlić – WG Diversity, Equity and Inclusion (Teacher, Croatia)
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- Ieva Kalka – WG Technology (Teacher, Trainer, Latvia)
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Europe and Eurasia Region Meetings

2021 GLOBE Virtual Regional Meeting for Europe and Eurasia

October 4 - 8, 2021, Online

Online meetings of Country Coordinators and Deputy Country Coordinators

Meeting No.1, February 4, 2021

Focus on: Plans for the year 2021, Water Bodies Challenge, Environmental Awareness

Meeting No.2, March 3, 2021

Focus on: Distance learning

Meeting No.3, June 9, 2021

Focus on: Planning and ideas for the 2021 Europe and Eurasia Regional Meeting

Meeting No.4, September 15, 2021

Focus on: Capacity Building Projects, sharing experience via Padlet

Meeting No.5, November 10, 2021

Focus on: 2021 Regional Meeting Feedback, Certification process of Trainers/Mentor Trainers, Tree Reporters Challenge.

Croatia

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Organization and Number of Staff:

2

Funding by:

Ministry of Science & Education

Cooperating Organizations/Individuals:

National Meteorological Service, University of Zagreb, Faculty of Science – Department of Biology

GLOBE Schools (what types, how many):

360 schools in total, but 150 have not yet reported

GLOBE Areas you and schools focus on:

Atmosphere, Biosphere, Hydrosphere, Pedosphere

Number of Schools Reporting Data Over Past Year:

120

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

There were 2 workshops organized by Education&Teacher Training Agency – one for GLOBE beginners and second for those who were previously trained – follow up. Both trainings were organized online via Zoom.

There was also workshop organized for Faculty students, future science teachers, with one day field training.

Cover picture attribution: Daria Lehmann, Scientific Assistant, GLOBE Switzerland

As we have our Regional GLOBE Centers, they have the autonomy in organizing workshops, but due to COVID 19 situation, they also had 2 online trainings / meetings in past year.

Croatian trainers were invited to train teachers in North Macedonia, but we agreed to organize joint training and Croatian teachers also participated. So, almost 100 teachers participated – also online.

Croatian trainers were invited to train teachers in Slovenia – this event was organized in person.

2. Science

Each year Education&Teacher Training Agency (ETTA) organizes National competition and Science Fair for GLOBE Schools (National GLOBE Conference). It takes place each year in May, but for last 2 years it had to be organized online. On the first day students had competition – they took exams online, using common digital platform. Second day students presented their research projects. Research projects were developed under the mentorship of Croatian scientists and specialists. Projects approved by a mentor could be presented on the Fair and published on Croatian web site (GLOBE.hr). Therefore, teachers and students are instructed in how to tackle science topic in correct way and how to apply scientific methodology correctly. In order to develop scientific skills, one of the workshops for GLOBE teachers organized by ETTA was devoted to that topic.

Croatian schools often cooperate with local scientific institutions and environmental organizations in the process of preparation for their research projects. This cooperation often extends to longer period and serves for the benefit of both sides.

There is one member of Croatian Science Team who applied for the membership In Science Working Group. It is dr.sc. Mirela Sertić Perić. She is fully qualified, so we hope she will be selected. She participated in GLOBE trainings, in Regional Meeting and in GLOBE Annual Meeting together with Diana Garašić with joint presentation of the research work about pre-service science teacher training and their evaluation of GLOBE as the teaching tool

3. Community

Croatian schools participate regularly in Regional Phenology Campaign, and in GLOBE Challenges, as well. Many students participated in activities organized for them – making videos, participated in IVSS and in webinars and conferences.

We started collaboration with new GLOBE member, our neighbor Slovenia. It was planned for four Croatian school to host several Slovenian teachers in November, but the visit was postponed because COVID pandemic got worse. Instead of the visit, we had Zoom conference in order to introduce future partners.

One more event took place - Slovenian workshop where 2 Croatian Schools were invited as guests and they presented how they organize GLOBE activities on daily bases.

Country Coordinator together with alumni Vladimir Ribičić prepared the poster about cooperation between National Meteorological Service and GLOBE schools for the Conference “Meteorological Challenges”, organized by Croatian Meteorological Society. The abstract was published within conference proceedings. You can find the full article "25 GODINA GLOBE PROGRAMA" (25 YEARS OF GLOBE PROGRAM) at Croatian Meteorological Journal: <https://hrcak.srce.hr/file/384361> (pages 13 to 19).

Country coordinator participated on the Regional conference: Understanding how marine ecosystem of Adriatic Sea functions. The subtitle of the conference was about the importance of Education. Among other project, GLOBE was presented to scientists, with the invitation to cooperate with GLOBE schools

4. Technology

Many schools are using GLOBE Observer, which is translated to Croatian language.

5. Communications

For communication we use web site: <http://GLOBE.hr>, as well as FB page GLOBE Hrvatska <https://www.facebook.com/GLOBE-Hrvatska-871742226188908>, which serves as a quick tool for dissemination of the news and information about the GLOBE and related events.

Most efficient tool for communication still is e-mail, sent by CC or deputy CC or by the representative of EETTA to the regional GLOBE coordinators.

A group of Croatian teachers started the project “GLOBE Program Elementary K-4” which incorporates the archive of sources for helping teachers adapt GLOBE contents for younger children. This initiative invites experienced GLOBE teachers to act as mentors for the beginners in GLOBE. International web site „GLOBE Program Elementary K-4“ contains information about the project (<https://bit.ly/3xwbhN2>) which offers the platform for cooperation and exchanging of ideas and experiences.

Plans and Ideas for Next Year:

For the next year we plan to continue with all the regular activities, but also to start the process of certification for new GLOBE trainers and mentor trainers.

We plan to refresh the contacts with US Embassy, especially because Croatia is the candidate for hosting Regional GLOBE Meeting in October 2022 – hopefully face to face.

Czech Republic

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Organization and Number of Staff:

TEREZA Educational Centre is a professional non-governmental non-profit organization fostering environmental and science education in the Czech Republic for the last 40 years. The center supports educators, parents, citizen scientists, municipalities and the general public with high quality programs, training and teaching resources. Reaching over than 1000 schools, 180,000 children and 8000 teachers a year, TEREZA is the leading organization in the field of environmental and science education in the Czech Republic. TEREZA has over 20 employees and dozens of volunteers around.

There are currently five people working for GLOBE country coordination office plus three people working for RCO for Europe and Eurasia.

Funding by:

State Environmental Fund of the Czech Republic, Ministry of Education, Youth and Sports, Prague City Hall, U.S. Embassy Prague

European Funds: PULCHRA Project, Visegrad Fund

Schools pay €70,- per school per year, newcomers pay €140,- a year

Cooperating Organizations/Individuals:

Apart from the GLOBE Program network, TEREZA is a member of Foundation for Environmental Education (FEE). Within the GLOBE Program we collaborate with various organizations, U.S. Embassy in the Czech Republic, Czech Hydrometeorological Institute, Faculty of Science Charles University, European Space Education Resource Office (ESERO), Institute of Botany of the CAS, and others. We also maintain close cooperation with 20 members of the Czech GLOBE Scientific Board and 20 GLOBE mentor-teachers and dozens of volunteers.

GLOBE Schools (what types, how many):

124 registered schools, about 2/3 elementary schools and 1/3 high schools or leisure-time centers.

GLOBE Areas you and schools focus on:

Czech schools are focused on all essential GLOBE areas (Atmosphere, Hydrology, Soil, Phenology, Biometry and Land Cover). During the school year 2020/2021 we developed the Theme of the Year called “Green light for greenery” in connection with chosen City Challenge of the PULCHRA project. Our schools are actively involved in the European Phenology Campaign and Microplastics Campaign.

Number of Schools Reporting Data Over Past Year:

Around 15 school are reporting data regularly.

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

We translated and finalized another two GLOBE Elementary textbooks (chapters Earth as a System and Water) and organized three days of Summer school for GLOBE Mentors (advanced teachers) in order to help them to develop special skills for supporting GLOBE teachers in their regions. We organized GLOBE Students Virtual Conference in December with participation of Czech and Slovakian schools.

2. Science

Czech GLOBE Scientific Board currently consists of 20 members who are helpful in developing and editing methodical materials, giving trainings, webinars, and others. In cooperation with GLOBE scientists we participated in the European project “PULCHRA – science in the city” exploring Cities as urban ecosystems. We compiled new publication about young scientists who are connected to the GLOBE Program (e.g. absolvents).

3. Community

Unfortunately, we had to cancel our big community event GLOBE Games 2021 in May. As an alternative we realized students virtual conference on December 2020, where students presented the projects they worked on last year and consult with scientists. We developed close collaboration with European GLOBE community through PULCHRA project and finished Visegrad project called Young Scientists for Central Europe.

4. Technology

We developed on-line versions of our consultations, workshops and trainings, including one-month on-line course on IBSE and webinars or on-line student conference. Schools were interested in using learning apps and on-line gadgets, e.g. during European Phenology Campaign. About ten schools investigated regularly microplastics in water according to the new methodology developed by Italy.

5. Communications

Our office communicated regularly with schools via newsletters, information webinars (so called GLOBE Café), face-to-face or online consultations. Furthermore, we developed new activity on Facebook with our new FB site Badatelé.cz focused on promotion of Inquiry based learning methods we use in the GLOBE program. In September 2022 we organized successful open webinar with Peter Falcon from NASA for GLOBE students, teachers and interested public.

Plans and Ideas for Next Year:

Develop IBL online course in connection with Facebook community forum.

Manage “Science Reporters” within the European project PULCHRA and support involved schools.

Organize international GLOBE Games 2022 in Zbiroh. May 26-27, 2022.

Organize face-to-face or virtual student conferences and workshops for teachers.

Support phenology observations through European Phenology Campaign.

Support microplastics investigations through Microplastics campaign.

Interconnect GLOBE activities with our Climate change education activities.

Promote citizen science and GLOBE through open webinars with collaborating scientists.

Estonia

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Organization and Number of Staff:

MTÜ GLOBE Eesti, 3 members of the Board
Ministry of Education and Research GPO Imbi Henno 'til August 2021, Tiina Pau from September 2021

Funding by:

Republic of Estonia Ministry of Education and Research
U.S. Embassy in Tallinn, Estonia
Environmental Investment Centre
Estonian Research Council
Schools, Local municipalities

Cooperating Organizations/Individuals:

Republic of Estonia Ministry of Education and Research
U.S. Embassy in Tallinn, Estonia
University of Tartu
Tallinn University
MTÜ Klubi EGEA-Tartu
AHHAA Science Centre

GLOBE Schools (what types, how many):

90 public schools have joined the GLOBE program
60 schools have reported data
20 schools have reported data during last 12 months

GLOBE Areas you and schools focus on:

Atmosphere: Air Temperature, Barometric Pressure, Cloud Observation, Precipitation, Relative Humidity, Snowpack, Surface Temperature
Earth as a System: Green Up/Green Down
Hydrology: Alkalinity, Conductivity, Dissolved Oxygen, Nitrates, Salinity, Transparency, Water pH, Water Temperature

Cover picture attribution: Daria Lehmann, Scientific Assistant, GLOBE Switzerland

Land Cover: Biometry Trees, Graminoid Biomasses, MUC, Photos, Vegetation Covers
Soil: Fertilities, Layer Descriptions, Soil Moisture via Sensors, Soil pH, Soil Temperatures

Number of Schools Reporting Data Over Past Year:

20

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

6. Education

EG1. We published GLOBE 25: teacher guide in September 2021. The study guide includes instructions and data sheets in Estonian. GLOBE materials are part of curricula in Estonia (science, geography, biology, physics, math)

EG2. We have 13 trainers in Estonia. Our trainers speak Estonian, Russian and English. We have one mentor trainer who speaks Estonian and Russian.

EG3. 6 research projects in GLE Estonia (95 participants involved). 8 research projects submitted to GLOBE IVSS 2021

EG4. We launched GLOBE Estonia Instagram account (@GLOBEeesti) and Youtube Channel. Stories in school blogs, local newspapers.

Paper in popular scientific journal „Eesti Loodus“ about the GLOBE program in Estonia

7. Science

SG1. 7 scientists and STEM professionals were involved in GLOBE Estonia Learning Expedition. 6 research projects supervised by scientists.

SG2. Schools from different regions participate in the GLOBE program. The network covers Estonia. 4 schools have received honor rolls.

SG4. 8 research projects in GLOBE IVSS 2021

8. Community

CG1. 2 new GLOBE schools joined the network

CG2. 20 schools participated in GLOBE Estonia Learning Expedition. Teams were formed of students from different schools. 6 presentations were made based on the data collected. Some research projects will be sent to GLOBE IVSS

Collaboration project with Garik Gutman – 8 schools participated

Collaboration project between schools -GLOBE KLASS+

9. Technology

TG1. 16 schools are reporting the data, 4 schools have received honor rolls throughout the year

TG2. GLOBE website is used by GLOBE schools (data sheets, materials)

TG3. GLOBE Data Entry App was used during the GLOBE Estonia Learning Expedition, apps are used in schools

10. Communications

CMG1. GLOBE FB and Instagram are introduced to GLOBE Schools.

GLOBE Estonia launched its Instagram @GLOBEeesti

Johannes Aleksander Rais is GLOBE vlogger

CMG2. Information about GRLE2022 was sent to RCO and GIO

CMG3. Paper about GLOBE in “Eesti Loodus”

Recognition for GLOBE Estonia

- “Keskkonnakäpp 2021” – for involving youth, environmental award

Cover picture attribution: Daria Lehmann, Scientific Assistant, GLOBE Switzerland

- Swedbank recognition – GLOBE 25, involving youth in scientific projects
- “Aasta haridustegu 2021” – “Act of the year, GLOBE 25 years in Estonia”, education award, (1) national finalist, (2) winner in Tartu
- National Science Communication Award, 2nd prize



Plans and Ideas for Next Year:

GLOBE Regional Learning Expedition August 2nd to 5th!

GLOBE IVSS

GLOBE Research projects support program

GLOBE Earth Day celebration

GLOBE Klass+ collaboration project among Estonian schools

Collaboration with MTÜ EGEA-Tartu – Cool Geography Lesson (visiting schools and introducing VR opportunities in GLOBE)

Finland

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Organization and Number of Staff:

2

Funding by:

No separate funding for GLOBE activities. Country coordinator and assistant CC are allowed to use some of their working time for GLOBE activities.

Cooperating Organizations/Individuals:

Researchers at the University of Helsinki.

GLOBE Schools (what types, how many):

All types primary and secondary schools, 154 schools are registered but only one of them is actively reporting data.

GLOBE Areas you and schools focus on:

Atmosphere, Hydrology, Earth as a system, Land Cover and Soil

Number of Schools Reporting Data Over Past Year:

2

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

Climate University has online high school course on basics of climate change
<https://www2.helsinki.fi/en/science-education/for-teachers-and-learning-communities/teachers-climate-change-forum> , <https://www2.helsinki.fi/fi/tiedekasvatus/lapsille-nuorille-ja-perheille/lukiolaisten-tiedeopinnot#section-22527>

Introducing GLOBE to biology, chemistry and geography teacher students by using GLOBE materials and apps. We had one online seminar for biology and geography teacher students in March. Covid-19 situation changed plans for 2021 a lot.

2. Science

3. Community

4. Technology

5. Communications

The newspaper Helsingin Sanomat made a brief story about the GLOBE weather station, which belongs to a former GLOBE school.

Plans and Ideas for Next Year:

- We are planning to translate the instructions for the study of microplastics into Finnish and we hope that teachers will implement them.
- Planning a Trees in Finland - campaign in spring 2021
- Project application: CLIMAtE change teachers' academy (CLIMADEMY) teacher's climate competence education and network. Leader Maria Kanakidou, University of Crete. The consortium has partners from four European countries Finland, Germany, Italy, and Greece. It integrates Universities with natural and human sciences, aggregated teacher training bodies, schools working with teacher education providers and national/regional authorities responsible for education and training of teachers and supervision of their continuous development and qualification.
- We continue to introduce GLOBE to student teachers and we encourage them to use GLOBE materials during their lessons.

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Organization and Number of Staff:

CNES (Centre National d'Etudes Spatiales); 2 CNES + 7 teachers

Funding by:

CNES

Cooperating Organizations/Individuals:

GLOBE Schools (what types, how many):

From primary schools to high schools: 46

GLOBE Areas You and Schools Focus on:

Atmosphere, hydrosphere

Number of Schools Reporting Data Over Past Year:

10 schools report data on GLOBE (Calitoo devices).

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education



We organized 1 teacher training this year: during the teacher workshop 26-28 October 2021 (about 30 teachers)

A student video conference with a student presentation of projects was organized in June 2021 via Zoom.

2. Science

Air Quality: Air Quality Campaigns 2020: autumn Campaign was held but few measurements were done due to weather; First edition of Nitrogen Dioxide Campaigns (one in December and one in May) was followed by 7 classrooms; cooperation with Ireland.

Hydrology: we just started this topic, studying water quality and water cycle (precipitation, soil humidity...). 9 stream gauges has been already installed by teachers in order to make projects on hydrology for secondary or high school students.

Satellite image of the week is now available and can be accessed online in French or English:

<http://web-backend.icare.univ-lille.fr/dev/jdescloitres/gallery/public/>

3. Community

4. Technology

After the development of the sun photometer Calitoo and the Black Carbon equipment, the next step will be building of small sensors at school: to measure PM2.5 and PM10 (in connection with high school curriculum) and the building of a network of Calitoo called **Calinet** (Calitoo data overlaid on satellite data)

5. Communications

Plans and Ideas for Next Year:

We plan to extend the measurements possibilities during the Air Quality Campaigns: PM10 and PM2.5 - in cooperation with US; NO₂ – in cooperation with Ireland.

Georgia

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Organization and Number of Staff:

CENN, 60 employees

Funding by:

Austria Development Cooperation

Cooperating Organizations/Individuals:

Ministry of Education, Science, Culture and Sport of Georgia

GLOBE Schools (what types, how many):

14

GLOBE Areas you and schools focus on:

Atmosphere

Number of Schools Reporting Data Over Past Year:

N/A

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

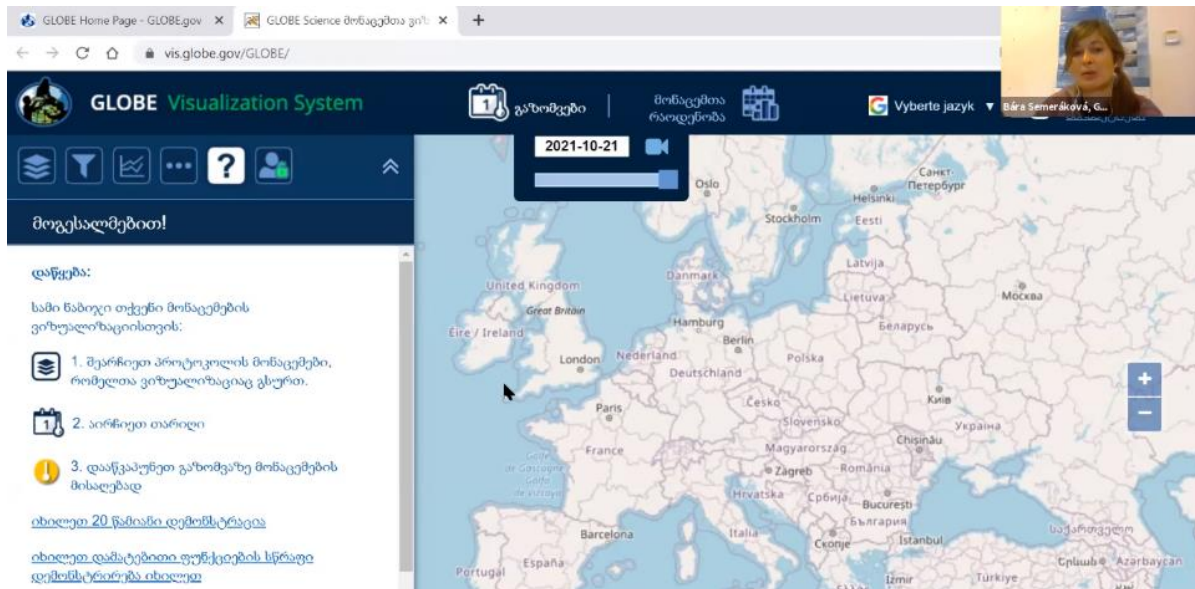
1. Education

2. Science

3. Community

On 2 April, selection of schools for a joint environmental program with MES – GLOBE has started and a relevant call was announced. During August-September, out of 150 applications received, 12 schools have been selected to pilot the GLOBE cloud protocol. In addition, cloud protocol materials were translated in Georgian.

From 20-21 October, a 2-day training was organized for selected schools under the program GLOBE. The training was opened by Mr. Kakha Khandolishvili, head of the Strategic Planning and International Relations Department of the Ministry of Education and Science of Georgia, and, Ms. Bara Semerakova, representative of the Europe and Eurasia Region Coordination Office. The training focused on the usage of GLOBE learning materials and cloud protocol. The training was conducted by Marina Grcic and by Bara Semerakova.



The GLOBE Program is being implemented with the financial support of Austrian Development Cooperation (ADC) within the scope of the project - *Promoting Sustainable Forest Management for Climate Resilient Rural Development in Georgia*.

4. Technology

5. Communications

Plans and Ideas for Next Year:

To have at least 7 active schools (which upload the data regularly).

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Organization and Number of Staff:

GLOBE – Deutschland e.V.

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Funding by:

Participants, sponsoring, competitions and prizes, project funding

Cooperating Organizations/Individuals:

ESERO, NABU Germany, School for Future NRW, Paderborner Naturschule (network), International Association of Westphalian Childrens Villages, Science College Overbach

GLOBE Schools (what types, how many):

About fifty GLOBE schools of all types: primary schools, middle schools, gymnasiums, comprehensive schools

GLOBE Areas you and schools focus on:

The focus: atmosphere and hydrology

Number of Schools Reporting Data Over Past

Year:

About fifty schools, there have been heavy problems with the Covid Lockdown.



Cover picture attribution: Daria Lehmann, Scientific Assistant, GLOBE Switzerland

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education:

Due to COVID pandemic, cooperation of students of different ages in school and workshops wasn't allowed. Some people used the situation for online cooperation with interested students and asked them to prepare short films alone or with a friend. Students took part in the Water Bodies Challenge, simply met with their interested teachers online and offered ideas. In the new school year many students told us that they were tired and afraid of their school marks.

As a help in Westphalia some headmasters accepted to integrate GLOBE into the everyday lessons. I see a positive development in the improvement of educational use of social media. For this actual situation GLOBE is a real help for schools.

2. Science:

As the science lessons in Germany have been reduced because of the Lock Down, we used the situation to deepen our own scientific the preparation of new projects in the year to come.

3. Community

The GLOBE Community was very active and offered enjoyable and interesting webinars and websites. For GLOBE - Deutschland this year was very special, because we look back to ten years of development of our association GLOBE - Deutschland e.V. We had planned several events: one meeting on the 11th of May, the foundation day, one meeting on the 11th of November, the day of our first general meeting.

We had the first meeting in an interesting way with congratulations and some shows and talks about our last ten years. You find these presentations on our website; www.GLOBE-deutschland.de.

We had to move our general meeting in November to February because of the Covid Situation. The 11th of February we will have a hybrid Annual Meeting (online and live) with lectures, webinars, trainings and new projects.

Our third activity in connection with our GLOBE birthday was to develop a little archive about GLOBE activities in Germany since 1995, specially since 2011. You will find all the offers on our website www.GLOBE-deutschland.de.

4. Technology:

The actual situation helps to develop much more student and teacher online cooperation skills. The consequence: much better equipment in schools, much better equipment for everybody. The cooperating schools are working on projects for better equipment by help of the national administration: tablets, weather stations, whiteboards and by this way GLOBE may intensify the cooperation with our schools.

5. Communications

The communications during the last year developed to have a new quality. There was a lot of activity in the areas outside schools, so we developed new contacts to Eastern Germany, interesting contacts and activities within Westphalia to find new partners and we enjoyed the offers of the GLOBE network. We want to reactivate all these new contacts in the new year when hopefully we will have the opportunity to work outside and with student groups and with live webinars and partners.

As a very happy development we see our international communication go on. We had planned for 2020 an international meeting in Bad Lippspringe on the topic "Tributary Rivers"; we had developed an Erasmus project and we had many interested participants in schools and universities. I am happy that the international group will go on working on our planned project first online and later live.

The cooperation with Ghana will go on, after we managed to send them the necessary equipment again. The first offer was stolen in the harbor of Accra. They will restart the preparation of a national teacher training.

Plans and Ideas for Next Year

- On the 11th of February 2022 we want to organize our Annual Meeting with lectures, trainings and new project offers.
- We already started to renew our project “Tributary Rivers” which we want to offer as Erasmus project.
- We are a partner of the “Paderborner Naturschule”. For this purpose, we develop German webinars on the GLOBE apps.
- The comprehensive school in Bad Lippspringe wants to develop the profile “Natural Heritage”. So, we will start to develop GLOBE lessons in a new workshop.
- We want to find and develop new GLOBE teachers in Bad Lippspringe to be able to develop more GLOBE lessons for the school.



Greece

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Organization and Number of Staff:

National and Kapodistrian University of Athens, Department of Environmental Physics
4 members in GLOBE team in Greece

Funding by:

National and Kapodistrian University of Athens

Cooperating Organizations/Individuals:

National Observatory of Athens, Foundation for Technological Research, Technical University of Crete
Ministry of Environment, Ministry of Culture, meteo.gr, Corallia incubator, several University
Professors and Researchers, etc.

GLOBE Schools (what types, how many):

Primary and Secondary: 33 schools

GLOBE Areas you and schools focus on:

Climate Change, Urban Environment

Number of Schools Reporting Data Over Past Year:

Measurements are made by a limited number of schools; reporting problems. Measurements and reporting by GLOBE teams.

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

New technologies in education; integration of urban science to school education

2. Science

Link to the Pulchra project: Science in the City

3. Community

Schools' visits at the National and Kapodistrian University of Athens; webinars on environmental issues.

4. Technology

Use of Earth Observation for environmental monitoring.

5. Communications

Schools' support – Newsletter in conjunction with PULCHRA.

Plans and Ideas for Next Year:

Concentrate to urban climate change.

Continue cooperation with the PULCHRA project.

Introduce the SDGs in the schools' activities.

Ireland

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Organization and Number of Staff:

GLOBE is coordinated in Ireland by the Environmental Education Unit of An Taisce. An Taisce is an Environmental NGO. The organization has approximately 70 full-time staff. Anthony Purcell, previous GLOBE country coordinator moved to a new role and was replaced by previous DCC Aileen Bright in September 2021. Aileen Bright is supported by Sabrina Moore (DCC) and an additional DCC will join GLOBE Ireland for the forthcoming year 2021/22.

Funding by:

Ireland's Environmental Protection Agency (EPA) is currently funding GLOBE Ireland.

Cooperating Organizations/Individuals:

The Environmental Protection Agency is the lead strategic partner for GLOBE in Ireland and is an active member and contributor to the program. The GLOBE program in Ireland works closely with the EPA citizen science and air quality teams.

GLOBE Schools (what types, how many):

The GLOBE program in Ireland works with Primary (ages 4-12) and Secondary (ages 12-18) schools, although most participating GLOBE schools are Secondary schools. Three hundred Irish schools have registered with the GLOBE Air Quality Campaign since 2019, with approximately 150 schools actively participating in the 2020/21 campaigns. As of, October 2021 there are 74 Fully Trained GLOBE members, and 698 GLOBE Observers in Ireland

GLOBE Areas you and schools focus on:

The Primary focus of GLOBE Ireland is the Air Quality Campaign, which is run in partnership with the EPA air quality and citizen science teams. The Air Quality Campaign runs twice a year, once in the spring and again in the autumn. GLOBE Ireland also promoted GLOBE Atmosphere and Biosphere protocols to schools and students participating in the Air Quality Campaign

Number of Schools Reporting Data Over Past Year:

In Ireland, most of the GLOBE schools participate in a non-GLOBE nitrogen dioxide protocol, data was reported at a national level by over 100 schools using this protocol. In the past academic year, 5 schools have reported data directly to GLOBE

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

During 2020-2021 academic year, the GLOBE program in Ireland supported over 100 teachers with measuring ambient nitrogen dioxide levels on their school grounds. Teachers were provided with educational resources related to air quality, to aid lesson planning and encourage inquiry-based learning. Schools were encouraged to introduce students to the scientific method through hands-on learning and meaningful data collection.

Teachers are encouraged to access GLOBE e-training and take part in the Atmosphere and Biosphere protocols, such as Clouds, Precipitation, Aerosols, and Green Up/Green Down and the Carbon Cycle protocols.

2. Science

The Irish EPA provided scientific guidance relating to the Air Quality Campaign. GLOBE schools benefitted hugely from the active involvement of EPA staff in many aspects of the program over the year. The Air Quality Campaign, in particular, has benefited immensely from the support and active participation of the EPA Citizen Science and Air Quality teams. GLOBE Ireland has also benefited from collaborations with scientists from Trinity College Dublin and University College Cork on projects such as 'lichens as bioindicators of pollution', GLOBE Italy/Deakin University pilot microplastics protocol, and air quality projects.

3. Community

Due to restrictions associated with the covid-19 pandemic, the GLOBE program was once again unable to have an in-person event to celebrate the end of the Air Quality campaigns of 2020/2021. Instead, on May 20th, GLOBE held a virtual online event to celebrate the successful completion of the 2020/21 campaigns. We were delighted to be able to celebrate the achievements of the teachers and students that worked so hard during the year. Over 200 people attended the virtual event, including teachers and students that took part in the Air Quality campaign, along with GLOBE Director, Tony Murphy, the Irish Environmental Protection Agency (EPA) Director General, Laura Burke, EPA representatives from the Citizen Science and Air Quality teams and scientists from Trinity College Dublin, Dublin City University, Technical University Dublin, and University College Cork.

Students presented air quality stories from four secondary schools and two primary schools. The students presented their air quality findings and spoke about the traffic-related pollution pressures that exist at their school. All students demonstrated an impressive depth of knowledge and scientific reasoning skills. Several schools created posters for display in their school and showed how they communicated their air quality story with their local community.

Irish EPA Director, Laura Burke, said 'two aspects of this work are important, firstly students are raising awareness around air quality and secondly students are collecting good quality data which supports EPA decision making on the Irish environment'. This meaningful statement from Laura Burke helped students understand how important their air quality project is for the EPA. The students also heard from Dermot Burke from the Air Quality team in the EPA. Dermot explained air pollution in a little more depth and described the role of the EPA in monitoring air pollution levels in Ireland. Students also heard from Trinity College Dublin scientist Dr Kamila Kwasniewska, who spoke about Lichen as bioindicators of air pollution and presented the new Lichen based Science-Art

collaboration between GLOBE Ireland, Trinity College Dublin, and the Irish Arts Council. You can watch the full video of the event here: <https://youtu.be/OE7J6QIMnvs>.

4. Technology

GLOBE was delighted this year again to be able to use the EPA visualisation website, developed by the EPA Analytics team. This allowed campaign participants to view nitrogen dioxide results in map and/or graph format. NO₂ data could be viewed over multiple campaigns and schools could clearly compare their schools' results to other schools nearby and with similar aspects. It was particularly useful for students to be able to interact with this site independently from their homes during school closures.

5. Communications

The Irish GLOBE program regularly communicates with schools via newsletters, webinars and by email. GLOBE Ireland continued to use social media [GLOBE Ireland Twitter](#) and [GLOBE Ireland Facebook page](#) to recruit new schools, promote GLOBE campaigns, connect with Air Quality campaign participants and encourage collaboration between GLOBE Ireland and the greater GLOBE community.

Plans and Ideas for Next Year:

The following are the main objectives for GLOBE Ireland over the new academic year:

- Promote and offer the GLOBE Air Quality campaigns (NO₂) in 2021-2022.
- Organize two air quality measurement periods, at national level, one in the autumn and the other in spring for contrast and comparisons.
- Look for ways to scale the program, particularly the recruitment and training of new teachers.
- Develop potential opportunities to engage with GLOBE hydrosphere protocols through an Irish water quality campaign with support from the EPA.
- Support schools participating in the Microplastics Pilot Protocol with Deakin University and GLOBE Italia.
- Promote and encourage schools to take part in the GLOBE atmosphere and linked biosphere protocols.
- Identify opportunities to participate in international and regional GLOBE campaigns and projects.
- Develop ideas and potential opportunities for a new national campaign based on the GLOBE protocols and supported by the EPA.
- Work with the EPA to support objectives of the Citizen Science and Air Quality teams through the GLOBE Program.
- Continue to work with the GLOBE Implementation Office to develop the NO₂ investigation as an official GLOBE protocol.

Israel

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Organization and Number of Staff:

Ministry of Education, 5 members

Funding by:

Ministry of Education, Ministry of Environmental protection

Cooperating Organizations/Individuals:

GLOBE Schools (what types, how many):

404

GLOBE Areas you and schools focus on:

Atmosphere, phenology, biosphere, urban heat island

Number of Schools Reporting Data Over Past Year:

75

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

We held 2 teacher training courses for GLOBE Program:

- A) A 30-hour course for beginners
- B) A 30-hour course for teachers with experience in the program.

About 60 teachers from all over Israel participated in the teachers training. The courses focused on climate change, exploration, clouds, plant phenology and more. Teachers received in-depth pedagogical training in hybrid instruction tailored to distance learning.

2. Science

Kfar saba urban heat island campaign

The Kfar Saba Municipality's Innovation and Sustainability Division is a partner in an innovative multi-age program in which elementary schools, middle schools and high schools participate. Students investigate the phenomenon of urban heat island in the city of Kfar Saba, and conduct a scientific study of phenomena in their immediate environment (schoolyards and community gardens). They monitor environmental data according to NASA protocols, share the results of their monitoring and thus contribute to NASA's global research on climate change. High school students will map the data, create an urban GIS map and create joint activities with elementary and middle school students. (program for 10 schools in Kfar Saba).



Israel's cloud campaign

Due to the limitations of the corona virus, we have developed a cloud learning and monitoring program that will allow students in Israel to participate in the GLOBE program, enter data to the GLOBE website, and meet students from other schools, mainly to strengthen the acquaintance between Jewish and Arab schools. We have developed Israel's Cloud Challenge. About 60 schools participate in the unique activity - each school chooses another school (Arab and Jewish schools) to conduct collaborative research, cultural acquaintance and more.

Some examples:

A joint learning meeting held in the presence of Dr. Hemed Tarbia, Supervisor of Sciences in the Arab sector, was attended by 60 teachers who signed up for the campaign.

During the meeting, the teachers were updated by the goals of the campaign and its principles, enjoyed a smartphone photography workshop conducted by Keren Eis, and learned about ideas for conducting activities from home and collaborative research.



Example for student meeting:

About 80 students from five different schools met for the first time in an extraordinary mosaic of cultures and proved that it is precisely during this challenging period that quality, exploratory and value-based learning can take place.

It was exciting to get to know the different schools, the geographical and climatic environment and of course the culture as well. The collaboration between the schools will take place throughout the year and will include sharing environmental data from different places around the country around the research question, in the hope that we will also be able to host each other soon.

Students from about 60 schools participated in the end-of-year conference. About 1000 students from all over Israel. They watched a clip that summarized their activities throughout the year and participated in active scientific workshops.



International collaboration

This year we expanded the collaboration between students from Israel and students from Malta:

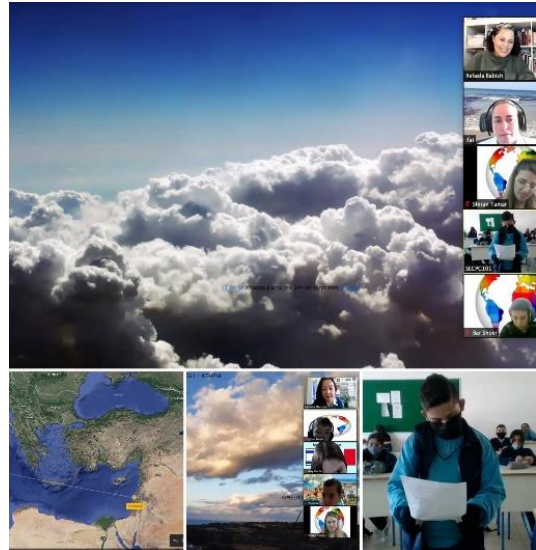
- 1) Malta - Dimona - Study of soil fertility
- 2) Malta - Haifa - Cloud research and climate change

As part of the collaboration, introductory student meetings are held. The students jointly study the environment (atmosphere and soil), learn about the uniqueness of each country, meet scientists, exchange data and write collaborative research papers together. We present the collaboration at regional and global GLOBE meetings.



Example of an introductory student meeting between the students of Neot Peres School in Haifa and the Gozo college middle school in Malta:

The meeting was organized by teachers (Israel: Yifat Oblas Greenberg, Shiran Halevi-Plaksin and Shiran Tamar; Malta: Ramona Mercieca), and was held by the US Embassy, Jerusalem, Israel (Christopher Green and Ellen Schnitzer) and Europe and Eurasia RCO (Dana Votápkova), GLOBE Malta (Ramona Mercieca), and GLOBE Israel (Refaela Babish). The students told about their countries, about the unique characteristics of their place, prepared songs and also excitedly shared the products of the cloud observations, in preparation for the joint study.



3. Community

Conferences in Israel:

We held 3 conferences, all online:

A) Year-opening conference for all teachers in Israel.

In the presence of representatives of the US Embassy in Israel, inspectors, counselors, representatives of the Ministry of Education and the Ministry of Environmental Protection. The conference was held online, as part of which we presented the annual program, Unique Campaigns. Two main lectures were given: Prof. Adi Wolfson - Climate Crisis and Nir Stav - Director of the Meteorological Service in Israel. The conference was attended by about 150 participants.

B) Conference to present the Kfar Saba GLOBE program.

The conference was attended by representatives of the US Embassy, the Mayor of Kfar Saba, the Ministry of Environmental Protection, and the Ministry of Education.

C) A teachers' conference to launch Israel's Cloud Challenge Campaign

As part of the conference, the teachers participated in a cloud photography workshop on a smartphone and began creating collaborations between Jewish and Arab schools.

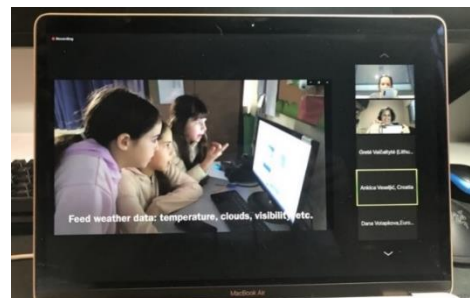
Participating in educational conferences:

I was invited to present the GLOBE program in several conferences in Israel:

- Conference at Tel Aviv University - with the participation of about 300 Science teachers.
- Science Education Conference in the Periphery, Ben Gurion University.
- Ministry of Education, Tel Aviv District Conference - Science Teachers, led by Supervisor Gila Lami, with the participation of about 300 teachers.
- Ministry of Education Central District Conference for Science Teachers - led by Ms. Ronit Rosenbush.
- Ministry of Education Haifa District Conference
- The Sharon District Climate Conference

International conference: 29-26/10/2020 GLOBE Conference for Europe and Eurasia.

Three outstanding clips were sent to the competition, including a clip prepared for GLOBE students at Yahalom Middle School, Basham, led by teacher Neta Maurer. On the second day of the conference, teachers and students from the participating countries were invited to attend. The



clip of the students of the Hadar School in Kfar Yona, led by teacher Nitzan Antebi, was selected for the show (described their work in cloud research).

On the third day of the conference, the original video of GLOBE students at the Begin School in Dimona was shown. A video that won big applause!

Afterwards, the projects presented outstanding projects by students from a variety of countries, including the project of the Afek School in Rosh HaAyin and the Albironi School.

4. Technology

An educational portal

Within the Ministry of Education's educational portal, we have set up a page for the GLOBE program. This page contains all the information for GLOBE teachers in Israel, publication of our activities, conference and teacher seminar competitions, registration forms and more

<https://pop.Education.gov.il/sustainability-education/sustainability-education-programs/GLOBE-program-environmental-education/>

Unique logo design for the GLOBE Israel program

We designed a unique logo for the program in Israel. The logo is used as the official logo of the program



5. Communications

We have a "Whats app" group of 80 GLOBE teachers all over Israel. We share ideas, practices and knowledge. Once a week the GLOBE team give a short, but inspiring new ideas to the teacher's community.

In addition, the GLOBE team (4 regional coordinators), visit the GLOBE school, once a month, and provide the teachers Pedagogical training.

Social media

The activity of the GLOBE Program on social networks is currently taking place through the Facebook platform. We upload to the Facebook page the main topics and examples of unique activities. The activity on the page is very important for the schools that participate in the program and allows exposure to the important educational activity.



Plans and Ideas for Next Year:

We plan 2 teachers training (for 60 teachers)

We will have three main campaigns: Trees around Israel, Urban heat island, I'm for the sea
In all campaigns there will be collaborative learning between Jews and Arabs, students will be monitored and researched various phenomena in the environment we will also deepen the collaboration with Malta.

Italy

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Organization and Number of Staff:

ASSOCIAZIONE GLOBE ITALIA
2 Country Coordinators and 6 Staff

Funding by:

US Milan Consulate Grant, European, National, Regional and from private foundations, Calls for proposal, Municipalities and schools' own budget.

Cooperating Organizations/Individuals:

In August, GLOBE ITALIA Association became GLOBE ITALIA APS Association, a small but significant change of legal nature, which allows us to be included in the Ministry of Education list of subjects offering trainings at national level. This allows us to upscale GLOBE initiatives to a national level. The aim of GLOBE ITALIA ASSOCIATION APS is to support the GLOBE ITALY School Network with training courses, activities, events and materials. The implementation is shared by:

- LABTER-CREA located in Mantova, focused on functions as coordination, information and communication, web management, event promotion and management

- IISS Malignani – BASSA FRIULANA located in Cervignano del Friuli, focused on using GLOBE protocols in primary, middle schools and high schools, event promotion and management

Since December 2020 Deakin University in Geelong (Australia) has become a very close partner of GLOBE Italia in the preparation and management of Microplastics Monitoring Protocol Trial.

GLOBE Schools (what types, how many):

Comprehensive School, including Primary and Junior High Schools – 32, Senior High Schools - 69

GLOBE Areas you and schools focus on:

- Hydrosphere (many but not reporting data), Atmosphere (few), Soil (few), Land Cover (few), Earth as a System (1), MUC (1)
- Several schools focused on Microplastics Monitoring Protocol, which is not an official GLOBE Protocol but it aims to become one.

Number of Schools Reporting Data Over Past Year:

Due to COVID-19 the number of activities on the field were drastically reduced and only the schools with automatic stations reported data.

Program Implementation, International Cooperation, and Activities over Past Year:

1. Education

GLOBE ITALIA continued to rebuild national school network by contacting authorities, scientists and US Embassy representatives. With the US General Consulate in Milan GLOBE ITALIA organized an international Earth Day session. Ministry of Education published the news on Virtual World Water Day 2021 in Mantua in its circular. GLOBE Italia has also been listed in the GREEN COMMUNITY for School ReGeneration chosen by the Ministry of Education.

GLOBE ITALIA has applied for a call of the Ministry of Education to select Entities to cooperate in co-planning of projects that will be realized by selected schools. We hope to be selected, but in any case, this is a way to be better known.

GLOBE Italia, through Labter-Crea Mantova, disseminates the information of ASviS (Italian Alliance for Sustainable Development), an institution that aims to increase the knowledge and the importance of 2030 Agenda for Sustainable Development, and the other way around. Through ASviS the initiatives of GLOBE Italia school network can have greater visibility on a national basis.

2. Science

MINCIO Project 31st edition, due to pandemic it has been carried out in limited scope: Samples were collected by IS Strozzi Mantova and Labter-Crea staff and analyzed by students, in collaboration with the EPA of Lombardy, Mantova section, and SAVI Laboratori & Service, which determined the presence of glyphosate and its metabolite AMPA in all the samples taken (an analysis too complex for the school laboratory). It is the first time that the presence of these dangerous chemicals is detected in all the samples analyzed, an alarm bell for the quality of the Mincio water.

RIO SCHOOL Project- 4th edition. The Rio Project was also made in a reduced form. The students of ITET Mantegna carried out samples and analyzes in the city only in October. IS Strozzi and IS Fermi did the tests in the spring. Also due to Covid, the planned student meetings were canceled.

PULCHRA Project (Horizon 2020) - GLOBE Italy collaboration with scientists of Udine University is going on: Six Italian schools participate and the focus of teachers and students is on Green Space as a Laboratory for Scientific Green Experiences for the Community. “**Pulchra Dissemination Hack**”, a full-immersion workshop based on the Challenge Based Learning methodology, aimed at students of

the schools involved; topic of the challenge: "how to communicate scientific initiatives" (event held remotely due to COVID, from 29 to 31 March, 13 April 2021).

GLOBE e-PULCHRA" – SUMMER SCHOOL 14-17 June: an international Summer School took place in Cervignano del Friuli, involving 23 students (GLOBE School). Water (included microplastics), soil and land cover were examined using GLOBE protocols and Apps to characterize a small neglected park in the town of Cervignano. Outdoor teaching, use of learning by challenges, teamwork and scientific laboratories at school, were the innovative ingredients. A meeting with the municipal administration is planned to show results and propose new ideas for the area.

GLOBE Italy - MICROPLASTICS MONITORING PROTOCOL TRIAL (MMPT). Thanks to the collaboration and support of the GLOBE Europe-Eurasia RCO and Deakin University, the MMPT, which is not an official GLOBE protocol but aspires to become one, has spread to a good number of countries.

Training webinars were held in February for teachers of European-Eurasian schools (E-E), in March for Italian schools and in summer for schools located in Asian and Pacific countries. More than 70 CCs, DCCs and E-E teachers and more than 60 Italian teachers took part in the webinars.

Deakin University, GLOBE Italia and Labter-Crea will train the trainers of the "OCEAN MATTERS: safeguarding the oceans" project (managed by TERI, the Indian Institute for Energy and Resources), and will involve 100 schools from 3 cities on Indian east coast. TERI has been awarded a grant from the US Consulate General in Chennai.

The Australian researchers held several online meetings with schools, discussing with students and teachers on the type of objects identified under the microscope. 20 schools drafted a Short Activity Report. The Reports can be downloaded from the GLOBE Italia website.

3. Community

Rivers in Spring, World Water Day 2021 in Mantova, March 22: The topic "Valuing water" includes the environmental, social and cultural value of water. Due to COVID, the event was held online. The event took on an international character thanks to the greetings brought by GLOBE Europe and Eurasia RCO, participation of 3 Ukrainian education centers and a Croatian school. The national participation was impressive: The Ministry of Education, schools of all levels, public bodies and environmental protection agencies, universities and research centers, private associations) all connected online by Italian regions including the South of Italy. The event consisted of:

- 1. Biodiversity and Environmental Protection, 2. Uses of Water, 3. Study, 4. Monitoring & Analysis, Water Management, Climate Change, School and Territory; All dedicated to online interventions by schools, associations, research centers, institutions, etc.
- Rivers in Spring Plus: recorded material
- Participation of NASA JPL (Peter Falcon and J.T. Reager) and of the main Italian research institutes. The vast participation has resulted in more than 80 products published on the GLOBE Italia website, all available to schools and citizens. <https://www.GLOBEItalia.it/index.php/gma2021>

Earth Day-GMT in Friuli Venezia Giulia ,22 April 2021, virtual: In an imaginary journey from Alps to Adriatic Sea, some GLOBE schools connected from the field or from the laboratories. 23 links from regional, national and international institutions, among whom were GLOBE Slovenia and GLOBE Czech, enriched the event. All the products are available on <https://www.GLOBEItalia.it/index.php/gmt2021> and https://www.youtube.com/watch?v=5QGYC8A_dVA

CALL of FVG REGION for funding: The project #where is the science presented by GLOBE ITALIA has been funded by FVG region. This will allow to have a Teacher Training, in presence for teachers of the region and online for other parts of Italy. It will give the opportunity to the ones who already asked to become GLOBE teachers (and to others we hope) to be certified. We plan campaigns to gather data especially using GLOBE Apps so to involve also communities in Citizen Science, events to allow

schools to show their projects, production of learning materials to help teacher and students to work on climate and sustainability according to GLOBE methods.

FESTIVAL LETTERATURA 2021, September

The largest Italian literary event, hosted a three-day laboratory dedicated to the research of Microplastics in surface waters. The laboratory was managed by the students of IS Manzoni and saw the participation of adults, students and children. Scientists and experts in science communication opened the working sessions, including the two Australian researchers who created the Protocol, who worked online in interaction with students and citizens.

<https://www.festivaletteratura.it/it/2021/eventi/21-non-dire-microplastica-se-non-ce-l-hai-nel-filtro-3076>

4. Technology

There are still critical issues for entering data on the site and the pandemic did not allow to improve the situation. Anyway, there we have good reasons to hope in improvement of the entering of data by schools, thanks to the use of Apps, because about 2800 GLOBE observer are active in our country

5. Communications

GLOBE Italia is using Youtube, Facebook, Telegram, Twitter to disseminate the action of the network and to connect schools and citizens. The virtual 21st River in Spring and the 10th edition of EARTH DAY are available on GLOBE YouTube and Facebook. A fortnightly newsletter is sent to schools-teachers and people registered in GLOBE Italy. Many newspaper articles and local TV have covered GLOBE events. The links to press review and social media can be found on www.GLOBEItalia.it

Plans and Ideas for Next Year:

Microplastics Campaign- GLOBE schools in Italy will be invited to use the microplastic protocol along with the traditional GLOBE Hydrology measurements.

PULCHRA Project (Horizon 2020) - six Italian schools are directly involved in the project and will use GLOBE protocol for Surface Temperature. Possibly other schools will be involved in the measurement campaign, even though they do not participate directly in the PULCHRA project

We plan to realize, in presence if pandemic will allow it or virtually if not, the following activities:

32nd edition of Mincio Project

22nd edition of WWD

4th edition of RIO School Project

23rd edition of At school on the river

12th edition of Earth Day

Connect school, science and citizens - the GLOBE program **TEACHER TRAINING** – from October 2021

Connect school, science and citizens - the GLOBE program **TEACHER TRAINING Focus Microplastics** starting November 2021

International Campaign of Microplastics March – May 2022

MMPT CAMPAIGN: after the training of teachers who volunteered in the trial, the Italian Campaign will be launched in March for all schools to participate. Before the launch some steps are planned:

- 2nd TRAINING webinars (October -December)
- deepening and practicing of the presented protocols (January-February)
- **LAUNCH of the MMPT CAMPAIGN** (March- May)
- discussion of results in meeting online with protocol creators
- drafting of **Microplastics Monitoring Protocol Report** for each school and publication

Kyrgyz Republic

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Organization and Number of Staff:

KG GLOBE, staff: 3 persons

Funding by:

Sponsoring

Cooperating Organizations/Individuals:

NABU in Kyrgyz Republic
Kyrgyz National University
Embassy of the United States in Kyrgyz Republic
Local private organizations

GLOBE Schools (what types, how many):

Secondary schools, High schools (40)

GLOBE Areas you and schools focus on:

Atmosphere, Hydrosphere, Biosphere

Number of Schools Reporting Data Over Past Year:

5 (regularly collecting data and started to enter data)

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

We have organized online meetings with school teachers in 2021. More than 50 teachers participated. At this meeting, active GLOBE schools presented their successes. Many schools want to be a member of the GLOBE program in the future

A seminar was organized among GLOBE schools (March, 2021). We were at the school named after D. Asanov in the Naryn city. Then the schools shared their experiences and worked together in the outside as well. You could see some photos bellow:

2. Science

We have just started collecting data this year with the purchase of special instruments for observing the atmosphere. We hope that in the near future we will be engaged in science at the school level.

3. Community

4. Technology

5. Communications

Our GLOBE students participated in various environmental campaigns organized by NABU in Kyrgyzstan.



Plans and Ideas for Next Year:

Training of new teachers.

Supplying GLOBE schools with equipment.

Organize summer school and geo-expedition together with scientist, university staffs, students, school teachers and children.

Republic of Latvia

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Organisation and Number of Staff:

Children's Environmental School is a non-governmental organisation (NGO) for the environment and **Education**. For GLOBE, there are 1 country coordinator, 1 Deputy CC, 2 trainers, and 1 event organiser for large events. One of the trainers, Ieva Kalka, is also a member of the GLOBE Technology Working Group.

Funding by:

Coordination of the GLOBE program is funded by the Ministry of Education and Science based on a delegation agreement. Additional activities are supported by grant projects of different foundations, including the Embassy of the USA in Latvia. Respective municipalities support school participation.

Cooperating Organizations/Individuals:

Embassy of the United States of America, University of Latvia, Nature Conservation Agency, Institute for Environmental Solutions, municipalities.

GLOBE Schools (what types, how many):

In Latvia, there are 31 public schools with people who received GLOBE training.

GLOBE Areas you and schools focus on:

From schools that are reporting or have reported in the past:

- Atmosphere: 21
- Earth as a System: 12
- Hydrology: 11
- Land Cover: 7
- Soil: 6

Most schools focus on more than one area; some have tried all areas; some focus on just one – atmosphere – or two – usually atmosphere and hydrology – areas. The atmosphere is the most popular area to start with for new schools as it is or is perceived as most uncomplicated.

Number of Schools Reporting Data Over Past Year:

1: Mazzalve Elementary School

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorised by GLOBE Strategic Plan 2018-2023 Goals):

Like in the year 2020, the Covid19 pandemic and related restrictions heavily limited school participation in GLOBE. The situation was changing rapidly, lockdowns and restrictions to in-person teaching were put in place several times, and great uncertainty barred schools from planning their work in any serious manner even two weeks in advance. This is the main reason many of our plans hasn't worked out, as described in the following paragraphs.

1. Education

We invited GLOBE teachers and students to participate in the PULCHRA Open Virtual Event of the Earth Day 2021 with expert presentations on different topics related to science and sustainability in an urban environment.

We invited schools to participate in GLOBE campaigns and related webinars, including Tree Reporters Challenge.

2. Science

3. Community

Country coordinator participated in both GLOBE Annual Meeting in July and GLOBE Europe and Eurasia Regional Meeting. We also invited and encouraged schools to participate, although we have no information on how many schools responded to this invitation. Nevertheless, schools were informed about important issues discussed in these meetings.

Country coordinator also participated in Europe and Eurasia Region monthly meetings for country coordinators.

4. Technology

Thanks to the support from the US Embassy, we translated GLOBE Observer App into Latvian. We have handed the translation to the developers of the Observer App and are waiting for the following steps.

5. Communications

We sent monthly newsletters to GLOBE teachers, informing them about relevant and actual GLOBE news and events.

We suggested monthly virtual consultations to schools; this initiative met absolute silence. Due to this feedback, we scraped this item from our plans.

Plans and Ideas for Next Year:

In December 2021, we plan a virtual Christmas Event for school teams, emphasizing creative presentations on Science and Christmas by school teams and informal conversations. We will combine it with a short workshop on opportunities of remote sensing.

We also invite schools to participate in the GLOBE Tree Challenge webinar on December 1st, PULCHRA Open International Workshop on November 30th and PULCHRA Open Workshop in Latvia on December 9th.

There is much uncertainty about 2022 due to the Covid19 pandemic. Nonetheless:

- We will continue communication with schools through monthly newsletters.
- We will continue to translate GLOBE materials into Latvian.
- We will continue to invite and encourage schools to participate in GLOBE campaigns and try to adapt some in Latvian for schools that cannot participate in international events due to language issues.
- We will try to encourage schools to use GLOBE for teaching their regular curriculum.

- When Latvian translation is added to the GLOBE Observer App, we will promote the use of the App for data collection and educational activities.

Lithuania

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Organization and Number of Staff:

Lithuanian Centre of Non-formal Youth Education. There are 209 employees in total, 6 of them are working in the department of Nature and Ecology education, 1 of them is working with GLOBE.

Funding by:

Ministry of Education, Science and Sport

Cooperating Organizations/Individuals:

Embassy of U.S in Vilnius.

Lithuanian Hydrometeorological Service under the Ministry of Environment.

Also, many various museums, schools, societies and other institutions because a lot of people joins us as lecturers in our events.

GLOBE Schools (what types, how many):

13 gymnasiums, 7 progymnasiums, 7 primary schools, 3 non-formal education schools, 1 private lyceum

GLOBE Areas you and schools focus on:

Atmosphere, Earth as a System, Soil, Hydrology, Land Cover.

However, phenology is way much more on top.

Number of Schools Reporting Data Over Past Year:

16

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

We proposed small grants program to Embassy of U.S. We submitted GLOBE trainings for new teachers in Prague, Europe and Eurasia Region Coordination Office. Sadly we did not get it funded. Now we are thinking to do similar trainings but from participants fees.

2. Science

We get in touch with **Lithuanian Hydrometeorological Service** under the Ministry of Environment because they are collecting phenology data as well. We are working to find a way that GLOBE participant could not only collect GLOBE phenology data but also participate in Hydrometeorological Service scientific studies.

3. Community

This summer we had summer camp for GLOBE program and Baltic sea project participants. Because of COVID-19 restrictions were mild at summer, we were able to meet face to face and had a nice opportunity to know each other. Looks like we are not going to have more face to face events during this year, so we were glad to have this one.

Another unexpectedly big event which showed how big our community actually is, was virtual GLOBE birthday photo exhibition. We get a few times more photos than we could ever think of it.

4. Technology

At the conference which will be held the end of this year we are secretly planning to use some technologies to make conference more interesting and realistic. Since conference will be remote because of COVID-19 restrictions, participants will not be able to physically visit us. So, we are planning to take 360 photo of our hall and virtually edit their posters on this picture so it would feel like their posters are physically hanged on the walls and they can walk around them. Another technology is that we are planning to film tour in Nature Research Centre form the first viewer perspective to make experience more realistic.

5. Communications

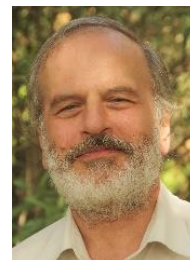
As always, we are communicating mostly through email. Teachers are getting newsletters, also news are announced through social media.

Plans and Ideas for Next Year:

The next year, we are planning traditionally annual summer camp and scientific conference. The new event might be virtual GLOBE birthday photo exhibition because it was way much more successful than we were able to dream about. And teachers' trainings in Prague.

Malta

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Organization and Number of Staff:

None of the two persons running GLOBE Malta are employed to work full-time on GLOBE. The CC is a full-time lecturer at university and GLOBE related work is done above his workload. The Deputy CC is a class teacher who has been officially granted 3 weekdays to specifically promote GLOBE in schools and support teachers.

Funding by:

GLOBE Malta is mainly supported by: The Directorate for Learning and Assessment Programmes - Ministry for Education and Employment; the Centre for Environmental Education & Research - University of Malta; and the US Embassy support. HSBC Bank (Malta) also supports GLOBE Malta in the purchasing of certain equipment and individual schools in carrying out investigations. The Europe Direct Information Centre (EDIC) provided funds for the running of GLOBE Challenges organised in Gozo

Cooperating Organizations/Individuals:

A researcher from the Institute of Earth Systems, University of Malta is directly supporting 10 schools in a project about weather observations. The NGO Nature Trust – FEE Malta promotes GLOBE investigations through their Eco-Schools and LEAF programmes.

GLOBE Schools (what types, how many):

Total number of schools: 46. The schools are from the State, Church and Independent Sectors and are distributed thus: Primary schools (5 -11yrs): 21; Middle Schools (11-13yrs): 3; Secondary Schools (13-16yrs): 15; Post-Secondary Schools (16 – 18yrs): 3; and Field Study Centres: 4.

GLOBE Areas you and schools focus on:

Atmosphere (Air Temperatures, Barometric Pressures, Cloud Observations, Precipitations, Relative Humidities, Surface Temperatures); **Earth as a System** (Green Up/Green Down); **Hydrology** (Mosquito Habitat Mapper, Water Temperature, Water pH); **Land Cover** (Biometry Trees, Vegetation Covers, MUC, Photos); **Soil** (Soil Temperatures, SMAP Soil Moisture)

Number of Schools Reporting Data Over Past Year:

Cover picture attribution: Daria Lehmann, Scientific Assistant, GLOBE Switzerland

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

GLOBE Malta organised the following:

- two online training sessions with science teachers of a specific secondary school
- a training session in the Biosphere Protocol (Green Up and Green Down) during an online LEAF teacher training session
- updated the GLOBE Malta space on the official Ministry of Education platform Teleskola (<https://teleskola.mt/the-GLOBE-program/>) supporting online learning
- two webinars with eTwinning Malta and the Digital Literacy Centre to share good practices

Trees around the GLOBE Campaign – Students of St Michael School, St Venera spoke about their project and how they implement GLOBE in their school at the campaign webinar. Recording: <https://youtu.be/OdQCtMLeZ2I>

2. Science

GLOBE Phenology Campaign 2020 (September – December). Students continued their observations on the same trees they had studied in the Spring Campaign. Two schools from Gozo and two from Malta successfully completed the Autumn Campaign and received a certificate.

European Phenology Campaign 2021 (February – June). The students observed their tree from buds to leaves and uploaded their measurements into the GLOBE database. Eight schools from Malta and Gozo registered and successfully completed all four activities and were awarded virtual badges, certificates and honour rolls. Xrobb I- Għaġin Nature Park and Centre for Sustainable Development registered for this Campaign for the first time. Two primary schools collaborated together by observing, monitoring and comparing leaf growth of an Almond Tree growing in their school garden. (See [Highlights from Dingli Primary](#) and [Highlights from San Lawrenz Primary](#)).

Urban Heat Island Effect Campaign (October, December and March). With their observations of surface temperature and atmospheric parameters the students are adding to the extensive data set that scientists worldwide use to study the urban heat island effect. Ten schools from Malta and Gozo including Xrobb I-Għaġin Nature Park and Centre for Sustainable Development collected surface temperature data using an Infrared Thermometer sponsored by HSBC Malta.

Continuation of the UM Citizen-Science Project at local schools Volunteer Weather Observer Programme - Dr Charles Galdies from University of Malta (Institute of Earth Systems) is the mentor and coordinator of this pilot project. A total of ten educators from primary and secondary State, Independent and Church schools have been selected and are monitoring and recording rainfall data.

International collaboration with Peru - students from Gozo College, Middle School participated in online meetings with 1st year General Ecology students of [Universidad Nacional Agraria La Molina](#) in Lima, Peru. They exchange their experience on GLOBE and specifically shared the results of their investigation on marine litter and data collected from the turtle nest site in Ramla Bay.

International collaboration with Israel – 2nd edition: The collaboration between 4 schools from Gozo and Israel brought together students, teachers and representatives from US Embassy and The GLOBE Program. It provided a unique learning experience where students and teachers, besides contributing to scientific discovery, were exposed to different cultures, languages and traditions through:

(a) The Soil project: Students of Gozo College Rabat Primary School, Victoria; Begin Elementary School, Dimona, Israel learned about soil as a vital resource and focused their investigation on soil moisture content. The students recorded their observations on a data sheet and through photos

which they shared online through Padlet. GLOBE Malta students carried out research on Rubble Walls and prepared a presentation for their friends in Israel during an online event held on 17th July. More can be viewed here: <https://padlet.com/theGLOBEprogrammalta/vs8p59x1ril40zpu>

(b) The Clouds Project: Gozo College, Middle School collaborated with Neot Peres School in Haifa, Israel and focused on cloud cover and various weather parameters including air temperature, air humidity, air pressure and aerosols. Students explored creative and artistic ways to capture sky conditions and learned new terms in Maltese, English and Hebrew. The students from both schools participated in a virtual Q&A live session with Mr Andrea Muscat, a local meteorologist - they learnt new facts about clouds and had the opportunity to ask questions directly to the scientist.

GLOBE EDIC STEAM Challenge - Six hundred students and 50 educators from seven schools in Gozo took part in this challenge, focusing on plant growth supported by the Europe Direct Information Centre (EDIC) Victoria. As part of the challenge, schools were provided with seeds of seven indigenous plants, shrubs and trees together with compost, soil, activity sheets and data sheets to record plant growth. The project activities included hands-on and minds-on science investigations, during which the students planted the seeds; observed environmental conditions promoting seed germination; measured and recorded plant growth; and interpreting the data collected. On January 15, Arbor Day, Adrian Gatt, founder of the Grow 10 Trees Project, explained to the participants how to grow and nurture the local trees. A live online Q&A session was also held with botanist Stephen Mifsud on the importance of safeguarding local indigenous trees. On April 22, Earth Day, GLOBE Malta and EDIC Gozo held an online event to celebrate the achievements of the schools participating in the Challenge. A tree was given to each participating school that successfully completed the Challenge, to be planted in the school garden to commemorate Earth Day 2021.

GLOBE Live Observation Sessions from Xrobb I-Għagin - With the COVID-19 pandemic, outdoor class activities were not possible during this scholastic year. However, GLOBE Malta still managed to engage students in scientific inquiry and data collection. GLOBE Malta and Xrobb I-Għagin Nature Park teamed up and offered online live sessions from the park. A total of 932 students joined live sessions about cloud types and sky conditions, air temperature, air humidity, air pressure, wind, urban heat island effect and global warming. Using a data logger the students read current weather conditions at the Xrobb I- Għagin site and reported observations using the GLOBE Observer App. Another 219 students participated in live sessions about the European Spring Phenology Campaign, Surface Temperature, Urban Heat Island and Tree Height Measurements. The sessions proved to be meaningful online learning experiences as students understood the use of weather measurements in the monitoring of changes in the environment, particularly rise in temperatures. Students came up with actions to be taken once they understood the root causes of Urban Heat Island Effect and Global Warming., such as inclusion of trees and plants in infrastructural planning, controlling vehicle emissions, and wise use of electricity, alongside clean energy production.

GLOBE Investigations:

(a) The Ideal Environmental Conditions for a successful turtle nest - students of Gozo College, Middle School, gathered data about air and sand temperature, weather conditions, cloud cover, humidity and barometric pressure at a turtle nest site. The objective was to find out how the sand temperature around the nest affects the hatchings during the incubation period. The full report is available here: <http://www.GLOBE.gov/do-GLOBE/research-resources/student-research-reports/-/projectdetail/GLOBE/what-are-the-ideal-environmental-conditions-for-a-successful-turtle-nest->

(b) GLOBE Investigation – A Tale of 10 Zones - This investigation was conducted using the GLOBE Surface Temperature Protocol to analyse the surface temperature of ten different zones Gozo College, San Lawrenz Primary School. The research was based on the fact that darker surfaces absorb heat energy at a faster rate than lighter ones, resulting in a raised temperature. Observations were done in various conditions from dry to wet ground. The research was adopted by the whole school

community, students, teachers and the ancillary staff. Nine samples from ten different zones were collected on five days each having different weather conditions. The full report is available here: <http://www.GLOBE.gov/do-GLOBE/research-resources/student-research-reports/-/projectdetail/GLOBE/a-tale-of-10-zones>

(c) GLOBE investigation – Mapping and measuring Trees: Students attending St Michael School focused on indigenous and non-indigenous trees found in the school ground, mapping them with the GLOBE Observer App. Tree height and circumference was measured for each tree and weather parameters observed. They investigated the effects of rainfall totals on tree height between indigenous and non-indigenous trees. The full report: <http://www.GLOBE.gov/do-GLOBE/research-resources/student-research-reports/-/projectdetail/GLOBE/mapping-and-measuring-trees-in-st.michael-school>. The ArcGIS StoryMap - [Mapping and Measuring Trees in St. Michael School](#)

GLOBE Water Bodies Challenge by Europe and Eurasia RCO - Three Schools submitted 5 videos and 1 Story Map for this Challenge. Two videos and 1 StoryMap from GLOBE Malta were selected as best entries and were shared with the international GLOBE community during an online event.

3. Community

GLOBE Vlogger - GLOBE International was looking for 12 students worldwide (two from each GLOBE region) to volunteer as GLOBE Student Vloggers. GLOBE student Hannah Vella attending Gozo College, Middle School was selected as a 2021/2022 GLOBE Student Vlogger. Hannah created vlog-style video content for the GLOBE YouTube channel. See the following links:

https://www.youtube.com/watch?v=8tqj-HKOOKE&list=PLfpnkASII_Nb5QSSHnVOJlugNnp2weyNF&index=6

https://www.youtube.com/watch?v=B7VyeIIDbZw&list=PLfpnkASII_Nb5QSSHnVOJlugNnp2weyNF&index=9

https://www.youtube.com/watch?v=B7VyeIIDbZw&list=PLfpnkASII_Nb5QSSHnVOJlugNnp2weyNF&index=9

Eco-Schools 10th Young People's Summit: During the Summit, Hannah Vella and Neil Mizzi (Gozo College, Middle School) and Haley Xuereb (Gozo College, Secondary School) shared the results of their GLOBE investigations during the workshops on Marine pollution and loss of biodiversity and Urbanism. Two scientists from the GLOBE community, Prof Kevin Czajkowski and Prof Claudia Caro Vera also participated in the event to share their respective research.

4. Technology

GLOBE Malta provides personalized support for teachers during their e-Training, while adding sites, inputting and visualizing data on GLOBE website.

5. Communications

Communication with GLOBE schools and teachers was maintained through e-mail and one-to-one school-based meetings.

Showcasing and promoting the work of the participating schools through regular updates of the GLOBE Malta Facebook page (with 1107 followers to date) and the Malta Page on the GLOBE website.

The GLOBE Program and the students' investigations were disseminated through newspaper articles and features on popular TV & Radio programmes on the national channel.

Plans and Ideas for Next Year:

Conclusion of negotiations with Explora (the Interactive Science Centre) about developing a GLOBE Hub at the Centre

Netherlands

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Organization and Number of Staff

Board existing of 9 people coming from both science and education backgrounds, coming together 6 times a year. Expert group of experienced teachers and GLOBE scientists are responsible for learning materials and training of teachers. Group of ambassadors including director of National meteorological institute, director Institute for Public Health and environment and Rector Magnificus Wageningen University helps us shape the program with at an annual strategic meeting.



Daily coordination is done by: Matthijs Begheyn, Country Coordinator (0,6 FTE) program coordination, development and strategy. Marcella van Steenbergen (0,2 FTE) school contact person working on good personal relations with teachers and helping them on day to day basis. Esther de Regt (0,2 FTE), communications officer.

Funding by:

Program funding:

- 75 schools pay €300,- per year for regular membership.
- 5 GLOBE Science Schools pay €1.450 annually for individual support and implementing of a cross disciplinary learning trajectory science and GLOBE.
- Participating in the Science Fair costs €250,-

Project funding:

- US embassy: funding for communication, award of \$4,000 for school that wins the annual science fair
- Ministry of Environment: particulate matter project funding
- Province of Utrecht: funding of sniffer bike project
- NLT: funding of learning module about particulate matter



Cooperating Organizations/Individuals:

GLOBE protocols:

- **Water** together with Wageningen University

Non-GLOBE protocols (developed by Dutch institutes):

- **Particulate matter** (www.GLOBENederland.nl/fijnstof): together with *National Institute for public Health and the Environment* (RIVM)
- **Living soil** together with *RIVM*
- **GrowApp** (www.growapp.today) with *Wageningen University*
- **Water animals** (www.waterdiertjes.nl) with *Wageningen University*
- **Plastic Soup**: with *Plastic Soup Foundation*

GLOBE Schools (what types, how many):

80 secondary schools from everywhere in the country have a paid membership.

GLOBE Areas you and schools focus on:

Hydrosphere, Atmosphere, Phenology, Pedosphere

Number of Schools Reporting Data Over Past Year:

Program Implementation, International Cooperation and Activities over Past Year:

1. Education

Development of new learning materials for Particulate Matter project; www.GLOBENederland.nl/fijnstof

2. Science

Our water scientist is preparing a scientific article about the results with water animals research.

3. Community

We are building a new website for better community involvement and are setting up more online meetings for the community.

4. Technology

We have received funding from the US embassy that we are currently using for our new website www.GLOBENederland.nl that will have a separate student and teacher part. We hope to flip the classroom and let students be more self-supportive

5. Communications

We received funding from the US embassy for an improved communication system. We are writing newsletters every week to our GLOBE members and every two weeks to other interested people



Plans and Ideas for Next Year:

Particulate Matter campaign: We focus on the Particulate Matter campaign that we started in 2020.

Communication: we will improve our communication with our new employee Esther and funding of US embassy.

GLOBE Science Fair: We organize the [GLOBE Science Fair](#) on April 22nd 2022. Students present their research to scientists and to each other in English. The winning team will receive \$4,000 to go to the international GLOBE meeting.

Republic of North Macedonia

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Organization and Number of Staff:

Ministry of Environment and Physical Planning, CC

Funding by:

Ministry of Environment and Physical Planning, as well as financial support by United States Embassy in North Macedonia for 2021

Cooperating Organizations/Individuals:

Ministry of Education and Science, Faculty of Civil Engineering, Faculty of Forestry (University "St.Cyril and Methodius, Skopje), Peace Corps

GLOBE Schools (what types, how many):

Until now, we have included 31 schools, 13 secondary schools and 17 primary schools, 1 kindergarten, 85 GLOBE observers

GLOBE Areas you and schools focus on:

Atmosphere, Phenology, Hydrosphere, Pedosphere and GLOBE at Night

Number of Schools Reporting Data Over Past Year:

11 schools

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

In accordance with the Concept for modernization of the technical education, adopted by a decision of the Minister of Education and Science, in the structure of the curricula for the technical education is represented the area of contents programmed by the school. Its function is to meet the wider needs of students who can choose to study other content beyond the content planned in the compulsory and elective programs. For example, the teacher Ruzica Jagurinoska in "Orde Chopela" High School in Prilep, made her own program named „Pedosphere“, based on the GLOBE Pedosphere protocols. After teachers' council in the school approved it, program „Pedosphere“ was sent and also approved by Vocational Education and Training Center in North Macedonia. In the next four years she can use it with two school classes a week in each school year, or 72 school classes per year.

In some schools, teachers use the GLOBE data and previous measurement results in other projects that are implemented together with international schools under the cooperation with the ERASMUS+ programme, and this way the data gains more value and recognition.

The current Covid19 crisis has resulted in unprecedented organizational changes for the schools, which is and will be reflected in the shortcomings for the implementation of the GLOBE Program. The good news is that despite the problems in 2021 the number of schools reporting this year has increased.

2. Science

With the restart of the GLOBE program, new equipment, instruments and chemicals were obtained as a donation by the U.S Embassy necessary for effective implementation of activities and trainings for the professors and students. Besides the donation, during the Covid 19 pandemic teachers attended one – day practical training for the GLOBE protocols.



3. Community

The restart of the GLOBE program in North Macedonia was promoted on the daily news and morning show of SITEL by the national coordinator.

<https://www.youtube.com/watch?v=cujlGdeuzec>

<https://sitel.com.mk/tema-na-denot-den-na-planetata-zemja-se-restartira-programata-GLOBE>

4. Technology

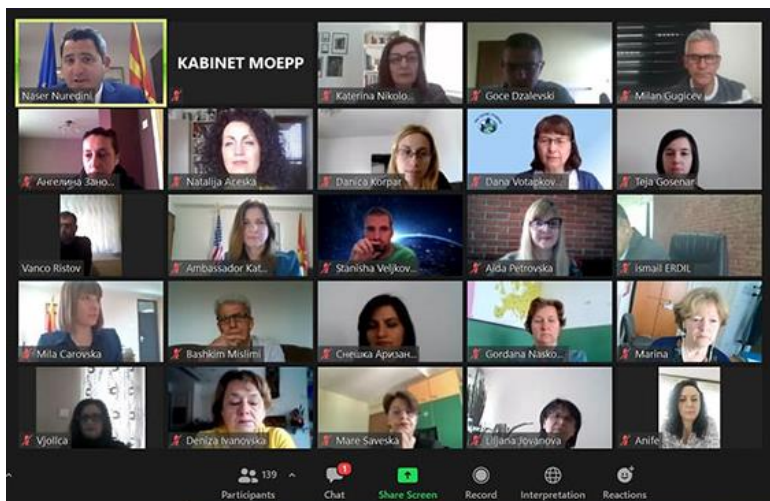
Students in their research often use mobile phones with various applications and tools to develop skills such as communication, archiving, photography, change tracking, computation and more. The Turn on the Night Kit from Laser Classroom is also used to implement one of the protocols.

5. Communications

Teachers attended the 1st GLOBE on-line training in North Macedonia, Croatia and Slovenia (April 22-23 2021, where there were 159 attendees. Also, in June 2021 one-day practical training regarding protocols was held at three different locations in North Macedonia (Skopje, Bitola and Valandovo) for the teachers.



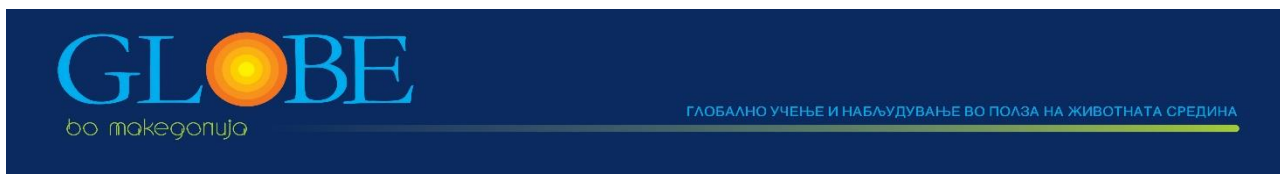
GLOBE practical training for teachers



1st GLOBE on-line training for teachers in North Macedonia, Croatia, Slovenia and Montenegro

Plans and Ideas for Next Year:

The planned support from the previous year was met and the GLOBE program in North Macedonia and the new commitments were restarted. The schools therefore were encouraged to join and participate in the program. Furthermore, trainings and procurement of new equipment, instruments and chemicals is planned for next year as new schools or existing ones expand their scope of work. In 2022 we expect to expand our relations in-depth with the schools and disseminate the program through various activities as much as we can.



Russia

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Organization and Number of Staff:

Southern Federal University (Russia) Remote Sensing Monitoring and Geoinformation Technologies Center

Funding by:

GLOBE Schools

Cooperating Organizations/Individuals:

Russia Ministry of Higher Education and Science

GLOBE Schools (what types, how many):

Secondary and High Schools, 108

GLOBE Areas you and schools focus on:

Land Cover, Atmosphere, Hydrology

Number of Schools Reporting Data Over Past Year:

No

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

GLOBE Schools have been continuing to communicate distantly by using Microsoft Teams videoconference software.

2. Science

We have been promoting excursions of students from a Rostov-on-Don GLOBE Schools to Remote Sensing Monitoring and Geoinformation Technologies Center of Southern Federal University (Russia). We have showed them how the satellite antenna works and invited to work with Antenna equipment

Cover picture attribution: Daria Lehmann, Scientific Assistant, GLOBE Switzerland

and software distantly. We made a special presentation for the students in International Geographical Information Technology Day.

3. Community

The article "INTERNATIONAL COOPERATION PROGRAMS ON ENVIRONMENTAL EDUCATION OF ROSTOV STATE UNIVERSITY" was published in a journal "Ecology. Economy. Informatics. Geoinformation technologies and space monitoring". – Issue 6. – Rostov-on-Don: Southern Scientific Center of RAS Publishers, 2021 (DOI: 10.23885/2500-123X-2021-2-6-9-11). We have been working with a group of experts – 10 GLOBE teachers in Rostov-on-Don, who works with us to shape and develop the program. We have been meeting distantly once per two months and work together on specific subjects.

4. Technology

We have showed to GLOBE students distantly how to download Landsat-8 images from USGS archive and how to use MultiSpec software and geoinformation technologies to download vector objects – roads, rivers and even buildings from Open Street Map site for free

5. Communications

There is a network of Russia most big and experienced Russia Federal University, and we are trying to use this network to implement GLOBE program in all Russia Federal Districts

Plans and Ideas for Next Year:

We plan to continue our efforts to implement GLOBE program in Russia. There is a plan also to become a certified GLOBE Mentor Trainer.

Slovak Republic

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Organization and Number of Staff:

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12 internal employees from which 1 part-time is dedicated to GLOBE and other 3 people are involved in GLOBE above their regular work agenda.

Funding by:

Embassy of the United States of America, Visegrad Fund, Small grants from local private foundations

Cooperating Organizations/Individuals:

Slovak Hydrometeorological Institute, Matej Bell University in Banská Bystrica, Ministry of Environment, Embassy of the United States of America

GLOBE Schools (what types, how many):

35 Primary schools and 8 Secondary schools

GLOBE Areas you and schools focus on:

Atmosphere, Biosphere, Hydrosphere

Number of Schools Reporting Data Over Past Year:

11 (21 of our GLOBE schools were trained only in October 2021)

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

Educational materials, presentations, and ideas for activities for all schools involved in GLOBE were provided by GLOBE Slovakia website. GLOBE teachers guide for phenology was translated into Slovak language and distributed to member schools. Compilation of phenology lessons was translated too and is available to teachers in pdf version. Regular monthly webinars were organised to discuss scientific topics and school measurements, as well as to keep the communication with teachers lively. Two introductory online seminars for new schools were held, first in March 2021 for 10 teachers and second in October 2021 for 38 teachers. We are pleased that our GLOBE Slovakia family is growing 😊

2. Science

Schools have started to record their observation in the GLOBE database, with phenology, clouds and basic hydrology being the most frequent measurements. In their school projects, students linked their GLOBE measurements with interesting observations at their study site (bird nesting, invasive plant species, etc.). IBSE methods with outdoor learning practice were introduced to teachers to support the science in daily curriculum at schools.

We were very grateful to have Peter Falcon from NASA at a special webinar on May 2021, organized by US Embassy in Bratislava. Teachers and students had a chance to absorb the NASA point of view on their GLOBE measurements as well as ask curious questions directly to NASA scientist. It was a great experience for all of us and we plan to organize such events with scientists also in the future.

3. Community

The GLOBE community in Slovakia welcomed new members from schools with socially disadvantaged students, mostly from Roma communities. They have met the challenges very well and are eager to continue in GLOBE observations with their students. The positive feedback to application of GLOBE methodology encourages more schools with disadvantaged children to join GLOBE so we will look for grants to support their involvement.

We celebrated the first year of GLOBE Program in Slovakia at online conference in June 2021. Students presented their activities, discussed with scientists from our Scientific Board and had a chance to meet each other for the first time, though only online. The positive energy from the conference was a great satisfaction for all of us after a very challenging Covid school year.

4. Technology

The GLOBE Observer App and GrowApp have become popular among teachers and students. Consultations with schools were held to overcome the English language barrier and technical issues when entering the data into the GLOBE database. GLOBE tools for hydrology and meteorology were introduced to teachers and provided for all new member schools.

5. Communications

Two GLOBE trainers held the introductory seminar for teachers for the first time, with the professional help of Europe and Eurasia Region Coordination Office. Five schools actively joined the European Phenology Campaign. Good cooperation was held with GLOBE Czech through Visegrad Fund project, which support schools in phenology investigations. We joined the International GLOBE meeting in July 2021 to present our project with disadvantaged students and to enhance our relationship with the international community. Three GLOBE schools successfully presented their GLOBE activities at Europe and Eurasia Regional Meeting in October 2021. We regularly attend CC meetings of Europe and Eurasia Region to learn about the ongoing events and to communicate our activities.

Plans and Ideas for Next Year:

- Raise funds and increase the number of GLOBE schools in Slovakia.
- Look for support of schools with disadvantaged students.

- Maintain good quality cooperation with schools through regular communication and online webinars.
- Introduce aerosols' methodology to teachers through thematic webinars as well as practical outdoor training
- Encourage schools to join campaigns and challenges, e.g. Microplastic Monitoring Protocol testing and European Phenology Campaign.
- Organise capacity building seminars for teachers in Spring 2022 in quarters of US Embassy libraries, dedicated to IBSE and outdoor learning.
- Support schools in participating at GLOBE Games in Czech Republic
- With help of NASA scientists establish GLOBE cooperation among schools in Slovakia and California

Slovenia

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Organization and Number of Staff:

Country coordinator and deputy country coordinator, supported by their organizations (Centre for School and Outdoor Education and the Ecoschool Program) and a team of three GLOBE teachers that have taken on additional organizational tasks (translation and quality of materials, purchasing and logistics of equipment, communication and promotion).

Funding by:

Ministry of Education, Science and Sport of Slovenia provides core funding, additional funding is provided by various projects (in 2021 there was one such project, financed by the US Embassy in Ljubljana).

Cooperating Organizations/Individuals:

The Ministry of Education, Science and Sport of Slovenia has charged the Centre for School and Outdoor Education (CŠOD) with coordinating the GLOBE program in Slovenia. CŠOD in turn formed a partnership with the Ecoschool Program in Slovenia to ensure a quicker implementation of the GLOBE Program in Slovenian schools. The Ministry has also formed an advisory group to oversee the GLOBE Program implementation in Slovenia.

GLOBE Schools (what types, how many):

Slovenia is new to GLOBE, but we have already registered 14 GLOBE schools, of which 8 are primary schools, 5 are secondary schools and one is the Centre for School and Outdoor Education with its 25 outdoor learning centers throughout Slovenia. There are at least as many more that have already applied for entering the program but have either not yet created profiles on the GLOBE webpage or their teachers have not yet finished their training.

GLOBE Areas you and schools focus on:

All GLOBE areas, with a starting focus on Hydrology and Atmosphere, as well as the more basic protocols in other Areas, such as soil temperature, biometry, land cover, green-up and green-down.

Number of Schools Reporting Data Over Past Year:

6 schools have reported data in 2021, along with several citizen scientists.

Cover picture attribution: Daria Lehmann, Scientific Assistant, GLOBE Switzerland

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

The first GLOBE teachers (including pre-service teachers) in Slovenia were trained in 2021, with 37 trained by mid-November 2021. Most of the teachers finished the e-training program on the GLOBE website, while 5 teachers also attended the April 2021 online training with teachers from GLOBE North Macedonia and GLOBE Croatia, and 20 teachers also attended the August 2021 live training in Slovenia with trainers from GLOBE Croatia (live), the GLOBE Europe and Eurasia regional office (online) and NASA (online).

The first 13 protocols have been translated into Slovenian in 2021 (Atmosphere – 2, Hydrosphere – 7, Pedosphere – 1, Biosphere – 3) with 3 protocols still set to be translated in 2021 (Atmosphere – 3).

2. Science

GLOBE Slovenia has not yet established a connection with scientists in Slovenia, but NASA scientists have participated in several of our events, and we are in contact with scientists from Australia that are working on the proposed Microplastics protocol.

3. Community

The GLOBE community in Slovenia is slowly taking shape, with teachers starting their work with students in the school year 2021/2022. We have several citizen scientists interested in the program and using the GLOBE Observer mobile app. We have also started to collaborate with a university that offers their pre-service teachers the chance to get to know the GLOBE Program, and we will establish this kind of cooperation with additional universities in the future.

The country coordinator and deputy coordinator are also active in the global, regional and cross-border GLOBE activities, connecting GLOBE Slovenia to the wider GLOBE community. School to school cooperation between Croatian and Slovenian GLOBE teachers has started in November 2021 and is set to continue for the duration of the school year and beyond.

4. Technology

GLOBE Slovenia was established during the covid-19 pandemic, so a lot of our work in 2021 was done using online tools (Zoom, MS Teams, Padlet etc.). We have found that this approach allows us to quickly connect different parties and lower our environmental footprint, so we will keep using it in the future – with additional in-person activities when the epidemic situation allows.

Starting the GLOBE Program in 2021, an important aspect tied to technology was procuring adequate equipment for GLOBE Program implementation. We purchased numerous devices in November 2021 and will distribute them to GLOBE schools in December.

5. Communications

Most activities of GLOBE Slovenia connected to communications were aimed at presenting and launching the program in Slovenia. Notable activities include:

- the GLOBE Slovenia online Launch Event at the beginning of the school year 2021/2022 in October,
- establishing the GLOBE Slovenia YouTube channel, where we have started publishing videos,
- featuring the GLOBE Program at the international conference “Outdoor Learning Didactics – ICT and Outdoor Learning”, organized by ČŠOD, the GLOBE Slovenia country coordinator, in June and July of 2021 (included a general presentation of GLOBE, presentation of the GrowApp use in the European Phenology Campaign, two presentations of the GLOBE Observer App – Clouds and

- Trees, and an appearance by a NASA representative at the panel discussion on the future of technology in outdoor learning),
- presenting the GLOBE program at several meetings and conferences in Slovenia,
 - presenting the GLOBE program through webpages and social networks of the country coordinator (CŠOD) and their partners (Ecoschool program, GLOBE schools).

Plans and Ideas for Next Year:

In 2022, our plans are:

- to successfully implement GLOBE activities in Slovenian schools, as this will be the first school year in which the GLOBE program is carried out with students in Slovenia,
- to motivate more teachers to become GLOBE teachers and at least double the number of GLOBE schools and GLOBE teachers in Slovenia,
- to carry out several training events, both live and online, for Slovenian GLOBE teachers,
- to enable Slovenian GLOBE teachers to attend training and other GLOBE events in other countries,
- to establish cross-border cooperation between schools in Slovenia and schools in neighboring countries (Croatia, Italy),
- to support schools that wish to connect with other schools in the wider GLOBE community,
- to start building connections with scientist in Slovenia in connection to GLOBE,
- to continue translating GLOBE protocols and other GLOBE materials into Slovenian,
- to acquire more equipment for GLOBE schools in Slovenia,
- and to further promote the GLOBE program in Slovenia.

Switzerland

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Organization and Number of Staff:

National implementation office: 4 people, most of them in small part time. Regional implementations by mandates, 10-20% in five Teacher Education Universities

Funding by:

Federal Office of Environment. For project funding: Foundations and other Federal institutions

Cooperating Organizations/Individuals:

Members of GLOBE Switzerland Association grouping Universities of Teacher Education and Scientific Institutions like University departments, Swiss Parks and diverse NGOs in environmental education and museums. GLOBE is integrated in the teaching programs (STEM) of at least 10 Universities of Teacher Education (FHNW, Luzern, St. Gallen, Thurgau, Graubünden, Zürich, Zug, SUPSI/DFA, HEP BEJUNE, Bern).

GLOBE Schools (what types, how many):

232 schools, most of them are public schools, among of them 6 Universities of teacher Education with many preservice teachers (students).

GLOBE Observer App: 897 Citizen Scientists registered

GLOBE Areas you and schools focus on:

Atmosphere, Hydrosphere, Pedosphere, Biosphere, Earth as a System

Number of Schools Reporting Data Over Past Year:

14

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

In numerous GLOBE introductory trainings and workshops for in-service and pre-service teachers, future multipliers in all regions of Switzerland could be reached by the central office and through seven Universities of teacher **Education**. The training units are carried out by trainers and our regional experts who are employed at the Universities of teacher **Education**.

Due to the corona situation, some trainings were transferred virtually. In general, more individual consultations were carried out as in the last years.

2. Science

Thanks to our national project developments, we can strengthen GLOBE's cooperation with partners from environmental research and environmental administration here in Switzerland. The GLOBE model is regarded as the starting point here, both the partners from education and research (science outreach) benefit from each other, and the offers thus become of higher quality. In 2021, our collaboration was focused on the following partners from science:

- ETH Zurich: Training course for young scientists to accompany school classes in their research projects on farms on biodiversity and climate change
- Research Institute of Organic Agriculture: Training course for farmers to welcome school classes on their farms to do research on biodiversity and climate change in the context of agriculture
- Swiss Federal Institute for Forest, Snow and Landscape Research WSL: Common projects on phenology in forests
- Botanical Garden of the University of Berne: Training course for teachers and public relations for topics around phenology
- Federal Office of Meteorology and Climatology: Common project on phenology
- Oeschger Centre for Climate Change Research (OCCR): Collaboration to organize a pupils' scientific conference in 2022 (GLOBE Contest)
- Academia Engiadina: Collaboration for an education offer on glaciers and climate change

3. Community

To reactivate GLOBE schools and to attract new schools, the Swiss GLOBE Contest has been launched in May 2021. In terms of model, the contest is structured similarly to IVSS. Partners are the U.S. Embassy, the Oeschger Centre for Climate Change Research OCCR, the Academy of Natural Sciences scnat, the Federal Office for the Environment, and five Universities of Teacher Education in the different Swiss regions. The research activities will run until May 2022, when the research teams are to submit their posters for evaluation/review. The selected posters will be presented at the final conference at the University of Bern, where a jury will also determine the three winning teams per age category (primary level, lower secondary level and upper secondary level). More than 440 teams (over 1300 students) have registered. We hope that this will also motivate schools to participate in the international IVSS.



4. Technology

We still are working on our new GLOBE website, in three languages (German, French, Italian). It's not just about restructuring the website to make it more user-friendly, it's also about revising and updating the content. It was decided to divide our offers into two main themes: climate and biodiversity.

Also new files (Thematic offer at a glance), fact sheets on the GLOBE protocols/contents and didactic aids for lesson planning are more and more made available to teachers. We have put a lot of material back in order to keep the website as clear as possible. Additional tutorials have been developed to

strengthen data entry and to help working with data. And we borrow weather houses to strengthen the data inputs.

The translation work requires a lot of resources.

5. Communications

Three to four times a year the GLOBE office sends a newsletter to the GLOBE network. Each time, the newsletter also contains the most important information coming from international program and points out activities, campaigns and training opportunities. If necessary, target groups are contacted directly (levels, topics). We regularly promote selected offers on social medias. And our website is linked to many other websites of our partners in all Swiss regions.

Plans and Ideas for Next Year:

We are looking forward to the GLOBE Contest! We will be quite absorbed by this project in May and June 2022). We will train the teachers of the participating schools which are not yet registered in GLOBE.

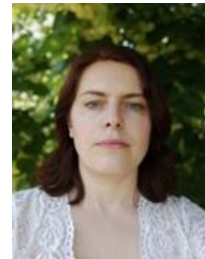
On international level we will continue motivating schools to participate in campaigns and to work with data, to collaborate with schools in other countries and to participate in IVSS.

Ukraine

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Organization and Number of Staff:

The National Ecology and Nature Center of the Ministry of Education and Science of Ukraine is a leading educational institution in the field of ecology, nature and science in Ukraine, a component of the system of extracurricular education for gifted and motivated school students. Also, NENC is the national coordinator of the GLOBE program in Ukraine since 1999. GLOBE is a part of a program of national integration into European and world educational space.

There are two people working in the GLOBE coordination office in Ukraine, however the center has the capacity to include other people during the organization of events or competitions.

Funding by:

Main funding: Ministry of Education and Science of Ukraine.

Cooperating Organizations/Individuals:

Ministry of Education and Science of Ukraine, Minor Academy of Sciences of Ukraine, Ukrainian Hydrometeorological Center, State Space Agency of Ukraine, Palladin Institute of Biochemistry and others.

GLOBE Schools (what types, how many):

There are 588 schools and educational institutions registered on the website, actively participating schools – about 50. The GLOBE network in Ukraine includes not only secondary schools, but also regional environmental education centers that are part of the system of afterschool education in Ukraine.

GLOBE Areas you and schools focus on:

The most popular areas among Ukrainian GLOBE students is Phenology (GreenUp/GreenDown), as well as Atmosphere (Air Temperature, Cloud observations, Barometric Pressures, Precipitations, Relative Humidities, Surface Temperatures). Some teachers have made measurements of Hydrology (Dissolved Oxygens, Nitrates, Transparencies, Water pH, Water Temperatures) and Land Cover (Water Temperatures, Water pH).

Number of Schools Reporting Data Over Past Year:

28

Program Implementation, International Cooperation in GLOBE Network, and Activities over Past Year (categorized by GLOBE Strategic Plan 2018-2023 Goals):

1. Education

We were providing support for GLOBE teachers and schools during this year as well as we were translating protocols and instructions.

2. Science

During the period 30 teachers were registered in the GLOBE Program. Science data were collected and entered on the site: 22 schools have received Science Honor Roll in Phenology, Atmosphere, Climate, Land Cover and Pan-GLOBE.

The annual competition "[Calendar GLOBE 2021](#)" was held, in which 180 students took part and more than 500 photos were sent. The best of them were selected and placed on the calendar.

The great project "[GLOBE. Ukrainian Clouds Atlas](#)" was finished. More than 145 students took part in the project and they have sent more than 800 photos.

Our videos and Story Maps were selected and screened at the **Water Bodies Show**.

Ukrainian teachers have taken active part in the **European Phenology Campaign** (31 schools have received certificates and badges in the 2021 My Tree in Spring). Within the framework European Phenology Campaign Ukrainian schools were actively cooperating with other schools. Both teachers and students participated in GLOBE_webinars.

[GLOBE Games Ukraine 2021](#). In June GLOBE Ukraine held the online GLOBE Games. The teams competed among themselves playing online quizzes and doing creative tasks. Also, participants have trained on Remote Sensing with our colleagues from Minor Academy of Sciences of Ukraine.

3. Community

30 new teachers were involved in the GLOBE Program.

4. Technology

28 schools entered scientific data during this period.

Also filling of the Ukrainian site of the program was realizing.

5. Communications

Consultations and explanations for community members are constantly conducted, we keep people up-to-date on news and events.

Plans and Ideas for Next Year:

Participating in the European Phenology Campaign and other GLOBE activities.

Translating GLOBE materials for teachers.

To involve new teachers to the GLOBE Program.



THE GLOBE PROGRAM

Europe and Eurasia
2021 Country Reports

GLOBE Program Europe and Eurasia Region Coordination Office

