

INDIA

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Cooperating organizations:

- Indian Environmental Society (IES)
- Program Implementing Schools

Participating schools:

NA

Funding by:

- Indian Environmental Society (IES)
- Department of Environment, Govt. of NCT of Delhi.
- Public Affair Section, American Embassy, New Delhi.

GLOBE protocols used in country:

- Hydrology
- Atmosphere
- Soil
- Land cover
- Phonology

Number of schools currently reporting data (2014):

- NA

Description of the program in your country and recent activities in 2015:

- **Workshop And Conferences**
 - Organized **Youth Conference On Earth Science & Climate Change** on Occasion of World Wetland Day -2015 during February 1- 2, 2015



Youth Conference on Earth Science & Climate Change

- Organized **Delhi Youth Science Congress** at which various School Participated & put up their exhibitions on Topic Related to Water Quality, Education for sustainable Development, New technological options for a better living & various other GLOBE protocol held During February 27-28, 2015. Delhi Youth Science Congress is program for youth to utilizing the students knowledge and efforts to improve the knowledge of the visitors visiting the parks/ Biological Diversity Park and zoos in Delhi. To work for the improvement of existing biodiversity inside the targeted parks/zoo in Delhi. The technical & learning in this resource involves developing understanding of Biodiversity and its importance.

The main objective of this program is:

- To improve communication and carrying capacity of the higher level students, mostly motivate children for the conservation of wild animals and biodiversity.
- To improve the cleanness level in and around the park.
- To develop spirit among the students to work for the protection of biodiversity, as well as the environment.
- To improve the Knowledge of the visitors about specific plants and animals species.
- To made the idea sustainable by moving the head of the institutions/ lectures etc.



Delhi Youth Science Congress

- Organized Conference on **Environmental and Science Communication** during October 16, 2015 in which various School Participated. The theme of conference is **MASE – Motivate and Attracts Students to Environment**. This Conference is not a traditional Conference but the students / teachers will have opportunity to learn and practice GLOBE protocols such as Soil & Atmosphere. The training session on Soil and Atmosphere protocol will be conducted by Trained GLOBE Master Trainer. The aim of the conference is to develop scientific attitude among the youth and Students. The Education Conference brings together teachers, educators, trainers and scientists from different Schools in order to share ideas on improving science education at school and enhancing the motivation of students for Environment and Science, by use of modern tools and methodologies. Teaching materials developed in the project, i.e. hands-on lessons and teacher training materials will be widely disseminated. The conference will develop the concept of **don't just Read about Science: Do Science**.



Environment & Science Communication

- **Orientations to youth & school teachers**

- Organized orientation for youths on GLOBE activities and protocols
- Organized orientation and activities training for the teachers of different schools in Hindi Language conducted on various Parts of the country during the Year.
- ✓ GLOBE Teacher's Training Workshop in Hindi held in Delhi during December 17-18, 2014 in which 43 Government School Participated. Workshop was conducted for 2 days in which all the Protocol were explained & hands-on training were given to teacher
- ✓ GLOBE Teacher's Training Workshop in Hindi in Lucknow During February 24-25, 2015 in which 32 Government & Private both School Participated. Workshop was conducted for 2 days in which all the Protocol were explained & hands-on training were given to teacher
- ✓ GLOBE Teacher's Training Workshop in Hindi in Jaipur During March 26-27,2015 in which 31 Government School Participated. Workshop was conducted for 2 days in which all the Protocol were explained & hands-on training were given to teacher

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- ✓ GLOBE Teacher's Training Workshop in Hindi in Chandigarh During May 25-26,2015 in which 33 Government School Participated. Workshop was conducted for 2 days in which all the Protocol were explained & hands-on training were given to teacher.
- ✓ GLOBE Teacher's Training Workshop in Hindi in Solan During August 7- 8, 2015 in which 32 Government School Participated. Workshop was conducted for 2 days in which all the Protocol were explained & hands-on training were given to teacher.
- ✓ GLOBE Teacher's Training Workshop in Hindi in Jammu During August 26-27, 2015 in which 33 Government School Participated. Workshop was conducted for 2 days in which all the Protocol were explained & hands-on training were given to teacher.
- ✓ GLOBE Teacher's Training Workshop in Hindi in Dehradun During October 13-15,2015 2015 in which 25 Government School Participated. Workshop was conducted for 2 days in which all the Protocol were explained & hands-on training were given to teacher.

A total of 229 were trained in GLOBE Hindi in which they were given training on the following Protocol

- **Atmosphere Protocol:** GLOBE student data within the Atmosphere investigation aids scientific understanding of spatial gaps in air temperature and precipitation coverage by weather monitoring stations, important data on aerosols and surface ozone. In addition, atmospheric data play a critical role in the calibration of satellite instruments collecting data on, for example, clouds etc.
- **Hydrology Protocol:** Water covers approximately 70 percent of Earth's surface, continually circulating between Earth's surface and atmosphere as part of the hydrologic, or water, cycle and is one of the basic processes in nature. Water evaporates into the atmosphere to become water vapor where it cools and condenses into liquid water or ice crystals to become clouds. It then falls back to the surface as rain or snow, where it can filter into the soil, be absorbed by plants, percolate to groundwater reservoirs, run off into water bodies, or evaporate.
- **Soil Protocol:** Soil makes up a thin layer known as the pedosphere and an important, yet very limited, natural resource which affects every part of the ecosystem. Soils hold nutrients and water for plants and animals. Soils also filter and clean water and can change the chemistry of water. Soils store and transfer heat and affect the temperature of the atmosphere.

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- **Land Cover/ Biology Protocol:** Land cover is a term used to describe what is on the ground or covering the land. Different terms are used to describe the differences seen when looking at the land and can be split into natural and developed areas.
- **Data Entry Protocol**



GLOBE Teacher's Training In HINDI

- **Celebration of Earth Day -2015**
 - To mark and celebrate International Earth Day on 22, April, 2015. The program held for two days (22-23 April, 2015). During the celebration Various activities were carried out Such as poster Making competition, Slogan writing competition, Tree plantation & protocol Study of Soil & Hydrology.



- **Conference of Global Citizen Science Congress**

- To mark and celebrate **Global Citizen Science Congress**
- GLOBE School members organized various program in their school and community premises.
- Orientation for the students through demonstration of steps for Atmosphere & Land cover Protocol.
- Understand importance for Data Collection for GLOBE Protocols
- Students from Thailand & Taiwan along with India Participate in the Conference.



Global Citizen Science Congress

The Way Forward

- Formation of youth team to expand GLOBE Schools network
- Significantly increase the participation of Government Schools.
- Increase the no. of trainings for Students, Teachers and Youths on GLOBE Protocols
- Organize orientation / interaction programs on GLOBE Program for Implementation for likeminded Youths
- Integrate GLOBE Activities in various ongoing programs and new proposals.
- Develop monitoring mechanism for consistent data entry in GLOBE Website.

Micronesia

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Cooperating organizations: Pohnpei Department of Education, Kosrae Department of Education, Yap Department of Education, Chuuk Department of Education

Participating schools: not selected pending GLOBE protocol training for teachers

Funding by: NDOE

GLOBE protocols used in country: None

Number of schools currently reporting data (2015): None

Description of the program in your country and recent activities in 2015:

The program is slowly rebuilding and communications were sent out to schools that are interested. Screening and selection of GLOBE participating schools will be determined beginning 2016. There are activities that schools do and observe that linked to GLOBE program goals and objectives for example science fairs, field trips to weather stations, community awareness programs, and participation in climate change meetings and conferences. Data and records of these activities are kept at the schools. Schools and the community observe earth days and other science related special calendared events.

Philippines

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Cooperating organizations:

- Quezon City Science Community Foundation Inc.

Participating schools:

- 100+ Quezon City High Schools

Funding by:

- DOST - Philippine Science High School System

GLOBE protocols used in country:

- Soil
- Water
- Land Cover
- Atmosphere

Number of schools currently reporting data (2015):

- Teachers are currently under training. Data reporting will begin 1st quarter 2016

Description of the program in your country and recent activities in 2015:

- Visit of Dr. Ellen Stofan, Chief Scientist, NASA – The event was attended by more than 150 students from Nine (9) different PSHS campuses from as many regions in the Country.
- The Globe Forum. Teacher training and GLOBE Protocol Demonstration. The event was attended by 70 Teachers from 28 different High Schools in Quezon City.

NASA Top Official Visits DOST-Philippine Science High School System



“Can we find another evidence of life in other planets?” posed Dr. Stofan. She informed her young listeners the current studies being conducted by NASA.

“Women in Science,” this is the theme of Dr. Stofan’s visit to the Philippine Science High School (PSHS) at the Main Campus last August 28, 2015. **Dr. Ellen Stofan** is currently the Chief Scientist of National Aeronautics and Space Administration (NASA) of the United States of America. More than 150 students from different regional campuses of the PSHS System attended this rare opportunity to hear a top NASA official talk.

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Pisay students were all ears as Dr. Stofan talked about planetary studies conducted by NASA.

Entitled, “*NASA Science: Looking Outward, Inward and Homeward,*” Dr. Stofan briefly discussed the activities, past, present and future studies being conducted by NASA with the aim of looking for another habitable planet. “*Can we find another evidence of life in other planets?*” posed Dr. Stofan. “*We are studying Mars, if there is a chance of life in this planet,*” she revealed. She also mentioned about climate change particularly on what is happening in the poles that greatly affect the earth’s climate. She summarized her talk by mentioning the main goals of NASA which are to innovate, explore, discover and inspire.

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"Surround yourselves with people who believe in you; try lots of things; talk to people involved in the field you are interested in; and ask counsel from your school to help you figure out what career you want to pursue," was Dr. Stofan's advise to the future women scientists.



Dr. Stofan with selected girl students of Pisay.

With the intent of encouraging and inspiring future women scientists, Dr. Stofan held an intimate talk with selected 14 PSHS girl students at a separate room after her talk. In this close conversation, she inspired the students by sharing her experiences on how she was able to overcome the challenges of being a working mother of three (3). She also underlined the importance of surrounding oneself with people who believes and affirms one's interest and goals in life. For those who are still finding what career they want to pursue, she advised, *"try lots of things; talk to people involved in the*

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field you are interested in; and ask counsel from your school to help you figure out what you want to pursue.”

Are women needed in science? Dr. Stofan has this to say, *“It is not about numbers, it is about diversity.” “It is important to believe in yourself and that be convinced that you belong in science,”* she said.

Dr. Stofan was accompanied by **Mr. Richard Bakewell**, Economic Officer of the Environment, Science, Technology & Health, and **Ms. Maria Theresa Villa**, Environment Science and Technology and Health Specialist, U.S. Embassy, Manila.



Dr. Maryann Go, Neuro-scientist & PSHS Alumna Batch 2000, and Dr. Ellen Stofan, NASA Chief Scientist.

Before Dr. Stofan’s talk, **Dr. Mary Ann Go**, a well-known neuroscientist and PSHS Alumna from Batch 2000, inspired the students by sharing her academic and career journey. She encouraged the students to study for free by availing of scholarships available, she being a DOST Scholar from secondary all the way to her graduate studies. After her master’s degree, she was able to avail a scholarship for her Ph.D. at the Australian National University. She also shared how she coped with rejections from the universities that she applied with. *“Rejection is part of life. Just believe that God is always in control. If you are rejected and not accepted, maybe it’s because it’s not really meant for you and that God has better plans for you,”* she said. Dreaming to become a Nobel prize winner someday, Dr. Go encouraged the young minds to keep trying and never give up; be tenacious as science takes tenacity; and be excellent by doing the best you can and with what you have.

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PSHS System Executive Director, Dr. Larry L. Cabatic talking with Dr. Ellen Stofan.

PSHS Executive Director Dr. Larry L. Cabatic, and Deputy Executive Director Dr. Rod Allan A. De Lara, personally welcomed the visitors and hailed their accomplishments in science. The PSHS System - Office of the Executive Director in collaboration with PSHS-Main Campus headed by Director Virginia Andres hosted the event.



PSHS Executive Director Dr. Larry Cabatic, assisted by Deputy Executive Director Dr. Rod Allan A. de Lara, awarding the Certificate of Appreciation to Dr. Stofan.



Dr. Cabatic, happy to receive a memorabilia from Dr. Stofan.

PSHS System conducts GLOBE Forum for Public High Schools

The Philippine Science High School (PSHS) System in collaboration with the Quezon City Science Community Foundation, Inc. (QCSCFI) hosted a GLOBE Forum last December 1, 2015 with Dr. DeshBandhu, head of GLOBE Asia-Pacific, as guest speaker. Fifty two teachers from 25 public secondary schools attended the forum held at AST Building, PSHS Main Campus, Diliman, Quezon City.



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Aside from the lecture of Dr. Bandhu, the teacher-participants gained further knowledge through actual demonstration of GLOBE protocols by the GLOBE-trained teachers from the PSHS Main Campus namely Dr. Melanie Anne Cheng & Sofia Docto for Land Cover Investigation and Bernard Llaguno & Caridad Gicaraya for Atmosphere Investigation.



GLOBE stands for Global Learning and Observations to Benefit the Environment. The GLOBE program which is on its 20th year this year, is an international science and education program that provide students and the public worldwide with the opportunity to participate in data collection and the scientific process, and contribute meaningfully to our understanding of the Earth system and global environment. This program is jointly sponsored by U.S. National Aeronautics and Space Administration (NASA) and the National Science Foundation (NSF), with support from the National Oceanic and Atmospheric Administration (NOAA) and Department of State.

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“The PSHS has been a member of this international scientific community since 1999. Through the GLOBE Program, PSHS System has been delivering one of its mandates: to promote science education in the country through its various outreach and teacher training programs,” PSHS Deputy Director Rod Allan A. de Lara said.



Dr. Alumandadela Rosa, Executive Director of Philippine Nuclear Institute, who also represented the QCSCFI, in her closing remarks, upheld the vision/mission of the GLOBE Program as it connects students, teachers, scientists, and citizens from different parts of the world to conduct real, hands-on science about their local environment and put in a global perspective.

Sri Lanka



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Cooperating organizations: National Institute of Education, Maharagama
Provincial Departments of Education
Zonal Education Offices

Participating schools: 46 schools presently not active

Funding by: Ministry of Education

GLOBE protocols used in country:

Atmosphere study – Clouds, Temperature, Rainfall, Rainfall pH, Relative Humidity, Barometric Pressure

Hydrosphere study – Transparency, Water Temperature, pH Value, Dissolved Oxygen, Electrical conductivity, Alkalinity, Nitrate.

Pedosphere study – Soil moisture and Temperature, Soil field and Lab characterizations

Biosphere study – Land cover sample site protocol, Biometry protocol, Manual protocol

Number of schools currently reporting data (2015):- None since registration of those have to be renewed

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Description of the program in your country and recent activities in 2015:

The program implementation is done by central government ministry of education. All teacher trainings are conducted by MOE and group of two master trainers and three trainers is for training purpose in local language (Sinhala) and English. GLOBE school level activities are organized by schools with help of MOE and provincial departments of education.

World Water Day - National program for students – Hydrology protocol training from 23rd to 24th March

World Environmental Day - National program for students – Introduction of GLOBE Program and Atmosphere protocol training 5th June

GLOBE protocol research awareness for teachers – 23rd to 25th July

10th Teacher group training – Specially for teachers of schools of Northern and Eastern provinces.

This was the GLOBE protocol training (Atmosphere study) for Tamil medium school. This group will be trained on protocols of other study areas in 2016.

Taiwan



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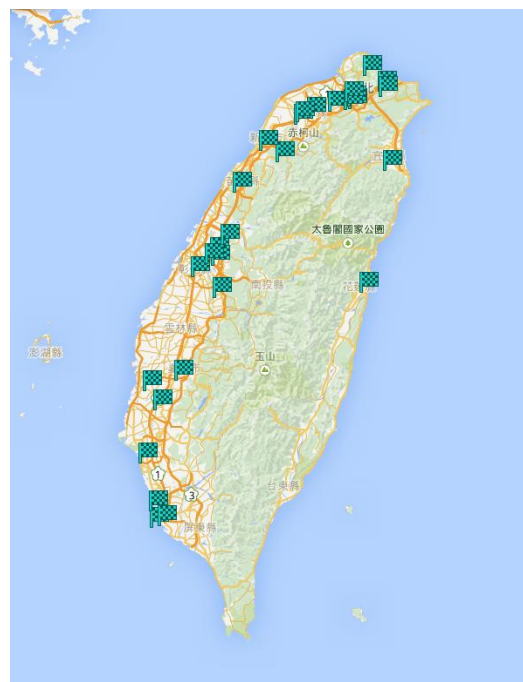
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Cooperating organizations:
None

Participating schools:

1. The Affiliated Senior High School of National Taiwan Normal University
2. The Affiliated Jhongli Senior High School of National Central University
3. National Wu-Ling Senior High School
4. National Lo-Tung Senior High School
5. National Chia-Yi Girls' Senior High School
6. Kaohsiung Municipal Girls' Senior High School
7. New Taipei Municipal DanFeng High School
8. National Chutung Senior High School
9. National MiaoLi Senior High School
10. Yin-Pei Junior high school
11. Nan-Kwang Senior High School
12. National Feng-Shan Senior High School
13. New Taipei Municipal Jin-Shan High School
14. Keelung Municipal Anle Senior High School
15. National Keelung Senior High School
16. Taipei Municipal Ming Lun High School
17. Taipei Municipal Zhongshan Girls High School
18. Taipei Municipal Jianguo High School
19. Fudan High School
20. National Hsinchu Senior High School
21. National Feng-yuan Senior High School
22. ST. Viator Catholic High School
23. Da-Dun Elementary School, Taichung City
24. National Taichung Girls' Senior High School
25. National Changhua Senior High School
26. National Hualien Girls' Senior High School



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27. Songmay Elementary School, Chiayi County
28. Houjia Junior High School
29. Kaohsiung Municipal Yuchang Junior High School

Funding by:

Ministry of Science and Technology, Taiwan

GLOBE protocols used in country:

Barometric Pressure Protocol
Cloud Protocols
Relative Humidity Protocol
Precipitation Protocols
Digital Multi-Day Max/Min/Current Air and Soil Temperature Protocol
Surface Temperature Protocol
Davis Weather Station Protocol
Biometry Protocol

Number of schools currently reporting data (2015):

13

Description of the program in your country and recent activities in 2015:

The goals of GLOBE Program Taiwan in 2015 focus on GLOBE School expansion, international interaction, and cultivation of trainers, teachers and students. We recruited 17 schools in the end of 2014. Therefore, the installation and training for new schools is our first mission of 2015. We cooperated with teachers and employers of each schools and helped them to install the primary observation stations. Meanwhile, we taught teachers how to use the GLOBE website and how to lead students to upload their daily data.

As to the international interaction, we held 2015 GLOBE Asia and Pacific Regional Meeting and joined the 19th GLOBE Annual Partner Meeting this year. Because of the 20 anniversary of GLOBE Program, we combined the country coordinator regional meeting and student science fair. There were about 180 people from 12 countries joining this meeting. Besides, Taiwan office arranged the field trip to north shore of Taiwan, which was conducted by one of GLOBE Taiwan school. In additional, we invited 15 teachers and students from Thailand to interact with our students. This event was a huge milestone for GLOBE Taiwan.

As to the cultivation, there were 20 people from Taiwan participating 19th GLOBE Annual Partner Meeting. 7 trainers, 6 teachers, and 7 students got trained in this meeting. For students, the field trip to Santa Catalina Island was very impressed. They observed the nature, collected data, communicated with partners, and presented their results. For teachers, one of our teachers, Yi-Wen Hung, was invited to give a speech about his teaching in the classroom. During the meeting, our teachers also joined the sessions which they are interested in. For trainers and staff, we participated in some trainings which could help us to implement GLOBE Program. GLOBE Taiwan team were inspired and encouraged a lot from this meeting.

In 2015, we will keep training our teachers and students to assist and improve their implementation of GLOBE Program. In addition, we will engage more scientists and educators in GLOBE Taiwan. We will try to offer a communication platform and construct a science learning network in the future.

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GLOBE Program Taiwan Activities List of 2015 (update: Sep., 2015)			
Name of Activity	Date	Venue	Number of Participants
Primary Atmospheric Observation Station Installation	2015/04/10	Song-Mei Elementary School, Chiayi County, Taiwan	30
Primary Atmospheric Observation Station Installation	2014/04/15	Fun-Dan High School, Taoyuan, Taiwan	40
2015 Regional Meeting	2014/04/26-04/30	<ul style="list-style-type: none"> • Hotel Kuva Chateau, Taoyuan • National Central University, Taoyuan • Affiliated Senior High School of National Taiwan Normal University, Taipei • North Shore of Taiwan, Jinshan 	180
Primary Atmospheric Observation Station Installation	2014/05/29	Taipei Municipal Zhongshan Girls High School	30
19 th GLOBE Annual Partner Meeting	2014/07/19-24	Los Angeles, USA	20 (Taiwan Team)
Primary Atmospheric Observation Station Installation	2014/08/11	Jin-Shan High School, New Taipei City	16
Primary Atmospheric Observation Station Installation	2014/08/11	National Keelung Senior High School, Keelung City	10
Primary Atmospheric Observation Station Installation	2014/08/12	Keelung Municipal Anle Senior High School, Keelung City	25
Primary Atmospheric Observation Station Installation	2014/09/09	National Changhua Senior High School, Changhua County	10
Primary Atmospheric Observation Station Installation	2014/09/09	Da-Dun Elementary School, Taichung City	60
Primary Atmospheric Observation Station Installation	2014/09/10	St. Viator Catholic High School, Taichung City	50
Primary Atmospheric Observation Station Installation	2014/09/10	National Taichung Girls' Senior High School, Taichung City	10
Primary Atmospheric Observation Station Installation	2014/09/11	National Fenyuan Senior High School, Taichung City	10
Primary Atmospheric Observation Station Installation	2014/09/14	Taiwan Municipal Jianguo High School	8

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Appendix – Photo
GLOBE Schools



2015/04/10_ Primary Atmospheric Observation Station Installation _Song-Mei Elementary School



2015/05/29_ Primary Atmospheric Observation Station Installation _Taipei Municipal Zhongshan Girls High School



2015/08/11_ Primary Atmospheric Observation Station Installation _Jin-Shan High School, New Taipei City



2015/09/11_ Primary Atmospheric Observation Station Installation _ National Fenyuan Senior High School, Taichung City

2015 GLOBE Asia and Pacific Regional Meeting

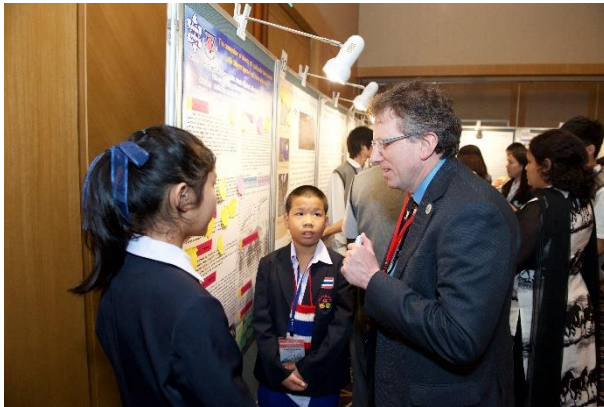


2015/04/26_ 2015 GLOBE Asia-Pacific Regional Meeting_ Teachers Sharing Session

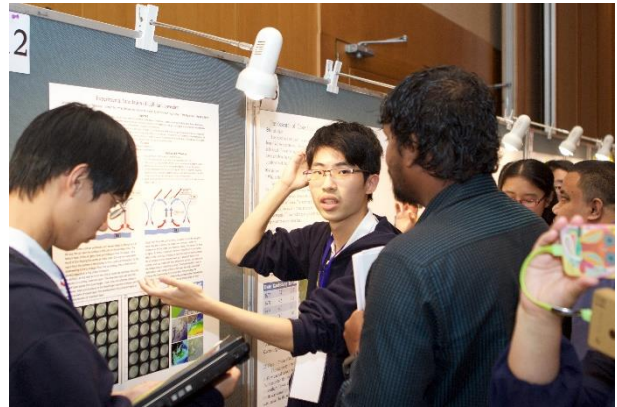


2015/04/26_ 2015 GLOBE Asia-Pacific Regional Meeting_ Students Science Fair

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2015/04/26_ 2015 GLOBE Asia-Pacific Regional Meeting_ Students Science Fair



2015/04/26_ 2015 GLOBE Asia-Pacific Regional Meeting_ Students Science Fair



2015/04/28_ 2015 GLOBE Asia-Pacific Regional Meeting_ Visiting of CSRSR



2015/04/29_ 2015 GLOBE Asia-Pacific Regional Meeting_ Field Trip to North Shore of Taiwan



2015/04/27-28_ 2015 GLOBE Asia-Pacific Regional Meeting_ Country Coordinator Meeting



2015/04/27-28_ 2015 GLOBE Asia-Pacific Regional Meeting_ Country Coordinator Meeting



2015/04/27-28_ 2015 GLOBE Asia-Pacific Regional Meeting_ DIY Activity



2015/04/27-28_ 2015 GLOBE Asia-Pacific Regional Meeting_ NTSEC Visiting



International Science Interaction: 2015 GLOBE Asia-Pacific Regional Meeting and Student Expo



▲ Under planning by the GLOBE Taiwan Office, Department of Atmospheric Sciences, National Central University, a celebration of the GLOBE Program's 20th anniversary was held at the 2015 GLOBE Asia-Pacific Regional Meeting in Taiwan.

With support from the Ministry of Science and Technology and NCU, and organized by GLOBE Taiwan Office, the “2015 GLOBE Asia and Pacific Regional Meeting and Student Expo” was officially launched on April 26th. This year’s event also celebrated 20 years of the GLOBE Program. Over 180 participants from 12 countries were invited to experience the passion and vigor of Taiwan and also to inspire students to participate in the GLOBE Program and allow us to show concern for the planet we call home.

The most exciting part would be the student science exhibition. After the exhibition, students shared their experiences through social media websites and expressed their excitement during the exhibition, as they were able to experience international exchange without even leaving the country. During the reporting process, not only were their thinking for independent research and improvement of English language skills stimulated, students also learned about reporting techniques, organizational logic abilities, comprehension, and observation skills.

In order to seek more cooperation opportunities, representatives shared their awkward situations and achievements while implementing the GLOBE program. The GLOBE Taiwan Office also arranged for a sharing session between Taiwanese and Thai teachers. Dr. Desh Bandhu, Director of GLOBE Asia-Pacific Regional Office, and Dr. Tony Murphy, Director of the GLOBE Program Implementation Office, were very impressed that each Taiwanese school has a different approach toward the execution of the GLOBE Program and the integration of science programs into education. They are looking forward to greater participation and performance from GLOBE Taiwan in future.

Country

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Cooperating organizations:

1. Walailak University
2. Thaksin University
3. Prince of Songkhla University Surat Thani Campus
4. Loei Rajbhat University
5. Srinakharinwirot University
6. Kasetsart University Kamphaengsaen Campus
7. Sirindhorn International Institute of Technology of Thammasat University

Participating schools:

436 schools.

Funding by:

1. The Ministry of Education
2. US Embassy
3. Intel Microelectronics (Thailand) Ltd. (supported Galileo board for Environmental STEM Education Project)
4. TTW Public Company Limited

GLOBE protocols used in country:

1. Atmosphere protocol
2. Hydrology protocol
3. Soil Protocol
4. Land cover protocol
5. Mosquito Protocol

Number of schools currently reporting data (2015):

973 data

Description of the program in your country and recent activities in 2015:

In 2015, The GLOBE Program (Thailand) has conducted activities that follow the vision by the Institute for the Promotion of Teaching Science and Technology (IPST) in promoting integrative learning using the STEM (Science, Technology, Engineering and Mathematics) Education. GLOBE Thailand has developed the environmental education learning projects as following.

Environmental Science Learning Material Development

1. Environmental Learning Activity Material Development

IPST has developed environmental camp learning activities for use with grade 4-9 students at The Sirindhorn International Environmental Park. These activities aim at giving the students practical

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experience in soil, hydrology, atmosphere and land cover measurement. While exploring the flora and fauna of an ecosystem the students will learn about the relationship between living- and non-living things therewithin. Through these learning activities, the students will learn to analyze data and make comparison between mangrove ecosystem and beach forest. To increase students' awareness of sustained natural resource and environmental conservation, the learning activities have been designed to motivate them to continue their exploration, investigation, search for knowledge, and research. These activities were tried out in primary and lower secondary schools in Phetchaburi Province from 29 June to 1 July 2015.

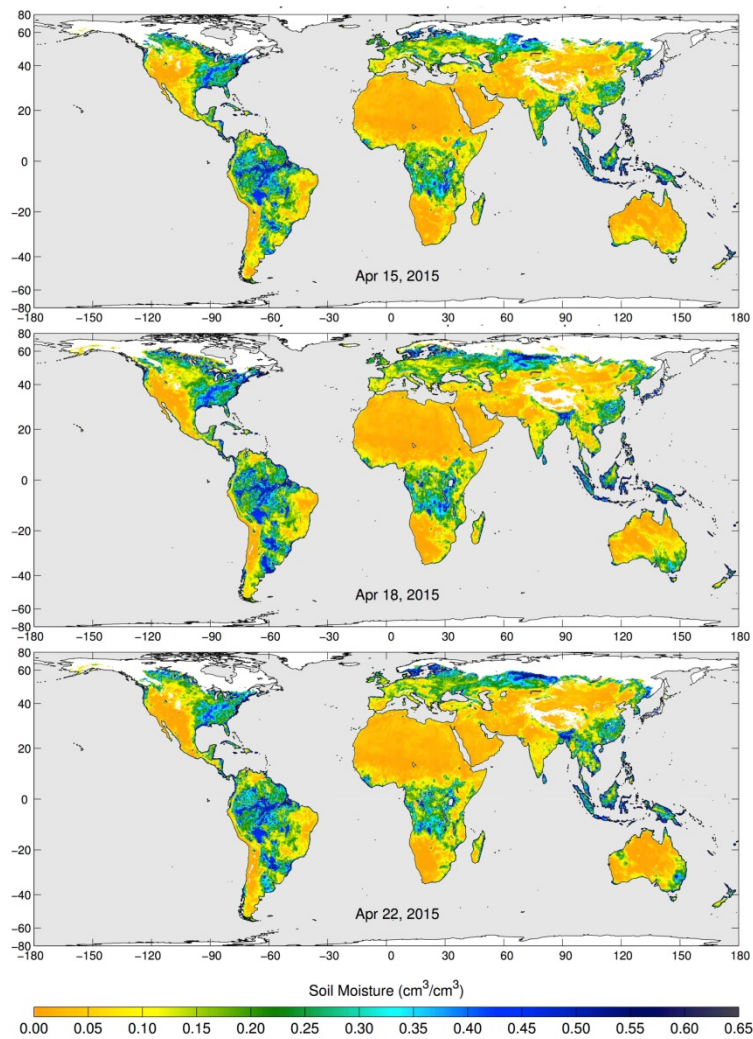


<p>วัตถุประสงค์การเรียนรู้ นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้</p>	<p>วัตถุประสงค์การเรียนรู้ นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้</p>	<p>บทนำ & วัตถุประสงค์</p> <p>นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้</p> <p>วัตถุประสงค์การเรียนรู้</p> <ol style="list-style-type: none"> 1. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้ 2. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้ 3. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้ 	<p>วัตถุประสงค์การเรียนรู้</p> <ol style="list-style-type: none"> 1. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้ 2. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้ 3. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้ 4. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้ 5. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้ 6. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้ 7. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้ 8. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้ 9. นักเรียนสามารถอธิบายถึงผลกระทบของมลพิษทางน้ำได้
<p>กิจกรรม</p> <p>จุดประสงค์การเรียนรู้</p> <p>วัตถุประสงค์การเรียนรู้</p>			

Promotion of Environmental Science Research

1. SMAP Project

The Soil Moisture Active Passive (SMAP) Project was first introduced to students from seven schools, namely Plutaluang Witthaya, Don Chan Witthayakhom, Muang Kalasin, Phapayompitayakhom, Phukhieo, Phichai Rattanakhan, and Yasothon Phitthayakhom on 7 November 2014 at IPST. On this occasion, IPST presented the schools with soil drying ovens to be used for measuring soil moisture. The project activities began in June 2015.



<http://smap.jpl.nasa.gov/resources/87/>

REPORT FOR 2015

2. Thai Tap Junior Water Prize 2015

IPST and TTW Public Company Limited organized the Thai Tap Junior Water Prize 2015 competition with an objective to encourage students to learn about, care for, and conserve water resources. Students were invited to submit their innovative water conservation methods to the competition, the result of which was announced on 19 February 2015. The winner was the research titled “Water Quality Analysis and Overall System Management Software for Reduction of Water Pollution from Coastal Marine Aquaculture” by students from Bangkok Christian College. The winning team attended the Intel International Science and Engineering Fair (Intel ISEF) 2015 in Pennsylvania, USA from 10 to 15 May 2015, sponsored by Intel Microelectronics (Thailand).



REPORT FOR 2015

3. Thailand GLOBE Student Research Competition 2015

Thailand GLOBE Student Research Competition 2015 was open to primary and secondary school students during 16-18 March 2015. The winners are as follows:

Secondary school category:

First prize: Plutaluangwittaya School, Chonburi Province, "The development of the Ruan Wan 2 for the propagation of the staghorn corals (*Acropora sp.*)"

Second prize: Singburi School, Singburi Province, "Characterization of the soil after the differently managed harvest"

Third prize: Kanchanaphisek Technical College Mahanakorn, Bangkok, "Quantitative comparison and species identification of mosquito larvae in temples and schools"

Consolation prize: Sa-Nguan Ying School, Supanburi province, "Sheet absorbs oil and soot while cooking"



Primary school category:

First prize: Anuban Lampang (Khelangrat-Anusorn) School, Lampang Province, "The comparison of skeletal soil quality after being covered with different types of mulches to grow squash"

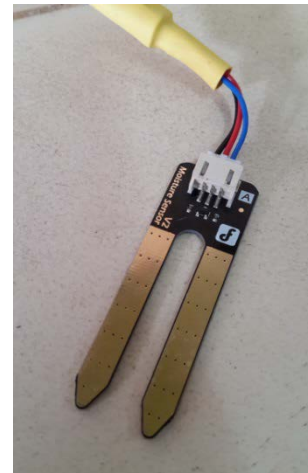
Consolation prize: Dara-Academy, Chiang Mai Province, "The evaluation of soil characteristics and land use to grow economic plants in Chiang Mai Province"

The Best Poster Presentation prize was awarded to Phanomsarakham "Phanom Adun Witthaya" School for the presentation of its research project titled "A variety of butterflies in Phanomsarakham District and Biology of *Papilio polytes romulus* (Cramer) and *Papilio damoleus malayanus* (Wallace)"



4. Study and Research Project Using Galileo Board

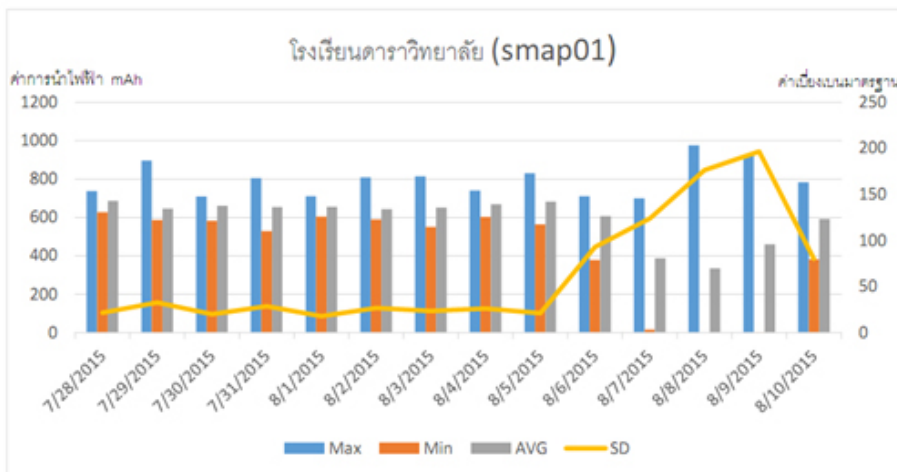
IPST, Intel Microelectronics Thailand, Ltd., Srinakharinwirot University, Sirindhorn International Institute of Technology of Thammasat University, and Walailak University jointly developed research and learning activities using Galileo board with a view to promoting and developing environmental science learning based on STEM education concept.



หน้าจอระบบแสดงผล



กราฟแสดงความชื้นที่เก็บได้ในแต่ละวัน



Promotion of STEM-based Environmental Science Research in Cooperation with Universities and Agencies Concerned

1. Cooperation with Universities in Promoting Environmental Science Research Based on STEM Education Concept

IPST cooperates with universities in the GLOBE network to systematically multiply the results of environmental education so as to build GLOBE Thailand's cooperative academic network at both national and international level as well as to develop students' knowledge and competence in undertaking environmental science research within the context of STEM education. During the fiscal year of 2015 (1 October 2014-30 September 2015), IPST provided operational budget for this purpose to Walailak University, Thaksin University, Prince of Songkhla University Surat Thani Campus, Loei Rajbhat University, Srinakharinwirot University, Kasetsart University Kamphaengsaen Campus, and Sirindhorn International Institute of Technology of Thammasat University. In all, 100 schools took part in different activities organized by the universities as follows:

1) Walailak University

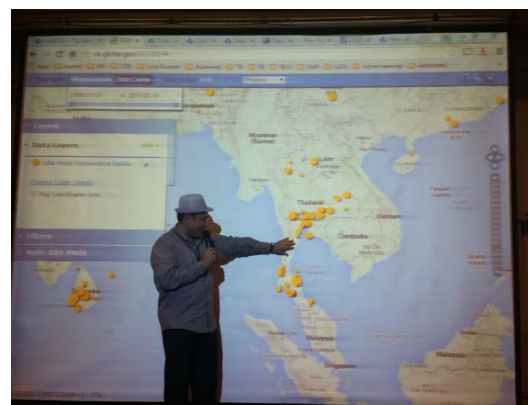
- CloudSat and GPM Project

This project encouraged students to study cloud types and measure cloud cover along the CloudSat ground tracks and compare the field data obtained to CloudSat measurements. In addition, the students measured rainfall as a step towards forecasting the weather and disaster. Teachers and students from 14 schools took part in six training workshops organized under this project.



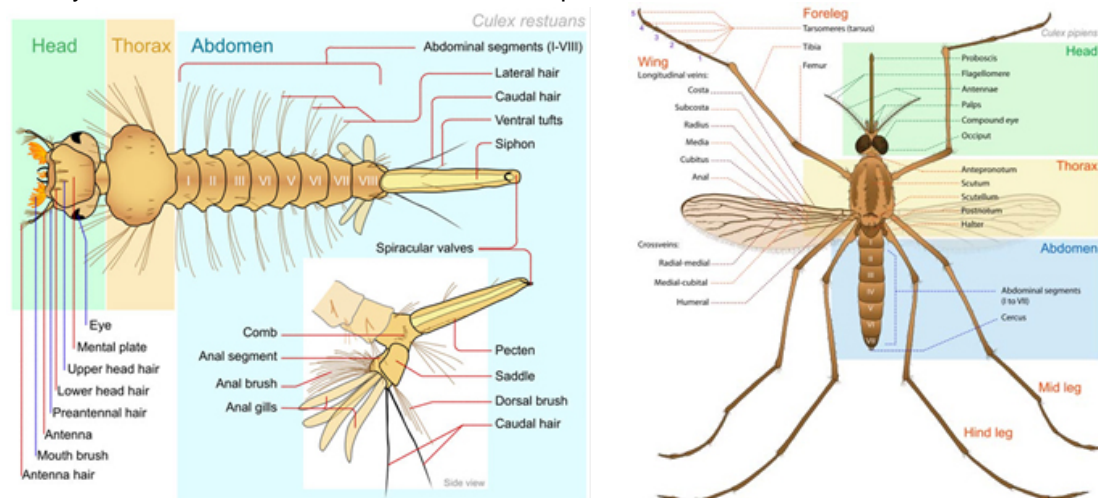
- GLOBE Data and Information System Workshop

The workshop introduced the new GLOBE Data and Information System and trained teachers and students from 30 schools to input and download data as well as to optimize their utilization in student research project.



- Development of the Mosquito Protocol

With the assistance of Prof. Dr. Elena Sparrow from the University of Alaska, the university has developed the mosquito protocol which is also available in English so as to promote its use by students in other countries in their mosquito data collection.



- GLOBE-STEM Education Learning Activities on Local Rice Species

Nine schools prepared nine lesson plans to investigate local rice species by relating and optimizing local weather data to benefit production, quality improvement and profit making.

2) Thaksin University

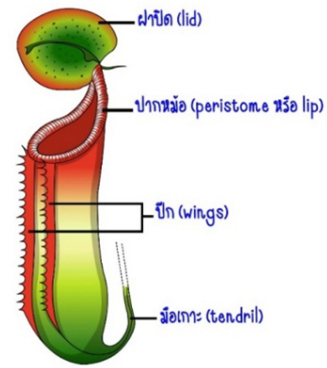
During this reporting period, the university developed an environmental research project applying STEM concept to promote environmental teaching and learning through Earth System Science in six schools. In addition, the university followed up on eight Earth System Science researches undertaken at school level in eight schools in 2014.



3) Prince of Songkhla University Surat Thani Campus

The university implemented two projects during this reporting period. Firstly, the prototype GLOBE-STEM environmental science project which includes learning activities and promotes research work on tropical pitcher plants. The five schools that took part in this project undertook five research works.

Secondly, the university implemented the GLOBE-STEM learning mobile app development project. This smartphone application software was used by the participating students in five schools to learn about mosquitos.



4) Loei Rajabhat University

An environmental research in the form of Earth System Science was developed by Loei Rajabhat University as part of STEM education. This project promoted and developed the competence of students in undertaking in-school Earth System Science research. A total of 11 schools participated in the project.



5) Srinakharinwirot University

The Department of Geography, Srinakharinwirot University promotes STEM education concept through the implementation of a capacity building project. This project intended to enable teachers and students to use Galileo board and to apply geographic information technology in their study and research on climate and investigation of environmental problems. GIS can be used to collect data, develop data base, analyze data and draw conclusions as well as present the results in an easy-to-understand format in order to explain problems or research questions. Five schools took part in this project.



REPORT FOR 2015

6) Kasetsart University Kamphaeng Saen Campus

The Kamphaeng Saen Campus of Kasetsart University implemented a soil science research development project based on joint collaboration between scientists and teachers and students. Under this project, research grants were awarded to five schools to undertake one soil science research each. It was required that each research applied STEM education concept.



7) Sirindhorn International Institute of Technology, Thammasat University

Five schools participated in a research project developed by Sirindhorn International Institute of Technology of Thammasat University. The project which focused on creating simple soil humidity measuring tools using Galileo board aimed at promoting Earth System Science teaching-learning following STEM education concept.



REPORT FOR 2015

2. Young Soil Doctor Project 2015

Together with the Land Development Department, IPST implemented the Young Soil Doctor Project 2015 to provide primary school children with basic knowledge of hydrology, atmosphere and land cover as pertinent factors of soil development. At the same time, the pupils learned how to plan a preliminary research, how soil scientists work, and how to solve soil problems in technically sound manner. Four workshops were organized during May-June 2015 to train 200 technical staff of the Land Development Department throughout the country. The training workshops equipped the trainees with knowledge and understanding of hydrology, atmosphere and land cover measurement as well as how to integrate it into comprehensive soil measurement and problem solving. It was expected that the trainees would be able to plan preliminary research, transfer the knowledge to teachers and students engaged in the project, and follow up on their research not to mention providing advisory services to them.



REPORT FOR 2015

Promotion of GLOBE STEM in Thailand and Abroad

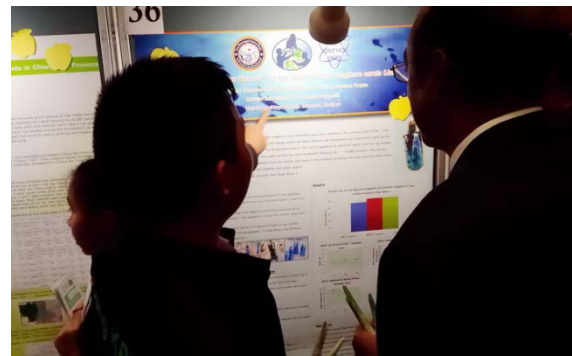
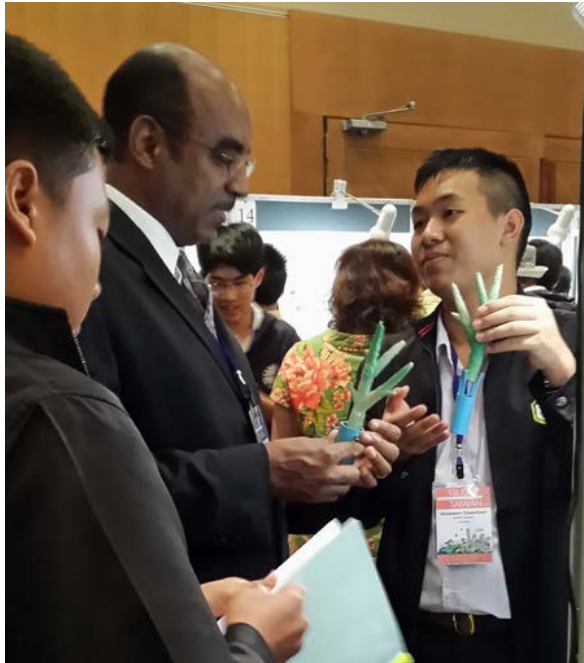
1. Thailand – India – Taiwan Student Exchange Program 2015

This reporting period saw two major exchange programs. The first one concerned Thailand and India. Forty students, teachers and scientists from Thailand and 32 from India attended the International Science, Mathematics and Technology Education Conference (ISMTEC) 2014 in Bangkok, Thailand from 7 to 9 November 2014. ISMTEC provided the participants with opportunities to share and exchange experiences via presentation of their research.



REPORT FOR 2015

From 25 - 30 April 2015, students from Dara Academy, Plutaluangwittaya, Anuban Lampang and Kanchanaphisek Technical College Mahanakorn took part in the Thailand – India – Taiwan Student Exchange Program 2015 in Taiwan to present their research works.



REPORT FOR 2015

2. The GLOBE Asia-Pacific Regional Meeting 2015

Two IPST academic staff, Miss Samornsri Kanphai and Miss Suwinai Mongkonthan, and two lecturers from GLOBE network universities, Assoc. Prof. Dr. Krisanadej Jaroensuthasinee from Walailak University and Dr. Sathaporn Monprapussorn from Srinakharinwirot University, attended the GLOBE Asia-Pacific Regional Meeting 2015 in Taiwan from 25 – 30 April 2015 to present progress reports on the GLOBE Thailand Project.



3. GLOBE Annual Partner Meeting 2015

The GLOBE Annual Partner Meeting 2015 took place in Los Angeles, California, USA during 20-24 July 2015. Students from five schools in Thailand, namely Paphayomphittayakom School, Triam Udom Suksa School, Satit Rayong Municipal School (Satit Tetsabarn Nakorn Rayong), Anuban Lampang School and Thatoom Pracha Sermwit School attended the meeting. On this occasion, awards were presented to Triam Udom Suksa and Paphayomphittayakom School for their regular data entry.



4. 2015 Science Project Competition: The Invention of Mosquito Trap

Together with S.C.Johnson & Son Ltd. and the Science Center for Education (Bangkok Planetarium), IPST organized the 2015 Science Project Competition inviting students to enter their mosquito trap inventions. Fifteen of the 23 entrants were selected for presentation on 18 August 2015 at the Science Center for Education (Bangkok Planetarium).



5. STEP-NUS Sunburst Environment Programme 2014

STEP-NUS Sunburst Environment Programme 2014 took place in RELC International Hotel, Singapore during 16-22 November 2014. Six participants namely, Miss Pornkanok Thanyalaksanakul and Miss Chaninat Pongudom, students from Dara Academy, Mr. Pongphak Kanwinphruet and Miss Apisara Santadkarn, students from Princess Churabhorn's College Nakhon Si Thammarat, Mrs. Pinanong Saengmanee, teacher from Princess Churabhorn's College Nakhon Si Thammarat and Ms. Suwinai Mongkonthan from IPST attended this Programme. The students presented their research project "A Study of Water Quality in Drainage Ditches Before Being Released into the Community. Dara Academy, Chiang Mai, Thailand" in oral and poster presentation sessions.



A Study of Water Quality in Drainage Ditches Before Being Released into the Community. Dara Academy, Chiang Mai, Thailand.

Title of Environment Topic: Chemicals and waste in the environment

This research aims to determine the physical, chemical and biological water quality prior to discharge into the water channel community area near Dara Academy, Chiang Mai, Thailand.

The Study were conducted temperature, transparency, pH, dissolved oxygen (DO) and organisms in the drainage water (out of the building and the point of drain-source community) from 26 August to 30 September 2014. They found that the temperature of the water in both study sites was normal between 24 – 32 °C, the transparency of the water was quite clear. The DO was low level between 0.5 – 4.8 mg/L, that could be harmful to aquatic life in the water. The pH of the water was neutral and suitable for living organisms in the range of 7.0 – 7.3.

The biological indicators was tested with aquatic insects and macro-algae. At the study site 1, aquatic insects found *Corixidae*, *Gerridae*, *Hydrophilidae* and *Chironomidae* and the study site 2 found *Corixidae*, *Gerridae*, *Hydrophilidae*, *Chironomidae* and *Coenagrionidae*. The average score per taxa (ASPT) was 5 to 5.33; moderate water quality. The macro-algae found at the study site 1 was *Spirogyra* and at the study site 2 were *Spirogyra* and *Mougeotia* and the ASTP was 2; moderate water quality.

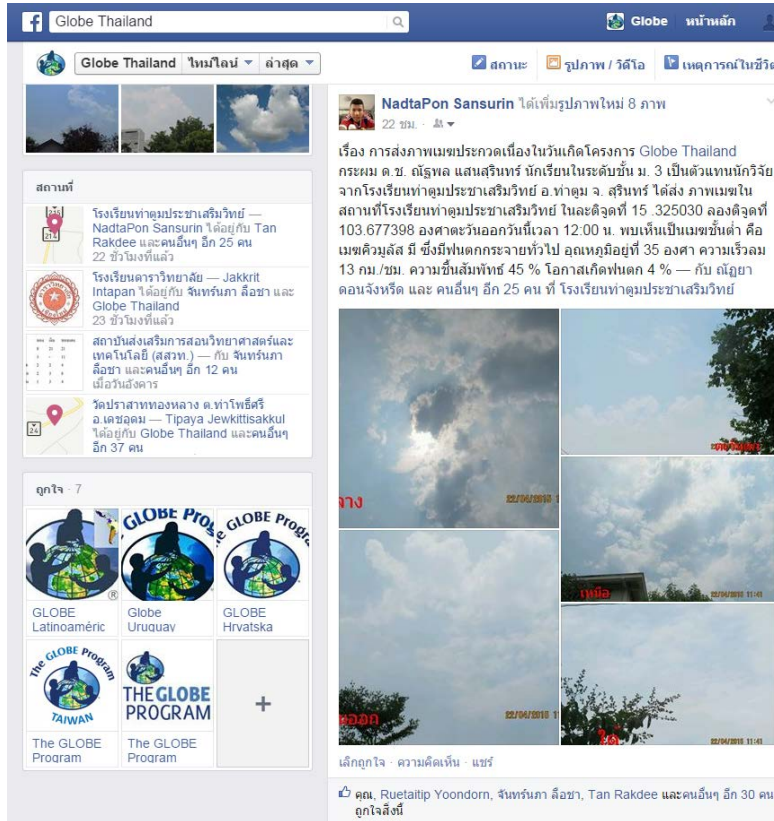
Researcher: Ms.Pornkanok Thanyalaksanakul, Ms.Chaninat Pongudom
 Presenters: Ms.Pornkanok Thanyalaksanakul, Ms.Chaninat Pongudom
 Co-presenters: Mr. Pongphak Kanwinphruet, Ms. Apisara Santadkarn
 Research advisor: Mrs.Karuna Poonlayaput from Dara Academy, Chiang Mai, Thailand.



Supplementary Activities for GLOBE Schools

1. Earth Day Campaign 2015

As part of the Earth Day campaign in 2015, at the invitation of IPST, a large number of students photographed clouds and post them along with the name of the clouds and a description on GLOBE Thailand Facebook before 2 p.m. on 22 April 2015.



2. Environmental Monitoring Project

This project which was launched in August 2015 encouraged students to continually monitor and measure the local environment in order to track local weather change. In this connection, IPST's support was provided in the form of thermometer, rain gauge, and cloud chart. Participating students were required to regularly collect data on air temperature, rainfall amount, types of cloud and their coverage at noon for at least six months and as long as one year. The data obtained were reported via the GLOBE Program website (www.globe.gov).

Environmental Monitoring project
 Cloud - Temperature - Precipitation
 2015 - 2016

WE project

เป็นโครงการที่ส่งเสริม และสนับสนุนให้นักเรียน
 ฝึกสังเกต คิดค้น ตรวจสอบ ควบคุมสิ่งแวดล้อม
 ในท้องถิ่นอย่างต่อเนื่อง เพื่อให้นักเรียนสืบค้นผล
 ของสภาพอากาศในท้องถิ่นของตน

เงื่อนไขการเข้าร่วมโครงการ

1. นักเรียนที่รับผิดชอบดูแลพื้นที่สังเกตการณ์ทางสิ่งแวดล้อม
2. พื้นที่สังเกตการณ์: อยู่นอกเขตอาคาร และปริมาณน้ำฝน (เรื่องอุณหภูมิอากาศ) ในเวลา 12.00 น. ตามเวลาท้องถิ่น
3. ศึกษารายละเอียดเกี่ยวกับสภาพอากาศอย่างละเอียด อย่างน้อย 1 ปี
4. เน้นที่ข้อมูลในสมุดบันทึก และส่งข้อมูลประจำวันไปที่โครงการ GLOBE (www.globe.gov)

สิ่งที่ผู้เข้าร่วมโครงการจะได้รับ (เช่นสมุดบันทึก)

1. ชุด ME project
2. ชุดอุปกรณ์ (เช่นสภาพขณะ, กล้องถ่ายรูป, ปริมาตรน้ำฝน, เทอร์โมมิเตอร์)

หมายเหตุ: หากมีข้อสงสัยหรือต้องการข้อมูลเพิ่มเติม กรุณาติดต่อที่ **0-2558-2558** หรือ **meproject.globeipst@gmail.com**

การสมัครเข้าร่วมโครงการ

นักเรียนสามารถสมัครได้ด้วยตนเอง โดยส่งใบสมัครพร้อม
 เรียงความ "สิ่งที่ได้จากติดตามตรวจสอบสิ่งแวดล้อมในท้องถิ่น" ความยาว
 ไม่เกิน 1 หน้ากระดาษ A4 ส่งมาที่ globeipstproj@ipst.ac.th หรือ
meproject.globeipst@gmail.com ภายในวันที่ 25 สิงหาคม 2558
 รายละเอียดการสมัครโครงการ โปรดดูที่หน้าเว็บไซต์ของโครงการ

3. NASA Administrator Bolden's Visit "Youth Outreach Event with GLOBE Schools"

On August 28, 2015, NASA Administrator, Maj. Gen. Charles F. Bolden, Jr. visited IPST and gave a special presentation about his experience in NASA space exploration. Among the 125 students and teachers from twelve schools attending the presentation were GLOBE Thailand students who had paid courtesy call on Administrator Bolden at NASA. Administrator Bolden's meeting with and talking to the students during his brief visit to Thailand has inspired the students to focus on space education. During his talk, Administrator Bolden encouraged the students to dare to think and take action by telling them: "Study hard, work hard, DON'T BE AFRAID OF FAILURE".

