

**TROP ICSU: Trans-disciplinary Research Oriented Pedagogy for  
Improving Climate Studies and Understanding**  
(<https://tropicsu.org>)

**Report on the TROP ICSU Workshop for Teachers at Beijing, China,**

**organized in collaboration with**

**The Beijing Institute of Genomics (BIG), Chinese Academy of Sciences, China  
(16-17 July 2019)**

<b>Workshop Title:</b>	A Faculty Development Program cum Workshop on CLIMATE ACROSS THE CURRICULUM: EDUCATIONAL RESOURCES FOR TEACHERS
<b>Date:</b>	July 16-17, 2019
<b>Venue:</b>	Hotel Holiday Inn Express Beijing Minzuyuan
<b>Facilitator from the TROP ICSU Team:</b>	Ms. Anita Nagarajan
<b>Speaker(s) from BIG:</b>	Ms. Li Lan
<b>Team of Coordinators/Helpers:</b>	Dr. Xu Wei and the team of volunteers from the Beijing Institute of Genomics (BIG), Chinese Academy of Sciences
<b>Number of Participants:</b>	31
<b>Disciplines/Subjects Taught by Participants:</b>	Biology; Chemistry; Chinese; English; Environmental Protection; Geography; Mathematics; Meteorology; Museum Education/Out-of-school Education; Physics; Robotics; Science; Science and Technology Education  A detailed listing of the disciplines is provided in <a href="#">Appendix I: Disciplines/Subjects Taught by the Participants</a> .

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## Summary of the Workshop

A **2-day workshop for high school teachers and university lecturers** was conducted in collaboration with the Beijing Institute of Genomics (BIG), Chinese Academy of Sciences, China, on July 16 and 17, 2019. The workshop was attended by 31 participants, including high school teachers and lecturers from schools and universities in Beijing. A representative from the Young Earth System Scientists (YESS) community also participated in the workshop.

TROP ICSU is grateful for the tremendous support and help from BIG in planning and organizing all the logistics and arrangements and for the interpretation and translation of discussions and presentations from Chinese to English and vice-versa, when required, during the workshop.

The objective of the workshop was *to introduce the participants to digital teaching resources for teaching topics in the Sciences, Mathematics, Social Sciences, and Humanities using climate-related examples, case studies, and activities*. In addition, participants would be invited *to review the educational resources of the TROP ICSU project and to provide their feedback on the appropriateness and ease-of-use of the teaching tools and lesson plans*.



Group Photo: Workshop for Teachers, Beijing, China

The workshop commenced with welcome remarks from Ms. Li Lan (BIG Data Center, Beijing Institute of Genomics, Chinese Academy of Sciences). Then, the TROP ICSU team provided an [overview of the TROP ICSU project](#) and its teaching resources. While the TROP ICSU presentations were delivered in English, participants were also provided with a translated Chinese version of the slides for reference. Over the next one and a half days, the teachers/educators worked in groups to carry out hands-on, interactive activities by using various [teaching tools](#) and [lesson plans](#) from the TROP ICSU website. They reviewed the teaching resources from the pedagogical and ease-of-use perspectives and provided feedback (via online review forms) to help in further enhancing the quality and effectiveness of the content. Further, participants worked in groups to develop new lesson plan ideas to teach topics in various disciplines using climate-related and climate change-related examples. In these activities, participants engaged in peer-to-peer discussions and exchanged ideas for effective teaching using relevant examples. Group representatives presented the new lesson plan frameworks and ideas and

discussed plans on the adoption of these new lesson plans in the classroom. The lesson plan presentations and discussions were in English, Chinese, or sometimes bilingual. The workshop concluded with a brief discussion on continued engagement and collaboration with the TROP ICSU project.

TROP ICSU had also invited a member of its partner organization, the YESS community, to participate in the workshop. The YESS representative from the meteorology field provided an overview (in Chinese) of climate-related topics and resources relevant to China.



Plenary Sessions at the Workshop for Teachers, Beijing, China



Plenary Sessions at the Workshop for Teachers, Beijing, China

Overall, the participants were keen on exploring ways to integrate climate science/climate change-related topics in their existing curriculum. They provided critical feedback on the existing teaching resources from the pedagogy perspective. Further, they actively participated in the creation of new lesson plans and specifically, in the generation of lesson plan ideas that are relevant to classrooms and teaching levels in China. Each group created a framework for one new lesson plan, and participants discussed steps for adopting the usage of the lesson plan in their teaching. Peer-to-peer discussions in groups enabled an exchange of ideas across disciplines and the development of new lesson plans.



Group Activity at the Workshop for Teachers, Beijing, China



Group Activity at the Workshop for Teachers, Beijing, China

Summary of the feedback received on the lesson plans from the TROP ICSU website

**Explaining the topic(s) in the discipline:** 100% of the responses from the participants stated that the reviewed lesson plan was **very effective or moderately effective** in explaining the topic in the discipline.

**Integrating the discipline topic(s) with climate science:** 100% of the responses from the participants indicated that the reviewed lesson plan was **very effective or moderately effective** in integrating the discipline topic(s) with climate science.

**Using the lesson plan in the classroom:** 100% of the responses from the participants indicated that they **would use the lesson plan in their classroom as is or with some modifications**.

Detailed results for the lesson plan reviews are provided in [Appendix II: Review of Lesson Plans by Participants](#).

Summary of the feedback received on the teaching tools curated on the TROP ICSU website

**Explaining the topic(s) in the discipline:** Approximately **91%** of the respondents thought that the reviewed tool was **very effective or moderately effective** in explaining the topic(s) in the discipline.

**Describing the tool:** 100% of the responses stated that the **tool description adequately shows how the discipline topic can be taught using a climate-related example, activity, or case study**.

**Using the tool in the classroom:** Approximately **82%** of the respondents indicated that they **would use the reviewed tool in their classroom as is or with some modifications**.

Detailed results for the teaching tool reviews are provided in [Appendix III: Review of Teaching Tools by Participants](#).

## Details of the Workshop

### Agenda and Overall Organization

The agenda of the two-day workshop was as follows:

- **Day 1:**
  - Presentation by the Beijing Institute of Genomics (BIG), Chinese Academy of Sciences, China: Welcome remarks by Ms. Li Lan (BIG Data Center); introduction to BIG, IUBS, and TROP ICSU; objectives of the workshop
  
  - Presentation by the TROP ICSU team: Welcome remarks
  
  - Introductions of the participants: Brief introductions including name, institution/organization affiliation, and disciplines/areas of specialization, expertise, teaching, and research
  
  - Presentations by the TROP ICSU team: Introduction to the TROP ICSU project, overview and demonstration of teaching resources (teaching tools and lesson plans) by using examples from each discipline
  
  - Group-based activity by the participants (groups organized by discipline): Review of discipline-specific teaching resources available on the TROP ICSU website (one lesson plan and one teaching tool per group); providing feedback on teaching resources through online review forms
  
  - Open discussion on the review of teaching resources
  
  - Brief discussion on the main activity for the next day



Group Activity at the Workshop for Teachers, Beijing, China

○ **Day 2:**

Introduction to the components of a lesson plan

Presentation by YESS community representative: Introduction to and overview of topics related to climate change, including impacts, examples, and resources specific to China; overview of the YESS community and its work

Group-based activity by the participants (groups organized by discipline): Creation of a new lesson plan based on an idea that integrates a climate topic with their regular teaching

Presentation of new lesson plans by participants: Brief summary of the lesson plan topic and tools/resources by each group

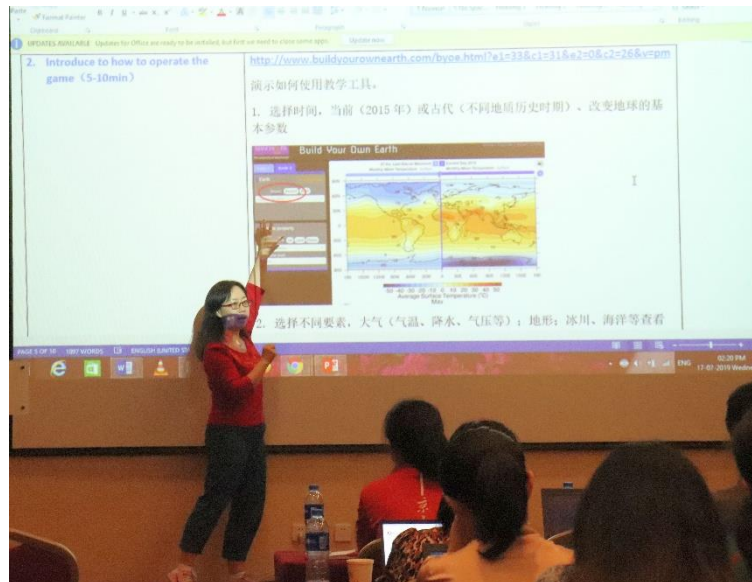
Open discussions with participants: Feedback on the workshop and discussions on long-term engagement of participants with TROP ICSU

Closing remarks





Group Activity at the Workshop for Teachers, Beijing, China



Presentation of a Lesson Plan at the Workshop for Teachers, Beijing, China

### Participant Feedback and Suggestions on Existing Teaching Resources

- Align the teaching objectives with the prescribed syllabus
- Include more effective evaluation methods
- Integrate climate-related topics with more disciplines
- Add clear teaching goals

## Ideas for New Lesson Plans

Some of the new lesson plan ideas and frameworks created by the participants were on the following topics:

- Impact of Climate Change on Soil Microbes (Biological Sciences)
- Impact of Climate Change on Photosynthesis (middle school level, Biological Sciences)
- Fuel Cells and Climate Change (Chemistry)
- Global Climate Change (Geography)
- Climate Change and Pollen Allergies (Biological Sciences, Medicine)
- 气候变化了，鸟类会怎样呢？ (Impact of Climate Change on Bird Migration) (Biological Sciences, Environmental Sciences)

## Key Takeaways and Learnings from the Workshops

- From observations during the workshop, the key learnings for the teachers were: the idea of using teaching resources that integrate topics in climate science or climate change with topics in their discipline and the concept of creating new lesson plans that could be used across disciplines.
- Participants found the hands-on, interactive group sessions to be very useful and engaging.
- Peer discussions in groups helped in the exchange of ideas and enhanced participants' learning.
- Teachers found it helpful to listen to the ideas and presentations of participants from other disciplines.
- Teachers recommended the addition of more specific learning goals.
- Some participants thought that the time duration specified for the lesson plans was not accurate and needed further refinement.
- Some feedback from participants:  
"The teaching objectives should be based on syllabus published by authorities."

*"there's no effective evaluation methods (so you don't know whether the students have already know the knowledge)."*

*"Two days of study have taught us how to lead students to study common topics from different disciplines, to acquire the rich resources needed for interdisciplinary research and to carry out new approaches to instructional design."*

### Next Steps

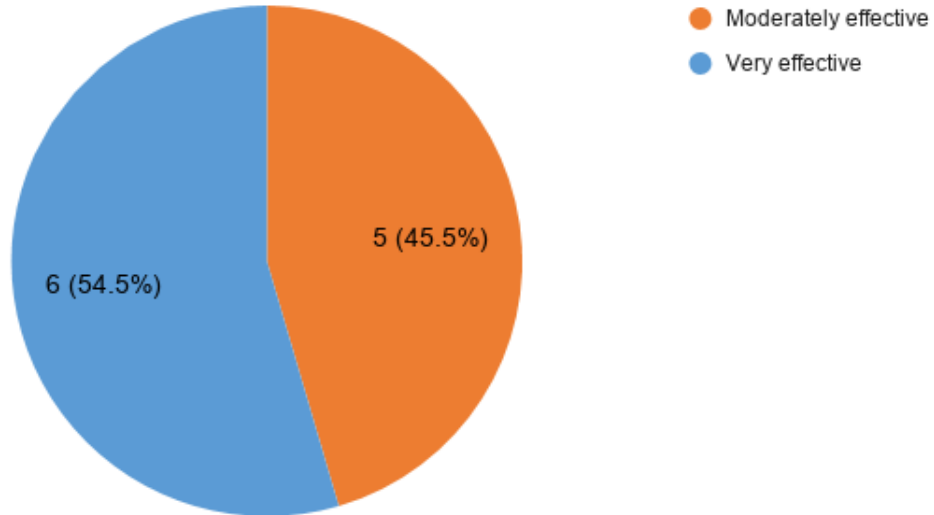
- Engagement by Team TROP ICSU with the participants to further enhance/refine the lesson plan ideas created during the workshop
- Modification of existing teaching resources (content and layout) based on analysis of feedback from participants
- Addition of region-specific (China, Asia) case studies, activities, and resources by using the ideas generated during the workshop

*Appendix I: Disciplines/Subjects Taught by the Participants*

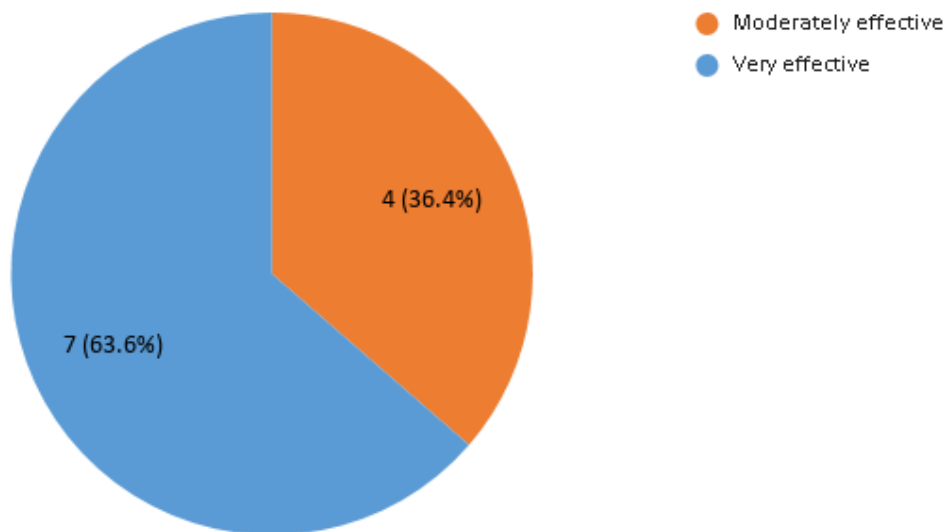
Bioinformatics; Biology; Chemistry; Chinese; Cytobiology; English; Environmental Protection; Genetics; Geography; Mathematics; Meteorology; Museum Education/Out-of-school Education; Nutriology; Physics; Phytology; Robotics; Science; Science and Technology Education

Appendix II: *Review of Lesson Plans by Participants*

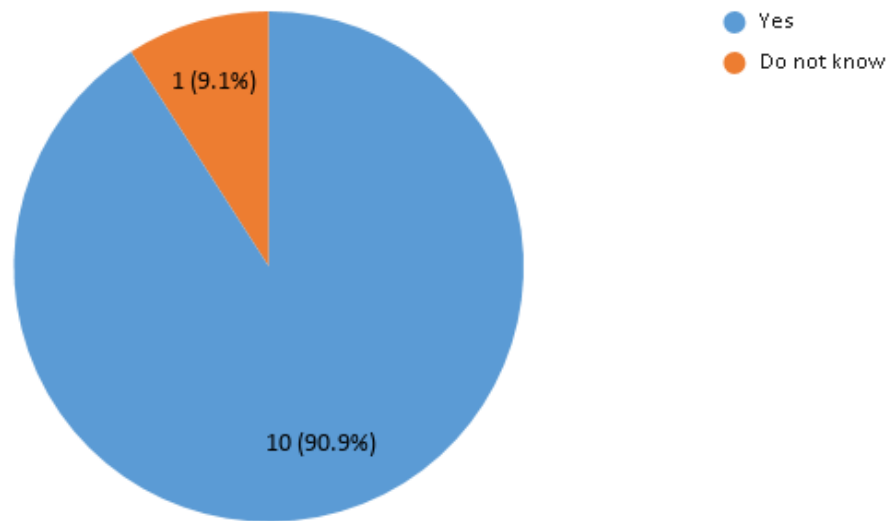
2. In your opinion, how effective is this lesson plan in explaining the topic(s) in the discipline?



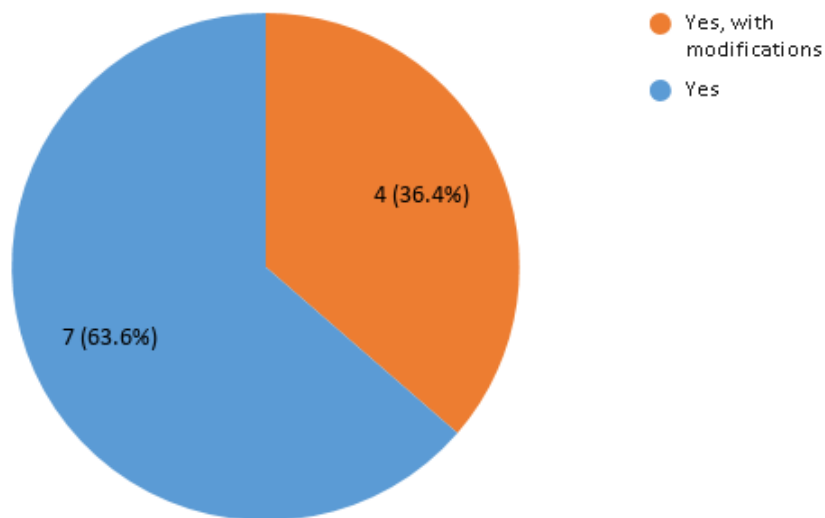
3. In your opinion, how effective is this lesson plan in integrating the discipline topic(s) with climate science?



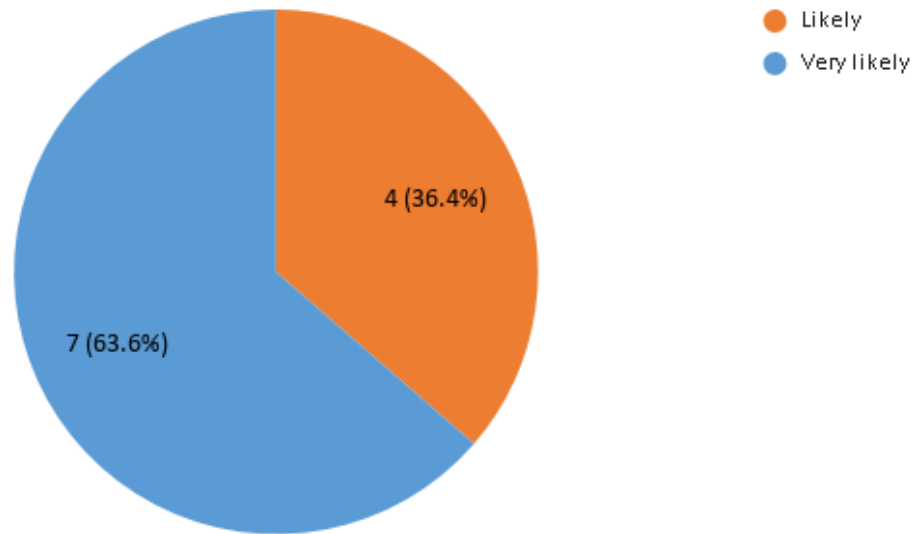
7. Do you think that your students will become more aware of climate change if you use this lesson plan in your classroom?



8. Would you use this lesson plan in your classroom for your students?

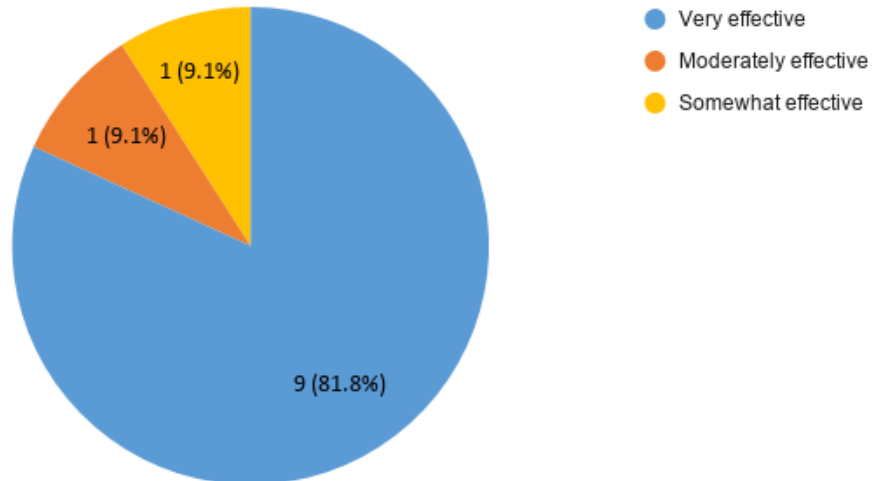


10. How likely are you to develop your own lesson plan that can enhance the understanding of a core topic in your discipline using a climate-related example, activity, or case study?

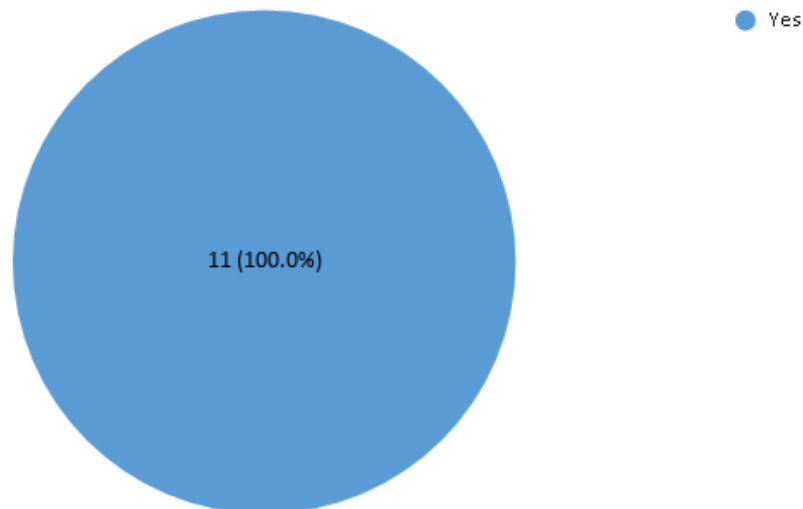


Appendix III: *Review of Teaching Tools by Participants*

2. In your opinion, how effective is this teaching tool in explaining the topic(s) in the discipline?

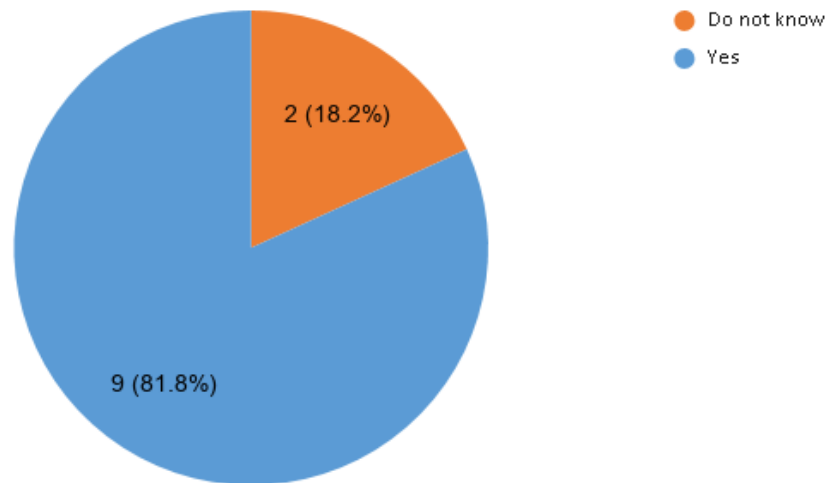


4. Does the tool description adequately show how the discipline topic can be taught using a climate-related example, activity, or case study?





5. Do you think that your students will become more aware of climate change if you use this teaching tool in your classroom?



6. Would you use this teaching tool in your classroom for your students?

