

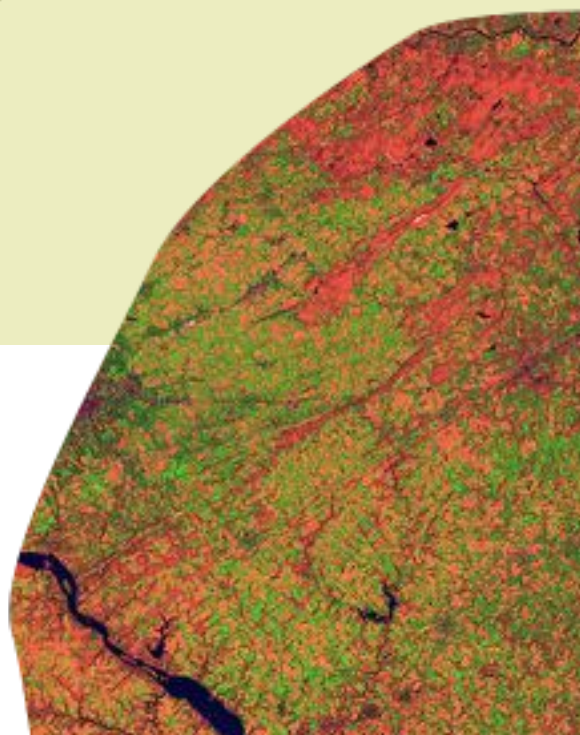
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**Occupy Climate
Change (OCC!)**
*Grassroots initiatives
entry*



FORMAS



Youth Leadership in Awareness Raising against Air Pollution in Mongolia

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Climate change issues are at stake in Mongolia as nearly as 80 percent of its territory is under threat of desertification due to excessive use of pastureland and decreasing level of precipitation (Dorj et al, 2013). When it comes to urban areas, air and soil pollution is vividly considered the major issues among other human induced climate concerns including waste management and reduced green areas in the city (Legal Info, 2011). Rapidly growing urbanization and rural-urban migration have been considered one of the major contributing factors to such pollution as tremendous number of former pastoralist Mongolians face limited choice but to migrate to the capital city for accessing better formal resources such as education for their children and employment for themselves (Terbish et al, 2020). Extreme climate conditions of drought and cold winter with snow blizzards also pushed pastoralist herders migrating to settle (in)formally in peri-urban settlements referred to as *ger* areas, where many are caught up in the intersection of poverty and social inequality (International Organization for Migration, 2019).

Expansion of *ger* area is often targeted as problem area as these settlements are often considered the major causes of persistent social and ecological problems, as well as the main sources of air smog as *ger* residents burn coal throughout winter (Naranzul & Sarnai, 2018; UNICEF, 2019). Despite the fact that the Government of Mongolia and donor organizations are taking varying measures to combat air and soil pollution in Ulaanbaatar, considerable changes have not been observed to date. Nurturing positive changes through an integrated governance to reduce climatic issues is not the only controversy faced in Mongolia but it is related to an absence of an integrated approach to climate governance which has not yet developed globally as the nature of climate issues vary considerably city by city (Bulkeley & Broto, 2013). In particular, initiatives that are authentically grown from grassroots organizations and individuals are sporadic at best, particularly in Mongolia, and much is left to be done in the fight against climate change and raising awareness among communities.

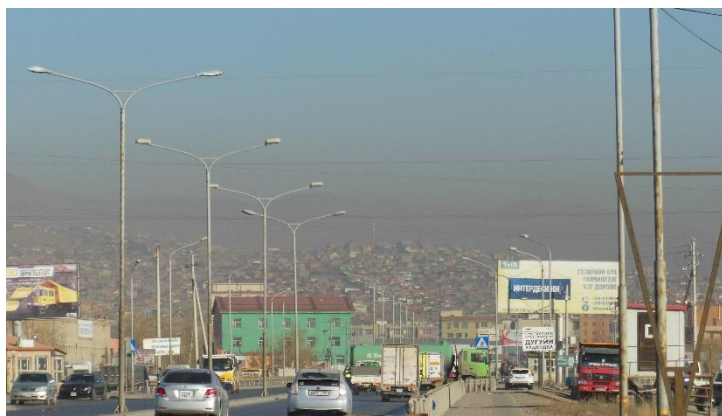


Photo 1: Air pollution is apparent not only in winter. Photo by the author, fall 2021

Ger areas in Mongolia represents a balance between pastoralist historical past with the rapid urbanization and areas are legally recognized by the Government of Mongolia in terms of land entitlement and settlement development (Hamiduddin, 2021). As such, these settlements areas are not identical to ‘slums’ as some may assume. Nearly half of the total population of Mongolia (3.4 mill) reside in *ger* areas today where households burn coal briquettes on the stove regularly to keep warmth during the bitterly cold winter in Ulaanbaatar (Terbish et al, 2020). Population of Mongolia is relatively young with about 63 percent of total population being aged under 35 and, undoubtedly, considerable number of them live in *ger* areas (Policy Watch, 2019). Pollution in *ger* areas, especially air pollution, have an impact on educational achievement of children and youth as it detrimentally impacts the health and safety of the youngsters in Ulaanbaatar (UNICEF, 2019).

One of the policy approaches by the Government of Mongolia towards *ger* areas continue to be re-development by gentrifying *ger* areas with high rise apartments in central parts and to redesign middle and peripheral zones with detached houses (Parliament of Mongolia, 2014). *Ger* residents, however, find this policy approach controversial as many face affordability issues in this redevelopment process whereas some others prefer living on their land with improved management of heating, water, electricity and sanitation arrangements. A modernist approach towards urban renewal such as this may further segregate the city, creating a divide between those who are capable and less capable (Godfrey, 2019). In addition, re-making of the urban areas without understanding what locals truly want also has a danger of creating more situations of “urban space held by the administration” (Sedrez, 2014, 113).

Notwithstanding the fact of some negative climate effects associated with rural-urban migration and expansion of *ger* areas in Ulaanbaatar, the focus of this story is either to criticize the migrants nor the unprecedented urbanization process currently at stake. But, rather, it is to highlight one of the local initiatives driven by Public Lab Mongolia (PLM)¹- a local non-governmental organization (NGO) that is working towards raising awareness on air quality by equipping Mongolian youth with the technology, training and resources to find the answers to questions they have about air quality. Guided by the Hannigan Air Quality and Technology Research Lab in the Mechanical Engineering Department of the University of Colorado and Department of Environment and Forest Engineering at the National University of Mongolia, this NGO has been conducting an AQIQ program that employs an STEM-based curriculum since 2020 by training 8-12 graders at three piloted high schools in Ulaanbaatar and six additional schools in Central and Western provinces, as air pollution is also apparent beyond the capital city. Equipped with the user-friendly air quality measuring devices called Y-Pods, nearly 180 adolescents were mentored to assess not only indoor and outdoor air quality, but they were also open to explore other pollutants and human practices (hair dye, nail polish, air freshener, shoe polish, washing detergent) that have some harmful effect in human and environmental health. Some projects developed by adolescents measured emissions from cars, with a recommendation for adults shifting to electric or hybrid car uses whereas other project examined pollutants from washing detergents, raising awareness on checking pollutants and emissions contained in a powdered detergents we use daily.

¹ <https://www.publiclabmongolia.org/>



POLLUTANTS EMITTED FROM DETERGENTS

AQIQ Mongolia Chapter
Агаарын чанарын боловсрол олгох хөтөлбөр



University of Colorado Boulder



PUBLIC LAB MONGOLIA

Khulan, Batjargal, Gerelchimeg, Nominerdene, Odgerel

Introduction

We all use detergent in our daily lives.

We conducted an experiment to compare the amount of volatile organic compounds emitted from different types of detergent to identify which detergent emits the most pollutants.

Hypothesis

Our team members predicted that all detergents emit pollutants, and that low-cost detergents would emit more pollutants.

Materials used

- Pod device, Plug
- Pencil paper for marking worksheets, expiration dates and observations
- Expensive and cheap detergent
- Watch, Phone for photography

Result



Method

- We warmed the Pod device for 1 hour to prepare for the experiment.
- Place **Amway** detergent at a distance of 5 cm from the Pod device
- Measure for 15 min and take baseline measurement for 5 min
- Measure the **OMO** detergent at a distance of 5 cm.
- We uploaded the data from the memory card and do data analysis



Discussion

According to the results, 20ppm of heavy volatile organic matter was released during the measurement of Amway detergent and 25ppm from OMO detergent.

Experiments have shown that expensive detergents emit less pollutants than cheap detergents.

When using detergents for laundry or other items, we recommend that you purchase detergents based on their low emissions, rather than on the cheap price.

We experimented with the detergent in their dry form. In the future, it is necessary to measure the pollutants emitted during the wash using these detergents.

Acknowledgements

We would like to thank Boulder University of Colorado, Public Lab Mongolia, and the mentors who are organizing the AQIQ program, as well as the teachers of School No. 3 in Arkhangai Province.



University of Colorado Boulder



PUBLIC LAB MONGOLIA

AQIQ Mongolia chapter
Агаарын чанарын боловсрол олгох хөтөлбөр

POLLUTANTS EMITTED FROM CARS

Chinbolor, Tumurbaatar, Odonchimeg, Gantsetseg, Bat-Erdene

Introduction

According to the Kyoto Protocol, there are six types of greenhouse gases, one of which is CO².

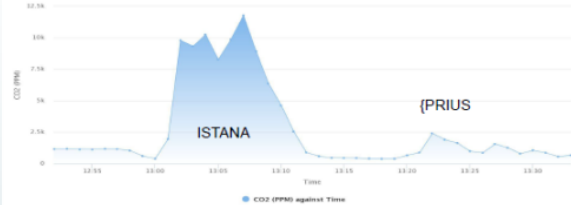
Atmospheric greenhouse gases increase the temperature of the Earth's surface and the lower atmosphere by preventing the release of heat into space.

22% of carbon dioxide released into the air from human activities is from vehicles. Therefore, we compared CO² emissions from diesel and hybrid engine vehicles.

Hypothesis

Our team members hypothesized that diesel cars emit more pollutants than hybrid engine cars.

Result



Procedures

1. We warmed up the Pod device using a portable battery for 1 hour.
2. Two cars running at the same time were placed at 1 meter from each other.
3. The Pod device was placed at the exhaust pipe of the SUV vehicle at 5cm distance for 10 minutes
4. After that, we took a baseline measurement for 5 minutes.
5. Next, the Pod device was placed at the exhaust pipe of the sedan vehicle at 5cm for 10 minutes
6. Then a baseline was taken for 2 minutes and conduct data analysis



Discussion

Our experiment results were consistent with our prediction.

The study found that diesel cars emit 3-4 times more pollutants than hybrid engine cars.

Based on this research, we advise parents and families to use electric/hybrid cars more

Probability of error

- One of the limitations may be that the measurements were taken one time, outdoors at -12 ° C.

Acknowledgements

We would like to thank Boulder University of Colorado, Public Lab Mongolia, and the mentors who organized the AQIQ program at Mongolian University of Education, as well as the teachers of School No. 3 in Arkhangai Province.

Photo 2: Poster developed by youth from Arkhangai province. Source: Public Lab Mongolia, 2022

Youth demonstrated greater level of aspiration in learning basic research skills and became aware of elementary knowledge in climate change and adaptation strategies through this program. It is expected that participants of this program dispatch their awareness and knowledge further to their peers and family members to start with the change at the micro scale to a greater activity towards community education for a climate justice. Starting small is significant as PLM believes, to acknowledge and to localize the climate change acts through bottom-up approach, so that we avoid the risk of cliché on climate topic among general public as many still do not believe the possibility for climate apocalypse (Swyngedouw, 2013).

Through these three years of implementation, educational bureau of the respective districts and provinces were supportive of this initiative and assisted the PLM in piloting schools for a smooth implementation of the program. Through this program, PLM hopes to prepare future air quality advocates and educators in their respective communities by instilling critical thinking and science-based reasoning skills in today's youth.

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