

## **Can organic intellectuals help to better communicate controversial scientific findings to the public opinion? A hint from geo-engineering**

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Given that technology is omnipresent present in our lives, it is normal for the average person to get interested in scientific concepts and theories. These are initially generated in universities, research centres and high-tech industries and gradually make their way into public opinion. This information stream is not working well and scientific findings sometimes get to the public opinion distorted, simplified, or even corrupted. Paradoxically, the scientific areas which are less affected by this problem are those which are characterized by the highest levels of complexity and theoretical frameworks, such as astronomy and theoretical physics, either perceived to have no direct influence on normal people's lives or judged as being a matter solely for specialists. In this case, the classical information flow (scientific community-media-public opinion) works as the use of metaphors and illustrations switch the description into a narrative fashion which makes it more easily understood by the public. However, this way of communication begins to fail when the scientific object relates directly to the average person's daily life.

In Quaderni del carcere (Q. II (XVIII) *Introduzione allo studio della filosofia*, 1932-1933) A. Gramsci brilliantly wrote: "One cannot make politics-history without this passion, without this sentimental connection between intellectuals and people-nation. In the absence of such a nexus the relations between the intellectual and the people-nation are, or are reduced to, relationships of a merely bureaucratic and formal order; the intellectuals become a caste, or a priesthood (so-called organic centralism)".

In this note this idea is mimed in the context of scientific communication, where similar intellectuals who are not mere reporters of scientific results, could create a "sentimental connection" between scientists and the people. Nevertheless, it is acknowledged that the political standpoint of Gramsci's reflections, are in this note used in a wider context of scientific communication. In this regard, with the term "people-nation" one means the public opinion of a specific nation. Such an intellectual should share the historical, cultural, and language heritage of the recipients of the information and be deeply embedded in the society is meant to represent. In other words, he will be an "organic intellectual". Notably, he will help to establish a fruitful two-way interaction between scientists and a specific community to avoid the dreadful characteristics of the "traditional intellectual" who, according to Gramsci (Quaderni del carcere, Q. IV (XIII), 1930-1932. *Appunti di filosofia I – Miscellanea – Il canto decimo dell' inferno*) "knows but does not understand and especially does not feel", while people "neither understand nor know but they feel". Moreover, interactions between these two worlds would avoid the sort of self-censorship shown, for instance, by German climate scientists when asked about aspects of climate change which are difficult to communicate or trigger contrasting opinions in the German society ([doi.org/10.1177%2F0963662514521542](https://doi.org/10.1177%2F0963662514521542)). This new kind of intellectual would also help journalists to reduce the high degree of interpretation, simplification and sensationalism which usually characterizes scientific results reported by the media. As a matter of fact, uncertainties and gaps normally present in scientific studies are rapidly filled with concepts and conclusions which do not come from the scientific world but usually do serve political or economic agendas. These would eventually make the entire original description radically different from the initial aim of the scientist. Nevertheless, the fair representation of uncertainties in a scientific study to a lay audience is of greatest concern between scientists and proven to be a major task.

The climate change crisis is global by nature and has reached a stage where scientists are considering creative measures to get more time to remove harmful greenhouse gases from the atmosphere. Geo-engineering is one of them. It is defined as the variety of techniques designed to intentionally modify the climate to relieve the harmful effects of climate change. It is a highly controversial topic with a resulting wide spectrum of opinions between the climate scientific community and public opinion. In this regard, geo-engineering is a perfect example of how "organic intellectuals" who share the cultural heritage of the recipients of the information, and not only know the science but also feel its real-world implications, can animate the democratic debate around such techniques.

Stratospheric aerosol injection (SAI), which consists in releasing specific particles in the upper parts of the atmosphere to backscatter the solar light and cool the terrestrial surface, is one of the most studied geo-engineering techniques. Relying solely on greenhouse gas emission cuts will not be enough to comply with the 2016 International treaty on climate change ("Paris agreement"). Consequently, scientists are exploring the possibility of using SAI strategies to contain the surface temperature increase below a certain threshold. So far SAI studies focused exclusively on modelling and lab studies, while outdoor testing has faced fierce opposition especially from environmental activists and local communities. Very recently a SAI research project called SCoPEX, conducted by Harvard University and designed to release a very small amount (2kg) of reflecting particles at 20km altitude over Kiruna (Sweden), has been dismissed by the Swedish Space Corporation under intense pressure of the indigenous Saami reindeer herders. Åsa Larsson Blind the vice president of the Saami Council declared in a statement that the technological fixes of the SCoPEX project were "completely against what we need to do now - transform to zero-carbon societies in harmony with nature" (<https://www.reuters.com/article/us-climate-change-geoengineering-sweden-idUSKBN2BN35X>). With all due respect to the vice president's opinions, I believe that continuing with the project would have given a unique chance to better understand how SAI would work and potentially reject it if proven too harmful to the environment. Or have it tuned to minimize the negative effects on the environment while reaping the benefits of a reduced surface temperature. The very small mass of particles released in the atmosphere would have generated zero impact to the Saami community's lives and interests.

What could we learn from Gramsci's lessons in this case? What would he have done? He would have probably involved indigenous people from the beginning of the project, invited to go to Harvard and to the several discussions which animated it. He might have suggested opening a web page on the project in the Swedish Saami language.

To conclude, it is time to let Gramsci's ideas on intellectuals, in our laboratories, offices and conferences. Geo-engineering, especially SAI, is a topic which inherently involves scientists, engineers, policy makers, stakeholders and local communities: a fertile environment for the formation of new organic intellectuals, able to "understand" and "feel" the other groups involved.

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