



## The educational challenge of COP22

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Less than a year ago, the COP21 led to the signature of the Paris Agreement. Its article 12 reads: All parties shall cooperate in taking measures, as appropriate, to enhance climate change education. The reasons for this Article are clear: schools are on the front line to communicate the challenges of the next decades to the incoming generation and the civil society. Children under 15 represent 25% of the world population, and never before the world had so many children. Most of these young people, living in middle or low income countries, will be the ones to suffer, if adaptation and mitigation of the climate change are not sufficient, but also the ones who will be in a position to act, since this youth has a new ecological sensitivity and a generous spirit (LS 209).

What could be a “climate change education” and its goals? There exists a very solid scientific consensus (LS 25) on climate, on which the industrial and political changes are based. But, bending the curve as expressed by V. Ramanathan, in order to limit at 2° the temperature rise, is a difficult goal to reach. Emotions and generosity will not suffice to create the appropriate and long-term behavioural changes in the civil societies, worldwide. From now on, these societies must understand the scientific message and its universal value, trust it, reason about its consequences and accept to act rationally. Education is the way to communicate to children and youngsters, the adults of tomorrow, and to their parents, the ability to understand with critical thinking and the will to act. The recent UNESCO Report Education for people and planet. Creating sustainable futures for all outlines in some details how this education challenge (LS 209) can be addressed in schools and its expected benefits.[1]

In the past, education always adapted itself to the relatively slow changes, from one generation to the next, whether these changes were physical or social. But, within the next 15 to 25 years, global warming will be 1.5°C, and 2°C within 25-35 years. Nothing as fast was experienced by humans in the last million years. The generation, who is now in schools, will barely be adult when experiencing the temperature rise and its consequences on weather, water, agriculture, housing... In parallel with industry or transports, educational systems must invent and implement changes at a pace they never experienced in their history.

In 1880 in France, at the time Louis Pasteur made his great discoveries, life expectancy at birth was 40 years. In 1950, before the generalisation of antibiotics, it reached 60 years. Most people agree that this gain was due not mainly to the use of drugs, but to education of mothers and progress in hygiene, based on Pasteur's scientific work. In France, hygiene was explained, taught and practiced in all schools when primary education became compulsory (1881). For climate change education, this lesson should not be forgotten: education can deeply and durably change behaviours.

Giving a renewed science education, where the youth discovers happily the depth of the best results of research (LS 15) is not sufficient. Integral ecology requires an opening to categories which transcend the language of mathematics or biology (LS 11). Understanding climate change, and coping with it, requires to deal with social systems interacting with complex natural ones. Hence, the first step, already not so easy, of this opening is to introduce a new interdisciplinarity in curricula, without losing the rigor of science subjects.[2] A second step, to properly deal with the education challenge (LS 209), is more difficult to implement in the schools. It should aim at conveying to the youth, in an argumented way, a critical eye on the human roots of the ecological crisis (LS 101), leading the students to practice technology but sometimes question it, since technics separated from ethics shall barely be capable to self-limit its own power (LS 136). In term of ecological imprint, the cost of a high human development with today's accepted index (HDI) is extremely heavy.[3]

Climate education requires a third step: the empowerment of children, who have to become the agents of change, now and in the future. The traditional school mostly aims at a top-down transmission of knowledge, although recent evolutions (OECD) stress the importance of skills, in parallel with knowledge, and emphasize an inquiry pedagogy with a more horizontal, rather than vertical, relation from teacher to student. This empowerment can begin in active and inclusive schools, where local solutions are explored, invented and argumented, implemented and analysed by the students, teachers, parents and the community. Potential topics are numerous: agricultural changes, improved water and air quality, understanding extreme events, as an act of love expressing our dignity (LS 211)...

Ultimately, to implement global solutions, the youth has to develop empathy for other people, to consider all humans as brothers and sisters, embarked in the same global fate, beyond nations, religions or cultures. This may seem naïve, but there is no systems which completely cancel the opening to good, truth and beauty, neither the ability to react which God keeps encouraging in the depth of human hearts (LS 205).

I summarize: to build a critical mind and a hopeful heart, indeed school for all, but no longer school as usual. A school with more interdisciplinarity, a more critical eye on technology and growth, an empowerment of children, a trust in the human heart and the power of spiritual values.

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These goals may seem a total Utopia, knowing the state of education and schools in so many countries worldwide. One billion children today do not have a proper education, over 250 millions have no schooling. At the current pace, 30% of children in the poor countries will not have primary education in 2030. Half of the 60 millions refugees today are youngsters, a large fraction of them without schooling in camps. In the last years, the spending for education has decreased in more than half the rich OECD countries[4] as did decrease the international aid for education towards the developing world. Certainly, implementing climate education in this context will not be easy. Nevertheless, avenues are opening to do it, both locally and globally. The messages of the Paris Agreement, the UN Sustainable goal, especially #4, the UNESCO 2016 Report, last but not least the Encyclical Letter *Laudato Si'* all go in the same direction, and I suggest here a few possible lines of action for education.

First, how best help educational systems, educators and teachers? In the last two decades, we have witnessed how effective for deep changes in basic science education has been the involvement, worldwide, of the scientific community with high figures (Georges Charpak, Mario Molina, Bruce Alberts, Wei Yu...).[5],[6] Since 1988, thousands of scientists worldwide are gathered in the IPCC for climate and UNEP (UN Environment Program) for biodiversity. Their Reports, every four years for IPCC, are based on the depth of the best results of research (LS 15) and have been decisive for global awareness and choices. These scientists all over the world represent a formidable potential to implement climate education. For example, the co-president of IPCC, Valerie Masson-Delmotte, proposes that, in the future, each Report of the IPCC be accompanied by the production of multi-lingual resources for helping teachers of primary, secondary or university levels. Could this be funded and organized at a global scale? Supported by UNESCO, science Academies and indeed IPCC, such an action would have a formidable impact, and change the fact that, today, out of 78 national curricula analyzed by UNESCO, only half of them mention "ecology".

Second, creating global networks of schools. A year ago, a Workshop at the Pontifical Academy of Sciences addressed the question of Children and Sustainable Development. Over twenty grass-root organisations were present, and ready to form a global network, accompanying teachers, before listening to the conclusions by Cardinal Turkson.[7] Since 2003, the InterAcademyPartnership has an active science education program, supported by many of its members, the science Academies. In Germany and Africa the Siemens Stiftung with Experimento,[8] in France the Fondation La main à la pâte,[9] explore how to accompany teachers in science and development issues. During the COP22, the Academy Hassan II from Morocco organizes a Workshop on Education and Climate change, while UNFCCC has, among many others, a Side event on Education, Key driver to scale-up climate action.[10]

Third, establishing children empowerment by helping youth organisations inside and outside schools. Led by Veerabhadran Ramanathan and his team, the University of California creates a course, aspiring to equip the bottom-up students movement with the capacities and knowledge (technical, scientific, social) necessary to act.[11] Supporting his thesis on children's agency, Joachim von Braun (Bonn) cites and helps developing eco-schools in India, Peru, Bangladesh, Ghana.[12]

Changes in education are slow, because of the magnitude of their scale, the mediocre resources, if any, devoted to the continued professional development of teachers in most countries and the often poor salary of these teachers. Yet, there is no time to wait to implement climate change education. The present Meeting, inspiring COP22 in Morocco, may contribute to launch an ample movement in this direction, inspired by the needed ecological conversion (LS 216) and the pursuit of integral ecology, advocated by *Laudato Si'*.

## End Notes

[1] In *Education for people and planet. Creating sustainable futures for all*, UNESCO 2016. Among these benefits: right knowledge, skills and technical behaviour; climate change awareness; curtailing population growth; reduce vulnerability to disasters; well designed curricula, strengthening people and connecting with nature; connecting parents.

- [2] Cf. this 2016 study in North Carolina (USA) schools (grades 4 to 12): “The strongest factor in students’ belief in human-caused climate change was their own knowledge of climate science.” <https://www.sciencedaily.com/releases/2016/09/160907143125.htm/>
- [3] Unesco Report 2016, op. cit., Fig. 1.
- [4] OECD, *In It Together, Why Less Inequality Benefits All*. Paris, OECD Publishing, 2015.
- [5] See Allende, J. “Academies active in education”, *Science*, 321, 1133, 2008; Alberts, B. “Redefining science education”, *Science*, 323, 437, 2009; Le#na, P. “Europe rethinks education”, *Science*, 324, 501, 2009.
- [6] In China, the new program of science education is advocated by Wei Yu, China Science and Technology Press, 2011.
- [7] A full report is in: *Children and Sustainable development. A challenge for education*, Springer, 2016 (in press). A 2015 Workshop of the Pontifical Academy of Sciences, <http://www.casinapioiv.va/content/accademia/en/events/2015/children.html/>
- [8] <https://www.siemens-stiftung.org/en/projects/experimento/>
- [9] <http://www.fondation-lamap.org/>
- [10] Side event at Marrakech (Morocco) on November 14, 2016. See [https://seors.unfccc.int/seors/reports/events\\_list.html?session\\_id=COP22/](https://seors.unfccc.int/seors/reports/events_list.html?session_id=COP22/)
- [11] <http://sustainability.uci.edu/engagement/uc-carbon-neutrality/>
- [12] von Braun, J. “Children as agents of change for sustainable development”, in *Children and Sustainable development*. See ref. 7.