

# The challenge of climate change: social and educational priority

Climate change raises enormous concerns in terms of production system adaptation. Acknowledging that Peru is one of the most vulnerable countries to its effects and that it involves social, economic and environmental problems that affect our people, infrastructure, productive and ecological systems, imposes the necessity to plan in the long term and act immediately to adapt to potentially adverse impacts.

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CONVERSATION WITH MIRIAM MARTÍNEZ ZÚÑIGA, CLORINDA POZO ROLDÁN AND TANIA REINAGA VIGURIA

Moderator: Huber Santisteban Matto. Held on October 29, 2014

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**TAREA:** Could you give us some personal and professional information? What are you doing at present?

**Tania Reinaga (TR):** I am a biologist. In the last five years, I have been working in climate change projects with international cooperation agencies and NGOs. At present, I am consulting for the elaboration of the base line of the regional strategy on climate change.

**Miriam Martínez (MM):** I am an educator and I have a Master's degree in Educational Sciences majoring in Investigation and Teaching. Currently, I am responsible of the Environmental Education Area of the Regional Government of Cusco, in the Natural Resources and Environmental Management Division.

**Clorinda Pozo (CP):** I am an educator and lawyer. I have a Master's degree in Investigation and University Teaching and another in Democratic Society, State and Law, my paper was on Environmental Law. I have worked for the Retama project in the La Salle Pedagogical Institute; and I am now in Arariwa, an NGO focused on climate change proposals.

**TAREA:** Many studies suggest that global warming is caused by the concentration of CO<sub>2</sub> or greenhouse effect in the atmosphere, what are the effect in the lives of people and ecosystems?

**TR:** Global warming, which produces climate change, is actually caused by anthropogenic activities. Greenhouse effect has always existed – having 15 degrees Centigrade made it possible to have life on Earth. It is only since industrial era that the process has accelerated. Temperature has increased in the last 100 years in approximately one degree Centigrade globally, and we can feel it every day. Peru is considered the third most vulnerable country to climate change worldwide. First of all, because the principal economic activity of the third of the population is dryland agriculture and it is already being affected due to water shortage. Some crops are moving up an ecological floor: if there were areas in which potato was the only crop produced before and not corn, now the situation is the contrary. It is growing, and even fruit.

Regarding ecosystems, for example, the cloud forests of Pilcopata, in Paucartambo, move up one floor every day; they will reach the scrublands and will extinguish. Some diseases are arising among flora and fauna, such as fungus in amphibians. Human health is affected by endemic diseases that belonged to the valley and the jungle, such as yellow fever.

**TAREA:** This means we will find diseases that were previously tropical in Cusco.

**MM:** In Urubamba, we can find yellow fever. We cannot say that it is only in Quillabamba. Likewise, acute respiratory illnesses are appearing due to extreme temperature.

**TAREA:** So, we should worry of the effects?

**MM:** Yes, it is important to highlight, for example, that the increase in the number of cars is producing more greenhouse effect gases, especially in urban areas. The other point is that, being a primary exporter country, in fact extractive industries produce a great amount of water, soil and air contamination, which contributes to increasing greenhouse effect. And the law is very flexible.

**TAREA:** In the Peruvian case.

**MM:** Yes, of course. And now with the *boom* in mining investment which is believed to be the solution of the economic problems of the country. This

is bringing environmental problems. That is why it is claimed that this type of development is not compatible with environmental development.

**TAREA:** Why would it be?

**MM:** Because the more investment, the more environmental impact. How many companies are really environmentally responsible? We have not seen any company assuming a commitment of positive change. They disguise that reality proposing isolated projects to communities that do not contribute to environmental development. For example, in Las Bambas and in Espinar, water is totally contaminated.

**TAREA:** Actually, corporate investment is correct, as long as it is compatible with environmental care.

**MM:** There we have a social issue. What is it good for communities were extractive mining projects are implemented? The idea of development is not the same for all of us. They must have the right to be consulted and decide how their surroundings should be transformed.

**TAREA:** Why are we considered among the most vulnerable countries to climate change?

**MM:** In general, all developing countries are vulnerable because we still have high levels of poverty so we are being absorbed by global warming. In the Andean area, glaciers are melting and there is water stress. In the end, we will suffer water shortage so it is necessary to have public policies with a water basin approach to have a good water resources management. Another issue is that Cusco has 51% of Amazon territory with vast extensions of forests, our source of carbon.

We face deforestation which carbon dioxide emissions produce. Therefore, new regulation on emission reduction should be taken. This means Red+ which allows us to protect forests and pay the people for ecosystem services. Another issue is food security: nobody has noticed that climate change is affecting agriculture. Products are not planted and harvested according to the regular calendar. There is uncertainty in the farmer who will produce food insecurity.

**TAREA: Is climate change strictly an environmental issue? Should an agency be created?**

**MM:** No, it affects everybody. It should be addressed by health, education, agriculture, forestry, mining and infrastructure sectors. Fortunately, Cusco is considered the first region that has taken climate change seriously. Since 2012, we have had a regional strategy and at present we have addressed 15 out of 64 strategies. For example, principal resources affected by climate change are water, biodiversity, forests, food security, production, energy, natural protected areas. And it is also considering in the education and health sectors. Therefore, we think all institutions should consider this as a model to generate projects and incorporate climate change as a variable in all social, production or environmental projects.

**TAREA: Could universities participate as well?**

**MM:** Yes, because there is research to do to understand climate change. There is still work to do to convince sceptical people about the changes. Likewise, in the health sector there are vectors that are ascending and producing illnesses, and it is something that compel national universities especially, as private universities can invest in other sectors more freely. For example, in the case of San Antonio Abad University, they have an important amount from the mining taxes that should be driven principally to investigation on climate change.

Another point is to generate citizenship environmental awareness. We can see children in basic education levels working in Science and Environment but this topic should cross the entire curriculum.

**TAREA: Precisely. I would like to go deeper into what is going on in education.**

**MM:** Well, regarding the Learning Paths in national curriculum and the Fundamental Learnings, one of them is to learn to live in a healthy and balance environment. But when we try to make it real in our daily job or when trying to develop students' capacities, I think there is a big inconsistency between what is written in the curriculum and the learning practice. There is a big gap that should be closed.

**TAREA: How is it expressed?**

**CP:** In the insignificant things that we learn, and we are not referring to basic competencies, performance or being aware of nature and the space we live in because is part of our lives. In the Andean philosophy, being part of something means that I must contribute to harmony, and if I destroy it, the opposite happens. On the other hand, in western culture when someone is the owner, he/she can deforest, harm or overexploit natural resources. This "extractive thinking" is stuck in our minds, and we do not have the innate disposition to keep the new information and express it through our values.

**MM:** I think there has been advance in mainstreaming contents in education based on the National Environmental Education Bill, approved in 2012, which must be followed up and evaluated. The other issue is that the Ministry of Education and the Ministry of Environment should coordinate in order to incorporate environmental issues in education.

**TAREA: What else should be done?**

**MM:** It is necessary to comply with the norm. Attitudes should be changed and we have not seen that change. It is not the responsibility of the Science teacher as it was before. Now mathematicians, communicators, physicists and chemists should include these topics in their fields of expertise. And we should prepare kids with this vision of the future. The other thing is to work deeply in Community Environmental Education. It is important because if we diversify environmental education into non formal and community education, we will have great achievements and change attitudes.

**TAREA: And how do you perceive it? Are we going along with climate change or lagging behind?**

**MM:** I have been collecting information regarding how schools are incorporating climate change in their local and school education plans. Well, it is a cross-cutting component, but climate change is not addressed. Asking teachers the reason why they do not talk about climate change, some say they do talk about it because they know it, they were trained and attended events organized by NGOs, the UGEL (Local Education Management Unit) or the Regional Government. They do it on their own but not because it

is part of the norm that sets it to be included in the School Education Plan. They think they should be incorporated.

**TAREA:** We should see children as agents of change because they are the ones who will suffer the strongest effects of climate change in 10 or 20 years.

**TR:** We are going to leave them a devastated world because the effects will be stronger every time. So, the variable climate change should be mainstreamed all the way from the norms of the Ministry of Education (MINEDU) to the Regional Directorate of Education, the UGEL, and then it should come down to schools, so teachers assume that as an activity in their daily work.

**MM:** I have some different thoughts from those of Tania's but her insights are interesting. I do not consider that the Ministry of Education should impose norms; it should be a two-way strategy. MINEDU has worked in national policies - it must be recognized – but there is a gap in the regions. Promoting the Regional Curriculum Design by Banco de Crédito was a very good initiative but it stopped half the way. We wanted to set our seal and work according to our environmental reality. We should resume this work so teachers know how to contextualize the contents starting from regional policies that are closer to them. We are not coordinating: there are very nice experiences but they are isolated. All the energy should be driven into working sustainable proposals based on regional policies and continue working institutional proposals that include daily practice.

**MM:** Yes, we have to find ways to build consensus and develop this topic, and make regions comply and adopt these policies. It would be interesting to have a task force to implement environmental education at regional level, as a result of this dialogue.

We are also preparing the base line for the climate change regional strategy. One of the lines suggests aligning climate change in the regional, local and school education projects as a cross-cutting component. We already have a policy on climate change management. We only need to use this management tool.



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**TAREA:** In fact, we are interested in taking matters into our own hands. If it is a matter of surviving, why education is not assumed completely? There is a big indifference towards this problem, at both formal education and society in general. There is a lot of emphasis in reading comprehension and calculating but it is more important surviving, in my opinion.

**MM:** We are talking about multiple intelligences, and we should develop different capacities and walk towards a more comprehensive development. But in reality, we are prioritizing logical-mathematical thinking and reading comprehension as “the” tools for learning. This is because teachers know their children will be evaluated in those two areas and that the teachers themselves will be indirectly evaluated as well. So they left other things behind.

**TAREA:** Goleman said it. It is written in *Ecological Intelligence*.

**MM:** And Gardner as well talks about environmental intelligence. We think it is important to follow the National Curriculum, e.g., working with the eight fundamental learnings democratically and equally, without diminishing one for another. This has to do with politicians: we need to work hard with them so they assume their duties, in the case of our region.

**TAREA:** More specifically, Tania was saying that greenhouse effect is being produced by human intervention, so it is people who are generating it through different actions...

**TR:** Precisely. Peru will hold the COP 20. The result will be a report to be presented in the COP in France in 2015. But it turns out that the most contaminating countries of the atmosphere – Canada and the US – have not signed the Kiyoto Protocol. We hope they will sign next year. For example, Peru produces 0,4% of greenhouse gas worldwide, almost nothing. However, atmosphere belongs to everyone and we cannot say that the greenhouse effect gases that the United States produces will not affect us. As I was saying, we are the third most vulnerable country to climate change because we are megadiverse country: out of the 114 of living areas in Peru, Cusco has 84. Out of the 32 climates in the world, 28 are in Peru. And if that happens we will not be able to rise again

immediately. Remember what happened in Cusco in 2010. The poorest families are still struggling to build their houses back. We hope that representatives of 113 countries in the COP 20 reach good agreements.

**TAREA:** Should we rethink this way of worshipping industry? Are Ollanta Humala’s calls for industrializing Peru good messages?

**MM:** That is why education should address sustainable development. There are Iberoamerican countries that are already promoting this type of education. I think corporate social responsibility comes into play. In fact, impacts from mining and hydrocarbon activities will damage the environment. But there are ways to mitigate, making those industries more sustainable for the development of the country. We should prevent and manage risks.

Investing forcibly, without respecting others, neoliberalism has become into cannibalism at any cost. This has to do with globalization, a worldwide effect that developing countries such as Peru or India are suffering. These countries are attractive to investors who think only in obtaining profits. Francisco Caballero wrote a very interesting book on the keys to globalization. He says that the European boom and the American dream are gone; now we are facing the Latin-American dream. What will save our countries from that overwhelming investment that does not respect anybody?

**TAREA:** And how is that Latin-American dream, according to Caballero?

**MM:** It is based on culture. People should place their conditions and have their decisions respected - because they are their life choices - facing them with their cultural background and their vision of development. Peru has grown economically but, what is happening right now? With the fall in the price of minerals income from mining taxes also fall. It is clear that extractive industry is not sustainable because it is too dependent on the price of minerals. Caballero’s idea is to generate another type of more sustainable and environmentally healthy productive activities. For example, we should look at agro-ecological agriculture, which has an added value.

**TAREA:** Universities are not assuming their responsibility as generators of knowledge. Sustainable development implies working on alternative clean energy. We do not see universities doing research, never mind schools. We do not see it in textbooks. You can see some things in Science Fairs but they are not even considered under this perspective.

**MM:** Yes, Electrical Engineer Faculties and others should respond to that. When we invited them to contribute to our climate change strategy, we generally received responses from the Faculty of Biology only, not the others. Environmental education does not compel only basic school but university as well: how to use energy from the water, the soil; how to manage solid waste rationally.

**TAREA:** I remember that there was a conflict in Espinar. Mollohuanca, the former mayor, was moved to one place to another, as in the times of Túpac Amaru. The ones against the movement were students of Mining Engineering. Obviously, they were thinking about their own future jobs.

**MM:** San Antonio National University, for example, has been involved in this process of climate change during the last four years. Now it is part of the Regional Committee on Climate Change. It is the first Peruvian university that has a Master Degree in Climate Change and Sustainable Management, and it is the first in implementing three diplomas on Climate Change and two in Sociology, in agreements with private institutions and NGOs.

**TAREA:** Which faculties do these students belong to?

**MM:** Look, in the Master course I am studying, everybody thought they were going to be only biologists and agronomists but there are journalists, geologists, physicists, civil engineers and mining engineers. I think that is why Cusco is a pioneer region in climate change. In the last years, the University has been using the canon for investigation. It is not very big but they have published some investigations.

This began in the Technical Group on Climate Change of the Regional Government because we have promoted the participation of the university. And the Master



TAREA / HUBER SANTISTEBAN

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*Miriam Martínez Zúñiga*

was created with the support of the Program for Climate Change Adaptation. It was not easy because the Investigation Department had to be created.

**TAREA: It is a concern that this is not an initiative of the faculties themselves.**

**TR:** Of course. This is an initiative of the Natural Resources and Environmental Management Office. I come from the Region of Junin where I have been working this issue with the Regional Government for two years. For me, it is a joy that this Office is the engine that is moving other institutions.

**MM:** Maybe when you prepare your thesis you could assume the issue on local knowledge. It is been very little investigation in the field and we can find good practice in local knowledge that can be collected in order to become scientific knowledge. Ecuador has done it; Colombia has generated green movements, and in Peru, we will struggle for water and clean energy. So, we should be pioneers and look forward to what is coming, working with people. We should start with an intercultural view and mix and weave knowledge from our ancestral knowledge.

**TAREA: What role will this indigenous knowledge have? How will the scenario be like?**

**MM:** They have developed agriculture and fishing, using spaces sustainably. For example, terraces did not produce landslides, did not degrade soil. How can we copy this knowledge and share it? Registers of knowledge are collected by civil society but we do not know the results. For education sake, it is important to have information system. If we do not generate platforms for knowledge to be shared generation to generation, we will lose. There is a good initiative in the Regional Government that has set up a Regional Environment Information System.

In the Master course and in my own professional experience, I have been working different approaches. Many NGOs are using the approach of adaptation based on ecosystems, in which biodiversity and the services for climate change adaptation are used. Likewise, they are using the community based approach where recuperating local knowledge and Andean vision is precisely what they are doing. At regional level, there are NGOs that are building rus-

tic reservoirs, looking at soil management, the pata-patas and ditches of infiltration as ways to adapt to climate change.

**TAREA: What are pata-patas?**

**MM:** They are a kind of terraces but worked in a more rustic way. There they used agro-forest systems, wind curtains. The Inkas were very wise; they faced climate change and food security.

**TAREA: Are they being recuperated to be reproduced or for their historical value?**

**MM:** They are ways to face climate change because they have been proved to be very effective. A lot of NGOs such as Arariwa have these ways of adaptation, especially in communities in the highlands, which are more affected by climate change. They are also working with gender perspective: the role of women, families. We know that women are going to be the most affected by the impacts of climate change for they control the economy, they take care of the children, prepare the food. These places are already suffering hydric stress and women have to walk longer distances to get water. They started using spray watering where fountains of water were available, and when planting and harvesting of water were far. Now you can see communities that have organized and proposed participatory budgets to work on community planting and harvesting.

**TAREA:** From the education point of view, this implies seeing rurality in a different way. We are experiencing a strong emigration to medium sized cities, to provincial capital cities. Sicuani, where we work, is receiving more and more peasants. Communities are practically deserted.

**MM:** I have been thinking why people emigrate or why the head of the family has an opportunity to continue working in agriculture or cattle raising in their communities. The problem is that their municipalities or authorities do not promote sustainable agriculture, do not boost projects for peasants to implement.

**TAREA: So, if everybody comes to the cities, how should rural education be addressed? Do we have to see it in the context of ecological crisis then?**

**MM:** I insist on implementing projects. My office is implementing a project in five provinces to generate and revalue ancestral knowledge on native crops. We have prioritized 81 native crops and there is an education element. I always say that all projects, plans and programs should have education components to be sustainable.

**TAREA:** Both formal and community education

**MM:** Exactly. And we are following the characteristics of the project, the peasants' traits who are assisted, and sensitization to develop native crops, for example. We are talking about quinoa, kiwicha, potato and yucca. There are many crops and in many ecological floors. This type of projects should be promoted by municipalities to help their people so they do not migrate, for their development. And the most important thing is that we revalue ancestral knowledge, as this is the approach of the project.

**TAREA:** **There is a homogenizing education, very urban but there is no vision for rural education. As opposed to other countries in which there is a substantial differentiation, even beneficial, in favour of rural education.**

**MM:** I think the rural topic does not have to do only with teaching the mother tongue – in this case Quechua – but also with a series of aspects regarding environment, related to beliefs, knowledge, insights. And in the case of the rural area, the cosmovision is different to the urban area. Understanding this is developing proposals in a participatory way to stop thinking like others. The idea is to work with them, building a culturally pertinent education but also new dynamics and challenges. For example, there are mining corridors surrounded by schools that do not know what happens behind their walls. They should be aligned to the development of new dynamics. In this way, young people could adapt and contribute to the development of their communities more effectively. This will only be achieved with a pertinent education.

Students should have more contact with nature. Living activities should be put over the mechanical or memory learning. For example, vocational schools with agriculture specialities have an important role but now they are almost inexistent. Is this what pa-



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rents want or is what the Ministry of Education thinks it should be done?

Bilingual education is very important and it should continue not only in rural areas but also urban areas, in secondary schools and even universities if it is possible. When I left university and had to work in rural areas, it was very difficult to communicate with people.

**TAREA:** What are schools working on?

**MM:** In agriculture. And they can add climate change approach. They should improve their curricula. There are also NGOs that are working in leadership schools that can be part of that approach.

**TAREA:** How do you see this dialogue in the future? On one hand, there is science, and on the other, there is the knowledge that has a presence in Peruvian and world history, and has shown its benefits.

**MM:** When we are working in recuperating ancestral knowledge, Andean cosmovision is complemented with the modern knowledge. For example, sowing and harvesting of water and creating rustic reser-

voirs represent ancestral knowledge. And in order to use water efficiently, we are incorporating spray watering, which is a modern technique. Or when we work in protecting genetic patrons of seeds, peasants know how to do it and the National Institution of Agrarian Investigation (INIA in Spanish) intervenes, and they complement each other.

**TAREA:** Now local knowledge is, somehow, assumed by official entities, why is this change?

**MM:** Since the beginning of the Green Revolution, our heritage has been valued. But we have waited for our knowledge to be patented abroad to start valuing it. We have not worked on identity and cultural contributions with all generations. I think we are being pushed by an agro-ecological movement whose promoter is a Chilean, Miguel Altieri.

**TAREA:** Is there another proposal that should be incorporated in education?

**MM:** I think territorial management should be included. It is in the course of Social Studies but very superficially. Concessions are increasing and its regulation is so flexible that almost all Peru is a concession. 🗣️