

El Nino and La Nina do deserve, expect and claim Tropical Aid

Many people are already aware and facing multiple effects from El Nino and La Nina influences such as droughts, floods, high or low extreme temperatures and moistures, storms, cyclones and other meteorological events mainly occurring in tropical and subtropical places. These impacts cause low crop yield, poverty, new pests and diseases and human and animal migration among other terrible consequences, including various social, politic and economic problems. There are plenty of definitions of El Nino and la Nina; however, as any concerned tropical citizen, I would like to share with you my own simple understanding of it, together with some humble recommendations.

First at all, it is important to comprehend the origin of the words to better understand their meanings. The term El Nino originated from Peruvian fishermen who first recognized a strange warm southward current that modified the temperature in the eastern Pacific Ocean waters that border their home. As any tropical region, Peru is host to one of the world's richest marine biodiversity (analogous to the tropical rainforest). Because these strong events were often observed close to Christmas time, the phenomenon was named "El Niño" (when capitalized, "the little boy" becomes "the Christ Child" in Spanish). Although "La Niña" refers to a "young girl", the term La Nina did not originate in the same way; it was adopted by researchers in the 1970s and 1980s to illustrate the relationship between relative warming and cooling events in the waters of the eastern tropical Pacific.

Although El Nino is defined by prolonged warming in the tropical rim of the Pacific Ocean when compared with the average value, it also could occur in tropical regions at the Atlantic or Indian Oceans. During an El Nino event, sea surface temperatures across a watery expanse can warm by 0.5 °C or more for a period of from a few months to a year or two. This surface water warming causes significant variations in atmospheric pressure and ocean circulation which, together with surface trade winds across the tropical Pacific, develops drought conditions nearby and a shift nurtured by convection with heavy rains and thunderstorms thousands of kilometres of its original location.

La Nina, the counterpart to El Nino, is a cooling of the waters across the Pacific region. However, La Nina brings a different set of atmospheric and oceanic patterns and connections to these and other regions, with some but not all effects roughly opposite to those of El Nino. Thus, we have such children and erratic events which are normally accompanied by variations in the tropical Pacific Ocean-based system of air circulation as well, as a vast see-saw in atmospheric pressure (Southern Oscillation). The Pacific Ocean is the largest ocean in the world, covering 35% of the earth and equal size to almost half of all the oceans (Atlantic, Indian, Antarctic and Arctic). Therefore these atmospheric events are mainly observed and originated at the Southern hemisphere.



Pacific Ocean: the largest ocean on Earth

The Southern Oscillation is a change in air pressure measured between the eastern (Tahiti) and western (Darwin, Australia) parts of the Pacific. When the pressure is high at Darwin it is low at Tahiti and vice versa. The combination of these atmospheric and oceanic effects associated with El Niño and La Niña is termed El Niño Southern Oscillation (ENSO). ENSO impacts the hydrological cycle, and it has been related to floods and droughts, river discharge, soil moisture, coastal water quality, and sea surface salinity. An analogy could be the formation of big storms at the Sahara desert. The Sahara, whose land mass is almost that of the continental United States, is the largest “hot” desert in the world. There are great swirling winds over the Sahara carrying sands over the Mediterranean, bringing storms into England, dropping sands on the beaches of eastern Florida and causing hurricanes that hit the eastern coast of the United States.

In any case, the great mass of winds formed by high sea (South Pacific) or land (Sahara) temperatures, develops and travel without any stop or barrier. Sometimes it spends its life out over the open ocean, never reaching landfall. But, when it does reach land, there are significant effects. El Niño and its sister event La Niña are not a new phenomenon; they have been around for thousands of years. However, nowadays our resilience is very low and we are not as adaptable and well prepared to tolerate and face it as we were in the past. Incas, Mayas, Polynesians and other tropical inhabitants worldwide were well recognized to be aware of their

natural resources and ever ready to promote knowledge and conservation of the rich biodiversity. Currently, agricultural growers keep setting their production (vegetal & animal), their health and their rich biodiversity and environment at severe risk through irrational use of highly residual pesticides and fertilizers. Sadly, this picture is common, continuous and worst one in any tropical region worldwide.

Generally speaking, tropical regions are still struggling to adapt using foreign technologies developed under temperate conditions (Industrial, Green and Molecular revolutions). Therefore, all local governments and non-government institutions in the tropics have been competing to secure the very desirable overseas aid (Australia, New Zealand, Europe, USA, China, Japan, Korean, Canada). Honestly, it seems to me that colonization time is continuing as governments and local private companies or institutions in tropical countries depend on remittances, respective overseas technologies and commands. Local or external organizations continue neglect and disrespect natural resources and rich biodiversity. It is also unfortunate indeed, that there is not yet sufficient investment in applied research to face and overcome our current sad reality. Nevertheless, it is never too late to start the most important local participation: **Tropical Aid**, integrated with all worldwide aid. Thus, any educational and research strategy which respects, rescues, promotes and strengthens marvellous **Tropical Diversity** could easily become the base of our so expected and deserved Sustainable Growth and Development.

This article kindly invites everybody on this planet and especially tropical people to be proud and aware of this marvellous region and its great biotic and abiotic diversity. It is the time to start thinking, rethinking and to realize that before this famous and trendy **Climate Change**, a significant **Human Change** has been occurring. Here I would like to raise just one recommendation based on the most compulsory necessity of being very proud of every natural resource in tropical regions: it to gather a good knowledge and look after it through respect, conservation and sustainable development.

1. RESPECT: it is necessary to be responsible and considered when talking about discovered or undiscovered tropical biodiversity. We should avoid any neglect and contagious degradation action on any natural resource. It is common to hear disrespectful words such as “jungle, wild, bush”, instead of, for example, “the marvellous tropical rainforest or countryside”. Other common words are “Cassava or Potato: the special food for poor people”, instead of “Tropical Crops: Good Healthy Food and Good Life for everybody”. Further common and real examples are shown in table 1.

Table 1. Different characteristics and terms for some great tropical vegetables in comparison with its analogous temperate crops.

	ROOT VEGETABLES		LEAFY VEGETABLES		VEGETABLE HERBS	
	SWEET POTATO	CARROT	PELE	SPINACH	CULANTRO	CORIANDER, CILANTRO
Latin name	<i>Ipomoea batatas</i>	<i>Daucus carota</i>	<i>Abelmoschus manihot</i>	<i>Spinacia oleracea</i>	<i>Eryngium foetidum</i>	<i>Coriandrum sativum</i>
Origin	Tropical	Temperate	Tropical	Temperate	Tropical	Subtropical / Temperate
Nutritional benefits	Higher	Lower	Higher	Lower	Higher	Lower
Health benefits	Higher contents of vitamins and antioxidants	Lower content of vitamins and antioxidants	Higher contents of vitamins and antioxidants	Lower content of vitamins and antioxidants	Higher contents of vitamins and antioxidants	Lower content of vitamins and antioxidants
Gastronomic uses	Undiscovered	Many uses	Undiscovered	Many uses	Undiscovered	Many uses
Main consumers	Poor kids and tropical people	Millions of kids promoted mainly by cartoons and Chefs	Poor tropical people	Millions of kids promoted mainly by cartoons and Chefs	Poor tropical people	Millions of kids promoted mainly by educational campaigns and media
Typical terms or quotes	FOOD FOR POOR PEOPLE	Eating a carrot a day is like signing a life insurance policy	BUSH SPINACH	Iron Vegetable	WILD CORIANDER	Exotic and Miracle Herb

2. CONSERVATION: without good knowledge; resources are not well looked after properly. The base of any knowledge is indeed good education and research. When we talk about local knowledge, we are relating it to adapted education and applied research which should be raised and developed by local people (**TropicAID**). There is a special necessity to conserve our tropical regions; otherwise, we will contribute in small but increasing scale a very serious negative effect analogous to El Nino or La Nina influences.

For example, each time that people make fires or generate rubbish at any rural or urban place, they are promoting severe and irreversible environmental degradation. Controlled burn or uncontrolled fires begin in the ground by burning and killing the rich and essential but largely ignored soil biodiversity and simultaneously destroying native flowers, removing a vital food source for honey bees and their allies. Wastes contamination also affects firstly the biodiversity and health of the soil and water resources and subsequently has a significant negative impact on fauna (animal) and flora (vegetal) population (See figure below).



Biodiversity Health and Human impact.

(It is also happening with billions of microorganisms in just 1 teaspoon of Soil)

3. SUSTAINABLE DEVELOPMENT: Now, it is the time indeed to start to develop our own local and sustainable paradigms. Current realities evidence that production technology in the tropics has lagged behind temperate zone technology in the two critical areas of **AGRICULTURE and HEALTH**, and this in turn opened a substantial social and economic gap between climate zones. The lack of appropriate education and applied research in tropical countries has emphasized and amplified as the main contributors to this significant gap.

For this reason, we need to have a concerted local and integrated effort to develop sustainable inputs and technologies specific to the needs of tropical regions, which will strengths the still rich biodiversity and improve the health of all. The Noni (*Morinda citrifolia*), Moringa (*Moringa oleifera*), Neem (*Azadirachta indica*) and Leucaena (*Leucaena leucocephala*), among other important plants used over centuries in tropical and subtropical regions will never be “miracle” plants if grown them as individual, mono or panacea crops. They should be introduced and integrated to local agro ecosystem to promote and restore **Biodiversity**. Here, we can see some important distinctions among tropics, subtropics and temperate regions, to **Rethink** about **Climate and Human changes**. Thus, any similarity with current reality is indeed not a coincidence.

DISTINCTIONS OF TROPICS AND TEMPERATE REGIONS BY LATITUDE		
Region / General characteristic	TROPICS	SUBTROPICS AND TEMPERATE
Latitude	23.5° North (N) to 23.5° South (S)	Subtropics: 23.5° - 30° N/S, Temperate: 30° - 50° N/S
Area	77000000 Km ²	54000000 Km ²
Human Population	Highest and constantly increasing	Lower and small reduction annually
Climate Seasons	Dry and Wet	Summer, Autumn, Winter and Spring
Day length/temperature	Intermediate & constant year round Length day: around 12 hours Temperature: around 30 °C	A wide range, up to each season Length day: 5 to 18 hours Temperature: -20 to +45 °C
Human, animal and vegetal Respiration and Transpiration rates	Intermediate and constant year round	A wide range, up to each season
Biodiversity	The Highest one. Example: Tropical Forest 500 trees/acre	Much lower than Tropics. Example: Temperate Forest 2 - 3 trees/acre
Origin centre for crops such as:	Maize (Corn), Rice, Potato, Sweet potato, Taro, Cowpea, Cassava, Yam, Tobacco, Beans, Tomato, Peppers, many Cucurbits, Peanut, many others still undiscovered	Wheat, Onion, Watermelon, Cabbage, Spinach, Carrot, Broccoli, Mustard, Cilantro, Asparagus, Melons.
Education, Knowledge and Research	Woefully incomplete and almost entirely done and derived from subtropics and temperate regions	High specialisation with an increasing level and adapted to their conditions
Economic Growth	Poor and getting worst severely. However, try to keep a positive trend of collectivism	Rich with increasing trend of consumerism (goods and resources) and individualism
Meteorological events (El Nino, Cyclones)	More frequent and unfortunately less prepared to face and overcome it	Less frequent and usually better prepared to face and overcome it
Food production	Very low productivity and crop diversity causing continuous severe environmental impacts	High crop productivity and looking for food diversity and mitigating natural resources' degradation
Agriculture Types	Subsistence Agriculture and irrational application of Conventional Agriculture	Agriculture and Horticulture applying high and adapted own Technologies
Natural resources' Health	Critical and getting worst as we are not developing local technologies and still using inappropriately all overseas technologies which promote the loss of biodiversity. "We do have Problems"	Also Serious concern, but they keep updating and researching on measurements to improve it. "They do have Challenges"
Potential of Development	Unlimited. Sadly still undiscovered	No comments

"With many hopes and keep looking for the Tropical Aid". Hugo Ramirez-Guerrero (July 2015)