



# Fundación Centro Experimental Las Gaviotas

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## A new Renaissance in the tropics

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**“Everything comes from everything, everything is made from everything and everything returns to everything.”**

Leonardo Da Vinci

We start our talks on Gaviotas by saying: a text without context is a pretext. Let us start with our context:

Gaviotas was born by chance going from utopia to “topia”, i.e. from dream to reality, enjoying the beauty of extreme difficulty.

We are constantly seeking temporary truths, towards tropical sustainability, within a “glocal” rationality, that means acting locally with a global criterion, mixing passion with serenity.

Whenever we lecture on the Gaviotas microcosm this warm plain in Colombia, before the Superb Orinoco River, (as called by that great man that saw far futures, Jules Verne), we give a new lecture for every listener, who at the same time will understand it accordingly to his/her own ideas. The possibility of a unanimous interpretation is unfeasible, because the Gaviotas approach cannot be aligned with preestablished ways of thinking.

Humankind, in its arrogance, writes laws for nature, classify it into kingdoms with a certain monarchical nostalgia. On the contrary, we do not observe hierarchies in an ecosystem, but cooperation in order to make connections.

This kind of world, “a village to reinvent the world” as Alan Weisman calls it in the cover of his book on Gaviotas, arose spontaneously from the chaos to the cosmos, keeping its faith in freedom, without a previous plan but always based on sustainability, that deserved an inspiring play from Robin Lane called ENTHUSIASM, in Portland, Oregon.

In Gaviotas, we do not have the same problems as people in other parts have; we do not have this big disconnection between communitarian and individual life, between art and science. Over there, we share values, common ties that allow us to be at peace with ourselves, with our neighbors and with nature. We cannot consider ourselves as supernatural creatures, because. To be a true individual it is necessary to be a part of a community. The technological advances of Gaviotas do not diminish human contact or that which must exist between human beings and nature.

Now, I am going to explain our approach in as clear a way as possible.

Culture has to be restructured to allow it to overcome crises, especially now that we are approaching the vital threshold of our planetary home. We wonder if it makes any sense, on the one hand living in the space age, in a scientific way, and on the other hand living in the Stone Age and destroying what we love the most and our greatest treasure: *Life*, in all its manifestations, that still remains the biggest mystery of universe.

Nevertheless, we call ourselves Homo Sapiens: “Sapiens”, but among the 40 million species we are the most irascible of them all. Incapable of recognizing each other, we have committed the biggest efforts of humankind to wars and conflicts that are nothing but the failure of intelligence. Now this same intensity must be put to the service of the planet’s sustainability, of our very existence, assuring its indivisible ecological unity, turning hate

into a biodegradable thing as befitting true human beings. It seems that we have forgotten that the Earth is the only planet with this life code: D.N.A.

First there was life, which produced the atmosphere as we know it now. Life is in charge of renewing and keeping it in balance. The former atmosphere was composed of gases which made almost no life possible.

It is up to us to conserve its fragile chemical composition, its dynamic stability, its proportions, and its behavioral pattern, articulated to living systems to biomass to warrant its continuity. Thus, protecting this biochemical quality of atmosphere must be declared a question of global security, for all countries. We are jeopardizing the key part of life. We should fight for a “World Declaration of Inter-dependence”. We cannot keep destroying the matrix and cycles of life, maintained and impelled by solar energy. We are at a dead end without exit, about to be overcome by the weight of our destructive activity and our exponential growth, the resilience of a finite and round earth, where all things meet again. We should fight the baldness of the earth! In other words, let us re-cover a large part of its biomass, replanting its original skin, and furthermore protecting and increasing vegetal life in oceans. As I said in my conference in Alamos Laboratory in New Mexico.

Citizens speak on behalf of nations, but who speaks on behalf of life? The future, present now, cannot be conceived outside of the equation: population plus science plus nature.

For instance, every 15 years the world population grows by one thousand three hundred million people, equivalent to China's present population.

Mother Earth does not deny admission to anybody, she does not demand a visa, and it is free. Before, biochemical changes occurred slowly allowing the Earth to adapt.

Thus protection and dynamic stability of our atmosphere go beyond just global warming, which is only a partial and incomplete analysis. This overheating of the earth is due to the emission of billions of tons of CO<sub>2</sub> produced by men's activities, because we know that the original atmosphere is 0,035% carbon dioxide.

We should remember that in Oracle, Arizona (USA) they constructed a glass ecosphere intended to sustain 8 people for two years - it failed. It was not possible to reproduce the chemical composition of our atmosphere, nor its behavioral pattern. Nevertheless our ecosystem (biosphere 1), biologically constructed by the earth during thousands of millions of years, provides this for 6.700 millions humans and for free.

Therefore we wrongly evaluate resources such as the atmosphere as free commodities, when they are actually of incalculable value and cannot be replaced.

Continuity of life goes beyond any ideology, any national border, and any religious or ethnic differences; towards this priority should be directed our philosophy and a new economy: a bioeconomy.

As a paradox, science and information technology have allowed every type of communication while at the same time diminished our relationship with our own earth.

Are we, perhaps becoming extraterrestrials?

Technological advances aspiring to provide health and welfare are creating the conditions of a society that is harming itself and its innocent host: **The Earth.**

Some day soon, the fundamental mission of the army will be to watch and protect the vital signs of the earth, its pulse, to avoid the trespassing of its biophysical limits before recovery becomes impossible and we reach a point of no return, scorning this wonderful serendipity that raised up life over 3.500 million years, more by cooperation (symbiosis) than by competition.

I do not propose an end to progress or modern processes, some return to primitive man. It does not mean giving up consuming, but rather consuming in a better way in a world where the ecological impact is actually taken into account.

What I mean is to apply imagination and creativity that are not limited by knowledge, to conserve and strengthen our life support with the enthusiasm that launched man into space, as I have mentioned in many academic institutions.

This crisis that we have been able to identify, due to our intelligence, is not unexpected. It is of human origin - it is not natural, thus we, with this same intelligence can overcome it. Any technological invention doesn't make any sense if it does not contribute to sustainability.

We need to make this intelligent cover of the earth (humanity) conscious by means of a communication strategy that makes these essential things not only understand but FELT by the community.

In Gaviotas, a place far from everything and near to anything, a decent community organized as a "Todarquía", i.e. where all is in all, with diversity and unity (university), with threads of different colors belonging to the same weave, with a cultural dynamic, self esteem and ingenuity, qualities that have been proved in the most difficult circumstances, increasing our consciousness, we have chosen to act in a harmonic and productive interaction with nature, in a responsible and dignified manner. Utilizing renewable energy produced by ourselves, living from the interest of our ecological assets, not spoiling them but rather improving them, this we call biological capitalism. One of its axis is a tropical forest cultivated in a mixed way, with biodiversity, using intervals between planting and with a partial harvest, so that we always have growing areas of the forest that produce material for the vital cycle. Both academic and non academic people contributed to this design, so that we did not depend on the academic point of view of a single discipline, and

in this way we structured a systemic project consisting of economic (without speculative capital), social and ecological parts.

In Gaviotas living is an art: *“The difficult art of simplicity”*.

Let us go a bit deeper to explain our forest.

Flying in a one motor plane over La Mosquitia jungle common to Honduras and Nicaragua in Central America, we saw by chance spots of Caribbean Tropical Pine; we collected some seeds and then planted them in Gaviotas, together with other seeds from the Maya jungle of Petén in Guatemala.

This pine was also found by the biologist from the United States, Barbara Caufield in the heart of Amazon jungle.

This first plantation did not succeed and the seedlings died.

At this point we began to discuss the situation disagreement makes us productive, but without fighting, being far from unique solutions, creating relations in a different way. Nothing is so unfair as to give the same solution to different problems. A year later I came back to La Mosquitia and after walking through the forest and observing the pines carefully, I found that those surrounded by fungus were the most vigorous.

We took some saplings, inoculated them with the fungus, planted them in Gaviotas, and afterwards obtained a very positive result. Then, we established a nursery, to select the plants that grew best.

Three years later, we started a plantation with an area of 8.000 hectares, the biggest planted forest in the country. And this in soil that the experts considered inadequate, even though we live in the equatorial belt of the planet, with the highest solar radiation index and the highest primary biological productivity on earth.

Future Agriculture will be more about the capacity and imagination to make use of light than the simple cultivation of the soil. This is photon-agriculture.

Paradoxically, these biological riches come together with terrible human poverty. Two hundred years ago this continent, Latin America, still not divided into so many republics fighting often one against the other, was more advanced than the USA in almost every aspect. Is not that we are poor, but we are in poverty trap where it should be impossible to be poor. In Gaviotas, with a certain irony, we call this the “miracle of poverty”. Amongst other causes the most important is that we have not tropicalised science and technology, we have not understood the advantages of living between Cancer and Capricorn, where nature works without seasons. We are not educated to see the obvious. Our inflexibility in the XIX century did not allow us to produce a directing class talented and appropriate to the environment and at the same time open to the world.

If we had understood the tropical world and pushed social mobility, fertilizing creativity, enterprising, this way assuming the capacity to take risks Latin America would by now be playing a top role in the world. (Latin America IS a continent, or one and a half.)

It is necessary to remark that, when an economist and professor of logic and ethics at Glasgow University, Scotland, Adam Smith wrote about the origins of the wealth of nations, the most advanced of them was only 5 times larger economically than the least; nowadays the gap is 65 times.

In Gaviotas, we said these were sterile terrains, yes, but for sterile brains, because what we really had were different terrains. Knowledge and imagination are most often what defines what is a resource and what is not a resource anymore.

In this way with the inoculation of fungus *telephora terrestris* and *pizolithus tinctorius* which associated with the roots and formed the mycorrhizas, acting as a biological fertilizer, through an intimate cooperation, was consolidated a biological construction to stimulate a primary productivity that resulted in something as magnificent as the Gaviotas

Forest. Life at the very beginning did not expand itself through competition but through networks, as Fritjof Capra says.

To ensure that the existence of this forest does not require external support i.e. that it is a sustainable or self-sufficient forest; we are taking advantage of the resins we are extracting from it. This resin is processed on site, in the same forest, without chemicals, in a biofactory where we produce colophony, turpentine, biodiesel, and other chemical products from it, nowadays those are the main products of Gaviotas In other words we live from nature's interest without diminishing its biological capital, but in fact increasing it.

This biodiverse forest, where more than 180 native species have been identified acting as a biological shield has become a biological bridge, as conceived by Mario Calderon Rivera. This corridor adds to the forest of galleries already there, manifestations of the degradation of Amazonian Forest. This forest is the opposite of a monoculture, which needs external support to survive, not to mention its uniformity producing sadness. We are approaching a standardized culture which is less enriching and where all of us are going to be as similar and as boring as clones.

It is worth noting here that we have wrongly thought for years of the Amazonian forest as the lungs of the world. This has been reevaluated by a study from the UNO, the treaty of Amazonian Cooperation and the Inter American Development Bank that says: "The mature Amazonian forest has an almost perfect balance between oxygen production and carbon dioxide fixation, and now it does not present an increase in biomass".

But the Amazonian basin plays a great role as a genetic bank and it is a part of the system of air conditioning of our planet.

This biodiverse experience and way of thinking could inspire an integrated development in a productive harmony with nature of the 250 millions hectares of ecologically similar land in South America, covering all its plains including those of the Orinoco River in Colombia,

added to the existent in Africa, Australia and Asia. As its axis this development would have biodiverse forests that produce, cover and permanently protect this fragile ground

I hope that in the future we can reach a perennial agriculture, just like the forest, with deep roots, widely extended through mycological carpets.

We have intended not to depend on fossil fuels, i.e. unearthed organisms such as coal, oil and gas, relentlessly altering our atmosphere fundamental chemistry. With this purpose four years ago four years ago, in cooperation with Colorado University and coordinated through Friends of Gaviotas Centro Las Gaviotas, designed, constructed and set in motion the first biofuel plant in the tropics that produces biodiesel from African palm. The first applications we have made have been in our tractors and electric plants in the Centro las Gaviotas, Vichada, and Colombian Orinoco Region with good results.

In 1977, the USA National Academy of Science stated in its report: “Climate and Energy” that, due to climatological considerations we would have to end the use of fossil fuels by 2027.

Some years later, through trial and error investigation we developed a different biodiesel, using pine resin from the tropical Caribbean Pine, which does not require the trans-ester process and does not produce glycerin or other residues. With this fuel we operate all our equipment. Nowadays we are producing and trying another biofuel from this resin to replace gasoline. We make use of it in the motorcycles we employ for fire patrols and fire fighting in our forest.

This proposal from Gaviotas looks towards a decentralization of the carbonized energy network, instead aiming at each place or region using renewable sources of energy in their environment, instead of connecting themselves thoughtlessly to this old rigid network. Further on thinking about a future source of energy at home, taking advantage of the roof areas, which is easy in the tropics.

Regarding biofuel we propose:

- Tropical palm, sugar cane, Caribbean pine and any other vegetal organism, able to produce biofuel should be placed in non rainforest areas, without cutting trees and of course by never using up agricultural areas.
- They should be planted together with other species as a tropical humid forest, and with forest and food plants, as we did already in Gaviotas with the support of the Fundación ZERI, UNO, and Marion Institute. We reject the cultivation of only one unique species, and accept the emerging of native vegetation under big trees to stimulate biodiversity, which act as a defense against disease. We can manage diversity with the same efficiency we manage uniformity.
- Investigate simultaneously the possible uses of native flora in the Orinoco region for producing biofuels.
- Establish 400 factories for biofuel in our national territory so that it will be possible to deliver biofuel directly to the consumer. It is important to note that the transport cost, for instance, of ethanol from Valle del Cauca to Bogotá is 30% of its final price. We must not confuse large volumes with good logistics. So, the final economical and social gains remain in that place or region.
- The real advantage of this proposal, according to the Gaviotan way of thinking, is that it obliges along with all its other environmental benefits the increasing the area planted with trees and the restoration of the vegetable skin of the earth.

When talking of biofuel we have to be attentive to the sounds of future that could produce radical changes very quickly, such as ethanol from cellulose, biodiesel from algae and synthetic bacteria. But we have to be more attentive to the advances of energy accumulators, of very long lasting big capacity batteries, light, and economic from solid elements as lithium. This will be a transcendental technological jump worldwide, which could address the energy issue in a very clear and deep way. These kinds of jump are not impossible. Just remember, for instance the invention of the transistor and the personal computer, to take just one example of many. Carl Sagan said: “in science and technology the only sacred true is that there is no sacred true”

We are not confronting an energy crisis but one of imagination and enthusiasm.

On the other hand the Centro Las Gaviotas from the beginning has worked on different renewable energies; one of the principle technologies being the use of solar energy for water heating, which Gaviotas originated in Vichada and then deliver throughout the country into the cities, and this is what produced the initial income to support the establishment of the biodiverse forest.

To date we have installed 30.000 unities, which mean a collection area of 60.000 m<sup>2</sup> producing 45.000 kilowatts. One of our installations in Ciudad Tunal, is the biggest installed in the world. That is an example of how technology, can come from the periphery to the center, the opposite of what is usually expected.

The very first technologies born out of Gaviotas's imagination, aware that civilization is a permanent dialogue between man and water, were those related to the transport and extraction of water, such as a tropical windmill, using a double effect pump and without need for a tail to direct it into the wind. We also designed a hydraulic battery ram, a manual sleeve pump, and a school see-saw pump, widely welcomed in the Colombian country side.

Electricity as that in Vichada is afforded by biodiesel fuel, hydraulic microgeneration and a turbine fed by the motor steam whose fuel is provided from thinning and trimming our forest.

Inside the forest there is a wellspring of extraordinary quality and from this we started an enterprise of bottled water functioning with different renewable energies.

The consumption of this water in Gaviotas, adequate and healthy food coming mainly from the surrounding agriculture and daily bodily exercise are the basis for improving the health of our Gaviotans and fertilizing the path to a better life style.

“It is better to have an enthusiastic apprentice than a depressed Nobel Prize winner”, was one of my father's sayings. With this insight, the Gaviotas educational program has been prepared for reality, inspired by our tropical environment, aiming at essential stuff,

keeping away secondary issues and no more living in the past, (which is the most influential in education, instead of focusing on creating the future), combining the rational with the emotional. Cultivating sensibility and transforming experience into education this program is deep within Gaviotas's heart. Therefore we think of Gaviotas as a school where we are all students, continuously questioning. It is more important to discover than to believe, because the only permanent thing is change - even though man longs for certitude to mitigate his anguish. So often humanity has failed to take into account the differences between human beings. We are each unique and unrepeatable but we often employ educative systems that are unaware of these differences. This is a crucially important issue.

We have designed and in part constructed an outdoors park named "Vivaciencia" ("Alivescience"), a symbiosis of art, science and pedagogy, consisting of 100 interactive modules each bigger than 10 meters high.

Crises, chaotic situations, are spaces for recreating our organization. Rigid organisms do not build confidence.

Each part is integrated with the totality, reflecting qualities they do not have separately. Therefore education cannot be treated in isolated parts, expecting the students then to do the final synthesis required, when they have been taught to think in parts, in a fragmentary way. We advocate an education in which relationships are evident and made explicit.

We are not strictly logical, in order to overcome the obstacles to creativity in this world, where knowledge becomes obsolete very fast. We do not lose our good temper, not even in the most stressful situations. When thoughts become dogmas, they stagnate because they become equivalent to finished concepts.

We aspire to keep being a dynamic community with some successes and some errors. Sometimes we do not find the words to express our feelings but we are in search of a happiness that is not measurable in economical terms, and this search will always go with us.

Civilizations in their final stages start to talk about sustainability and solidarity. And they will be judged by their capacity to overcome crises, together with the human

wisdom to create new ways of life. We are not talking about merely cosmetic environmental measures, as I have said in many presentations at academic institutions.

I want to repeat that humankind originated in the tropical region and in this region a different homo sapiens must be reborn one that should put an end to extinctions, should be vital first of all, in love with life, and capable of giving birth to a new future.

Last but not least, do not forget that maturity consists of making dreams come true. Let us make a pact with hope, let us be reborn in the Tropics.

Paolo Lugari

Gaviotas, Colombian Orinoco, May, 2009