

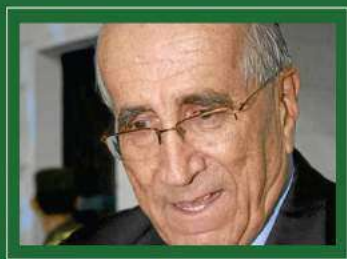
# RENAISSANCE IN THE TROPICS

A circular inset image showing a tropical landscape. The foreground is a field of tall, yellowish-brown grasses. The middle ground is a dense, lush green forest. The background shows a blue sky with scattered white clouds. The text 'PAOLO LUGARI' is written in white, arched letters across the top of the circle.

PAOLO LUGARI

OR GAVIOTAS  
AGE

MARIO CALDERÓN RIVERA



## MARIO CALDERÓN RIVERA

**Mario Calderón Rivera**, Colombian outstanding humanist and thinker graduated from Javeriana University as a lawyer-economist received a Honoris Causa degree from Autónoma University of Manizales.

His first public job was as a Secretary of Ministers Council during Alberto Lleras Camargo who initiated the National Front.

At regional level he was treasury Secretary in Caldas Province and simultaneously he was a teacher at University, furthermore he was associated to many enterprise projects. Thereafter he was call to Washington for an important job in the juristic office of The International Development Bank. Back to Colombia he was manager of the Central Mortgage Bank where with the support of President Belisario Betancourt he organized the reconstruction of Popayan (historic colonial city in south Colombia) and the creation of two cities: Tunal in south and Salitre in Bogotá's heart, both have more than 300.000 inhabitants. In Tunal City Gaviotas Center made the installation of the bigger solar water heating system in the world for 5,000 families.

During two terms he was named State Secretary but he did not accept for his unflinching modesty.

After serving as an advisor in the UNO he came back to the coffee region engaging in sustainable development in this region from the Commerce Chamber promoting until now the concept of bioregion.

From his shelter in Chinchina, on the Andean Mountains he continues writing his renowned column in La Patria newspaper while he wrote this book. With this work he aims Latin-Americans to act with tropical rationality. He always has been a supporter of Gaviotas Center Foundation.

RENAISSANCE  
IN THE TROPICS

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MARIO CALDERÓN RIVERA

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

***LEONARDO DA VINCI***

*To my wife, Edna Luz (R.I.P.)  
For her loving care*

*To my children*

*To my grandchildren*

*To the doctors who restored my life  
for writing this testimony*

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## FOREWORD

*“PAOLO LUGARI, inventor of the world”*

**GABRIEL GARCIA MARQUEZ,**

*Literature Nobel Prize*

This is in the first place, a text driven from a context lasting a period of five decades, characterized by Gaviotas imaginative paradigm in Colombian Orinoco.

**“At the end of this text, showing men’s attitude facing their same planet it is easy to conclude that very seldom there is such a premonitory instinct from such a distant point of the world. A world where the great context is given by Gaviotas age and not necessarily by Gaviotas time far beyond time and geographical limits, because as the wisest gull of the flock says: “flying high is to be above time”.**

Paolo Lugari conceived Centro Las Gaviotas **“far from everything and near to anything”** as a way of generating a tropical thinking nucleus. In that time, 40 years ago, it was really a mad act. Because this was the strangest idea for a world in the middle of an ideological conflict that turned its back to the planet’s destiny. But mainly the other way around of any established belief about the consequences of such crazy deed. This corresponded to the fossil fuels fallacy that makes them the nucleus of the world power. For Paolo Lugari it would be enough that geography had recovered its true sense for a systemic connection with the essence of the Tropics.

The chapters in this book do not have any other pretension than recover the contexts which do not imply at all the whole truth. They represent just an attempt to reconstruct a hypothesis that could be merely a new pretext for going through the traces marked by the best observatories of the world. One of them is no doubt that presided by Paolo Lugari from his systemic brains, his dream of renewable energies could not have a better response forty years later, than that listened by the world in Barak Obama's inaugural address: **“We will utilize the sun, the wind and the Earth to feed our automobiles and make our factories work”**.

It is important to remark, of course that the big number of quotations and references to explain the contexts of Gaviotas not only do not pretend exhibit a false erudition but it is intended – within a Socratic humility - to recognize the unlimited complexity of the mater, thus it should be pretentious and vain to approach it with my own allegedly original concepts. But this is also the recognition of the great anticipatory instinct that put Paolo Lugari almost lonely in the heart of Gaia. Long time before the academia became aware of the irreducible organic condition of Earth.

In an exhausted planet, **Renaissance in the Tropic** has the meaning of a return to **creation**, because in any other place of Earth you can find similar evocation of Paradise. Human beings spread from the Tropics in an exploration lasting thousands of years to get lost in countless crossroads. And in the Tropics, some ancient and pre-Columbian cultures constructed everlasting green paradigms, but later on they were substituted by imported models from the temperate zone that were useful just to perpetuate poverty.

In the American Tropic there are best conditions to irradiate new life to Earth. But also to be a converging point from all things the human being has extracted from his experiences in his own long history. This is the revival from the **Tropics**.

## PROLOGUE

In this book, Jonathan Livingston Seagull in the work of Richard Bach is a point of reference of high-flying for being out of time, or as the pioneer Paolo Lugari conceived: "Far from everything and next to nothing," as the capacity for an entrepreneurial risk of that nature. Moreover, with the understanding of being on a planet in distress by environmental deterioration, to design and implement a revival of the Tropics, in a sense return to the processes of Mother Nature.

At the same time, taking as reference the work of Alan Weisman, "Gaviotas, a Village to Reinvent the World", which precedes this book on the task of weighing the historical dimension of the work undertaken by Lugari. Gaviotas appropriate name, which clarifies the creative dimension, in the service of solving flashpoints in the world. He collects this aspect in a wise sentence pronounced by Lugari when receiving the honorary doctorate from Carnegie-Mellon University: "Important thing now is to recover the skin of Earth".

It also relates Lugari's ventures in obstinate work exceeding four decades, with Karl Popper's thought, in their scientific components, with the ongoing search for the truth, with the character of being testable, and therefore the implementation of appropriate mechanisms for a rational society lacking a best north.

In these eloquent and wise pages, he highlights the achievements of Gaviotas Center, a product of intelligence joined with the continuing work of this singular man of science and humanism, Paolo Lugari.

He mentions too, which alludes to a revived Quixote, the "windmills" to rescue deep water springs and power generation with "the gentle breezes of the plain." Just name the "sleeve pumps" with a large capacity for manual extraction of water, "micro generators" that use the minimum waterfalls, to supply electricity to homes, and ", solar water heaters" that achieve mass acceptance in Colombian cities. Moreover highlights him, one of these latest creations, the production of biodiesel based on the tropical Caribbean pine oleoresin without the use of chemicals and no waste which operates 100% all the engines in Gaviotas, all this enormous capacity to produce "energy chains" from the bounties of nature.

Furthermore, he talks about those programs such as edible mushrooms, suppliers of protein so hard needed in disadvantaged sectors of the population.

In these pages I review, we can see the creative activity of Lugari, with chains of appropriate techniques to produce beneficial effects in people and in Nature itself, it also contributes to the recovery of the skin of Earth by planting biodiversity tropical forests.

There is one aspect that I cannot overlook in this work: the way it includes Lugari's Roman father legacy about enthusiasm as its dynamic shaper of plans, programs and ambitious accomplishments. And indeed the results are categorical. "It is better a man with enthusiasm than ten

depressed Nobel laureates," this is his cherished parental recall.

He talks about what happened in international and local conflicts in the crucial sixties, considering that such decade was characterized by "deep historical inflections for the future of man", and points out such events as Vietnam war, or the events triggered by the revolution of May in Paris; as well as the Cuban revolution and the nuclear missile crisis between the USSR and USA, with real threats of a nuclear war with an unpredictable planetary catastrophe. He mentions also the situation in China, with the closure of a closed period and the start of a policy and market openings, as seen by the time being. His capacity of inquiry goes so far as to register in the same period the ending by Catholic Church of the horrific "Index of Forbidden Books." He regards as well the recognition of the scientific legacy and the thought of the great Pierre Teilhard de Chardin, whom he qualified as having been "one of the enlightened minds of the twentieth century."

When entering these troublesome 60s, he shows the convergence of the chaotic and historic roads that were open. With the arrival, likewise, of the "American Dream", the "American way of Life", amid the tensions of the "Cold War", coupled with the industrial and consumer frenzy. The resulting trace of "boredom" starts the observing with deep concern the disastrous consequences of that consumerist lifestyle. Anarchy, concern and "boredom" led the greatest minds into outstanding formulations and high creativity, as in Paolo Lugari's case, whose mission has been combined with the ambition of a "prospective emerging science," at a planetary level, but localized expressions. In the context of issues of war, of rebellion not channeled, chaos open,

windows that were deployed in search of proper light and looks with prospective sense, Lugari find spirits in the world who were like-minded and achieved the best agreement, in a kind of cosmic synergy.

In his words, "Gaviotas dared to think the unthinkable. But to shorten the path between solutions and ideally perfect unthinkable it actually preferred to go at once, in the words of Paolo Lugari, from Utopia to Topia, which is equivalent to reality. "

To me it was a very exciting opportunity he gave me of reading these pages, which I held in their historical dimension, as a reference to assess, with justice, the unique and great work that is Gaviotas, the product of a scientific-humanist, with deep social commitment facing the distressing situations the world is confronting. There is this road, still the states' policy have to gather for taking on, hopefully in time, environmental issues and poverty in the world with the dignity due to human beings.

***CARLOS ENRIQUE RUIZ***  
***Manizales, Colombia, Aleph December 5, 2011***

# INTRODUCTION

## “ENTHUSIASM”

*“Jonathan befriends the wisest gull in this place named Chiang, he teaches him to move instantaneously to any place in the universe. The secret Chiang says, is to "begin by knowing that you have already arrived... because flying high is to be above time”.*

**RICHARD BACH, “Jonathan Livingston Seagull”.  
The Macmillan Company, 1974**

The stage is in the Rose Golden Arena, a landmark of Portland, USA. Over there next to Columbia River, near the Pacific coast, Oregon State has one of the best and more traditional urban constructions.

Surrounded by a landscape of valleys and mountains, roses adorn every corner of the place. For many years the rose’s festival gather tourist from Canada and all the USA provinces. Because it is the city having the greenest places in this country it is also the symbol of live nature in a world that for ages seemed to be turned back to the Creation.

The central character is Robin Lane, founder and Director for 30 years of the acrobatics and theater group DO JUMP, cultural symbol of Portland. With six acrobats with refined training, Lane has created a mix of theater, dance and air performance. All of this framed in a moving



background of music and images emerging in an overwhelming way.

The great score comes from Alan Weisman's book, *Gaviotas, a Village to Reinvent the World*, a charming story about a community lost in a Colombian tropical savanna. Some Chapters of the play were reproduced by New York Times and Los Angeles Times and transmitted by the NPR National Public Radio. Few months before, Lane was delighted by reading Weisman's book. Thereafter came a happy meeting with Paolo Lugari, the brains in Gaviotas universe. This was really an intercontinental dialogue about a little village in this South American plain. And when the theater director at the city of the roses wanted to go deeper into the secret of this singular phenomenon she just heard something that moved her strongly *Enthusiasm*. She, as the whole audience knew from the very beginning that the essential meaning of this word has to do with the intervention of gods as well as with the exaltation of creative imagination.

"I was looking for a story or a fable for taking in on my musical shows" she wrote afterwards in her notebook designed by her for illustrating the idea to the audience of *Enthusiasm* as well as to the students of schools in USA that have the opportunity to know this experience. And all of that comes from the fascinating reading of Alan Weisman's Book. *"I was aware of the power stories have for changing the way we feel our lives. This is a real story about a village governed by the values I believe in, this story renew my withered optimism. Even though this is not the kind of plots we have at stage, because we generally have very different themes, I want to put Gaviotas story at the heart of the arena"*.

Robin Lane thinks this is not only a story of hope; it is a really creative story. She thinks that the process that began more than 40 years ago in GAVIOTAS is still evolving and it is the most similar to her conception of art.

"ENTHUSIASM" has enchanted thousands of audiences not only because there is the especial genius of Robin Lane. There worked too Alan Weisman's wife, play writer and sculptor Beckie Kravetz one of the most famous theater mask maker in the world, as well as Joan Szymko composer and choral director, very prestigious in North-America.

"ENTHUSIASM" is an epic play about GAVIOTAS creative process, as well as an unparalleled pedagogic deployment reflecting the cycle of trial and error Paolo Lugari has started four decades ago following Karl Popper who was one of his inspirations. During two hours, one sees the world Alan Weisman describes in his 300 pages book. From his coming to an abandoned camp in Vichada plains until the moment he made take off a zeppelin- laboratory over 8,000 hectares planted with Caribbean pine. These are a recovered tropical landscape broken by the evolution of abnormal phenomena that suddenly interrupted the harmony between it and the Amazonian jungle. From the NASA satellite photographs one can now perceive a green spot extending over the Orinoco river bank. It is an amazing image. It is somehow a definitely response to the hypothesis of the recovery of the skin of the planet, that Paolo Lugari declared in his speech in his Honorary Doctorate Ceremony awarded by Carnegie Mellon University 2007.

Alan Weisman describes masterfully this path reproduced also in Robin Lane drama.

At the stage the plot is presented as a provocative blend of an aerial sensual dance, breathtaking acrobatic movements, humor and live music with an impressive narrative in off. Step by step the deployment of the show transforms a naked staged into a tropical exuberant scenario and paradise's signs.

It is a tangible path studded with milestones each with a unique symbolism. Among others, the windmills are invading the vastness of the plains to extract subsurface waters. Yet furthermore sleeve pumps saving time and energy, because they replace the backbreaking days of women and children fetching water for family consumption. Likewise the micro generators fed by minimum waterfalls produce their household electricity and productive activities. And there is solar water heaters, technology the transferred to cities found the economic surpluses with which began the bio diverse forest plantation of Gaviotas, all are part of the infinite energy chains that can get to create a new lifestyle for the Earth. And as one of the pioneering works of gulls, hydroponics and food programs subsequently fungi invade large areas of marginal Bogota and other Colombian cities, as an advanced message coming from the Orinoco with solutions for food for hungry people.

One finds over there, unfolded on the fields a very rich range of technologies adequate to them. UNDP includes these same technologies in a tool box useful for a deprived community with scarce development when getting its first steps towards its self-rescuing.

Robin Lane does not stop there, from her playing vision she looks further to the horizon opened by Gaviotas: *“Gaviotas is an example of creativity and sustainable way of life. Through invention, ingenuity, imagination, and enthusiasm the Gaviotans have lived in a self-sustainable way while developing technologies that can benefit poor communities all around the world and diminishing the pollution which contributes to the global overheating and further more to disruption of atmosphere composition. They live in peace in the middle of a country torn by war aiming to be a beacon of hope for the world”*.

This book tends to go into this Gaviotas world, during its vital cycle of fifty years. Beyond Alan Weisman’s book but within his context because each of the milestones settled by his founder and all altogether is the manifestation of an advanced thought. Silently with this Socratic humility that opens the path to wisdom, Paolo Lugari has been connected to the best human symbols of each decade. Sometimes as a protagonist sometimes as interpreter of foreign leaders into our local language he acted locally with a global vision. He always flies as the seagull above the time because it flies higher.

**“ENTHUSIASM”** was the main content in Gaviotas soul. It was and still is the essence of that vision and from his founder, who as a kid heard from his father, Mariano Lugari who came from a very distinguished Italian family; this saying that remained in Paolo’s soul: *“It is better an enthusiastic man than ten depressed Nobel prize winners”*.

# Chapter I

## THE LIBERTARIAN DECADE

*“Let us try both of us to invoke the marvelous power of science instead of its terrors, let us explore the stars, conquer the deserts, extirpate diseases, take advantage of the deep sea and stimulate arts and commerce”.*

*JOHN F. KENNEDY Inaugural Speech January 20, 1961*

The 60s were the most stormy time in the last century, but they were also that ones that marked the deepest historical changes in the future of humanity. They were also those that mark a consolidation of the geopolitical world map, mainly because they gave Africa a finally release from the colonialism. More than 25 nations got their independence then. Even though they have remaining conflicts these releases allowed this continent accelerate its process of insertion in the global scenario of the XXI century.

The vision on this critical decade offers a lot of impulses flowing from everywhere in the world. There were shaking movements in the geopolitical area, as well as in the economy and commerce theory in religion and culture. There were settled the basis of the European Union and the Latin American Association of Free Commerce (ALALC), Allende's triumph in Chile, the Great March, and the Cultural Revolution in China, the Second Vatican Council, the insurgence of the hippie movement, the Beatles, the

Rolling Stones, Andy Warhol, Bob Dylan's music and Marilyn Monroe's phenomenon and, of course the consecration of "Che" Guevara.

As a symbol of this libertarian hallmark in the sixties it is generally oversight the Second Vatican Council that ended the ignominious Index Librorum Prohibitorum et expurgatorum or index of prohibited books, which pretended prohibit reading those books deviated from the Catholic Church's dogmas. And something very important: 1965 was the year when the world could receive the full thought of the Jesuit priest Teilhard de Chardin, one of the illuminated brains of the XX century. An international committee integrated by Arnold Toynbee and Aldous Huxley gave to the world this precious legacy that remained for many years at the edge of the Index, only because it was an attempt of elevated inspiration for shorting the path between the creationist dogma and the evolution theories. That was a real attempt to bringing closer science and religion. Because if the 60s were the years of the emerging concept of an organic Earth, and biosphere was a concept introduced into the universal language, Teilhard added the superior concept of noosphere as a wrapping of the relationship among Men-Nature.

At the end of the 50s and during the 60s humanity scored the most radical of its technological changes in XX century. It was the age of the Russian Sputnik, the first rocket launched into space a feat that appears as if Soviet Union started winning the space war. It took ten years to overcome that fact by the first astronaut coming to the moon in 1969.

Then the Cuban revolution occurred 90 miles far from La Florida, and the Vietnam War. And within this political nightmare there were the killing of John and Robert Kennedy and Martin Luther King, and then the libertarian movements of La Sorbonne, Mexico, and Kent Universities. This crossroad of geopolitics and culture would attract a lot of researchers and of course it corresponded to some undercurrent movements acting along the second part of the XX century. Many emerged openly in a variety of ways. All of them related to the profound changes that started at the century beginning.

The most fascinating thing of the 70s regarding from a systemic perspective is their meaning as a convergence of the chaos and as a boiler for the most contradictory historic pathways. All that happened after that and that marked the beginning of the XXI century was a part of the emerging synergies that influenced all the world history.

The triumph of the Cuban revolution, at the end of the 50s, meant an impressive geographical approach between the two bigger powers in conflict. That represented nothing more and nothing less that, at 90 miles away from USA coast, the Soviet Union had created an advanced guard that would be an unbearable nightmare for the White House. The missile crisis in 1962 was the point where humanity was at the very edge of a nuclear holocaust. Mainly from the perspective of the theory framework of the nuclear warheads targeting the destruction of thousands of people and enormous spaces. This was more or less the collective imaginary for supporting the international relationship backing on the fear from both sides.

Nevertheless, looking backwards, what avoided this extreme outcome was that strategy of feeding the Cold War by periphery conflicts. All of them stimulated by both sides in territories which did not mean a physical menace to Washington or Moscow, or at least that seemed to be the conclusion implied in the motives for averting the missile crisis. This was apparent because in the following decades, the two powers did not come so dangerously close again, except for the active Berlin volcano and some dabbling in Eastern Europe.

That meant however that Soviet Union after the triumph of the Cuban revolution committed itself to make Fidel Castro the symbol of the revolution of the so called Third World. And of course this charismatic leader was enclosed very deep in the heart of the inhabitants of the emergent nations and in the immense community of poor countries. That grew bigger at the end of the decade with Salvador Allende's triumph in Chile putting the milestone of socialism coming to the power in a democratic course. And all of this almost at the same time the Cultural Revolution in China marked the comrade Mao's personal imprint in communism much more close to the rural people than to the urban population. That was something that established a border between Chinese and Soviet communism and helped USA to play a very clever chess with it as a piece from the White House.

President Richard Nixon and Prime Minister Chou En Lai put the first milestone to the open politic of Gorbachov in Russia and Chinas extraordinary entrance in the international economic market with Deng Xiaoping's genius. Nothing similar to this extraordinary vertiginous cycle seemed so unthinkable. Berlin's Wall fall was nothing



more than a symbol of this overwhelming avalanche of changes coming from behind and with a “butterfly effect” emerged from the libertarian movements of the 60s.

### THE AMERICAN DREAM

But the 60s were also the decade in which the American Dream, the American Way of Life materialized within the Cold War tensions mixed with the euphoria of the industrial society and the consumerism effervescence. This was the message brought to a Europe in ruins by the Marshall Plan, for many analysts, offering it an economic recovery and showing the American welfare level as a Promised Land. It was in such a way that in Europe appeared a contradictory feeling between gratitude, admiration, jealousy, and rejection expressed in its best way in Jean Jacques Servan-Schreiber’s book the “*American Challenge*” (1967).

Behind the contradictory feelings of Servan-Schreiber, there was, no doubt, a reasonable reaction as an intellectual from new Europe, it was impossible for him to avoid a critical approach to the Marshall Plan, such a phenomenon did not have an historic precedent, so for certain wary minds even morbid, it could be seen as an invasive and neo-imperialist domination. This is moreover a reason for facing it with a mix of gratitude and rejection. This “post-industrial society” was not something strange for him. Because ten years before, the economist John Kenneth Galbraith, a Harvard professor and President Kennedy’s advisor had made the best radiography of this “way of life” that become the American Dream. This dream was not looking for a welfare defined as a luxury without excess in the commodities and services consume, meant to be necessary

for material prosperity, in his masterly radiography Galbraith presented the “Opulent Society” as the new social phenomenon within the Cold War. That was not, as we could imagine, a convincing phenomenon regarding the disappearance of poverty laying inside the competence for the world dominance. Professor Galbraith on the other hand showed a model of society where the predominant tendency seemed to be opulence expressed in the extravagant demand of goods and services always going farther than the merely necessary. In this context Galbraith saw a kind of crossroads, where the economic model of USA could only be back on the road through the Keynesians ideas. Those ideas meant certain type of intervention that not just corrected the income concentration but also neutralized the damaging effects of the hyper consume for the minority on one hand and on the other hand the opprobrious sub consume of the big majority.

### **THE 68 YEAR STUDENT’S REVOLT**

It is not strange that such an important social analyst as Fernando Vallespín, Professor from Madrid Autónoma University, who thinks that there is a necessary relation between the “opulent society” and the libertarian movements of the 68. “These are two milestones, he wrote in Foreign Policy magazine that at first place do not have a too obvious relation. Only at a first glance but by going a little deeper we perceive that the drawing in the book of the Canadian economist shaped the background image that would give some sense to the Paris revolt. It was fundamental that the message in Galbraith book alerted about the failure to consider economic growth as an aim in itself and as the nucleus of the economic policy without

paying attention to other much larger factors. If we go after this myth of the “conventional wisdom” he said we will lose sight of the undesirable consequences of this blind faith in economic growth, such as environmental degradation, rising inequality and irresponsible obsession with over consumption... In a perfect dialectic way adequate to a Marxist thought, the objective condition of the May rebellion was a settled down of the opulent society, the society of the non-limited economic growth and mass consume. A new society that bore her antithesis engraved in her genes. Although these were only perceptible throw the sight and feelings of those youngsters”. That is something that goes very well with the ideas expressed with his indisputable academic authority by Antanas Mokus, Colombian National University Rector and former major from Bogotá: “May 68” valued libertarian and irreverent attitudes, by overwhelming so rebellious and fresh the rigid polarization of the Cold War between capitalism and communism, it opened the door to criticism of everyday life, including feminism and the green movement. Many institutions: universities, researching centers, families and the gender relations still were very similar in both sides of the Berlin Wall, notwithstanding the economic model”.

Seen back at that time and with a better objectivity that was not possible then in such a confusing age the students’ revolt in Paris’s streets in the 68 was a gunshot anticipating an age which neither the media nor the people suspected. Because there started to emerge the true essence of the counterculture, anticipating very clearly over there as well as in other scenarios a society submerged in an unknown complexity and uncertainty although not in apocalyptical signs.

For these uncompleted perceptions, the news arriving from the barricades around La Sorbonne appeared more the replay of the taken of the Bastille, this time against the Charles De Gaulle regime considered autocratic. But if this was be true it was be right that those were only street occurrences finished with the army's charge against 30.000 students and workers demonstrating surrounding La Sorbonne University, meanwhile the same communist party asked for moderation and to return to work. In few months De Gaulle recovered himself and won an overwhelming victory in the poll with the support of the 60% of the French electorate.

Notwithstanding this fact, the historic true was very different. The May revolution in Paris corresponded to a demand against the Gaullist regime. As well as the gigantic march against the Pentagon had as a pretext the deep dissatisfaction about the Viet Nam war. The occidental world aligned with the United States fed mainly the reject to communism, but at the same time cherished a profound disagreement with the totalitarian regimes supported by Washington in the developing world. But inside the emergent generation it was fed up with the paradigm based on hyper consume and the inclement destruction of nature.

1968 was also a year when from San Francisco and from many corners of London appeared thousands of "rebels without cause" coming mainly from middle classes with privileged incomes. That spoke of the good and noble motivations of this disappointed generation, even though the external appearances shown what some simplistic people called bad instincts.

In the industrialized world of 1968 emerged waves of a libertarian subculture that appeared as anarchist special the hippies and unusual expressions of art with a general change of values announcing the postindustrial age. But at the same time from this culture came out the longing for going back to nature. That is why Daniel Cohn-Bendit, nicknamed Daniel the Red, the big hero of the Parisian revolution, could change his label as an anarchist for one as an ecological leader in Germany after the Cold War. That is also why a new language appeared that of the graffiti that arose from the Sorbonne revolution, the bloody days from Kent University, the Mexican Autonoma University, as well as the hippies' communes in California. These messages were totally coincident in their libertarian content. In spite of their original roughness these slogans eventually became refined with values that the new generations could rationalize and adapt to tolerant and civilized societies, somehow the desperate outcry against the Vietnam war and the repression of the individual liberty added to the longing for a much more simple life rejecting the hyper consume and bound to nature were the quintessence of these graffiti.

Those that were born under this sign of the 68 and its ideological environment bore from the cradle those labels which will bring the behavioral codices of the generation imprinted by their rational and incorruptible independence into a vocation for creating and changing the world: *"It is forbidden to forbid"* *"The imagination to the power"* *"Make love don't make war"*, *"We don't want a world where the guarantee of not starving entails the risk of dying of boredom"*, *Your master needs you, you don't need him"*, *"Let us be realistic let us demand the impossible"* *"They are buying your happiness steal it"*, *"the barricade closets*

*the street but opens the via”, “The chaos is me”, and “forget all you have learned start dreaming”.*

The creativity came from this anarchic language, as from the chaos out. That is why the young people that were starting to shape themselves under these signs apparently demoniacal have now in their hands many of the threads of the nation’s destiny. And in the majority of the cases are much more dependable that the former generations that tear their hair out in front of which they considered a desecration of sacred values that people believed untouchable.

After the two world wars, the Vietnam’s war became for two decades the cruelest manifestation of the conflict. Nevertheless the world map was here and there agitated by explosions that systematically fed the confrontation between Washington and Moscow.

However behind this foreground of the confronting big powers a new society was flourishing. Farther more than the rampant industrialization the world began to go over the borders of a simple mechanical revolution to come into the yearning fruits of an unlimited welfare. And in this very apocalyptic scenario of the nuclear menace they started to develop the first manifestation of a prospective science. From then on this new analysis tool was always present as an almost biological necessity for confronting the future.

The big paradox was that the Cold War strategy was implemented on an “unthinkable” subject the nuclear holocaust. The “détente” was simply **“be armed before your enemy will be armed”** and the most effective defense always will be to anticipate the attack when you feel that your enemy will attack. That is to say **“he who strikes first strikes twice”**.

Never, as in the sixties emerged from the collective subconscious such repressed impulses stimulated by the intimidating nature of the conflict based on the arms obsession. That fed the real possibility of a nuclear war consciously or more probably accidentally provoked by the suddenly and unwillingly activation of fatal mechanisms of mass destruction.

### **LOOKING INTO THE FUTURE**

The prospective scenario is in Hudson Institute, created in 1961 by the Rand Corporation; it was and still is a strategic study center created at the beginning of the post war in Santa Monica, California by the USA Air Force. Its main role was to provide security strategies orientation for USA. From there Herman Kahn, an exceptional gifted young man started to make a task that will have extraordinary international consequences.

Almost simultaneously in Colombia Paolo Lugari started to disentangle the secrets of the humid tropics, from the humid rainforest of the Pacific Coast and from the big savannah between Meta and Orinoco rivers. Herman Kahn had flight over both territories and over both had constructed his own utopias. The Centro Las Gaviotas emerged from those utopias and from then on presaged a world that had with the Hudson Institute some affinities but many differences in the way it imagined the world much more close to the nature signals than to the strategic geographic plays of the Cold War.

Between Herman Kahn und Paolo Lugari appeared an mediated relation through Mauricio Obregón and Robert Panero both of them great high inspired scholars that

marked a long-term footprint in the first attempts to build a cosmic vision from Colombia. It was however very clear the difference in their journey plan, in the path of the second half of the twentieth century and the arrival in the XXI century.

The first time the world received the message of “thinking unthinkable things” was when it had to think about the thermonuclear war. And Herman Kahn stated it in this cold way: *“One of the characteristics of our time is that intelligent and honest people think it is unmoral to think and even more to write explicitly about to fight a nuclear war... we are acting as those ancient kings that punished the messengers that brought bad news, and by doing this we do not change the news but only procrastinate their diffusion... in our time the nuclear war could be unthinkable, unmoral, insane, awful and very unlikely but not impossible”*

Herman Kahn was a nuclear physic obsessed with which his professional back ground taught him in a much more clear way as to other people. He honestly believed that his duty was to construct daily possible scenarios for allowing the Rand Corporation and now the Hudson Institute to choose alternative ways for protecting the USA security, and not only for boasting about their tactical and strategic superiority. As well as to verify in a very precisely form any moment in which the Soviet Union could reach or overcome the adversary power in conquering the space or in the destructive power of her arms or in the possibility of giving the worst damaging blow. As it happened in 1960 after the Russia’s powerful demonstration as she launched the Sputnik, or when the communist enemy appeared as capable of setting 300 nuclear missiles towards western and reaching their target in a maximum time of five minutes.



The impact of such immediate blow could produce 5 million of deaths in USA. And for showing the dimension of the conflict in his task of conceiving scenarios to think the unthinkable, Kahn also imagines what could be the soviet ultimatum to the President of USA: *“We want to announce you that from now on for each of our cities you destroy we will destroy five of yours. We want to make this menace so precisely for you to understand very clearly our target, thus we are going to give you this list: If you destroy Moscow, for instance we are going to destroy New York, Washington, Los Angeles, Philadelphia, and Chicago. If you destroy Leningrad we are going to destroy Detroit, Pittsburgh, San Francisco, New Orleans, and Miami... it should be clear for you that you could not possible win the war. The best thing you can expect is to sign with us any reasonable peace treaty. The worst thing is the total destruction of your country and the end of its history”*.

Facing such threat was President Kennedy during the missiles crisis. At that time the Soviet fleet stood off the Cuban coast against the United States. For the first time the world was facing a real threat to his capacity for response. From White House 22 October 1962 one could hear the quite voice of who assumes full responsibility on any extreme situation.

*“The Thirties taught us a clear lesson: If we allow, the aggressive forces to grow without control and without any response, we will come inevitably to war (...) we should not take the risk prematurely and without any need of a nuclear war, but we do not refuse to consider this risk if we have to face him at some point (...). herefore, to prevent the operation of a military offensive, we will apply a strict*

*quarantine on all military equipment headed to Cuba (...). If in despite of this the preparation of military offensive continues, and thus the threat that hovering over the continent increases, we will take the necessary action. Consider the possible U.S. missile launch from Cuba against any nation in the Americas as an attack the Soviet Union to the U.S. This attack will require large-scale response against the USSR (...).*

*"The price of freedom is always high, but Americans have never failed to pay. There is a path we will not run ever: surrender and submission."*

It was not possible to demonstrate if Khrushchev's decision to give up in front of the White House ultimatum was a strategic reason or in fact a quit on alleging tactical superiority. For many people it was the clear demonstration that this was the result only of his histrionic ability, as it had happened more than once along the history. Although it could be possible that Herman Kahn had plausible motives for thinking about an advantage, at least temporal, of the Soviet power.

The "war and peace games" were always played on the "stage" of the unthinkable. And the characters were of course human beings sometimes embodying countries or institutions confronting challenges demanding immediate responses. In the game of the Cold War Kahn could not avoid but playing with the competence that emerged in the communist block between the Soviet Union and China. There were almost always imaginary confrontation scenarios showing the United States and the Soviet Union tacitly joined against China threat.

Truth is that neither in his books about the thermo nuclear war nor in his book about 2000 he could not imagine the really dimension of the XXI century Chinese colossus. He preferred to imagine a XX century where 25 mini powers will reduce the nuclear danger into spots of local region wars. According to his perspective in this probably stage the peril of a generalized nuclear holocaust will be minimized. It is clear that with this vision he ignored or wanted to ignore the risk that for the entire world confirmed the ineluctable interdependence of the planet's ecosystems.

The obsession with the thermo nuclear war permeated every pore of the sixties. And it is very clear with the missiles crises in the Caribbean Sea that the world was at the edge of this holocaust. Herman Kahn had in the Hudson Institute this almost obsessive dedication. This dedication he had expressed in a long essay on *The Thermonuclear war* (1959) as an associated investigator in the Center of International studies at Princeton University. He will continue this exploration in Hudson Institute with his book *Thinking about the unthinkable*, Avon Books. 1962. Mandatory lecture for well-informed people. This was in its cover. "Thinking about the Unthinkable" was the slogan that fed the Hudson Institute vision from the very beginning, as well as it was for many of the milestones of that decade. That motto would feed the scientific and technologic advances as well as the deep powers that inspired the explosion of the cultural revolution of 68 and the telluric movements that originated new cultural expressions, such as the hippies and the musical trends that circulated through the currents of the new rebel generations. The Lugari's intellectual proximity to that trend but also his own mind made that in some way

## **SILENT SPRING**

As if the planet itself wanted to send a message through a brilliant mind which was not clouded by the conflicting interests, *Silent Spring* (1962) from Rachel Carson made a breathtaking impression in some academic and thoughtful minds. Linda Lear her best biographer made a very revealing introduction to this meaningful book: “*Carson wrote in an age of new abundance and an intense social conformity. The Cold War with its atmosphere of suspicious and intolerance was at its best. The chemical industry one of the most benefited with the post-war technology was at the same time one of the main sources of the national prosperity. The DDT helped in the fight against the insect pest in agriculture and the ancient illness caused by insects; with the same certainty the atomic bombs destroyed the United States’ military enemies and altered so dramatically the balanced between humanity and nature. People empowered the chemists with their white lab coats working in remote labs with their almost divine wisdom. The results of their work were exalted by their alleged benefices. In the post-war United States’ science was god and science is masculine*”

Its first chapter said all or almost everything: “*Once upon a time there was a village at the heart of America where all seem to be in harmony with the environment. The town was in the middle of a field with prosperous farms and fields of grain and hillsides with orchards where, in spring, white clouds floated over green meadows. In autumn oaks, maples and birches formed a fire that flew and floated through a curtain of pine trees. Then the foxes howled in the hills and the deer crossed the silently fields, half hidden in the mists of the autumn mornings...*”

But this idyllic landscape crossed by clear paths, full of life and color, of crystal clear water and native and immigrant birds, was suddenly hurt by dead signs and burst of bizarre nature that changed the landscape forever and converted it in a “spring without voices”. Rachel Carson, from her desperate solitude knew how to express the most adequate diagnosis. *“Not witchcraft, no enemy action had silenced the resurrection of new life in this broken world. The man himself has done it”*.

Rachel Carson gave the first anguished outcry of alarm about the presence of the DDT in the market. A product that from that moment on topped the list of pesticides presented as the panacea against the nightmare of the insects. It was the precursor of the chemical pesticides that would start a new era. From the labs of a flourishing industry was planned new ways to “dominate nature”. Even if that domination will broke the natural balance. There was created the mirage of a “better life” through chemistry. Rachel Carson went further showing how the chemical mix for killing indiscriminate the insects’ kingdom eventually will alter completely the cellular processes of plants and animals. Very soon, the researchers found that its implications could be irreparable to human health, but also for the environmental balance.

For the owners of the new industry she was only a hysterical woman whose alarming vision of the future could be ignored, and if necessary “eliminated” of any publicity in the media. Two hundred fifty thousand dollars (from that time) were spent not only to discredit the content of the book but also its author. But she felt that she was to lead a really revolutionary movement not only for defending the

sacred meaning of human life but of all life. It was not an easy task and sometimes one thought the voice of this courageous woman will be silenced. But the echo of her complaint came into President's Kennedy office and members of the Congress. Nevertheless her success was partial. As a prelude to the double moral present in the decisions of the developed countries about the environmental problems the industrialized world refused to accept the Kyoto Protocol and tried to look at the pollution and the destruction of the rainforest in South America. Meanwhile their own emissions multiplied its own emissions and per capita contribution to the accumulation of greenhouse gases increases exponentially over those of the poorer nations.

New Yorker's the most sophisticated written media from the big city, published by chapters the text of *Silent Spring*. That publishing touched deeply the hearts of the American scholars and scientists.

In an epilogue written for the commemorative edition of the 40 years since the appearance of *Silent Spring*, the eminent biologist Edward Wilson, Harvard professor, explains very well the reaction of the chemical industry and the indifference that eventually surrounded the publication of the book: *"for people whose ancestors in his recent memory settled a vast continent and whose country has never lost a war, any argument to limit and constrain seemed almost unpatriotic"*.

Rachel Carson died few years after the publishing of her book and a little time later the DDT was forbidden in the United States. However remained permission to sell it

anywhere in the world. But her message took hold so deeply into the collective consciousness that drew the attention of President Kennedy himself. Furthermore he also gave life to the deepest base movements (grass roots) in many communities, to the extent that their influence was the main reason for a law that created in the seventies the U.S.A Environmental Protection Agency. One of his great lectures delivered half a century ago by this exceptional woman should be in the gate of any community that wants to be kept alive *“We as most living creatures are part of the vast ecosystem of Earth”*. She was a lonely voice crying in the wilderness. Because nobody like her had the feeling of this latent process unleashed by this civilization kept awake by the thermonuclear threat but back to the health of their own planet. Under these conditions there was no time to think in the long term about the shaping of a destruction scenario much more dark than the implicit threat of the nuclear warheads.

Thirty five years after the appearance of *Silent Spring* another illuminated woman Janine M. Benyus would show the world the path to biochemist biomimicry as the alternative to stop the accelerated process of imbalances derived from the entropic action. In her book *Biomimicry, Innovation Inspired by Nature* published in 1997, Rachel Carson is a paradigm to remember. When she presents a world addicted to agrochemicals Janine Benyus wondered *“Who is winning”?* *Since 1945 the use of pesticides in the United States has increased a 3.300 %, but the total of crops spoiled by plagues has not decreased. In fact, notwithstanding the two thousand two hundred million pounds of pesticides employ yearly, the lost of crops has increased in a 20%. Meanwhile more than five hundred plagues have become resistant to our most powerful*

*chemicals. And the worst of all is the last bad news is that our ground is becoming less productive. Our answer has been to try to improve fertility with 20 million tons of urea yearly, almost 160 pounds per capita only in the United States.*

Within the prospective scenarios considered in the war and peace games some of them apocalyptic was evident the lack of the nature factor, hence the fate that in each of them could go the terrestrial habitat. It is probable, however, that Khan had read *Silent Spring* and in his mind no balance could be possible without peace achieved without preserving the fate of nature in the context of a nuclear confrontation or maybe it was aware that the only argument implicit in the DETERRENCE as the essence of the Cold War constituted the best guarantee that the Holocaust never will happen. Within this indulgent logic there was the increasingly strengthen of the chemical industry precisely as a way of feeding this apocalyptical conscience and all within the fun of being without potential depleting horizon. Perhaps he thought that once humanity will overcome the conflict will come as well the moment for compensating the nature for the damages. Something derived from the only concern coming out from the economic global development and not only in the United States. By doing that he appeared anticipating the possible scenarios of the 2000. Because he feels that for the beginning of the XXI century the world where one third of the population would form part of opulent societies, another third would move in the levels of decent survival and other third party would be so badly or worse than today. Although to softer this third scenario he considers the black spot in the future he rushes to think solutions would come via demographic control.



In some degree Herman Kahn feels as if he were fulfilling a providential mission. Max Lerner the most accomplished American journalist during a big part of the XX century qualified his book about nuclear war as the most important work of political-military strategy in the century: *“I have read quickly some parts of his book once, another parts slowly, but I know that I will come back to it again and again in the next months for checking his judgments and predictions and find light for my darkness. I can testify from my experience in trying to finish my book Age of Overkill that Kahn’s book has taught, absorbed, and shaken me, more than any other writing in the present military strategy”*.

For Max Lerner Kahn’s Book offered the world somehow the scenario to get without dying until 1975, advancing meanwhile by developing a **“credible first-strike capacity”**, to advance while the task of maintaining the balance between the desire to assure enough strong defense systems and the possibilities of negotiating a long-term sustainable peace.

### ***THE ALLIANCE FOR PROGRESS***

For Latin America the sixties was characterized by the Alliance for Progress that has a question and answer meaning. Not only from the point of view of the missing this opportunity for the political direction in Latin America but also for the lack of vision of the international policy of USA.

Never before in the hemisphere relations there was such an open space as President Kennedy wanted to make. That

systematically different relation than that imposed under the stick of Theodore Roosevelt or the providential destiny always focused by the Monroe Doctrine it was a pretext to remove any foreign influence including European, but it was as well an attempt to define unilaterally from Washington what was convenient for the hemisphere.

The best ally of President Kennedy was the Democrat senator from Arkansas William Fulbright, chairman for approximately 20 years of the Foreign Relations Committee. In a memorable cycle of lectures in John Hopkins University, he not only made an extraordinary critic of USA foreign policy but he got inside the subconscious of that big nation to disentangle its contradictory essence.

*“There are two Americas, one is from Abraham Lincoln and Adlai Stevenson and the other one is from Theodore Roosevelt and the modern super patriots, one is generous and human and the other one narrowly selfish. One is capable of self-critic and the other one is hypocritical and pharisaic. One is reasonable, the other one romantic, one good humored and the other one solemn, one is inquiring and the other one dogmatic, one is moderated the other one is intense passionate, one is sensible the other one arrogant using its big power; both are characterized by some moral but one is the moral of the decent instincts balanced by human imperfection and the other one is the moral of the self-assurance inflamed by the crusade spirit”.*

The Alliance for the Progress showed exactly the positive face described by Fulbright and in the middle of the

confrontation of the two powers in his inaugural speech as president, Kennedy showed he was a leader willing to work together in building a new society.

***“Let both sides seek to invoke the wonders of science instead of its terrors. Together let us explore the stars, conquer the deserts, eradicate disease, tap the ocean depths, and encourage the arts and commerce... all this will not be finished in the first 100 days. Nor will it be in the life of this Administration, nor even perhaps in our lifetime on this planet. But let us begin”.***

The Kennedy’s sacrifice was also the murder of an ideal of freedom and justice in the polarized arena of the Cold War and also represented a step back and a virtual death of the Alliance for Progress and the very current of renewal that in Latin America had incarnated charismatic leaders like Alberto Lleras Camargo and Juscelino Kubitschek.

#### ***AN ALTERNATIVE SOCIETY***

The sixties was also the age when the idea of an Alternative Society was promoted in a most powerful way. It was the path to overcome the lack of rationality that drove into the two world wars. And within them the permanent threat of war inside the construct of the Cold War, the Viet Nam conflict and the ideological confrontation that would heat up even more the XX century. The longing for an alternative society would be in the bottom of the so-called counter culture, but also in the root of the environmental movements that from the sixties on will permeate the whole world and that was as well present in Gaviotas creation. In the environmental movements that

from the sixties on will permeate the whole world and that was as well present in Gaviotas creation. In the environmental movements there were libertarian intentions of some kind either to get rid of a threat of war imposed by the interests of the two great powers or to throw off the yoke imposed by an oppressive industrial society or to break the dependence on nonrenewable sources of energy and stay in permanent alliance with Nature.

### ***THE GAME OF THE UNTHINKABLE THINGS***

Gaviotas dared to think unthinkable things. But for shortening the road between the unthinkable and perfect solutions and reality it preferred passing, as Lugari says, from Utopia to Topia that is the equivalent to reality. Never as in the sixties emerged from the collective unconscious those impulses repressed by the very intimidating nature of the conflict fed by the arms obsession based on the ghost of a nuclear holocaust.

After the two world wars, the Viet Nam's war became for two decades the most cruel expression of conflict, although the world was somehow agitated here and there by explosions systematic fed by the confrontation between Washington and Moscow.

However behind this close up of confronting powers was a new society flourishing in its maximum expression. That society furthermore of this rampant industrialization began to overcome the borders of a mechanical revolution for reaching the longing fruits of an unlimited welfare. And in the same apocalyptic stage of nuclear threaten started the first manifestations of a prospective science. From there on this new analysis instrument was always present as an almost biological necessity to confront future.

## Chapter II

### A RENAISSANCE MAN

#### Following LEONARDO DA VINCI

*“Nowadays the only reasonable thing  
is the Utopia”.*

*CARL SAGAN*

In a corner of the well-drained Orinoco region, a mural painted on the wall in a big room stands as an allegory that evokes the tropical nature of the vast plain. It is cross by an aphorism: Maturity is to make dreams come true. In the beak of a gull crossing the horizon it seems to float the Chiang’s banner, the wisest of the family of John Livingstone Seagull Gaviotas always had open for the whole flock to read. “The gull that sees the farthest flies the highest” Because the passion to fly is always encouraged by the mysterious force of intuition that has been the most powerful force in the cognitive process, and in human mind acts before reason begins to discern the content beyond the future that awaits us and that we are building every day.

“Far from everything and next to nothing” that is the enigmatic way Paolo Lugari uses to define many times this tropical space.

Certainly it is not easy to decipher the true scope of this conceptualization however what is true is Gaviotas was born thousand light years away from the lineal thinking of its surroundings including of course many of the so called centers of advanced thinking. But furthermore and paradoxically far more close to prehistory than history. At least, as history and prehistory are conceived in the occidental civilization parted in the middle by milestones that intend to make a limit between civilization and barbarism. This perspective was broken by Levy-Straus when he answers to Guy Sorman: “There are neither “primitive nor evolved” civilizations;; there are only different responses to fundamental and identical problems. Not only the “uncivilized people” think but their “uncivilized thinking” is not inferior to ours and it is very complex”.

All of this imprinted an original power to Gaviotas. Because it was connected not only with the lessons of the evolution for ages, but also with the sources of modern philosophy and science, with the pre-Socratic sources but also with those of more ancient civilizations lost in time, as well as with those of the surviving cultures of our tropical rainforest and those of the pure enclaves of the indigenous cultures that surveyed the onslaught of industrial society. But always within the syncretism the Greek philosophers connected themselves with the creative forces of cultures from all ages.

Gaviotas by its systemic approach is essentially a ubiquitous sight, transversal and holistic. In fact, its original activity centered about the renewable sources of energy comes from its pre-Socratic inspiration as we said again and again along this book. Gaviotas shares this source with the

scientific revolution in all the areas of human knowledge. The renewable energy sources were at the heart of pre-Socratic philosophy and they met the great "beginning of everything".

The same way, if initially GAVIOTAS camped on the tropical savanna it was precisely to prove its systemic condition. To prove that in the pre-Socratic approach the concept of peripheral is just a deformation implied by the linear approach. The circular processes are inherent in the behavior of nature, (nothing is residual, nothing is peripheral all is virtually raw material, all is an involving nucleus). That is why Paolo Lugari went first to the Pacific rainforest in the forests of Chocó a territory consider to be in the extreme conditions of surviving. And in the same way as in the tropical savannah that once was a rainforest as dense as that in Chocó GAVIOTAS vision is latent in each wild spaces of that desolate area. That same area has recently entered into the category of geographic bioregion with geo-strategic importance at maximum level for the balance of the planet, but also as a sustainable life option for human beings. GAVIOTAS has its place anywhere and its relative importance is valid because Colombia has a mega biodiversity. As well in life as in regions, thus in Paolo Lugari's mind there is this confidence in a connection between the poverty in the tropic and the fact that the foreigner powers that occupied these vast territories are countries with seasons, where nature makes her pauses that she does not make in the equatorial belt where her behavior is radically different. From the very beginning its settlements had a strange cultural imprint on an original millenary fabric. That is why the cultural fusion was characterized by not being authentic. The racial mixes ended up creating a society resigned with increasingly

alienate paradigms far from the balance that some pre-Columbian cultures kept with their environment.

## THE GAIA HYPOTHESIS

Paolo Lugari built Gaviotas village on the same organic notion that emanated from Greek philosophy. That same notion that J.E. Lovelock used in the seventies to construct his Gaia hypothesis.

In some way the organic vision of Earth had been anticipated in much more simple words by Leonardo's genius in a paragraph of the Leicester Codex quoted by Fritjof Capra in his masterpiece *The Science of Leonardo* (2007)

*"We could say -Leonardo said 500 years ago-, that Earth has a vegetative soul and that the soil is her flesh, the successive rocky stratus building her mountains her bones, porous rocks their cartilages, and water veins her blood. The pool of blood around the heart is the ocean. Breathing is the rise and fall of blood of the pulse just as on Earth is the flow and ebb of the sea".*

Paolo Lugari stopped especially on THE SKIN OF EARTH from which the atmospheric composition depends, settled on the ground as the flesh Leonardo felt and without its vegetable cover, she was doomed to disappear.

GAVIOTAS was born as a little hamlet lost in the remote Orinoco region. However, in the mind of its founder Gaviotas was organically connected with an alive tropical reality far more extended and much more important. So as



with the same Lugari's inspiration the Greeks would build there the most beautiful temple to the goddess who embodied all the essences of their organic conception of Earth.

### SYMBIOSIS AND COMPETITIVENESS

Some years later and many miles away Lovelock would make a hypothesis that Paolo Lugari following da Vinci began to validate with greater probabilities of success. Because for GAVIOTAS as for Lovelock vision GAIA is still a complex entity compressing biosphere, atmosphere, oceans, and soil, sustained more in symbiosis than competence as Paolo Lugari says. It is a whole which is a feedback or cybernetic system which looks out for an environment with excellent conditions as much physical as chemical for the planet balance. Under such conditions and natural mechanisms for the balance control which can be described –again within the Greek tradition as **homeostasis**, a concept created by Claude Bernard. Over this unfathomable territories stepped also the immortal Teilhard de Chardin to add a new dimension to the wonder of creation. The same that allows, as Lovelock says: that *“the whole universe of living matter from the whale until the wide range of virus, from oaks to algae could be regarded as a constituent part of a single living entity capable of manipulating Earth's atmosphere to meet all her needs and endowed with faculties and powers beyond those of her integral parts”*.

In Carnegie to him (2007), Paolo Lugari recalled Lyn Margulis co-creator with Lovelock of the hypothesis Gaia: *“The origin of life occurred much more by cooperation*

*between species than competence, thus the world should make a declaration of interdependence instead of independence”.*

*"With the creation of GAVIOTAS we wanted to do something in productive harmony with nature, using nonlinear thinking tools, transversal, with disciplined and undisciplined academically, useful for complexity, where everything is in everything, as Democritus of Abdera used to said".*

At the beginning of the XXI from his center for environmental literacy in Berkeley and in his book *The hidden connections* Fritjof Capra would signal Gaviotas as “an environment full of innovation and hope where the combined valued created by a totality is always bigger than the addition of the values created by a separated operation of the components”. There is a perfect synthesis not only of the Gaviotas vision but the epistemological focus that starts to cover the science and technology territory.

## **THE GUIDING PRINCIPLES OF GAVIOTAS**

Defined by its founder from the first day as a rational humantropicalsettlementGaviotas will be framed in a systemic model of unavoidable synergy that always maintained an organic relationship with its particular environment and its far or close surroundings. In his more explicit statement he defined some parameters which are neither unique nor exclusive but signed somehow a Decalogue for his initial path. Those are:

1.Productive not only contemplative harmony with nature.

2. Bioclimatic urbanism and architecture.
3. Utilization of local resources for its construction when they suit high technology implementation.
4. Proximity between dwelling and place of work so that people can walk or ride their bike being that way free but belonging to the community.
5. Life style and green lifestyle with urban and architecture design contributing to joining families instead of bringing them apart.
6. Preferences for small or middle scales so that nature forces could act in time for recuperate the environmental balance, spontaneously or with some technologic help. By doing that the satisfaction of the present requirements wont damage the probability of satisfying that of the future generations.

#### **INTERGENERATION SOLIDARITY**

7. Creation of the opportunity of casual meetings, spontaneous dialogues, unforeseen questions for feeding a continuous creativity.
8. Remote, quiet but not incommunicative settlements at a far Colombian border. In this age of knowledge, of speed communication distances are being deleted. All can be close for sharing but not so close for hurting individuality.
9. For the tropical environment there are not pre- established norms because its diversity builds its rationality. In Gaviotas the human settlement is by definition an integral whole

inviting to share in the communitarian life. This is the other way around than the predominant disorder in the world of fragmented cities

10. Energy self-sufficiency utilizing renewable energies sources, such as hydraulic, solar, wind and biomass because they are fed by permanent residues flowing from nature or producing by the human use of her resources.

### **TECHNOLOGICAL PARAMETERS**

Its basic technological principles were inspired by the concept of Appropriated Technologies with Advanced Design and established in another Decalogue which has being improved for years:

1. Technologies have to be cheap for the countries that do not have investing resources.
2. Technologies have to use many hands in an environment where jobs are so scarce but they have to be competitive.
3. Prices should be compatibles with the low per capita income of people.
4. Pollution levels should be zero or very close to zero so that the environmental spent be compatible with the income level.
5. Research and development have to offer access to all formation level from students until technicians and high level professionals but to undisciplined and creative minds.

6. Technology has to be imbued with humanistic traits in the social, psychological, and environmental areas for being a transforming factor in them.
7. Continuous research should stimulate the synergic interaction with creative imagination without conceptual rigidity, without inexorable plans open to the unexpected.
8. When talking about capital, knowledge, and intelligence have to be taken into account in the first place.
9. The process should produce the elements of the capital and not demanding only foreign capital implements.
10. The endeavor should not only be dedicated to use natural resources in a most sensitive way yet as improve knowing and imagining most efficient ways of using them, because those resources are a natural capital that has to become an inexhaustible source, making a living from the interests of nature.

The GAVIOTAS' feat is determined since her very origin for her appeal to Nature. This is according to Paolo Lugari the best path to construct a sustainable model of tropical rationality. This rationality starts just with the comprehension of the tropical complexity but also with the capacity of disentangle this apparently chaos for finding the obvious solutions for a sustainable development. Within the best Socratic tradition it starts inside the water and is going on and on in the mysteries of the soil, the solar light and the wonders of photosynthesis, as well as the deepest parts of the forest, air and wind also the biosphere.

Water for all, solar energy for the basic requirements of human beings, guaranteed health in the tropic, food security without borders, expansion of the forest border to neutralize the paradigm of forest destruction as a condition for human settlements. Within this action developed and designed Gaviotas in less than two decades adequate technologies with minimum environmental impact easy to obtain and very cheap. Through these technologies they can guarantee a harmonic living together with tropical environment. What appeared to be an unequal struggle from fragile and unstable human settlements with a surly and indomitable nature became a real path to possible and productive synergies.

In the former context and inside the essential ideas of its inspiring principles GAVIOTAS initial agenda was oriented towards the topic directly related to these principles. For this very reason the water revolution was in the middle of its obsessive searches. Within the systemic Gaviotas focus were emphasized in the beginning these special points:

- Water for all, applying renewable energies.
- Solar energy for water heating and purification.
- Forestation in Orinoco Region emphasizing Caribbean pine with Gaviotas micro scattering.
- Self-sufficient hospital for rural tropical regions.
- Social hydroponics.

The component “Water for all” was framed within a program of water delivery for small settlements with less than 250 inhabitants. They should have schools and health care. With this purpose the program established 700 micro aqueducts especially design for the conditions of the wet tropic, all of them equipped with devices of low environmental impact, easy to handle and without any fuel. Those equipment were double action windmill, sleeve pump, the school see-saw, and the ram (water hammer) for extracting water. For this purpose they got the support of the UNDP.

## **PARTICIPATORY GOVERN**

In perspective, this program represented to governments an incomparable challenge. Without much effort one could guess a participatory governance paradigm which in financial terms was an incalculable leverage of available resources. Nevertheless it was evident from the beginning that such a participatory model was unacceptable or at least very difficult to accept by a political system resting upon an unbeatable bureaucracy and bureaucratic technology as it was the case with the self-sufficient hospital that we are going to analyzed later.

Each one of the physical and technological components of this pioneer program are dazzling by their simplicity, as well as there are surprisingly inextricable labyrinths where they were sometimes trapped. Because the colonialist tradition of our countries did not allow them to remove their exclusive reliance on cultural and technological dictates of temperate countries. These technological standards are often very expensive, thus they provide a lot

of bureaucracy and mask corruption and waste of resources. But mainly they have the tendency to create barriers when mysteries are revealed. Thomas Friedman, one of the sharpest analysts of the post-industrial society author of *The World Is Flat*, defines quite well the collapse of all boundaries

*“When the world flattens the solution is not to build a wall the solution is to get a spade and dig deep inside ourselves or inside the own system... when the world flattens you should live honestly, because wherever you do wherever error you make some day it might be traced. The flatter the world becomes more people becomes transparent”.*

### **LEONARDO DA VINCI'S PARADIGM**

Paolo Lugari looked always at himself in Leonardo da Vinci's mirror, who as described by Fritjof Capra framed his life in the study of the interaction of all alive organism with their natural environment and that as manifestation of a cognitive process moving under life on Earth. That is something that corresponds to a logic development of the three levels of the soul that Aristotle identified in the organic life on Earth. Starting from the metabolism of “vital force” in the plants, through the “animal soul” expressed in the autonomous movement and in the capacity for feeling pleasure and pain until reaching the peak of the human soul that includes both the two of them but covers them with the exclusive trait of reflection. This feature, according to Teilhard de Chardin, makes the difference between an “animal that knows and a human being that knows that he knows”.



At least in some of her symbolic components in the heart of the Orinoco Region GAVIOTAS anticipated in about ten years the publishing of *John Livingstone Seagull* the beautiful Richard Bach's story. Nevertheless both belong to the literary essence of the sixties. The hindsight into this decade if you penetrate it is fascinating for its highly historical complexity that traps you in the interaction of all its components. Within the noisy clash of opposites it is impossible not to recognize the affinity of the characters of the story. Since the first seed was planted in the Orinoco region and then in the Alma Mater of Carnegie Mellon Paolo Lugari claim to the four winds: "*Gaviotas is a symbol of free thinking without bonds or conventions*". And that limitless freedom, the same that feeds the gull flying high watching the infinity is this freedom only fed by renewable energies

## **COLD WAR AND LIBERTARIAN MOVEMENTS**

GAVIOTAS emerged simultaneously with this new waking up of the world. It just began to be an alternative way against the threat that Earth could be thrown into Apocalypses, without any note in its agenda. Hermann Kahn y Paolo Lugari were acting at the same time from very different scenarios. The former one as a key point inside the impressive machinery of the Cold War strategy, first at the heart of the Pentagon in the Rand Corporation, after that through the Hudson Institute founded by Kahn himself 1961. By that time a close friendship between Herman Kahn and Roberto Panero a very outstanding thinker friend of Paolo Lugari helped to feed the Gaviotas' founder imagination, that one that took off toward very different targets.

GAVIOTAS was born together with much of the thinking tendencies beginning to permeate the world sometimes creating and multiplying confusion, sometimes awaking hopes, but Lugari as well as the other visionaries were joined by the same feeling about the planetary risks. But there were also unthinkable probabilities. When they wanted to go from different levels after the construction of ecumenical stages they took account of President's Kennedy call to International Community from the UNO Assembly, September 1961.

*“Today each habitant of the planet should contemplate in his/her mind the day when our Earth won't be habitable. Each man, each woman each child is living under the Damocles nuclear sword hanging from subtle threads under the threat of being cut by accident, neglect or cruelty. The war weapons must be abolished before they end up by killing us”.*

Gaviotas seemed to be as unthinkable as any attempt to disrupt the endless euphoria invading the consumer society that began very vigorous after the World War II. However in their perception of post-industrial society dominated by technology and “the unthinkable”, Herman Kahn as well as Paolo Lugari always saw the possibility of a changed man both in his attitude towards future as well as his own role in his planet. Both have passed by H.G. Wells and by Orwell but paradoxically both preferred to look 2000 years back for laying their eyes on the ancient Greece.

Since that memorable time of the sixties Lugari had the same obsession for Democritus of Abdera that he reiterated in Carnegie Mellon: “everything is in everything”, such a vision would be complemented in a beautiful way by

Thomas Berry a philosopher from the XXI century: “Everything is in everything and nothing is complete without everything”

In his prologue to Year 2000, Daniel Bell, President of the Year 2000 Commission of the American Academy of Arts and Sciences anticipated in a very premonitory way synergy as one of the essential factor in the foresight at the beginning of the XXI. *“If there is some difference between the studies about future on progress right now (they were speaking from the 60s) and those from the past (H.G.Wells) this different is a growing sophistication in the ideology and the attempt to define borders”.*

Surprisingly when one explore the 2000 society in United States of America; Kahn dared to predict it closer to the Greek stoic and epicurean philosophy than to a militaristic society overwhelmed by the idea of a nuclear holocaust.

*“Sophists have had bad press- says Kahn- frequently they have been described as unscrupulous and/or manipulative superficial in words and ideas. Yet some Greek sophists could be done that, yet much of them could be similar in their philosophical ideas to modern positivist, pragmatists or nominalists. The Greek Cynics, Stoics, and Epicureans were all of them antimilitaristic and no doubt most of them rejected Earthly ambitious and pretensions almost in an escapist way perhaps due to their frustration against the Greek culture after it conquered the world. The cynics (from which Diogenes was the most famous) went further more rejecting the established aspirations and values repudiating the accepted behavior codes and favoring a coming back to poverty, to personal independence and nature (as dogs do, that is the etymology of the name). In a different way as*

*modern Hippies, they practiced the self-control and asceticism. ...The Stoics had of course an almost biblical passion for rightness and duty while the Epicureans had almost a similar passion for “cultivating their garden and their friends”... A modern stoic would correspond to an American of public spirit, responsible, hardworking, about the task, who feels compelled to do a good job for his government, his company or other institutions and working without much recognition for their services, or special awards in both cases committed to universal values”.*

## **WHERE WAS WRONG THE HUDSON INSTITUTE**

Still seems too soon to say exactly what was wrong in the Herman Kahn's fly over the future possible world anticipating 30 years. Any mistake could be neglected if at the end of the day his perception that the holocaust ghost always alive, always overwhelming could be neutralized by a collective conscience permeated with some mix of epicurean and stoic thoughts. A picture supposedly resulting of the post-industrial society he so accurately depicted in many of his writings, but especially in *The Year 2000*. That is something that is happening but with a combination of factors and circumstances that are very clearly far from those anticipated from the Hudson Institute.

It is not absurd but natural to compare prospective stages. From the big industrial society on one hand and GAVIOTAS almost a savage landscape on the other hand. That comparison could be mediated by the simultaneity of both characters in those stages: Sacramento, California and GAVIOTAS, Vichada. And there is a fortunate circumstance the proximity of those two stars shining in the

world of prospective and formulating a desideratum about very rational things that would happen in the future.

It is necessary to say that Hudson Institute was right in some essential characteristics of the technological wave that will permeate the world coming towards XXI century. The impressive display of a hitherto unknown arsenal of prospective weapons made Europe herself shivered against the USA technologic prowess.

Jean Servant-Schreiber, brilliant intellectual founder and director of L'Express friend of Albert Camus, Jean Paul Sartre, André Malraux, and François Mauriac, wrote a very impressive book by that time *The American Challenge*. In this book he stripped the mixed feelings produced by the Marshall Plan against a real or fictitious complex provoked by the supposed domination from USA over Europe. Something very similar to a Freudian complex. "*We are not in the presence of a classic political imperialism, says Servan-Schreiber, but in a much more mechanic way in an overflow of order due to the difference of "pressure" between North America and the rest of the world including Europe*". And so this sort of panic coming from the gratitude felt by Europe rebuilt for her rescue was expressed in many conscious and unconscious ways, and believe it or not almost always with a feeling of defeat against her savior. "*England and France, says Servan-Schreiber bluntly, are now in the same position as the defeated countries of the last war as Germany and Italy, against the real winner that knew how to exploit his success and began now his big conquer ... the American expeditionary force would go away from Vietnam where it has nothing to gain but a lot to lose. But American industry won't abandon Europe where it does not stop to enhance its*

*conquests and increase its power”.*

Industrial society has in Servan-Schreiber an interpreter that only needs to dig into Herman Kahn's work for formulating his own diagnosis about the course taken by Europe from the Marshal Plan on. Servan-Schreiber is so amazed by the technological advance of USA as by what he considers a new type of imperialism taken without weapons, but by civilized means never paralleled in history. One can feel a totally new society emerging before the 30 years old men now will have retired. “It won't be only a much more “rich” society. From certain point on richness is not only a higher level of life as in a different way of life. “Post-industrial” society is characterized by an unprecedented freedom regarding physical, economic, and biological coercions for men. Semi disappearance of manual work more spare time than working time shrinking of distances, overwhelming development of cultural and information means, tenfold power over nature and life etc. Would be happier this society? This is a question we could not answer”.. But thing is that it will represent the vanguard of human history and that really affects us. If we prolong the actual lines, we Europeans do not participate in this society, at least not entirely”. It does not mean we are going to be poorer, probably we are going to be richer”.

And it was not least because in Herman Kahn's vision of Europe the postindustrial society seemed to move to a dark stage. The dome corresponded to United States, Japan, Canada and Scandinavia. Western Europe with the Soviet Union, Israel, Oriental Germany, Poland, Czechoslovakia, Australia and New Zealand only fitted in an advanced average. While the big amount of 120 countries including China, India and the rest of Asia, Latin America including

Brazil, Mexico and Argentina, Africa and the Arabian world only would reach the consumer societies level, and some of them barely would reach the threshold of the industrial stage.

This was an incredible misunderstanding of Hudson Institute. Flying over the world geopolitics without even feeling the role of China and India is so surprising and not to mention the omission of energy issue which then and now is synonymous of oil. He neither talked about the oil crisis in the seventies that just arrived at the precise moment when he wrote “The year 2000”. In the index not even appears a mention of the Persian Gulf, neither of the oil as a trigger for global geopolitics.

Unexpected and surprising the Hudson Institute gaps, they are nevertheless very obvious because of the later development of the theory of uncertainty. However Herman Kahn was really a pioneer mind in the prospective vision of our XXI century.

### **GAVIOTAS IN PERSPECTIVE**

GAVIOTAS from its genesis took place by chance, but it required a non-linear mind to project itself with a real strength. At the same moment of its birth emerged in Santa Monica, but not by chance, the Hudson Institute. His founder and inspirer came from the Rand Corporation an institution born in the heat of the institutional post-war, but as GAVIOTAS it was moved by the uncertainty about the future. However Herman Kahn needed the obsessive stimulus of the nuclear holocaust for writing his first book under this title that expressed the total strength of his volcanic mind: Thinking about the unthinkable things.

Daniel Bell, chairman of the 2000 year Commission in the United States Academy of Arts and Sciences would write in his introduction to *The year 2000* something that describes very well an impetuous personality as the founder of GAVIOTAS: **“Half of the actions of the human beings are regulated by chance and the other half by themselves”**. And as Kahn rose above those who preferred to put their head in the sand like an ostrich against the threat of thermonuclear war, Lugari challenged traditional leaders who were still thinking technological applications could be applied in the tropic as they were in the temperate zone. Since the very outset Mauricio Obregón the vice president of the board of Harvard alumni, and Roberto Panero both of them visionaries linked to Herman Kahn by means of an intellectual identity would generate with Gaviotas a latent and permanent synergy. An all of this nevertheless there were very big distances and differences in their conclusions about confronting uncertainty. There were not so clear differences between Lugari and Aurelio Peccei chairman of the Club of Rome another visionary in the sixties and seventies as Herman Kahn, who dared to think the unthinkable. Although the dimensions of their thoughts were different they were related.

Herman Kahn just needed the attention of leaders imbued with a Calvinist spirit convinced of the providential destiny of their country. Lugari on the other hand had to face very immeasurable difficulties in a fragmented territory where, as he said, *“in Latin America there were similar difficulties through several republics with the common denominator of social rigidity, lack of mobility, barriers to creativity and low self-esteem”*. That is not caused by the inherited indigenous genes contrary to the historic undisputed believe. We can see the indelible traces of the mesoamerican



cultures that are astounding the world, as Lugari says; they flourish when the big European cities were “only little settlements”.

## THE CALVINIST ETHICS

It was crystal clear that in Hudson Institute’s perspective there was something that let people to come over the thermonuclear ghost, it was the Calvinist ethics which guide the Mayflower passengers. That ethics planted in the north produced a society shaped by work and a richness which was a sign of predestination to heaven. Herman Kahn elaborated his idea of an industrial society from urban formations which from the world described by Max Weber, *The Protestant Ethic and the Spirit of Capitalism* (1904-05, English translation 1930) shows a break with the feudalism assuming as moral imperative values personal and familiar achievements, financial prudence, economical calculations, commercial vision, professional and business success. Looking into the XXI century from this biased cultural environment in the sixties was not an easy task but it had many chances of success as it was due to its systemic approach.

GAVIOTAS was born in a hemisphere where the resignation to poverty comes from a life inspired by disdain for Earthly gains awaiting unearthly rewards. Different from Hudson Institute and possibly in a bigger way Paolo Lugari linked the conditions of a creative mind, systematically cornered by much more great indifference, skepticism and envy in the higher decision levels in a society dominated by immediately decision making. The bigger difference could be this mentioned by Lugari in

Carnegie Mellon: the difference of stages “*in one of them, the northern hemisphere the collective consists of locomotives and in the other one precisely in the tropic, of wagons because it did not make tropical science and technology*”.

From such a dissimilar back ground Kahn and Lugari agreed in the systemic approach for this reason development become for both of them a moral and economic imperative. From this point of view the Hudson Institute sees the world advancing towards the post-industrial society moving on the most advanced and expensive technologies. Gaviotas however anticipated that the tropical world, which paradoxically is the world of poverty, in it this transit will do through appropriate technologies. This is not just because the appropriate technology is synonymous of out of fashion but it is the other way around. Because in a more lavish nature as the tropical one there are also the most extraordinary resources for communicating natural creativity to human mind precisely as a multiplication factor that in the medium and long term become in the development world an insuperable fortress facing what now we consider the advanced societies.

## **TWO VISIONS TWO WORLDS**

It was not by chance when Gaviotas emerged in the heart of Colombian Orinoco region the Hudson Institute went deep into the southern hemisphere for challenging the very terrestrial balance. Because this was the mega project Latin American “internal seas”. That will be an unimaginable accumulation of moving water joint by the interconnection

from the bigger waterways including Rio de la Plata, Orinoco and Amazon rivers. That included the same territory where Gaviotas was constructing another dream according to a holistic vision and looking for a better world. It had a great context notwithstanding obvious differences but characterized by the message sending from Mother Earth through Rachel Carson's Silent Spring.

Within this wild nature framework where you can find simultaneously all kind of extreme things and where the chaos produces more chance events, GAVIOTAS found as well the more conducive stadium to creation because as Lugari defined it is the most permeated by uncertainty and extreme difficulties, extreme remoteness, scarcity and abundance, lack of security or unexpected resources for getting back safety to life threaten in other parts of the world. His conclusion is that humankind in these big zones should be framed from its birth on in an **equatorial mind**. This mentality projected from GAVIOTAS has being fundamentally based on a development whose sustainability has being mainly far from lineal structures. There only can be very complex approaches bound to build the future from uncertainty. The hypothesis always confirmed with his unchanging persistence by Paolo Lugari is: *“the anguish and stress withstand by our tropical societies are produced by the deceitful search of certitude that cannot be reach because total security is impossible, you can only reach it hypothetically in cloned societies where all people could be biological and mentally equal”*. For this reason he seems to be on the same side as Herman Kahn regarding a technological development without boundaries also for the tropical regions. *“The risk of genetic engineering is not just engineering but the fact that it may fall into the hands of fools that give it distorted uses,*

*because you may use a hammer to break someone's skull or to hang a masterpiece. People give sense and ethics to technology it is not the other way around... civilizations that believe themselves as eternal by staying safe and stable have disappeared".*

## **A VITAL PATH**

As we are going to observe, Paolo Lugari is at the same time a dizzy creator of ideas as well as an avid consumer of original ways of thinking coming from all sides sometimes for confirming what his intuition had anticipated and also for connecting with the best and most innovative of the global academy as well as exploring the unsuspected world of undisciplined academy and intuition.

His great inspiration was his own father Mariano Lugari, an Italian of noble lineage, Leonardo da Vinci is his bottomless well where Paolo has quenched his thirst as his father would like it to be.

Mariano Lugari a selected mind who spoke 9 languages was much more a Renaissance man. He did not wanted his son to go to formal school and when he tried to introduce his eldest son into the science of life he addressed the famous naturalist Victor Manuel Patiño, “bio curator and lifelong protector of natural resources, indefatigable *explorer of ancient and new ecosystems, who was in the threshold of nature genius and emulated the immortal Humboldt, Bonpland and Mutis*”, as the Valle University designed him in a prologue to his work: *La alimentación en Colombia y en los países vecinos*. Editorial Program, Valle University. 2005.

With very deep insights in bioscience Victor Manuel Patiño published 1945 his first book *Una exploración agrícola en Suramérica*. He was author of several investigations on the Colombian Pacific Coast, where as a result of his findings he became a pioneer of the African palm in Colombia. He was chairman in the Botanic Garden in El Valle Province and an advisor of the Botanic Gardens in Bogotá and Cartagena. But before that, Patiño made in Colombia and the Andean countries a gigantic task of collecting genetic material of corn and its many varieties with a total of 6,000 samples which were placed in experimental stations in Colombia and the United States. After that he was awarded the José Celestino Mutis Prize from the Colombian FEN Fund (1993). And he finished his monumental work in 8 volumes *History of material culture in the Equinoctial America*, published by Caro y Cuervo Insitute 1990-1993.

Victor Manuel Patino no doubt would define the big vocation of Paolo Lugari within liberal lines as those that distinguished Simon Rodríguez tutor's approach for Simón Bolívar The Libertador. Mariano Lugari gave very clear instructions: ***"I am sending you Paolo for you to inspire him and produce the enthusiasm for botanic but it is no important for you to teach him"*** That is something that talks about the global libertarian thought on education. In his masterpiece: *Demanding the Impossible. A history of Anarchism* (Harper Collins/Fontana Press 1993), Peter Marshal dedicated one of its most dense chapters to Leon Tolstoy as a teacher and his rural school where he developed the theory of "spontaneous learning" especially guided by his dialogue with nature. He developed his theory framed inside the principle of **"teaching less as possible"** instead of this to *"develop moral sensitivity and*

*the ability of thinking autonomously*". "Tolstoy developed his own theory of spontaneous learning, as Marshal writes, he wanted to eliminate all compulsory approach and let students have an autonomous growing". At the entrance of his school he wrote this sign "COME IN AND LEAVE FREELY". The school practiced no interference with students letting them to learn wherever they wanted to. "When they are subjected only to natural laws, just as their own nature suggests wrote Tolstoy in one of his letters (loc. Cit.), they do not feel provoked and they do not protest, but when they saw themselves subjected to external interference they do not believe in the legality of bells, programs and rules". And, Peter Marshall continues, "from his experience Tolstoy felt that certain degree of disorder was useful and necessity should come from the students themselves".

It is certainly possible that Paolo Lugari's mood and the essence of Gaviotas have the same roots in these principles. That is something that could inspired Lugari's criticism to the educational system "requiring" them who work there to unlearn what they have learned. He believes experience teaches.

Within such a context one can understand the innate keen from Lugari to Leonardo da Vinci. In a captivating book *The Science of Leonardo. Inside the Mind of the Great Genius of the Renaissance*, Fritjof Capra describes the childhood of the big Renaissance genius that appears very similar to Paolo Lugari's. Hand in hand with his uncle Francesco, a very cultivated man and passionate with nature, Leonardo walked for hours throw the Tuscany sites watching the world and "*learning from him the names and properties of the flowers and medicinal plants*". But from him he learned also his "*infinite curiosity and the required*

*patience for the close observation of nature*”, and there emerged as well his spirit for painting and design. At the same time he started to disentangle the water, air and light language that would be present in his wonderful work as a painter, sculptor, and gardener.

Leonardo’s most surprising aspect is that he scaled the heights of knowledge and art beyond the borders of his time. Without having been to college or to what by that time was called “scuola di lettere”. Where they learned humanities based on the great Latin authors, and Rhetoric, Poetry, History, and moral Philosophy. Being an “illiterate” an “undisciplined” as Paolo Lugari says because he did not assisted to a university by that time, Leonardo was only able of learning arts. Capra remarks Leonardo along his life tried very hard to overcome this “disadvantage”, preparing himself in various disciplines, consulting the scholars of his time wherever they were and forming a rich personal library. On the other hand he was aware that because he did not was limited by the classical Rhetoric rules he had a very big advantage. For him was easier to learn directly from nature especially when his observations contradicted conventional ideas. *“I am aware said Leonardo, as I am not a man of letters some snobbish people would think they can discredit me, they do not know that the compilation of my knowledge is more valuable because it derives from my experience rather than the words from others and my experience is the true responsible for what I have done well”*.

## Chapter III

### KNOWLEDGE AND IMAGINATION FOR THE TROPICS

*“there is no place in the whole immensity of the universe a single shelter against change... if you expect, everything changes”*

*CARL SAGAN*

#### SOMETHING MORE DANGEROUS AND TRANSCENDENT THAN GLOBAL WARMING

In his speech at the ceremony of Honorary doctor degree awarded him by the Carnegie Mellon University, Paolo Lugari stated a very important hypothesis kept in GAVIOTAS vision long time ago. Its main premises settled questions not even totally solved by the academia. Nevertheless in GAVIOTAS vanguard vision they could have answers we can summarize like this.

= We inhabit the sun. We live in a round planed called Earth where the sunlight for millions of years has prompted the reactions that arise the biological activity in its primeval soup creating an atmosphere similar to that we have now. There the balance between nitrogen, oxygen and carbon dioxide and other rare gases stay stable because of the live systems; their biomass integrated 99% by vegetables. Only a 30% of Earth' surface has forests. Still with the present population we do not have reach



critical levels that prevent the proceeding of the life cycles that are the basis of their biological foundations where microorganism and animals play an indispensable circularly role.

- Which institution could tell us what could be the minimum biomass for this vital function to continue before we reach the no return point? The aim will be keeping the balance of the bio atmospheric pattern, the fundamental chemistry of Earth. If we allow this disruption to take place we were jeopardizing the key of life and coming closer to an unbearable atmosphere for human species.
- We do not have a thermostat for controlling the weather however we have long since begun to destabilize it. We must try without procrastination to recover a big part of Earth's skin that was originally forested, and the life in the oceans. That way we could neutralize the unstable chemistry of the atmosphere and at the same time stop the greenhouse effect causing the global warming.
- Embedded in a planetary consciousness by the principles of bioethics we must take the precautions against the biggest challenge in the history of mankind, which is the recovering of vegetation of our planet. A civilization is measured by its ability to understand, confront, and overcome the crisis, especially when it has to do with the life structure.
- We have being able to defend our nations. But who is in charge of our Earth and live species if even our scholar understanding is fractured. We made a splintered curriculum believing the students will do the synthesis.

However they continue thinking in a fragmented way, they do not have the capacity of generating a systemic way of thinking.

- This way this vision does not let us to understand our planet as a whole. The big proposal without distracting ourselves by accessory issues is to fight Earth's baldness planting again her original skin worldwide (this is our spaceship). Within this framework one of the national projects could be e.g. planting perennial species together with food species excluding monocultures. Far, beyond the agricultural border, for producing bio fuels by doing that we are going to plant energy instead of unearth it as it is the case with the fossil fuels. This has hard consequences that we all can perceive. If we continue this activity we would hurt our civilization that is worried about its decline and begins to talk about "sustainability".

That was, of course not the first time Paolo Lugari presented this fundamental thesis about the true problems of our planet. Seven years before, his proposal to Spain, on occasion of the Five Hundredth Anniversary of America's discovery was inspired by this very perception of utilizing the huge strength of the tropics for favoring the planetary balance. Until then the bigger sector of the international academy ignored that the Amazonian jungle was a self-regulated ecosystem because it has achieved its climax. Within the wonders of the evolution emerging from chaos and from the organic reality of Earth the tropical jungle is an essential part of Earths metabolism. However its self-regulatory capacity has a limit marked mainly by the predatory human activity.

Talking with Gaviotas language about systemic sustainability Paolo Lugari anticipated the mainly concern in Rio de Janeiro's Summit. Because even the industrialized countries become very late aware of this reality, they started to regard sustainability not only from the point of view of the extreme limits the not renewable energy sources could reach. It is to remark that the integral vision, not just the industrial- energetic, came from the developing countries. Paolo Lugari talked from the very beginning from renewable energies as the inexhaustible source that could guarantee the conservation of renewable resources. Within his perspective could not be a similar reservoir more efficiently in terms of no contaminating energy. Jaime Lerner the former mayor of Curitiba wrote to the World Watch Institute 2007: *"Sustainability is an equation between what one spares and one wastes, thus if sustainability spare/waste equals zero, sustainability tends to infinite. Waste is the most abundant resource of energy"*.

Furthermore, one can see very clearly the agreement of Gaviotas vision with Hawken and Lovins in the light of the main hypothesis stated in Carnegie Mellon, this intellectual affinity we are going to see later. The biological capitalism as Gaviotas basic concept, "living of the interest that produces the natural capital without affecting its main structure" is in line with the fourth principle of natural capital: *"For keeping our income we need not only maintain our natural stock of natural capital but increase it in a very important way in preparation for a population that could double in the next century. This fourth principle of natural capitalism is a question of common sense. The only way of maximizing productivity of natural capital in the short term is to change consumption and productivity patterns. Taking into account that*

*nowadays 80% of the world's population receives only 20% of the resources flow it is obvious that this majority will require more consume instead of less. Industrialized world will require increasing productivity in a radical way as well at home as abroad and then start to reverse the loss of natural capital and to increase its supplies. This is the only way to improve life quality worldwide much more than sharing shortage”*

Paolo Lugari showed from the beginning in Gaviotas, in the sixties, a trait that very few could totally understand, but in some way all felt. In a world full of paradigms of massive destruction of nature, the concept of Autopoiesis, this is the capacity of an organized system (a cell, a corporation, the conscience) for self-production and self-reproduction in line with what the Chilean biologists Maturana and Varela masterfully described. For Paolo Lugari's holistic vision the natural evolution for thousands of years has been an autopoietic (self-creation) that makes any human being keeps his vision at 360° on Gaia reality. On this realities settled Gaviotas its organic sustainability development from the very beginning. This sustainability Aurelio Peccei, MIT, Harvard and later on Amory Lovins in “Factor 4” and “Natural Capitalism” among others will project towards the twentieth century. Lugari in the same way as them would have his feet firmly planted in the true sense of what might be called a “revolution in evolution”. This revolution very precisely described by the Meadows and Randers: *“So far it is so impossible for anybody to describe the world that could emerged from a revolution of sustainability as it could be for the farmers 6,000 thousand years B.C. forecast the corn and soybeans fields on the modern Iowa, or for an 1800 century English miner to imagine an automated assembly line at Toyota. In the same way as the biggest*

*revolutions, the sustainability revolution would need many centuries for developing, although it is now in progress”*

GAVIOTAS was, without doubt, in the way of thought forms that Popper, in terms of the theory of knowledge and its epistemological scope, called optimistic and pessimistic ... because today, after Newton, after Maxwell after Einstein, we know that the naysayers have to be wrong.

In the above mentioned context there is of course the danger of incurring a conformist position, which would apparently leave to time the solution of all problems. It is possible that the big differences between different schools lay there. The different schools that are coming into the stage claiming the idea of sustainability are, on the one hand people that do not have any concern whatsoever for the finiteness of Earth resources. On the other hand there are those who think that recovery capacity of the planet is infinite. But there are also those who knowing the finiteness of the resources make a proper use of them. Preserving especially the renewable resources and dealing with Earth for understanding which of them is adequate for substituting the non-renewable.

GAVIOTAS vision anticipated many years this dynamic approach. Furthermore, its auto poietic vision always implied a fully understanding of the unlimited capacity of the Tropics for recovering, as well as for the activation of the cognitive processes among species alive (a vision that seems to be sharing for Aristotle, Capra, and Lovins). Gaviotas identified from the outset the position of the tropical savanna in the evolutionary processes, not only as a part of the Amazonian rainforest thousands of years ago but

also its break with this ecosystem and its transition to a differentiated state tending to reinsert itself in this original framework. The initial attempts to recover the mantle now covered with savanna and gallery forest apparently inappropriate for assimilating the reforestation processes were reinforced by Gaviotas' alliance with nature. In the mycorrhiza they found this almost miraculous solution. "More than 90% of the plants need this kind of association says Paolo Lugari. The fungi (*pizolithus tinctorius* and *thelephora terrestris*) are applied to the plants' roots and through a symbiotic process they convert into mycorrhizas. From that moment on the mycorrhizas contribute not only to expand the reticular area but to enhance the nourishment absorption and protect the plant from sicknesses, as well as helping it to regulate the necessary humidity to its development". Here it is worth to say what Edgar Morin notes on Gaviotas in his latest book called *The Way. For the Future of Mankind* (2011): "*It would be necessary to seek in ecological intensification to increase yields using bio-ecological features of ecosystems, which would lead to develop reforestation (which regulate the water cycle). This experiment is already begun in Colombia by the foundation of Paolo Lugari Las Gaviotas*".

**In this analysis as in many others the phenomenon of the planetary wearing systematically emerged the urge of relating demographic planning with extravagant consumes habits present in industrialized countries. Otherwise the analytical models approaching this unavoidable relationship will show over and over again that overpopulation problems are in the industrial countries as well as in the slums of the poor countries.**

An economist in USA and **Alternative Prize in Economy** Herman Daly states three fundamental requisites for a sustainable development:

- 1. The rate of use of renewable resources cannot override the rate of regeneration of them.**
- 2. The rate of use of non-renewable resources cannot override the development rate of renewable sustainable substitutes.**
- 3. The rate of contaminant emissions cannot override the assimilation capacity from the environment.**

Based on these three basic principles, Daly concludes that if we do not have those prerequisites we are coming into an “anti-economic grow”, because, as long as the growing of human economy is pushing beyond the optimal scale regarding biosphere, we are in fact becoming poorer”. And putting a big emphasis in preserving the three basic balances, Daly goes the same direction as that pointed out by GAVIOTAS story: “The quasi sustainable use of nonrenewable resources requires that all investment in non-renewable resource exploitation combined with a balanced investment in a renewable substitute (for instance, the oil extraction will join the planting of trees to produce alcohol from wood). The idea is to divide the net income coming from non- renewable in both, one as a profit which could be consume each year and a capital part that should be invest in a renewable substitute. This division is arranged in a way that at the end of the life of the non-renewable resource would yield a sustainable yearly product equivalent to the profit from renewable incomes.”

Even at the moment of the Rio summit, Gaviotas approach could not be convincing enough for changing conformist attitudes.

The facts started very soon to agree with Paolo Lugari's premonitions. The clearest witness was the Living Planet Report 2006, with that World Wildlife Fund (WWF) tried to show the real dimension of the ecological trace done by the human species. The central conclusion of this exploration along the global systems is very clear: This trace has tripled for forty-five years from 1961 until it represents now a 25% excess of the self-regeneration capacity of the planet. And this deepening of the issue has been shown in the constantly loss of biodiversity affecting all the natural kingdoms. Nevertheless, it is unavoidable to get back to the Gaviotas systemic approach. Its starting point is the renewable energy sources that represents the nature itself and gives Gaviotas the basis on which the Living Planet Report 2006 constructs its diagnosis.

Paolo Lugari has been tireless in his perception of the circular process of nature:

- = There is not energetic crisis but a crisis of taking advantage of natural resources that is an imagination crisis.
- = The largest undiscovered oil well lay inside of the efficient use of our available energies. But fundamentally in the preservation and in taking advantage of the renewable energy sources.
- = Planet Earth absorbs less and less photons because its biomass is decreasing.



- The fundamental issue is to keep the atmospheric chemical balance regarding its chemical composition as well as its behavioral pattern.
- To recover the skin of the soil and to preserve ocean life represent the best contribution to this unavoidable balance.
- Coming back to the genesis of life as Lynn Margulis said “in the beginning was the bacteria”. And the key element in photosynthesis process is chlorophyll the great synthesizer of nutrients together with solar energy...

All this is the pre-Socratic synthesis. Union of “four elements”: water, air, light and soil this synergic interaction of the creative miracle gives form to living matter. That gives the content to biosphere. From there on, phenomenon regarding biomass quantity ensuring survival of human species only can be treated within an ineluctable relationship. And this inside the organic conception of Earth is named as Lugari would say “biosphere metabolism”, outside it all balance is broken. Fragmentary views only help to contribute to perpetuate a self-extinction model. This is synonymous of a hyper consume society. Because one-disciplinary rational is not enough to understand life’s phenomenon.

In the above context the news from Living Planet 2006 and later reports were not flattering. Because where prosperity index have increased that was achieved by overexploitation of natural resources. That not just diminishes the ecological offer for poor countries but contributes to make more difficult to reach the goal of welfare for the great majority. “*Unlike financial capital that*

*can be exchange for another one with the same monetary value, ecological resources are not easily exchangeable. The ecological debt measures the risk that resources and ecological services would not be more available in the future for meeting human demands*". Within this perspective of uncontrolled use with no regard for the resources efficiency the Report estimates the accumulated ecological debt as equivalent to 34 years of the planet's biological activity.

### **LIVING PLANET INDICATORS**

The WWLF supports its diagnosis on two basic indicators. On the one hand "the Index of the Living Planet" monitors global biodiversity, through 1.313 species representing vertebrates, fish, amphibians, reptiles, birds, and mammals concluding that between 1970 and 2003 they diminished 30%. On the other hand the second indicator refers to the "ecological footprint" measuring the demand on soil and water required for feeding human population living on Earth. This concept includes farmland, forests, rainforests, pastures, fisheries, areas to absorb wastes as well as areas for physical infrastructure built by humans. These results give an ecological footprint of 14.1 billion hectares biological productive representing an overuse of 25% beyond the effective bio capacity of the planet. According to the Report the global population only has just two biologically productive hectares per capita. Nevertheless from these two only 1.7 hectares are available because 0.3 is the minimum area for supporting biodiversity conservation. This frontier was trespassed in the 80s and the whole humanity entered into an ecological debt that should be paid. While all industrial countries exceed by far the world's average the poorest countries remain under -

utilization levels and in 2003 others like China and India barely approached a half of it. Within a much more differentiated range, Japan has an ecological footprint of 4.4 hectares per capita and a bio capacity of 0.7, while Brazil, in the heart of the tropics with a footprint of 2.1 has a bio capacity of 9.9 hectares. Colombia has a bio capacity of 3.7 and a footprint of 1.7. The fact is that only 8 countries: USA, Brazil, Russia, China, India, Canada, Argentina and Australia concentrate more of the half of the global biological capacity. Meanwhile at least 3/4 parts of the global population is settled in territories that are ecological debtors with consumption higher by far than their bio capacity and at expenses of the rest of the world.

All this shows an independent world that needs to act with solidarity which paradoxically is not precisely at the side of the hyper consumption territories.

The 2008 WWLF Live Planet Report not only ratifies the findings of 2006 but reveals an advanced in the ecological footprint in a greater way in the use of fossil fuel and deforestation and the change in the uses of the soil in the tropical region, the virtual destruction of fishing sources, ocean contamination, and all the consequences of global pollution.

### **GAVIOTAS PREMONITIONS**

Before the world became aware of the contamination effects of deforestation and the relation with altering the chemical balance of the atmosphere and global warming, Paolo Lugari had constructed the most sensitive hypothesis and from GAVIOTAS he advanced in the process of its

validation. His first explorations of the planet and its evolution had taken him into the Chocó rainforest. Until then on this biogeography region there were only options of gold exploration with gigantic dredges and a shameful degradation of its mighty rivers another option was the exploitation of its precious woods. Lugari from his first meeting with Chocó on challenged the prospective people to find, in Chocó's biotic richness unparalleled in the world, a productive model useful for the global humanity, but in the first place useful for its forsaken population.

The wood obsession has always turned its back on any consideration for the ecosystem. It is feed up mainly by businessmen's greedy people strange to the region and stimulated by industrialized country's companies protecting their own secondary forest zones. They almost always ignored the fate of the primary forests of the developing world. That way has perpetuated the spoilage of the mantle of tropical trees.

The most pathetic case is that of Japan which preserved most of its original forests, exploited the forests reserves of the Asian countries wrongly believing that the ecological damage will respect its own natural borders. All that not only would spoil the biotic reserves of the selling countries but make them importers of the wood after their economies were constructed on the basis of the indiscriminate forests exploitation.

GAVIOTAS appear in the heart of the tropical savanna and that was not by chance. It was a sensitive decision made over an open landscape that in the historic evolution had been a part of the impenetrable Amazonian rainforest. And inside this systemic vision could not appear this

scenario only for resign “to remoteness, silence, and solitude”.

For Lugari imagination deserts are the only ones that do not have place in Gaviotas. And on this basis he did not only build his basic hypothesis about Earth’S SKIN but also those about the TREE CHEMISTRY and within it about the TROPICAL PINE CHEMISTRY as one of the components of nature’s cyclic processes.

With this after five hundred years of Cartesian thought in Gaviotas they expressed the Leonardo Da Vinci’s teachings quoted by Capra: *“Simplification hurts knowledge and love... What is the value of someone which for condensing the content of what he/she pretends to know ignores most of what is in the totality of the object? O foolish man he does not realize that is falling into the error of them who stripped the tree all its leaves and branches full of flowers and fruits just to prove that the tree is good for making planks”*.

#### **THE FINDING OF THE CARIBBEAN PINE IN THE AMAZON RAINFOREST**

The first “Caribbean Pine” plantings were made with seeds brought from Honduran La Mosquitia rainforest by Paolo Lugari, while he was flying with Mauricio Obregón. He was aware that it was a tropical variety compatible with the Amazon ecosystem. The biologist and explorer Catherine Caufield found the Caribbean in Central America and she wrote. *“It is one of the most valuable plants of the rainforest. Unfortunately there are only few more or less big areas in the Central American humid rainforest and its survival is uncertain”*.

On the eve of the V Century of America's Discovery, Paolo Lugari knocked at Spain's gates with completely innovative ideas about the meaning of a drained Orinoco region for recovering Earth's skin.

At that time even in the highest spheres of the global academy an approach as that from Gaviotas does not occupied a central place. It seemed rather a frivolous interpretation while science believed there were other sources of Earthly unbalance.

#### **PAUL KENNEDY CONFRONTS THE ENVIRONMENTAL CRISIS**

1993 Paul Kennedy an eminent Yale professor published a book which had great resonance pretending to confront for the first time from the highest levels of Academy not directly related with ecology the emergency in the environmental crisis.

*“I am not quite sure if I could define myself as a scientist -anticipated him a history professor-, but as a scholar whose task is to make big questions and use a careful language to suggest possible answers leaving always an open future”.*

All this I made for offering “more direction and orientation than concrete solutions”. And, therefore this professor did not hesitate to identify “our environmental problems” as one of the most critical areas in his point of view.

Kennedy compares the situation of the world on the eve of the twenty-first century with the scenarios that inspired the monk Malthus to launch their cries of alarm about the

relationship between population growth and food supply. Nevertheless he honestly takes away the false bad intentioned interpretation that took away from his theses the success that finally history will give them. Furthermore he found that Malthu's vision became an inspiration source for finding in technology a way to compensate the unbalance between population growth and food security.

*“In brief -Kennedy said-, British people escaped from the Malthusian trap through three doors: emigration, agricultural development and industrialization”. Meanwhile for India its situation was the other way around. “A starving population doubled and tripled in the ninetieth century, but on a very less productive base. The terrible result was that although India and United Kingdom had similar per capita industrialization levels at the beginning of the industrial revolution (1750), in 1900 Indian's level was a hundredth of the United Kingdom's level. No doubt industrialization and modernization created problems to industrialized societies but these are insignificant compared to these that grow without having an industrialized revolution... this way territorial expansion played its traditional role as a valve for super population”.*

It is clear to Paul Kennedy that interrelation between population's growth and food production becomes most conflicting as countries drop behind regarding education and new productive technologies. This synergic interaction produces finally a neutralization of the population growth, a better distribution of the income and an essential improvement in food.

Furthermore it is interesting the way Paul Kennedy bases his work on World Watch Institute and the World Resources

Institute being in his book the clearest x-ray of our planet.

Coming to “dangers for our environment” it is really impressive the agreement with the main sources of Gaviotas vision since the 60s, especially with the tree chemistry emerging from Gaviotas production on occasion of the fifth century of the Discovery as well as of the Rio Summit.

*“In the last ten years or so -Kennedy says-, it has emerged a second answer to the question why should wealthy societies be concerned about the fate of poor remote villages. Because economic activities in the developing world, from thousands of millions of farmers or little industrial enterprises increase the damaged inflicted on the planet as the thin film of life on Earth is unique and is interconnected. The damage produced to atmosphere by activity in the tropics could have serious effects not only locally but in the whole planet. The environmental question as well as massive emigration means that perhaps for the first time, what make people in the south could damage people in the north. Only since the fifties Earth has loss almost a fifth part of its topsoil of farming land, one fifth of tropical forest and tens of thousands of plant and animal species”.*

With this focus Paul Kennedy justified what since the Rio Summit started to be part of a new conscience about the global interdependence.

This “assault to nature” as Kennedy named it is now much more incomparable ruthless than in Malthus age. Because in the world of the English monk the environmental impact of any attack on nature did not go beyond the local frontier.



The endless complexity of human culture and its structures including the ruins of which it has destroyed in few decades even if they needed millions of years for being formed makes from this present world an interconnected universe.

From his scholar perspective it is clear that Professor Kennedy approaches an organic vision with his allusion to “the thin life film on Earth” and the “topsoil of Earth”. Also the Gaia hypothesis and even Leonardo Da Vinci’s conception made Paolo Lugari spoke from Gaviotas about the “skin of the planet”. In this same point of view was also clear his reference to the steps that the world began to be taken to neutralize the critical dismantling of the terrestrial physiology. *“A global program for foresting and reforesting could achieve the absorption of a lot of CO<sub>2</sub>. A forest full of new trees takes five tons and half of carbon dioxide a year while growing”*.

On the other hand his book *Preparing to XXI Century* represented and still does the most authorized scholar support to the tireless dedication of Lester Brown and the World Watch Institute for the planets sake. It is not strange then due to his honest and holistic vision he makes a critic to the USA elusive position before the environmental crisis and the movement of the international community toward an attitude change. “My theory is that this is an escapist culture. All people coming from Europe was escaping from religious persecution, scarcity and economic crisis. If you do not agree with your neighbor put your stuff in your cart and flee to the Appalachians, in a way this continues to be like this. The World Watch Institute recognizes the contribution from Gaviotas to the solution of this crisis in its article *The Gaviotas Experience* (2004).

**FIGHT AGAINST INDIFFERENCE**

In the nineties GAVIOTAS still was in the middle of this hostile atmosphere where he was since its foundation. Except the pause during Belisario Betancourt's term, the state policies never tried to test GAVIOTAS hypothesis, not for personal reasons against its founder, but as an expression of the impenitent reductionism in the treatment of national problems. The same sustained before other values of Colombian intelligence. Before them there was always a respectful attitude a display of praise words and of course, celebration for the foreign recognition of their talent. As a rule in Latin America it has been always more difficult to fight open hostility than indifference.

But we must recognize that above local indifference, new realities uncovered after the Rio Summit, but mainly by the indisputable reports of expert groups and International Observatories such as World Watch Institute and World Resources Institute these realities began to open spaces although the State continued apart from them.

**THE END OF NATURE?**

The 90s that were the eve of the Environmental Summit began with a very similar message to that of Rachel Carson's "Silent Spring". The End of the Nature does not point out to a specific threat in a specific space as DDT. Bill McKibben appears as a pioneer in the claim against the global phenomenon symptomatic of the planetary disintegration. Climatic change, global warming, ozone layer, sea level rise, and desertification, very complex themes which arcane was penetrated only by scientists.

But by means of scientific writers like McKibben a university professor they started to shake harder the conscience of the common citizen. This vision coming from *The End of Nature* appears at first sight as an apocalyptic one and so was considered by most of its critics. After this will come another one 2003, named, *Enough*, it was a sign of the inexhaustible potential of technology as well as the possible dangers embodying by the “techno prophets”. That serves him to provide a panorama where the post- industrial society seems to meet its twin sister embodied in a “post-human society” infected with “nano enthusiasm”. And that does not constitute a fiction world or a totally undesirable one. “We live in a world where we have too much intelligence, too much capacity, too much rubbish” McKibben says. Yet it is an optimistic vision of a world in which there is evidence that human being is able of overcoming a fate seemingly inexorably tragic. Commenting a book from a great Harvard analyst about climate change, Kelly Sims Gallagher (World Changing) welcomes enthusiastically the statement of the preface and editor Alex Steffen “*If we are confronting an unprecedented crisis yet we are as well in an innovating moment that cannot be compared with anything before...WE LIVE IN A WORLD WHERE THE NUMBER OF PEOPLE WORKING FOR A BETTER WORLD INCREASES IN AN EXPLOSIVE WAY*”.

## **THE TROPICAL NATURE**

There is a curious gap, at least in appearance, McKibben. In his always beautiful pages on the wonders there seems not to be this natural distinction between the potential of temperate ecosystem and the exceptional characteristics of

the humid tropics especially in the Ecuadorian countries. *“The Tropics of the Tropics as Paolo Lugari describes it. There where the photosynthesis works at its best and where there is more force on the use of the overall ecosystem interaction and biosphere’s chemistry for neutralizing the devastating effect of the biomass loss caused by upsetting the live base of the planet’s balance”.*

McKibben needed to come into the XXI century for seeing the real message of the Club of Rome launched 30 years earlier. He wrote in Harper’s Magazine, one of the most serious intellectual and scientific publications in USA this surprisingly prove: “Suddenly these somber guys of the Club of Rome could be right, when in the seventies they spoke about the *“limits to growth”*, nevertheless in his Book “The End of the Nature” McKibben seemed not to give more importance to the deforestation processes in the tropics. But mainly to the meaning of planting “new forests”, furthermore to advocate for the protection of the forest’s ecosystems whose climax plays such a significant role in the global balance. But as the upright scholar he always was in this same Harper’s Magazine he connected with a key link in *“a planet with forests increasingly more vulnerable. This year a beetle encouraged by higher temperatures managed to kill 10 times more trees than in any previous infestation in northern Canada. That means there is much more carbon dioxide into the atmosphere that seemingly condemns to routine the Canadian efforts to meet the Kyoto Agreement”.*

According to McKibben the forests take care of the major percentage of CO<sub>2</sub> produced in USA. These ecosystems are precisely the ones more affected by the increment of the global temperature and by fires that have become virtually

unstoppable. Meanwhile in the heart of the humid tropics, Paolo Lugari claims the crucial role that 250 million hectares could play in the plains of South America. One of these is the high savanna of the Orinoco. An immense territory which could absorb as a forest at least 1,000 million tons CO<sub>2</sub> (the Gaviotas 8,000 hectares forest absorb between 5 – 7 tons CO<sub>2</sub> hectare/year) from the 24.000 million those 24.000 million produced on Earth during 2002, according to the World Bank (from Little Green Data Book, 2007).

Accordingly Paolo Lugari's hypothesis on the role of a tropical forest in 250 million hectares of tropical savanna has been substantially increased by researches beginning to be known in such authorized publications as Nature, WWL, and Science among others.

On Earthly chemistry, forest and ocean ecosystems contribute to the highest degree to carbon sequestration. Furthermore they contribute to carbon sequestration. But they are also responsible for more than 80% of carbon exchange between ecosystems and atmosphere. These figures show the extent of the consequences of deforestation and the meaning of this vision launched by Gaviotas paradigm. That simultaneously with a revolutionary scheme for planting forests in the tropical savanna by means of inoculate mycorrhizas in the roots, has developed a mechanized technology allowing planting a tree every three seconds.

The acceptable absorption index in the majority of the 90s researches on different world areas found 0.8 - 2.4 tons on boreal forests and 0.7 - 7.5 on the temperate zone, and 3.2 - 10 on the tropics. Within this context is clear the

advantage of the tropics in the neutralization of the climate change. Not only because the growing and photosynthesis cycles are much more efficient but because this projects help to accelerate social development in the involved countries and create an environmental culture that would reflect in additional contributions to decreasing environmental deterioration.

From these investigations can be deduced that after the role of tropical forest ecosystems, another vital support for the capture of CO<sub>2</sub> were long time the northern hemisphere forests. But this is possible to say as well from many temperate countries that covert millions of square kilometers as USA, Canada, China and Russia. With the global warming has increased the liability to fire in those immense extensions only overcome by the tropical rainforests. This phenomenon not only destroys the capacity for absorbing CO<sub>2</sub> but also contributes to multiply the amount of not sequestered one. In other words current “drains” are going to become “emitters” of greenhouse gases. According to American Scientist this progressive degradation of the “green index” of Earth is stronger on the boreal forests especially during July and August every year. A projection of the negative effects of this trend shows in the middle term those fires could produce in USA during this months a pollution of CO<sub>2</sub> similar to the year emission from cars plus the energy production in a medium seize State in USA.

## **THE FAILURE OF BIOSPHERE**

Paolo Lugari gave the key note in many speeches in academic forums, such as Carnegie Mellon University and

Alamos Laboratory in New Mexico highlighting the appalling failure of Biosphere 2 experiment, launched in 1991 in Oracle, Ariz. This had a cost of \$200 millions for creating an autonomous artificial ecosphere for 8 people it could not reproduce the atmosphere chemic composition. Nevertheless "*Earthy ecosystem makes that for free for 640 million people*" says Lugari.

Thus Bill McKibben within this framework is right when he says: "There is a number, a new number highlighting very clear this issue. Perhaps is the most important number on Earth: 350 as the parts per million (pp/m) of carbon dioxide in the atmosphere. Civilization grows at the edge of leisure and security provided by a feasible relationship with natural world. This scope would not last at 350 at least not for a long time. This is the limit we have before us" This figure had increased regarding the beginning of industrial revolution when the carbon dioxide index in the atmosphere was less than 280 ppm.

## Chapter IV

### GAVIOTAS AND THE CLUB OF ROME

*“The story you are writing sounds as poetry and now you are adding music to it” the former president Belisario Betancur said hugging farewell Paolo Lugari. “You will join us in our first concert it will honor you” Replied Lugari”.*

*The old former president exultant remembered what people say when coming back from GAVIOTAS .*

*“Gabriel García marquez told me when returning from there:*

*“This is what Colombia needs”. ...When Felipe Gonzalez president of Spanish government descending from the airplane that took him with his family back from GAVIOTAS, said “this is what America Latina needs”. And Aurelio Pecei, founder and president of the Club of Rome after visiting GAVIOTAS 1984 with the board of the Club exclaimed enthusiastically: “this is what the world needs”.*

***Report of ALAN WEISMAN in his book***

***“GAVIOTAS A Village to reinvent the world”.***

Herman Kahn was moved by the obsession of the thermonuclear holocaust and the advent of the postindustrial society. Under these feelings he wanted paradoxically to watch the future of the world, as preparing an umbrella for protecting it from the sacrifice he believed as the unavoidable outcome of the Cold War. Meanwhile and with few years apart, Aurelio Pecei a man of extraordinary formation who had lived the horrors of the World War II watched the future in a very different way. He fought in the Italian army and was a prisoner in a Nazi concentration camp for almost five years. He concentrated



in what he called the “predicament of the mankind” before a planet with finite resources but with infinite potentials for procuring welfare to everyone.

What is paradoxical in Paolo Lugari’s path is his instinctive tropical rationality as he calls it he was very close to Herman Kahn as he was to Aurelio Peccei although he was near him, just two months before his death. Peccei visit to Gaviotas was his last contact to Colombia and to Latin-America.

### **REPORTS TO CLUB OF ROME**

The concept of limits to growth was never strange to Paolo Lugari’s world, neither from the point of view of human and material resources, neither from the pertinent technologies, because pertinence has been one of the high points of his creativity. Thus when the Club of Rome from the Massachusetts Institute of Technology and from its headquarters in Rome shook the world with its first report on “limits to growth” in the germinal village of GAVIOTAS they experienced the feeling of coincidence. The predicament of humankind” nucleus of Peccei’s concerns corresponded exactly to the challenge that in Paolo Lugari’s mind posed the paradox of a tropic submerged in loneliness and poverty in the midst of overwhelming biotic wealth synonymous of paradise. It was necessary ten years before Aurelio Peccei came almost exultant to Gaviotas to write down in the book of distinguished visitors his best expression of his feelings before this answer to the predicament of humankind since its beginning: “Gaviotas a paradigm for the world”. Without knowing each other Aurelio Peccei and Paolo Lugari were connected before the

ame challenge implicit in the human predicament. And they keep connected until Aurelio Peccei almost came to die in his first contact with the Colombian Orinoco Region. Less than four weeks passed after this visit and this great gentleman of the XX century took definitely his seat in history.

Before Aurelio Peccei and the full board of the Club of Rome visit other reports lead by “Beyond the Limits of Knowledge”, this time from Harvard University, contributing to open the path initiated by MIT group, under the inspiration from Dennis and Donella Meadows. This latter talk many times about GAVIOTAS in articles and lectures.

The first report of The Club of Rome is essentially a prosecution for human myopia, and of course to the leaders of this society going to the exhaustion of its finite resources. This is not as many times it is called a new form of Malthusianism. Although to tell the truth it is a coming back to the English monk’s message but taken in it’s really essence which was never before well understood. Specially taking into account the global picture of a planet whose wealth has been appropriate from a fraction of the human species, while the other part has not yet the minimum for surviving. In this world, according to Paolo Lugari, the only sustainable thing has been the poverty of half of its habitants.

For the time of the First Report the global leaders just had time for confronting the Cold War. Thus the Mexican, Victor Urquidi, when prologued its first Spanish edition published by Fondo de Cultura Económica says: “*Within the United Nations where these aspirations have achieved*

*their expression in many documents and recommendations the vision of the future of humanity has not a big scope. In the political field there are not goals. ...In the economic and social ones we are operating by “decades”. Presently we have the Second Decade Development with dubious quantitative and qualitative goals... This Club of Rome study does not pretend such ambitious goals nor is it an end of the world. This is above all an instrument or method with which by means of “system analysis” technique we interconnect certain number of variables”.*

It was not a perfect method yet perhaps it was the better possible by the time. The model designed by the MIT group put up with a new analysis 30 years later guided once again by Dennis and Donella Meadows to conclude that under the light of refined instruments the first report forecasts were completely successful in its essentials.

Aurelio Peccei would be present in many global scenarios since then. In all of them he elicited admiration and controversy. But he always could stare to his opponents for stating this central truth from all reports coming from different academic and scientific sources, *“in our technological society each step forward makes man stronger but at the same time makes him more impotent; each man’s triumph against nature seems to be also a triumph from nature against man... science and technology have within them the threat of thermonuclear incineration as well as health and prosperity, population growth and move toward cities have originated new and more humiliating poverty types and one squalid urban planning often culturally sterile noisy and degrading; electricity and motive power have alleviate the burden of physical work, but they have remove that satisfaction produced by it, cars produce*

*freedom for going elsewhere but it has also fetishism of them and the venom of the cities”.*

The limits to growth were meticulously unraveled by the MIT group within a global interconnected and interacting context taking into account following indicators: natural resources, economic growth, population, food production, and industrial growth and contamination levels.

Contrary to what many media thought and informed to the world the Report never intended to be an apocalyptic prophecy not even close the doors for a better world. It was the other way around, they said about the method that probably it has failures as is common in any human product. *“The model we have built is imperfect like any other, oversimplified and incomplete”* but overall it confirms the hypothesis that before the complexity achieved by human presence on the planet *“any country even the biggest could try to solve its own problems without solving the problems menacing the global system”*. And in this sense from his headquarters in Rome within Aurelio Peccei’s holistic vision there was a deep empathy with this emerging thing in the heart of the Orinoco Region.

UN General Secretary, U Thant in the eve of the Report of the Club of Rome declared a series of warnings: *“To the UN members there are perhaps ten years left to control their old quarrels among themselves and enter into a global sharing in undermining the arms race, improving the environment, limiting the population explosion and finally give the necessary impetus towards development”*. The previous challenge and very different levels of interest within the global population to feel involved in a truly interdependent world inspired or seemed to inspire a time

and space picture within the human perspective, as a starting point. Coming from the biggest geographical spaces where the biggest human settlements exist far from scientific advances, isolated in their own misery. Where their actions and reactions emerge and die within a time that do not allow to see far beyond their own cultural limitations thus tending more and more to isolation accentuated by the influence of the same environment but further more by the impossibility of assimilating the good or bad changes coming from abroad. This model seeks essentially to open space and time perspectives that would allow policies inserted in an interdependent and interactive world achieving the “transition from growth to global equilibrium”.

For many people criticizing the limits to growth is very difficult to evaluate the true foundation of the model. The authors always insisted that the aim of the report was not a catastrophic prognosis, as the authors of *beyond the limits*, 30 years after also said, even though the model used included “collapse models”. *“The basic behavioral model of the global system consists of an exponential population and capital growth followed by a collapse”*. Nevertheless the Club of Rome stated very clear that social variables such as *“income distribution, attitudes before seize of family, choice between goods services and alternative food will follow the same patterns used throughout the recent world history... the validity of the model continued only until the point where each growth graphic turns down into a collapse”*. As might be inferred *from the report* “the implicit assumptions in the parts of the model consist of *population and capital growth should be allowed until they reach the collapse*”. For them that at least feel the true message it is clear that the idealized balance stated there corresponds to real

potential within the human community environment and the limits to growth “are only those imposed by the finiteness of the global system”. In its final comments were accepted the critics about the little importance given to the alternative sources of clean and renewable energy and its alternative uses.

Curiously this was the time when Gaviotas began its journey. In the noosphere there are always these interactive unconscious phenomena.

The most emphatic conclusion is that responsibility lies with the more developed countries, not because their vision is clearer or more comprehensive but because they spread the syndrome and are still the source of the growth keeping it alive”. This requires in the first place that developed countries start to plan their development considering the space corresponding to the poorest countries for recovering from their backwardness. This planning should come *“rather than through hazard or catastrophe but through a basic change of values at individual, national and global level”*.

Anyway if something is repeated in the Report is that the complexity of the global issue yet much more of the human problem is that they are absolutely unpredictable and far from the perception of any numeric language. Nevertheless it is clear that in all Aurelio Peccei’s work and life the “human predicament” went toward the necessity of a reorganization based on “a supreme effort of moral and political comprehension, imagination and resolution accompanied with social innovation paralleled to technological change as well as radical institutional and

political processes reforms at all levels including the highest that is the global policy”

## **DEVELOPMENT IN A PEACEFUL WORLD**

15 years after GAVIOTAS foundation and ten after the first Report of the Club of Rome about the limits to growth; after the Conference of Habitat in Vancouver and the award given to Paolo Lugari by the UN Development Program (UNDP) the resonance of the paradigm established in the Colombian Orinoco region had gone beyond the national frontiers. The Paolo Lugari and Aurelio Peccei meeting had its better expression in the forum “*Development of a world in peace*” in 1983 planned a year before by President Belisario Betancur together with Aurelio Peccei the charismatic President of The Club of Rome.

The visit pay by the Club of Rome board to GAVIOTAS, Vichada sealed an identity expressed in the full agreement between the two visions. But it grew more concrete as far as the Club for the first time went into the heart of the wet Tropics. Over there Paolo Lugari brought forward a milestone of unlimited scope for the projection of the ideas of Peccei in Latin America. But it was furthermore the best occasion for gathering those personalities to face the wet Tropics. And in this same place almost 20 years later were personalities from a very high politic and academic level, such as Federico Mayor Zaragoza, Unesco General Director, Eleonora Massini, prospectivist of Gregorian University of Rome, Gregorio López Bravo, Spain State Secretary, Rodrigo Escobar Navia Education Secretary and one of the most brilliant Colombian minds, all of them face the overwhelming weight of the mysterious deep jungle.

But essentially facing the endless space of the tropical savannah. In the best of its moment for verifying the possibilities of that enormous territory to join humankind in its coming back to millions of years of evolution to be part again of the Amazon rainforest to add to this protector skin of Earth. But also to become a synergistic multiplier in the infinite chain of renewable resources that had died by human activity but also by evolutionary processes that seemed irreversible.

GAVIOTAS was by that time more than ever a reference to the world.

Aurelio Peccei had led the Club of Rome into the core of Earthly concern. As stated by the former Colombian President Carlos Lleras Restrepo in a forum, a personality of continental dimension who introduced Paolo Lugari and moderated the forum about Lugari's conference. Any organization that was not in the list of the *Europe Year Book* could go so deep *"to build a conscience in the human species and the feeling of this collective responsibility of men for the next future. Starting in the first place from the work of Meadows and her coworkers "The Limits to Growth", many concepts have been modified especially that of development. A humanistic sense is present now in the appreciation of economic activity and global interdependency and it is no more ignored. It is contrasting to other dominant approaches, one of political scope that of national sovereignty. Others of military strategy, of taking advantage of natural resources, of international economic relations, and the means for preserving peace. ("Desarrollo en un Mundo de Paz" Editorial Presencia, Bogotá 1983).*



Within this large context the Colombian statesman points to *“the initiatives developed by Gaviotas that are a sample of the changes in the life quality and the relationship between man and nature, lectured by the Club of Rome”*. (Ibídem)

Aurelio Peccei was in his zenith. He had become an exceptional really universal man former chairman from Olivetti and Alitalia board member, administrative committee member of Fiat, founder of Adela Investment, former member of the London International Institute for Environment and Development, Malta International Sea Institute member, Washington Population Institute board member, World Wildlife Fund board member, Geneva International Administration Institute, Davos European Forum Foundation advisor board member, Brussels European Community Research and Development Committee, Rome Architecture National Institute Chairman, New York Advisor board member of Friends of Earth, Board of Governors member of the Society for International development, New York Business International Corporation board member.

From the summit of his life always connected with the deepest world potentials, Aurelio Peccei stood up in Bogotá for evoking Charles Dickens:

- *“It is the worst epoch; it is the best of the epochs.”*
- *“It is the time of madness; it is the time of lucidity.”*
- *“It is the winter of desperation; it is the spring of hope.”*
- *“We have nothing before us, we have everything before us.”*

According to its renovation purpose of this world agitated by so many conflicts Forum Humanum had as its essential raw material a huge interdisciplinary group of young researchers. And his scope covered all human disciplines. Its main target: design a New Humanity. It had perhaps some utopian prerequisites in such an uncertain time yet it corresponds to the awful disappointment within the awareness of millions of human beings. In a world polarized by conflicting ideologies in the context of the Cold War and a “rave of weapons”, the collective desire wanted to come after a utopian world without the weight of violent complexes of human nature. For Aurelio Peccei, within the spirit of Bogota’s meeting, *“any development would be possible unless peace would prevail in the world. Furthermore within the totalizing vision of the Club of Rome, this new humanity was impossible to think of without ending “the senseless violence against the natural environment from which fundamentally comes our life”.*

Forum Humanum, in its first statements added to what was presented as the first red lights showing the planetary imbalance from the Report about the Limits to Growth, and before that from Barbara Ward and Richard Carson. Aurelio Peccei approaches even closer his lens for showing *“a very worrying picture of exhaustion and degrading: wild life holder of nature treasure disappearing, deserts advancing, forests fast destroyed costs and estuaries ruined; a large amount of vegetables and animal species condemned to extinction, air, water, soil and even the air we are breathing, natural cycles, climate and ozone layer many times irreversible damaged, human ecology directly affected by over cultivation and over grazing and for excessive exploitation of fishing areas, pressing ecological systems of cultivable soil and grazing as well as fishing*

*areas that are called to meet exponentially increasing human demands”.*

Forum Humanum wanted from its very beginning to be heterodox, and although its initial headquarters was the Gregorian University of Rome, one of the so called pontifical universities with the Society of Jesus imprint, its multidisciplinary features gave it a very important academic credibility. “The alternative futures” for humanity started to be a real hope with the indisputable authority awarded by Aurelio Peccei. Placed on the heart of the wet tropics and traveling with real anxiety through Gaviotas territories at the edge of the vast Amazon it was very easy to imagine him as a leader of a large coalition announcing as its first initiative to show directly before global public opinion and its great leaders “the dramatic dilemmas of this end of century”. For suggesting the first step: preparation at the highest level of the available knowledge and information of an extensive feasibility study on integrated land and space use, management and conservation region by region of the world as a whole... a total inventory of the humanity heritage compared to the expected needs and complemented by a series of considerations, suggestions and criteria for everything needed to keep the planet habitable, at a time in which a much greatest human family will live in it.

A gloomy foreboding due overcome him after a very strength effort by the long walking along GAVIOTAS facilities because he seemed transformed.

He remained two days more in Bogotá for a lecture before an audience consisting in the most selected Colombian brains. Getting back to Rome he took up with great force

the ideas of Forum Humanum he wanted to write down in a premonitory impulse in “Agenda for the end of the Century”. He dictated it to his most sensitive and faithful assistant, Anna Pignocchi. From this perspective the 6000 remaining days of the twentieth century, the major “tasks” for those responsible for the fate of Earth were to plant global corporations to survive the beatings, threats, constraints and future opportunities while taking advantage of the opportunities it offers to reach a record level of the human performance and its quality of life. And he pointed out five key zones for human future. Human settlements, nature conservation, govern of the systems, human development, and non-violence. Each of them is a gigantic zone but some of them are unexpected for the reductionism of the conventional and lineal vision.

Probably through the most important of the issues the systems’ Government Aurelio Peccei saw a world lost in the ideological twist and interests of the Cold War. All of this as an expression of fragmented thinking that had deleted any trace of solidarity among nations and individuals and became a way to destroy the only possible home (in Barbara Ward words) for all of us to survive. For the Club of Rome President the first step was the holistic vision towards something like a homeostasis. An expression of a systemic balance without which humanity no matter the differences of their opposing positions would unavoidable doomed to wreck.

Beginning 1984 Aurelio Peccei disappeared from a stage where he was to the last minute a leader without borders. His last visit to Colombia was also a happy opportunity for meeting GAVIOTAS path for almost two decades and the waves launched to space by the Club of Rome.

That was logic. Because the meeting *Development in a World of Peace* helped to confirm the validity of the wet tropics in this vision from the global leadership. President Betancour being full identified with the president of the Club of Rome talked about GAVIOTAS meaning as “a beautiful example of coexistence with the environment within a technological framework that extract the pure energy of nature without contaminating or disturbing its appearance”. Within this context the statesman pointed to his own initiative to go until the vast confines of the Orinoco Region following the same vision developed by Paolo Lugari. Starting by the settlement of a development base in Marandúa, a territory nearby GAVIOTAS and that meant opening a door to the promising frontier for Colombia and the world as well.

Showing that before “human issues”, from which Aurelio Peccei had talked many times, Colombia could not assume an individualist position, President Betancour remembered his speech in the United Nations General Assembly:

*“Neither now nor ever have we pretended looking for definitions that convert us in odious beneficiaries of an invaluable for us natural resource, - it is no doubt a priority for those geographical areas under its undeniable influence if we think of peace and development but definite not subject to exploitation with destructive aims or abusing national sovereignties or international stability”.*

## **FROM VANCOUVER TO RIO SUMMIT**

The names of Bárbara Ward, René Dubos y Paolo Lugari are associated to Vancouver Habitat Summit, Canada, 1976.

Because this memorable event coincided with the publishing of *"The Home of Man"*, that inspired this global event. Through its pages this great women show the world for the first time the alarming trends of this accelerated urbanism. An in Vancouver she met Paolo Lugari who was presenting Gaviotas to the world joined by the former major of Bogotá and later Colombian president Virgilio Barco.

Lugari came precisely from that world which worried her so much due to its urban problems and the generalized poverty. This map of the urban planet described by Barbara Ward five years before the conference was the same scenario as GAVIOTAS was. Over there Paolo Lugari began to project his creativity in a context corresponding to tropical world distant and different. Although they have not met before both proposed the same solutions. For human beings similar in their basic requirements, from distant cultures but identify in their origin because all of them belonged to the same roots, as Barbara Ward wrote down in *The Home of Man*:

*"It was necessary at least half a million years for Earth to be peopled by the first 100 millions of people near the year 1000 before Christ. After the improvement introduce by agriculture and the increase of food produce at firs by the Neolithic man and then by the big civilizations of the basins of Egypt and Mesopotamia, from India and China... around 1500 after Christ perhaps there were 500 million of human beings on Earth... Humanity overcame the score of 1,000 million around 1.830. The following 1,000 million came 30 years later. Today (1976) with almost 4,000 millions of human beings the following thousand millions came only after 15 years"*.

Those visions from Ward and Dubos had prophetic character, because only 25 years later, even with the revolution in demographic tendencies and the immense progress in the life expectancy at birth, the world has overcome the 6,000 millions of habitants. But over 90% of that increase occurred in the poorest countries. Nevertheless the problems of an overflowing urbanism accentuate while rural and urban marginality deepen the gap between rich and poor people. America and Europe *of human score* accumulate 75% of their population in urban centers, while Asia and Africa with less than 40% of urban population are very quickly approaching a level higher than 50% in less than 20 years. By that time according to predictions of Anna Tibaijuka Director of UN-Habitat the 1,000 millions of habitants in the slums of urban zones in the world will be increased to 2,000 million. (The State of the World 2007. World Watch Institute Washington 2007).

Of course this accumulation of poverty will concentrate in the big cities around the world that will not be in the north but in the south of the continents.

In Barbara Ward's account about the human settlements in our planet we can see the way this kind of urban problem surprised the leaders of the world. Until the moment she had written her book 30 years ago, it was estimated that 90% of human beings that had lived in our planet had not lived in cities but in little hamlets and towns with no more than 20,000 inhabitants. By the time of the first Constitution of the United States this was the percentage of USA inhabitants living in settlements not bigger than 2,500 people. By that time only Boston and Philadelphia had around 50,000 residents. After 100 years of industrial revolution at the end of XIX century only 15% of 1,650

million of human beings could be considered as urban people. In 1960 those 1,650 became 3,000. But 1,000 million were urban inhabitants. Thereafter will trigger an overwhelming yet unavoidable phenomenon that only bears a moderate treatment regarding environmental issues and of propaganda regarding urban decentralization.

Mid XX century 75 cities in the world had a population over a million inhabitants but only half of them were placed in development countries. By the time of Habitat Conference in Vancouver almost 200 cities had over a million inhabitants but half of them were located in developing countries. Since then in those same countries the amount of these urban agglomerations with more than a million residents has doubled. In 2005 with global population of around 6.500 million inhabitants, 3,200 million live in cities. Yet the dominant phenomenon at the beginning of the XXI is that of megalopolis that has over 10 million inhabitants and now they are the developing countries those that cover the most of this universe, because from 21 cities with these figures 17 are placed there. And it will be in this world and probably in those monstrous agglomerations where the increment of 88% of urban growth is going to happen between 2000 and 2030. (The State of the World. Our Urban Future- World Watch Institute 2007).

#### **GAVIOTAS NATURAL CAPITALISM AND FACTOR FOUR**

This name had not been invented nor its regarding essences had been so attractive or had the sex appeal that many years later will open to this idea the desirable stages for its diffusion. Nevertheless Gaviotas village in a lost



corner of the Colombian Orinoco region had all the necessary ingredients for constructing a natural capitalism or a biological capitalism as Paolo Lugari names it, and not exactly because there was an emergent wave in the horizon of the universal thought neither because there was an unusual political determination of a politic leader at the moment. It is to say that there were not those reasons but it was opposite to the trend of that collective conformism and despite the established bureaucratic structures, that this name was born.

On the eve of XXI century Paul Hawken, Amory B. Lovins y L. Hunter Lovins launched their book *Natural Capitalism, The Next Industrial Revolution* (Earthscan Publication Ltd. London, 1999) and although they do not had in mind Paolo Lugari's path their inspiration went to the same roots that feed Gaviotas. And those roots could not be different from the Socratic sources or Leonardo da Vinci's. The same that help the Club of Rome through the Factor Four Report prepared by Ernst Ulrich von Weizsäcker, Amory B. Lovins and L. Hunter Lovins.

In all those cases as Hawken and Lovins expressed the basic principle is: *“Through the industrial revolution, manufactured capital, money, factories, and machinery were the main factor in industrial production and natural capital was considered only a marginal factor which mattered just in case of starving or war when scarcity became a critical problem”*.

It is interesting that with the pretext of natural capitalism the book became a plausible attempt to vindicate the sense of the first Report of the Club of Rome about the limits to growth. It is necessary to insist that the history of this that

was a milestone of extraordinary importance in the second half of the XX century and was reflected in Gaviotas in a remarkable way has not been sufficiently analyzed. This very transcendent document was judged by hundred international personalities including 5 Nobel Prize, scientific men and Academy members. Very few doubts remained even though there were different opinions, about the spirit of the movement headed by Aurelio Peccei. There was almost total accordance that there was in that document something more important than predict future. Its content was essentially interpreted as a critical approach of consume models and waste of resources that sooner or later would bring humanity to the point of blast by the hyper consume and the avalanche of its own rubbish or look for ways of reconciliation with nature.

There is no doubt that Natural capitalism fell short in its evocation of the Limits to Growth. Because it could find in the Second Report to the Club of Rome, Without Limits to Knowledge produced in Harvard University an adequate answer. An answer that yet far behind the predictions offered by Natural Capitalism it was in the path of the true knowledge. This was the same that was suggested in Factor 4, something that anticipated the work produced two years later by Paul Hawken, B. Lovins y L. Hunter Lovins.

The best job made by Natural Capitalism we have to recognize is the rescue of the real spirit of the Limits to growth laid in the insight of the concept of ecosystemic services beyond the mere measurement of physical resources for the industrial transformation. This is which the authors consider the Fourth Principle of Natural Capitalism which we already mentioned in the previous chapter.

The mentioned predicament also evokes one of the central hypotheses of Gaviotas vision: To recuperate the skin of Earth (explain in the III Chapter) this is the larger synthesis involving all ecosystemic services of natural capital. This was the great content of the proposal rejected by Spain when Paolo Lugari stated this big challenge on occasion of the 500 years of the discovery of America. A challenge that was accepted curiously enough by Japan for opening the door to the recuperation of millions of hectares of the tropical savannah in South America with the aim of coming back to the forest ecosystem and not in a negligent way. From the aid awarded by the Japan Special Fund, according to the will of this country to absorb CO<sub>2</sub> it was possible to reinforce with additional 4000 hectares an integral project which as that of Gaviotas originated a new natural capital consisting in 8,000 hectares of tropical savannah converted into a bio diverse rainforest through the Caribbean pine plantation where 250 different species spontaneously reborn.

Most of them were in dormancy. There it was found that in mixed forests, unlike monocultures, generated more biomass and diversity. This not only represented new reforest areas but also arose an almost miracle covert of understory and isoforest and the emergence of fauna and flora in a marvelous bridge-like biodiversity strip between the Amazon rainforest and huge plains of the tropical savannah. In this new territory where a big sparkling creation emerged Gaviotas could establish a new sample of Biological Capitalism which as Paolo Lugari said: **“We can live from the profit of natural capital”** without affecting its original extension yet fortifying it day by day. This is clear expressed in the cluster of tropical agrochemical production. It is something as a refinery in

each tree which let nature sustain it and use it as a support for protecting its atmospheric layer. This alternative opens the door to the Gaviotas production of rosin as a very important industrial input and furthermore the chemical derived as colophony for paints and glues among others; ester of glycerol for chewing gum, turpentine pine oil, fumaric and maleic resins and biofuel.

A short time ago Paolo Lugari gave a new step passing from the crude pine resin by means of a new process to a more efficient biofuel and a less contaminant one than that produced by the African palm.

There was in an early stage FACTOR 4 because GAVIOTAS is probably the most interesting and useful cases coming from imaginative projects making possible the non- destructive development of the tropics.

Looking backwards in the light of FACTOR 4 and *The Natural Capitalism* the pioneer role of GAVIOTAS CENTER is undeniable. And furthermore it is also new in the protagonist role it played without political support. And still it was pioneer in an environment that perhaps was not hostile but indifferent before its transcendent scope

The 60s and 70s move within the sharp situation of the Cold War, but also in the euphoria that pushed the beginning of the hyper-consume era. Having sold during the 80s thermal solar energy in a housing project was his more significant achievement so that the installation of solar energy for 5.000 apartments has being the biggest project in the world. Yet his ideal scheme very close to the FACTOR 4 hypotheses was held as a heroic fight in public forums. There were expressed the full desirable requirements of

human “organic” settlements as right defined by *The Natural Capitalism*.

Paolo Lugari and Amory Lovins knew each other long before they met because the waves they provoked from their own places met each other. Especially in a world where all the borders were deleted and the systemic thought connected the most geographical distant brains. On the other hand Gaviotas effect became joined from its very beginning with that of Aurelio Peccei from the Club of Rome. Years later in 1997 together with Ernst Ulrich von Weizsäcker, Amory Lovins would inspire one of the most solid Reports of the Club of Rome in the eve of the XXI century (Factor Four – Duplicate the Welfare with half of Natural Resources). In October 2003 Paolo Lugari met Lovins in a place from Colorado State. And the founder of Natural Capitalism gave him an exemplar of Factor Four with this dedication: **“To Paolo Lugari and his brave companions, who had created a great inspiration for all of us and a light for the world. With admiration and gratitude”**. By that time Amory Lovins together with his wife Hunter Lovins and Paul Hawken had published the book *Natural Capitalism The Next Industrial Revolution*, qualified by the former president Bill Clinton as a “huge proposal”.

#### **GAVIOTAS AND THE FACTOR 4**

Few years before he met Lovins Paolo Lugari had buried an illusion. That was an illusion that in its original design a famous Japanese magazine pointed out as one of the most innovative idea in tropical world regarding hospital conception. *The self-sufficient hospital* was an outstanding

notion not only in design but also in execution and implementation. Nothing was so adequate to the technology paradigm for the wet tropics. That was the big quintessence for him to jump into his crusade. But nothing was as adequate to his Pre-Socratic conception of the elements as the origin of all creation.

That was a **full-scale prototype of a self-energetic hospital**. It was hundred per cent structured with renewable energy sources. In its bioclimatic architectural design, its drinking and distilled water provision, extracted by double effect wind mill, solar stove with thermal recirculation of oil at high temperatures, solar laundry dryer, biogas and hydroponics production among others. This singular instance was presented in forums and publications of international prestige. The social benefits for native communities were evident. Yet, once again it appears as Nobel Prize Gabriel Garcia Marquez, said in Colombia reality overcomes fiction. A monumental creation act like this were to produce truly amaze in a country like this overwhelm by health care problems in all the far away corners of its geography. It represented of course a challenging symbol to all conventional forms of solving human development issues. Yet at the same time it was a concrete answer probably a puzzling one for the political class and the bureaucracy whose conformism with the vital problems of people was comparably to their ineptitude. Anything could move this central bureaucracy installed in legal solutions where the revolutionary model from GAVIOTAS did not fit. A national scheme recently adopted, Law 100 of 1993 known as General System of Social Security in Colombia just ignored any exception in its rigid and generalized scheme. In such an unequal fight peripheral creativity is just destroyed because the law very seldom

takes into account the peripheral utopias. Anything is so unfair as give equal solutions to different problems.

Describing this absurd result is paradoxically, at least in this particular case is easier for a foreigner familiar with the outrageous contrast existing in Colombia. Gunter Pauli, an international renowned Belgian economist within the area of strategies for sustainable development, Club of Rome member, founder and president of the ZERI Foundation, Advisor of the United Nations University in Tokyo, wrote in one of his books a page describing masterfully this almost crazy episode.

- “Gaviotas capacity for integrate agendas in sustainable solutions was fully demonstrate with the construction of the self-sufficient hospital in Vichada. Just imagine a hospital in the middle of nowhere two days far away from Bogotá, united by a terrible road or two hours flight with a little plane. Paolo Lugari’s team constructed a hospital with a concrete floor capable of offering to its patients and the personal working there the facilities that could produce its own energy, for distillation of its water, preparing food locally, drying the operating room, air conditioning other rooms based in bioclimatic design, and an special recovery room equipped with hammocks for indigenous patients for it is not convenient for them to do the nursing in modern beds with white sheets.”

- “It is an imaginative design with plain technology and practical application, yet the costs of construction and implementation are very low. Gaviotas hospital became very soon an important facility having being pointed out for a Japanese magazine as a model to be replicate at global

level. The news spread and visitors from all over the world came to see this health care facility produced by a multidisciplinary team without “stars” where each element has an esthetic, functional, technological, and climatic reason. This achieves such dimension that makes easy to do good and difficult to do wrong. The space there is an extension of natural space. This architecture is intentionally separated from conventional styles.”

- “Solar collectors on the hospital roof are showing how easy it is to distill and purify water without using non renewable energy sources. Solar energy heats oil (cotton seeds oil) in a vacuum tube until 180 o C producing enough heat for preparing food three times a day. Almost all food is produced in the local garden. Because indigenous families accompany the sick person to hospital for helping and cheer him/her up during recovery, together with them they constructed a maloka (indigenous communal house). The families bring local medicinal herbs and their preferred food that are cultivated nearby. After few years Las Gaviotas has a botanic garden and a natural history museum with the big knowledge of the indigenous tribes.”

- “Gaviotas hospital drew international attention yet the inadequate laws back to the far away regions made this hospital to be closed.”

- “Paolo Lugari and his team were not discouraged by this; even in the worst circumstances they are creative and bold. Because drinking water requires very good sanitary conditions the forced closure of this health care facility left it without use just few months. Creativity is the name of the game for Gaviotas. Nowadays this self-sufficient facility offers the best contribution to the health care in Vichada: It



is producing natural pure water of high quality and low cost. They hope that this preventing measure will contribute to achieve the original goal of the field hospital which probably will open again if political class recover they senses and take into account the reality of the rural regions far away of the capital. In Regions as Vichada where there is such level of poverty and health care is very scarce the standards for urban regions do not make any sense.” (Upsizing, Ciencia Generativa, Más Ingresos, Más Empleo y Cero Contaminación. Gunter Pauli, ZERI Institute for Latin America and Manizales University, 1997).

## **GAVIOTAS AND THE SUSTAINABILITY**

Development’s sustainability belongs to Gaviotas essence.

The beginnings of Gaviotas were based on renewable energies. But furthermore each milestone it has planted has the footprint of sustainability. Thus its affinity to the Club of Rome and its First Report coming for years after its foundation. Yet furthermore akin to Aurelio Peccei and his fundamental principle frame working within the humanity predicament and of course its affinity to the essence of other Reports to the Club such as Factor Four, and the evaluation to Limits to Growth 30 years later, from Donella and Dennis Meadows with Jorge Randers, a rigorous and critic review.

As it has been explain many times the First Report of the Club of Rome with the framework of Professor Forrester might be debatable and highly debated within a false point

of view of future prediction, yet each year after its publication showed the essential content that was the unsustainable model based on waste of resources was in fact irrefutable. In a short paragraph preceded by a deep analysis of the scope of the first agricultural revolution lasting the first ten thousand years of the “homo sapiens” and the first scientific and industrial revolution lasting only 500 years, “ 30 Years after the Limits to Growth” makes this synthesis:

*“All this instrumentation (from both the two revolutions) was the base of an incredible productivity and to a world that now supports with some unequal sufficiency 6.000 millions of people that is 600 times more than the population existing before the agricultural revolution. The expanding markets and the increasing demand drive the exploitation of the environment from the poles to the tropics, from the summit of the mountains to the ground of the ocean. The success of the industrial revolution similar to the before successes of chasing, collecting and agriculture created their own scarcity not only of prey for hunting or lands, fuel and metals but the whole capacity of charging of the world. The footprint of humanity had once again the level of sustainable. The success generated the need of another revolution”*

This was anticipated by the Report to Limits to Growth. Because in some way the model World 3 allowed it to be read or at least read between lines. Three decades afterwards Dennis and Donella Meadows demonstrated it as a fact, because it was an unquestionable fact the ecological footprint left by humanity was not still a fiction created by a computer. Earth Council published 1997 a study from a group chaired by Mathis Wackernagel about the

indispensable spaces for producing the necessary natural resources that could meet the global demand but even more important for accommodating the waste derived from its use. According to the methodology adopted since the 80s the natural resources consumed annually by the people on Earth have been above the range of regeneration that Nature has been able to afford. The interpretation given by the Club of Rome to this periodic diagnosis is very clear. **“The ecological trace of the global society has outstripped the supply capacity of Earth”.**

Together the First Report of the Club of Rome and the Report of Earth Council planted a milestone for judging the true situation of the planet. This coincided with President Carter arriving to the White House and of course it was consistent with his spiritual and intellectual attitude. His rise to power came at a time when the society of the United States was overwhelmed by the heavy burden of the Viet Nam conflict. This syndrome made that the social stage needed not only a political leader but a religious one. As he was a lecturer in his community church and a peanut farmer in Georgia prairies.

Knowing these secrets of Jimmy Carter is not surprising that the same spirit almost messianic that impelled him to rescue American soul from the darkness of Viet Nam war led him also as his first priority the exploration of planet Earth condition. One of his first steps around 1977 was to go to the Environmental Protection Agency and the State Department asking the preparation of a report about “the probably changes on global population, in natural resources and the environment until the end of the century”. Very soon President Carter gave to this Commission a higher range and name a very renown Yale University Professor as his

chairman, James Gustave Speth who later on will become Director of UNDP the program of United Nations for the Development Program.

The first approach of the group inspired by professor Speth produced an initial diagnosis: *“a global warming would be probably visible within next 20 years and would open the eyes about the use of fossil fuels and forest conservation”*. This prelude received an immediate response from the administration that asked the National Academy of Sciences the verification of what was perceived as the signs of a climate change. From that arose a report of the Massachusetts Institute of Technology named The Charney Report after the scientist Jule Charney published at the end of 1979 by the commission presided by Professor Speth. The essence of the content of this report presented to President Carter was: *“The conclusions of this brief but intense research could be reassuring to scientists but disturbing to them that are in charge of policies. If carbon dioxide continues it’s increasing our group do not find any reason why climate change would not increase and those changes could not be despised. The conclusions in previous studies have been reassuring in general yet our group observes the ocean the big and powerful axis of the climate that is probably capable of diminish the course of this change. A policy of waiting and see what happen could be a policy of waiting till it is too late”*.

The world was entering a period of uncertainty yet only a little circle of scholars and researching people paid attention to it. The world leaders preferred interpretations based on the conviction that all concerns regarding natural phenomenon could not challenge human capacity to

overcome them. The Cartesian vision of human control on creation was still unbeatable. Yet the premonitions of the Club of Rome and of the subsequent alarm cries coming from different world observatories were still not validly discarded. The reports and discussions stimulated by President Carter went even further, because to the forecasts on climate changes were added analyses that likely led to trigger other issues coming from them such as Earth not being able to feed a population growing in an explosive way, and the big risk that hung over coastal areas and the millions of people living there.

Yet if this alarm cry about such important and visible issue as physical security of millions people do not move public opinion in the world, much less could achieve a theoretical threat as far back as the excessive increase of deforestation and the emission of carbon dioxide for the health of the generations to be. Equally useless were the calls for controlling fossil fuel use and protecting the forests, neither the advance in the exploration of alternative sources for fuel or expanding the forested areas around the world.

The foresights from the Commission directed by Speth “*The Global Report to The President*” 1980 were basically right. Not only regarding the increment of global population, from 4.300 million people from 1980 to 6.300 in 2.000. There were right too regarding the extinction of life mainly in the tropics where there is the biggest amount of live species. The previous report based on the recorded trends predicted the world would continue attending the disappearance of an acre of rainforest every three seconds. But furthermore it estimated that by that time half of the rainforest had been already disappeared forever. To this was added the fact that about six million hectares were added

each year to the deserted areas of the world (7). With the addition and interaction of these facts, the report concluded that by mid-century the average temperature of Earth would rise between 2 and 3 degrees Celsius.

In February 1981 was published the report *Our Future: Time to Act* developing the Global Report, President Carter had lost election and Reagan term began with an opposite aim regarding environment.

It is clear that the sustainability of our planet goes beyond the disguising of a society with ridiculous levels of hyper consume and unwell deviation to waste. FACTOR 4 summarized this symptom starting with the therapeutic treatment “*Duplicate welfare with half natural resources... extract four times more welfare from an oil barrel or a ton of soil...*”

In the above mentioned context it is too simple to understand the complexity of our global mismatch, even more because it is caused by the demand of a minority of consumers while the largest majorities remain outside of a marked allegedly global. Industrialized countries contribute to this global unbalanced with a high percentage yet they believe they are profiting the most by being the kings of the market. United States with almost 30% of the gas emission producing the greenhouse effect with a population of 300 million emits the equivalent of 2.600 million people living in 151 countries in the world. (James Gustave Speth, *Red Sky at Morning, America and the Crisis of the Global Environment*. Yale, University Press).

The tendency to the insolvency of the planet was clearly stated by the model World 3 serving as a guide to The First

Report of the Club of Rome about the limits to growth. Its validity was questioned from very different points of view. Yet three decades later the Club of Rome does not make any effort to claim the correctness of the statements derived from World 3. They were very close to the conclusion of the report prepared in 1997 for Earth Council by Mathis Wackernagel about the space required for producing natural resources demanded by the global population and the waste of these resources. The answer of the model let us to deduce that since the end of the 80s natural resources consumed every year had exceeded the nature capacity to regenerate to the same extent. Such an unbalance in nature behavior set humanity in a predicament beyond the superficial or “light” version of the environmentalism that wants to disguise godly a society sinking into a hyper consume clearly ridiculous and an outrageous waste.

**1,500 MILLION HYPER CONSUMERS  
AND 3,000 MILLION LIVING WITH 2 DOLLAR A DAY**

Without disregarding the value of collective pedagogy which begins to give visible results is evident that society is still light years away from a sufficient understanding. The search for sustainability still stays within thousands of magic formulae for “saving the planet”. It is a cruel paradox of 1,500 million hyper consumers among a population of 6,500 million yet from them 3,000 million only has the capacity of consuming 2 dollar a day. Nevertheless for all of them the same manual of all the bookstores is exhibited *“50 simple things you can do for saving the planet: buy an energy efficient automobile, recycle your bottles and cans conscientiously vote... if you are one of those people that can afford a car, bottles, cans and elections”*.

Since Gaviotas started it was a long way from this easy viewing, because from its very origin wanted to rescue the holistic vision and overall first overviewed the thousand years of the planet formation which could not be destroyed or recover along the generations of the most recent species coming in.

### **THE ISOLATION OF THE UNITED STATES**

Rio Conference was not really the failure many superficial critics thought. It was also evident that most of the big powers the industrial ones were taken aback so they could not together prepare their usual procrastination tactics for instance through the UN Security Council thus it was so obvious that United States were isolated in his position before the proposed Biodiversity Convention. President Bush at the edge of his term adopted a very cynical position for refusing making a decision before any compromised, and the candidate to vice presidency of the United States, Al Gore preferred not to adopt any position.

Meanwhile the European Economic Community and Japan were to set aside worries about substantive aspects of the treaty, conscious of the domestic political cost derived from their opposing to a powerful movement for the protection of the environment.

This different attitude was reflected in the amount of the financial compromise. To Washington's humiliation, its irresolute president offered 250 million dollar for a new help, Japan gave 2,500 million dollar to The European Community. Thus for this plain reason the United States went directly to the rear of the causes presented in Rio. The



same thing happened strangely in the Technological Exposition of Sao Paulo, where the space occupied by the pavilion of the United States was ten % of that occupied by Japan and the European Community. That we most say did not say too much about the sails took down by USA or the degree of competence of the other powers acting in the global economy. Meanwhile it was evident that the Rio conclusions and the new age of the thought of sustainable development strength over there led unavoidably to a new way of thinking de global development.

### **GREAT RESULTS, LARGE VOIDS**

The voids in the summit were no doubt very large yet its emergent achievements were very significant. The two largest according to undisputable authorities were population problems and ocean issues. Rachel Carson in her book *The Sea Around Us*, says: *"In the sea where it first appeared life is now under threat from one way of life"*. In the first one it was evident the recurrence of the old approaches to population density. In the second was very clear the scarce space given to the theme of the seas that cover 70% of our planetary surface. In both fields was very easy to perceive deliberately distortions as well as elusive attitudes trying to avoid compromising situation to the big powers.

### **THE TRUE PROBLEMS OF OVERPOPULATION**

As it was obvious the new perspective that imposed the so called "Rio Spirit" left no validity to the conventional scheme of constructing the demographic chart of the world

sole on the basis of population density per square kilometer. That fact was underlined by the Colombian Foreign Minister Noemi Sanin and was propagated by authorized development analysts in USA and Europe.

In the threshold of the meeting in Rio, the Club of Rome dealt with this issue in a lucid report about the global revolution. (*La primera revolución mundial*. Fondo de Cultura Económica, 1991) It was in consonance with the vision of the team which from the Massachusetts Institute of Technology 30 years before had built the systemic model “Limits to Growth”.

In these as in other analysis with systemic approach the worn out of the planet showed systematically the urgency of relating global demographic planning with radical changes in the extravagant habits of the consumers in the industrial states. Because analytical models that began to confront this unavoidable relationship showed over and over again that overpopulation problems affected industrial countries and not in the overcrowding of the poorest countries.

An American, Alternative Nobel Prize economist, Herman Daly using a similar model came to the conclusion that per capita consume of non-renewable resources United States population could be at the edge of 22.000 million inhabitants. All this does not mean discharge political leaders of development world from responsibility regarding their passive attitude before possible and indispensable demographic control.

**NOTHING OF THE KIND WAS DEALING WITH EVEN IN A SUPERFICIAL WAY IN RIO**

Regarding the ocean issue, it was evident that the ghost of the Sea Convention, still not ratified for the necessary amount of countries by the time of the Conference, was hanging around in Rio. There were too much bundles on one hand for industrial countries to deal with and too much inhibition on the other hand for development countries. Colombia with more than 2.000 kilometers of coast on the big oceans was not exception. And although within the themes and the Agenda 21 there were some scattered mentions about sea contamination by industrial waste, it was shocking and impossible to explain the absence of the seas in the Conference.

Whatever you may say about Rio Conference, about its scope or its inexplicable failures you may conclude that it marked a start impossible to deny. Planetary conscious started to be more than an illusion. The best testimony for that was the presence of 20.000 NGOs in different scenarios of the Conference.

Lester Brown inspirer of the World Watch Institute said in very sensible way that circumstances of the global adjustment just starting “soft compromises” were a better option than “concrete positions”. Those last were impossible in very incomplete vision of our planet. It was an almost unthinkable achievement that industrialized world accepted to move from 03 to 0.7% of NGP as an assignment for assistance to development. This was closet to the aim fixed in a very wrong way some decades before, when the worn up of our planet was not even felt.

**THE SIXTH WAVE**

Sustainable development is not just an option for the time being. It is an imperative for humankind in this XXI century. Yet, at the same time it is the fundamental support for a natural capitalism with a very big potential.

Thirty years ago, Alvin Toffler published his work *The Third Wave* shaking the academic thought and coming to be the unavoidable reading for scholars. With futuristic intentions Toffler started from human creativity into postindustrial society and the dominion of advanced technologies that would revolutionize all intelligent activities. Somehow the book turned to be an anticipation of globalization and the era where supposedly not only borders would be eliminated as well as ideologies and even the government models- that were to powerful in this Cold War time, for coming into a society dominated by information and technological change.

The “waves” of Toffler seemed more an allegoric picture intended to embrace human evolution till the technological revolution seemed to point to limitless progress. Yet after 30 years the quickly changes not only in human evolution but in Earth’s health has forced to rethink everything. The World Watch Institute presented in its 2008 anniversary edition an analysis about the state of the world a global reviewing including Armory Lovin’s study. He is the founder and president of “Natural Capitalisms Solutions”, an organization centered in sustainable development issues. Keeping in mind Toffler’s idea of “wave”, Professor Lovins makes a more detailed dissection of the so called “innovation waves”, regarding the illusion of limitless resources in the world. A world alleged immune to use and

abuse of its potential rough materials to feed the economic development of the nations. This analysis marks a deep difference before the author of *The Third Wave* who makes an overview of civilization in its three big stages. The first stage the shepherd and agricultural society lasting thousands of years, the second the industrial revolution lasting 200 hundred years and the third one the postindustrial society alleged with limitless horizon. On the one hand in the new perspective of sustainable development the feasibility is based on the interaction with nature, on the other hand the second and third wave had been anthropocentric.

This sequence presented by Professor Lovins start from the industrial revolution of the XVIII century and is the first impulse generating the waves beginning with iron manufacture, and the hydraulic engineers, mechanic textile manufacturing and the large development of commerce, steam machine, railroad, iron and steel sector, cotton revolution, and electricity, chemistry, intern combustion motor, petrochemical, electronic, aviation, space conquest, and finally in the xx century digital nets, biotechnology and informatics. The sixth wave, as only option for the XXI century is based on the sustainability as the multi and inter disciplinary imperative. Resources' "radical" productivity, the systems' design, biochemistry, green chemistry, industrial ecology, renewable energies and nano technologies among others.

### **IT IS GAVIOTAS WAVE**

The five previous waves to this unavoidable one expanded themselves ignoring the impact of the human action on

nature. Adam Smith and David Ricardo's world had less than 6% of the XXI century population. Alvin Toffler only predicted the third wave without feeling that between the sixties and the XXI century the greenhouse emissions responsible for the climate change crisis would double and bring post-industrial world to a collapse point. Not to mention something more important, as Lugari says, the alteration of atmospheric chemistry related to the biomass including oceans and emerged land. According to scientific estimate this is the minimum from 6 thousand million people consuming and thus producing an average emission of 4.6 tons of carbon dioxide per capita yearly thus putting the planet at its resilience limit.

What the State of the World 2008 calls "the mathematics of sustainability" suggests that the dilemmas facing humanity are very clear: either we change our way of life, or develop more efficient technologies, or reduce the population of Planet. Each of the three factors holds immeasurable complexities, but in solving those interrelated factors the fate of the human species will be changed. The sixth wave, built up on natural capitalism embodied in sustainable development, is no longer a mere pipe dream but a perfectly feasible option. As has demonstrated the new behavior, incalculably profitable, that have undertaken major business conglomerates in the world, such as Dupont, Wal-Mart, General Electric, Toyota, British Petroleum and a host of small, medium and large industries, companies and even colleges, that have found those new high-yielding unexpected sources. The result has been billions of dollars in profits for their shareholders, but also elimination of millions of tons of pollutants and climate change aggravating factors. It is For the benefit of businesses and for the benefit of Earth.

By the mid-twentieth century, 75 cities around the world had a population over one million inhabitants. From them only 24 were in the less developed areas. At the time of Vancouver Conference, almost 200 cities were above one million, but half of them were located in developing countries. Since then, in those countries, the figure of the same urban agglomerations with more than one million people has doubled. In 2005, with a world population close to 6,500 million, 3,200 million lived in the city. However, the dominant phenomenon at the beginning of the XXI century was the mega-cities with more than 10 million people, easy culture medium for unexpected virus propagation. And it was the developing world, covering almost all this universe. For the 21 cities that exceed that figure 17 belong to the developing world. It is in this world and probably much more in these monstrous agglomerations which will produce 88% of the increase of urban growth between 2000 and 2030. (The State of the World. Our Urban Future, World Watch Institute 2007).

## Chapter V

### THE END OF THE COLD WAR, THE RIO SUMMIT AND THE TROPICAL FACTOR

*“With its natural resources, with its people in Colombia would be impossible to remain poor. But we did. That is what we call in Gaviotas the miracle of poverty. Because we do not understand the tropics now we are the last car of the locomotive. To approach the tropics one must unlearn much of what has been learned”.*

**PAOLO LUGARI**

At the heart of Paolo Lugari's thought are his convictions on traditional approaches around the tropics and the tropical things. His great emphasis has been placed in the cultural distortions inherited from the occupation of the territory with a vision and models imported from countries of the temperate zone. According to Lugari's statements, these misconceptions were expressed not only in colonial times but were perpetuated in the educational systems in their own legacy and conceptual foundations that have shaped the political system that, almost without interruption, has dominated Latin America during the last two hundred years. For even when, apparently, there have been revolutionary twists, nothing has been advanced about the conception of the role of geography in determining production patterns. The Cartesian point of view operated on the supposed uniformity of Earth and back to its diversity. This reduction approach was disturbed only by the naturalists of the seventeenth century led from Baron von Humboldt and Don



Jose Celestino Mutis. However, despite the fact that they contributed to the breakdown of colonialism and unleash a wave of freedom in the early nineteenth century, its major findings only came to surface with its true content when connected to the non-linear thinking of contemporary science. Thanks to this encounter with the essence of pre-Socratic philosophy, which Gaviotas has helped to rescue, we have begun to overcome what Fritjof Capra calls the "perception crisis", which affected all areas of secular knowledge favored by linear thinking.

The best summary of this fascinating epistemological transformation is in the appendix Capra wrote for the commemorating edition of the 25th anniversary of the publication of his masterpiece "The Tao of Physics." From the new scientific paradigm revealed by quantum physics and the subatomic universe, there is *"a new vision of reality that will form the basis of our future technology, our economic system and our social institutions"* (*The Tao of Physics*, Editorial Sirio, 2007).

It was no coincidence that Spain lost their dominions overseas at a time when science changed its idea on the scope of land riches. Yet at the same time, industrial revolution began to transform the appearance of cities and the technological change initiated the breakup of the isolation of the known world. Two hundred years later, there is also a radical break in the "perception of the world" and the collapse of major paradigms in the relationship of man with nature.

Paolo Lugari's vision of this Humid Tropics has been expressed in all his discourses. **"We're in the tropics, he said many times, but we have developed technologies**

**brought by the conquerors and the North Americans. Our educational texts are translated. In the zone of greatest biological productivity of the planet, live 60% of the world's poor people. That seems to mean, that the world's enterprise is poorly managed, that the technology brought from other areas is not working well in the tropics. The cause of our sustainable poverty is the misunderstanding of the tropics; we do not have tropical science and technology... The tropics is about to reinvent itself. Without knowing it, the tropics went to the back. "Within the same context, Paolo Lugari remembers that - in terms of conventional indicators - "the continent through Latin America, 200 years ago was ahead of the United States in almost every respect. Now is the other way around. Even in pre-Columbian times, when Teotihuacan, or Tenochtitlan in Mesoamerica were true examples of organizational and human settlements, many important European cities were mere hamlets".**

It must be noted, however, that Paolo Lugari looks into the Amazon jungle not so much as an immense biodiversity reservoir - yet it is far overshadowed by Andean ecosystems - but as a structure whose "climax" by itself plays a vital balancing role for Earth and, of course, for her dynamic stability.

#### **THE WORLD AT THE END OF THE COLD WAR**

The eighties were marked mainly by recurrent crises of the Cold War. The same appears to worsen in the first half of the decade. The eighties were marked primarily by recurring crises in the Cold War, which seemed to intensify

in the first half of the decade. However, things began to change from an apparent appeasement in the ideological confrontation. This coincides with the rapprochement between China and the United States. A scenario that President Nixon and Chinese Premier Chou-Enlai contributed to form, under the unquestionable inspiration of Deng Xiaoping, the legendary character rocketing up his triumphant emergence after being ostracized by Mao Zedong. That situation, in many respects, was the real turning point in the Cold War that unleashed devastating effects in the global geopolitics expressed in the Soviet Union in the perestroika led by Mikhail Gorbachev. After such shifts in the two socialist powers, the fall of the Berlin Wall marked the dramatic turning point that somehow, influenced all interpretations on the closure of the historical cycle in the history of human conflict.

Such an end was not in the predictions of the Hudson Institute or in the more adventurous games of the global prospective. Instead, it served as a pretext for a triumphant explosion in the West. Within the ideological context in which the Cold War moved for over thirty years, it was not difficult for the media to sell the idea that Karl Marx's corpse was lying on the battlefield and capitalist cause emerged triumphant.

Although that outcome was not marked, as many had hoped, for the unconditional surrender of one party, nor by the arrival of victorious armies in the vanquished territories. The facts, however, demonstrate that the real balance of the Cold War was not so much for sharing the spoils, but to look at the burden placed on all the conflicting forces represented half a world destroyed by the irresponsible management of the leaders of its destiny.

The picture, then, was quite different for both Powers in conflict as for the world as a whole. But above all, the balance expressed just a waste of time for the development tasks, and especially regarding the unstoppable deterioration's advance of our own planet. Directly or indirectly, this dual responsibility could only be taken by the two superpowers who wanted to divide the domain of the world, no matter the consequences.

For 45 years, over 150 local wars in the Third World - not yet finished when Berlin Wall fell down- had caused devastation and death equivalent to the combined effects of two world wars of the twentieth century. Vietnam was, of course, the bloodiest symbol of that nightmare. As it was the military intervention of the Soviet Union in Afghanistan, with its persistent attempt to perpetuate its yoke in Eastern Europe.

To appreciate the real meaning of this long chapter in the human history would be sufficient to perceive what experienced in its own arena every one of both opposing superpowers, but also the state of the world between two fires for nearly half a century, as well as the shaky direction of Planet Earth. This last balance was already in preparation to be presented to Earth Summit in Rio de Janeiro.

The imprint of this long process left on the shoulders of the United States was evident. A national debt nearly tripled the Third World debt (\$ 12,400 for every inhabitant of that country): a fiscal deficit that has become immeasurable, 30 million people in absolute poverty in the richest nation on Earth, the highest crime rate and drug addiction in the world and a declining educational system.

The Soviet Union, meanwhile, finished with a minimum being postponed for the vast majority of its 300 million inhabitants, with the most gigantic unproductive bureaucratic apparatus of the world, with a fiscal deficit, as was confirmed, could far exceed that of United States.

At the end of the Cold War, the situation of the world development was also the result of the arms race, which was imposed from the top of the superpowers to the vast base of the Third World. In the latter, military spending increased six-fold between 1960 and 1985. The foreign debt burdened it was no stranger to ideological and military confrontation during the preceding four decades. While proclaiming otherwise, the only truth was that, given the priority to increase the war machine, welfare had been merely postponed. ***It showed that, as has been said many times, war is the failure of intelligence.***

The Cold War also exacerbated global inequalities. In the fall of the Berlin Wall the figures were most revealing. Nearly 70% of global GDP was generated and consumed by only 15% of the population. Developing countries harbored 76% of the population, but generated less than 20% of total income. In 1987 countries with the lowest level of development had a per capita income less than \$ 300, while that in advanced nations with market economies passed from US \$ 14,500. In the poorest countries on both sides lived more than half of the world's population but only with 6% of the income.

Given this overall picture did not fit, of course, the victorious attitudes. However, it was clear that in some high-level international stages, there were behaviors giving completely wrong perspective. It was curious to see, for

example, how certain levels of foreign policy of the United States remained with arrogant attitudes that seemed to operate on the basis that this country was unquestionably the absolutely winner of the Cold War.

Yet worldwide the old and new left anchored in the libertarian dream of the sixties and other people equally simplistic acted as if the Cold War had been waged solely to validate the theory of economic liberalism. Nothing else seemed to indicate the so-called Washington Consensus, which open neo liberalism and had a dramatic outcome, comparable to the fall of the Berlin Wall, the collapse of Wall Street in the first quarter of 2008.

In the center of this scenario emerged the situation of Earth, our common craft, that of the poor and the rich. Ernest Junger, a summit of the twentieth century thought, - previous and contemporary to the Cold War-, defined very clearly this new man's situation in his world. According to the essence of his thought, humanity would have reached the point where, after having discerned-in appearance-the means to overcome their own wars, was now faced with the rebellion of Earth, which for the last two hundred years was the scapegoat of the industrial revolution. This was, of course, a terrible premonition. If man was able to control his own warrior impulses could be possibly late to try to control the telluric rebellion that he himself sparked by his excesses. It was evident, therefore, that only an act of wisdom on a planetary scale could build hope not to be late to remedy the unpredictable effects of the imbalance caused by the man himself.

## THE FIRST GLOBAL REVOLUTION

With the end of the Cold War and the eighties came a new report from the Club of Rome. On this occasion prepared from the heart of the organization and not from an outside observer. "The First Global Revolution" not only lifted the veil of the deterioration of the planet after a sterile ideological battle. It called the first revolution around a globalizing effect crusade for the recovery of all lost balances. "The implosion of the ideology that has dominated most of the twentieth century has been quite spectacular, but in no way has been unique. It joins the end of the *"American Dream" which lost its credibility with the bitter Vietnam War, which profoundly marked the collective consciousness, with the failure of the Challenger, Hispanic immigration, poverty into wealth, drugs, violence and AIDS and the fact that the melting pot no longer works*". ("The First Global revolution", The Club of Rome, 1993).

Somehow, the eighties also marked the return of Rachel Carson. In the frenzy of the Cold War, but also in the desire to live the present moment, the world had lost track of what could become a "silent spring". Before "The First Global Revolution" touched the ear of a world which did not yet end to understand the extent of the fall of the Berlin wall (it may not yet have come to understand), the eighties began to be filled with disturbing milestones:

- **December 3, 1984.** Bhopal, India: a leak produced in the pesticide factory of Union Carbide infects the air with methyl cyanide, killing 3,600 people injuring 100,000, 50,000 of whom were suffering from permanent disability.

- **April 26, 1986.** Chernobyl, USSR: an accident at the Chernobyl nuclear reactor destroyed and released into the atmosphere five tons of fuel (50 million curies of radiation). A radioactive cloud spreads over the world, affecting Ukraine and Belarus (USSR), Finland, Scandinavia, Poland, Germany and France. **Immediate human casualties:** 32 people killed (29 by radiation), 150,000 people homeless and 119 permanently abandoned villages, 499 serious injuries, 600,000 people exposed to radiation, 12 were converted into invalid and between 7,000 and 25,000 waiting for the imminent development of cancer. Crops and animals exposed to radiation throughout Europe for several years. In 1990, approximately 3,000,000 people had to be under medical supervision, with two deaths each day as a result of the nuclear accident.
  
- **March 24, 1989.** Prince William Bay, Alaska: U.S. Exxon Valdez oil tanker run aground, spilling 40,000 tones oil and polluting more than 1744 kilometers of coastline, which kills 33.126 birds 980 otters. It had to be spent 1.9 billion dollars on cleaning and in compensation to the fishing villages.

The Club of Rome for the umpteenth time reached the same conclusion: *"in search of a new enemy to unite us, we find the idea that pollution, the threat of global warming, water shortages, hunger and other things like that would fulfill the role properly. In its totality and in their interactions, these phenomena constitute a common threat which demands the solidarity of all people. But in designating them as the enemy, we fall into the trap which we have already noticed I.e.: take the symptom as a cause. All these dangers are caused by human intervention and can only be*



*overcome by changing attitudes and behavior. The real enemy then is humanity itself.* "(Ibídem page 154).

In its call for survival, the Club of Rome faces three possible strategies, among them, "reforestation, especially in the tropics" that ends up being one of the priority strategies, after the reduction in CO2 emissions and higher energy efficiency, which actually lies in an encounter with an abused nature. Although a quarter of CO2 emissions stem from deforestation, mainly in tropical America, the report insists that the main initiative to supply funds to address the problem must come from rich countries, directly responsible for the model of over consumption that causes depletion of world resources. In the same context, the report brings the attention to the significance of the proposal submitted by Colombia, just on the eve of the Rio Summit and the V Centenary of the Discovery, tending to stabilize the ecological conditions of the Amazon Basin.

### **ON THE EVE OF THE SUMMIT OF RIO**

At the end of the eighties, the world was preparing for the United Nations Conference on Environment and Development in 1991. By then, Brazil would be the scene of a possibly unprecedented meeting in the history of the planet.

A year and a half far from the meeting, organizers faced a huge logistical problem, with more than 25,000 registration forms. It was also clear that - for the first time in the life of the community of nations, none of the 159 heads of state could find justifiable excuse for being absent.

It was not by chance that such a gathering of mankind will be held in the heart of Humid Tropics. At the end of the day, one of the clearest scientific consensuses at the last part of a stormy century was that the survival of living species had to pass through the preservation of rainforests and oceans. It was enough to see that very few issues like this were beginning to fill the library shelves of the intellectual world.

In late 1990, in a deep and convincing reference bibliography, Professor Susanna Hecht and investigative journalist Alexander Cockburn, described the historical past and revealed the increasing fragility of the Amazon scenario. Interestingly, almost the same time, a science journalist partner of *New Scientist*, Catherine Caufield, projected, in a different style with courageous denunciations, a similar view from the Amazon to the Colombian Pacific rainforest. It was this journalist who, through her book, provided one of the best confirmations of the adequate choice that GAVIOTAS had already made of the Caribbean pine as the species for planting in Orinoco tropical savanna. She found in the heart of the Amazon rainforest large patches of this tree that was beginning to transform the gallery forests in El Vichada.

It was amazing how right such publications were and the significance of the new symbols deployed in them. That was the same as proclaimed by Gaviotas. A world that seemingly abandoned ideological myths apparently intangible, it began to take into count some anonymous actors of everyday life, one of them, and the most meaningful one for the meeting in 1992, was the Chico Mendez. His tragic death - in December 1988, and subsequent prosecution and conviction of his murderers, set the stage to perceive the depth of the implications of the

"Amazon factor" on the future Earth. It was enough then to know that his death almost coincided with the issuance of the new Constitution of Brazil, in 1988. That great political breakthrough helped to accelerate the enactment of Nossanatura Plan, which marked a radical change in the Brazilian government's policy on the management of the forest. Among the members of the Assembly proclaimed the new Constitution, was a great black leader of the slums of Rio. This writer was invited two years before to a large forum on mega-cities and environment in Rio de Janeiro, where this woman stood, tall with 1.90 cm. to say to an audience of Latin American experts in urban and regional development: *"only when reconciliation is achieved between popular and scientific knowledge, can the world begin to emerge from this crossroad"*.

The heroic struggle of Chico Mendez not only served the cause of their brothers, the hundreds of thousands of "tappers" (small rubber-tappers), but also the cause of 200,000 indigenous survivors of a long history of harassment, of depredations and brutal repression in the vast jungle.

The story does not require many words. In the Carajás mega project - in the heart of the old rule of the Indian-Carajá summarizes everything. The Amazon Basin is the most colossal structure of photosynthesis. It is at the same time, the largest iron ore deposit in the world. In the project area were located at that time, according to the estimated reserves, 18,000 million tones of this mineral. The three blast furnaces powered by charcoal deforestation involve between 1,000 and 1,500 km<sup>2</sup> per year. And when the projected total investment program completion (25 blast furnaces, three cement plants, and six steel mills), the

demand for coal could reach 2.5 million tons per year. All this represented, per se, a tremendous complexity requiring an equivalent rationality to confront it.

In the middle of this rampant exploitation of natural resources were and still are not always a transparent partnership between the theories of development and the corrupt or simply myopic techno-bureaucratic apparatus. Knowing this, Chapter VIII of the new Constitution of Brazil decided that only the law could affect areas of indigenous settlements. Moreover, in the case of legislative decision, any exploitation in these territories should give rise to royalties for such communities.

The reality has demonstrated, in different ways, that the fate of Brazilian indigenous and the vast population living in the traditional extractive economy was equally tragic. In Carajás geologists found iron, but the prospectors find gold. In the crossfire of conflict generated by this convergence were the Indians.

From such a picture of tensions, and difficulties to rescue some degree of sensitivity in development administration three prophetic visions derived, among others. The first was that the future of the forest should not and could not be planned without the involvement of those who had lived with it for millennia. "Development without destruction" was the central slogan of the "Manifesto of the Peoples of the Forest", enacted in 1985, at the height of the struggle that led Chico Mendez. Secondly, it was inevitable a reversal of the direction of certain royalty streams that were in an incomprehensible way going to the industrial world. The pharmaceutical complexes could not continue profiting by only tracking the mysterious paths of indigenous wisdom.

Although for certain sectors of world opinion might seem unusual, it was time that the jungle will be paid a royalty systematically evaded.

The great opportunity that came with the Rio Summit was to force this inhuman treatment of the forest to be removed. The clumsy bureaucratic vision of nature reserves could not continue to provide a purely contemplative stereotype of "national paper parks." The inescapable conclusion had to be that human beings living in the forest were also part of the Biosphere, for the first time in human history, was to be the focus of attention for more than 150 countries. Without that step could not be saved the marvelous but fragile mega biodiversity of tropical forests.

#### **INFORMATION THE BIG EMPTY**

It has been a widespread belief that our countries are over-diagnosed. This is no doubt about the miserably diagnoses made. However, neither our researchers, even the loftiest scientific community, have even had a minimum of information that is still deposited in the surviving rainforest. Rightly, Professor Paul Ehrlich of Stanford University goes to the root of the problem when he states that "*the destruction of tropical forests could reduce, by itself, the organic diversity of our planet by 50% over the next decade.*"

The Global Tomorrow Coalition, a Non Governmental Organization of the United States, carried out in 1990 a condensation of literature produced by nearly 25 highest level investigative entities in that country(The Global Ecology Handbook by Global Tomorrow Coalition (1990).

A thick volume devoted specifically to the semiliterate reader of United States and the world. In one of his central chapters, which is dedicated to the urgency of research in the field of tropical biodiversity, is writing down this disturbing diagnosis:

*"The tropical conservation is limited by the knowledge gap and lack of ongoing research programs. There are probably no more than 1500 scientists competent professionals in the world to classify the millions of species found in tropical rain forests, and their numbers may be declining due to cuts in funds for research funding and opportunities for new professionals. The number of publications in tropical ecology decreased by more than 50% between 1979 and 1983. According to Peter Raven, Missouri Botanical Garden in the early '80s, fewer than 25 scientists around the world were qualified to oversee large-scale studies of tropical ecosystems"*

It was clear at that time and it is much more in this day and age, that the dramatic gap that could be glimpsed in the above quote should be fulfilled before it was too late. Just because the rate at which biodiversity was being destroyed is obviously much faster than the scientific innovation and political will to neutralize it. There is no doubt that Cold War contributed to this.

Paradoxically, this huge time lag in the search and management of biodiversity may be an advantage for some countries in the Humid Tropics, like Colombia. This will depend, of course, on the imagination and creativity of our scientists, but also on their ability to connect to the thread that attach them to the ancient wisdom of the jungle, still surviving in the folk tradition and in many anonymous

researchers and scholars. Mark Podkin, a brilliant researcher from Conservation International, does not hesitate to affirm that "every time a healer of the forest dies it is as destroying a library by fire."

The challenge implicit in the above facts can be summarized in the following statement by Professor Edward O. Wilson, a renowned Harvard professor: "*Many human problems, like overpopulation, starvation and destruction of habitat, are primarily biological in origin, and can be solved in part by biological diversity a source of economic wealth. According to the Global Ecological Handbook, Wilson notes that wild species are one of our most important food sources, but the least used. In the meantime, we depend entirely on a "pool" of species to survive, which accounts for barely 1% of existing species*".

In this same direction, the GAIA Atlas repeatedly mentioned, in those years gave us a lucid guide to "**the keys to the Wilderness.**" "As more and more away from the natural environments and resources they contain, we're becoming increasingly dependent on knowledge and skills of those living in close harmony with its immediate environment. Many of our foods and pharmaceutical products were investigated for the first time when they saw to be used by indigenous peoples. Rather than to set aside these "**human keys**" to the wild, we should regard them as vital, intrinsic elements, from the ecosystems we are trying to preserve."

It was also clear - in the light of the enthusiasm created on the eve of the Rio Summit- that with the sophistication that had reached the equipment for the extraction of animal, microbial and plant materials, the problem was to know

how to extract them. There were already many examples of the way traditional societies had served to focus research on new medicines, food and other products. By preserving and conserving human diversity, it was possible to ensure the ability to exploit the wealth in conserved areas. Advances in the field of ethno botany are expressed especially in the Amazon area.

### **RIO SUMMIT AND THE DILEMMAS OF SURVIVAL**

To say that after the Rio Summit the world could not remain the same sounded like a cliché. However, it appeared that few milestones in human history were within reach of many people and with such persistence as marking this great assembly of Earth. Not so much by the degree of conviction with which commitments were adopted, but for the feeling that to like or dislike of the passengers, from there departed a train with changed routes. Certain or uncertain, but in any case other than those cheery and arbitrarily set by high-consumption societies.

Something similar could be said from memorable meetings associated with geographical names of great historical resonance. Westphalia, Vienna, Versailles, Yalta. However, those meetings were from those who believed they were owners of the world and only were dominated by their own lust for power. Neither in Westphalia, or Vienna, or Versailles or Yalta, there was nothing but different forms of burying defeated empires and to supplant them by even more overbearing power schemes. And yet the San Francisco Conference, with the creation of The United Nations, was able only to form a stage for the Cold War to elapse for nearly half a century, with the apparent peace



between the superpowers, but in the midst of cruel and permanent peripheral conflicts.

### **THE REBELLION OF THE PLANET**

The Rio meeting was certainly a man's first encounter with a planet in rebellion. And aside of some gestures as arrogant as theatrical, the common characteristic of the documents that circulated from hand to hand, was humility. No one dared even to hint the slightest blame to GAIA. Only man pleaded responsible. It was, without doubt, the first act of contrition, after fifty years of Cold War and a crazy arms race that served only to forget the global fate of man and mercilessly destroy of land resources.

Beyond the "carnival of celebrities", as Newsweek called the dominant hue in the Summit, there were many and varied facets, that for better or for worse marked, this episode.

### **THE TROPICAL FACTOR AND THE WORLD'S**

History will, most certainly say, that in Rio there were elements of a new style of relationship between humankind and its environment. And though there is still precarious level of awareness about which could be the way forward, no step of man, alone or in group, will be free of responsibilities in a world irrevocably subject to the laws of global interdependence. Clearly, the first major result that should be noted at the end of the Summit was a new perception of global governance, a theme that touched the entire human activity and the application of minimal

rationality in dealing with the organizational structure of Earth and its biosphere. Agenda 21, signed by 178 nations clearly pointed towards that new awareness of human destiny. It can be easy to understand, therefore, that in this larger context were framed attempts to achieve a consensus around the Convention on Climate Change and Biodiversity. In both cases the conclusion a slow but ineluctable understanding was that global geopolitics had begun almost suddenly to turn over a new axis: the tropical factor. In this larger context was clear that the vision, built by GAVIOTAS not only stayed entirely valid, but was on track to become a collective consciousness.

There was probably many ways to express the depth and scope of that fact. The simplest and most telling was the biological aspect. The motivations of the Convention on Biodiversity put us before it. Man's survival as a species dominates the scenery of concerns when one becomes aware of the excesses committed in the annihilation of thousands of early life before the man in the chain of terrestrial evolution. For this reason one arrives eager to claim the protection of banks of life that lie at the heart of the Wet Tropics, including the Amazon and the cloud forest of the Andes. Biotic reserves become, then, the biggest sign of global wealth. The issue was taken with some degree of conviction by the countries holding the geographic privilege, including Colombia. But there is a long way to go before this new factor could receive not only recognition of the international community, but could be inserted in foreign policy and national development plans. Which of course, depend both on the sense of survival that inspired the profound reshaping of the organs of government at national level, and the sensitive acting with the trustees of that incalculable wealth.

## **TROPIC IS SYNONYMOUS WITH LIFE**

Paolo Lugari has run over the past five decades developing GAVIOTAS paradigm as an expression of the meaning of the Humid Tropics in the rebirth of life in the land and as the scene from which one can break the vicious circle of poverty.

Life is not only the human existence but the biological chains in the origin and evolution of all species, as well as the atmospheric chemistry maintenance, a topic which is repetitive Lugari. Our tropics, and especially our humid tropics, have the highest linkage of these chains with millions of years. Biodiversity is by nature complexity. The inevitable law of the interconnection of all living species shows that we cannot let aside our responsibility in preserving the biological chain.

If the tropics are still alive, Earth will probably have better security of life. If the Tropic dies or is vitally damaged, the rest of the planet will weaken faster. It is possible that the tropical border is the last chance of life left in the ground. For this same reason it is also possible that no portion of land geography is so vitally interesting for the six and a half billion people that make up the human species. The advanced studies of global biodiversity indicate that the tropics contain between 50 and 90% from the gene store for GAIA. However, this overwhelming reality has a tragic face. With the current destructive pace in 30 years less than 10% of this reserve- which remained intact for millions of years - will be gone. And the overall damage will be irreparable. These same forecasts predict that, under similar circumstances, 25% of the current tropical rainforest will be gone when the XXI Century

starts. It is perhaps the great feature that is matching by all the observatories on the evolution of Earth mentioned in this book.

The bio tropic has the utmost photosynthesis superstructure. Still keeps the water and moisture to ensure the preservation of large-scale gene banks. But also, as anticipated over two hundred years ago Baron Alexander Von Humboldt - the second discoverer of America, after Columbus- the American Tropics still has the potential to be the food pantry of the planet. The tropical zone occupies only 10% of the land, but contains almost three-quarters of living species. The mega biodiversity is present in all parts of the tropics. But in some parts more affluent than others. Colombia has, with Brazil, the highest mega world's biodiversity. However, Colombia has the highest relative biological concentration in the region of the Cordillera de Los Andes. The Andean region is inhabited by more species of higher plants than in the entire Amazon region, at least twenty times more extensive. Moreover, the wet Andean region, with only 0.2% of the surface of Earth, is the home for 6.3% of the known species of birds. In the biogeographically region of Colombia, Pacific Chocó - with 13,000 mm of rainfall annually – one has identified areas with more than 260 species of trees with a diameter exceeding 2.5 cm/ M2 1000,. This density in temperate zones reaches at most a few dozen. A great summary of the biological richness of tropical America is given by the Report of the Committee on Development and Environment for Latin America and the Caribbean, 1.990.

"Of the 250,000 species of higher plants, said this document, 90,000 are found in tropical America. If we consider that 10% of these plants are composed of

medicinal species, 10% are industrial, and 15% edible then we would have 31, 500 species to be used. In the late seventies, only 1% of the estimated 50,000 species of angiosperms in the Amazon had been examined to establish their chemical composition. Compared to the 90,000 species of higher plants from tropical Latin America, tropical regions of Africa contain 30 000 and 35 000 Asian. On the other hand, the diversity of the wet slopes of Los Andes above the Amazon floodplain is the producer of this surplus of Neo-tropics plant species with respect to Palaeo-tropic, over there one expect most important discoveries".

Latin American continent is a kind of intermediate between the affluent North and the South with large areas of poverty. However, our own contrasts between wealth and poverty are much stronger, possibly more unfair. The number of those who believe as we do this situation cannot and must not continue is continuously increasing. The Biotropics possibly represents the best scenario for this new development ethic. We want to correct many of our unjust social structures. But at the same time we want to reconcile with a nature that has given us thousand times more than the rest of the world. Our mega biodiversity offers to humanity thousands of possibilities to preserve the biological chains. The Biotropics saved in its jungle thousands of new potentials to nourish and heal the world. The global supermarket is incredibly reduced to 20 plant species or their derivatives; it is back to the mega Biotropics biodiversity. The curative possibilities are countless from thousands of plants with active principles that could be the key to human health. The potentiality of development can only be based on biodiversity.

**THE LATIN AMERICAN TROPICS**

The simple overview of the history in tropical Latin America presents us with a process of destruction and no name depredations within regional ecosystems. Almost without exception, the so-called comparative advantages that gave us access to advanced country markets were defined in terms of natural resources inevitably conditioned by fragile ecosystems which fragility was never properly felt and was worsened by the institutionalization of irresponsible behavior. The serious and scary in all this conventional approach is that, as being shown by all the basic indicators of development not only we have not gained ground to the structural problems of poverty and income distribution in Latin America, but its exacerbation matches the breakdown of many vital equilibrium of global impact. The picture that even the most hardened technocrat cannot deny is that of a world in which at least one fifth of the population is trapped in extreme poverty that can lead to an irreversible genetic erosion. More than one analyst has had to conclude, that even the achievements in what has been called the green revolution, do not compensate the wave of destruction of life that is hidden behind what is pompously called the extension of agricultural frontier. Making sense of the green revolution could only be achieved by a profound shift towards the preservation of ecosystems and within them, to the revival of biological linkage that has been abruptly interrupted.

The Rio Summit marked, certainly a start for making a global awareness of fundamentals for survival. However, policy decisions still seem lost in the bureaucratic maze, but mainly in the messy web of interests involved. And although it has earned, for example a remarkable space with

the signing of the Comprehensive Convention on Biodiversity, there are plenty reasons to believe that the pace of life loss on Earth progresses exponentially, compared to the erratic course of human decisions. The incapacity of "homo sapiens" to connect with other intelligent rational beings, the same called by Edgar Morin sociability deeply inscribed in the living universe, this incapacity has placed us in the realm of the irrational, as a result of the arrogance that was distinctive in the conduct of the warring superpowers in forty years of Cold War.

### **A NARCISSISTIC CULTURE**

The above considerations do not claim of course any originality. Arnold Toynbee, one of the peaks of universal historiography placed the "egotism" many years ago, as the dominant feature of Western culture. Some prominent Japanese professor teasingly associated this feature with the proliferation of aerobic centers in all cities of the West. This undoubtedly also qualifies the anthropocentric view, as largely responsible for the imbalances that now cornered the human race in its own contradictions, masking the contempt for the rest of the animated universe. The same that, again according to Morin, was a simplistic mentality that made biology became biologism, such as a closed view of life on the body, and anthropology as anthropologism, as an insular conception of man. Nothing could be expected from such a paradigm of irrationality, unlike the systematic destruction of what the new science identifies beautifully as "the logic of living things.

Coinciding with the Rio Summit, Lester Brown, launched from the World Watch Institute, in Washington, one of the harshest warnings about the threat of breaking the planetary

balance. Together with Sandra Postel and John Ryan, Lester Brown pointed toward a critical limit which was approaching the destruction of Earth's tree mantle, especially the primary forest and rainforest, as stronghold from terrestrial biodiversity, but also as the major feeders of photosynthetic superstructure of Earth. (Lester Brown, "State of the World", WW Norton & Co. New York, 1991).

According to data provided by researchers from the World Watch Institute, during the last ten thousand years the forest cover and shrub land has been disappearing; because the trees were cut down to make space for crops, pastures and settlements. Seventeen million hectares of tropical forest are demolished annually by the various forms of logging. Of 6200 million hectares of primary forest is destroyed in the Amazonas basin.

However, such an approach to nature valid or not scientifically speaking, still remains in the beginning of the road, to the point that the simple replacement of forests, will not remedy at all the loss suffered by biodiversity during a few thousands of years that meant irretrievable loss of millions of species, possibly the result of hundreds of millions of years. The argument is offered by Arne A. Wyller, another professor at Harvard and the University of Oslo, a member of the Swedish Academy of Sciences, and who meets the unusual status of being PHD in microbiology, astrophysics and philosophy. Professor Wyller has received in his book, "The Planetary Mind", the conclusion of studies on fossils that would say that conservatively speaking, it may well be close to two billion of different species alive for Planet life. This has happened however through extinction and recovery crisis of biodiversity, which has lasted about ten million years, in an



evolutionary cycle in which the life of the human species has lasted only one-tenth of one percent. This indicates very clearly the very fragile condition of a supposed civilization based on anthropocentric views that ignore the marginal situation of man in the evolutionary chain of life. But in addition, and despite the dazzling evolution of human knowledge and its technological capabilities, when it comes to scientific truth one has to conclude that everything that man has "invented" in any knowledge field on matter or life, was already made and tested in the laboratories of nature. The only thing that human science has been able to do is to reproduce in test tubes or in their mathematical models or computer programs, processes that nature has developed before and after the arrival of Homo sapiens."

## MAN AGAINST NATURE

It is simply naive to think that man is able to survive the breakdown of systemic structures whose components took almost infinite time to fit in, it is necessary to compare it against the newcomer status of the "intelligent animal." The truth, as Professor Wilson says, is that there are probably ten to one hundred million species of arthropods and insects - less than a million of them classified, and most of them will never be classified or even discovered – they do not need the man at all, but they create the balance for the man to live. *"If all they disappeared, says him, humanity could not possibly last more than a few months"*. If only just all of us sensed this reality, although due to its infinite complexities outsiders never would get to understand it, we would be prepared to participate in the project of human survival, not of nature, because she will survive and evolve

on its own.

It has become a discredited commonplace to mention the crossroads of human history, to describe what may be death or resurrection. Crossroads in the strict sense is a point of intersection between two or more streets or roads. So it is by definition essentially an opportunity. From the path taken from the rail crossing will depend many final destinations. Man has many times taken the wrong way when making decisions that is what history taught us. However, nature gave him opportunities over and over again. But humanity every time also came again to other intersections with diminished horizons. In this he arrives in a position that he never dreamed of due to his contempt for the lessons of the past. Nature however is there extremely abused, but she has the geological time to resurface.

Throughout this larger context - the end of the Cold War and the sixties, GAVIOTAS was already there anticipating answers. When the Club of Rome pointed to the "reforestation in the tropics" as the desirable output to help offset the environmental crisis left by the Cold War, when the observatories on the state of the Planet denounced the virtual extinction of the world's primary forests and the progress towards the disappearance of the rainforest, when Professor Edward O. Wilson expressed with full authority from Harvard that *"the planting of only 50% of that same area of square kilometers of "tree layer" destroyed through ten thousand years of destructive human agriculture, would be sufficient to reverse the current level of CO2emissions "*, Paolo Lugari had already mounted a global span lab in the center of the Orinoco and had validated his hypothesis about premature baldness of the planet in its first phase and the recovery of the "skin of Earth "through a gigantic plan

to reforest the South American savannahs in a possible extension of 250 million hectares, with criteria and technology away from monoculture and accompanied by food species. In addition, completed with a deep action designed to protect and enrich life in the oceans.

In the background of this entire context it will always be unavoidable to return to Paolo Lugari's premonitions expressed in multiple settings but always with the same essence. At Carnegie Mellon, when receiving an honorary degree in science, talked of the origin of Latin American poverty, "***we did not know how to do tropical science or technology, nor are we going into tropical rationality.***"

In the light of the foregoing, it is clear that the option rejected by our tropical countries was far from free. The geopolitical conditions led inevitably to well-known outcomes. And in its origins were, of course, the colonial powers. The First Industrial Revolution sign all processes and at the end of the emancipation movements, the imperial powers, as well as emerging nations, continued along the same anthropocentric, mechanical, and nature destructing path.

Thomas Berry, in one of his finest books, *The Dream of Earth*, makes a description of certain common denominators of the present era, which coincided with the discourse of the sixties counterculture. "*The labor movements in capitalist countries, socialist and communist movements, like capitalists, are strongly committed to the techno-industrial processes. It is a matter of employment, of sharing wealth of having a more equitable place in society. The chimneys mean working, money and housing, food and clothing, economic survival and education for*

*children. Acid rain, pollution of rivers, the paving of land, toxic waste, the loss of fish and birds, all this is distant and produces only marginal concern. If this is the condition for survival in the real world, so be it. The romantic idealism to the natural world is part of an earlier world of dreams, illusion and escape from reality."*

At the end of the eighties GAVIOTAS had developed a forest of over a thousand hectares based on the variety Caribbean pine, a species common in tropical Central America, but also immersed in the Amazon jungle. As described before, this experience served GAVIOTAS to resolve all the apparent shortcomings of the soil that could mediate the introduction of this forest. This was done based on the mycorrhiza, which represented a solution for large scale projects on the vast territory that could be subject to forest plantation. As Paolo Lugari beautifully expresses ***"there is in all this a profound humility lesson of nature, letting something as seemingly small as a fungus, allow the emergence of a magnificent forest full of life and diversity."***

At the same time, the GAVIOTAS technicians have perfected a new technology, both for the preparation of nurseries and for a mechanical planting from bare root at a rate seldom exceeded in the world.

Studies by multidisciplinary groups on the forest established that after the first five years of the first seed, the tropical savanna was covered by a tree blanket producing at an accelerated rate an expansion of biomass, but also of biodiversity coming from the gallery forest and from the Amazon jungle itself. This wonderful capacity present in the recovery of well-drained Orinoquia opened

the doors to some unimagined horizons. This natural span for the creation of new life and growth of photosynthetic structures represented an early response to all questions, or part of them, to be raised at Earth Summit. And of course, gave all the contribution GAVIOTAS would offer to Spain for it to have the opportunity to enter the Fifth Centenary of the America Discovery with a major project of global desirability.

Beyond the above context, GAVIOTAS would enter the twenty-first century with assumptions and proposals on human problems, which would penetrate the substance of the questions about alternative and clean energy sources; but above all, reaching the tropics potential to contribute to global solutions not previously perceived. This explains its pioneering role in the design and construction of a plant for producing biofuel from palm oil, the first in the world. Then a revolutionary development of arbochemics applied to the generation of energy from pine oil. In 2005 the founder of ZERI, Gunter Pauli, and the President of the Club of Rome, Dr. Ashok Kholsa, a PhD in Experimental Physics from Harvard, co-wrote an essay where they stressed this essential role. The document entitled "Biodiesel, Energy Solution for the Tropics" they say: *"When the experimental center Las Gaviotas opened the first Biodiesel plant based on palm oil in 2004, the media world hardly noticed. Perhaps the approach was too simple. Probably was not seen as high technology to capture the attention of all readers. Still, this was the beginning of a revolution. Biodiesel extracted from sunflower, soybean and maize has been studied in detail for many years in Japan, Europe and North America. However, the number of liters of Biodiesel produced per hectare per year from these plants is small compared with*

*the productivity of tropical species. Unfortunately there has not been comparable research effort in this field. There has not been much interest in the industrialized countries market”.*

## Chapter VI

### GAVIOTAS AND THE V CENTENARY OF THE DISCOVERY

#### GAVIOTAS WANTED TO CHANGE ITS LAND. SPAIN SAID NO

*"In Colombia, Las Gaviotas community is an example of participation in a much more ambitious recovery project. This town was built on a degraded savanna and its inhabitants planned to recover the forest in a 8,000 hectares. In addition to supply the community with food and commercial products, the land currently absorbs annually 144,000 tons of carbon and this absorption will increase as the forest continues to grow. The community effort has been impressive, yet its plan for the coming decades is still more ambitious: they expect reforest over three million hectares with the help of other people, which would be sufficient to absorb a quarter of annual emissions of carbon in Colombia"*

*World Watch Institute, Washington." The State of the World 2008.*

*Innovations for a Sustainable Economy. "*

*Anniversary Edition 25. Icaria Editorial, Barcelona 2008*

#### STATE OF THE WORLD 1991

There was never a direct and deliberate exchange of information between Gaviotas and the Lester Brown's World Watch Institute, in Washington. However, from the moment that the first report on "State of the World" in 1986 appeared, the tuning between the two currents of thought was instantaneous. Because some of the themes developed

by Gaviotas during the two previous decades, flourished from the first time in the Observatory on the status of Earth. It has not stopped since then to sending continuously alerts that are becoming increasingly difficult to ignore. However, it was evident from the beginning the affinity of Lester Brown's thought and his group of researchers with the same scenarios where GAVIOTAS mostly deployed its imagination. The Humid Tropics and, within it, the vast Amazonian ecosystem, the Colombian Pacific rainforest, as well as the mega ecosystem in the Colombian Andes, were often the subject of attention in the headquarters of WWI.

Paolo Lugari did what no scientist in the world on the eve of the nineties did, to sell the idea that the key to return to the original impetus of life on the planet was to preserve the photosynthetic structures. His almost obsessive persistence on the disappearance of the "earth's skin", manifested in deforestation and the impact on marine life, leading to continued deterioration of the biosphere, was also a great excuse to plant the first thousand hectares of Caribbean pine in the Orinoco tropical savanna, crossed by wooded corridors that form the gallery forest.

No more than five years passed before a group of researchers found that the first impact of this cultivated forest planted in a blanket of hispid vegetation, had substantially increased their rate of biodiversity and sixteen times the amount of biomass which, put this experiment in its starting point at the threshold never sensed before of a territory of tens of millions of hectares including the territories of Colombia, Venezuela and Brazil, with a vocation for global impact.



Future Society, founded in 1986 and based in Washington, published in August 1988, a vision of Earth prepared by Lester Brown, Christopher Flavin and Edward Wolf who, formed the core of the World Watch Institute. This paper was intended to describe the state of the world in terms of forest cover and in terms of global estimates on the different use of wood and biomass in general. His diagnosis could not be more blunt: *"Adding trees to global forest inventory is a valuable investment in our economic future, either to satisfy growing fuel wood requirements in the Third World, or to stabilize the regimes of soil or water in river basins where land degradation and disruption of hydrological weather are undermining local economies. Given that some trees could serve ecological purposes and combustion plant would require a total of 120 million hectares. Additionally it will be required to plant 30 million hectares to meet the demand for sawn timber, paper and other forest products. If one aspires to achieve this goal by the end of the century it will require planting an amount of 17 million hectares annually"*.

This single transcript gives an idea of the challenge that began no doubt, to be part of the strategies devised to outline the Rio Summit. However, the writers were far from thinking that - in a corner of the Colombian Orinoco - the vision went further. Because from there you could see an area in which it was not simply to recover degraded land and water cycles disturbed by human action. There also were vitally affected local economies and in their immediate environment. And in view of GAVIOTAS was acting not only to rebuild what was disturbed by man, but also to return in evolution, returning to the global ecosystem the tropical savannah areas that thousands of years before were part of Earth's tree mantle.

The seed of the 1300 hectares already planted by GAVIOTAS in the Orinoco well drained, had all the elements and scope of the ideal scenario described by the World Watch Institute and the World Future Society; likewise, the scenarios presented by the Club of Rome. This was from the standpoint of environmental recovery and growth of terrestrial biomass, and the rescue of biodiversity and the substitution of energy sources. And in its heart there was a vision of course much more focused on the reality of the tropics and its imponderable meaning for humanity.

In The Report on the State of the World for 1991, Lester Brown, Christopher Flavin, Nicholas Lenssen, Sandra Postel and John Ryan, would return to the same shared remote scenarios. But, especially within the repeated visionary motivations that move GAVIOTAS to send a message to Spain for the V Centenary of America's Discovery. Those were to invite that country which at the end of the fifteenth century had discovered half the planet, to fill a huge geopolitical space. This only required a basic policy decision to convert Earth Summit in landmark for breaking the presence of the human species on the planet in two parts. The facts presented from two different perspectives so far from each other, but coinciding in their intersection with the pulse of Earth, were simply impossible to ignore.

With data that would shake all scholar spaces around the world, the World Watch Institute in 1991 came to show a face of Earth that made it almost impossible for the directors of the great event of the America discovery to ignore. Because this seemed to be the opportunity that history has once again provided the imperial power that arrived five hundred years ago with a modest ships to the

coast of America.

During the 20 years since the first celebration of Earth Day in 1970, the world has lost about 200 million hectares in tree layer, said Lester Brown. Curiously, this was an area equal to that calculated by Paolo Lugari as available in the South American savannahs to help recover lost skin on earth. This was also an area almost equal to the size of the United States in its territory east of the Mississippi River. Deserts have expanded during the same period, 120 million hectares, an area equivalent to the cultivated area in mainland China. Meanwhile during the same two decades, world population increased by 1600 million people.

### **THE ENERGY PARADIGM**

World leaders at that time understood very little about energy systems not based on fossil fuels. Between 1990 and 2020, according to forecasts by the World Energy Conference, it was projected a 75% increase in global energy consumption, always based on coal, oil and nuclear generation, which implied that the world could happily go centralized around mega projects and a permanent restraining of any attempt of community participation.

Notwithstanding such predictions, citizens throughout the world began to rebel against the energy "solutions" dictated by their governments. By a decision of the people, nuclear power was never expected to have significance. In recent decades, the pace of expansion in the exploitation of this source tended to decrease and only slightly exceeded 6% of primary energy consumption. But the dispute continued and still there were many advocates of this energy source.

According to the provisions of WWI in the early nineties, the existing reactors at that time were scheduled to be withdrawn within the next 40 years and it was considered very probable that most of them would not be replaced.

According to data from WWI (1991), in the early 90's, the carbon dioxide emissions exceeded 6000 million tons each year. Faced with warning lights that had been going on, this level of emissions should not only stand, but drastically reduced. And that was precisely the reason why the Kyoto Protocol fixed nineties as reference year for the commitment of the international community.

In the described context, the fossil fuels were three quarters of global energy demand and were the paramount source of emissions. The reality proved stubbornly that only shifting to other clean energy sources could be removed the time bomb threatening Earth.

An exercise done by WWI itself showed that for reducing - between 1990 and 2030 - CO<sub>2</sub> emissions by 60% according to the urgent goals that some sectors of the scientific community think are unavoidable, it should immediately rethink centralized models, making the transition to renewable energy sources in a decentralized manner, which should supply 70% of energy demand in the next 40 years.

Curiously, this same prospective vision was presented by GAVIOTAS to Spain at that time, inviting her to open the threshold of the Orinoco well drained, with tens of millions of hectares ready to become a vegetable skin revival of the Tropics and not necessarily in a single project to implement in the short or medium term. Because the first step that involved the proposal to Spain was the recovery of its

historical sense in the project in the course of many generations to come. Ten years later, Paolo Lugari posed a similar challenge to the leadership of Colombia, to design and build the first biodiesel plant in the world, with horizontal cooperation from the University of Colorado, based on African crude palm oil. For this purpose, it also benefited from the coordination of Foundation Friends of Gaviotas. The palm would be sown in new areas without cutting a single tree, through small and medium extensions, mixed with other tropical species mainly food. The diversity makes the forests preserve themselves, while the monoculture requires ongoing outer patient care.

All this was designed by Paolo Lugari on the basis of a decentralized - as Lester Brown conceived it- with opening small and medium production units in each of the Colombian regions and replace a substantial part of the consumption of fossil fuels.

The most interesting prospective hypothesis raised by WWI was that she operated on the assumption that the technologies needed to make this great leap were available. And the major prerequisite for achieving the effect was increased local democracy which would allow local communities to influence the restructuring of energy models.

Contrary to what was believed, the main sources of renewable energy, hydroelectric and biomass provided already 20% of global demand.

Throughout this larger context, the exercise of WWI opened a huge prospect for solar energy and geothermal energy. As a test of the real potential, the paper showed how

the cost of photovoltaic electricity had decreased from U.S. \$ 30 per kilowatt hour, only \$ 0.30. At the end of the century it was estimated that the cost could be \$ .010 and for 2020 \$ 0.04. Anyway it is still to expect that technology continues making great leaps, as has happened in other areas of science.

Many years before the V Centenary of the Discovery of America GAVIOTAS vision was already focused on one of the big issues implicit in what was becoming, at the end of the eighties, one of the great beliefs moving the preparation of environmental summit in Rio de Janeiro. When Paolo Lugari, stated in all the scenarios where he talked, its obsessive concern with the loss of "the skin of Earth", did nothing but to anticipate the large content of "GAIA Atlas of Planet Management", directed by Norman Myers and Jennifer Kent, originated at California University. Its first edition appeared in 1984 and was updated in 2005 with a foreword by Professor Edward O. Wilson, Harvard University.

*His most interesting revelation is that "the amount required for protecting 25% of critically endangered ecosystems, plus the heart of the virgin forests in the Amazon and Congo, and New Guinea as well has been estimated at about 30,000 million dollars. This is equivalent to one thousandth of Gross World Product and incidentally, also one-thousandth of the value of ecosystem services provided free by the natural ecosystems that still survive on Earth. "*

With less than 10% of the land surface and the relative risk of being no more than 5% at the beginning of the XXI century, the tropical forest-housed as calculated by the

ATLAS-two-fifths of Earth's biodiversity, from both vegetable and animal kingdom. According to this testimony:

*"An area of tropical forest with a span of an hectare and half can contain up to 200 different trees. They grow abundantly in many layers: tall trees emerging cross the vault, their stacked trunks festooned by vines and climbers with aerial roots, to the last square inch of surface is covered with lichens, mosses and algae, and a variety of fungi that colonize the forest floor. There is virtually not a single branch in which they have not rooted epiphytic ferns, orchids and bromeliads, while smaller trees and shrubs below competing for space and light. This intricate plant life sustains an even greater diversity of insects and other animals; a good portion of them specialized, and with life cycles associated with certain plants."*

*"Yet, despite its intrinsic interest, these forests were still largely unknown as reserves that are essential for human survival."*

*"Scientists had identified less than six of their two million species (a minimum estimate). If we enter into a forest with a network, it would take less than a few hours to catch an insect still unknown to science (which would be named after its discoverer). We now know more about certain areas of the surface of the moon than about the interior of the Amazon and the moon will remain where it is for a long time to come, while tropical forests are being altered and destroyed every second. Each time you slash a small area of tropical forest maybe several potentially valuable species are lost forever. "*

This was the world Paolo Lugari wanted to connect with Spain. But the first step was converting ecosystems through reforestation from the plains for returning them to the full development of their affinity with the forest border where they are now located. And so instead of being, as they are now an easy access to the depredations of the rich jungle they should be a protective belt generator of new and incalculable wealth.

### THE NEOLITHIC AGRICULTURE

Descending from the abstractions, the vision of Gaviotas had also focused on one of the major topics related to food security and the potential for the Humid Tropics to meet the demands of a growing population. Moreover, the GAVIOTAS production model tested in the Colombian Orinoco is essentially a self-sustaining model in all its aspects, but initially focusing on renewable energy in food. The GAIA Atlas describes the major nutritional problems of the world as what it calls "misleading harvest." *"Today, there is said, most of the world depends on a handful of species. 24 crops occurred in 1980 over 2500 million tons. Four of them represented proportionally more than twenty others combined. In terms of meat the world depended on a narrow frame selection as the greatest contribution was in the pork. The modern supermarket is misleading because of the variety it offers. However, once removed the wrapper, it is clear that 95% of our global nutritional requirements is obtained from only 30 types of plants and that three quarters of our diet is based only on four crops led by wheat, corn, and rice. A far cry from the 80,000 potentially edible plants, thus, agriculture is virtually in terms of the variety of sources, little more than a Neolithic farming."*



## LOSS OF BIODIVERSITY

Beyond the food problem as the inability to supply the market with few suppliers of supermarket products worldwide, the vision of Paolo Lugari headed the crucial issue of biodiversity as a result and in support of the photosynthetic structure of Earth. The loss of biodiversity due to the destruction of Earth's skin, especially in the Humid Tropics, will seriously affect agriculture throughout the world and help to accentuate the food crisis. For this obvious reason, at the bottom of all proposed GAVIOTAS to reforest is implicit formula to protect agriculture as a primary food source.

It looked clear how almost inadvertently, that led to the crucial issue of biodiversity as the times began to run. For this reason, the vision Gaviotas projected in the world after the Cold War and through the proposal to Spain, there was not a significant geopolitical factor comparable with that of biotic diversity, as would be fully demonstrated in the Rio Conference.

In terms of survival there cannot be upper-reference, the relative value of this factor exceeded by far that of any physical resource. In this context, the **humid tropics**, as the central reference for all Paolo Lugari's approaches, had to be valued against the industrialized world. Because this concept traditionally only had the appeal of the picturesque. This was after they noticed him just as a supplier of raw materials to fuel industrial fever.

## **PHOTOSYNTHETIC STRUCTURES**

Plants provide the best means of capturing solar energy by photosynthesis. They convert sunlight into biomass, and this was consumed as firewood, charcoal, agricultural waste or animal waste, the first source of energy at the start of the nineties. This was the main energy for about half of 2500 million people called Third World. According to the same prospective exercises, ethanol would be produced primarily from agricultural and wood wastes and not from the precious nutrition grain for human population. The cost of this production was reduced in 10 years from \$ 4 to \$ 1.30 per gallon. The estimate was that, having reached the 90's, its cost will be reduced to US\$ 0.60.

It was more than evident, then, that agro forestry opened a vast horizon for the developing world. Improving the technological processes for the conversion of agricultural and forestry waste into energy could multiply the role of biomass in a framework not only compatible with the protection of the environment, but also to the preservation of biodiversity and the continued improvement of photosynthetic structures.

A factor of immense importance in this new energy approach lies in its projection into employment generation. It was out of the question the pioneering role played in this field by Gaviotas. Biomass energy especially which is obtained from the harvest of forest, would generate more use any of the alternatives based on fossil fuels.

According to the same analysis of WWI, in the case of geothermal energy there was the possibility that basic exploration and drilling equipment for oil, could move

towards the use of geothermal potential.

The profile for this new energy model was beginning to emerge, and decentralization was its most prominent feature. The solar or wind facilities could be built economically on a scale that was less than a thousandth of what represented a typical nuclear plant or coal. Some renewable energy systems could be built to a house scale. All of which immediately suggested the incalculable importance of GAVIOTAS achievements despite the most adverse circumstances and that it was not on the agenda of any government, it had succeeded in crystallizing in less than 20 years, solar solutions for heating water for families at a figure that surpassed any Latin American country.

The major conclusion of Lester Brown was that if by 2030 the developing world had 80% of world population, these countries have little hope of achieving basic development goals if they continue down the path taken by Western energy since 100 years. In the same line of rationalizing energy policies and putting them in a decentralized framework with citizen participation, were the demands for meeting forest management throughout the world.

#### **DISMANTLING OF EARTH**

During 10,000 years, since the beginning of human agriculture, the forest cover of the land had been disappearing because the trees were cut down to make way for crops, pastures and settlements. At the beginning of the 90, ten and seven million hectares of tropical forest disappear annually by the various forms of logging.

Brazil U.S., Australia, China and other countries in Europe, shared the top spot on this frightening dismantling. While Canada maintained 52% of the area of primary forest, 63% Brazil, Zaire, 56%, Indonesia 43%, Peru 60%, Venezuela 71% 42% Papua New Guinea, Colombia had saved only 26 % (from original 71 million hectares), the United States retained the 15% (from 438 million hectares), Western Europe was virtually zero (from an area not sufficiently well known). Australia retained the 5% (from 244 million hectares) and China 1% (from 476 million hectares). And although nothing is said about this subject on Japan, other sources indicated that its primary forest was virtually untouched, simply because this country preferred and still prefers to import all the wood it consumes. Perhaps for that reason, almost a third of the country triplex imported used in 1987 simply for concrete formwork was discarded after two or three usages. Worst of all, Postel and Ryan say, is that almost all this material was made of high quality timber extracted from the tropical forests of Southeast Asia. Of them very little was left. In short, from the original surface of the tree mantle only remained the world by 24%.

The timber industry and firewood were in the early nineties, and still are, primarily responsible for deforestation in the tropics together with spontaneous colonization. In the humid tropics meant that inclement exploitation the degradation of 4.5 million hectares of original forest each year. This is contributing to the global market for timber and furniture industry, who attended the 1,700 million cubic meters, worth U.S. \$ 85,000 million. United States, the Soviet Union and Canada accounted for 50% of this huge market.

The degradation of tropical forests had reached almost unbelievable extremes. According to the study of WWI, Malaysia, for instance, exported \$ 3,000 million in timber in 1989. In 2000 that figure rose to 4,700 million. However, according to abundant sources cited by Ryan and Postel, the country could become a net importer of wood in less than a decade. Nigeria was yet to be importing since 1988, with only U.S. \$ 6 million industrial timber export, and import \$ 100 billion in forest products, having been one of the largest net exporters of these products.

Everything was leading to think that one had globally completely forgotten the concept of sustainable forestry, which according to the WWI should be understood as "**the maintenance of biological diversity, environmental preservation of the forest and conservation of wood stock.**"

One of the most striking predictions of this prospective clinical picture was that, long before the surviving primary forest disappeared it will have lost their biological integrity. According to the same diagnosis, on the northwestern Pacific Coast in U.S., for each hectare of original forest cut, there was an effect of contour degradation affecting 14 hectares of remaining forest.

The "protection" approach that began to gain strength dismissed the tolerant concept which had led to practices of selective "exploitation", such as that occurred in the biogeography of Chocó region with multinational paper business. The experience of the Amazon and Indonesia began to show that even within that treatment could be local weather disturbances and increased risk of wildfires.

According to Postel and Ryan, the establishment of commercial plantations, consisting mostly in a single tree species, or a genetic variation within a species, contributed to eliminating many plant and animal diversity in the temperate zones. 97% of the reforested area in West Germany was populated by only three tree species, which contributed to the serious problems of deterioration that would rush on these areas. Pacific silver fir in northwestern United States, whose bark contains an active substance against cancer, faced rapid extinction with the operation developed by one of the major timber firms in the country.

In the case of tropical forest, the symptoms were not very different. According to WWI, in the Peruvian Amazon, where the wealth of fruit and rubber trees generated more long-term profitability of timber, the botanist Charles Peters and his colleagues found that if one of the six species of fruit trees was damaged by the cutting of timber, the financial gains from commercial timber harvest could become zero.

Other scientific testimony is presented by Terry Franklin, a forest ecologist at the University of Washington, who says, among other things, *"Creating uniform woodland with narrow genetic base, increases the vulnerability of forests from climate change to pests and pathogens threatens"*

**As regarding Caribbean pine, mycorrhizal not only acted to improve soil conditions, but at the same time create conditions for the emergence of the undergrowth. In this system after a very short time biodiversity transmitted from forest gallery, which are degraded traces of the Amazon, but at the same time have been for**

**millions years dormant seed savers, the jungle became anew a savanna ecosystem. That virtually erased the initial condition of an apparent monoculture. It is something that only happens in the tropics. In the practice, some species came to meet and even exceed the height of the pines, in a demonstration of extraordinary symbiosis, so GAVIOTAS experience becomes a case study for the world.**

### **RETAKING THE COURSE OF THE BOTANICAL EXPEDITION**

Within this context, one fully understands the expectation opened for Latin America, the V Centenary of the Discovery of America as a historic opportunity for a strategic alliance of almost unimaginable scope. That in a deep sense meant to regain the geopolitical content of the Botanical Expedition to overturn it in the company of the former imperial power considered in all textbooks as the "fatherland's mother" on a planetary-scale project . Because at that time was impossible to ignore that this historic milestone was a visionary action from King Carlos III, the most progressive of the enlightened despots of the seventeenth century who sensed with more intelligence what scientific advance of that time meant for the Spain expansionist purposes.

Two centuries later leading the Presidency of Spain, with a restored parliamentary monarchy, was President Felipe Gonzalez.

## LATIN AMERICA AND SPAIN AT THE END OF THE COLD WAR

At the end of the nineties, Jean Grugel and Jorge Alegre from the Instituto Universitario Ortega y Gasset in Madrid made a fairly objective assessment of what had been until now Spain's policy toward Latin America under the regime of the Spanish Socialist Party with the presidency of Felipe González by ("*The PSOE Spain and Latin America: Towards a New Relationship?*" *La España del PSOE y América Latina: ¿Hacia una nueva relación?* Juan Alegre, Jorge Grugel, Instituto Universitario Ortega y Gasset, Madrid).

Although after dozens of pages there were not a result that arouse some enthusiasm, the central hypothesis outlined from the beginning was that at least, "*one of the few coherent lines of Spanish foreign policy has been its ambition of developing a special relationship with Latin America. However, the justifications, the instruments and goals of that policy have changed radically over the years.*" All this was perfectly true, especially since the time for Spain's main priority in foreign policy had to focus on their integration into the European Economic Community and NATO. Before that, as the study says, the decades of Franco's regime were wrapped in traditional rhetoric of Latin America in the middle of the "Spanish family." The big change was the post-Franco transition to the "American community," which admittedly did not make a big difference, despite the unquestionable Gonzalez's sympathy for the second cause.

PSOE's rise to power in 1982, coincided with the convulsions in the heart of Central America with the collapse of military dictatorships in the Southern Cone, with



the external debt crisis and the particular characteristics of the so-called Reagan Doctrine, fueled by military interventions where the "national security of the United States" was threatened. These circumstances clearly influenced Spain's policy toward Latin America which was involved in rhetorical nuance. Sometimes it served mostly as a pretext for the "fatherland's mother" did not pass from words to deeds. The Foreign Minister then very appropriately defined almost always elusive goals of this policy: first, support the cause of peace, freedom and democracy against the war, dictatorship and military coups..., second to promote growth and economic welfare in the area, and third, working for greater justice regarding the relationship North-South. "The Instituto Ortega y Gasset recognized that one of the unspoken purposes of this policy was the belief that she would "produce an increase in its influence in the international context and at the same time, put Spain in a better position to negotiate within Europe and America." And last but not least, the same purely declaratory policy eventually became a strategy to "dominate through its consent the internal bureaucratic positions related to the region within the community." Some observers inevitable think, this was a policy inspired rather than by real conviction by contrived convenience.

Ortega y Gasset Institute itself recognized that "*after five years of faithfully following this policy, the results achieved so far are scarce ... unless progress in inter-regional dialogue referring to Asia and Latin America and, in the second, Spain helped lead to three special axes: economic and energy knowledge, measures relating to the economic environment and measures relating to the companies.*" However, the most accomplished in terms of EU support for development in Latin America was 300 million ECU less

*han that granted to Poland and Hungary. (The Financial Times, 03/19/1990).*

Yet, it was not however reached a significant juncture as the V Centenary of the Discovery of America. And that was precisely the probability that seemed to open from 1988. This year, direct investment in Latin America accounted for 20% of Spanish foreign investment. However, in 1990 it presented a marked increase, reaching 200 million dollars. And on the eve of V Century people thought that Spain would not only give a very real shift in the volume of its investments in Latin America, but mainly in terms of their destination. It was obvious that such an opportunity had to find new destinations in Latin America for productive investment, arising especially out of its tropical condition and the perspective that would be the new course in the world after the Rio Summit. However neither mining, which was the focus for the simple reasons of domestic consumption, came to occupy an area of prime importance. Because from the beginning the effort was directed to companies already established in the field of communications and transportation, with a visible bias towards Argentina, Mexico, Chile and Venezuela, described as *"the privileged partners of Spain in the continent."*

In terms of cooperation for development, no fundamental change took place. Up to the point that according to the paper quoted from Jose Ortega y Gasset Institute in Madrid, the Minister of Foreign Affairs, Fernández Ordóñez, acknowledged in the newspaper ABC on March 5, 1990, that Spain *"cooperation expenditure figure is ABSOLUTELY RIDICULOUS"*

The establishment of a fund of US \$ 500 million in Inter-American Development Bank, as a tool for Spanish presence on the occasion of the V Centenary of the Discovery, created a great hope about what could be the unprecedented shift. However, it was the President Gonzalez, who, speaking to *El País* of Madrid, in September 1989, was responsible for some clarifications: *"a very high proportion of funding will be used to purchase equipment and Spanish products."* Which puts these resources at the same level of other funding available for international trade and gave the maximum management event a clearly mercantilist overtone. Everything seemed to be reduced to a preferential rate, which was the common denominator of other trust funds from various sources administered by the IADB.

When it started the IADB had by definition non-refundable credit characteristics in priority areas identified in the field of education and specialization of agricultural development programs and rural public health programs, investments in communications and telecommunications and urban development investments. All these within the framework of trade agreements with some constraints always referred to non-negotiable priority for awarding contracts to Spanish firms. That meant in most cases subcontracting with local firms with resulting over cost in all cases. *"More than a demonstration of solidarity with developing countries,* concludes the report of the Instituto Ortega y Gasset, *these contracts are the result of its conviction that the relationship with Latin America can be beneficial for the Spanish economy.* Therefore, the selected countries have the largest economies in the continent and are those that have been updated with international financial organizations and have a refinanced debt. " The

conclusion of the report is more than revealing: *"Here lies, therefore, a demonstration of the potential weaknesses of the treaties: the existence of conflicts that might emerge between the need for Spain to increase its exports to Latin America on the one hand, and the development demands in that region on the other hand."*

## **GAVIOTAS PROPOSAL**

Upon reaching the nineties, GAVIOTAS had developed the larger essences of its original agenda and high technologies appropriate for the Tropics. It had consolidated its place in the Colombian Orinoco, had created a community with its own horizons, and was present in the cities with solar energy heaters for houses in scales not known elsewhere in the world. It did all this taking into account its central assumptions about the virtual richness of the Humid Tropics. But in addition it made the first big step for recovering those mega million hectares of Amazonian ecosystem starting with the reunion of the savanna to the forest. This was not just generating a vast infrastructure of original ecosystem protection and rescue wasted life for Earth. Also to create new cultivated forests sustainable spaces in terms of living with new settlements.

The main examples of those adequate technologies were present in many different regions of the country, but especially in the eastern plains and in the major Colombian cities; although they had already advanced in the coffee and the Chocó region. These were windmills with double effect, sleeve pump for water extraction from deep wells, the ram for lifting water, solar water heater, solar heater for cooking with thermal oil, solar absorption refrigerator, and solar water distillatory for using in hospitals. Most of these

durables products had well exceeded the testing stage and only required a political will to mobilize them to a mass market. That political will had been moved already in the field of incorporating solar water heaters for housing programs, thanks to the political decision of President Belisario Betancur between 1982 and 1986. About 15,000 popular and middle-class homes were fully funded, including the water heater in cities such as Bogotá and Medellín. While thousands of double effect windmills scattered throughout the tropical savanna solving the vexing problem of water for rural families

Within this important context, but additionally, in the perspective of "**recovering the vegetal skin of Earth**", a central thought in Paolo Lugari's mind, GAVIOTAS had planted over a thousand hectares of Caribbean pine in its settlement Vichada.

However, this particular aspect was only part of the Wet Tropics where Paolo Lugari designed alternatives for a different development of the entire human habitat. Yet his vision is based on global interdependence, which is the first phenomenon influencing the relationship between man and nature. The great essence of his discourse was always connected with this holistic approach to the creative power of this transcendental alliance:

- *"Sustainable development is possible even in the most extreme circumstances, where distance, scarcity, and insecurity, converting crises into opportunities."*
- *"The future agriculture will be the art of harnessing solar energy through photosynthesis (coupled by means of light), who's mystery has not yet been deciphered. All this*

*through proper leaf architecture, growing a great diversity and species association in a biologically rich soil, in the stage of life, approaching this way to a new culture."*

- *"We were able to reconcile the serenity of the scientist with the desire of the performers.*

To Paolo Lugari the world is a systemic structure. As are all and each of its living components. And history is the result of such inevitable synergistic relationships. Not necessarily framed in a blind determinism or the conventional view of ideology. It is the other way around, insofar as humanity has moved away from the simplistic constraints of irrational ideologies; it has also lost the ability to search external agents responsible for all human tragedies. And what can be said regarding the relationship inside the social group it can be applied more firmly in the relations between man and nature. In this particular area of course fit all possibilities for the unexpected. This corresponds to the essence of GAVIOTAS. However, the simple observation of human history can draw huge areas where human rationality or irrationality determined the behavior of Nature.

Within the same systemic theory of Earth and its status as a living organism - as suggested by the Gaia hypothesis of James Lovelock-, it is very frequent to find answers from our planet or, if you will, conditioned reflexes, which demonstrate not only its synchronism but also its "intelligence" and "cognition", in the style of Aristotle's thought, or of land metabolism as Capra Fritjof calls it, or as conceived by Teilhard de Chardin the growing presence of "a world of greater organic complexity". One such conditioned reflex can be expressed no doubt by their latent

or visible states of anger or rebellion. Desertification and floods are tangible evidence of these provoked reactions. As it can be, on the other hand in miraculous degree the green revolution when it clearly corresponds to the adequate stimulation between man and nature. As it has happened certainly in the relationship started between Gaviotas and a tropical ecosystem of millions of hectares that could be incorporated into the cognitive process. A clear example of cognitive synergy may well be the role of mycorrhizae, not only in the acceleration of forest growth, but also the simultaneous multiplication of biodiversity in the understory.

### **EARLY CIVILIZATION**

The paradox of all these circumstances is that primitive man, in his concept of divine nature, was much more "civilized" in front of her. This was in stark contrast to the barbaric behavior exhibited by members of industrial society. It is understandable, then, that "the end of nature" which so brilliantly described Bill McKibben in his beautiful book of the same title ("The End of Nature", Random House Trade Paperbacks New York, New York 1990), seems to begin just when the human being believed that his greatest victory was to have reached an irreverent perspective before her.

It was not, of course, projecting an apocalyptic vision of the world. But clearly the human being of the late twentieth century began to have a greater awareness regarding the borders of their own survival. When at the beginning of the seventies, the Club of Rome released its premonition about the limits to growth many skeptical positions could see

relapsing forms of Neo-Malthusianism in it. Twenty years later, on the eve of the V Centenary of the Discovery of America and the Rio Summit, those echoes returned to rumble. Although purification was subjected to the methodological approach, the eminent group of Massachusetts Institute of Technology who surprised the world with their predictions was precisely in those days, a full confirmation of the essence of the mega trends observed in the first report. Professor Dennis Meadows himself had summed up masterfully the lesson of the first bell, "**continue business as usual could only lead to slip**"

#### A LETTER TO FELIPE GONZALEZ

In January 1991, Belisario Betancur, Colombian President from 1982 to 1986 was appointed President of the Colombian Commission for the V Centennial of the American Discovery. He addressed a memorable message to his friend Felipe González, Spanish Prime Minister. As Head of State he accompanied for a week González during his visit to Gaviotas. There was also the Literature Nobel Prize Gabriel García Márquez and the painter Alejandro Obregón. In this distant place of Llanos Orientales, the three of them shared ecstatic the vision of Gaviotas. There, the man of *One Hundred Years of Solitude* left imprinted on the guestbook this phrase: "**Paolo Lugari: inventor of the World.**" And Felipe Gonzalez left his signature appended at the foot of this manuscript: "**wonderful experience to highlight creativity and dignity.**" At that same time, Professor Richard E. Schultes, Director of the Botanical Museum at Harvard and considered the most profound knowledge of tropical biodiversity, had left stamped in the same guest book these words:



**"the place where you think tropically".**

Belisario Betancur met again one of the essences he dreamed of when having political power. Therefore, during its four years of government joined his central government agenda, housing for all social strata, but especially for the lower and middle class using solar energy for water heating purposes. He also trumpeted to all the winds the benefits of the holistic view of GAVIOTAS.

*Development in a World of Peace* was called the Club of Rome meeting held in December 1983 under the auspices of the Colombian Central Mortgage Bank. This was precisely within the political framework Betancur, the entity that during the eighties incorporated solar water heaters produced by GAVIOTAS in their programs for constructing houses for middle class people. This great forum, whose scope is explained in chapter IV, "was the culmination of the visit that the Staff of the Club of Rome, led by Aurelio Peccei, held at CENTRO LAS GAVIOTAS, shortly thereafter the life of this great twentieth-century Crusader come to an end.

In his letter to Spanish Prime Minister, Belisario Betancur expressed, among other things the following:

- *Mr. President Cesar Gaviria has discerned me the great honor to stand at the front of the Colombian Commission for the Celebration of the Fifth Centenary of the Discovery of America.*
- *Of course, there are many big issues we can formulate to make this celebration a truly ecumenical sense. A circumstance, perhaps the most significant is the fact that*

*for year 92 has been called the United Nations Summit on Environment. There is a reason to believe that, without hyperbole, this event will initiate a new era in the life of mankind. Not just leaving alternatives that could be more or less free choice, but choosing what Ernest Junger called "the unavoidable designs" dictated by a planet in a state of unavoidable rebellion against who inhabited and abused it for thousands of years.*

*-For this very clear reason, if Spain has the indisputable and undisputed title to be the discoverer and conqueror of much what is now the Humid Tropics - that science considers the key to the survival of the human species- would not be understood in the Fifth centennial such issue to be eluded.*

*-This letter seeks to call attention to two major topics: the mega Amazon system (including the Colombo- Venezuelan Orinoco) and the Colombian Pacific coast, to make a proposal from two scenario projects commemorating the Fifth centenary.*

*-AMAZON. At this point the former Colombian president made a personal recollection, referring to his mega project Marandúa: "The torrential flow roared plunging the Jirijirimo Cachivera looking for the lake on its way to the Atlantic Ocean, so is called the Amazon river: The Walking Lake. For four weeks I had been in the middle of the Amazon rainforest. Harmless Piranhas in the water; they are so until they see bleeding wounds; and in the air the tall cedars, the web of the green jungle. The plane was eight days late. La Mama Valencia withdrew fifty meters, after the bush, to reflect on my questions and to question the spirits while their prayers rose dissolved in the spirals*

*of snuff. He returned and whispered: "Tomorrow at one o'clock of the afternoon came the plane." Who told you, I asked. Marandúa, who brings good news, she said.*

- *Well, one of the biggest challenges the conclusion of the fifth anniversary of the discovery of America, lies in the good responses that from our hemisphere we give to the great questions of Earth.*
- *With the arrival of Spain to our territories to meet our culture, it was accelerated the parsimonious pace of history and extended the stage of relations between nature and humans. However, it must be acknowledged that little time has been passed to establish the real balance of the coexistence of five centuries, which have met so many profound changes*
- *For Spain and Europe are, among other things, evangelize, the Laws of the Indies, the monumental undertaking of the Botanical Expedition of Charles III, and summits of knowledge of natural sciences, such as Baron von Humboldt and Cadiz priest Don Jose Celestino Mutis. Their testimonies are not even, when it comes to weigh the myriad factors that lead to measure the responsibility of human beings in the evolution of the planetary balance.*
- *On the threshold of the third millennium, the tropical rain forest and the water wealth of tropical America, summarized the richest biodiversity of the human species and the most critical support for their survival. In "Our Own Agenda", an excellent report that the United Nations Development Program (UNDP) and the Inter-American Development Bank (IDB) presented on Environment and*

*Development in Latin America abounds this truth.*

- *That reality is just beginning to creep into these impressive figures: of the 250,000 species of higher plants, 90,000 are found in tropical America. If you consider that 10% are medicinal species, 10% are industrial and 15% edible, those amount to 31,500 useful species to be exploited. At the end of 1970 only 1% of the estimated 50,000 species of flowering plants in the Brazilian Amazon had been examined to establish their chemical composition. Compared with 90,000 species of higher plants in Latin America and the Caribbean, tropical Africa contains 30,000 and Asia 35,000. The diversity of the wet slopes of the Andes exceeded that of the Amazon's plain and is source of the surplus of neotropical plant species regarding the paleotropic. There are expected much more discoveries.*
  
- *With this perspective in mind, we present to the Arab-Latin American meeting - organized by Prince Hassan of Jordan and myself, with the auspices of Expo Sevilla 92, the Club of Rome and the Santillana Foundation for Iberoamérica- the proposal "An Own Agenda for Spain, The Arabic World and Latin America" aiming to preserve the Amazon mega ecosystem by means of the creation of big scale rainforest in the Brazilian-Colombian-Venezuelan Orinoquia plain. This project is linked with the ideas suggested by Professor Lester Brown from the World Watch Institute and similar approaches for neutralizing the changes in the world climate*
  
- *I summarized in the Carmona Parador meeting in July 1990 an approach of this nature: a way to contribute to prevent the long-term desertification of the Amazon*

*Basin, home to a large tropical rainforest and the Basin of the Orinoco, who still holds the green part of its plains and the life of its surviving fauna, is to convert the second in a huge cultural biodiversity forest. According to the technical data available in the well-drained Orinoco, both in Venezuela and Colombia, there is the possibility of cultural forests with one million hectares each on average. This would create an alternative solution against the depredation of natural forest, fauna and flora would be protected and that way create a new opportunity to help extend the life of the human species.*

- *The above scenario - as regards the extension of biodiversity of the cultural jungle adjoining the forest-savanna already received an encouraging corroboration, through a study - commissioned by Gaviotas- by biologists at the Colombian National University. Initial findings point to a dramatic increase in the level of biodiversity, from the implementation of the cultural forest.*
- *Colombia is fortunate to have in Centro Las Gaviotas advanced projects in harmony between man and nature, under the visionary and ecumenical inspiration of Professor Paolo Lugari, a Colombian whom we are proud of.*
- *Gaviotas is the place not only to develop the ecological study of this mega project, but also to convert its current operating headquarters in Vichada, in the middle Orinoco region - with nearly 10,000-hectare- in Colombian Orinoco into the first major cultural forest.*
- *Before 12 October 1992, Colombia could present this symbol of what would be millions of hectares planted with*

*Caribbean pine, a native tree of our own rainforest and its best friend to save Earth's biodiversity.*

- *The Pacific Development Naval Base has a geopolitical value that goes beyond its military significance. From Bahia Malaga – through the estuaries of the Pacific to the Midwest and through the Atrato River to Urabá and the north coast it is opening a limitless horizon for the new role of the Navy in the world after the end of the Cold War. And nothing is more logical with that mission as its taking care of the open sea and the tropical rainforest that are both World and Colombian Heritage. Science and humankind in this immense genetic bank should live together facing our future from now on far away from the old depredation forms and closer to ecumenical structures.*
  
- *This time Colombia has boldly taking advantage of the wealth lying under the covering of the jungle, not abusing her and thinking about what could emerge for human health and unlimited enrichment of science. As Professor Richard Evans Schultes - Director of the Botanical Museum at Harvard University in the beautiful book "The Kingdom of the Gods", published by El Navegante says: Never anywhere was combined with such force a potential benefit to mankind, without detriment to nature and with an economic scope so clear for Colombia.*
  
- *From these considerations follow these two particularly interesting complementary projects. First the feasibility and costs study for converting large areas of the Colombian Orinoco forests for simultaneously alternative logging, and Amazon ecosystem protection, as a bridge to extend the current areas of savanna forest biodiversity. At*

- *the same time, this project could have the possibility of building a prototype of cultural biodiversity forest of 10,000 hectares in the grounds of Centro Las Gaviotas where already there are 1,000 hectares. This forest would not only be a window show desirable to present at the Fifth centenary, but an invaluable support to strengthen Gaviotas self-sustaining structure, as a technological effort probably unparalleled in the world.*
- *The second project will be located in the Pacific Naval Base, in agreement with the Colombian government, as biodiversity research center and as a database in tropical biology. The University of Bogotá Jorge Tadeo Lozano, a pioneer in marine biology and the group of Prof. Jorge Reynolds - with advanced research in biology and habits of whales, as in the Amazon pink dolphins and the fauna of tropical rivers, may well be the counterpart for this big agreement with a Research Centre of Spain, or an entity such as the Smithsonian Institute.*
- *I am asking you to authorize the immediate dispatch of a small group of specialists in this type of project, so that two groups of Colombians (Gaviotas and the Navy, and Bogotá University Jorge Tadeo Lozano, with Professor Reynolds) develop budgets and other elements for projects that could receive funding within the program of Cooperation between Spain and Colombia.*

What catches the attention of Belisario Betancur's letter to Felipe Gonzalez is the geopolitical background. The same, unfortunately, escaped to the myopia of techno-bureaucratic apparatus of the Ministry of Industry, which guided the strategies of the great celebration. If they had been able to get the background of the message, would

have been able to tell the immense opportunity that Spain was in front, with the vision that King Carlos III had in mind when he conceived the Botanical Expedition of the New Kingdom of Granada under the inspiration of the wise Mutis. Looking in retrospective and more in a situation like the coincidence of the fifth century celebration and the Rio Earth Summit, the importance of the scientific-political project was undoubtedly at the same level of America discovery. Because if the feat of Columbus gave Spain the status of the empire on which the sun never sets, the Botanical Expedition was essentially a operation to clear expansionist aims yet historically full of meaning, at a time when the world began to understand for the first time the role of economic policy in creating wealth for nations. The Physiocracy school of Francisco Quesnay, which focused the wealth of nations in the use of land, was intended to feed the obsession with the conquest of natural resources primarily related to agriculture and mining. It was clear, in view of the emerging economic school - a prelude to mercantilism and economic liberalism and then to the first industrial revolution-that the strength of the Spanish empire continue to depend on how he knew to exploit the agricultural and mining potential of its domains . For this reason, all scientific projects supported by Carlos III in America in addition to the expedition to the New Kingdom Granada had a clear vision inspired by the Physiocrats. Unfortunately for the Empire, history was not going to give much scope for developing these expansionist purposes. Because it was not long before the cries for independence began to emerge throughout the hemisphere. They were, paradoxically, inspired by the ideas which naturalists, somehow associated with the Physiocracy concepts, meant to awaken the libertarian ideals.



Spain continued to attach so much importance to botanical and mineral treasures accumulated by the Botanical Expedition, that still defeated by the liberating armies, the Spanish took him in his escape. Pablo Morillo, the cruel Peacemaker designated by Fernando VII in a war to death for re-conquering the unruly territories, was forced to leave abruptly America. But not before packing in over a hundred boxes of documents about plant anatomy, 5190 laminas and 771 botanical designs, along with 15 drawers of mineral samples with pictures and other native animals. That fact alone makes you think - however as a mere geopolitical fantasy that despite his defeat, the Spanish Empire did not give up a possible conquest which would also have the opportunity to recover a project so vitally important to keep them in the same political role. Nobody of course, could anticipate two hundred years to imagine what would be the twenty-first century world.

In the global context of the late eighties, few people as Belisario Betancur were able to suggest to Spain such items to ride on the crest of the wave. One of them was to recover the thread of the history. No one as him was so close in Colombian politics and intellectual life as much as him to the Iberian country. Not only because he was Colombian ambassador there, but for his business and intellectual links in this country. And because the Colombian State came from performing a big feat with his mega project "Marandúa" audacity comparable to that in the sixties when Juscelino Kubitschek had opened its visionary decision to open a new frontier, with the founding of Brasilia in the heart of a tropical South American wilderness. But mostly, Betancur was reopened after two hundred years, the path of the wise Mutis Botanical Expedition and picked up the great legacy of Chorographic Commission in 1850, led by

Colonel Agustín Codazzi, one of the wildest sorts of experience in Latin American territory. In these circumstances he had assumed the presidency of the Botanical Expedition II.

At the start of the nineties, all Latin American countries had their eyes on the fifth anniversary of the discovery. Colombia, of course, had special reasons to look with great expectation to a date that could mean a fundamental change in the relations between Spain and its former colonies. And no more imbued with these reasons that the former President Belisario Betancur, considered as a first order humanist in Latin American scene. No one like him in the past had been so close to the highest levels of power in the Peninsula. Not only as an ambassador of Colombia to the government of Spain. He also was indispensable participant in all forums on Hispanic culture and its diffusion in Latin America. As Head of State he had sown, under the leadership of Colciencias and National University one of the most significant milestones in the relations between Colombia and Spain, converting the second botanical expedition in the best commemoration of 200 years of the most momentous imprint from the Spanish crown in America under the rule of King Carlos III. It then created the Second Botanical Expedition Foundation with headquarters in the city of San Sebastián de Mariquita. The Foundation's main purpose was to rescue the research and findings of this grand event to generate a process of deep renovation in development strategies.

Nearly two decades later, in 2008, upon completion of the second centenary of the death of Mutis, former President Betancur, Chairman for many years of Santillana Foundation for Latin America, returned to stay ahead of the

Mutis Commission.

It was necessary of course, that the world just crossed the tunnel of the Cold War to see that the real conflict was deepening between man and his environment. It meant in the first place a challenge to achieve a new global development model with no conditioning by the roots of the Cold War. That is, far from the blind struggle for world domination in the name of opposing ideologies and back to the environment. In this race the only valid geopolitical factors were defined as desirable goals by the conflicting superpowers. Meanwhile, it became clear the growing rift between the global political system and planetary conveniences. The yawning gulf between North and South was not simply a political trick it was too a gap in the arbitrary distribution of natural resources and the detriment of Earth's balance.

#### **ASSUMPTIONS OF GAVIOTAS' PROPOSAL**

This gap was not of course a mere pretext to return complainant on the issue of colonial empires, whose first act, objectively speaking, was disturbing the ancient harmony between primitive peoples and nature. Thereafter, the crude mercantilist vision of so-called conquerors and the blind struggle to survive of the intervened cultures transit through what is known as the emergence of capitalist forms and the industrial revolution, fueled largely by the exploitation of raw materials that began to flow from the mysterious and picturesque tropics.

Who analyzes other territories with a global perspective of this rapid change in the appearance of human society, would

unexpected facets. To our knowledge, few had stopped to relate separate events that took place in a bipolar world that long time ago had created a smoke screen that prevented from perceiving the inevitable interdependence of the planet.

A hypothesis among many, which is implicit in the GAVIOTAS vision, is that basic commodities nourished humanity and allowed their livelihood. The conventional analysis was done so far on the factors of dependence that many of these products created on the developing countries. While developed economies expanded capital accumulation and increased their abysmal distance between wealth and poverty.

Mono exporting economies of the Third World represented a clear expression of this target. The so-called exchange price ratio reveals how the accounting of land wealth never properly registered negative balances, which with obvious good sense some sectors of the international community began to detect in the balance of world resources.

It was very clear how almost inadvertently it was leading to the crucial issue of biodiversity as crucial issue in our time. For this reason, the GAVIOTAS proposal after the Cold War and as a key proposal for Spain, there was no significant geopolitical factor comparable with that of biotic diversity, as fully demonstrate the Rio Conference. In terms of survival, and there cannot be a better reference, the relative value of this factor far exceeded that of any physical resource. In this context, the humid tropics, as the central reference for all Paolo Lugari approaches had to be claimed against the industrialized world, to this world that

traditionally thought of this concept only as a picturesque one. And this was after the tropics was set just as a supplier of raw materials to feed the fever of the great industrial powers.

### **A SIMPLISTIC VIEW**

The inability of the foreign ministries of the world to systemically perceive the situation of Planet on the eve of the Rio Conference, also prevented the Spanish Foreign Ministry from understanding the meaning of the Environment Summit challenge but also much closer from its historic destiny from the fifth centennial. Moreover, a look in retrospect could explain how myopic the approximation of Spain to those two stages so crucially linked was.

A simple review of the records known of the Rio Conference let us see that the contribution of Spain left no trace other than generally bland statements that highlight the vast majority of other countries. In the same line as described by the Instituto Ortega y Gasset, the focus of cooperation was provided with clear constraints of bilateral interchange and far from the vision to invite the contents of the Summit. It must be said that few countries were presented with proposals with no conditions. Which, admittedly, was a to much in a world still recovering and beginning to venture into the panacea of neo liberalism and not yet ready for a comprehensive global view. In the case of Spain came the offer of a fund to be called Araucaria and only came into action with resources that have since been applied to specific projects relating mainly to the preservation of natural heritage. It combines the action of

Spanish and Latin American NGOs, as part of the overall cooperation between Spain and Latin America mainly under the Biodiversity Convention emerged from the Rio Summit. Until 2007, Araucaria was committed to a dozen projects all with a limited scope and resources. Yearly they have not exceeded US \$30 million. However, it is far from the dimensions that might be if the V Centenary of Discovery has been taken as the starting point towards a radical change in the focus of the alliance between Spain and its former colonial possessions.

With a minimal organization, but with a mystique unmatched GAVIOTAS had recorded the following achievements on the eve of the V Centenary of the discovery:

- Application of bulk soil cement in its 45,000 m<sup>2</sup> facility in Vichada.
- Planting with mycorrhiza 1300 hectares of Caribbean pine, generating biodiversity (190 species per ha), which meant the development of minimum tillage technologies with previously unknown applications in tropical America.
- Installation and operation of an Extraction Plant for oil from a native palm named seje. This variety of tropical palm is equally abundant in Chocó bio geographical region. It has been studied with great detail in the doctoral thesis for Harvard University developed in Gaviotas by Professor MJ Balick, Director of the Ethno botany Department of the New York Botanical Garden. Its central conclusion was that the seje palm oil had characteristics superior to olive oil.

- Establishment and maintenance of 10 hectares of vegetables in inert substrates.
- Establishing and maintaining a sustainable tropical livestock.
- Design, construction and equipping of self and bioclimatic hospital for 16 beds, operating entirely with renewable energy.
- Design, manufacture and installation of thousands of solar water heaters for household or institutional use, installed in different cities. One of them a joint family in Bogotá is the largest housing project with solar energy for water heating ever built in the world (5,000 apartments).
- 6000 Design and manufacture of double effect windmills for water extraction in isolated areas.
- Construction of 700 micro aqueducts in marginal rural areas for the National Rehabilitation Plan (PRI) based on technological tools developed in GAVIOTAS.
- Design and manufacture of 12. 000 Umbrella rams for lifting water in isolated rural settlements.
- Design and manufacture of 5,000 rockers for manual water pumping to schools, health institutions and recreational parks.
- Design and construction of 2 bioclimatic houses for Colombian deserts.

- Design and construction of a technology park outdoors in Marseille (Risaralda) in the heart of the coffee region of Colombia, with large-scale interactive modules.
- Design and construction of interactive solar power modules for learning at schools.
- Design and operation of a rural boarding school for 120 children in the Colombian Orinoco region for 12 years for a total of 1400.
- Designing and manufacturing the first 80 solar cookers for remote areas.
- Designing and building a solar cooker based on thermal oil extracted from cottonseed.

## GAVIOTAS PROPOSAL FOR THE V CENTENARY

Paolo Lugari stated the better and clearer hypothesis to prop the shaky global ecosystem. His first assumption was that the causes of the ecological imbalance are primarily anthropogenic. **"In the first place, next to the greenhouse gases the essentially destruction of the skin of Earth and the vegetal life in the oceans, with the consequent alteration of atmospheric chemistry are the main causes. Deforestation of the world hit the highest point and the recovery process of the skin can only be ground with the best possible probability in the Humid Tropics, which is a huge photosynthesis plant, which is solar energy stored through the chemical processes working in nature, from biomass from which come the composition of 99% oxygen and nitrogen"**.



It is clear that the tropical regions receive more solar radiation than temperate regions. For this very fact the Tropic is also excellent for regenerating the photosynthesis. This means essentially that biological processes that feed the ecosystems have the highest potential there. From GAVIOTAS scenarios, the message to Spain - regarding the V Centenary of the Discovery of America and the meeting of two cultures "could only be referred to the deeper meaning that continues to be the landmark discovery. But at the same time as the best homage to the cultural fusion that marked the settlement of the New World, was the role that Spain could meet driving from Tropical America the regenerative process of a depleted planet.

The milestone of the fifth anniversary also coincided with the global summit an unprecedented event in human history. In Rio de Janeiro they have confirmed all the hypotheses presented by GAVIOTAS to Spain, inviting her to plant a landmark to correct the ecological footprint marked by the presence of the Old World in the territories discovered by Christopher Columbus. Paradoxically, the very symbol of that repair was embodied in the Caribbean Pine, the same variety the discoverer found on his second voyage and took him to which he called Isla de los Pinos and the Cuban Revolution named the Isle of Youth. Furthermore this is the same species that populated million hectares in Central America, and was also dispersed in the Amazon rainforest.

### **GAVIOTAS PROPOSAL**

The proposal was not improvised by Gaviotas. It was fully consistent with the global geopolitical context, it went straight to Spain's vocation to break into the global scenario

with the potential for transcendental changes, and this proposal had enormous authority. From the ecological point of view GAVIOTAS was presented as a highly desirable partner. At that time, his project was the result of nearly ten years of experimentation with the planting of Caribbean pine on approximately 1,300 hectares, exactly in the territory identified from major observatories of Earth as an unparalleled stage to recover the face of Planet. Something if you will more significant than have added to the known world an area larger than ever recorded.

GAVIOTAS forest planting was preceded by a very deep research on the conditions of poor soils, with varieties from many sources. According to Paolo Lugari, *those soils were poor material just for poor brains*. GAVIOTAS innovative technology was developed with the bare root method and application of mycorrhiza to neutralize soil deficiencies. By such means, could markedly decrease costs and increase yields in the process of reforestation. The nurseries were endowed with sprinkler irrigation systems that render more efficient the mycorrhiza inoculation, which corresponded to the symbiosis of the fungus with the root and a bio fertilization process. When fungi invade the roots of the pines became vital auxiliaries for the tree to use the soil nutrients through their filaments. It was the best way to digest. Without the mycorrhiza which also has a very low cost, would have been impossible to reach the efficiency levels achieved by GAVIOTAS.

GAVIOTAS went beyond the simple preservation of the ecosystem balance, which still remains a far distant goal in all agendas. For, viewed from the air, the ground covering was deteriorating every day. The alternative GAVIOTAS proposed to Spain was the key to a partnership with nature

which allowed not only coming back in evolution to reinstate million hectares of Amazonian primitive forest ecosystem. Jet it was also a mechanism to close the valves of fossil fuel pollution, and open the right doors to enter the era of clean biofuels. That did not constitute threats to traditional food sources jet it could be enriched by poly cultures incorporating new food species.

In GAVIOTAS proposal, after seven months in the nursery, fertilization treatment, air and ground pruning, pine is taking with bare root directly to planting machines. Using minimum tillage machinery they will be massively transplant to previously prepared areas. Through the papers describing the implementation of reforestation projects in tropical countries was not possible to see large gaps in the scope and application of costs compared to Gaviotas.

To begin with, the tropical factor enveloped GAVIOTAS model. Earth's Institute itself, by analyzing the global phenomenon of demand and production of wood in the world, stated the fact that while fields planted with corn in the United States tripled those for the same use in Brazil, the Brazilian timber operations went better than those of United States by a ratio of three to one. To meet a given demand for wood Brazil needed just a third of the necessary land span in the United States or in any country of the temperate zone. In GAVIOTAS the estimated cost to establish one hectare of new forest is the lowest you can have in the world. There is, at worst, a ratio of 1 to 5 in favor of the Tropics. On the other hand, GAVIOTAS could in large-scale cultivation couple a 160-horsepower tractor to four tillage machines that way lowering even more its costs per hectare.

In the plantation they do not apply fertilizer or irrigation. The only activity for it is a constant vigilance against fires. In 10 years the forest will be ready for use, but since its childhood it will be fulfilling its vital role in CO<sub>2</sub> sequestration and oxygen production.

In the case of the well-drained Orinoco, there is an almost immeasurable economic factor. Reforestation is here a primary impact, to achieve an evolutionary regression to a thousand years ago state, when the Orinoco savanna was not semi sterility, but part of the mega biodiversity of the Amazon. This way it could be met the most desirable principle of sustainability. Because not only was possible to create a new demand on the existing ecological supply. As a result of a conscious action on the ecosystem it could be trigger a regenerative process that not just aimed at meeting the needs of economic agents, but could contribute to increase the ecological supply for future generations.

## **MERCHANT MANAGEMENT OF V CENTENARY**

Unfortunately, the larger context was unattainable for the mercantilist conception of the celebration of V Century. Because, such an event was much more a mercantilist agenda for the Ministry of Trade and Industry, led by Don Inocencio Arias. It was much more a geo-strategic weapon to magnify the presence of Spain in the renewed international stage as part of the post-Cold War. The bureaucracy, acting from Madrid conditioned the management of \$ 500 million that Spain put in hands of the Inter-American Development Bank, to the only destination of activating trade and what has been called the second American conquest by Spain. The Gaviotas proposal, as

had been anticipated with regret by the ambassador of Spain in Colombia and as they had predicted, also with great frustration, IDB officials in Washington, was rejected. The expected explanation: it was a project that would not generate an immediate purchase of Spanish products.

Not even three months had passed since the Spanish negative when something unexpected happened at the facilities of international financial organization. Inside an office where two officers talked drinking a hot coffee, one of them put his eyes on a large volume that lay on the OUTPUT basket on a desk. That was the large volume with GAVIOTAS project whose fate was the archive for the projects rejected at the IDB. The officer who put his eyes on the cover of this large volume turned out to be a Finnish expert affiliate of the Japan Special Fund, a fund of 500 million dollars, equal to the Fund of the V Centenary of the Discovery of America. With a quick glance at the contents of the Gaviotas draft, his eyes lit up and almost instinctively said: THIS IS OUR PROJECT! And in less than three months, even without a new application, the project moved to the "piper line" Japan Special Fund, so that from TOKYO Japan's government itself announced what would be the largest individual donation Fund in Colombia: TWO MILLION DOLLARS, with this money Gaviotas made the following investments:

- Design, from one already existing facility, a bio factory of rosin and turpentine, without using chemicals in their manufacturing process.
- Purchase of equipment for this bio factory.
- 4,000 hectares planted with Caribbean pine to capture CO2

- Other activities to strengthen the physical infrastructure of GAVIOTAS
- To those 4,000 hectares planted with Japan's resources will be added 3,000 ones seeded with GAVIOTAS own resources.

With this will be opened thanks to Japan, the door for crystallizing the dream expressed by Belisario Betancur to Felipe González. It was also a clear sign that Marandúa as holistic vision and as a new border for Colombia and Tropical America could in the future enable the Colombian dream of president Betancur. And all this was in the context of Gaviotas UTOPIA. For the world to notice the huge stage of the Orinoco. There was the opportunity to create a vast bio diverse forest cover as conceived by Paolo Lugari. Where, sustainable development for men should also become an opportunity to restore the lost balance of Planet Earth.

In less than three years GAVIOTAS began transforming the landscape of endless tropical savanna dotted with gallery forests, in a green patch of nearly ten thousand hectares. In less than two years, NASA satellites began to detect this wonderful pop, it was just a foretaste of what was anticipated as a reality of global dimension.

The ex-post evaluation conducted by the Inter-American Development Bank (IADB) was successful as a report of a project in the shortest time and with maximum efficiency rarely been recorded in the annals of the institution. But above all, it was the best sign possible for those who began to look into that corner where Colombia would not dream of finding the path to reach unexpected alliances and enter

the big leagues in the world reconstruction. There was the processing plant for colophony the origin of the chain with which Paolo Lugari's ARBOQUIMICA was beginning to, as one of the pioneering innovations of greater significance in the Colombian industry.

## **B2.0 PLAN OF WWI**

In the World Economic Forum from Davos (Switzerland) in 2007, especially devoted to the effects of climate change, Lester Brown - Founder and Director of Earth Institute and founder of World Watch Institute, presented a Plan B 2.0 ("**Rescuing a Planet Under Stress and Civilization in Trouble**"). There, on the first day, former British ambassador to the United Nations Sir Crispin Tickell had warned that climate change could exacerbate the split between rich and poor and contribute to radicalize the population and promote terrorism in the most affected countries. And German Chancellor Angela Merkel, responsible for opening the discussions called for the entire international community to come closer in their positions within the negotiating process to lessen the impact of climate change, emphasizing that "a failure is everyone's responsibility".

Lester Brown has undoubtedly the greatest authority on all matters related to the planet deterioration. With scientific authorities as Christopher Flavin and Sandra Postel, Brown's trilogy embodies more credibility in the field of voices, some kind of trumpets of the Apocalypse, that have been predicting the collapse of the environmental balance.

For the World Watch Institute GAVIOTAS was not a new fact. On the contrary, on several occasions during the decade of the nineties and so far this Century, "State of the World" has referred to Gaviotas as a paradigm in the tropical world. And of course, in Plan B 2.0 one can feel the same trends. Communications giant Ted Turner called it a "masterpiece".

Lester Brown enunciated his first case before the Davos Summit as follows: *"The health of the economy cannot be separated from their natural support systems. More than half of human beings on earth made their living directly from the cultivation of land. Mountain ranges, forests, fisheries are part of their living. Many more depend on the employment in forest product industries, leather industry, the textile industries of cotton and wool, and food processing. A strategy for eradicating poverty will not succeed if the environmental support systems are collapsing. If agricultural lands are eroding and harvests are low, if water reserves are depleting, wells are drying, if the mountain ranges are decertified and livestock is dying, if the sources of fish are collapsing, whether forests are being depleted and if rising temperatures are burning crops, an eradication of poverty - no matter how carefully is designed and implemented, will be a failure. "*

And showing in Haiti the most clear and dramatic example of how all factors interact to produce the collapse of a nation, he remembers the words of Craig Cox, director of the Society of Soil and Water Conservation in the United States *"the benefits of the resources conservation, at their most basic levels, are not yet within reach for many. The ecological and social collapse has reinforced each other in a downward spiral into poverty, environmental degradation,*



*social injustice, disease and violence."*

To conclude: *"Restoring the land will take a huge international effort, much larger and demanding than the Marshall Plan that helped rebuild Europe and Japan. And that effort must be assumed in war times so that environmental degradation does not become economic decline, as happened to earlier civilizations that went through the natural boundaries and ignored their critical limits."*

For the first time in a forum of this nature, Lester Brown filed a "BUDGET FOR RESTORING EARTH." It was very difficult to think, of course, that those astronomical figures he exhibited could go beyond of upsetting the presents. Simply because the great industrial powers - which are also responsible for the highest percentage of land degradation- did not even had a budget line created to undertake such an enterprise. But also because if there are still tremendous inaccuracies in the measurement of land damage, especially in side impacts, much more are those to approach even a reliable repair budget. Although it is clear also that there is probably no one who has researched the issue as Lester Brown himself. These are the great figures of the annual resources estimated for minimum periods of 10 and maximum 20 years:

Reforest Earth	US\$ 6.000 million
Protection of agricultural land	US\$ 24.000 million
Restore mountain	US\$ 9.000 million
Restore fish sources	US\$ 13.000 million
Protecting biodiversity	US\$ 31.000 million
Stabilize groundwater levels	US\$ 10.000 million

From this reading of Plan B 2.0 it could be concluded, however, that only very few countries had made a conscious effort to recover any damage caused to nature by human action. Starting, of course with what at the late nineteenth century and in the course of the twentieth century happened in some states, such as New England, where the territory covered by forests fell from third to three quarters. However, in a country the size of the United States, it is clear that a good part of the explanation is that the vastness of its territory and further productivity gains have opened up new lands to agriculture allowed opening new land to agriculture that compensate more than is subtracted for forest recovery.

There is of course some acting through non-governmental organizations as a constant presence in the front of the certified conservation and promotion of reforestation as a way to recover the immeasurable space lost for centuries, but especially during industrial revolution and urbanization.

A more serious effort in terms of forest certification is the Forest Stewardship Council (FSC), an NGO founded in Toronto in 1993. Its objective is part of the trilogy of economic viability, social benefit and sense of responsibility on forest conservation. Its regulation and operation is moving within strict certification criteria, not just forest management, but in the relevance of the methods to extract their products and to offer them in the market. Its certification is expressed through a particular label that covers both management and food processing and marketing. However, the projection is still far from representing an alliance that goes beyond meeting standards to enable a secure border for the timber market in the world and, incidentally, contributes to the conservation of nature

as a whole.

The most remarkable efforts are revealed by Lester Brown in South Korea, China and India, where a political decision of historic dimensions has led to adopt policies to curb desertification. Millions have been hired in China to build in a 70-year project with an investment of \$ 8,000, a wall forest of 4,500 km from Beijing to Inner Mongolia. A project just comparable to the Great Wall of China and a similar historical symbolism from the point of view of its intention to restore national vitality. A project of comparable size took South Korea under the leadership of President Park Chung Hee.

According to Lester Brown in 1985, the United States Congress - with tremendous support from involved communities, created the Conservation Reserve Program (CRP) to reduce soil erosion and control overproduction of basic commodities. In 1990 there were about 14 million hectares under contract to ten years for the recovery of vegetation. With this program was reduced from 3.1 billion tons to 1.9 billion tons of erosion between 1982 and 1997. This of course based on federal subsidies.

As has happened with most of "Summits", the World Economic Forum in Davos 2006 ended without anything to happen. The climate change issue, "this central issue believed to be sufficient to produce a conscious act of political will on the part of entrepreneurs in the world, ended displaced by the phenomena of China and India. Both as a display of spectacular figures deeply significant of course for global development, opened the appetite of multinationals rather than moved environmental awareness of the audience, to which Lester Brown directed the

message. However, World Bank President, Mr. James Wolfensohn went beyond specific forecasts of the two Asian countries, to show what underneath the screen was revealed. *"We will go, he said, from 6 thousand to over 9 billion people worldwide the next half-century and most of that increase will be in the developing world ..."The rich people do not realize that their welfare depends largely from the lack of achievement and opportunities of the majority, the current risks will not disappear"*

The analytical conditions leading to a purely political vision of the planet, perceiving the phenomenon prevented much deeper in terms of overall deterioration and breakdown of many links that ignored, do not regulate the whole of an interdependent world.

## Chapter VII

### GAVIOTAS AND THE ZERI CONCEPT

*"The new green revolution is not to extract more of the land, but  
produce more with what Earth produces"*

**GUNTER PAULI**

At the end of the twentieth century GAVIOTAS paradigm had transcended Colombian borders and begun to relate to the advanced hypothesis in the academic and business world. Its affinity with the Club of Rome, the World Watch Institute and multiple publications of great authority on the model implemented in the tropical savannah of South America, soon became identified with other initiatives of global significance. One occurred at the headquarters of the United Nations University in Tokyo and was designed by a young Belgian economist Gunter Pauli, familiar with new trends in the economy of international financial services, mainly in Japan and Singapore. In this field he was co-author with Richard Wright's outstanding book about the Japanese case. ("The Second Wave. Japan Global Assault on Financial Services." Waterloo Publishers, London, 1987).

ZERI Initiative (Zero Emission Research Initiative) corresponded to a systemic view of a production model - global, regional and local - both in its interdisciplinary inspiration, and in dealing with environmental ecosystems.

Gunter Pauli's name in a few years would be familiar to a number of university departments in Colombia. EAFIT University published his book "Progress", an insightful book that anticipated many of the stages of the XXI century productive economy. Those were mainly related to reengineering process leading to a waste-free manufacturing, "after the search of zero defects (total quality management) and zero inventories (just in time), zero emissions will be the next target for production engineers". Subsequently, the CESA University in Bogotá published a Spanish version of his book "Break the Box", an invitation to step outside the conventional paradigms.

ZERI Initiative (Zero Emissions Research Initiative) represented from the outset a profound shift in the linear concept of the virtual development of applied knowledge.

Gunter Pauli had already met Aurelio Peccei President of the Club of Rome and was affected by the same concerns about what this great world leader called "**the human predicament.**" However, from the moment he contacted Paolo Lugari and experienced Gaviotas, his attention focused on the crucial importance of the Humid Tropics. And to confront his own experience in the United Nations University and the research group ZERI by then scattered around the world he concluded that few schemes provide better elements to validate the vision on integrating bio systems that the Gaviotas ongoing process for more than thirty years. There in the middle of the Colombian Orinoco region was one of the best key to achieve the desired goal of **zero emissions.**

From that moment Gunter Pauli became the carrier of this message to all academic and business settings in the world.

In 1999 he presented to Andrés Pastrana Arango Colombian President a well-documented proposal entitled "Diversification in the Tropics. A proposal for Colombia ", published by the National Learning Service (SENA) with a foreword by Cesar Vallejo Mejía, former director of Colombia's National Planning and Rector of the Universidad Autónoma de Manizales.

After the onset of the Club of Rome report on "*Limits to Growth*" and "*No Limits to Learning*", arising from the Massachusetts Institute of Technology and from Harvard University, respectively, any initiative had come so close to the human predicament facing the future. Not only from the point of view of the finiteness of the planet's resources, but mainly before our environmental catastrophe resulting from the huge volume of useful biomass unreasonably polluted by waste in thousands of production processes.

Since the dawn of the eighties, Jeremy Rifkin and Ted Howard had opened the eyes of the world with a wise premonition about the contents of high complexity in an entropic society: "No organism can survive for a long time immersed in their own waste." To these preachers, values and institutions of consumer society had reduced the "reality" just to the Cartesian view of what can be measured, quantified and tested. What in the prevailing model of development is expressed in the linear search of the benefit regardless of the consequences for environment, yet at the same time ignoring the paradoxical virtually positive of polluting wastes.

According to the above, it is clear the coincidence of emerging trends in the knowledge teaching us that the linear and mechanical view of the world goes exactly

against the governing laws of the natural balance. As Gaviotas tout within that context, the synergy of nature is entirely circular. Because in this world, everything left from an individual meets the vitally needs of another. In an endless chain that only mankind has been able to break much to detriment from nature, that sooner or later takes revenge. And almost always in a fatal form for those who mistreat it.

This circular view, not a simplistic one, is the theme of the book, in which Gunter Pauli opens the door to a fruitful science, full of feedback mechanisms and free of perverse forms of waste. The obsession with the abuse of nature is replaced by the revolutionary ways of "doing more with the same thing." The Green Revolution had the surprising effect of multiplying the food potential of a world filled with hungry crowds. The greatest of his miracles was, without doubt, to have achieved food self-sufficiency in India and the recovery of the world's food supply. However, after a few decades, the balance of the first green revolution that was an agrochemical and environmental revolution, returns us to even much greater questions about the future of world food. For the umpteenth time on a linear approach to critical areas of human problems led to the exacerbation of other environmental areas. The destruction of countless biological sanctuaries, as a result of deforestation for commercial agriculture and excessive use of bio destructives chemicals, had to lead to many breaks in the natural linkages. But it also became clear that the use of that agricultural production increased almost exponentially continued in a similarly linear model. According to this paradigm, as the only desired product in the transformation process would be profitable for the shareholders of the company, it matters little that the highest percentage of



useful biomass be thrown into rivers and streams, being one of the generators of the environmental catastrophe. The principle of "polluter pays" was a huge fallacy, because it gave the opportunity for economic conglomerates to use incomplete solutions that ultimately, always went to all consumers. We see that nature does not need such subterfuge.

By a sort of "Peter Principle" expressed at nature level, the first green revolution has already reached its maximum level of incompetence. Nor agrochemicals or genetics plant could be able to obtain sustainable land such as the human population growth will demand. Consequently, the bases of the second green revolution, as defined by ZERI may no longer be settled on the principle of extracting more and more land but to do more with what the land produces. Or mimic nature without destroying it, as already hinted at the emerging science of Bio mimicry, so seductively presented by Janine M. Benyus in her book "Bio mimicry. Innovation Inspired by Nature".

In this larger context we discover the true content of the tropics as the kingdom of biomass diversity on planet earth. Paolo Lugari anticipated that. Much more when, in the analysis of a few cases - including tens of thousands who offers the tropical mega biodiversity - leads to the overwhelming conclusion that, useful biomass is over ninety percent contaminating the global environment. Mental poverty that persists in simplistic models "input-output", "cost-benefit" and others expressed the prevailing mediocrity in the curriculum of many of our schools of economics, can only lead to worsening the state of Gaia. According to the methodology ZERI, multidisciplinary approach to the production process can pave the way to

reach a sustainable model of not destructive development. This must mean, from an economic perspective, the pursuit of optimum level of productivity is not applicable only to capital and labor (even at the expense of the concentration of wealth and increasing levels of unemployment) this optimum level is obtained from all the inputs, mainly from biomass incorporated into numerous production processes.

The proposals on the feasibility of the concept ZERI for the processing industry of the coconut palm, the African palm, bamboo, all woods and tropical fibers as sisal are very compelling. Not only from the point of view of the mass conversion of contaminants in a products source for meeting many human needs. Also for what they represent as improvement in profitability for companies that use a fraction of the available biomass, both as a form of vertical integration in the agribusiness chain, as well as the open options for new job-creating enterprises.

Photo synthesizing capacity of our tropics appears as an obvious solution. Both in the context of GAVIOTAS vision and within ZERI framework, as in the framework of the Club of Rome report on "The First Global Revolution". In each and every one of these approaches has acquired a new dimension, as an instrument of negotiation with the North. Primarily, to offset CO<sub>2</sub> emissions through reforestation projects and tropical ecosystems recovery something that defies the imagination of the world's leaders in search of new horizons for two thirds of humanity, to reach the next millennium without much hope of improving their present conditions.

All this is easily understandable in light of facts that are

becoming more predominant and could be summarized as follows:

- The production model worldwide has led the state of Earth to the breakdown of many of its natural balance and the population to inequality and poverty conditions that are not consistent with law and the real possibilities of any citizen of the world to access to minimum levels of welfare.
- Two thirds of humanity are still stuck in living standards far from any ideal of distributive justice, and hundreds of millions of people are facing extreme poverty and terrifying phenomena of genetic erosion caused in the famine and irreversible depletion of their productive land.
- Natural ecosystems do not generate waste because the waste of a species are essential food for others, matter is recycled continuously through vital networks, which ensures diversity regeneration and life, from its very beginning. Paolo Lugari has said that life did not reach the planet as a result of combat, but as a consequence of symbiotic and synergetic interdependencies. It is always the result of cooperation and not of competition.
- The best behavior in society can only be achieved when everyone contributes to the best of their abilities, and when the contribution of everyone - no matter how small, regardless of where they come from or who come from - are accepted into the ecosystem with respect, dignity and appreciation, because all contribute to enhancing diversity.
- Living systems are unique regarding feedback mechanisms (e.g. The circulatory system of mammals, the nitrogen cycle and carbon cycle), as well as its

adaptability to environmental change parameters.

- World has still untold diversity of resources and assets that have remained unused since immemorial time, underused or treated as waste, mainly due to human ignorance of natural and genetic resources.
- An approach to developing integrated systems that emulate nature, simultaneously channeling variety of opportunities when they use their synergies, for just a single technology cannot cope with the challenges face by humanity to achieve a sustainable development.
- Recovery and incorporation of the best traditional technologies in rural communities is mandatory, as well as the promotion of multidisciplinary research, to approach the development strategies.
- The creation and supply of new forms of more sustainable human life is vital, as well as the design of environmentally friendly and more socially acceptable technologies.
- Under a harmonic development within nature is perfectly legitimate to maintain the production systems directed towards a maximum benefit for shareholders, with the highest productivity of labor and capital, and adding value to all those items previously considered as waste.
- More than 1500 million human beings living in our planet are in an abject poverty, while billions of tons of biomass that could be converted into useful products are treated annually as waste. One of the priorities of Earth during the third millennium should be to rebuild and

expand agricultural frontiers for food, based on the total rethinking of the paradigms that have fueled the secular world production model and to enlarge welfare opportunities for two thirds of humanity.

- The purpose of the new generations should be directed to the construction of sustainable production systems, based on the will for global biodiversity and nurturing life which is the greatest asset for humanity. Life offers bioresources for every climate and soil type for each latitude and altitude, for every fresh water well and oceans, and for every community and every culture. Something that brings us back to the true meaning of geography as has been touted by Paolo Lugari.
- Within this new agenda for humanity it is a priority to care for and sustain the sense of urgency for quick solutions, sustainable and environmentally friendly.
- That sense of urgency must be applied in the first place for designing educational policies consistent with the major contexts all the way through the world. Our educational and research institutions at all levels should have a fresh view on all categories of bio resources in the ecosystems where they are located, with a view to the rediscovery of natural products containing the global biota, taking into account their reproductive rates and population dynamics, helping to identify varieties that exhibit the greatest potential for commercial exploitation in the short and medium term.

The Self-Sufficient Hospital in Vichada was stamped as one of the best symbols of GAVIOTAS. Similarly the concept ZERI was recorded in the minds of six million

visitors that entered into the Hall of bamboo in Expo Hannover 2000 designed by the architect Simon Velez of Colombia. This beautiful structure was a replica of that opened in Manizales city of on the occasion of the V ZERI World Congress made in Colombia in the Coffee region in 1999.

Zero-emission approach is based in a critical view of productive models of global and regional level, particularly in the field of production and use of terrestrial biomass. The first approaches are directed to agriculture, the sustainable use of global biodiversity, agribusiness and the processing of any organic waste, including most of the pollutants worldwide.

However, the ZERI concept is much more than that it represents essentially as Gaviotas does, a manifestation of systemic thinking, as expressed by the pre-Socratic philosophers 2500 years ago. Multi-disciplinary, inter-disciplinary, trans-disciplinary and even - as Paolo Lugari says-"undisciplined." Not by chance, a major nurturing source of this new flow of contemporary thought is coming from Capra, one of the pinnacles of scientific thought in the century, current director of the Center for Ecoliteracy, Berkeley. In 1995, Capra was author together with Gunter Pauli of a basic work for understanding the Zero Emissions Concept: "***Steering Business Toward Sustainability***" (United Nations University, Tokyo, 1995).

A year later, in 1996, Capra published one of his best books, "*The Web of Life*", translated into Spanish in 1998 by Editorial Anagrama, entitled "*The Web of Life. A New Perspective on Living Systems*". "That is an exquisite introduction to systems thinking, but also the fascinating

world of integrated bio systems, the large field within the ZERI initiative.

It is easy to understand that the ZERI concept goes against any simplistic and linear one. It does not fit, of course, in Cartesian or mechanistic approach. And therefore, rules out any analytical method that seeks to measure particularly unique features from its parts. The "Cartesian machine," according to Capra, "complex phenomena crumbling in parts, to understand, from the properties of these, the operation of all", he says "in nature there is no" up" neither "down" nor hierarchies. There are only networks within networks". (Op. cit.).

The ZERI methodological approach travels a different route from that Cartesian way, because it is mainly inspired by the tradition of Chinese wisdom, which coincides with the now current trends in science; in this context agencies and super organisms (v. gr. The communities of plants or animals) are measured not only in terms of its constituent elements, but also in terms of their functional interactions or interdependence with ecosystems or outline with the entire terrestrial biosphere. Which means that, in the same vein, the whole is greater than the sum of its parts. For example, at least to the layman there is some connection between the facts that mushroom production in the tropics - the great Flag Project of the Zeri V World Congress - the conversion of substrate in mushroom often exceeds 100% of the biological efficiency. This efficiency is measured by the conversion of physical weight of the substrate in final production of fresh mushroom.

As the future of food is the most critical crossroads in which humanity is in the XXI Century, nothing may be more vital in the context of the inevitable adjustments to be made to the productive paradigms. From the World Watch

Institute in Washington, the most important global health observatory of Planet Earth, Lester Brown has uncovered a disturbing perspective ("Beyond Malthus: Nineteen Dimensions of the Population Challenge," Lester Brown and Gary Gardner, Norton Press, New York, 1999).

Depletion of borders for the Green Revolution - in terms of breaches of environmental balance and depletion of agricultural soils, for the removal of organic coatings and agrochemicals adding up is a reality impossible to ignore. As has been expressed throughout the process followed by the Zero Emissions Concept, "the second green revolution cannot be done on the basis of extracting more and more from the land, but fitting more and more with what the land produces".

David S. Landas, an eminent professor of economic history at Harvard University, recently published a dense, scholarly work, entitled "*The Wealth and Poverty of Nations. Why some are so rich and some so poor.*" When unveiling one of the cruelest features that separate the affluent societies of the poorest, shows the overwhelming reality of a world when entering a new century divided like this "a third of the population paying for weighting loss, other third living to eat and one third without knowing where it is getting the next meal." Faced with such dramatic picture is evident why it is almost impossible to bring peace to this world. For Colombia, a production model with equity, not just for clearing the future food for two thirds of humanity, but to ensure quality of life for all is essential. HANNOVER EXPO-2000, the popular World's Fair with the participation of most countries in the world, managed to join very well the meaning of that challenge by calling the community of Nations (were present 180) for systemically



combining the trilogy Nature, Sci- Technology and Quality of Life. The Pavilion ZERI Andean Biotropica was in this German city symbol of Colombia, but also from the whole tropical world, which is also the stage from where it continues to project the Gaviotas vision.

## EPILOGUE

*"The sun lights for all of us"*

**PAOLO LUGARI**

It is necessary to repeat, at the end of this book, that it is essentially inspired by one of the favorite statements Paolo Lugari's: "A text without context is a pretext." That is the same which for almost half a century have been validated by all the facts. The same as in Latin America and of course in Colombia, paradoxically, is far less understood by many leading sectors of the Academy and still distant from the theory and political praxis.

The tour "through Gaviotas ages" has shown an impressive relevant context. The emergence of this unusual phenomenon in a remote part of the Colombian Orinoco, "far from everything and next to nothing", was from the start an indecipherable enigma half unfamiliar for the intellectual milieu not used to such challenges; as it was for a society seemingly satisfied, the freedom wave in the sixties. After more than forty years of existence, the GAVIOTAS original vision has become a compelling paradigm; and more than compelling, impossible to evade. However, what gives value to this visionary phenomenon, is not just the evidence offered by the present facts, but what at that time the anticipatory audacity Paolo Lugari's meant.

As can be seen throughout this book, the construction of a reconciliation project with Nature, precisely in the center of the Wet Tropics, where the challenge seemed just to subdue the wild environment- Gaviotas showed the feasibility of learning to imitate it- and that went far beyond the adventure. This was initially based on renewable sources of energy that meant being many decades ahead of that thinking anchored in the deformed Cartesian ideas, completely disconnected from Pre-Socratic and Aristotelian sources of an organic vision. Not only was that way of thinking tied to the same outdated and polluting energy sources of the first industrial revolution of the eighteenth century, but also quite oblivious of the terrible symptoms of GAIA. Meanwhile, against all the trends, Gaviotas provided a renewable energy realm defying all conventions. It was therefore obvious that his message was in opposite direction to a thought attached to the mandate of "torturing and enslaving nature", in the manner of Sir Francis Bacon, one of the supposed precursors of so-called scientific method, and therefore intellectual of the first industrial society.

In as recently as October 2006 date, a view from the highest levels of global foresight caused, among others the following opinion about the presence of Gaviotas in the dawn of the XXI Century "*Gaviotas projects are not designed for true or prefabricated orthodoxies. They not only challenge the common wisdom, but fits on the identification of new truths that emanate from the people and local circumstances and to act on them. That is something that requires a broad understanding of the fundamental things, while one patiently will reach the bottom of the issues themselves.*" This is a statement issued by a report signed by Anders Wijkman, Member of the

Swedish Royal Academy of Sciences and the European Parliament; by Ricardo Sanchez, Regional Director for Latin America and the Caribbean of the UN Environment Programme, and Wilenius Marckku Professor, Member of Executive Committee of the Club of Rome and Professor of Future Studies in the School of Business at Turku (Finland). This document basically goes into the model of reforestation and "arboquímica" applied in almost ten thousand hectares of reforestation in the Colombian region of El Vichada, which is part of a systemic project. And from its consolidated force, is rated as high importance to extend it in the first instance, three million hectares in the eastern plains of Colombia and 250 million hectares in the rest of the South American savannahs.

We live in a global society with abysmal contrast between one-quarter of humans consuming and hyper-consuming and three-quarters that barely survive on two dollars a day. These "truths emanating from the people," from those the report referred to have ultimately inspired the GAVIOTAS accent on what over more than four decades, Paolo Lugari called *"the development of a communicative intelligence tending to assimilated more the necessary things into the community than just what it would want. In other words turning sensible and desired the necessary things because it does not buy these ones for buying accessories things"*.

One of the inescapable conclusions of any attempt, of having a retrospective vision of GAVIOTAS history as this book has, is the contrast presented between the vision of Paolo Lugari and his intellectual audacity that accompanies it, and the indifference of his country and the complete

absence of political will to take the risk of accompanying him on his efforts. Craig Venter, who inspired the human genome project, described very well this phenomenon of back down before innovative ideas, "we have a government system so afraid of taking risk that it just *commit to projects of a sure success.*" This is something that somehow explains the vicious cycle of poverty where paradoxically the poor people move in the Humid Tropics. Breaking this vicious circle is an essential part of the strategy of Gaviotas. Because from the Tropics rationalization the sustainable growth we will achieve becomes the way for gradually increasing the proportion that corresponds to the poor people. By Paolo Lugari something can only be conceived within the equation population, resources, nature, science and technology.

Throughout the period covered by this book - without interruption for five decades - Paolo Lugari has emphasized its central diagnosis: *"if we do not make tropical science, over here where there is an obsession about technologies designed for countries with four seasons, we will perpetuate poverty. Or at least, we will close the doors to appropriate and advanced technologies that could break the vicious cycle of poverty in vast pockets of tropical territories"*. Although it is not just that, the testimonials from this book and all the GAVIOTAS experiences, indicate very clearly that the biological wealth from the Humid Tropics as a balancing factor represents the biggest impact on the global ecosystem, which evolved into the crucial reserve for the very survival of the planet. Not only because it provides and can continue to provide a lot for Earth's atmospheric balance, but for what still keeps for GAIA survival factors. **In the same vein, Paolo Lugari hypothesized the TROPICAL concept as a transversal**

**element indispensable not only in educational curricula, but also as an obligatory reference to technology and science in the global Academy.**

In the middle of the scenarios in which GAVIOTAS has anticipated pioneering ideas that go into the bottom of the messages sent by Earth on its potential problems, is the assumption about the loss of the planet skin. Paolo Lugari has created and proved on the Tropics the hypothesis that Nature has the inherent capability to regulate itself, in a constantly circular process that evokes the miracle of autopoiesis. That is part of the implicit feature in virtual self-regulating living systems. **Paolo Lugari demonstrated that ability to interact with the organic conception of the universe, allows him to look into the future communities in that "they will generate well-structured connections between individual and community, based on the freedom to build a culture with continuing creativity, and do not forget the vitality and permanent quality of life and happiness established upon values that transcend the purely economic. Because the community must be a collective work of art. "This conviction about the vital forces inherent in GAIA is what makes GAVIOTAS rise above an environment in which, in the words of Paolo Lugari, "science and computer technology have given us all kinds of communications and data access but have not encouraged our relationship with Earth itself, as if we were turning into aliens. Science and technology, which aim to heal and to benefit, are creating conditions for a society that is making sick its host and its guests."**

GAVIOTAS has not only been at the forefront of the concept of sustainable development. Reading this book can

lead us to conclude that from the very start point Paolo Lugari's thinking defied all rooted preconceptions ruling out any hypothesis about the finite nature of Earth's resources. When the Club of Rome launched his warning about "The limits to growth", five years had already passed since the assumptions on renewable energy and appropriate technologies for interactive and non-aggressive nature, had been validated in a community from Los Eastern Plains of Colombia. And we must remember also that the model of Massachusetts Institute of Technology was simply a tool and only served to project a time line progressive depletion of world resources. The first report to the Club of Rome just stated the "problematic" and had not yet reached that "The First Global Revolution", two decades later, would call the "solucionatic." Amory and Hunter Lovins, Ernst von Weizsäcker, produced in 1997 "The Factor 4. Duplicate the Welfare with half the Natural Resources "as the report that harder faced directly the challenge implicit in the finitude of Earth's resources.

The Rio summit exposed the reality of the planet. A situation systematically ignored by much of the international community and the business world, yet it was in the mind of humanity, especially since the dramatic called from Rachel Carson and Barbara Ward, with "Silent Spring" and "Only one Earth", respectively. **On the eve of the XXI Century Paolo Lugari had already discovered the vast territories of the tropical savannahs. But he had moreover begun his productive occupation in harmony with the mycorrhiza, which was like the great accelerator compatible with the energies of nature, to return in the evolution at the time when tropical savanna ecosystem of the Amazon jungle was no more part of it yet become a vast plain crossed by gallery**

**forests. There, by a miracle that only occurs in nature, lay dormant for millions of years a huge seed bank. It only required the innovative genius of Paolo Lugari, armed with appropriate technology for the tropics, to launch an unexpected latent potential to recoup the disappeared forest ecosystem caused by phenomena so far not sufficiently decoded.**

What more powerful attracts attention is than even the most recent reports on the phenomena of climate change are not going beyond recognizing and recording their underlying causes, and of course, the responsibility that corresponds to human action. It is clear, however, that all recommendations are addressed primarily to offset deforestation processes whose critical points are located in tropical regions. At the same time, it showed the dominating concern in countries with higher levels of industrialization that are looking for alternative sources of energy different from fossil fuels to diminish CO<sub>2</sub> emissions. The steps from the United States, some countries of the European Community and China, have sufficient scale to expect an impact of some significance in the medium and long term. However regarding reforestation and forest conservation there is a high degree of uncertainties and this is very worrying. Both the Stern Review on the economics of climate change and global warming, as the timid decisions regarding recommended incentives to accelerate action against deforestation and, above all, to strengthen CO<sub>2</sub> capture programs, demonstrate that the international community is not going beyond the pure formulation of good intentions. Advances have not been able to become relevant in terms of streamlining operations, mitigation of CO<sub>2</sub> emissions by decreasing the rates of deforestation, let alone in incentives for reforestation and even in the simply



protective actions of existing reserves. It is striking for example the impotence shown by the more advanced countries before the dramatic increase of destructive fires of hundreds of thousands of hectares of forests, as a demonstrated consequence of climate change.

As a demonstration of the still existing gap between the rhetoric of the statements and policy decisions are the ongoing discussions on alternatives for the change of the Kyoto Protocol on the deadline 2012. Because it is not clear yet even something as basic as developing countries being eligible for clean development mechanism (CDM) projects related to conservation of native forests. One can still appreciate the narrowness of vision when addressing climate change, in contrast to the visionary context framing Gaviotas achievements – as we see through the sight from this book-. For none of the sources consulted are aware that there has been a single hypothesis that is placed in the same perspective as Gaviotas is. Because its hypothesis is based on the recovery of an ecosystem such as the tropical savannah, spanning the Amazon ecosystem recovered through reforestation, which not only generates biodiversity and contributes to the capture of CO<sub>2</sub>, but can continue to serve as protective belt of the huge reservoir of biodiversity essential for the protection of life on the planet. Yet, it also opens the way into clean energy; so the world can recover its atmospheric balance, because in its current state, the atmosphere places the human species at a crossroads with no apparent exit.

From the first thousand three hundred hectares planted with Tropical pine - that unleash a process of multiplication of biomass and biodiversity transferring from gallery forests to reforested savanna - Paolo Lugari *"began to*

*validate his hypothesis back to an ecosystem that was part of the Amazon rainforest. Then, by expanding the area reforested by some ten thousand hectares, the first steps in structuring a major chemical pine and using the multiplied biodiversity, made the giant step of designing a biofuel based on pine resin. Very few in the middle of Colombia and many others abroad have perceived the significance of this progress in the heart of the Humid Tropics. However, for no one is as clear as for the founder of Gaviotas, that within this global systemic interdependence, a political will applied to models of the same or similar inspiration, could become key for changing the processes that are contributing to global deterioration”.*

*From a systemic perspective, the Barbara Ward approach, Paolo Lugari always assumes the organic indivisibility as the only way to ensure human environment.*

*One of the recent most shocking testimony on the state of Earth, you can read in the book "A Climate for Life: Meeting the Global Challenge," published by CEMEX and guided by the highest scientific authorities on climate change. The foreword written by Professor Edward O. Wilson and actor Harrison Ford, sum up their scope: "The central message of A Climate for Life is that the environment is a comprehensive package that can not be stabilized, restored or care for parties. You must stop the deterioration of the planet on all fronts, with the implementation of intelligent and coordinated actions, which give equal attention to the small components of the natural ecosystems as a whole”*

*Each of the scientific authorities that contribute to the content of this book and all together, from their own*

*universal observatories, send a message that seems to sound more as an apocalyptic trumpet, yet is the harshest reality scientifically proven. That message is summed up in the fact that the current concentration of atmospheric CO<sub>2</sub> (the main cause of climate change and essentially generated by deforestation and fossil fuels) is located at 380 ppm (parts per million of air gas mixture) , growing at an annual rate that is about to reach 3 ppm per year.*

The most visible action of a world leader, possibly for being geographically closest, is that of President Barack Obama who, as an essential part of its massive economical rescue package for the U.S., including over US \$ 150,000 million for the exclusive purpose of leading the model to renewable energy, mainly wind and solar. However, he acknowledged with great honesty that China has taken a leading position, with the announcement of a gradual break with the present model of its industrial development, based primarily on coal as it was the first industrial revolution in the West during the eighteenth century. For the same reason it has been placed on second, after the United States among the countries with the highest emission of CO<sub>2</sub> in the world.

With the global economic crisis there are also gigantic dilemmas for hyper consume societies posed by climate change and persistence in the use of fossil fuel. Within a widespread economic depression, there are many challenging circumstances that go just beyond expectations of seeing the pace of global economy recovered. The first one relates primarily to the new consciousness appropriate to an inextricably interdependent world about the vital need to interact in terms of survival, not only in terms of global governance and economic stability within cultural diversity, but mainly of the essential balance of life on earth.

Moreover the realization that the prerequisite for sustainable economic recovery is inevitably in its conversion to revamped models of production and consumption. Much more when there is no doubt that the planet problems in large proportion, are owing to causes arising from human action.

Are the industrial countries ready to abandon fossil fuels as major energy suppliers? The attempt appears to begin now to tax the coal consumption not only for making it more expensive but mainly to force the use of new technology to reduce their polluting effect. One of them is its gasification, another to capture carbon dioxide emitted by its combustion, to return it directly in liquid form into the bowels of Earth. However, these developments are still slow and in the meantime, climate change does not stop. According to reports released by these days, over the past two and half years more than 80 coal plants in the United States have been voluntarily closed or have been denied permission to run by state regulatory authorities. And no wonder, because more than 600 power plants driven by coal in this country are responsible for almost one third of CO<sub>2</sub> emissions and sustainability is becoming increasingly uncertain. To the extent that recognized leaders such as former Vice President Al Gore, Harry Reid, the head of the Democratic majority in the Senate, and Eric E. Schmidt, President of Google, have become the main promoters of a wide moratorium on new coal plants in America.

Truth is that, among fossil fuels coal is on top of the list of fuels aimed to be eliminated. Because although the technology called carbon capture and storage to achieve the expected development, comparative cost would remain very high compared to other alternatives, including those

much more wanted, those that are renewable. According to the plan designed by the director of Google, by the year 2030 the U.S. economy could have been released almost completely fossil fuels. All coal-fired and half of the energy generated by gas, would be replaced by wind and sun, and in part by other sources such as geothermal.

Paolo Lugari was a world pioneer in bringing into the city technologies for using solar energy for water heating. Photovoltaic solar energy for power generation was and still is a significant development in other countries. However, Colombia was able to show in the eighties solid facts, based of course on a proven technology and below the costs of conventional energy, including hydropower for heating water, which is the largest energy component in the energy bill of the family expenses in cold weather cities and the temperate zone. However, the main ingredient at that time was not so much the available technology, but the political will applied to a development strategy based on the construction of housing for middle and lower strata of the population. By this means and financial instruments available, the cost of solar water heaters joined the mortgage. Within this framework, the impact of the monthly amortized cost of the heater was for just a fraction - between half and one third-from savings on the monthly bill paid by families that were before 100% dependent of the companies providing electricity service. In other words, the household saving achieved in the warm water, not only served more than enough to amortize the long-term credit for that purpose, but left room for other household expenses. In a housing estate as Tunal in Bogotá, with nearly 5000 apartments built by the Banco Central Hipotecario (BCH), this continues after more than 20 years of installed solar thermal heating.

Toda la energía generada por carbón y la mitad de la generada por gas, estaría siendo producida por el viento y el Sol y, en parte, por otras fuentes como las geotérmicas.

Paolo Lugari fue pionero mundial en traer masivamente a la ciudad las tecnologías para el aprovechamiento de la energía solar para calentamiento de agua. Por otra parte, la energía solar fotovoltaica para generación eléctrica tuvo y sigue teniendo desarrollos notables en otros países. Sin embargo, Colombia pudo mostrar en los años ochenta hechos contundentes basados, desde luego, en una tecnología suficientemente probada y a costos muy por debajo de las energías convencionales, incluida la hidroeléctrica, para calentamiento de agua, que es el componente energético mayor en la factura energética familiar en las ciudades de clima frío y en las de estaciones. Sin embargo, el principal ingrediente en ese momento no fue tanto el de la tecnología disponible, sino el de una voluntad política aplicada a una estrategia de desarrollo basada en la construcción de vivienda para los estratos medios y bajos de la población. Por esa vía y con los instrumentos financieros disponibles, el costo de los calentadores solares de agua se incorporó al crédito hipotecario. Dentro de este esquema, el impacto del costo de amortización mensual del calentador apenas correspondía a una fracción –entre la mitad y una tercera parte– del ahorro en la factura mensual pagada por familias que antes dependían 100% de las empresas prestadoras del servicio de energía eléctrica. En otras palabras: la economía familiar lograda en el calentamiento de agua, no solo servía más que suficientemente para amortizar el crédito a largo plazo para este efecto, sino que dejaba margen para otros gastos del hogar. En una urbanización como la de El Tunal, en Bogotá, con casi 5.000 apartamentos construidos por el Banco Central Hipotecario (BCH), esa situación se

Paolo Lugari designed and implemented the paradigm. Demonstrated in due time, with a persistent political will, a country like Colombia could without great effort reach a widespread use of solar heaters to the point of getting a solar thermal power generation equivalent to at least 20% of total amount.

The experience of the eighties showed that Colombia could lead a movement of unsuspected dimensions toward the massive use of renewable energy. It was evident that neither the cost of technologies nor the availability of resources was the limiting factors. Within the total housing price, the cost of the heater did not exceed 5%. From this circumstance could be a comprehensive housing policy that not only commit the Government, the financial sector and home builders, but also the power generation companies. A measure of government to force incorporate in the homes financed by the financial sector a solar heater, it would create for itself a stimulus to generate a wide range offer, not only from private industry, but also from their own power companies that would have in the production of heaters a profitable line. Given that a significant proportion of the energy consumed by households is for heating water, the savings generated by lower monthly energy bill not only contribute to the repayment of loan mortgage for the solar heater, but leave additional availability for savings or for household consumption.

Within this context, Paolo Lugari kept advancing until, at the beginning of the XXI century, he built in Bogotá the first biofuel plant-based on crude African palm oil, which caters the operation of transport equipment and power generation of Gaviotas. But he went even further with the use of tropical Caribbean pine oleoresin by a physical

process that leaves no residue, makes all the biodiesel (100% unmixed) currently consumed in Gaviotas, Vichada, replacing the previous and coming, as it said the African palm.

Moreover, with the same oleoresin is produced biofuel which operate at a rate of 30%, the three gasoline vehicles (type Otto) Gaviotas offices in Bogota.

In a lecture to the National Colombian Academies of Physics, Exact and Natural, Medical and Geographical Sciences in November 2007, Paolo Lugari makes the best summary of what could be a Colombian response of global span to the integral vision dramatically devastating of the climate change condensed in the book of CEMEX:

- 1. The biodiversity forests, where more than 180 native species have emerged, forming corridors that add to the existing gallery forests, are the best sanitary shield. It is the antinomy of mono specific forests that require external aid for its existence and maintenance. In addition to the sadness that creates uniformity. I believe even less in a standard culture, a little rich, where all will be as similar as boring. It is almost a clone.*
- 2. This experience of biodiversity and this way of thinking can serve as inspiration for a development of about 250 million hectares similarly ecological only in South America, including all the high plains, including the high plains of the Orinoco in Colombia.*
- 3. Hopefully in the future inspired by the forest we can find a perennial agriculture with deep roots and spread through a mycological mantle.*



4. *The proposal of GAVIOTAS in this area, tending to the decentralization of energy, is:*

- *The palm or other vegetable with oil qualities should be planted in non-forest areas, without felling a single tree or to occupy for any reason food production land.*
- *They should be planted mixed with other tropical forest and food species, not a monoculture, and allowing the emergence of native vegetation in the grove and isobosque to strengthen biodiversity, which in addition will be the best health protection.*
- *Simultaneously investigate the use of native flora of the Orinoco, for the production of Biodiesel.*
- *Establishment of 300 Biodiesel plants in the country, because its technology can deliver this biofuel directly to consumers. It is important to note that the cost of transporting ethanol, for example from Valle del Cauca to Bogota, accounting for 35% of its final value. In addition, this achieves the economic returns to remain in the town and the region.*
- *El Centro Las Gaviotas, since its inception, is working in the area of renewable energies, the most important application of solar energy for water heating, having so far installed 35,000 units corresponding to 70,000 square meters of collecting area, equivalent to an installed capacity of 52,000 kilowatts.*
- *Gaviotas Power in Vichada, as well as Biodiesel and micro hydropower, is supplied through the sun and wind and wood energy plant of 200 kw, which is fed*

*with the biomass resulting from thinning and pruning of the forest.*

- *In the area of biofuels we must be attentive to the sounds of the not too distant future, that can produce radical changes, such as cellulosic ethanol, biodiesel from algae and, especially, the sound of Craig Venter, a geneticist and biologist from United States, founder of Celera Genomics and one of the pioneers of human genome sequencing. If it is true the hypothesis of a synthetic bacteria, he would have succeeded in creating a biological frame, which could be added to groups of genes to produce fuels such as hydrogen and ethanol.*
- *All rural architecture are built by GAVIOTAS bioclimatic technologies applied to the Humid Tropics, producing significant savings in air conditioning and shaping the design appropriate for the equatorial environment.*

To this Paolo Lugari has recently added a step of great importance, getting a new biofuel for diesel engines derived from pine resin. According to the verified evidence and after months of operation, we have obtained a biofuel more efficient and less polluting than made from African palm.

*“The most intriguing reference to Craig Venter, now president and founder of J. Craig Venter Institute (JCVI) in Rockville, Maryland, (USA,) is that very recently, after Paolo Lugari made this previously reflection this scientist confirmed his hypothesis that, in the way of his research on synthetic biology, he is almost certain of making renewable energy from living organisms designed to harness sunlight*

*and "having the ability to self-replicate ...in the long term we look forward to alternative energy sources previously unthinkable. The creation of synthetic bacteria can help to combat climate change, by obtaining biofuel alternative to petroleum and coal"*

In his obsessive goal to open roads to clean and renewable energy solutions, Paolo Lugari has advanced almost alone - at least in tropical environment- always looking for adequate solutions technologically highly developed. But always thinking the poorest communities can afford them. In his mind there is a recurring dream: *"the crisis of useful energy will be overcome when the ingenuity of man could develop a low cost battery, a battery based on a solid very light element such as lithium. We are not facing an energy crisis but a crisis of imagination and enthusiasm."*

Throughout this book it is clear the pioneering role played by Paolo Lugari in the formulation of valid hypotheses about the problems of Earth. The most authoritative observatories of the state of the world have awarded his outstanding protagonist. Presently when all the emphasis is given on global warming caused by the increase of carbon dioxide, Lugari maintains its persistence on the urgency of addressing a problem that he considers much more substantial from the point of view of the sustainability of life on the planet. As we have seen through the many testimonies of authority included in this book, the large gaps in the decisions to be made in the main summits about global environment are manifested in the moment of addressing problems of deforestation and all those phenomena that accelerate what Paolo Lugari calls the baldness of Earth. According to this hypothesis, the high priority would be protecting the biochemical composition

of the atmosphere and its behavioral pattern, referred both to the indicator of CO<sub>2</sub> but principally to the amount of biomass covering the ground and the preservation of plant life in the oceans. Because on the amount of biomass depends currently the percentage of nitrogen and oxygen of 99%, according to him, it seems that there is insufficient awareness of this crucial factor for the ecosystem balance will eventually be more expensive to restore, if known to be on time for rational solutions possible.

Lugari, as a visionary in his lectures is emphasizing *"that the energy to extract it is to be planted."* So has maintained that *"the importance of biofuels lies not only in production but in the fact that forces us to sow the land to obtain, which results in the recovery of the skin of Earth, thus increasing biomass ultimately depends, as we have mentioned several times in this book, the dynamic stability of the current atmospheric composition is 99% nitrogen and oxygen, and this composition would make it impossible altered human life"*

At the end of the first decade of this century, when the dimensions of a crisis that shook all the structures is already inextricably linked to climate change and global warming, the sustainable development has become more than just a rhetorical game. Looking to the Humid Tropics, Ashok Khosla, President of the Club of Rome, does not hesitate to say: "There is an exemplary project in Colombia, which is not only self-sustaining but has managed to turn the savannahs into tropical forest in Vichada.

There is no doubt then that GAVIOTAS started ahead of developed countries-from the heart of the Tropics "to diagnose the crisis of planetary sustainability and act on it with their thinking and their practical achievements from its microcosm in the Orinoco Basin. That is expressed by this phrase printed on the wall of the headquarters in Centro Las Gaviotas in the Colombian Orinoco, flown at high altitude for the seagull that flies higher:

*"MATURITY IS TO BE PERMANENTLY MAKING  
DREAMS COME TRUE."*

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# APPENDIX

GAVIOTAS achievements  
photographs



Partial overview GAVIOTAS - Vichada, Colombia



Airmail stamp honoring Center Las GAVIOTAS  
Colombia 1983



Overview of GAVIOTAS Headquarters in Bogotá



Overview in Vichada of gallery forest and savanna



GAVIOTAS airport in the middle of biodiverse forest





Aspect of the natural tropical water bottling from underground source in GAVIOTAS sustainable forest. It was before the autonomous hospital



underground ducts for venting the natural tropical water bottling in GAVIOTAS



Corridor inside the tropical water bottling in GAVIOTAS



Extraction of GAVIOTAS natural tropical water by windmills with double effect above the springs



Tropical water reservoir GAVIOTAS



Natural tropical water bottles GAVIOTAS assembled in a system similar to Lego



Natural tropical water for WOK restaurant



Recycling water bottles for GAVIOTAS housing wall construction



Solar cooking thermal oil GAVIOTAS



GAVIOTAS solar clothes dryer



Solar water distiller GAVIOTAS



Hydroponics GAVIOTAS, Vichada



GAVIOTAS hydroponics in poor neighborhoods in Bogota



Bioclimatic house GAVIOTAS Vichada



Bioclimatic house GAVIOTAS Vichada



Bioclimatic house GAVIOTAS Colombian Guajira





Factory aspect of GAVIOTAS solar water heaters



Factory aspect of GAVIOTAS solar water heaters



First GAVIOTAS solar water heater in  
Vichada



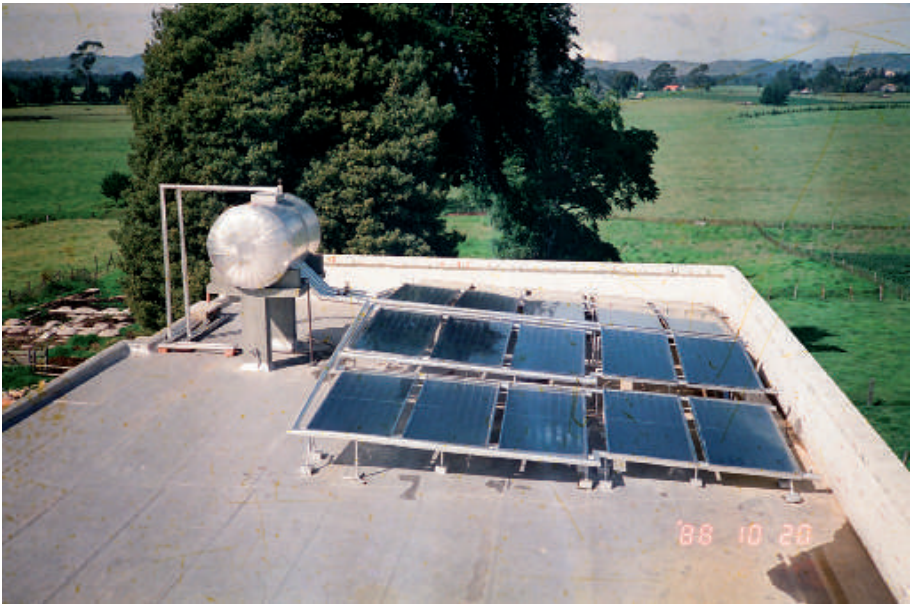
GAVIOTAS solar installation of water heaters in the Nueva  
Villa de Aburrá urbanization in Medellín city



GAVIOTAS solar heaters installation in Niza VIII Bogota



GAVIOTAS solar heaters installation in Ciudad Tunal, the biggest in the world in Bogota



GAVIOTAS solar installation in a children protection house Bogota



GAVIOTAS solar water heaters in Nueva Santa Fé condominium



GAVIOTAS solar water heaters installation in Mederi Hospital Bogota



GAVIOTAS solar water heaters installation in Mederi Hospital Bogota



GAVIOTAS solar heaters installation for 1.100 apartments



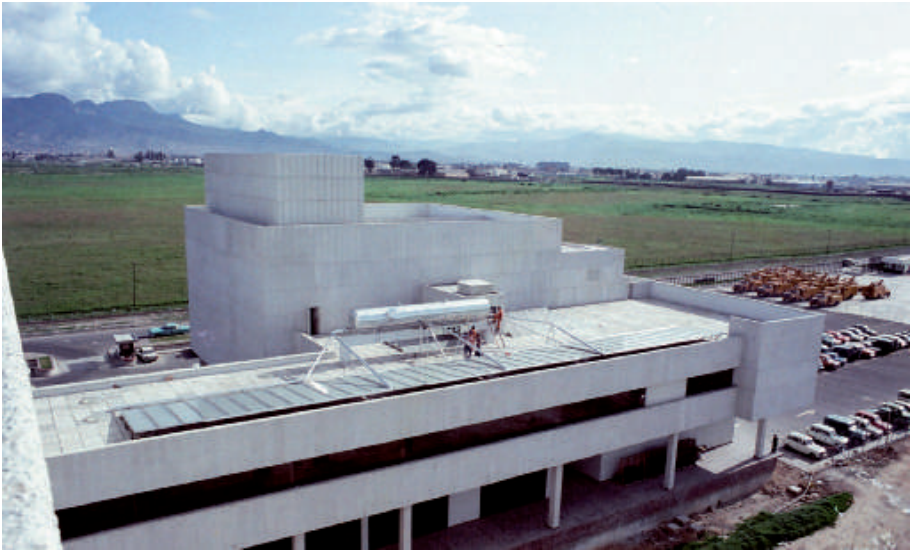
GAVIOTAS solar water heaters American Embassy  
Bogota



GAVIOTAS solar heaters installation in an elderly home



GAVIOTAS solar heaters installation in a religious community, Cali City



GAVIOTAS solar heaters installation on the cafeteria at Electric Power Plant Company Bogota



GAVIOTAS solar heaters installation in a Bogota Hotel

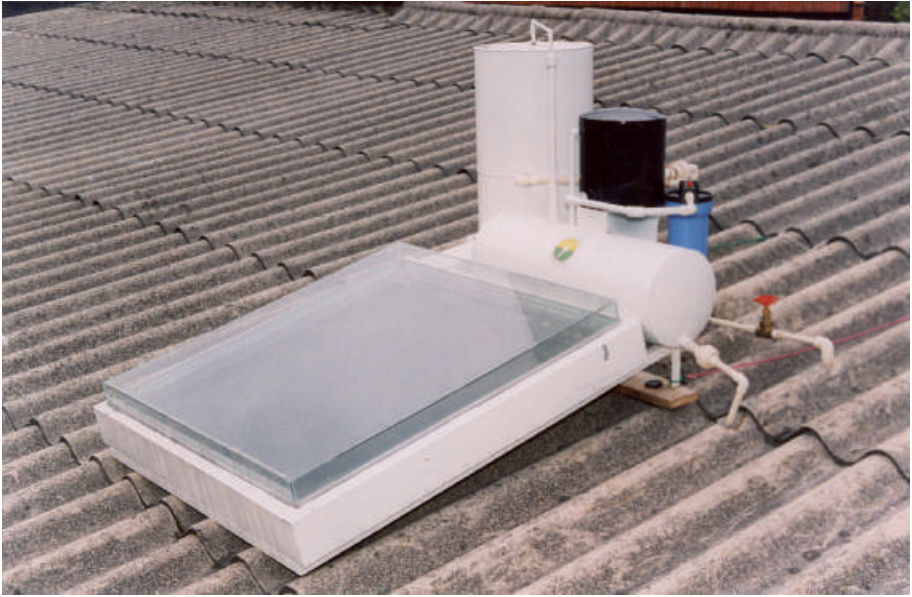




GAVIOTAS solar heaters installation in a health care center from social security, Bogota



GAVIOTAS solar heaters installation in rural area Tenjo



GAVIOTAS Compact solar boiler



Solar space heating by radiant floor in GAVIOTAS office in Bogota



Manual machine for bending sheets used in GAVIOTAS tropical double effect windmills



GAVIOTAS tropical windmill double effect for water extraction



GAVIOTAS sleeve pump for extracting water



GAVIOTAS micro-acueduct with sleeve water pumps



GAVIOTAS remote control pump for extracting water



GAVIOTAS Ram pump to draw water



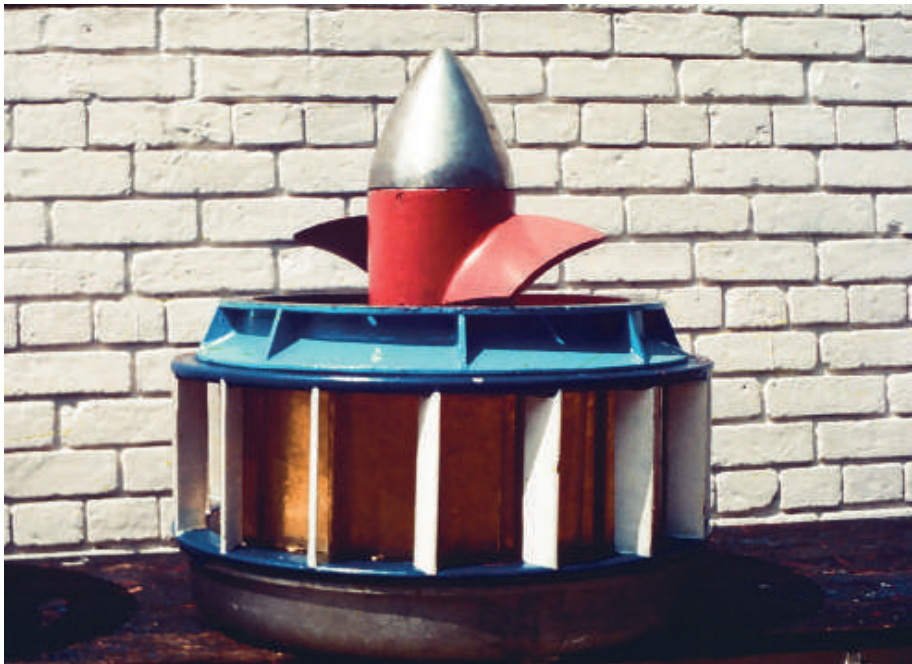
GAVIOTAS micro acueduct with ram pump



GAVIOTAS see-saw pump for water extraction



GAVIOTAS hidraulic micro turbine 1Kw



GAVIOTAS hidraulic turbine for electric power with a small waterfall



Dam and powerhouse of GAVIOTAS hydraulic electric turbine to generate electricity with low waterfall



GAVIOTAS hydrostatic pump to draw water





GAVIOTAS hydrostatic wheel to draw water



GAVIOTAS type pipe manufacture



GAVIOTAS module for teaching, Vivaciencia



Panoramic view in playground Vivaciencia, made by GAVIOTAS



Solar interactive module for water heating made by GAVIOTAS



Hydraulic interactive module in a playground made by GAVIOTAS



Aeolian interactive module in a playground made by GAVIOTAS



Teaching explanation in an interactive aeolian module in Vivaciencia playground



Satellite dish as interactive module in playground  
by GAVIOTAS



Explanation of the interactive satellite dish module



Interactive module of turntable in a park of Vivaciencia built by GAVIOTAS



Interactive module for waves in a Vivaciencia playground by GAVIOTAS



Dam from gabions made by soil-cement in GAVIOTAS caribbean pine nursery



Machine for constructing terraces in the tropical caribbean pine nursery at GAVIOTAS



Caribbean tropical pine seed sowing at GAVIOTAS



Micro sprinkler irrigation of tropical pine nursery,  
GAVIOTAS





Tropical caribbean pine nursery with two months seedlings at GAVIOTAS



Checking the density of the tropical caribbean pine seedlings at GAVIOTAS nursery



Measuring the height of the seedlings in the nursery, GAVIOTAS



Measuring the diameter of the seedlings in the nursery,  
GAVIOTAS



Machine rebuilding the terraced caribbean tropical pine nursery,  
GAVIOTAS



Lateral pruning of the roots of tropical caribbean pine seedlings in  
the nursery, GAVIOTAS



Pruning the roots of the tropical pine seedlings  
caribbean in the nursery, GAVIOTAS



Trimming tops of the tropical caribbean pine seedlings in  
the nursery, GAVIOTAS



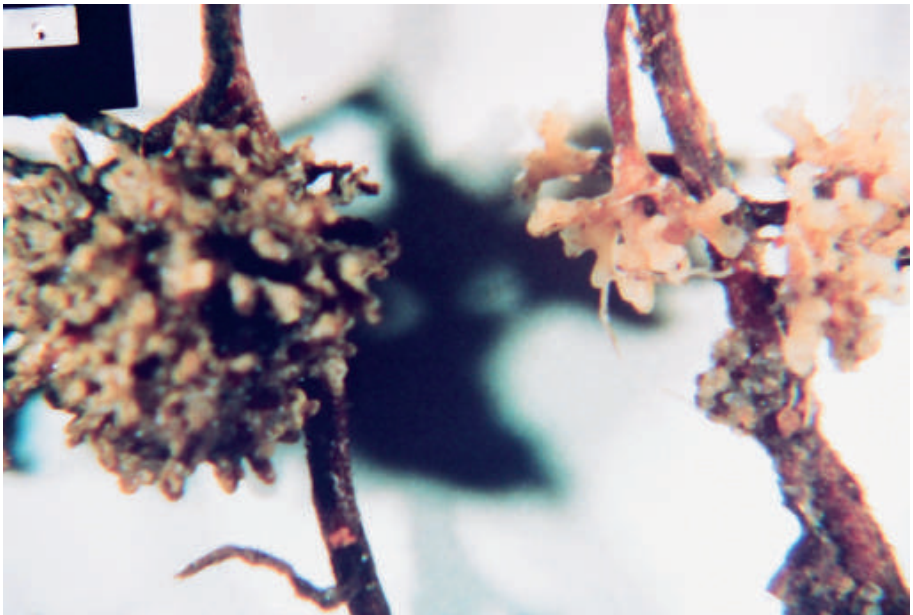
Panoramic of tropical caribbean pine nursery (7 months)  
GAVIOTAS



Manually pulling of tropical caribbean pine seedlings,  
GAVIOTAS



Impregnated with wet clay roots of the seedlings  
in the nursery of caribbean tropical pine,  
GAVIOTAS



Mycorrhiza in caribbean tropical pine



Appropriate technology for cooling the truck transporting the tropical caribbean pine seedlings



Transporting tropical caribbean pine seedlings in boxes to the savanna to be planted



Details of minimum tillage planter GAVIOTAS to tropical caribbean pine



GAVIOTAS tropical plantation pine savannas caribbean Vichada with minimum tillage





GAVIOTAS children in tropical caribbean pine plantation



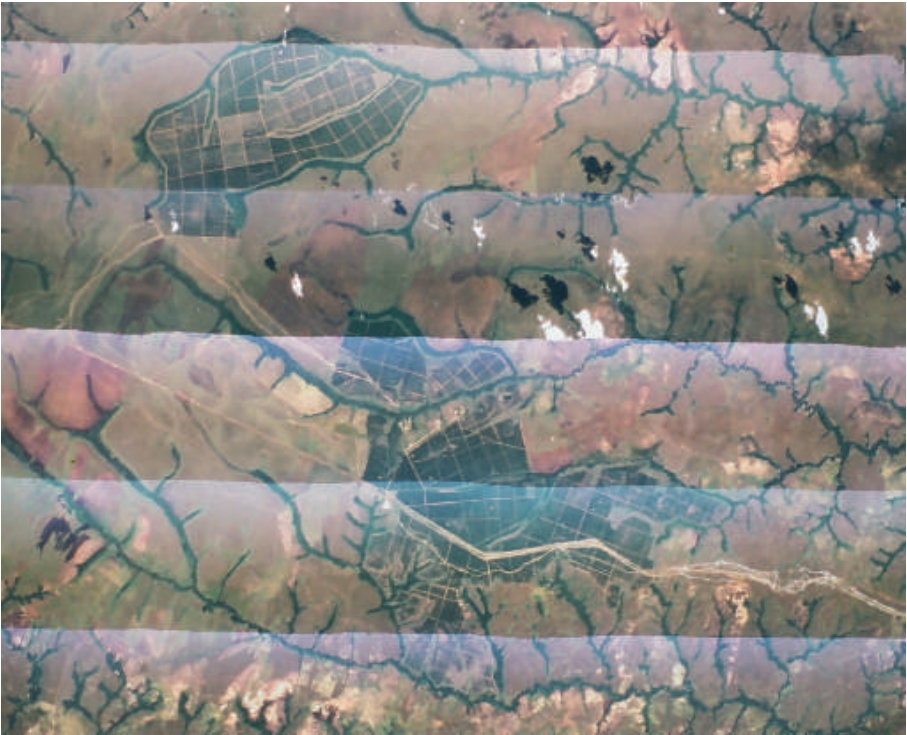
Caribbean tropical pine planting at night, in the GAVIOTAS savannas



Caribbean pine plantations of different ages tropical savannas,  
GAVIOTAS



Overview of a tropical caribbean pine plantation in his  
early years in the savannas, GAVIOTAS



Total area of the caribbean tropical pine plantation GAVIOTAS



Tower type GAVIOTAS with harmonious design for fire control in the GAVIOTAS forest



Biodiversity spontaneously generated in tropical caribbean pine plantation, GAVIOTAS



Biodiversidad generada espontáneamente en plantación de pino tropical caribe en GAVIOTAS



Tools for extracting the flowing oleoresin in the tropical caribbean pine bark, GAVIOTAS



Use of urban minibus before being incinerated, for transporting the gavioteros



Detail of the placement of the bag for harvesting the oleoresin of caribbean tropical pine



Overview of the tropical caribbean pine oleoresin harvest  
GAVIOTAS forest



Oleoresin harvest of tropical caribbean pine in a span of 30 days, GAVIOTAS

Female participation in the activities of the tropical caribbean pine, GAVIOTAS





Resin tapping ladder in height of tropical caribbean pine  
GAVIOTAS



Children in the tropical caribbean pine forest, GAVIOTAS





Transportation of tropical caribbean pine oleoresin to the biofactory using tractors moved by biodiesel, GAVIOTAS



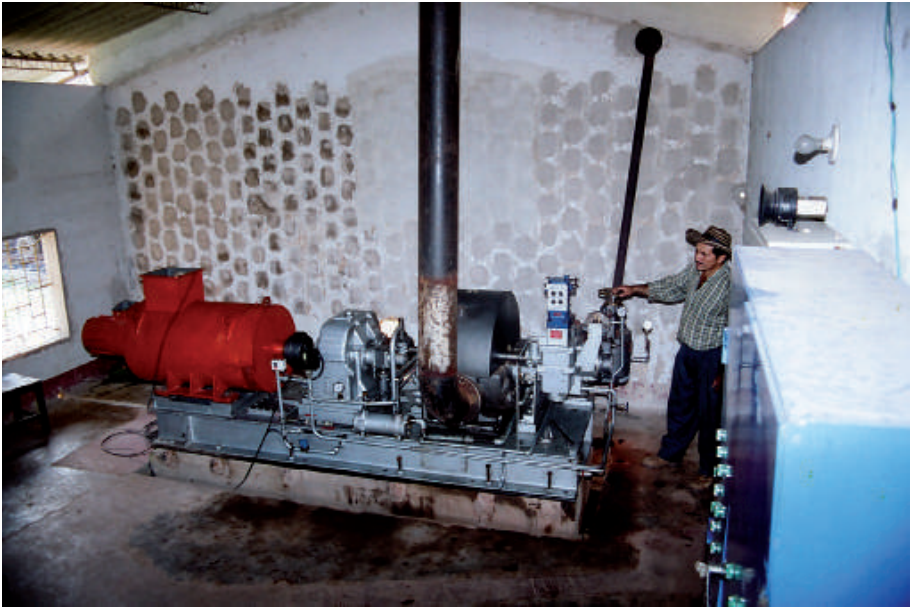
Download of oleoresin in arboquimica Biofactory, GAVIOTAS



Transportation of wood pruning and thinning to the power generation plant



Boilers fueled by wood logs from pruning and thinning the forest, GAVIOTAS



GAVIOTAS steam turbine powered by wood for electricity generation. At present this is done in a 100% biodiesel tropical caribbean pine



Partial aspect of arboquimica biofactory, GAVIOTAS



Partial aspect of arboquímica biofactory,  
GAVIOTAS



Filling with rosin cardboard packing, GAVIOTAS



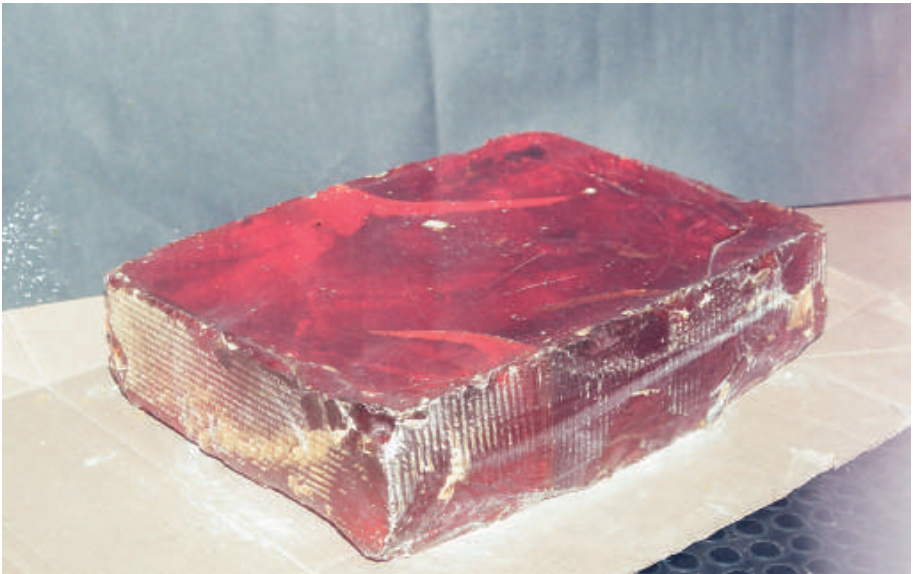
Detail of filling with rosin the cardboard packaging,  
GAVIOTAS



Partial aspect of arboquímica biofactory GAVIOTAS



Aspect of the generation of electricity from the GAVIOTAS rosin plant. In these ponds cachamas, native fish Orinoquia are being cultivated



GAVIOTAS colofony block WG 25 Kilos



Turpentine GAVIOTAS



Arboquimica products of the sustainable tropical forest,  
GAVIOTAS



Pilot plant to test arboquímica



Disastrous state of the first 40 Kilometers of the road  
(if you can call it road) GAVIOTAS - Bogota





Cassava grater GAVIOTAS type used in indigenous communities



GAVIOTAS food program building on local insects (Big ass ants)



Cachama crops, native fish in fish ponds, GAVIOTAS



African tropical sheep in GAVIOTAS forest



Partial aspect of GAVIOTAS Center Center, Vichada



Multiple classroom bioclimatic with reflective roof



Partial view of african palm nursery in Vichada, Gaviotas



Regenerated biomass fertilization



Biological fertilization through native fish (cachama)



Mixed culture of tropical palm



GAVIOTAS type biodiesel plant using crude Africa palm oil located in Bogota. Currently biodiesel is extracted from the tropical caribbean pine oleoresin



GAVIOTAS biodiesel



Appearance of a tractor operating with crude African palm oil to which was added an outdoor oil heating kit



Car and tractor driven by GAVIOTAS biodiesel

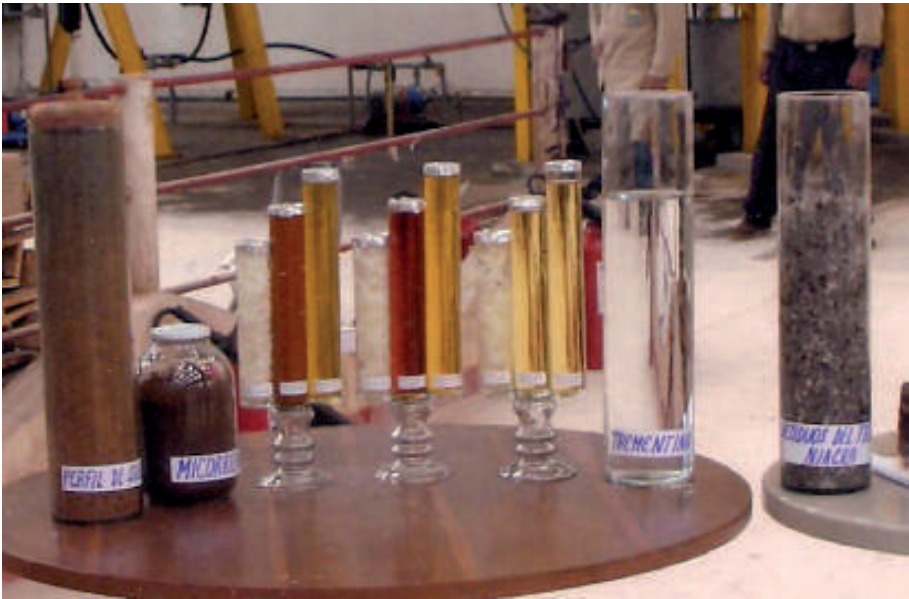


Detail of biofuel processing plant pine oil



Overview of pine oil biofuel processing plant





Tropical caribbean pine oleoresin biofuels with them operate all power plans and diesel tractors, GAVIOTAS



Pine oil powered center  
(100% biodiesel station)



Identification of Biodiesel in GAVIOTAS vehicles



Identification of Biogasoline in GAVIOTAS vehicles



Visit in GAVIOTAS, Vichada, by Gabriel García Márquez, the former president of Spain, Felipe Gonzalez, and the painter Obregon, accompanied by Paolo Lugari



Play about GAVIOTAS



Mural about the whole story of GAVIOTAS, located in the Central Multiple Hall



Covers of the books written about GAVIOTAS in the U.S.A, Colombia, Korea, China and Japan



# RENAISSANCE IN THE TROPICS

# GAVIOTAS

For the recovery of Earth's skin

There is a new start towards the world. One age that Mario Calderon Rivera, outstanding thinker and humanist, called Renaissance in the sense of both the Italian Renaissance as a change of mind of man to himself, and the contemporary one as a change of mind from man towards nature where he is living.

The Renaissance, led by this brilliant saying of Leonardo da Vinci: "Everything comes from everything, and everything is made out of everything, and everything returns into everything" especially in a round planet. This also comes to be true in Centro "Las Gaviotas" where they achieved, among other things, the reawakening of the Amazon rainforest in the Colombian savannas of Orinoco.

There they join the community welfare with the wealth generated by the sustainable use of tropical biodiversity, which, being located in the equatorial zone, has one of the highest rates of biological productivity. Mario Calderon within this context, travels through the last 60 years showing the ideas of man when he began to reflect on the effects of his action on Earth. They consist of a new attitude towards nature, seeing himself as being part of one system, with it he can coexist without destroying, understanding their connections, i.e. its complexity. Gaviotas age is this way of thinking.

The author in honor of Gaviotas and its founder, Paolo Lugari, sets the theoretical foundations of the progress mankind has made in this respect since the last half century.

Gaviotas is an example, a path, but at the same time an outpost of a bio culture that makes its way to protect both human life as well as that from others, which ultimately are subjected to the recovery of the vegetable skin of Earth, by the increase in biomass, as this determines the dynamic stability of the composition of the atmosphere of 99%, of nitrogen and oxygen. If this composition would be disturbed by the continuing decline in biomass it would make impossible for human life to exist, something much more serious than global warming. Just warming is only a reductionist analysis of the issue.

Development is seen now in productive harmony with nature, without undermining the very foundations of civilization.

With an extensive knowledge of the authors who have constructed the ecological thinking trends of our time, Calderón contextualizes Gaviotas in the present world highlighting its conceptual contributions and its innovative achievements, always pointing to a decent lifestyle without denying the modernity