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Program Proposal: Strengthening the Great Green Wall of the Sahel Africa

NGO Arca Tierra

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About us

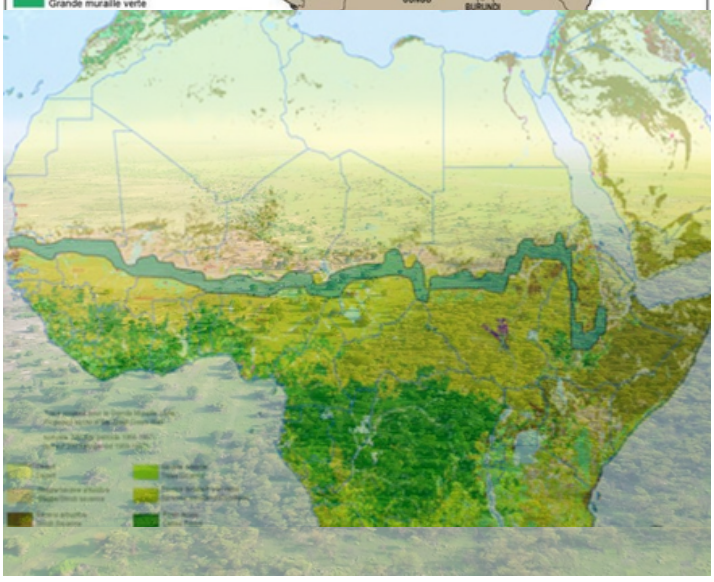
The NGO Arca Tierra is a Non-Governmental Non-profit Organization, environmentalist and human rights activist, we are dedicated to educating, innovating and advising for the solution of climate change, mitigation of natural disasters and the expansion of humanity with quality of life, through sustainable development and equal rights. It will achieve this mission through its 24 Strategic Plans.

We have innovative proposals to create sustainable development according to geographic and climatic conditions, in the process ecosystems are recovered and preserved, described in the Sustainable Development Programs on our website, as well as advising for the transition or consolidation of democracies and human rights, for the viability and sustainability of the program.

The Green Wall includes the countries: Senegal, Mauritania, Mali, Burkina Faso, Niger, Nigeria, Chad, Sudan, Eritrea, Ethiopia and Djibouti. They are joined by other participating countries, specifically: Ghana, Cameroon, Algeria, Benin, Cape Verde, Egypt, Gambia, Libya, Somalia and Tunisia.

Introduction

This program has the goal of strengthening the commendable current activities led by the African Union, for planting the Great Green Wall, where in addition to solving climate problems, human and environmental rights are guaranteed without discrimination (apartheid), especially equality of gender, against violence and feminicide, housing, work without slavery, access to drinking water, electricity, basic services, health, education and child protection, the transition to democracies adjusted to the culture of the country that wants our advice, guaranteeing the security against terrorism in the region, which are supported by the terrorist and genocidal Putin, because where there is gold, oil and minerals, his Wagner mercenaries invade stealthily as in Venezuela or abruptly, as in Ukraine. Wagner's Russian and foreign mercenaries are largely responsible for the instability of many of the countries in and around the Sahel strip, with mass killings of innocent civilians.



Why Is This Program Needed to Strengthen the Planting of the Great Green Wall?

Desertification advances on the planet as a result of global warming, causing more deaths and displacement than any other natural disaster, desertification devastates 23 hectares per minute, causing socioeconomic havoc, which leads to water scarcity, hunger, poverty and massive displacement. The main region affected is the continent of Africa, especially in the Sahel strip, a problem that is aggravated by terrorism and dictatorial regimes.

The Great Green Wall, 8,000 kilometers long and 15 wide, which will cross the driest areas of the Sahel to restore a total of 100 million hectares and stop the advance of the Sahara towards the south, is extremely necessary to solve the current humanitarian catastrophe , 27,072,615 people are in a situation of food and nutritional vulnerability that increases annually by 76% and will worsen in the future, according to the UN, 500 million Africans will be poorer and 60 million will be displaced from their homes due to desertification in the Sahel Strip. The main needs that the region faces are access to employment, access to and distribution of drinking water, and pollution and garbage management and security, especially where terrorism and Putin's mercenaries, the Wagners, operate.

according to a study by the LASPAD laboratory (Laboratory for the Analysis of Africa-Diasporas Societies and Power) of the Gaston Berger University of Saint Louis (Senegal).

The Great Green Wall project began in 2007 and has progressed approximately 15%, which makes it clear that it is necessary to strengthen the successful actions proven in the world and innovate tools against desertification.

According to recent studies published in National Geographic, this project is stalled, far from being achieved, in part due to lack of financial resources and efficient use of resources, so the strategies to be used must be reconsidered, according to Dr. Alisher Mirzabaev of the Research Center for Development -ZEF- of the University of Bonn, it takes decades for a few hundred seedlings to become a forest, which makes the process very slow and determined that the green wall should generate immediate socio-economic benefits to make it viable and avoid displacement.

Goal of This Program

In short, the overall goal of this program is:
Promote the consolidation of the Great Green Wall in the Sahel strip and its surroundings, aimed at the consolidation of human and environmental rights, with sustainable development, conserving and recovering ecosystems.

Objectives

-**Support the African Union in its leadership for the execution of this program,** through open innovation consultancy, that is, helping to evaluate, design specific projects for each country and geographical region, the coordination of all the efforts involved for the successful achievement of projects according to schedules of activities.
- **Determine the safe places to terrorism where to start works,** with established democracies and the places where the UN and the G5 of the Sahel guarantee security for civil society and so that the civil and environmental engineering infrastructures that are built are protected.
- **Establish offices of the NGO Arca Tierra in the region**, it can only be established in democratic countries and where it is not illegal to be LBTIQ+ because the author of this program and part of her staff belong to this community and even if it were not so, the NGO's policies are Against discrimination based on sexual orientation, the UN condemns this discrimination, so homophobia is illegal under international law. It will need support for its installation in the region and will be able to function in the shelters and safe zones established by the G5 and the UN in other countries.
- **Establish models of Sustainable Refuges of the NGO Arca Tierra**, where works are going to be carried out, in the shelters a democratic system will work, directed by the refugees, supervised by the UN and with the security of the G5. The refugees will be trained in democratic values, so that they are capable of designing their democracies, in administration and operational activities, food production through aquaponics, necessary specialties, for the works of the green wall, where they will work with labor rights in gender equality, without slavery and without discrimination, by race, creed, nationality, gender or sexual orientation, with temporary housing, basic services, medical care, education, cultural and sports activities.
- **Build Sustainable Shelters for demobilized from terrorism,** especially for kidnapped children and youth, where they will serve sentences according to their crimes, while they receive education and work remunerated in sustainable economic activities, with reparative justice they will make amends for their crimes, if they destroyed 5 schools, they will rebuild them... And so, until once the reparation is fairly considered, they will be released with training and savings from their hours worked, reintegrating them into society as good citizens of the country in question.
- **Improve financing systems,** currently many climate financing agents support the Green Wall, such as: Green Climate Fund and Global Environment Fund, development banks, African Development Bank and World Bank, cooperation agencies bilateral (Agence Française de Développement), UN organizations (Food and Agriculture Organization) and the European Union. By improving we mean making more industrialized countries take responsibility for their CO2 emissions, and pay tariffs for this and many other environmental projects, our air quality management policy proposal describes how to achieve this .
- **Green wall design,** considering the recommendations of the NGO Arca Tierra and other specialists related to the technologies and natural resources that we recommend, especially agroforestry or agrosilviculture, botanists, among many other specialties, for the benefit of human activities, the recovery of flora and fauna. It will be a standard model to follow and that will be continuously improved with experience, since in the Sahel strip there is the same climate pattern where they will be built, it will only vary in case of geographical and climatic variations.
- **Write construction, operation and maintenance manuals** for gray and green infrastructures, and train refugees and/or citizens who still live in the region.
-**Contracting** with bids for companies and personnel with labor rights and logistics management to start the works of the green wall.
- **Simultaneously build the green wall in different countries of the strip and surrounding areas,** starting with the safe areas, with the above objectives it is intended to achieve security throughout the region, until the works are connected, with security and sovereignty of the nations where it is built , through the coordination of the African Union, with our support, of other organizations and specialists necessary for this program.
- **Maintenance and continuous improvement of the Green Wall,** continuously improving access to human and environmental rights without any discrimination.

Standard Green Wall Model Proposed by the NGO Arca Tierra

Considering the climatic reports of periods of extreme drought and flooding (August and September) in the Sahel strip, due to the fact that the temperature has increased by 1.2º Celsius in recent decades, against 0.7º C on average, according to the Research Institute for Development (IRD, according to its acronym in French), due to these extreme environmental conditions and terrorism there are 9.3 million displaced people and millions do not have a job, only 49% have electricity and lack of drinking water . Both episodes of extreme drought and flooding cause havoc and hundreds of thousands of victims, deaths, loss of crops and grazing animals, which is why they call it the hunger belt, which expands as time goes by. Due to these climatic conditions and poor resource exploitation practices, soils are degraded, influencing unsustainable agriculture and livestock practices. The lands of the Sahel are grass and savannah, with areas of scrub in the north, alternating areas of trees, mainly acacias, in the south. During the long dry season, many trees lose their leaves, and grasses die. Due to these conditions and illegal hunting, the fauna is also in danger of extinction in these vast desertified lands. In addition, significant sandstorms occur with significant frequency. The temperature is regularly 37°C and can reach up to 47.6°C. The scarcity of water due to desertification, pollution and poor water management by governments, due to a lack of water infrastructure and terrorism that seizes the scarce water sources in the region, is a serious problem to be solved, because without water people do not survive for more than 5 days. With these general situations in the Sahel Strip, climate, water resources, soil and vegetation, we recommend the following Green Wall model, composed of:

1.-Green and Gray Mountains

When referring to green and gray we refer to works of engineering and nature. It is essential to build mountains to limit the advance of the Sahara desert, different countries have considered building mountains, to reduce costs they have been built on garbage dumps and rubble, such as in New York, in Germany, England, the Netherlands, Japan have also been proposed, due to the high costs of solid construction, they consider that the best option is to make them hollow and multifunctional so that it is a profitable investment for recreation, tourism, sports, among others. In the case of the mountains of the Sahel strip, some may serve these purposes of tourism and sports, but the main green and gray mountains will be to solve the main problems: bioclimatic housing (with thermal comfort), food production for humans and wildlife, education, job training, health, culture, sports, water infrastructure...

The construction of green and gray mountains is feasible, in fact Japan considers building a mountain city 4 km high and have been built in past centuries, in the 19th century it was built the Artificial Mountain of Buen Retiro, in Madrid Spain, a hollow mountain that ensured the management of water resources raised on a brick vault and circular masonry with mixed walls of these materials on the top of which hung a stalactite. Radial corridors with barrel vaults start from the central hall. Inside there was a waterwheel that supplied water.

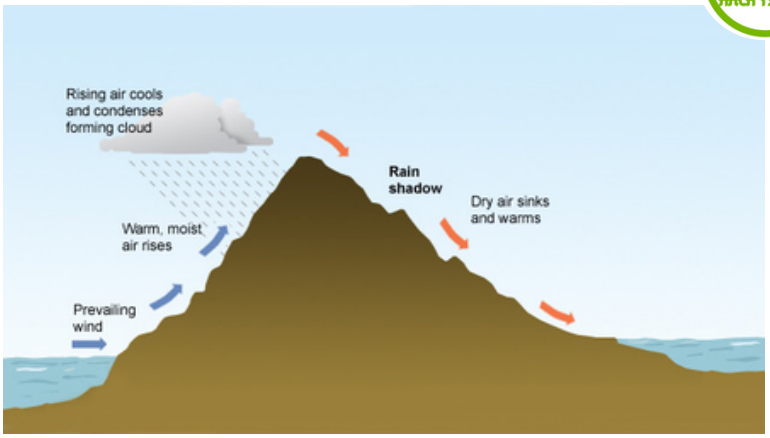
Gobi Desert, the largest desert area in the world, is surrounded by the Altai Mountains

Fake Hills (Artificial Hills) the prestigious study of Chinese architects MAD

Ski mountain built on the roof of a waste incinerator, to produce heat and electricity, in the capital of Denmark, designed by Bjarke Ingels. copenhill

The United Arab Emirates has considered the construction of mountains to maximize rainfall throughout the country, because mountains generate rain, the higher the temperature, the more water the air can contain, when a mass of humid air reaches a mountain and is seen Forced to rise, the cold causes the vapor to condense and rain to form.
This project is in the "Detailed Modeling Study" stage, led by experts from the US-based University Corporation for Atmospheric Research (UCAR), which manages the National Center for Atmospheric Research (NCAR) , by NCAR Principal Investigator Roelof Bruintjes, to determine the exact height and model to achieve it.

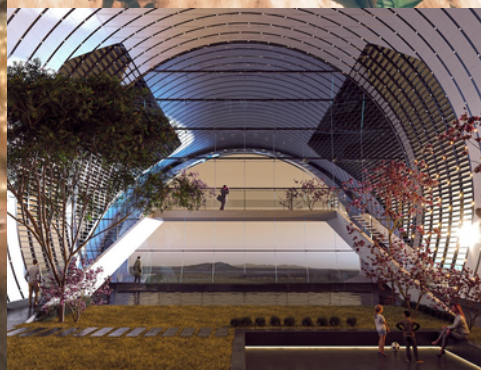
Built with the super adobe technique by the firm ZAV Architects, developed by the Iranian-born architect Nader Khalili.



The NGO Arca Tierra in its 24 Strategic Plans, written in the book 531 Beauties of the World II Edition of 2015, by our founder Patricia Rincón, we propose the creation of stationary rains, the construction of "Oasis Cities" domes is explained in its Plan XVI capable of creating stationary rain in the middle of deserts, domes, emulating mountains, are used to protect from sand storms, create oases and humidity conditions, winds and lights, to produce stationary clouds called lenticular clouds. "These are formed not by height but by gravity waves created by ascending air currents, obtaining a wave that goes up and down, staying in the same place. If the temperature and humidity are adequate, the lenticular cloud is created. Because in the oasis city in a microclimate like the one in the illustration, it will have high levels of humidity and the heat around it may produce the ideal conditions for its formation, since hot air rises and cold air descends" Patricia Rincón, Book 531 Beauties of the World II Edition. We plan to build this oasis city in the future, we are currently working on Plan 1 Climate, where we intend to develop the necessary graphene-based materials and modernize construction techniques with 3D and 4D printers. In our online course Systems to Purify the Air and Water of Cities, the Atmosphere and the Oceans we explain how to develop these innovations.

Another way to help the production of stationary rain, "By convection it would be produced by temperature differences, the low ones in the oasis city and the high ones in the desert air, their differences in density of warm and cold air, so that the materials The hotter materials are lighter and rise and the colder materials are denser and heavier and sink. Convection in the atmosphere creates vertical cloud development that is the carrier of electrical storms and heavy precipitation." Patricia Rincón book 531 Beauties of the World.
These data could help define the height and position of the Green and Gray Mountains, according to air currents, the height of the dunes of the Sahara, which in addition to helping to generate rain, serve to protect against sand storms, although certain grains of sand sporadically would not hurt the forests and grasslands since it serves as fertilizer, in fact sand from the Sahara reaches the Amazon rainforest providing nutrients to the trees.

So we have that the Green Gray Mountains will provide protection from the advancing Sahara, help produce rain and be multifunctional. There are various models of houses that simulate the mountains, they are resistant and bioclimatic because they generate thermal comfort and compact sand can be used for their construction, domes built with superadobe (sand and straw in bags). Locals can be trained as they build.



Nüwa, a vertical city carved out of rock, is a Spanish project led by researchers from the Institute for Space Studies of Catalonia (IEEC), the Polytechnic University of Catalonia (UPC) and the Barcelona Institute of Cosmos Sciences (ICCUB). Following scientific, technical, economic, architectural and social criteria, the Mars Society has chosen Nüwa as one of the ten most feasible models among 175 different ones.

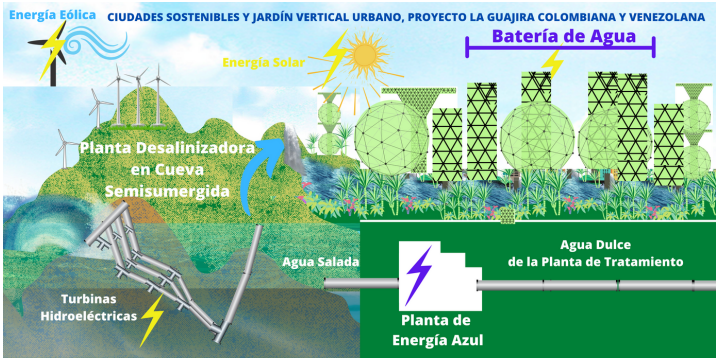
Worldwide, various models of cities have been proposed on Mars, with the existing deserts and with desertification, they will not be models for Mars, they will serve to survive on Earth, since through pollution we are deterraforming the planet, these proposals and investments in recreating Mars habitats, can be done in the Sahel Strip and would help overcome the hunger belt.
It is very laudable to postulate the future of humanity on other planets, but we have to prioritize saving Earth, because if we cannot survive on a planet with all the natural resources, much less can we survive on Mars. So the project to save the Earth from desertification, such as the Great Green Wall and the Mars projects, will be able to contribute, if we manage to recover desertified areas, reduce and absorb CO2 emissions, it will serve to develop technologies related to terraforming and as an experience for survive in extreme climates.

The NGO Arca Tierra considers that we must first save the Earth, then conquer the Moon, which would serve as a launch pad for the conquest of the solar system, we explain how to do it in our Plan XXI, in fact in Plan XXI is where We emphasize the use of microalgae for the generation of oxygen and absorption of CO2, but in view of the fact that the Earth is rapidly changing its atmospheric and oceanic composition due to high concentrations of CO2 and other greenhouse gases, we urge the integration of the use of microalgae in panels solar panels, glass, outdoor and indoor lamps, the use of bio skins, to reverse desertification caused by global warming, we explain how to integrate them into buildings in our models of sustainable cities.

So, let's land on Earth, you can use the models for Mars in the Sahel Strip to create Gray and Green Mountains, hollow mountains, with vertical cities such as Nüwa city a vertical city, inside the hollow mountain with domes radiation shielded and many other models would have to be considered depending on the geographical conditions. The earth from the excavations of the construction of the green wall can serve as material to build sustainable cities along the Great Green Wall, with different bioclimatic buildings and designs according to their function.

In 2020, the United Arab Emirates government announced that it would invest to build a Martian city, providing thermal and radiation insulation, built with the services of Danish architect Bjarke Ingels, under the name of Mars Science City. To make it a reality, 3D construction techniques that will work with the sand of the Dubai desert will be used in the construction of the complex.

2.-Water Infrastructure and Renewable Energies



Model of the NGO Arca Tierra's water battery. See our Sustainable Development Program in Desert Areas

Given that the region experiences long periods of drought and short periods of flooding, with inefficient systems to prevent contamination and a deficient supply of drinking water, water infrastructure is needed to maximize the efficiency of water management.

The unevenness of the Green and Gray Mountains must be integrated with the design of the water infrastructure, for the collection of rainwater and its storage in networks of underground aquifers, in rivers and surface lakes, with techniques of Natural Biological Systems NBS (R) composed of sand, rocks, vegetation in the water networks and microalgae wastewater treatment plants, access to abundant drinking water is guaranteed, without waste with reuse, in water circuits, these circuits may also be renewable energy sources.

The waterfalls that will be produced by the unevenness created by the Green and Gray Mountains, will serve to oxygenate the water and purify it with the shock of rocks and grit, they should also be used to generate hydroelectricity, there are various models of ecological hydroelectric plants that can be used depending on the flow If the use of pipes is necessary, there are also models of hydroelectric plants in pipes. Along the water highway there will be various renewable energies, especially solar, in areas near the sea there will be desalination plants, which will also be integrated into the water and energy circuits, to supply water to the water networks. and in the process generate blue energy to lower costs and increase profits. The water and renewable energy circuits will form a water battery, for the storage and distribution of renewable energy, reducing the need for electrical wiring and electric poles in the beautiful landscapes that will be formed.

These networks of artificial water sources must integrate nature, for the maintenance of optimal levels, they will also serve to ensure that the underground aquifers are replenished, since their depletion generates the collapse of the soil and changes the distribution of the weight of the planet, which affects the gravitational axis and therefore the Earth's magnetic field that makes life possible on the planet. The networks or water circuits may be built in phases in each country of the strip and may be connected, with the goal of recovering water reservoirs from times when ancient ecosystems prospered in the region.

For example, in Libya, the Ubari desert salt lake is fed by springs from an underground aquifer created by ancient rains. Fresh water evaporates, causing large concentrations of salt. The networks would serve so that the fresh water is not lost, but rather that it is stored or distributed for the supply of drinking water and that through the circuit its continuous replenishment would be ensured. This lake was formerly the size of the Czech Republic, 200 years ago it was a fertile and green region, today it almost disappears into the sands of the Sahara. It was freshwater when rainfall was abundant and radar images from space show its ancient canals, lakes and rivers that traveled to the heart of the desert. The ideal would be the recovery of those ancient lakes, rivers, canals and their ecosystems.

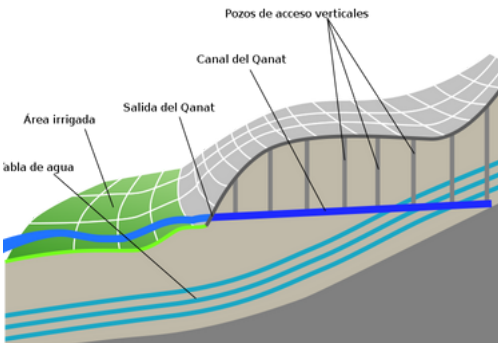
Another example would be The Nubian Sandstone Aquifer System is the largest groundwater reservoir not replenished by other sources, originating from the last ice age. It covers about 2,500,000 km² in the eastern part of the Sahara desert, between Libya, Egypt, Chad and Sudan, it is estimated that it contains about 150,000 km³ of water that could last 1,000 years, although other estimates indicate that it could run out within 60 -100 years. The system owes its name to the fact that it is basically composed of hard ferruginous sandstone (Nubian Sandstone) with an abundant presence of slate and clay with a thickness of between 140 and 200 meters. These indications of nature to preserve fresh water for hundreds of years, from when the area was humid and fertile, must be considered when storing water in areas with high temperatures.

It should be noted that the largest irrigation project in the world, the Great Artificial River of Libya, which was built in 5 stages, consists of extracting water from the Nubian Sandstone Aquifer System to irrigate various farms, the oasis of Kufra, cities, as well as in the supply through large pipelines to coastal areas. The main contractor for the first phases was Dong Ah Consortium and the current main contractor is Al Nahr Company Ltd. Since 1995, UNESCO participated in the training of the engineers and technicians involved in the project. The technical material was made in Korea. Galvanic corrosion protection on the pipeline was supplied by an Australian company, AMAC Corrosion Protection, based in Melbourne. The rest of the products were made in Libya, where the Brega prestressed concrete pipe factories were installed, the pipes manufactured by this plant were considered the largest pipes made with this technology in the world, the steel wire was supplied by the company Italian Redaelli Tecna SpA with headquarters in Cologno Monzese (Milan).

In the first stage for its realization, 85 million m³ of earth were excavated, 500 m deep, earth that would be very useful for the Green and Gray Mountains, buildings, infrastructure, raw materials for photovoltaic panels, reforestation and it would be very useful reserve the deeper land for agriculture, because it is usually fertile soil, gravel, clay or silt. Therefore, it is necessary to develop various industries around the use of sand from the excavations to be used in the Great Green Wall and make the project self-sustaining over time. For example, the Japanese Super Apollo project, which aims to produce all the planet's electricity with solar energy in deserts, which we consider viable, there would even be enough electricity for the Moon, alternative that we will promote in our plan XVI Deserts, will be possible through the wireless transmission of electricity (witricity) and the use of rocks and sand from the deserts to extract graphene for the manufacture of more efficient photovolaic equipment, which we will promote in our Plan V Costas , but until now the majority of solar panels are made of silicon and at present there is already technology to extract silicon from the sand, so Japan and other countries would be interested in investing in the Sub-Harian strip.

Then it would be necessary to consider the successful and beneficial actions for the region of infrastructure works related to this project from the past, such as from ancient Egypt, the Quanats, underground aqueducts, 3,000-year-old engineering marvels, and which still function in Iran. , which consist of an elevated source of water, at the surface level at the head of an ancient valley or even in an underground lake, inside a cave, drilled long and inclined tunnels that circulated from above, where the source of the water was located, until the place where it was needed, they came to measure up to 64 km and when they came to the surface they created oases.

Those of the present, such as the Great Artificial River of Libya and those projected for the future such as the space cities in the desert promoted by world space agencies and the Mars Society project or the Super Apollo Project. The natural channels of rivers, lagoons and wells from the exhausted past should also be considered, in order to reactivate them and recover ecosystems.



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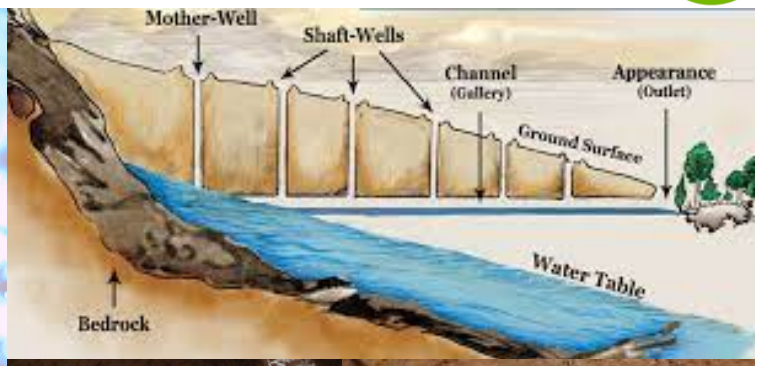
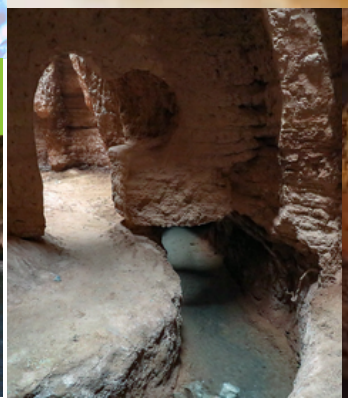
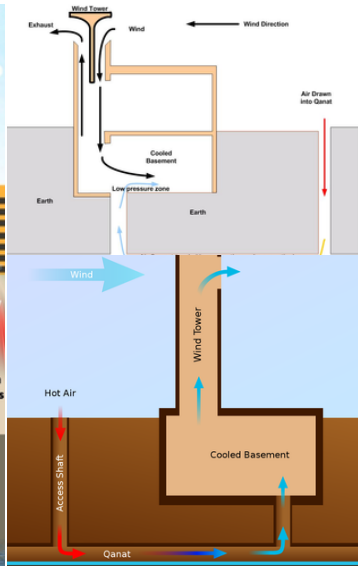




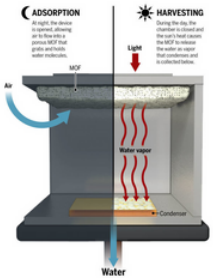
The water battery proposed by the NGO Arca Tierra works through water circuits to supply drinking water and electricity. They are circuits because the water can also be reused at the end of the route. Reversible pumping systems are installed. In the images on the right, the quanat systems show us that it is possible to build them in the deserts, in the Great Green Wall project they will be modernized, but the rock and sand tunnels must be imitated to purify the water on its way . In our course Systems to Purify Air and Water of Cities, the Atmosphere and the Oceans it is explained.

The water battery proposed by the NGO Arca Tierra includes vertical gardens, for planting ornamental plants, wild flowers, butterfly farms and bee breeding, to reforest, recover ecosystems in surrounding areas of the city and in the city. They can also be used for agriculture, to produce food at any time of the year in large volumes, they work with photovoltaic energy, they produce clean air and water with microalgae, limestone rocks and can be enhanced with laser, UV, graphene mesh technologies, among others. others, so that in the event of chemical or biological weapons or due to rising pollution levels, they are activated to purify the air and water. In our model for cities, oxygen is released in their glass and CO_2 is absorbed, for desert areas we suggest installing industrial foggers that work with water from the water battery or if the water highway does not yet reach the region, they should include the production of atmospheric water for crops and for misting systems, for thermal comfort in cities and to reduce temperatures in forests and meadows, to prevent forest fires. (See more about forest fire control).



The Vertical Garden of the NGO Arca Tierra will include industrial foggers and/or atmospheric water generators.

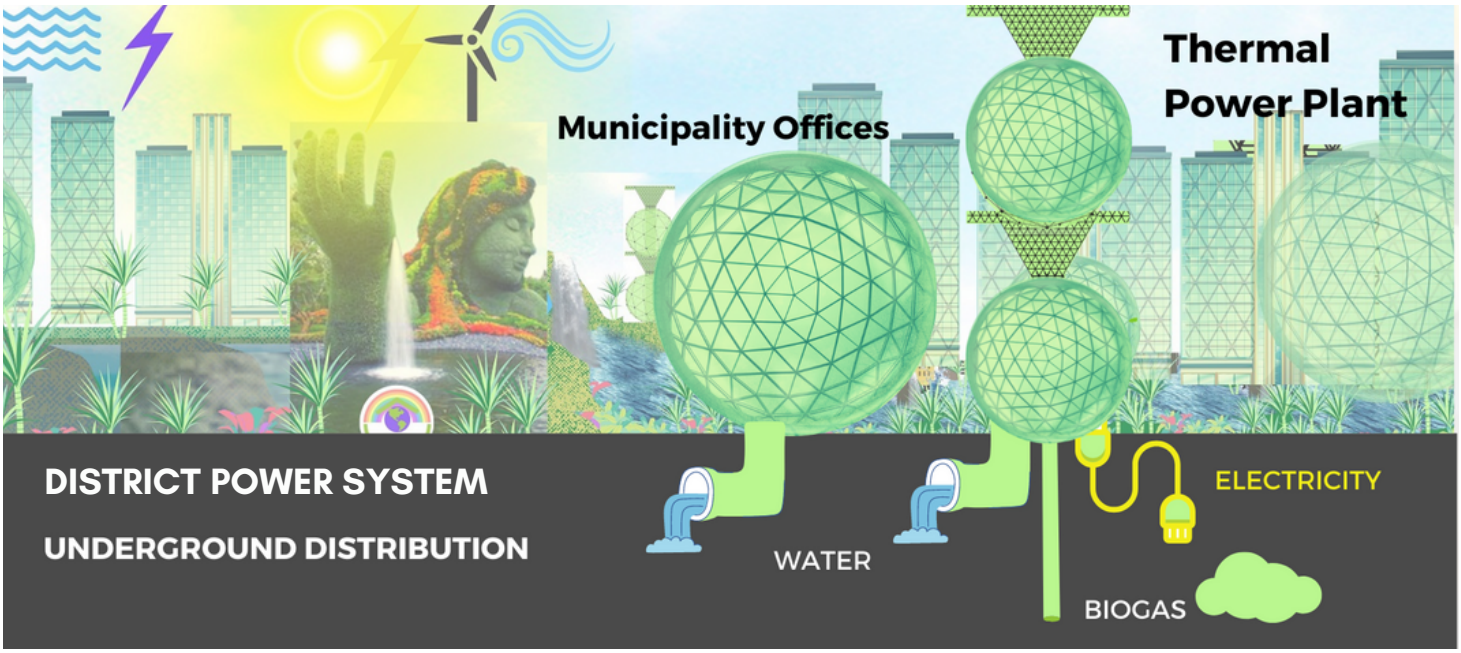
There are various technologies that use air convection to produce cold air and atmospheric water.



For 3,000 years there have been nebulizers and air conditioners for interiors and exteriors without electricity or CO_2 emissions, the quanat systems were also integrated into their water networks. Quanats have also been found in Latin America, Mexico, Peru and Chile.

In Israel they are experts on the subject, Watergen is a leader in the generation of atmospheric water, 6,000 liters per day.

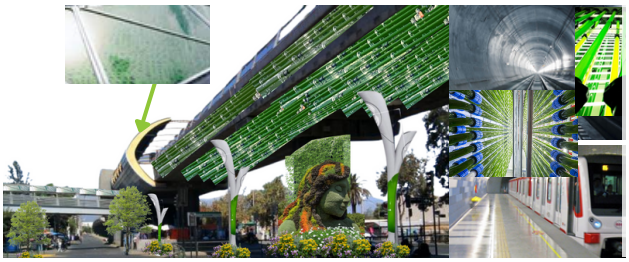
3.- Buildings

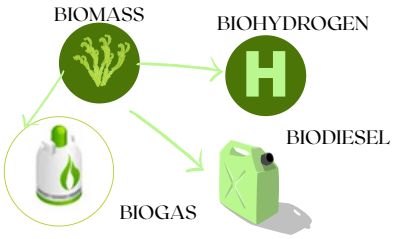


The buildings and infrastructures will be part of the circuits of the water batteries, of the connected water networks, to receive and/or inject clean water and renewable energy.
Therefore, the buildings will not inject contaminated water into the hydrographic network system, each residential or industrial construction must as a rule integrate wastewater treatment systems, we recommend the use of open-air microalgae treatment plants and in closed spaces with photobioreactors of mycoalgae. Similarly, they must have rainwater collection systems, they may use the water for their own consumption and/or sell water with bidirectional systems of receiving water and injecting water.
They must integrate renewable energies through bio skins of microalgae photovoltaic panels that absorb CO2 and emit oxygen, wind energy on roofs, hydroelectricity in pipes, biogas and microalgae-based biofuels, among other alternatives depending on the region, in rural areas they will be able to produce energy with biodigesters from the methane resulting from raising animals. The energy will be for internal consumption and the excess energy will be sold to the electricity distribution network, with bidirectional meters, as is done in Chile.
In this way they will be integrated into a clean air, water and electricity generator circuit, without CO2 emissions, to do it efficiently with thermal comfort, we recommend district energy systems, as explained in Complex Projects for CO2 Absorption and Reduction on our website.

Las edificaciones deben ser bioclimátcas, aprovechando los materiales disponibles en la zona y para generar confort térmico. En esta imagen se observan casas con recolectores agua lluvia y en las paredes circula el agua para el confort térmico de Concave Roof, de BMDesign. Tambien recomendamos domos, estructuras resistentes a cualquier desastre natural y que generan confort térmico.

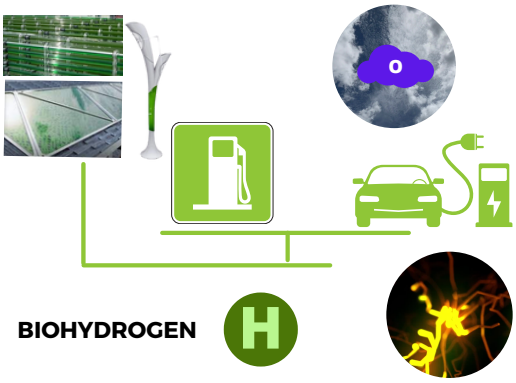
4.- Infrastructure and Means of Transportation



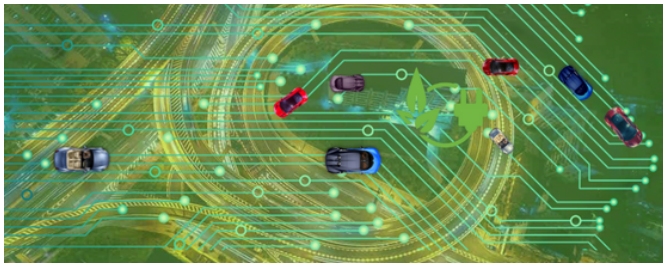


The Chilean Andrea Irarrazabal has several patents for microalgae biofuels

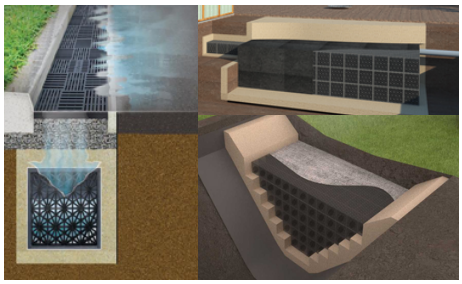
Transport infrastructure must be designed as explained in buildings, be generators of clean air and water and renewable energy. The means of transport may be surface and underground, Dubai has good public transport infrastructure although it is expensive, the abundance of renewable energies will make it more economical, the abundance of microalgae will allow the production of large quantities of biofuels, thus green transport with zero CO2 emissions it will be feasible.

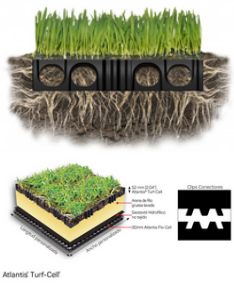


See Green Metro Project to generate clean water, air and thermal comfort



Electromagnetic trains, subways, buses and electric cars within cities and nearby areas. The vast amounts of free hectares allow the first development of vacuum trains to transport cargo and passengers, the promotion of ecotourism and safe safaris without interfering with the fauna, it will serve as shade, clean water and food based on microalgae, facilitating conservation activities of endangered species. The tracks can be built with graphene glass or other highly resistant ones, so that they can generate photovoltaic energy. They must be built at a height that prevents flooding from interfering with transportation.



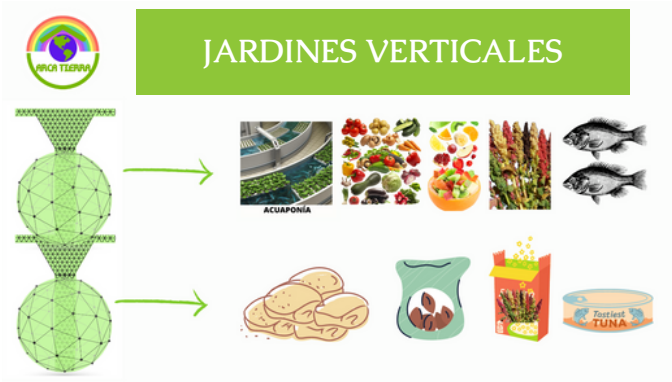


Atlantis developed systems to prevent flooding on grass, roads, parking lots...

Pedestrian paths and land routes must have water absorption systems, with gravel, sand, to filter the water towards the drinking water aqueducts or for reserve tanks in the area. Thus, the paved floors of the cities will not be flooded and will not interrupt the water cycle.

5.- Sustainable Food Production and Ecosystem Recovery

The way to defeat hunger is by empowering refugees and resident citizens to produce food in large volume, under any extreme climate, this is possible through acupuncture, in vertical greenhouses, no matter how far from the sea it will be possible to produce the main source of humanity's proteins, fish, shellfish and molluscs, in a feedback system with crops of vegetables, fruits and grains. The best way to distribute the tanks is in spiral domes, resistant to any climate.



The way to improve profitability for farmers is to have food processed and packaged on-site to make it long-lasting and no food wasted. Processing waste is used to produce compost, fertilizers to improve soil health, and to make compostable packaging. Distribution through vacuum trains, or electromagnetic trains that work in any climate and reduce the marketing chain will help make food affordable for consumers and improve farmer profitability.

Mira más acerca de cómo crear un Desarrollo Sostenible en Zonas Rurales

Soil Recovery and Agroforestry

Livestock and grazing activities can be sustainable, the importance of meadows for the absorption of CO2 is high, although the presence of trees and shrubs is still important to normalize the temperature and the water cycle. Animal feces are used to make fertilizers and generate bioelectricity in biodigesters that prevent the release of methane into the atmosphere. Therefore, it is imperative in the Great Green Wall to include agroforestry or agroforestry, a production system that integrates trees, livestock and pastures in the same production unit. This system is aimed at improving the productivity of the land and producing food in an ecologically sustainable manner. Among its benefits are the protection of the soil, the effects on the microclimate, the recycling of nutrients and the diversification of production.

Farmer Margaret Gauti Mpofu spreads manure compost on the vegetables she grows on her plot outside Bulawayo, Zimbabwe. Credit: Busani Bafana/IPS.

The procedure to recover ecosystems in the Great Green Wall, of ancient savannahs and leafy grasslands with some forests, will be possible with the provision of water and energy, with the nutrient-rich soils of the deep sands of the desert, obtained from the excavations for the water infrastructures and Green and Gray Mountains, mixed with compost and sand from the Sahara rich in nutrients, the main fertilizer of the Amazon jungle, the soil can be prepared for planting mainly switchgrass, wild flowers and in this case, for the famine strip, plant quinoa meadows, quinoa has a very high nutritional value, which defeats malnutrition and grows under extreme climates, so it can adapt to life in the desert, to provide food in grains and fodder for the livestock.

Planting saffron is feasible, profitable and attracts pollinators, other species of African grassland wildflowers should be considered.

Pira or quinoa has managed to be planted in places where no crops are grown, in the Sinai desert, in the driest desert in the world, Atacama in Chile. The Arturo Prat University (Chile) and the Amity Uttar Pradesh University (India), managed to characterize the production of quinoa in the Atacama Desert (Chile), the driest in the world, achieving grain yields of up to one ton per hectare.

Thus, the infertile soils will recover progressively, as they recover and the ecosystems become more humid and less hot due to the presence of water and vegetation, the crops and plant species to be selected will change in order to maintain the health of the soils. .

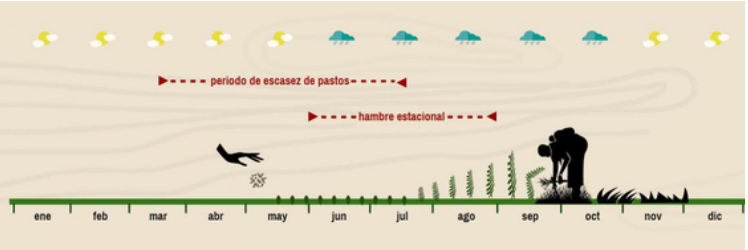
Initially, it will only be possible to plant compost with fertilizer, preferably that obtained from food production and recycling containers. When dealing with this topic, the way to make it produce sustainably will be explained, so that they do not have to import fertilizers, it is illogical and unsustainable that a country has to import fertilizers, if organic waste is present in all nations, in fact if it is produced with parts of sand from the Sahara it is very possible that it exceeds the quality of fertilizers on the market. Just as it is totally illogical to import food for fish from aquaponics, if aquaponics uses the microalgae harvest to keep the water clean, it can be used to produce biofuels and the waste to feed the fish, because every industry must function as a biofactory, producing quality products, reusing without wasting, without polluting and operating with renewable energies, this will generate profitable production for farmers and accessible products for consumers.

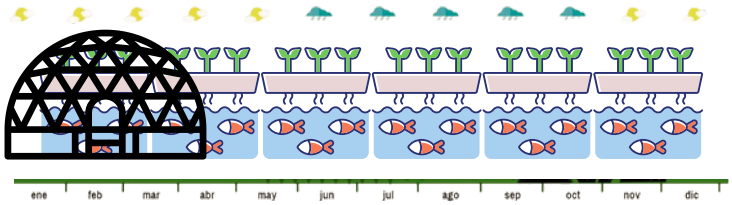
I was once asked why plant fish on the coast if it is close to the sea and it is very expensive to import food for the fish? Because fishing in aquaponic farms on land is more productive, with less risk than in the sea, it conserves the oceans, since industrial fishing is destroying marine ecosystems, if we want to produce food on a large scale to defeat hunger, we must be able to produce in great volume, with quality and low costs to make food accessible and at the same time we help the environment, we absorb CO2 and oxygen is released, without contamination.

So, initially the soil will be recovered, with the soil from the deep excavations, compost fertilizer, switchgrass, quinoa and wild flowers that will attract pollinators, until then trees will be planted, although there are very enterprising women who are making the impossible possible , plant trees in desertified soils, the Lady of the Acacias, Ajmi Toumi, a native of Bir Salah was residing in France and returned to Tunisia to defeat desertification because it is predicted that in two decades 75% of the territory could become desert, reason for which he created the social enterprise Acacias pour Tous (Acacias for all), empowers women to recover the greenery of Tunisian lands, created an acacia nursery, had a well drilled and built a vocational training school. They plant acacias every 3m on the edges of the crops to prevent the passage of sand and wind, they are fast growing, provide shade for other plant species and protect the soil from erosion to make the soil fertile. In the area protected by the acacias they plant the Indian moringa, with little water they grow fast, their leaves, flowers and pods are edible, they also plant olive trees and medicinal species such as aloe vera. They process the products to be sold and through their sale, they finance their activities.

This is an effective and wonderful climatic action, in the Great Green Wall in the areas where the Green and Gray Mountains have not yet been built, which will provide greater protection from the sand and wind of the Sahara, this technique of the Lady can be used of the Acacias and to integrate the community to carry out sustainable economic activities of production and processing of food and other products.

Lady of the Acacias Ajmi Toumi





Comparison of planting in the Sahel strip in the open field, versus planting in dome greenhouses with aquaponics techniques.

Although quinoa is planted in the fields to rehabilitate the health of the soil and progressively trees, or food is produced with the social enterprise tactic "Acacia for All", we recommend it for all regions of the world and even more so for the Sahel strip , where there is extreme drought with a short period to plant and harvest before short but intense periods of flooding occur, which devastate the crops, we recommend planting in vertical greenhouses, in the form of domes, because the domes generate thermal comfort and resist disasters microclimates can be created in them with less energy, characteristics that allow planting and harvesting at any time of the year, protecting the crops from any damage and through aquaponics the benefits are multiplied, water is reused, making it possible to plant despite little availability, organic fertilization since it is done with the natural emulsion of the fish. Low environmental impact, the land needed for crop production is reduced. The production of fish, vegetables, fruits, vegetables, develop faster by 30% or more thanks to the exchange of nutrients. In this way, food would be produced even for domestic consumption and export, it would no longer be the strip of hunger, it would be the strip of prosperity.

Aquaponics is the technique to defeat hunger and conserve the environment. Food and plants can be grown in greenhouses for the recovery of ecosystems. In our Program for Sustainable Development in Rural Areas, different models of domes are explained that further accelerate food production through LED lights and the production cycle as a biofactory. The selection of what to plant would be through coordination between supply and demand that minimizes food waste and maximizes profitability within a range that guarantees accessible prices to consumers, emphasizing that it must be done without price controls that generate scarcity and inflation. , but by applying the economic laws of supply and demand. It also affects the selection, what else does the population need? Malnutrition is something to prevent and defeat, quinoa is a very cheap nutritional source that can defeat malnutrition, endless foods can be developed from it, the NGO Arca Tierra has a formula for a drink against malnutrition for infants, children, and pregnant or lactating women, we look forward to support in manufacturing prototypes and obtaining validation for commercialization. We also promote kits so that citizens can empower themselves to defeat hunger. If you are interested in supporting the development of the serum and/or the Kits against hunger, contact us at info@ongarcatierra.org

According to the countries that make up the G5 Sahel (Chad, Mauritania, Burkina Faso, Mali and Niger), around 6,057,000 inhabitants of the strip are suffering from high acute malnutrition or higher than usuall

Another way to apply aquaponics techniques is in lakes, either to recover them, or that the crops themselves prevent water evaporation, this is feasible, the origins of aquaponics date back to Aztec agriculture, which began to cultivate on the lakes in rafts called chinampas, to avoid the saturation of the soil. Among the most important floating gardens are those of Lake Xochimilco, in Mexico.

Given the food shortage and the need to protect aquatic and plant species in danger of extinction, researchers from the Autonomous Metropolitan University, Xochimilco unit (UAM-X) of Mexico, apply these systems to produce food and aquatic and terrestrial plants in order to avoid its extinction.

Chinampas of Mexico City were recognized as an Agricultural Heritage System of Global Importance

Natural Biological Systems NBS

It can be said that aquaponics is a natural biological system to guarantee the quality of water and the feedback of living beings in a cycle of optimizing the survival and productivity of the species involved. Natural Biological Systems can be implemented for the treatment of wastewater for all human activities, in an economical and sustainable way, the company Ayala Aqua, designs systems composed of plants, grit and rocks to treat residential wastewater, agricultural and for different industries, in this way no low-cost home or industry will be able to prevent the contamination of water sources, it would be used to create gardens of plants and flowers that favor the presence of butterflies and bees, or even plant food, in lakes, soils and / or green roofs.

In the oases that are created, floating platforms can be installed, such as those developed by BioHaven®, which have integrated internal buoyancy, which can be adapted to any weight; It has been used in the creation of walkways, pond and canoe dipping platforms, docks, and fishing pegs. In addition to being part of the aquascape, they improve water quality and enhance habitat. These habitats are extremely valuable environments and provide a wide range of beneficial ecosystems.

Recovery and Conservation of Butterflies and Bees

This activity is essential for any ecosystem to prosper, greenhouses can have bees, so that they multiply and accelerate the growth of crops, this has been done successfully, the combination of agriculture and beekeeping. It must be repopulated with endemic bees as territories are recovered, as a sustainable economic activity that supports agriculture and beekeeping alone, for the marketing of honey and other products derived from this activity. UNESCO and Guerlain empower women and support biodiversity through the "Women for Bees" program, sponsored by Angelina Jolie, this program seeks to educate women to lead the recovery of the bee population and to achieve their independence economically with this praiseworthy work.

Butterfly farms can be installed in greenhouses where flowers are planted, repopulate endemic butterflies where they find wild flowers and in populated areas with living flower sculptures, to protect butterflies, arranged in such a way as to help butterflies complete their migratory routes .

The Vanesa de los Cardos Butterfly flies 40 hours straight and 14,000 kilometers across the Sahara to reach Europe. Reforestation is key in Africa to avoid its extinction.

6.- Recycling as a Sustainable Economic Activity

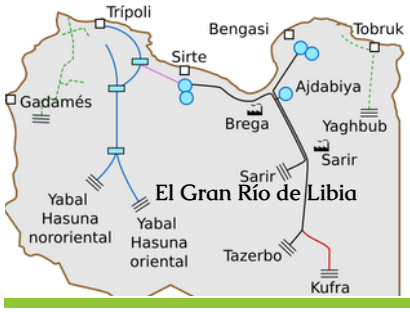
Production of Plastic Substitute Products

Recycling Centers

Ecological Waste Incinerator Plant for Electricity Supply

Recycling implies work from home, at work, in the city, which is why the efforts of citizens, companies and industries to recycle must be remunerated. Many do it for free, take their waste to recycling centers, despite the work of gathering waste, classifying it, transporting it, dumping it in collection centers... Not everyone can do it while working to survive. Recycling is not only a good thing to do, it is a sustainable economic activity that is very necessary to avoid pollution and for it to prosper, this activity must be paid and rewarded. The creation of industries around recycling and the replacement of plastic with compostable products should be encouraged. All economic activities must function as a biofactory, without contamination. If all industries recycled, they would save costs and increase their profitability.

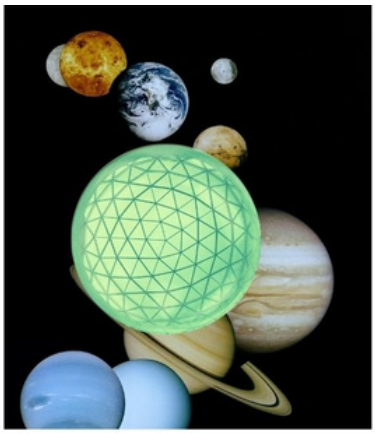
The way to make it a sustainable economic activity would be to create companies that collect recycling materials, these would be in charge of providing homes, companies, industries and the city with containers for their classification, by collecting the classified waste, weighing it and assigning it a monetary value, they pay monthly to the household or to the corresponding entity, in this way the citizen receives a bonus for this work, the collector distributes the materials to be recycled to the corresponding recycling industries. Let's take organic waste as an example, the collection company distributes it to a fertilizer industry, receives a payment for it, the industry sells the fertilizers to farmers, to ecological power plants that incinerate waste, to the Great Green Wall project to recover health of the soil... Thus everyone wins and a sustainable economic activity is carried out. If we look again at the project The Great Artificial River of Libya, which was built in 5 stages, in each of them it was ensured that pipe factories were available for its construction. As the Great Green Wall is built, urban-planned industries and residences will be built, designed to be carbon neutral from the start.



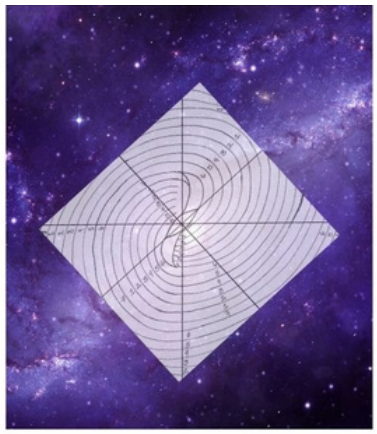
7.- Urban Planning for Sustainable Cities and Respect for Human and Environmental Rights

Tree City

Globe City



Galaxy City



Models of sustainable cities from the NGO Arca Tierra, the world population is growing, overpopulation is a future problem that we must solve now, cities with a few million people, or only hundreds of thousands, collapse, because the urban planning is deficient and sustainable development is not promoted in rural areas, in our YouTube Series Against Climate Change we explain how to achieve sustainable development and promote programs to achieve it

Our models of sustainable cities Tree, Globe and Galaxy are designed in order to consolidate human and environmental rights, because what is the purpose of cities? The quality of life of the citizen, to which we must add sustainable development so that it can prosper for present and future generations. Therefore, its citizens must be given equal opportunities to exercise human and environmental rights, so how would it be planned and organized? Based on what? Of the functions for a better quality of life and the provision of human and environmental rights, I would plan the location of the buildings according to their functions with respect to human and environmental rights, if it is for work, education, health, sports, recreational parks .....

Each country has its own culture and history, so their democracies must adjust to them, some countries consider the monarchy part of a democracy, especially European countries, due to their history and culture, Latin American countries that became independent from monarchies Europeans, they absolutely do not consider the monarchy as part of their democracy, so each country has the right to design its democracy adjusted to cultural and historical factors, in the continent of Africa, each country is very unique, some very different from others , in fact in a country each province is very different from another, but the traditional African political organization is usually monarchical, frequently hereditary and, in any case, sacred. It is surrounded by a rudimentary administration, but not only central, but provincial when the size of the State requires it.

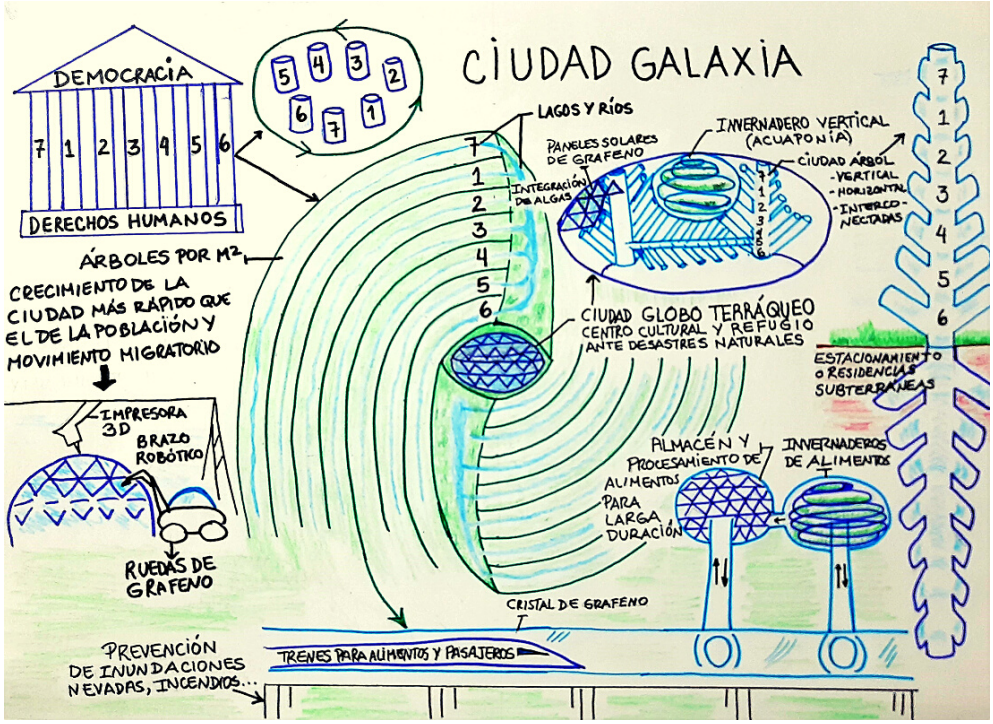
What does not change from one country to another, no matter where you are, is that human rights must be respected, human rights are inalienable, you are born with human rights and no one must transgress them, democracy is a human right, Democracies make viable sustainable development, the consolidation of human rights and, as a consequence, improve the quality of life. The NGO Arca Tierra consolidates participatory democracies, where the government and citizens assume human rights responsibly, as benefits to be enjoyed and duties to be fulfilled, so that they can be consolidated and continuously improved. If I have the right to work, I have employment benefits and the duty to be efficient.
Making clear the importance of considering culture and history for the design of a functional democratic model, that democracy is essential, that human rights are not negotiable and it goes without saying that crimes against humanity are not negotiable or are discussed, because unfortunately impunity has curtailed the democracies of Latin America and Africa. *"Without justice there is no peace."* gandhi

In our Evolution textbook and course, we teach management policies for a just, prosperous, and sustainable world. Start now! It's free.

Making it clear that urban planning in a democracy must be oriented towards the achievement of human rights, whatever the democratic model chosen, we designed an organizational structure adaptable to national governments, continental organizations and the UN, it is functional regardless of the country because it is based on human rights, classified into 7 bureaus, which reduces bureaucracy and acts effectively with the capacity for infinite expansion.

In our online course Organization and Models of Sustainable Cities we explain the organizational model and how a sustainable city would be designed. Here in a general way we will explain the Galaxy City model, the ellipsodial shape, with 7 arms that represent the bureaus of the organizational model, for example bureau #4 deals with production, with industries, so on this road there are related buildings, which also decreases traffic. In all its branches there are green areas and trees are guaranteed for a certain m2 that guarantee the quality of the air, if you observe the blue lines, they are rivers and lakes, in such a way that on the roads they move with the kinetics, the water battery , with the infrastructures and buildings connected to receive and transmit clean water and energy in a green circuit, explained in the previous points.

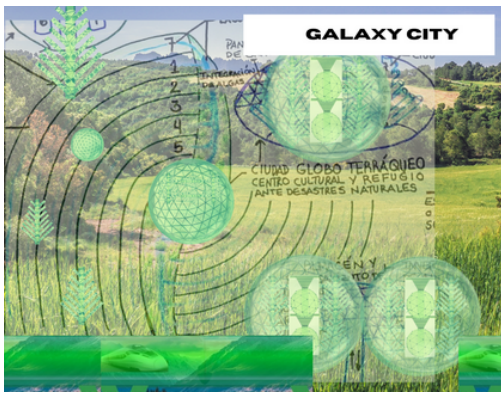
Buildings can also be cities, since tree cities, globe cities and why not, floating cities can be built on them, but even on land they can be built, because even if you hear a lot of noise about overpopulation, and that we are many and that hunger, climate change is due to population growth, but the real reason for the environmental disaster, hunger and poverty is the lack of organization and planning. A few cities grow and of course the majority in search of work migrate to them and fill them up, and you take a bus out of the city and you see land and empty land to build on, abandoned rural areas because they migrated to the big cities because in their towns they don't they had schools. Of course, it is true that today's large cities are unsustainable, polluted, with some more poverty than others and with unequal opportunities to exercise human rights, because they grow without urban planning and/or continue to grow on the sides of a large avenue.



that never grows, so everyone lives crammed into poorly maintained buildings under the lights and glitter of a great avenue, because cities must grow at the rate or faster than demographic growth and migratory movements, it is a very worn excuse to blame all the evils to migration, to the migrant who sows what you eat and if you were not in your country entire crops would be lost and you would have to buy more expensive food, migration only generates problems when there is ineffective organization and planning of integration for a sustainable development.

So we have plenty of space to expand humanity and we would have even more space if every m2 were used, with efficient designs that integrate bio furs, alternative energies to be carbon neutral and integrate nature, in this way the expansion of humanity does not would be considered a problem, let's solve once and for all the true causes and thus we will have plenty of time and resources to play the game of the expansion of humanity in the solar system, because the future is expansion.

In the galaxy city, from the graph there are other cities, we observe in the center a globe city, resistant to natural disasters that serves for government offices, congresses, events and in case of natural disasters it can be activated as an emergency center, it would already have reserved food, beds, for certain



number of people according to the demographic index, because in the movies there is a disaster, there are 100 people and only 20 can be saved, because there is no more shelter, which we see in real life, why is this? Is it because climate change is unpredictable, because they arrived late to the refuge, because those who the government says must be saved? Gentlemen, simply because of poor organization and planning. If the demographic index is 100 places for 100 people, they must plan and a little more, estimating internal and external movements.

So in the Sahel strip there are vast spaces to build sustainable cities and make existing ones sustainable, many lack the necessary services and infrastructure, we offer to provide training and advice to make this possible, to promote democratic governments, organization and urban planning, currently we have the campaign of the Sustainable Cities Project, for more information.

Timeline

In each country or sector with certain geographical conditions and socio-economic, environmental and political factors, an evaluation must be made and a project issued. Projects, in general, will be carried out in the following stages:

Activities	Time
Stage 1 Organization and Preparations	1 Month (The work to obtain support will be continuous) Work Tables as Open Innovation
Stage 2 Design and Development	3 months
Stage 3 Final Budget and Resources	3 months
Stage 4 Construction and Commissioning: putting green and gray constructions into operation with socio-economic activities, as progress is made	According to the dimension of the Project from 1 year onwards
Stage 5 Continuous Improvement	Always

Continuous improvement is super important, so inspections and recommendations for the continuous improvement of constructions will be carried out periodically and more sustainable economic activities can be added, training and employment options can be provided in populated centers with higher population density so that refugees and citizens have stable sources of employment in the maintenance and operation of the Great Green Wall. Technologies will be updated, the NGO Arca Tierra will encourage its research and development centers to create improvements for the functioning of the Great Green Wall and the countries involved that will help defeat desertification, this program is aimed at recovering desertified areas due to warming global, it does not have the purpose of disappearing the Sahara or another desert, because together with the glaciers, the deserts create the synergy of the air currents, the sand storms are part of the planet's thermostat, because they reduce the temperature, among other benefits .

SUPPORT THE REALIZATION OF THIS PROJECT!
write to us info@ongarcatierra.org