Presentation

Billion Agave Project

A different approach

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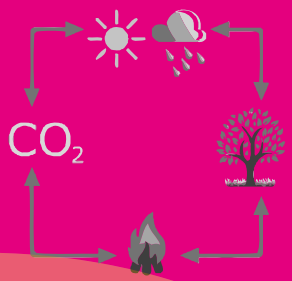
What is the Billion Agave Project?

This is an initiative that arises from national and international civil society organizations, which seeks, through the coordination and participation of the academic, public, private, community and social sectors, to develop projects for the sustainable and integrated use of agave cultivation, with the goal of improving living conditions in the communities, preserving the environment, regenerating soils and contributing to stop climate change through carbon sequestration.

Project Relevance

The confidence in this project rests on the fact that agaves, whose center of origin is Mexico, are prodigies in environmental, social and economic services, with very robust biological roots and very deep cultural roots, which make them, respectively, outstanding for carbon sequestration, soil regeneration and water storage, and highly familiar and endearing to the communities, which since time immemorial have given them infinite uses.

Sustainability



Agaves Characteristics

Agaves are exceptional plants that are abundant in arid and semi-arid ecosystems, but are also present in tropical ecosystems; they are distributed in the Americas, mainly in Mexico, where 223 of the 273 species exist.

Thanks to a highly efficient metabolism for photosynthesis and water management, they are able to thrive even in extreme drought conditions and in degraded soils unsuitable for agriculture.

The metabolic pathway they use for photosynthesis, called Crassula-cean Acid Metabolism (CAM), makes them up to eight times more efficient in producing sugars than plants with C3 and C4 metabolic pathways and up to ten times more efficient in the use of water. During the day the tiny openings in their leaves, called stomata, close, thus significantly reducing water loss by evaporation; CO2 is captured when the temperature drops, mainly at night, and stored in the form of malic acid. After capture, photosynthesis is carried out with the light energy of dawn.

Approach

Comprehensive Use

Agave can be used from the root to the top of the stalks. Before the Conquest, they were already used for hundreds of applications, both for personal use and for construction, agriculture, household goods, musical instruments, food, medicines and spirits, among others.

In some regions, the industry has focused on taking advantage of only some of its products, such as tequila derived from blue agave or the fiber obtained from henequen. The Billion Agave Project (BAP) rescues the millenary holistic vision and generates projects for multiple uses that are socially, economically and environmentally sustainable.

Some of the commercially important uses already identified and addressed by the BAP are the following:

Forage
The stalks have a high content of sugars, water and fiber and, after crushing and subsequent fermentation or dehydration, they become an excellent maintenance feed for animals.

Fiber
The most common fiber is extracted from the henequen, used primarily for cordage; however, finer fiber can be obtained from other agaves for paper, handicrafts and animal feed, among other uses.

Inulin
It is widely used by the food industry to increase the amount of fiber in products and also serves as a thickening agent that improves the organoleptic characteristics of food.

Lactic acid
It has a wide range of applications in the food, chemical, pharmaceutical, chemical and cosmetic industries, among others. Recently, research has accelerated due to its possibility of transformation into biodegradable polylactic acid (PLA) in the packaging industry.

Bioenergy
The high sugar content of agaves makes them one of the plants with the greatest potential for producing biofuels such as ethanol, biodiesel, pellets, synthetic gas, biochar and bio-oil.

Syrup
It is a natural sweetener with between 50 and 75% fructose, with nutraceutical properties that can double the sweetening capacity of sugar and whose glycemic index is much lower than that of sugar, making it a very healthy sweetener.

Carbon credits
Agave plants are highly efficient at sequestering CO2, storing up to 143 tons of this greenhouse gas in one hectare per year, which makes the plantations strong candidates to participate in the carbon bond market.

Distillates
They are alcoholic spiritual drinks, some examples that are already highly commercialized are tequila, bacanora, sotol, raicilla and mezcal; the steps to elaborate them are jima, cooking, fermentation and distillation.

Fermented products
The best known is pulque, made from the pulp to obtain mead, which when fermented becomes pulque, a viscous beverage with a high probiotic content.

Science & technology

Research Projects

In order to develop new technology and knowledge that will give scientific support to BAP projects, collaboration agreements have been established with national research institutions. Some of these agreements and projects are the following:

National Polytechnic Institute, Leon Campus, Biotechnology Department.
-Evaluation of fructan extraction methodologies in stalks of four species and four ages of agaves.
-Evaluation of the potential for molasses production in stalks of four species and four ages of agaves.
-Production and bromatological characterization of stalk meal for fodder purposes in four agave species.
-Evolution and content of lactic acid in agave stalk silage.

Center for Research and Assistance in Technology and Design of the State of Jalisco (CIATEJ).
-Evaluation of the content and characterization of fructans in pineapples and stalks of four species and four ages of agaves.

Scientific Research Center of Yucatan (CICY)
-Agroecological models for henequen.
-Henequen distillation.
-Enzyme consortia.
-Inulin extraction from henequen.

Innovative Projects

The BAP has implemented strategic actions for the regeneration of degraded soils, establishing diverse agroecological systems with the native vegetation that still persists. The models associate wild and semi-cultivated agaves with trees or shrubs that preferably fix nitrogen, and perennial grasses or annual crops. The woody elements of the system are pruned periodically to avoid excess shade, the residues are used to make agave silage to supplement the diet of ruminants, and are also used as vegetative cover to reduce runoff, improve water retention and soil fertility.

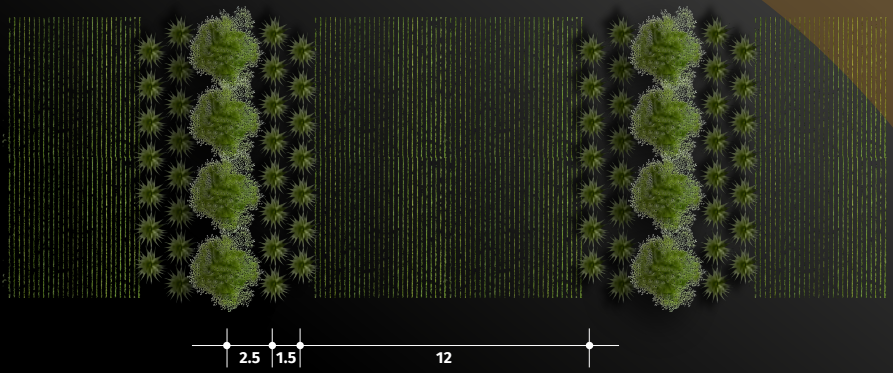
100%

Agroecological Models

One of the agroforestry systems most tested by the BAP is the agrosilvopastoral system that combines the cultivation of two thousand agaves and five hundred mezqui- tes (legumes) with the rotational grazing of ruminants among its alleys.

The system produces large quantities of agave biomass (stalks and pineapples), which is crushed and fermented in closed containers for twenty-eight days, producing a rich silage that improves its digestibility, nutritional value and shelf life.

The availability of a large amount of local forage prevents overgrazing of pastures, improving soil health and animal diets.



Development

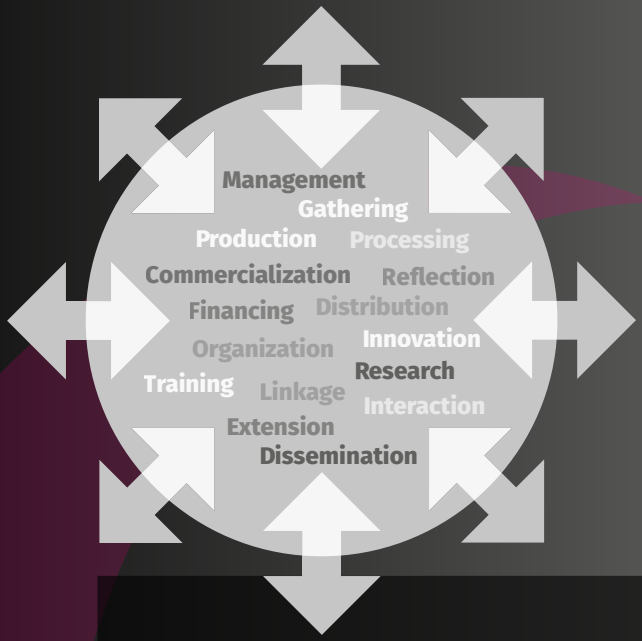
1
Rancho Vía Orgánica
San Miguel de Allende, Guanajuato

2
CEDICAM
Asunción de Nochixtlán, Oaxaca

3
Fundación Koch
Suchixtlán, Oaxaca

4
Hacienda Sotuta de Peón,
Yucatán

5
Sarape CircuLab-Rancho El Mexicano
Guadalajara, Jalisco



Implementation Hubs

Through the establishment of collaboration agreements with organizations that share the values of environmental, social and economic sustainability, hubs are established where the various activities that make possible the development of the BAP are carried out.

From and to these hubs flow the people, knowledge, resources, inputs, products and services derived from the implementation of the various productive projects that arise from the BAP in each one of them, and whose purpose is to turn them into scalable productive models that can be replicated by other organizations and communities.

Examples of Economic Potential

Organic Inulin

Inulin is a natural prebiotic with beneficial properties for digestive health. Agave is an abundant source of inulin, making it an ideal raw material for its production. The organic inulin market is growing rapidly due to a number of factors such as increasing demand for healthy foods and beverages, growing concern for digestive health, increasing population with diabetes and increasing investment in research and development of inulin-based products, growing demand for natural and organic products, and expansion into new markets, among others.

Annual market value growth in Mexico: 11.4%.

Annual market value growth in the world: 12.3%

Market value and volume in Mexico

The value of the organic inulin market in Mexico is estimated at US$4.5 million in 2023. This market is expected to reach a value of $8.2 million by 2028, with a compound annual growth rate (CAGR) of 11.4% during the period 2023-2028.

The market volume is estimated at 1,500 tons in 2023. This market is expected to reach a volume of 2,800 tons by 2028, with a CAGR of 11.4% during the period 2023-2028.

Global Market Value and Volume

The global organic inulin market value is estimated at $540 million in 2023. This market is expected to reach a value of $1.02 billion by 2028, at a CAGR of 12.3% during 2023-2028.

Volume is estimated at 180,000 tons in 2023. This market is expected to reach a volume of 340,000 tons by 2028, with a CAGR of 12.3% during the period 2023-2028.

Agave Silage

Production Volume

Agave (particularly the species salmiana, americana and mapisaga) produce large quantities of leaves or stalks per year as of natural fodder, which can be chopped annually and fermented, transformed into fodder. Perennial agave forage production far exceeds most other forage production (which requires irrigation and the incorporation of expensive chemicals) with three different varieties (salmiana, americana and mapisaga) producing approximately 100 tons per hectare of fermented forage annually. 100 ton/ha of forage annualy.

100 ton/ha of forage annualy

Economic Value

Agave forage from three of the most productive forage varieties has a market value considered at $100 USD per hectare: per ton ($10,000 USD per hectare net profit). This system, together with $10,000 USD rotational grazing, has the capacity to feed up to 100 sheep, lambs or goats per hectare, producing a potential net value added of $7,500 USD per hectare. Once certified organic, lamb production can easily increase net profits, especially if the offal (heart, liver, kidneys, etc.) is processed as dried and frozen nutritional supplements.

Forage value per hectare: $10,000 USD

Mesquite flour

Benefit to Communities

In some areas, such as the Mixteca in Oaxaca, due to high feed costs and the scarcity of grazing areas with sufficient feed, it has become very difficult for farmers to have grazing animals; this system could give them back that capacity and, with it, support their food self-sufficiency and their economy.

Agaves - Mesquite Diploma Course Regenerating semi-arid zones

The objective is for participants to receive tools to detonate actions that will transform their landscape through the development of a hybrid educational program, taught by professors dedicated to the research of productive and regenerative systems in semi-arid zones.

120 hours
In collaboration with DICIVA - Guanajuato University.

Billion Agave Project Network

This network is an attempt to connect people and entities interested in the agave issue, in order to practice the collective construction of knowledge and integrate the different concerns and initiatives in a large international movement that proposes and implements solutions to economic, social and environmental problems through the development of holistic and sustainable projects around agaves. Our Network already has 46 organizations with approaches related to production, commercialization and research, among others, from the social, community, academic, public and private sectors, which are mainly located in Mexico and the USA.

- -Subsecretaría de Autosuficiencia Alimentaria
- -Vía Orgánica
- -Caminos de Agua
- -Centro de Sanidad Vegetal del Estado de Guanajuato, CESAVEG
- -Agave 100
- -Biósfera Farm Raíces Ancestrales
- -Sitio Experimental Vaquerías-INIFAP
- -Centro de Desarrollo Integral Campesino de la Mixteca- CEDICAM
- -Productores del ejido Santa Teresa
- -Consejo Empresarial Agropecuario Tlaxcala
- -Las mujeres del mezcal y maguey
- -Magbio
- -Hacienda San Antonio Ometusco
- -Grupo Teotl destilados de pulque
- -CHOICE Humanitarian
- -Bakal Forraje Sustentable
- -Organización República Indigenista
- -Cooperativa Agrosilvicultores de Hidalgo
- -Inveragave
- -CICY
- -Universidad de Guanajuato
- -Instituto Tecnológico de Tlajomulco
- -NK-150
- -EKI Energy Services Limitedd
- -Certificadora Royalty
- -Rubisco
- -Secretaría de Agricultura y Desarrollo Rural
- -Semarnat
- -Maguey AKI
- -Conafor
- -Mayabio
- -Empresa Agropecuaria AM
- -Biopakal
- -Ama Mezquite
- -Huella Purepecha
- -Hacienda Zamarripa
- -GNR8
- -CIATEJ
- -Universidad Antonio Narro

www.regenerationinternational.org

Graphic design: **Arturo Carrillo** - Photography: **Sean Reagan**