

# AGRICULTURAL BIODIVERSITY, PROTEAS AS INSTRUMENT OF INTEGRAL DEVELOPMENT IN THE PROTECTION SPACE SIETE LOMAS. SOUTHEAST OF TENERIFE. CANARY ISLAND.

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## Abstract:

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The Proteas are ornamental shrubs cultivated for their commercial value and for their color. Of interest to the areas of medium altitude of the Canary Islands, they have consolidated as an activity in La Palma, Tenerife and Gran Canaria. The Southeast of Tenerife it has not been developed as a crop, however the medians of this area meet the climatic conditions necessary for its development. With maximum temperatures 30 °C minimum over 4 °C, relative humidity of 18.4% and a solar radiation of 1036 W/m<sup>2</sup>, his interest is both; productive; for his contribution the agricultural biodiversity and economic; for his results in the agricultural activity. In the upper part of the Valley, there is the Siete Lomas protected area of agricultural protection with the remains of a traditional agricultural activity. To the north-west of the protected area, in the municipality of Candelaria, at 1200 meters above sea level, it houses the old *Bodegas de Chivisaya* of the 19th century, abandoned and damaged by pastoral activity. A bioeconomic resource with a history to recover where beekeeping, viticulture and forestry coexisted for decades. Proteas production favors the sustenance of life, nutrition, nectar and pollen, shelter for local fauna and complementary economic contribution to the agricultural activities of the place. Biodiversity-based economy that leads to attraction for rural areas, enhancing the recovery of abandoned farms with the presence of young farmers ecofriendly who see a new sustainable business model shaping a varied agriculture where it takes the form of agro ecology with service horizons. This concept of biodiversity favors the recovery of agricultural land, generates complementary economies such as ecotourism defined as "responsible trips to natural areas that conserve the environment, sustain the well-being of the local population and involve interpretation and education" (The International Ecotourism Society, TIES, (2015)).

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**Keywords:** *Biodiversity, proteas, insects, rural development, young farmers.*

## INTRODUCTION:

Many studies have shown that sustainable agricultural development favours healthy ecosystems. Biodiversity is the basis of this balance, with implications for the activity of the farmer and the space surrounding him. Pollinators, vertebrates, mammals, but especially insects, favour the continuity of ecosystems. The degradation of their habitat with the loss of natural refuges, of flowers with nectar and pollen, affects the life of the insects that have lost the hedges, rocks, and bushes where they lived, limiting the development of the beekeeping activity and the agricultural ecosystems. Agro-ecology is sensitive to this situation, and is based on agricultural systems that favour diversity in the rural space in productive ecosystem farms. In this context, biodiversity and agriculture must go hand in hand in order to achieve the conservation of the ecosystem and the optimization of agricultural activity (R. Winfree and Col 2018).

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Western institutions have become aware of this aspect, designing programs for the ecologization of agriculture, encouraging the recovery of hedges, organic fertilization,...., orienting business activity towards the conservation of the environment. Actions materialized in the conservation of the flora and the fauna favoring the interaction with the vegetative mass of the agricultural exploitations.

European environmental development policies encourage farmers to devote at least 5% of their farmland to areas of biodiversity: areas of ecological interest, e.g. crop diversification, perimeter vegetation or fallow land, good agricultural practices, all in favour of biodiversity and habitats. These actions are integrated in the rural development programme of the Common Agricultural Policy (CAP 2014-2020), which includes as strategic objectives the conservation of the rural landscape and action to combat biodiversity loss. Within this framework, the actions for the modernization of Canarian agriculture and the incentive for the creation of companies by young farmers are developed in accordance with the Rural Development Programme of the Canary Islands (RDP 2016-2020), with action by the Regional Government and Local Entities.

### **THE PROTEAS IN THE MIDLANDS OF THE CANARY ISLANDS.**

The Canary Islands are from Macaronesia, located in the Atlantic Ocean, of volcanic origin with deep ravines that generate hills formerly transformed into farms still operating and of an average altitude greater than 500 meters, in places with a slope greater than 30% , with terraced crops.

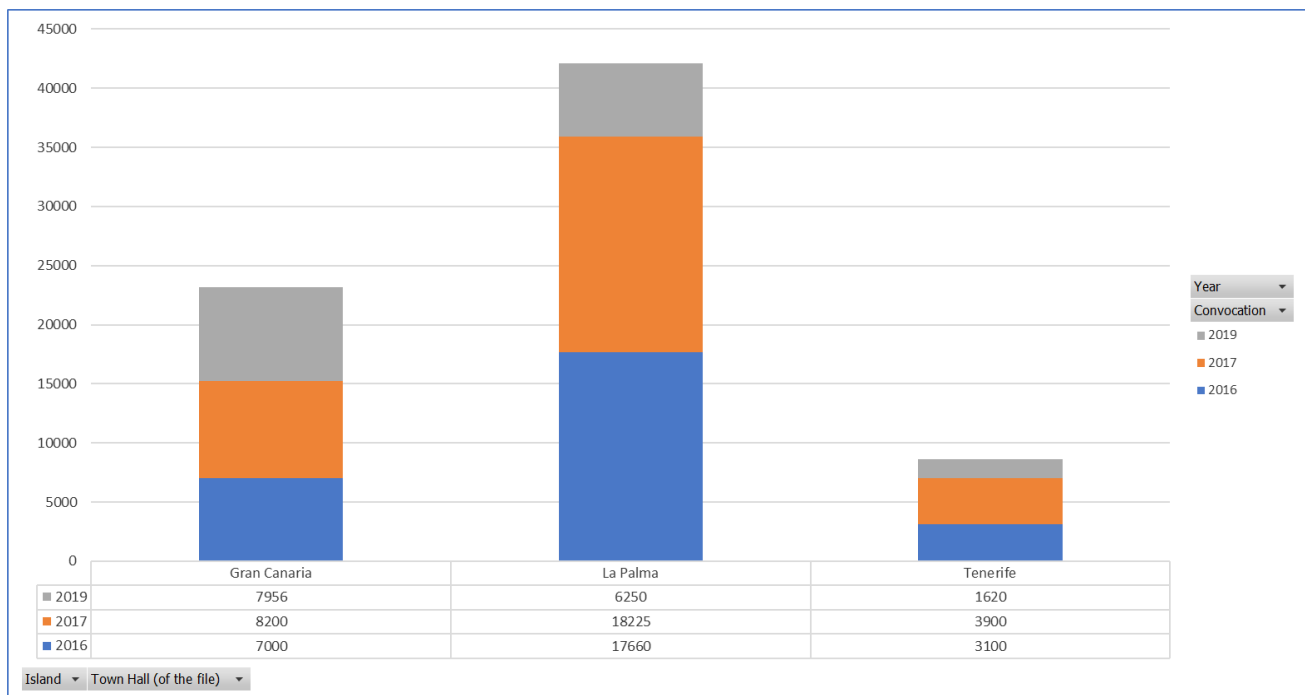
After the Conquest of the Canary Islands by the Kingdom of Spain, in the fifteenth century, orography promoted the construction of terraces to save the slopes of the land. Ancestral methods, *the Guanches, aborigines*, built terraces on wooded slopes for ordinary crops and beekeeping activities.

The old and popular documentary records highlight the existence of agro-apicultural activities associated with farms, with other agro-forestry activities of the time. The revitalization of the agro-apiculture with a conservation agriculture favors the activity that protects the environment and generates a Sustainable Rural Development.

The reconstruction of these medium sized farms is based on crop association systems, proteas are a resource that brings new business and environmental opportunities for the agricultural development of these highland farms where biodiversity is the foundation of their development.

The botanical family *Proteaceae* is composed of multiple genera, some endemic to Sout Africa such as the *Proteas, Leucadendron, Leucospermum*, others to Australia, such as *Banksia*. These are among the crops promoted in the Canary Islands at a regional level, (PDR 2016-2020). These are ornamental shrubs cultivated for their commercial value and colour. In 1975, the first trials were carried out in the *Jardín de Aclimatizacion de La Orotava* (Rodríguez Pérez, J.A., (2007).

As a result, in the 90s, the Island of Tenerife had a selection of optimum varieties for cultivation that is now consolidated in the Islands of La Palma, Tenerife and Gran Canaria, where it is grown in areas dedicated to medium-scale agriculture. The Government of the Canary Islands during the period 2016 to 2019 has encouraged the cultivation of Proteas. As a result, 72,000 plants have been sown, covering 18 hectares (BOC 243/2015; BOC 82/2017; BOC 247/2018).



Promotion of the cultivation of Proteas. The Government of the Canary Islands. Period 2016 to 2019. Own elaboration.

Proteas are found in the midlands, in areas that are between 400 and 800 meters above sea level. These areas have a traditional agriculture dedicated to horticultural crops with production destined for the internal market and in competition with imported products. Most of them are dry farming crops, in small terraces, not very technical and organized, made up of small farms, their farmers have a dedication, preferably, part-time as a complement to other non-agricultural activities. They are areas of interest for conservation because of their agricultural, environmental and tourist value. The local administrations have provided them with networks of walking trails, encouraging visits by tourists linked to nature and ecotourism

### **PROTEAS, AN INSTRUMENT OF SUSTAINABLE DEVELOPMENT.**

The Proteas in the Canary Islands as a professional crop are formulas of traditional production, medium sized estates, of an average size of 3000 square meters, in a monoculture system, with anti-breeding and in irrigation. However, there are other crops that acquire other forms of production, the associated system, small plots of land next to other traditional dry farming crops. They form hedges on the edges of plots, decorative, others isolated in gardens and constitute a reserve of plant varieties adapted to the agricultural ecosystems of the Islands, forming part of the agricultural landscape of the midlands.

The associated cultivation, mostly non-productive, serves as a delight for the farmer, also as a support for a part-time family economy that sells by proximity sales, generates biodiversity to the agrarian ecosystem and also provides an attraction for those who walk the paths of the islands. Its flowers are not crops, they reach the end of the vegetative cycle, they constitute striking hedges with varied colour that attract insects and provide agricultural biodiversity.

The Proteas have contributed to the ornamental agricultural biodiversity of the midlands of the north of Tenerife, present in small agroforestry plots, associated with other traditional crops. Its shrubs are integrated into the landscape of the local midlands, with specimens that are more than 20 years old. In the *Caserío de Montiel*, *Icod de Los Vinos*, in the northeast of the island, we can see small farms whose proteas have been integrated into the traditional agricultural landscape, next to areas of forest.

This agro-diverse activity provides essential functions to the ecosystem with the production of biomass, with the cycling of nutrients and with its pollination, favoured by the rotation of species among which are the proteas, plants that are not very common in the Canarian landscape.

### **THE AGROFORESTRY DEVELOPMENT OF THE SIETE LOMAS NATURAL PROTECTED AREA**

Güimar Valley has places that are valued for their historical, aesthetic and cultural tradition and which have been recognized by the Canary Islands Government in the Special Plan for Protected Landscape (BOC 194/2004), with the aim of preserving the natural, cultural and landscape values that surround traditional agriculture. It is known as Siete Lomas and forms part of the network of Natural Protected Spaces of the Canary Islands. These are agroforestry farms with a unique agriculture and landscape formerly managed by farmers, most of them abandoned. Their protection aims to maintain their ethnographic values linked to traditional activity, agriculture, beekeeping, livestock and forestry.

It is located on the island of Tenerife, in the centre of the Güimar Valley, and covers an area of 1013.90 hectares, distributed in three municipalities, Candelaria, Arafo and Güimar. It borders to the north, east and south with the Corona Forestal (T-11) and to the west with the Güimar Valley depression. The lowest elevation is 500 and the highest is 1458 meters above sea level.

There are 76 Canarian endemisms. This biodiversity has been maintained thanks to the rugged configuration of the hills, both in terms of natural and cultural values. Its climatic conditions of temperature, humidity and solar radiation could accept the cultivation of proteas generating environmental and economic value to emerging farms.



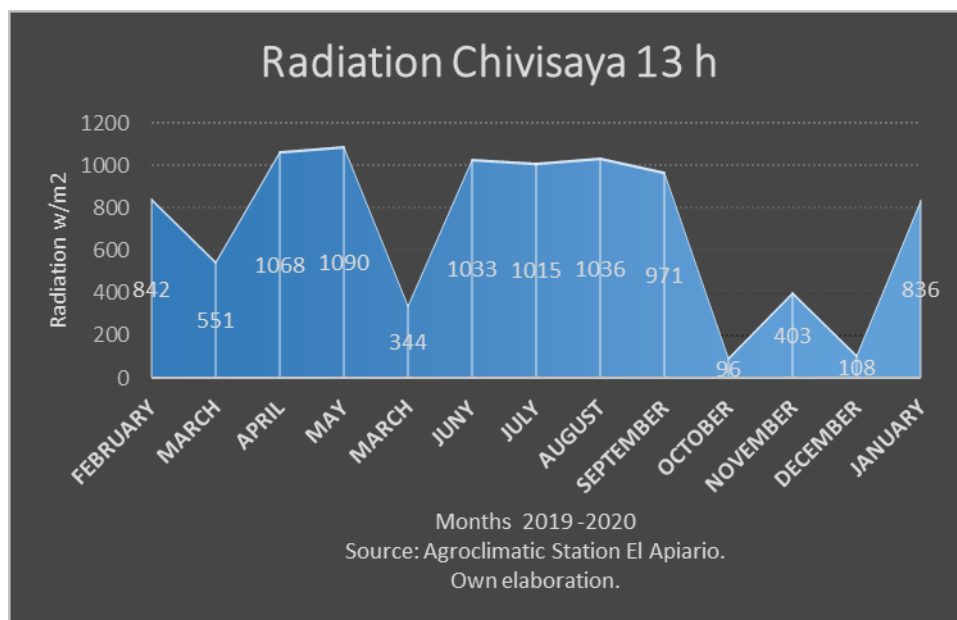
*Bodegas de Chivisaya-Drom El Apiario. Imaging (2017)*

To the northeast of the space are the old warehouses of the *Chivisaya* wineries. A unique enclave, with terraced estates, formerly used for vine cultivation, eroded by pastoral activity. Currently, one of the wineries is being reconverted, a business activity for new ventures by young people. They design a multi-disciplinary economic activity to enhance the agricultural space with the integration of its cultural values, within the framework of a sustainable rural development promoted by regional institutions.

### **YOUNG FARMERS AND RURAL DEVELOPMENT.**

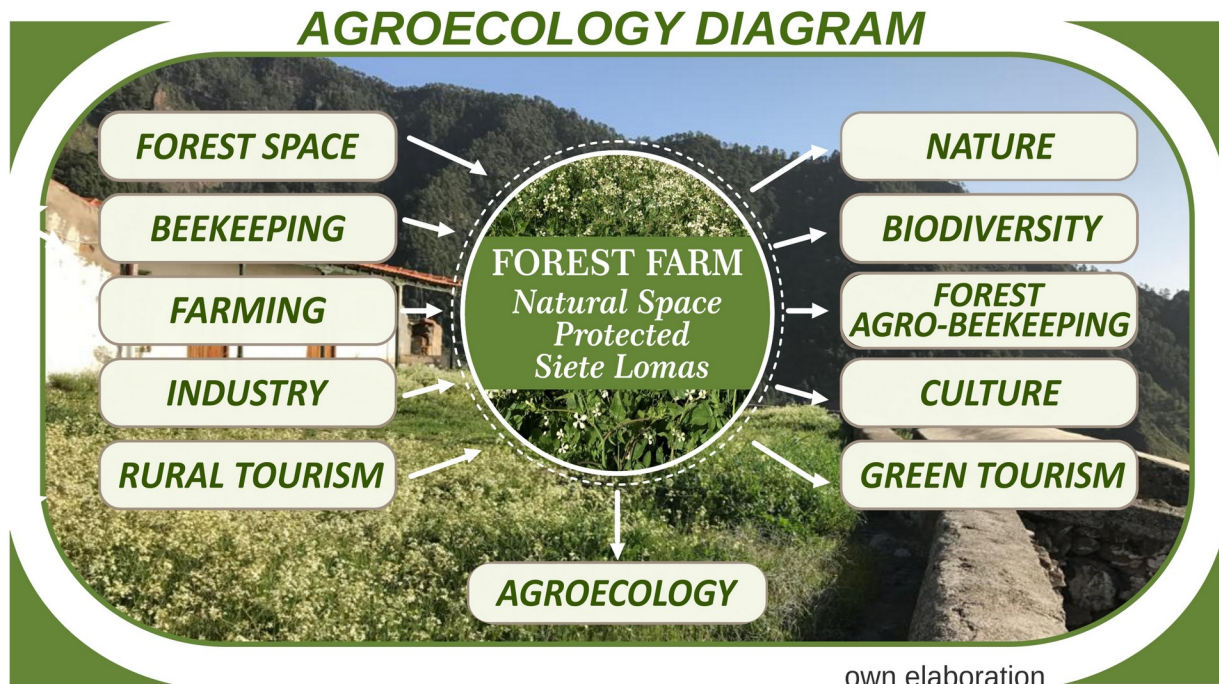
Young organic farmers have set up an agro-tourism business in the area. It is called *El Apiario*, located on the last hill, where one of the wineries is located. A 4 hectare farm with historical, environmental

and cultural values. Its buildings, such as old wineries and cistern, are more than 150 years old. The business development program is aimed at beekeeping among the agroforestry crops, such as almond trees (*Prunus dulcis*) and thyme (*Thymus vulgaris*), both of which are widespread in the area. Its flowers are a contribution to agricultural biodiversity, with flowering in different seasons complementary to the existing ones.



The proteas as a bush in the small terraces that border the farm is an opportunity to beautify the agricultural environment and increase the floral mass also contributes to the economic results of the business activity. The agricultural characteristics of the property, *El Apiario*, is composed of small terraces facing east and west, at a minimum height of 900 meters and maximum of 1100 meters, soil of medium fertility, acid, with high solar radiation.

Internationally, floriculture is recognized as an alternative agricultural crop for income. In the agriculture of a sustainable enterprise, it is required an integral approach, to generate strategies to approach an agricultural production with infrastructures, technical capacity for an integral Rural Development where the primary sector joins with the industrial and services sector. In this context of sustainable development we enter into the foundation of Agroecology in its version as a global agricultural space where the business activity acquires a multidiplinary function to favor the conservation of the territory with sustainable and integrated economic activities.



The cultivation of proteas associated with other crops brings richness to the design of the reconversion of the estate. Its presence in perimeter hedges, in cultivated plots in the areas near the old cellars and cisterns, in association with other crops gives colour to the place and increases the productive potential of the estate. Proteas also incorporates other flowers that provide pollen and nectar to the bees on the farm. In this design phase, we are looking to enhance the value of resources with history by reconstructing the whole of the agricultural plots and buildings, generating new economic activities to complement the traditional ones.

## CONCLUSIONS.

The Canary Islands have an agricultural production potential located in the mid-altitude lands, constitutes an insular ring at a height of more than 600 m to 1500 m, are agroforestry companies. The proteas, ornamental shrubs, are adapted to the microclimates of the areas bordering the forest areas, their flowers have an attractive color, are rich in nectar and pollen, favoring the nutrition of insects such as bees.

The incentive for the development of cultivation at regional level articulated around young people visualizes new entrepreneurial resources, consolidates the productive offer of the Canary Islands countryside and the return of young people that puts in value the farms from a combined vision of the local resources articulating the service sector with the agricultural productive one.

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