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Historical Evolution and Multidimensional Characterisation of the Butia Palm Landscape: A Comprehensive Conservation Approach

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Abstract: The *Butia odorata* palm grove in southeast Uruguay forms a particular landscape of the Pampa biome, which has been inhabited and transformed since the early Holocene. The forms and meanings of this contemporary landscape are the result of the historical interaction between culture and nature. The conservation of its natural and cultural heritage has been compromised by anthropic activities, leading to conservation proposals from different disciplinary perspectives that are partial and do not consider the landscape's integrity. In this article, we propose a comprehensive approach, integrating the ecological, cultural and socioeconomic aspects through a historical look at the domestication process of this landscape. This approach is based on a transdisciplinary narrative aimed at generating a multidimensional and diachronic characterisation of the palm grove landscape on which to base a participatory definition of the most appropriate instrument for conservation through sustainable use.

Keywords: *Butia odorata*; Pampa biome; domesticated landscape; biocultural landscape; in situ conservation; sustainable use

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1. Introduction

Palms of the *Butia* genus occur in Argentina, Brazil, Paraguay and Uruguay, a region where the 24 species of this genus of the Arecaceae family are distributed [1–4]. Some of these species form clusters of individuals called palm groves, palmares or butiazais. In particular, the palm grove of *B. odorata* (Barb. Rodr.) Noblick, locally called 'butia palm grove', is distributed in the Pampa biome [5,6], in the southeast of Brazil and Uruguay, which is the southernmost of the genus [7]. In Uruguay, two large palm grove territories stand out in the Department of Rocha, in Castillos and San Luis, which extend approximately 70,000 hectares (Figure 1) [8–10]. It is found in the mid plains of the Bañados del Este Biosphere Reserve and forms part of the Bañados del Este Ramsar site [11]. This palm grove has varying palm densities—from a few dozens to more than 500 palms per hectare [12]. They are found mostly in natural grasslands and form diverse environments according to the type of surrounding vegetation and land use [13]. This landscape (Figure 2), marked by the presence of the butia palm grove, consists of diverse agroecosystems located on private land used for agriculture and livestock activities. The local identity is strongly linked to the butia culture through artistic expressions and local symbolism [14].

The butia palm community is at serious conservation risk as a consequence of some anthropic activities that have led to a structure of centenarian palms and a lack of younger individuals [15]. This problem is included in the national and regional environmental agenda, and there has been progress in proposing and implementing different types of conservation and sustainable management alternatives [13,16–19]. However, these

proposals are partial, formulated from specific disciplinary perspectives that do not consider the integral conservation of this landscape's natural and cultural heritage. The conservation of the palm grove must necessarily be a focal point, as it structures and gives meaning to the landscape, but on their own, they have not considered the multiple dimensions and historical evolution of the landscape.

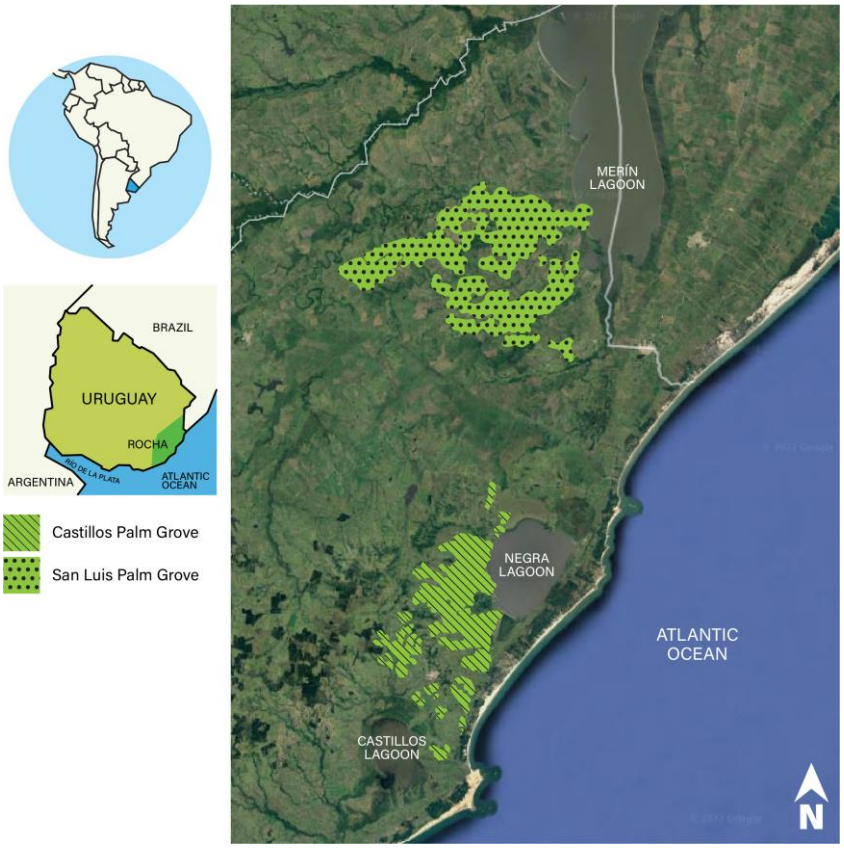

Figure 1. Geographical location of the *Butia odorata* palm grove in Rocha, Uruguay.

Figure 2. Diversity of butia palm groves.

The butia palm grove has been inhabited and transformed since precolonial times [20–22], so that culture has shaped the landscape and the ways of inhabiting it over time. Humans have domesticated this landscape for various purposes through different practices, building cultural niches and giving rise to contemporary landscapes that are the result of a mosaic of multiple human–environment interactions [23–25]. From that perspective, this landscape has changed by adding 'layers' that over time have made it more complex. However, these layers are constantly integrated and resignified, which gives life to the landscapes and transforms them into a kind of palimpsest [26,27]. It is therefore relevant to understand the historical trajectory and the different human–environment interactions that have contributed to the current configuration of this particular landscape.

The general objective is to understand these dynamic and dialectical interactions in temporal depth and the underlying cultural models of nature to gauge the complexity of this landscape and propose alternatives for its conservation and sustainable use. The specific objectives we propose are to collect and systematise existing information on the multiple dimensions of the landscape, to construct a transdisciplinary narrative that generates a multidimensional and diachronic characterisation of the palm grove landscape, to develop a socioenvironmental conceptual model and to analyse and discuss the adequacy of management tools and instruments for conservation and sustainable use.

2. Methodology

Using the theoretical frameworks of historical ecology and environmental history, we take a comprehensive and transdisciplinary approach that integrates ecological, cultural and socioeconomic dimensions through the historical trajectory of landscape domestication [28].

The methodology involves a scoping literature review [29] for recovering and synthesising indexed publications and grey literature. This review aims at developing an integrated narrative that considers environmental, sociocultural, agronomic, economic and symbolic elements, showing the landscape's historical change. The historical periods chosen for this analysis are somewhat arbitrary; this decision aims to show the main elements that define the landscape, from the Upper Pleistocene to the present. We pay special attention to the main biophysical and cultural elements concerning climatic changes and the diversity of anthropic actions throughout history. Specifically, we consider the variation in sea level, changes in the water network, vegetation and fauna, the effects of fire, the construction of mounds, subsistence activities, the main changes that have occurred during colonisation and the impact of modern production systems, as well as the diversity of ways of inhabiting the landscape and the material and immaterial legacies.

From the qualitative analysis of the information, we develop an interpretative model of the socioenvironmental trajectory of the butia landscape. From a group discussion between the work's authors and a design and illustration specialist, we produce a graphic representation of this model summarising the butia landscape's main aspects.

Finally, using an argumentative literature review [29], we also discuss different conservation strategies for the butia palm grove.

3. Results

When the Butia Palm Grove was a pristine landscape

Although its age is still unknown, the butia palm grove has been present in the region since long before the arrival of the first human settlers. The earliest records in eastern Uruguay date back to the Upper Pleistocene, some 30,000 years before present [30]. However, this chronology could be accepted as a minimum age, as we lack older paleoenvironmental records that could provide new evidence. On the other hand, the present distribution of butia palm groves in Uruguayan territory is associated mostly with the mid plains linked to Pleistocene transgressive deposits in which the sea would have reached 10 (Castillos palm grove) and 20 (San Luis palm grove) metres above its current level. These events have been dated to some 30,000 and 110,000 years before present [31], which could

be assumed as maximum ages, at least for its present distribution in Uruguay. However, the palm grove might have varied its distribution, density, extension and layout during the last glacial period (117,000–11,000 years ago), accompanying glacioeustatic and climatic variations, that is, retreating to refuges and riparian hills during maximum cooling while expanding during warmer and more-humid interstadials on substrates generated by the transgressive–regressive cycles.

These climatic oscillations also impacted these landscapes' fauna during the last glacial period. The fossil record shows the typical representatives of the South American megafauna of the Lujaniense age (such as glyptodonts, mastodons, toxodons, megatheres, ground sloths and sabre-toothed tigers, among others) and other mammals. Some of them currently have a tropical to temperate distribution in South America, suggesting a possible relationship with some favourable climatic moment (last interstadial or even the last interglacial cycle). However, the presence of some forms that have adapted to dry and arid environmental conditions has also been verified, these being typical of the conditions prevailing in the Late Pleistocene [32].

A landscape under construction since the Holocene—The coevolution of human communities and ecosystems

The first human settlers arrived in the region about 11,000 years ago, according to the oldest records available [33]. This initial settlement occurred during the Pleistocene–Holocene transition, with climatic and environmental conditions typical of the beginning of the interglacial period, i.e., a gradual increase in temperature and humidity and sea level rise [34,35]. It is feasible that many valuable archaeological and paleoenvironmental records corresponding to this period are currently submerged given that, albeit rising, the sea was still about 30 metres below its current level at the beginning of the Holocene and reached its present level only about 7000 years ago [36].

The scarce paleoenvironmental records for southern Brazil and eastern Uruguay indicate that the butia palm grove already existed when the first human groups arrived in the territory, although very little is still known about its extension, density and layout. Along with other woody species, the climatic improvement of the Holocene would have allowed the expansion of butia palms from riparian forests and other Pleistocene refuges [37].

The human inhabitants that settled in the area developed strategies based on hunting and gathering, incorporating butia into their subsistence. Direct evidence of this use was obtained at the Los Indios site, the earliest site in the Department of Rocha [33]. The first dates obtained for the early occupation were made on carbonised palm endocarps, with chronologies of 9500 years before the present [38]. Although the records of these early occupations are very scarce, they show that palms were harvested and transported and that their fruits and seeds were eaten. Even though this type of subsistence implies forms of human–environment interaction of low intensity and with little visibility in the archaeological record, sustained over millennia, they could have caused important modifications that shaped the early palm grove landscape: fruit selection and spreading, favouring of specimens, transplanting of propagules and fire management, among others.

These interactions intensified towards the mid Holocene, with warmer and more-humid conditions (Optimun climaticum), and the beginning of a new transgressive phase (Holocene Transgressive Maximum), in which the sea would have reached between 4 and 5 metres above its current level [39]. The obstruction of drainages due to the change in slope resulted in extensive areas of permanent wetlands in the middle plains (elevation > 10 MASL), while the low plains were invaded by the sea [40]. In these conditions, one of the greatest anthropic modifications in the prehistory of the South American lowlands began, leading to the formation of true domesticated landscapes. Thousands of anthropogenic earthen monolithic structures, known as 'cerritos de indios' (Figure 3), were built as from the mid Holocene (5500–200 BP) in the plains, ridges and hills adjacent to this wetland [38,41]. These mounds are the materialisation of singular and ancient experiences of intensive environmental management, which involved soil and drainage management, favourably affecting biodiversity and often pursuing or promoting specific productive

purposes [42,43]. These anthropogenic soils are a clear example of environmental management through which, by altering edaphic conditions and incorporating nutrients, habitats conducive to the growth and production of useful species are created [42,44]. On the other hand, species management and cultivation, earthen architecture (including mounds, platforms and ridges), hydraulic engineering works (the channelling and either maintenance or reactivation of small bodies of water) and the controlled use of fire are also common archaeological manifestations in the region from the mid Holocene onwards [21,42,43].

Figure 3. Indigenous mound.

The role of butia palms was recognised early on by regional archaeology thanks to archaeological records, the ethnographic analogy and the current importance of these resources for local populations [22,45]. Palms are constantly present throughout the archaeological records of the Indigenous mounds, to a full spatial and time extent and in different manifestations. The charred endocarps of palms have been frequently found, as well as specialised lithic instruments for fracturing the endocarps and recovering the seeds, locally known as rompecoquitos [22]. The micropaleoethnobotanical record has also provided evidence of the importance of palms in the subsistence of these native peoples [20,21,45]. On the one hand, the presence of the plant micro remains (opal phytoliths) of butia fruits in sediments, inside ceramic vessels, on the active surface of grinding instruments and in the dental plaque of individuals exhumed in the Indigenous mounds is direct evidence of the fruit's collection, processing and consumption. On the other hand, the frequent finding of opal phytoliths produced in palm leaves, involucres and stems indicates the broader subsistence role of this resource, which is linked to construction, industry and even burial rituals [21]. Indirect evidence has also been provided from bioanthropology: dental indicators (caries) have been attributed to the possible incidence of extensive palm fruit consumption [46], and trace elements (Sr/Zn) have been associated with the consumption of palm seeds [47].

Although there is no direct evidence of intensive palm management or domestication practices, it is indisputable that the palm grove landscape's domestication began from the mid Holocene. This domestication involved different soil, drainage and species management practices, including hunting, fishing, gathering and horticultural practices, with the incipient development of agroecosystems as early as 4600 years before the present. It involved domesticated species such as squashes, maize and beans and managed species such as *Canna glauca* (aquatic Canna), *Thypha* spp. (cattails), *Bromelia* spp., *Oryza* spp. (wild rice) and other wild rice relatives (*Leersia* spp. and *Luziola* spp) [20,21,48]. Once established, these new forms of interaction and environmental management did not stagnate in the face of the successive climatic and environmental changes of the mid and late Holocene, but they constituted a dynamic and active form of successful adaptation to the environment.

With the gradual lowering of the sea level and the establishment of a more-temperate and subhumid to seasonal climate towards the end of the mid Holocene (4000 BP), the occupation of the higher wetlands grew with the construction of more and larger mounds; this was the highest mound density recorded in the whole area of the Merin Lagoon Basin [43]. It was not until 3000–2500 years before the present, with the sea close to its current level and climate conditions similar to the present, that the construction of mounds expanded towards low wetlands, including the coastal lagoon environment on both sides of the Merin Lagoon Basin [40,49]. Watercourses riparian and hilly forests would have spread once the climate had stabilised and the base level had decreased, while the palm grove expanded over the geoforms linked to the last transgression [40].

At the regional level, the same period corresponds to the beginning of mound constructions in the lowlands of northeastern Uruguay (from ca. 3200 to 14C BP), in the Paraná Delta (ca. 1600 to 14C BP) and in the lower reaches of the Uruguay River (ca. 1800 to 14C BP), e.g., [50,51]. This denotes an expansion of the construction of burial mounds as a technological feature and, mainly, the increasing anthropisation of the landscape.

Beyond these climate-environment changes and their impact on the configuration of the territory, no significant variations have been found in the forms of human–environment interaction over almost 5000 years of the construction, maintenance and use of the Indigenous mounds. Although there was an increase over the past 2500 years in the production and consumption of cultivated resources (particularly maize), including specific technological developments for their processing and perhaps storage (e.g., ceramic vessels and grinding tools), crops continued to represent a secondary and complementary element in a ductile, wide-ranging subsistence [52,53].

Contemporary to the final period of mound construction in the lowlands and to the arrival of the first European groups (16th and 17th centuries), other material manifestations that witnessed the cultural imprint of the butia landscapes appeared. On the tops of the sierras and high ridges, stone accumulations known locally as cairns or vichaderos began to be erected. These constructions are made of stone blocks located in high sites and encompass a variety of forms, including mounds and rings, both closed and open. Historical sources and recent archaeological research have revealed that these structures were used for multiple purposes: as burial sites, ceremonial sites, territorial markers and hunting structures, among others [54,55]. From a landscape standpoint, they are found in places of high altitude and good visibility which have good connectivity with the middle plains, the palm grove, coastal lagoons and associated wetlands.

These landscapes, which had already been heavily anthropised by centuries of recurrent construction practices (in earth and stone), environmental management and resource and niche production, received the first European expeditions in the territory and witnessed the earliest contact with the Indigenous groups who inhabited it. However, there are very few chronicles and accounts for that early period because of the limited incursions into the territory [56]. For eastern Uruguay, no references to contact with mound and/or cairn builders have been found, even though they were still occupying the Merin Lagoon Basin at that time. The lack of precious metals delayed the interest of colonial authorities in the eastern Uruguayan territory, with very few incursions and descriptions until the second half of the 17th century. This began to change when Colonia del Sacramento was founded and thanks to the spread of European livestock [57], upon the discovery of the nonmineral wealth the territory had to offer: grasslands.

Changes during the Spanish/Portuguese colonisation

During this period, there was an enormous abundance of open-range cattle. Around 1677, there were around four million cattle in this area, presumably domestic cattle that had escaped from the Jesuit missions on the Uruguay River and then became feral cattle. These herds of feral cattle were called Vaquerías del Mar (literally, 'herds from the sea'), constituting the main cattle reservoir for the Jesuit missions of the Uruguay and Paraná rivers [58]. Illustrations from that period in the memoirs of Jesuit priest Florián Paucke [59], and the diary of Father Juan María Pompeyo and Brother Silvestre González of 1705, refer

to cattle drives of more than 400,000 heads of cattle [60]. Both sources also mention that Indigenous people participated in these gigantic drives.

In the large grasslands of the region, these cattle were mixed with cervids (*Ozotoceros bezoarticus*, *Mazama gouazoubira* and *Blastocerus dichotomus*), which had been exploited over thousands of years by local Indigenous groups. These herds of native herbivores shaped the landscapes of grasslands that today make up the Pampa biome, in which the butia palm groves are found. This new animal setting made up of cattle and deer became a new object of economic management for the Indigenous populations of the region [61]. Cattle, deer, horses and Indigenous people began to interact in this new geopolitical context, trading with the military who settled or transited across the border area and the new settlers who were living in the first settlements near the border [62]. To better estimate the economic relevance of this trade, in the 1790s, more than half of the hides brought into Montevideo's port were unbranded cattle [63], while [64] reported that two million deer hides were legally exported from the ports of Buenos Aires and Montevideo between 1870 and 1880.

This abundance of cattle, as well as the associated logistics and different forms of management, must be interpreted not only from an environmental perspective but also in light of the colonial border disputes between the Portuguese and Spanish empires. These were political buffer areas that influenced both human and animal mobility and contributed to defining the population structure linked to the palm grove and the use of resources. As part of a series of treaties and border disputes, mostly linked to the First Treaty of San Ildefonso, in 1777, the territory of the Neutral Fields (Campos Neutrales) was created, a buffer zone between the two empires where neither fixed settlements nor demarcating border markers were allowed. In the areas surrounding the Campos Neutrales, several fortifications and population centres were set up in what is now Uruguayan territory in order to stop the westwards Portuguese expansion. Within this framework of population consolidation near the border, two systems which granted land to settlers for productive use were implemented: suertes de estancia ('land favours') and farm agriculture. This population structure characterised the type of land ownership and use around the town of Castillos at the time of its foundation, in 1866 [65], which would influence the configuration of human relations with the *Butia odorata* palm grove. For the new settlers, the palm grove was a very accessible source of food and raw materials for various construction purposes. At the same time, its monumental presence began to be incorporated into Castillos's culture, forging a strong identity link between the palms and the inhabitants of the town of Castillos and the new settlers who began to use the palm grove as a recreational site [66,67].

The butia palm groves became a key element of this framework: the leaves, and sometimes the trunks, were used to build permanent and temporary housing, as well as sheds and shade shelters. The palms were transplanted to form palm pens (Figure 4) that have been associated with the origins of cattle ranching in Uruguay, which resulted from the fusion of different worlds (Indigenous peoples and new settlers, plus introduced species and native species). According to [62], the first pens were probably built by the Guenoa-Minuan Indigenous groups that lived in the area, who quickly adapted to cattle management and colonial trade. These cattle management strategies were preceded by previous experiences in the management of cervid herds, and that knowhow was adapted to the new environmental and political context.

Although some of the first pens were likely built by these groups, they would have continued to be built later in association with more-specific cattle management tasks to establish permanent settlements near the border. However, other hypotheses propose that pens were also used to support long-distance cattle drives, connecting southern Brazil with Colonia del Sacramento (some 1000 km away). This route, which crosses the palm grove, is part of a network of historical cross-border roads connecting distant places such as Colonia del Sacramento and São Paulo [68]. In this framework, the territory defined by the Neutral Fields played a crucial role in that it constituted a portion of territory between both empires without active military surveillance or a fixed population and through which there was a very fluid transit of cattle drives and smugglers [69].

Figure 4. Palm and stone pen.

The border played a key role in defining the butia palm grove landscape. Indigenous and colonial settlements promoted trade between worlds and cattle movements across the border and the Neutral Fields. The troperismo (cattle drives) or the explicit need to avoid such movement (the fixed activities of cattle management on private properties where the pens were located) are hypotheses that depend on colonial disputes over the border. In this framework of border disputes and new economic, political, environmental and cultural contexts, the incipient development of cattle ranching associated with the palm grove was another important element. However, the growing settlement of the area through large estates and small properties was associated with the development of a form of livestock production based on slavery.

The establishment of large estates in the border led to one of the largest concentrations of slaves in the country [70], making up a slave-owning cattle system. These slave-holding estates formed a rural landscape with no other settlements until Castillos was founded, in 1866, and Santa Vitória do Palmar, in present-day Brazil, in 1872 [71]. This cattle system, which focused mainly on leather production, evolved into a meat industrialisation system in places known as saladeros (meat-curing industries), which proliferated in 18th-century Uruguay, where most of the tasajo (dried beef) production was sold to feed slaves in the region [72]. Once slavery had been abolished in the mid 19th century, many of the former slaves continued in a regime of de facto slavery, or, as some authors have put it, second slavery [73]. The long distances to the most populated centres, years of structural and symbolic violence, material dispossession and social destructuring, among other factors, meant that many slaves continued in this regime of second slavery. In fact, in the estancias, slaves began to be hired under very unfavourable conditions, with 20-year and inheritable contracts. In spite of this new form of slavery, around 1860, several of these new 'workers' (or 'peons') slowly began to flee the estates and built small villages where they met again and developed independent life projects. Many of these settlements, now abandoned, are in the area around the Castillos palm grove (as is the case of the Portera Negra settlement) and are traces of a past that bore witness to a productive and exploitative system.

By then, the Indigenous groups in the area had largely disintegrated, acculturated and hybridised into the culture of the new settlers, and they became part of the local population together with freed slaves and new settlers who did not own any land. This had an impact on the use of the palm groves, which constituted a readily available resource for these marginalised populations. In addition, the consolidation of human settlements resulted in different forms of delimiting properties and land, mainly for more-intensive land management. In this process, palm pens, which were still regularly built, and other types of enclosures made of earth, thorny plants or just by opening clearings in the forest played key roles [74]. In this process of the spatial appropriation of territory and resources, several native vertebrate species were displaced and overexploited.

Modernisation

At the end of the 19th century and during the first decades of the 20th century, with the newly independent nations, the region began to seek its own forms of economic development. Between 1872 and 1882, the countryside was revolutionised by the wire fencing of the land, not only because of how fast it happened but also because of the

profound changes it brought about. Fencing reduced labour costs, improved the quantity and quality of production and secured the herds, reinforcing the idea of private property. Another important change was the introduction of sheep [75]. In this context, a process of changes in the grasslands' structure and the composition of the vegetation had begun, which may have led to overgrazing and which therefore would have affected palm grove regeneration, as [76] indicated.

From 1915, the government began to promote agriculture, which led to the creation of a belt of small farms around the town of Castillos and other smaller settlements. The palm grove played a key role in shaping the population structure thanks to the palms' industrial exploitation, which started in the first half of the 20th century. In 1943, a butia oil factory called Cocopalm was set up to 'wholly industrialise' butia palm fruits. The oil produced from the seeds was used for a variety of nonfood purposes, such as to make engine lubricant or even soap [10].

Palm fibre factories, or 'vegetable horsehair factories', as they were locally known, were the most spatially and temporally widespread in the area. There were between 5 and 10 factories: some of them coexisted, while others changed owners [77]. The industrialisation of butia leaves initially took place in southern Brazil (near Santa Vitória do Palmar and Rio Grande do Sul) at the beginning of the 20th century [78]. In Rocha, all the factories were first in Paso del Bañado, about 5 km from the town of Castillos, but some later moved into town. Paso del Bañado, a village that is in the middle of the palm grove and that is nowadays in ruins, saw a big population growth with the arrival of these factories, as they provided work for several people. The leaves were harvested in the nearby palm grove, although they were sometimes harvested in other areas. In total, these factories employed hundreds of people who lived in the area. There were technical specialisations such as leaf harvesters, as well as commercial intermediaries for multiple uses such as filling mattresses and cushions, espadrille soles and brooms [67]. The harvested leaves were transported in wagons and trucks to the factories where they were 'fiberised'. These factories thrived thanks to what was known as the Import Substitution Model, which marked Uruguay's economic policy from 1930 to 1960. In general terms, the model discouraged the imports of First-World products and promoted national industrial production, bringing down customs barriers and favouring the exchange rate policy [79]. When this model collapsed, the factories disappeared because they could not compete with the price of imported synthetic raw materials.

This industrial exploitation of the palm grove evidenced what the palm grove represented from an economic perspective for the inhabitants of Castillos and its surroundings. In fact, since the beginning of the 20th century, several authors have highlighted the economic potential of this ecosystem [80]. Industrialisation was part of a process of interactions that was affected by centuries of very varied uses.

A series of traditional uses such as the elaboration of sweets, liqueurs, jams, jellies and coffees made with butia seeds and the fruit with aguardiente known as 'cane with butia' [67] were already very common among the local population and were also commercialised. The ban on 'palm honey', a drink made from the sap of the palms that required draining the palm and ended up killing it, was established by Act 9872 of 1939. This use, which was a traditional and basically domestic use, was part of the relations between palm trees and people. The high level of imbrication between people and the palm grove was the socioenvironmental and cultural context that led to the strengthening of the local identity, based on several traditional uses and local artistic expressions.

The second half of the 20th century to the present day

The 1950s brought significant changes in the country, which also led to the evolution of the landscape of the butia palm grove. In 1951, the rural population was at its highest, coinciding with a stage of agricultural expansion and a high number of estates of no more than 100 hectares [75]. However, from then on, a continuous process of rural–urban migration began, which has lasted until the present day, with a consequent ageing of the rural population. These processes are largely due to factors such as land concentration, an

increased corporate presence and reduced family production. Large families leave very small plots of land to their children, which is compounded by a shortage of jobs [81]. Butia fibre factories closed in the second half of the 20th century, changing the tangible and symbolic landscape of an entire era.

Meanwhile, the Castillos palm grove is used for livestock in the larger paddocks, together with small agricultural farms and family horticultural production (Figure 5). Although livestock systems have incorporated some technological changes throughout the 20th and 21st centuries, their magnitude has been low, and they have hardly altered the landscape. However, changes have occurred thanks to the forestry industry, which introduced some exotic plant species into the higher lands and sierras that make up the palm grove, and thanks to the drying up of some wetland areas [82].

Figure 5. (**a**) Palm grove used for cattle breeding, (**b**) palm grove with rice crop, (**c**) palm grove with horticultural crops.

This period is also marked by the arrival of the Green Revolution, which had a particular impact on the start and development of rice agriculture in the palm grove region of northern Rocha (Figure 5). This led to the drying and canalisation of wetlands and the use of agrochemicals, which radically changed the landscape of this palm grove. Although there is a legal prohibition against damaging the palm trees, they are subjected to cycles of flooding and are exposed to aerial spraying, a situation that affects regeneration, the vigour of the palms and probably fruit production [83]. In the San Luis palm groves, there are also livestock producers on natural grasslands that form patches on a matrix of rice–livestock rotations on sown pastures.

Now, in the 21st century, different models of inhabiting these butia palm groves coexist: family farming, corporate agriculture and forestry companies. In recent years, there have also been some individuals and families who have migrated from the city to the countryside in search of a more natural environment.

In this context, the diversity of the butia palm groves is not determined only by the differences between the Castillos and San Luis areas or only by the differences in palm grove densities. This landscape presents a rich and intricate net in which palm groves coexist with diverse types of wetlands, forests and grasslands; flora and fauna which are characteristic of these environments; and vast plant genetic resources [13,84–88]. Palm groves provide various ecosystem services such as food for associated wildlife, domestic animals and humans; fibre for local crafts; honey; and fodder, shelter and shade for livestock. Ecosystem regulating services include erosion control and the maintenance of soil fertility, the regulation of the hydrological cycle and microclimate, and pollination services [85,88].

The palm grove provides multiple tangible and intangible cultural services, both from an aesthetic point of view (as a source of inspiration in preserving social relations and ties to the community for ecotourism and recreational services) and for education and science [7,19].

In these landscapes, hundreds of family farmers raise livestock and, in some cases, small-scale agriculture, especially horticulture for self-consumption, for animal feed and occasionally for selling purposes. It is these families who conserve the agrobiodiversity of both landraces and wild species. In the Castillos palm grove, 149 landraces belonging to 33 cultivated species have been identified, including *Cucurbitaceae*, *Phaseolus* beans and a variety of sweet potatoes, corn and bell peppers, among other crops [89]. Traditional knowledge associated with the use of native wild species has also been surveyed, recording 106 species in the Castillos palm grove, which are used mainly for food, medicinal and construction purposes, although they have also been used for ornamental, aromatic and fuel purposes, among others [90]. Local knowledge associated with the use of this agrobiodiversity refers to different types of practices and uses that are passed down within families, especially by women and, to a lesser extent, between neighbours.

Regarding the different uses of butia, in addition to fresh consumption, traditional products such as liqueurs, coffee seeds (gradually disappearing), jams and jellies are still made. These products are consumed by the families or marketed on a small scale in an area called Vuelta del Palmar (Figure 6). In the first decade of the 21st century, some locals were trained in food handling and processing. Technological research was also conducted on product innovation and seeking to develop specific equipment to process butia fruits [91]. The main products included different types of juices, nectars, sauces, pastries, ice creams, sugar-coated almonds (kernels), chocolates and candies [67,91], which are marketed by family microenterprises. A couple of years ago, the local government implemented a tourism programme called Flavours of Rocha, which aimed to promote gastronomy from local produce and in which butia fruits played a prominent role [19]. A participatory proposal for an ecotourism route was developed in parallel [92], but it has not yet been implemented. There have also been efforts to provide training to local artisans and support to visual artists to promote art and crafts linked to butia [19]. Among these many challenges, it is also intended to valorise traditional knowledge, literature, music and painting linked to the palm grove.

Figure 6. Stall where artisanal products are sold.

4. Discussion

Interpretative model of the butia palm forest landscape

Through a transdisciplinary analysis, as proposed by [25,93] to understand the human history of past and present landscapes, it is postulated that the current landscape of the butia palm grove in the southeast of Uruguay is a domesticated or biocultural landscape [24,94]. It resulted from human–environment interactions and climate changes that have occurred since the beginning of the Holocene [95–98]. Nature–culture coevolution, as an integrating concept [99], allows us to understand the current landscape and to value the legacies for current and future generations [25,100,101]. The current landscape shows that in the domestication process of the butia palm grove, the intensity of interventions has varied over time. Promoted, managed, cultivated, swidden/fallow and settlement landscapes [24,95] have succeeded one another and coexisted in the palm grove. Because of the nutritional, social and cultural importance of palms [102], they are indicative of domesticated landscapes [103–107], as we propose for the butia palm grove.

The use and management practices of different resources to achieve safe and productive environments transformed the landscape of the butia palm grove, as shown in Figure 7. Figure 7a represents a pristine landscape which, according to available data, could be dated to at least 30,000 years ago. Figure 7b,c correspond to the arrival of the first human settlers until the encounter between Indigenous and European cultures, accounting for approximately 95% of the time elapsed since the arrival of the first human settlers. Figure 7d represents the colonisation stage, which basically took place between the second half of the 17th century and the 19th century; Figure 7e shows the modernisation that began in the early 20th century; and Figure 7f represents the current situation.

The transition from a pristine to a promoted landscape [24] began with the arrival of the first humans in the region (Figure 7b). Anthropogenic fires were frequent starting from the early Holocene [108,109], which, added to wildlife grazing, caused changes in the physiognomy and composition of the vegetation, favouring grasses and herbs in the grasslands [110–112]. Hunting and gathering activities were favoured [113], and greater security was obtained in inhabited environments, among other benefits. As already mentioned, there are records of butia fruit consumption dating from as early as the arrival of humans to the palm grove territory, which could lead us to suppose that butia palms have been promoted since then. Adult palms are not affected by fire [114], and this disturbance is probably a promoter of butia seedlings. Regarding the extinction of megafauna, the available regional information is not conclusive in relation to whether it was caused mainly by hunting activities or whether it had multiple causes [115,116].

In Figure 7c (mid Holocene), promotion activities are maintained, but the management of the environment is already evident through the construction of thousands of Indigenous mounds that speak not only of a managed landscape but also of a settlement landscape [24]. An increase in human populations was recorded, also coinciding with an increase of riparian forests 5170 cal yr BP under warmer and wetter climate conditions [107]. In the case of the butia palm, the records of fruit and seed consumption are abundant for this period, and it can be presumed that promoting this species was an important factor in its spread. On the other hand, controlled fires and changes in the dominant vegetation probably led to a marked increase in the numbers of certain animals, such as the Pampas deer (Ozotoceros bezoarticus) [117]. Hunter-gatherers would have built relatively stable niches that would have allowed them to maintain this way of life for thousands of years [112]. Rather than specialising in specific management, cultivation and domestication practices at the species level (although they did use them), mound builders developed environmental management strategies that had repercussions on resource concentration, niche construction and domestication at landscape scale. The success of this ductile and resilient strategy explains 5000 years of the perpetuation of this dialectic interrelationship between humans and the environment, which was the precursor of the butia biocultural landscape.

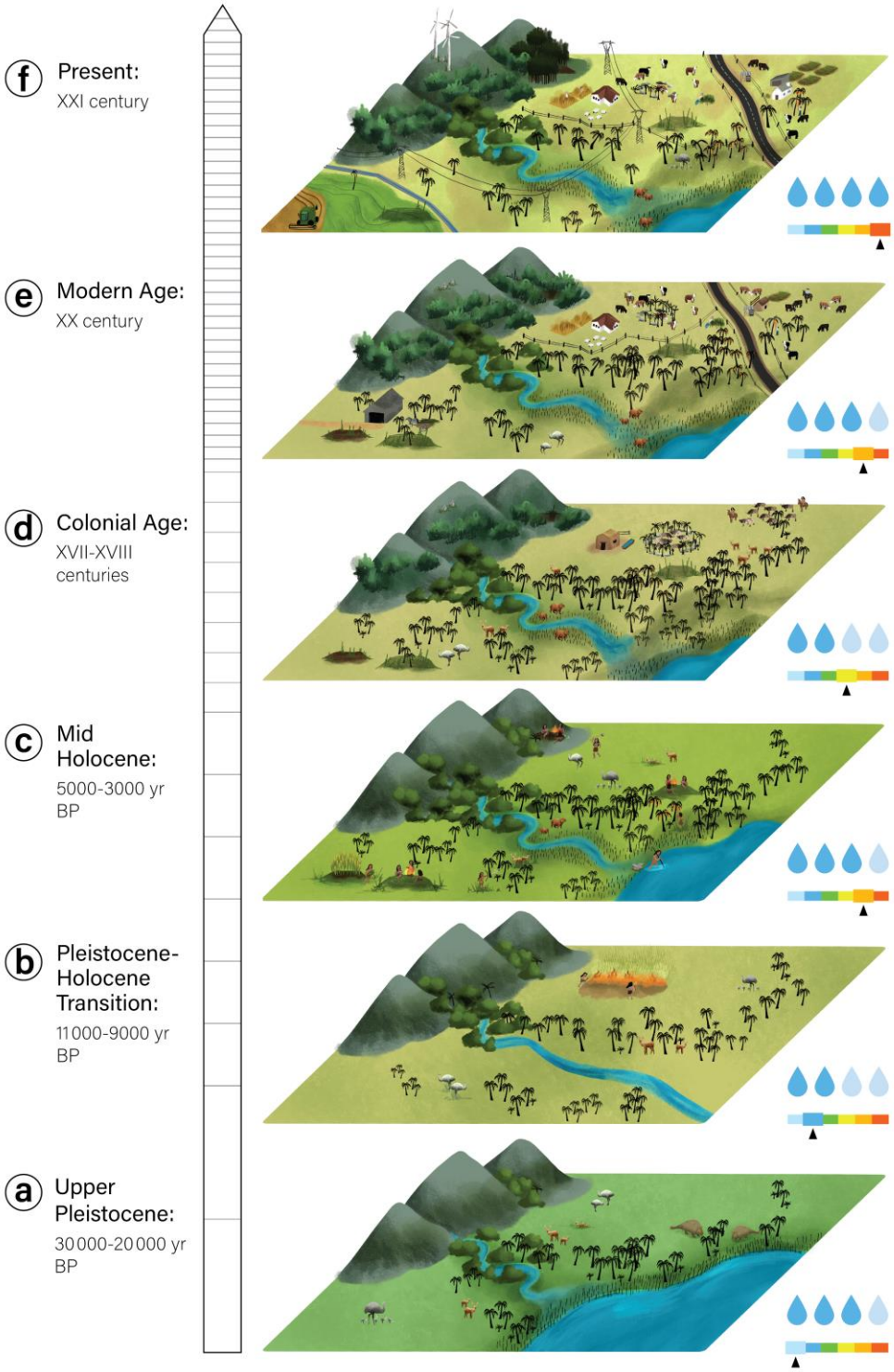

Figure 7. Conceptual model representing the environmental evolution and landscape dynamics of the palm grove region. The diagrams are illustrative for different times and do not represent quantitative data: (**a**) Upper Pleistocene; (**b**) Pleistocene–Holocene Transition; (**c**) mid Holocene; (**d**) colonial age; (**e**) modern age; and (**f**) present time. Chronologies are expressed in calibrated years before the present (yr BP) and calendar age. No spatial scale.

Figure 7d shows the encounter between Indigenous and colonial cultures, a period marked by interimperial logics, commercial interests and processes of active and passive border claims and by new configurations between native and introduced herbivores such as cattle and horses. Cattle introduction was key to affirming the pastoral destiny of the

Pampa biome and, in particular, the Butia landscape, where the coevolution of grasses and herbivores shaped the landscape of the grasslands, or campos. In colonial times, the cattle were semifreely managed, driven by troperos. The campos had no fences and were open areas, except for the palm pens. On the other hand, this troperismo could also have caused the spread of butia seeds [86,118]. The settlement of European populations also brought along European crops that became integrated with native American crops in small, cultivated areas.

The modern age (Figure 7e) shows substantial changes, many of which are maintained in the present. Cattle ranching on natural grasslands is the predominant activity in modelling the landscape, but the fencing of paddocks started to change the grazing ecology, particularly affecting the regeneration of the palm grove. The cultivated and industrial landscape (with the butia fibre factories) was added to the livestock, which promoted well-managed, small-scale agriculture and settlement landscape, which increased agrobiodiversity, the rural population and the heterogeneity of the forms of inhabiting the butia palm grove.

The present age (Figure 7f), which is the shortest in the 10,000 years of the construction of this biocultural landscape, has seen the greatest conservation changes and risks. A transition towards corporate agriculture, particularly for rice and soybean plantations in the San Luis palm grove, and forestation in higher lands for the cellulose industry, along with the new pastures and grassland improvements, constitute the main causes of the loss of the natural campos and therefore of plant genetic resources and ecosystem services [119,120]. This situation is aggravated by the overgrazing of natural grasslands [121], which is the main cause of the low regeneration in the palm grove [16,84,122]. The worldwide devaluation of grassland ecosystems is argued to be the cause of the lack of conservation policies, particularly in the case of the Pampa/grasslands biome in the Rio de la Plata [5,85,123].

In the present age, changes in the production systems have worsened the palm grove's regeneration, compromising the conservation of agrobiodiversity, associated traditional knowledge, the material legacy of its rich cultural past and the diversity in the ways of inhabiting it. Other activities, such as the creation of networks, the development of butia products and their use in gastronomy, and the potential development of ecotourism and handicrafts have become more prominent over this period. This situation confronts us with challenges and opportunities to conserve the palm grove landscape within the framework of sustainable use.

Conservation problems and strategy

Herter in 1933 proposed the creation of a reserve or natural monument for the palm groves of Rocha, arguing that all the formations and associations of the country are found there: sierras, grasslands, palm groves, wetlands, sandy areas, streams, freshwater lagoons and oceanic coasts [8]. Even though a long time has passed since then, the only existing legal protection is the National Act of 1987, which prohibits cutting or otherwise damaging the palms, but it fails to contemplate the regeneration of the palm grove, let alone the biocultural integrity of the landscape. The palm grove landscape's being in a Biosphere Reserve and in a Ramsar area has not resulted in specific legislation or the implementation of concrete measures. Meanwhile, the butia palm was added to the list of priority species for conservation in Uruguay [124], although it is the palm grove community that is endangered, not the species.

This vulnerability is due to the centenarian age structure of the palms and the lack of regeneration in lands used for agriculture, the main causes being livestock overgrazing and crops, mainly rice [83]. Cattle grazing management has been proposed to develop a conservation strategy that allows the palm grove to regenerate within the framework of sustainable livestock production. It is based on grazing exclusions during the winter season, instead grazing the rest of the year with young cattle classes adjusting the stocking rate according to forage production, preferably in areas of lower palm density or even in surrounding areas [16,17,88]. This alternative has the virtue of enabling the regeneration of

the palm grove and the conservation of the natural grasslands, and it does not decrease but instead can increase meat production [125,126]. By integrating producers, academia and local public institutions, it has been possible to inform producers about this form of cattle management through training and dissemination programmes. As a result, seven demonstrative areas were established on private properties, in addition to a pioneer area established in 2015. However, the overall area is small (82.5 hectares), so the challenge is not only to continue monitoring and validating this practice but also to incorporate larger conservation areas in the 18 cattle ranches that comprise 70% of the Castillos palm grove [13]. Other initiatives propose the reintroduction of young palms through transplants, although they have so far made no progress [126].

The palm grove's conservation does not refer exclusively to butia palms; from the ecosystem's point of view, it means conserving a variety of flora and fauna in which pollinators and dispersers stand out, as well as the environmental services provided by the ecosystem [85,86]. Conserving the spatial configuration of palm groves is crucial to ensure the viability of palm populations, avoiding the effects of environmental fragmentation on their reproduction and genetic diversity, in addition to the conservation of associated biodiversity [88].

In this context, the reduced generational turnover in family production is a worrying situation that threatens the conservation of agrobiodiversity and associated local knowledge, as well as other forms of intangible cultural heritage such as the local negritude heritage and the heritage of stories, legends, poetry, songs and paintings. Although this topic is rarely included in conservation proposals, we understand that it is essential to continue supporting public policies linked to family agriculture, rural women and youth. In the same sense, policies to valorise agrobiodiversity are relevant, both by generating value chains and through agroecological certifications [88,127,128].

The tangible cultural heritage such as the Indigenous mounds, palm pens, cairns, the landscape of old vegetable fibre factories and old estancias, among others, remains unprotected. In the 1980s, the Commission for the Archaeological Rescue of the Merin Lagoon Basin was created in order to recover and save from destruction as much material evidence of the Indigenous mounds as possible [38]. This led to a slow process whereby Indigenous mounds were being recognised as heritage, requiring major academic efforts to promote their conservation [38,47]. Although a slow regulatory change regarding heritage has recently taken place in Uruguay (Act 18,068 on the Safeguarding and Promotion of the Diversity of Cultural Expressions and the adoption of UNESCO's Convention for the Safeguarding of Intangible Cultural Heritage), the main legal norm in force regarding cultural heritage in Uruguay is Act 14,040 on Tangible Cultural Heritage, which was passed in 1972. This protects the Indigenous mounds as individual entities and in a very generic way, with an obsolete heritage approach that shows discrepancies with the new socioterritorial needs [129]. Regarding palm pens, several local organisations have been concerned with their study and conservation [62], but there is currently no legal figure that safeguards these archaeological structures.

In legal terms, Uruguay has two laws that could be applied to the conservation of the butia palm grove landscape, one concerning protected areas and another concerning land-use planning. The Act for the Creation of the National System of Protected Areas (2000) and its Regulatory Decree N°52/005 establishes different categories of protected areas, among which protected landscapes and protected areas with managed resources are the most plausible alternatives to be applied to the conservation of the butia palm landscape. However, these categories do not address landscapes in the sense that we propose in this paper. For instance, the recent creation of the Laguna de Castillos protected landscape within the framework of the National System of Protected Areas includes only a small area of the palm grove territory, being marginal and not representative of the landscape as a whole. In general, archaeological and cultural heritage conservation is conceived independently from environmental conservation and management [130], although some progress has recently been made in identifying, recognising and protecting cultural values

in the management plans of protected areas where these are present [131–134]. On the other hand, agrobiodiversity conservation has not been incorporated as a specific object when designating protected areas. Although these conceptions are slowly being reversed, we understand that they would not be the most appropriate solution, mainly because of the need for a participatory governance [135] of the palm grove landscape. The current participation mechanism consists of a specific commission of local public and private actors coordinated by the Ministry of Environment, which is relatively poor as it is only advisory.

Act 18,308 (2008) on Land Management and Sustainable Development defines 'land management' as 'the set of cross-cutting actions of the state that aim to maintain and improve the quality of life of the population, social integration in the territory, and the environmentally sustainable and democratic use and exploitation of natural and cultural resources'. It is a public function that is carried out through guidelines, programmes, plans and actions of the state institutions with competence in the subject. This legal tool is binding for both public entities and private entities, and its scope comprises the definition of strategies for sustainable development, land use and management; a set of criteria on the location of economic and social activities; and identifying and defining areas under a special protection regime thanks to their ecological, heritage, landscape, cultural, environmental and natural resource conservation interests, among other objectives. Its guiding principles include environmentally sustainable planning with social equity and territorial cohesion; coordination between the public and private sectors; decentralising land-use planning; promoting local development by enhancing the natural, built and social resources found in the territory; citizen participation at all stages; and reconciling economic development, sustainability and social equity. This norm, especially because of its biocultural approach and its intention to decentralise decision-making and foster citizen participation, represents an interesting option to propose a land-use-planning and sustainable development plan for the butia palm grove landscape.

This standard had already been included in a decree enacted by the Departmental Board of Rocha in 2020, which created an interinstitutional commission that is entrusted with 'the final drafting, in coordination with the Departmental Executive Branch, of a land planning instrument to establish a statute for the protection and management of the existing butia palm grove in the Department of Rocha, based on appropriate grazing management practices to regenerate the palm grove and conserve the natural grasslands'. This instrument represents a big step forward; however, it clearly does not aim at conserving the butia palm grove landscape from an integral perspective, regardless of the positive mechanisms that it provides.

Landscape-level approaches are those that reconcile production, conservation and other uses in rural landscapes. The proposition of 10 principles for the implementation of this type of approach [136] largely coincide with the guiding principles set out in the Act on Land-Use Planning and Sustainable Development. As key aspects, they highlight multifunctionality, the multiple interests of stakeholders and the establishment of duties and responsibilities for stakeholders. This approach entails a series of challenges, such as integrating disciplines and sectors in order to bring together policies related to land use, agricultural production, tourism, education, science, access to services and the development of specific markets, among others. A collaborative governance approach that allows rural communities to be integrated into the different sectors (and political-administrative levels) in land-use and management policymaking would contribute to cocreating solutions that involve experts and local knowledge, building strong social networks [137].

In terms of actively including the private sector in conservation, voluntary conservation by the private sector is an interesting alternative that has recently been explored in Uruguay [138,139]. A good example of this has been the livestock management demonstrative areas that have been established.

Applying the concept of biocultural landscape promotes the notion that conservation and use are not dissociated, but rather, they are parts of the very genesis and evolution of landscapes. This contributes to developing solutions that value and include the experience

and knowledge of local communities and farmers, which is a key element in any type of conservation proposal that factors in agrobiodiversity [93,140–142]. This concept's integral nature facilitates the inclusion of tangible and intangible cultural heritage in conservation proposals and instruments within the framework of UNESCO's conventions on cultural diversity and the safeguarding of intangible cultural heritage. In a conservation area of these characteristics, the three conventions agreed to at the Earth Summit (1992) would also be implemented (i.e., the Convention on Biological Diversity, the Climate Change Convention and the Convention to Combat Desertification) while also contributing to achieving Sustainable Development Goal 15 and other SDGs.

5. Conclusions

The transdisciplinary approach presented in this paper allowed us to support the interpretation of the butia palm landscape as the result of different intensities of domestication and forms of inhabitation that occurred and continue to occur from thousands of years ago to the present. The proposed model showed that past and present legacies must be preserved, especially to be valued by current and future generations.

Considering the existence of the landscape, as presented in this article, implies thinking about conservation categories in which time and space are intertwined with biophysical, socioeconomic and cultural aspects, defining a complex mesh whose density calls for an appropriate conservation strategy. To this end, we have relied on the concept of biocultural landscape, whose strength lies in how it considers cultural and natural variables in an integral way and from a diachronic perspective. It is also a concept that can bridge academia, the private sector, local communities and conservation policies. In this sense, the approach presented reconciles the multifunctionality of landscapes, collaborative governance and sustainable use.

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References

1. Noblick, L. *Butia*: What we think we know about the genus. *J. Oil Palm Res.* **2014**, *208*, 5–23.
2. Soares, K.P. Le genre *Butia*. *Princeps* **2015**, *1*, 12–57.
3. Deble, L.P.; Keller, H.A.; Alves, F.D.S. Resurrection and epitypification of *Butia poni* (Arecaceae), a neglected palm micro-endemic in the grasslands of Misiones, Argentina. *Phytotaxa* **2017**, *316*, 171–180. [CrossRef]
4. Velazco, S.J.E.; Insaurralde, J.A. Butia, un género endémico de Sudamérica. In *Palmeras NUS al sur de la América Austral*; Hilbert, N.I., Pochettino, M.L., Hernández, J.E., Eds.; Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo; CYTED: Cambridge, UK, 2020; pp. 117–122. Available online: www.cyted.org (accessed on 8 February 2023).
5. Overbeck, G.E.; Müller, S.C.; Fidelis, A.; Pfadenhauer, J.; Pillar, V.D.; Blanco, C.C.; Boldrini, I.I.; Both, R.; Forneck, E.D. Brazil´s neglected biome: The South Brazilian Campos. *Perspect. Plant Ecol. Evol. Syst.* **2007**, *9*, 101–116. [CrossRef]
6. Rivas, M.; Condón, F. Plant Domestication and Utilization: The Case of the Pampa Biome. In *Advances in Plant Breeding Strategies: Breeding, Biotechnology and Molecular Tools*; Al-Khayri, J.M., Jain, S.M., Johnson, D.V., Eds.; Springer International Publishing: Cham, Switzerland, 2016; pp. 3–24.
7. Rivas, M.; Barbieri, R.L. *Butia odorata* (Barb.Rodr.) Noblick. Butiá, Butiazeiro; IICA PROCISUR, Montevideo. 2018, p. 24. Available online: http://www.procisur.org.uy/adjuntos/300ac8bda0dc_Butia-03a.pdf (accessed on 5 February 2023).
8. Herter, G. *Apuntes Sobre el Palmar de Castillos*; Departamento de Rocha: Ostenia, Uruguay, 1933; pp. 193–204.
9. Chebataroff, J. *Palmeras del Uruguay*; Facultad de Humanidades y Ciencias: Montevideo, Uruguay, 1974; p. 31.
10. PROBIDES. El palmar, la palma y el butiá. In *Fichas Didácticas*; PROBIDES: Rocha, Uruguay, 1995; p. 23.

11. PROBIDES. *Plan Director. Reserva de Biosfera Bañados del Este/Uruguay*; Probides: Rocha, Uruguay, 1999; p. 159.
12. Zaffaroni, C.; Rivas, M.; Resnichenko, Y.; Hernández, J. Aporte para la conservación de paisajes singulares: El caso de los palmares de *Butia capitata* (Mart.) Becc., en el departamento de Rocha, Uruguay. In *Anais do X Encontro de Geógrafos da América Latina*; Universidade de São Paulo: San Pablo, Brazil, 2005; pp. 116611–116622.
13. Rivas, M.; Filippini, J.; Cunha, H.; Hernández, J.; Resnichenko, Y.; Barbieri, R.L. Palm forest landscape in Castillos (Rocha, Uruguay): Contributions to the design of a conservation area. *Open J. For.* **2017**, *7*, 97–120. [CrossRef]
14. Dabezies, J.M. Heritagization of nature and its influence on local ecological knowledge in Uruguay. *Int. J. Herit. Stud.* **2018**, *24*, 1–15. [CrossRef]
15. Rivas, M. Desafíos y alternativas para la conservación in situ de los palmares de *Butia capitata* (Mart.) Becc. *Agrociencia* **2005**, *IX*, 161–168.
16. Rivas, M.; Barbieri, R.L. *Boas Práticas de Manejo Para o Extrativismo do Butiá*; Embrapa: Brasilia, Brazil, 2014; p. 59.
17. Sosinski, E.E., Jr.; Barbieri, R.L.; Rivas, M. Pecuária em campo nativo: Uma aliada na restauração dos butiazais. In *Palmeras NUS al sur de la América Austral*; Hilbert, N.I., Pochettino, M.L., Hernández, J.E., Eds.; Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo; CYTED: Cambridge, UK, 2020; pp. 181–194. Available online: www.cyted.org (accessed on 8 February 2023).
18. Dabezies, J.M. Negotiating the Taskscape. Relocating Human—Environmental Relationships in Conservation Proposals around Palm Forests in Uruguay. *Conserv. Soc.* **2019**, *17*, 236–249. [CrossRef]
19. Rivas, M.; Barbieri, R.L.; Marchi, M.; Sosinski, E.E.; Amorim, F. La Red Palmar/Rota dos Butiazais—Una red internacional para la conservación de los Palmares de Butiá mediante su uso sostenible. In *Palmeras NUS al sur de la América Austral*; Hilbert, N.I., Pochettino, M.L., Hernández, J.E., Eds.; Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo; CYTED: Cambridge, UK, 2020; pp. 195–221. Available online: www.cyted.org (accessed on 8 February 2023).
20. López Mazz, J.M.; Dabezies, J.M.; Capdepont, I. La Gestión De Recursos Vegetales En Las Poblaciones Prehistóricas De Las Tierras Bajas Del Sureste Del Uruguay: Un Abordaje Multidisciplinar. *Lat. Am. Antiq.* **2014**, *25*, 256–277. [CrossRef]
21. del Puerto, L.; Gianotti, C.; Inda, H. Gestión del medio y producción de recursos en las tierras bajas del noreste de Uruguay: Análisis paleoetnobotánico del sitio Pago Lindo. *Cuad. Do Lepaarq* **2016**, *XIII*, 197–222.
22. Suárez Vespa, D.; del Puerto, L.; Inda, H. 2022. Dónde hubo fuego macrorestos quedan: Paleoetnobotánica de un cerrito de indios del sitio CH2D01. *TESSITURAS* **2022**, *101*, 171–202. [CrossRef]
23. Crumley, C.L. Historical ecology: Integrated thinking at multiple temporal and spatial scales. In *The World System and the Earth System: Global Socioenvironmental Change and Sustainability since the Neolithic*; Hornborg, A., Crumley, C.L., Eds.; Left Coast Press: Walnut Creek, CA, USA, 2007; pp. 15–28.
24. Clement, C.R.; Cassino, M. Landscape domestication and archaeology. In *Encyclopedia of Global Archaeology*; Smith, C., Ed.; Springer Nature: Berlin, Germany, 2018. [CrossRef]
25. Cassino, M.F.; Alves, R.P.; Levis, C.; Watling, J.; Junqueira, A.B.; Shock, M.P.; Ferreira, M.J.; Andrade, V.L.C.; Furquim, L.P.; Coelho, S.D.; et al. Ethnobotany and ethnoecology applied to historical ecology. In *Methods and Techniques in Ethnobiology and Ethnoecology*; Albuquerque, U.P., da Cunha, L.V.F.C., de Lucena, R.F.P., Alves, R.R.N., Eds.; Springer Protocols Handbooks; Springer: Berlin/Heidelberg, Germany, 2019; pp. 187–208.
26. Balée, W.; Erickson, C.L. *Time and Complexity in Historical Ecology: Studies in the Neotropical Lowlands*; The Historical Ecology Series; Columbia University Press: New York, NY, USA, 2006; p. 432.
27. Roberts, P.; Hunt, C.; Arroyo-Kalin, M.; Evans, D.; Boivin, N. The deep human prehistory of global tropical forests and its relevance for modern conservation. *Nat. Plants* **2017**, *3*, 17093. [CrossRef] [PubMed]
28. Silva, F.; Coward, F.; Davies, K.; Elliott, S.; Jenkins, E.; Newton, A.C.; Riris, P.; Vander Linden, M.; Bates, J.; Cantarello, E.; et al. Developing transdisciplinary approaches to sustainability challenges: The need to model socio-environmental systems in the *Longue Durée*. *Sustainability* **2022**, *14*, 10234. [CrossRef]
29. Munn, Z.; Peters, M.D.J.; Stern, C.; Tufanaru, C.; McArthur, A.; Aromataris, E. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Med. Res. Methodol.* **2018**, *18*, 1–7. [CrossRef]
30. Del Puerto, L. *Silicofitolitos como Indicadores Paleoambientales. Bases Comparativas y Reconstrucción Paleoclimática a Partir del Pleistoceno Tardío en el SE del Uruguay*; Académica Española: Berlin, Germany, 2011; p. 168.
31. Montaña, J.; Bossi, J. *Geomorfología de los Humedales de la Cuenca de la Laguna Merín en el Departamento de Rocha*; PROBIDES: Rocha, Uruguay, 1995; p. 32.
32. Martínez, S.; Ubilla, M. El Cuaternario en Uruguay. In *Cuencas Sedimentarias de Uruguay: Geología, Paleontología y Recursos Naturales*; Cenozoico, G., Veroslavsky, G., Ubilla, M., Martínez, S., Eds.; UR. FC. DIRAC: Montevideo, Uruguay, 2009; pp. 195–228.
33. López Mazz, J. Early human occupation of Uruguay: Radiocarbon database and archaeological implications. *Quat. Int.* **2013**, *301*, 94–103. [CrossRef]
34. Bracco, R.; García-Rodríguez, F.; Inda, H.; del Puerto, L.; Castiñeira, C.; Panario, D. Niveles Relativos del Mar Durante el Pleistoceno Final—Holoceno en la Costa del Uruguay. In *El Holoceno en la Zona Costera del Uruguay*; García-Rodríguez, F., Ed.; UCUR-UdelaR: Montevideo, Uruguay, 2011; pp. 65–94.
35. del Puerto, L.; García-Rodríguez, F.; Bracco, R.; Blasi, A.; Inda, H.; Mazzeo, M.; Rodríguez, A. Evolución Climática Holocénica para el Sudeste del Uruguay: Análisis Multi-Proxy en Testigos de Lagunas Costeras. In *El Holoceno en la Zona Costera del Uruguay, García-Rodríguez, F., Ed.*; UCUR-UdelaR: Montevideo, Uruguay, 2011; pp. 119–156.

36. Inda, H.; del Puerto, L.; Capdepont, I.; Bracco, R. Formation processes of coastal archaeological sites: A changing prehistoric scenario on the Atlantic shore of Uruguay. *Geoarchaeology* **2017**, *32*, 633–645. [CrossRef]
37. Salgado, E.T.; Pimentel, A.M.; Ferreira Chueng, K.; Gomes Coe, H.; Cardoso Pacheco, A.; Girardi Bauermann, S. Holocene palaeoenvironmental and palaeoclimatic reconstruction of a native ecosystem on the coastal plain of southern Brazil through multi-proxy analysis. *J. S. Am. Earth Sci.* **2021**, *106*, 103067. [CrossRef]
38. López Mazz, J.M. Las estructuras tumulares (cerritos) del Litoral Atlántico uruguayo. *Lat. Am. Antiq.* **2001**, *12*, 1–25.
39. Bracco, R.; Inda, H.; del Puerto, L.; Capdepont, I.; Panario, D.; Castiñeira, C.; García-Rodriguez, F. A reply to "Relative sea level during the Holocene in Uruguay". *Palaeogeogr. Palaeoclimatol. Palaeoecol.* **2014**, *401*, 166–170. [CrossRef]
40. Del Puerto, L.; García-Rodríguez, F.; Bracco, R.; Inda, H.; Capdepont, I.; Castiñeira, C.; Blasi, A.; Fort, H.; Mazzeo, N. Historia ambiental y dinámica cultural para el Holoceno medio y tardío en el este del Uruguay. In *En Clave Inter. Procesos, Contexto y Resultados del Trabajo Interdisciplinario*; EI-UdelaR: Montevideo, Uruguay, 2013; pp. 99–110.
41. Bracco, R. Montículos de la Cuenca de la Laguna Merín: Tiempo, Espacio y Sociedad. *Lat. Am. Antiq.* **2006**, *17*, 511–540.
42. Del Puerto, L.; Gianotti, C.; Bortolotto, N.; Gazzán, N.; Cancela, C.; Orrego, B.; Inda, H. Geoarchaeological Signatures of Anthropogenic Soils in Southeastern Uruguay: Approaches to formation processes and spatial-temporal variability. *Geoarchaeol. Int. J.* **2021**, *37*, 180–197. [CrossRef]
43. Gazzán, N.; Cancela-Cereijo, C.; Gianotti, C.; Fábrega-Álvarez, P.; del Puerto, L.; Criado- Boado, F. From Mounds to Villages: The Social Construction of the Landscape during the Middle and Late Holocene in the India Muerta Lowlands, Uruguay. *Land* **2022**, *11*, 441. [CrossRef]
44. Bracco, R.; Panario, D.; Gutiérrez, O.; Bazzino, A.; Duarte, C.; Odino, R.; Reina, E. Mounds and Landscape in the Merín Lagoon Basin, Uruguay. In *Advances in Coastal Geoarchaeology in Latin American*; Inda, H., García, F., Eds.; The Latin American Studies Book Series; Springer: Berlin/Heidelberg, Germany, 2019; pp. 103–129.
45. Dabezies, J.M.; del Puerto, L.; Gianotti, C. Investigación y gestión de la prehistoria de la Región Este: Nuevos enfoques del pasado para el presente. In *Prehistoria de Rocha. Apuntes sobre Poblamiento Temprano de estas Tierras*; Intendencia Municipal de Rocha y Ministerio de Educación y Cultura: Rocha, Uruguay, 2013; pp. 11–159.
46. Sans, M.; Solla, H. Análisis de restos óseos humanos del este del Uruguay. In *Primeras Jornadas de Ciencias Antropológicas en el Uruguay*; Museo Nacional de Antropología, Ministerio de Educación y Cultura: Montevideo, Uruguay, 1992; pp. 171–175.
47. Bracco, R.; Fregeiro, M.; Panarello, H.; Odino, R.; Souto, B. Dieta, modos de producción de alimentos y complejidad. In *Arqueología de las Tierras Bajas*; Durán, A., Bracco Boksar, R., Eds.; Ministerio de Educación y Cultura: Montevideo, Uruguay, 2000; pp. 227–248.
48. Iriarte, J.; Holst, I.; Marozzi, O.; Listopad, C.; Alonso, E.; Rinderknecht, A.; Montaña, J. Evidence for cultivar adoption and emerging complexity during the mid-Holocene in the La Plata basin. *Nature* **2004**, *432*, 614–618. [CrossRef] [PubMed]
49. Bracco, R.; del Puerto, L.; Inda, H.; Panario, D.; Castiñeira, C.; García-Rodríguez, F. The Relationship Between Emergence of Mound Builders in SE Uruguay and Climate Change Inferred from Opal Phytolith Records. *Quat. Int.* **2011**, *245*, 62–73. [CrossRef]
50. Gianotti, C.; Bonomo, M. De montículos a paisajes: Procesos de transformación y construcción de paisajes en el sur de la cuenca del Plata. *Comechingonia* **2013**, *17*, 129–163. [CrossRef]
51. Bonomo, M.; Politis, G.; Gianotti, C. Montículos, jerarquía social y horticultura en las sociedades indígenas del Delta del río Paraná (Argentina). *Lat. Am. Antiq.* **2011**, *22*, 297–333. [CrossRef]
52. Del Puerto, L. Interrelaciones Humano-Ambientales Durante el Holoceno Tardío en el este del Uruguay: Cambio Climático y Dinámica Cultural. Ph.D. Thesis, Universidad de la República, Montevideo, Uruguay, 2015; p. 289.
53. Mut, P. Paleodieta de los pobladores prehistóricos del este del Uruguay: Un retrato isotópico. *Anu. De Arqueol.* **2015**, *2015*, 147–178.
54. Sotelo, M. Stone structures in the highlands of Uruguay. In *Encyclopedia of Global Archaeology*; Springer: Berlin/Heidelberg, Germany, 2018; pp. 1–17. [CrossRef]
55. Suárez Villagrán, X.; Rodríguez, M.; Bentos Pereira, H.; Gianotti, C.; Sotelo, M.; del Puerto, L. Absence of bones in archaeological sites from the southeast of Uruguay: Taphonomy or human behavior? *Geoarchaeology* **2022**, *37*, 694–708. [CrossRef]
56. Bracco, D. *Charrúas, Guenoas y Guaraníes. Interacción y Destrucción: Indígenas en el Río de la Plata*; Linardi y Risso: Montevideo, Uruguay, 2004; p. 398.
57. López Mazz, J.M.; Bracco, D. *Minuanos. Apuntes y Notas para la Historia y la Arqueología del Territorio Guenoa-Minuan (Indígenas de Uruguay, Argentina y Brasil)*; Linardi y Risso: Montevideo, Uruguay, 2012; p. 342.
58. Barrios Pintos, A. *400 Años de Historia de la Ganadería en Uruguay*; Cruz del Sur: Montevideo, Uruguay, 2011; p. 366.
59. Paucke, F. *Hacia Allá y para Acá: Una Estadía entre los Indios Mocobíes, 1749–1767*; Universidad Nacional de Tucumán: Tucumán, Argentina, 1944; p. 706.
60. Cardiel, J.; González, S. Las vaquerías del mar. In *Enciclopedia Uruguaya*; Arca: Montevideo, Uruguay, 1968.
61. Moreno, F. La gestión de los recursos animales en la prehistoria del este de Uruguay (4.000 años AP-siglo XVI). In *Departamento de Prehistoria*; Universidad Autónoma de Barcelona: Barcelona, Spain, 2014.
62. Dabezies, J.M.; Marín Suárez, C.; Bañobre, C.; del Puerto, L.; Rodríguez Iroldi, F. Encierros ganaderos en la frontera colonial de la Banda Oriental: El caso de los corrales de palmas del sureste del Uruguay. *Lat. Am. Antiq.* **2022**, *33*, 336–354. [CrossRef]
63. Moraes, M.I. Las economías agrarias del litoral rioplatense en la segunda mitad del siglo XVII: Paisajes y desempeño. In *Historia e Instituciones Económicas II*; Universidad Complutense de Madrid: Madrid, Spain, 2011.

64. Thornback, J.; Jenkins, M. Part 1, Threatened Mammalian Taxa of the Americas and the Australasian Zoogeographic Region (Excluding Cetacea). In *The IUCN Mammal Red Data Book*; IUCN: Gland, Switzerland, 1984.
65. Fajardo, F. *Crónicas del Maldonado Antiguo*; Torre del Vigía: Montevideo, Uruguay, 2002; 133p.
66. Dabezies, J.M. Procesando vegetales ayer y hoy: Una aproximación a algunos usos actuales de la palma de Butia capitata para entender algunos usos pasados. Trama. *Rev. De Cult. Y Patrim.* **2011**, *2*, 10–21.
67. Dabezies, J.M.; Rivas, M. Usos de la palma Butia odorata en el sureste del Uruguay. In *Palmeras NUS al sur de la América Austral*; Hilbert, N.I., Pochettino, M.L., Hernández, J.E., Eds.; Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo; CYTED: Cambridge, UK, 2020; pp. 159–180. Available online: www.cyted.org (accessed on 8 February 2023).
68. Fraga da Silva, A. *"Meu avô era Tropeiro!": Identidade, Patrimônio e Materialidades na Construção da Terra do Tropeirismo—Bom Jesus (RS)*; Fundação Universidade Federal do Pampa: Yaguarao, Brazil, 2011.
69. Oliveira, O.; Teixeira, C. Os currais de palmas em Santa Vitória do Palmar RS, Brazil. *Biblos* **2006**, *19*, 61–73.
70. Frega, A.; Chagas, K.; Montaño, O.; Stalla, N. Breve historia de los afrodescendientes en el Uruguay. In *Población Afrodescendiente y Desigualdades Étnico-Raciales en Uruguay*; Scuro Somma, L., Ed.; Programa de las Naciones Unidas para el Desarrollo: Montevideo, Uruguay, 2008; pp. 5–50.
71. Borucki, A.; Chagas, K.; Stalla, N. Rocha en tiempos de escalvitud y abolición. Amos, esclavos y morenos libres en el relato de la sociedad rochense. *Rev. Histórica Rochense* **2012**, *1*, 5.
72. López Mazz, J.M.; Marin, C.; Dabezies, J.M.; Tejerizo-García, C. Arqueología y memoria de la esclavitud africana en la frontera uruguayo-brasileña: El caso de la Estancia de los Correa (Rocha, Uruguay). *Rev. De Arqueol.* **2020**, *26*, 181–201. [CrossRef]
73. Tomich, D. *Through the Prism of Slavery: Labor, Capital, and World Economy*; Rowman and Littlefields: New York, NY, USA, 2004; p. 224.
74. Nahum, B. La estancia alambrada. In *Enciclopedia Uruguaya*; Rama, A., Ed.; Editores Reunidos y Editorial Arca: Montevideo, Uruguay, 1968; p. 79.
75. Moraes, M.I. *Mundos Rurales. Nuestro Tiempo 16. Publicación Oficial de Bicentenario Uruguay*; IMPO: Montevideo, Uruguay, 2013; p. 62.
76. Fiebrig, C. *Apuntes de una Excursión a Castillos*; Departamento de Rocha: Rocha, Uruguay, 1933; pp. 187–192.
77. Dabezies, J.M. Relaciones históricas entre el Butiá y los seres humanos. De los Constructores de Cerritos a los Corrales de Palmas. In *En tu Imagen*; de la Llana, N., Ed.; Intendencia Departamental de Rocha: Rocha, Uruguay, 2015; pp. 23–31.
78. Puig y Nattino, J. *La Palma Butiá. Contribución al Estudio de las Plantas Indígenas Alimenticias. Boletín nº 16 del Ministerio de Industria*; Inspección Nacional de Ganadería y Agricultura: Montevideo, Uruguay, 1915; p. 18.
79. Arnábal, R.; Bertino, M.; Fleitas, S. Una revisión del desempeño de la industria uruguaya en el período de sustitución de importaciones. In *Séptimas Jornadas de Investigación de la Asociación Uruguaya de História Económica (AUDHE)*; UR.FCEA-IE: Montevideo, Uruguay, 2010.
80. Araujo, O. *Diccionario Geográfico del Uruguay*; Tipo-Litografía Moderna: Montevideo, Uruguay, 1912.
81. Castro, P. Distribución Regional de la Producción y Geografía Económica: El Caso del Agro en Uruguay (1870–2008). Master's Thesis, Universidad de la República, Montevideo, Uruguay, 2017.
82. Achkar, M.; Brazeiro, A.; Bartesaghi, L. Evaluación de las principales presiones y amenazas a la biodiversidad de Uruguay. In *Eco-Regiones de Uruguay: Biodiversidad, Presiones y Conservación. Aportes a la Estrategia Nacional de Biodiversidad*; Brazeiro, A., Ed.; Facultad de Ciencias, CIEDUR, VS-Uruguay, SZU: Montevideo, Uruguay, 2015; pp. 70–85.
83. Rivas, M.; Barilani, A. Diversidad, potencial productivo y reproductivo de los palmares de *Butia capitata* (Mart.) Becc. de Uruguay. *Agrociencia* **2004**, *1*, 11–20. [CrossRef]
84. Rocha, N.; Geymonat, G. *M'boti: Ecosistema único en el Mundo*; Casa Ambiental, Castillos: Rocha, Uruguay, 2009; p. 405.
85. Rivas, M.; Jaurena, M.; Gutiérrez, L.; Barbieri, R.L. Diversidad vegetal del campo natural de *Butia odorata* (Barb.Rodr.) Noblick en Uruguay. *Agrociencia* **2014**, *18*, 14–27. [CrossRef]
86. Barbieri, R.L.; Marchi, M.M.; Gomes, G.C.; Barros, C.H.; Mistura, C.C.; Dornelles, J.E.F.; Heiden, G.; Beskow, G.T.; Ramos, R.A.; Villela, J.C.B.; et al. *Vida No Butiazal*; Embrapa Clima Temperado: Pelotas, Brazil, 2015; p. 50.
87. Marchi, M.M.; Barbieri, R.L.; Sallés, J.M.; Costa, F.A.D. Flora herbácea e subarbustiva associada a um ecossistema de butiazal no Bioma Pampa. *Rodriguésia* **2018**, *69*, 553–560. [CrossRef]
88. Sosinski, E.E., Jr.; Marques Urruth, L.; Barbieri, R.L.; Marchi, M.M.; Martens, S.G. On the ecological recognition of Butia palm groves as integral ecosystems: Why do we need to widen the legal protection and the in situ/on-farm conservation approaches? *Land Use Policy* **2019**, *81*, 124–130. [CrossRef]
89. Rivas, M.; Pereira, S.; Calvete, A. *Diversidad de Variedades Criollas Hortícolas y sus Conocimientos Tradicionales Asociados en el Palmar de Castillos*; Centro Universitario Regional del Este y Facultad de Agronomía (UdelaR): Rocha, Uruguay, 2018; p. 42.
90. Vidal, R.; Rivas, M.; Chiappe, M.; Quintero, D.; Castro, X.; Calvete, A.; del Puerto, L. Relevamiento de los recursos genéticos vegetales con usos y conocimientos tradicionales asociados en tres zonas rurales. In *Conocimientos Tradicionales Asociados a los usos de los Recursos Genéticos en Uruguay*; PNUD: Montevideo, Uruguay, 2021; pp. 17–47.
91. Crosa, M.J.; Burzaco, P.; Irisity, M.; Gioscia, D.; Sosa, J.; Ayres, C. Valorización del fruto y su procesamiento. In *Valorización de Frutos Nativos como Forma de Promover el Desarrollo Local. Aprovechamiento Agroalimentario del Butiá en Rocha*; Barrientos, M., Ed.; INIA: Montevideo, Uruguay, 2014; pp. 25–40.

92. Portes, N. *Aportes para la Valorización del Palmar de Butia odorata de Laguna Negra: Catálogo de Atractivos y Propuesta de Ruta Ecoturística. Tesis Licenciatura en Gestión Ambiental*; Centro Universitario Regional del Este, Udelar: Rocha, Uruguay, 2018.
93. Lacerda, A.E.B.; Hanisch, A.L.; Nimmo, E.R. Leveraging traditional agroforestry practices to support sustainable and agrobiodiverse landscapes in Southern Brazil. *Land* **2020**, *9*, 176. [CrossRef]
94. Hong, S.-K. Philosophy and Background of Biocultural Landscapes. In *Biocultural Landscapes. Diversity, Functions and Values*; Hong, S.-K., Bogaert, J., Min, Q., Eds.; Springer: Berlin/Heidelberg, Germany, 2014; pp. 1–8. [CrossRef]
95. Clement, C.R. 1492 and the loss of Amazonian crop genetic resources. I. The relation between domestication and human population decline. *Econ. Bot.* **1999**, *53*, 188–202. [CrossRef]
96. Clement, C.R.; Denevan, W.M.; Heckenberger, M.J.; Junqueira, A.B.; Neves, E.G.; Teixeira, W.G.; Woods, W.I. The domestication of Amazonia before European conquest. *Proc. R. Soc. B* **2015**, *282*, 20150813. [CrossRef]
97. Levis, C.; Flores, B.M.; Moreira, P.A.; Luize, B.G.; Alves, R.P.; Franco-Moraes, J.; Lins, J.; Konings, E.; Peña-Claros, M.; Bongers, F.; et al. How people domesticated amazonian forest. *Front. Ecol. Evol.* **2018**, *5*, 171. [CrossRef]
98. Pereira Cruz, A.; GiehlI, E.L.H.; Levis, C.; Machado, J.S.; Bueno, L.; Peroni, N. Pre-colonial Amerindian legacies in forest composition of southern Brazil. *PLoS ONE* **2020**, *15*, e0235819. [CrossRef]
99. Pretty, J.; Adams, B.; Berkes, F.; Ferreira de Athayde, S.; Dudley, N.; Hunn, E.; Maffi, L.; Milton, K.; Rapport, D.; Robbins, P.; et al. The intersections of Biological Diversity and Cultural Diversity: Towards integration. *Conserv. Soc.* **2009**, *7*, 100–112.
100. Crumley, C.L. Historical ecology: A multidimensional ecological orientation. In *Historical Ecology: Cultural Knowledge and Changing Landscapes*; Crumley, C.L., Ed.; School of American Research Press: Santa Fe, NM, USA, 1994; pp. 1–16.
101. Erickson, C.L. Historical ecology and future exploration. In *Amazonian Dark Earths: Origin, Properties, Management*; Lehmann, J., Kern, D.C., Glaser, B., Woods, W.I., Eds.; Kluwer: Dordrecht, The Netherlands, 2003; pp. 455–500.
102. Dransfield, J.; Uhl, N.W.; Asmussen, C.B.; Baker, W.J.; Harley, M.M.; Lewis, C.E. *Genera Palmarum: The Evolution and Classification of Palms*; Kew publishing: Richmond, England, 2008; p. 727. [CrossRef]
103. Clement, C.R.; Rival, L.; Cole, D.M. Domestication of peach palm (*Bactris gasipaes* Kunth): The roles of human mobility and migration. In *Mobility and Migration in Indigenous Amazonia: Contemporary Ethnoecological Perspectives*; Alexiades, M., Ed.; Berghahn Books: Oxford, UK, 2009; pp. 117–140.
104. Porro, R. Palms, Pastures, and Swidden Fields: The Grounded Political Ecology of "Agro-Extractive/Shifting-cultivator Peasants" in Maranhao, Brazil. *Hum. Ecol.* **2005**, *33*, 17–56. [CrossRef]
105. Sosnowska, J.; Walanus, A.; Balslev, H. Asháninka Palm Management and Domestication in the Peruvian Amazon. *Hum. Ecol.* **2015**, *43*, 451–466. [CrossRef]
106. Smith, N. Palms and cultural landscapes. In *Palms and People in the Amazon*; Springer: Cham, Switzerland, 2015; pp. 1–8.
107. Araujo, J.J.; Rojas, J.L.; Keller, H.A.; Hilgert, N.I. Landscape management among the Guarani of the Atlantic Forest of Misiones, Argentina: The case of the Syagrus romanzoffiana (Cham.) Glassman (Arecaceae) palm tree. *Ethnobiol. Conserv.* **2021**, *10*, 22. [CrossRef]
108. Behling, H.; Pillar, V.D.P.; Orlóci, L.; Bauermann, S.G. Late Quaternary grassland (Campos), gallery forest, fire and climate dynamics, studied by pollen, charcoal and multivariate analysis of the São Francisco de Assis core in western Rio Grande do Sul (southern Brazil). Rev. *Palaeobot. Palynol.* **2005**, *133*, 235–248. [CrossRef]
109. Behling, H. Late Quaternary vegetation, fire and climate dynamics of Serra do Aracatuba in the Atlantic coastal mountains of Paraná State, southern Brazil. *Veget. Hist. Archaeobot.* **2007**, *16*, 77–85. [CrossRef]
110. Biggs, R.; Boonstra, W.J.; Peterson, G.; Schlüter, M. The domestication of fire as a social-ecological regime shift. *Pages Mag.* **2016**, *24*, 22–23. [CrossRef]
111. Bond, W.J.; Parr, C.L. Beyond the forest edge: Ecology, diversity and conservation of the grassy biomes. *Biol. Conserv.* **2010**, *143*, 2395–2404. [CrossRef]
112. Pillar, V.D.P.; Vélez, E. Extinção dos Campos Sulinos em Unidades de Conservação: Um Fenômeno Natural ou um Problema Ético? *Nat. Conserv.* **2010**, *08*, 84–86. [CrossRef]
113. Rowley-Conwy, P.; Layton, R. Foraging and farming as niche construction: Stable and unstable adaptations. *Phil. Trans. R. Soc. B* **2011**, *366*, 849–862. [CrossRef] [PubMed]
114. Overbeck, G.E.; Scasta, J.D.; Furquim, F.F.; Boldrini, I.I.; Weir, J.R. The South Brazilian grasslands—A South American tallgrass prairie? Parallels and implications of fire dependency. *Perspect. Ecol. Conserv.* **2018**, *16*, 24–30. [CrossRef]
115. Piperno, D.R.; Pearsall, D.M. *The Origins of Agriculture in the Lowland Neotropics*; Academic Press: San Diego, CA, USA, 1998.
116. Prates, L.; Pérez, S.I. Late Pleistocene South American megafaunal extinctions associated with rise of fishtail points and human population. *Nat. Commun.* **2021**, *12*, 2175. [CrossRef] [PubMed]
117. Mellars, P. Fire, ecology, animal populations and man; a study of some ecological relationships in prehistory. *Proc. Prehistoric. Soc.* **1976**, *42*, 15–45. [CrossRef]
118. Azambuja, P. *Tahim a última Divisa: Geografia e História de uma Região*; Polygraph & Stillus Artes Gráficas: Santa Vitória do Palmar, Brazil, 1978; pp. 236–239.
119. Ríos, C.; Lezama, F.; Rama, G.; Baldi, G.; Baeza, S. Natural grasslands remnants in dynamic agricultural landscapes: Identifying drivers of fragmentation. *Perspect. Ecol. Conserv.* **2022**, *20*, 205–215. [CrossRef]
120. Baeza, S.; Vélez-Martin, E.; De Abelleyra, D.; Banchero, S.; Gallego, F.; Schirmbeck, J.; Veron, S.; Vallejos, M.; Weber, E.; Oyarzabal, M.; et al. Two decades of land cover mapping in the Río de la Plata grassland region: The MapBiomas Pampa initiative. *Remote Sens. Appl. Soc. Environ.* **2022**, *28*, 100834. [CrossRef]

121. Tiscornia, G.; Jaurena, M.; Baethgen, W. Drivers, Process, and Consequences of Native Grassland Degradation: Insights from a Literature Review and a Survey in Río de la Plata Grasslands. *Agronomy* **2019**, *9*, 239. [CrossRef]
122. Báez, F.; Jaurena, M. *Regeneración del Palmar de Butiá (Butia capitata) en Condiciones de Pastoreo. Relevamiento de Establecimientos Rurales de Rocha. Serie Documentos de Trabajo N° 27*; PROBIDES: Rocha, Uruguay, 2000; p. 34.
123. Parr, C.L.; Lehmann, C.E.R.; Bond, W.J.; Hoffmann, W.A.; Andersen, A.N. Tropical grassy biomes: Misunderstood, neglected, and under threat. *Trends Ecol. Evol.* **2014**, *29*, 205–213. [CrossRef]
124. Marchesi, E.; Alonso, E.; Brussa, C.; Delfino, L.; García, M.; Haretche, F. Plantas vasculares. In *Especies Prioritarias para la Conservación en Uruguay*; Ministerio de Ambiente de Uruguay: Montevideo, Uruguay, 2013; p. 222.
125. Sosinski, E.E., Jr.; Hagemann, A.; Dutra, F.; Mistura, C.; da Costa, F.A.; Barbieri, R.L. *Manejo Conservativo: Bases para a Sustentabilidade dos Butiazais*; Boletim de Pesquisa e Desenvolvimento, Embrapa Clima Temperado: Pelotas, Brazil, 2015; p. 28. Available online: http://www.infoteca.cnptia.embrapa.br/infoteca/handle/doc/1058122 (accessed on 8 February 2023).
126. Rivas, M.; Vilaró, M.; Sánchez, A.; Sosa, A.; Di Candia, A.; Dabezies, J.M.; Do Carmo, M.; Claramunt, M. Integrando productores, academia e instituciones públicas para la conservación y uso sostenible de los palmares de butiá. In *10° Encuentro Nacional sobre Frutales Nativos. Serie de Actividades de Difusión 796*; INIA: Montevideo, Uruguay, 2021; pp. 43–48.
127. Scaramuzzi, S.; Gabellini, S.; Belletti, G.; Marescotti, A. Agrobiodiversity-Oriented Food Systems between Public Policies and Private Action: A Socio-Ecological Model for Sustainable Territorial Development. *Sustainability* **2021**, *13*, 12192. [CrossRef]
128. De Boef, W.S.; Thijssen, M.; Sopov, M. Agrobiodiversity, livelihoods and markets. In *Community Biodiversity Management. Promoting Resilience and the Conservation of Plant Genetic Resources*; Boef, W.S.D., Subedi, A., Peroni, N., Thijssen, M., O´Keeffe, E., Eds.; Routledge: London, UK; Taylor & Francis Group: New York, NY, USA, 2013; pp. 177–187.
129. Barreiro, D.; Gianotti, C.; del Puerto, L. *Cerros lindos. De la cadena de Valor del Patrimonio Cultural al Patrimonio como Innovación Social, Anales de Arqueología y Etnología. Facultad de Filosofía y Letras*; Universidad Nacional de Cuyo: Mendoza, Argentina, 2023; pp. 131–161.
130. Criado-Boado, F.; Gianotti, C.; López Mazz, J.M. Arqueología aplicada al Patrimonio Cultural: La cooperación científica entre Galicia y Uruguay. In *Actas del II Congreso Internacional de Patrimonio Cultural y Cooperación al Desarrollo*; Muñoz, G., Vidal, C., Eds.; Universidad Politécnica de Valencia: Valencia, España, 2006; pp. 165–186.
131. Beovide, L. La zonificación arqueológica en la cuenca del río Santa Lucía, Uruguay, como herramienta de gestión territorial: Sinergias y conflictos en el desarrollo sustentable. *Rev. Mem.* **2018**, *5*, 112–131. [CrossRef]
132. Gianotti, C.; Villarmarzo, E.; Piazza, N.; Nin, M.; Rodríguez, L.; Lembo, V. El Paisaje Cultural Laguna de Rocha como objeto focal de conservación: Propuesta para su integración dentro del plan de manejo de un área protegida. In *Paisaje, Patrimonio, Proyecto, Desarrollo Local. Paisajes Culturales en Uruguay*; Medina, M., Ed.; CSIC: Montevideo, Uruguay, 2015; pp. 15–31.
133. Rodríguez-Gallego, L.; Nin, M.; Suárez, C.; Conde, D. *Paisaje Protegido Laguna de Rocha, Propuesta de Plan de Manejo*; Futuro Sustentable SRL: Montevideo, Uruguay, 2012; p. 50.
134. SNAP. *Fortalecimiento de la Efectividad del Sistema Nacional de Áreas Protegidas Incluyendo el Enfoque de Paisaje en la Gestión. Documento Técnico N° 2, URU/13/G35, DINAMA-MVOTMA*; SNAP: Montevideo, Uruguay, 2014; p. 113.
135. Emerson, K.; Nabatchi, T. *Collaborative Governance Regimes*; Georgetown University Press: Washington, WA, USA, 2015; p. 280.
136. Sayer, J.; Sunderland, T.; Chazoul, J.; Pfund, J.L.; Sheil, D.; Meijaard, E.; Venter, M.; Boedhihartono, A.K.; Day, M.; García, C.; et al. Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. *Proc. Natl. Acad. Sci. USA* **2013**, *110*, 8349–8356. [CrossRef] [PubMed]
137. Primdahl, J.; van Eetvelde, V.; Pinto-Correia, T. Rural landscapes—Challenges and solutions to landscape governance. *Land* **2020**, *9*, 521. [CrossRef]
138. Cortés-Capano, G.; Tolvonen, T.; Soutullo, A.; Fernández, A.; Dimitriadis, C.; Garibotto-Carton, G.; Di Minin, E. Exploring landowners´perceptions, motivations and needs for voluntary conservation in a cultural landscape. *People Nat.* **2020**, *2*, 840–855. [CrossRef]
139. Vida Silvestre Uruguay. Available online: https://vidasilvestre.org.uy/gestion-para-la-conservacion/predios-privados/ (accessed on 12 December 2022).
140. De Boef, W.S.; Peroni, N.; Hanazaki, N. People, biodiversity and landscapes: Introduction. In *Community Biodiversity Management. Promoting Resilience and the Conservation of Plant Genetic Resources*; Boef, W.S.D., Subedi, A., Peroni, N., Thijssen, M., O'Keeffe, E., Eds.; Routledge: London, UK; Taylor & Francis Group: New York, NY, USA, 2013; pp. 125–132.
141. Peroni, N.; Albuquerque, U.P.D.; Assis, A.L.D.; Lins Neto, E.M.D.F. The domestication of landscapes and cultural keystone species in a context of community biodiversity management in Brazil. In *Community Biodiversity Management. Promoting Resilience and the Conservation of Plant Genetic Resources*; Boef, W.S.D., Subedi, A., Peroni, N., Thijssen, M., O´Keeffe, E., Eds.; Routledge: London, UK; Taylor & Francis Group: New York, NY, USA, 2013; pp. 145–150.
142. Reis, M.S.; Montagna, T.; Mattos, A.G.; Filippon, S.; Ladio, A.H.; Marques, A.D.C.; Zechini, A.A.; Peroni, N.; Mantovani, A. Domesticated landscapes in Araucaria forests, Southern Brazil: A multispecies local conservation-by-use system. *Front. Ecol. Evol.* **2018**, *6*, 11. [CrossRef]