ISSN: 2446-6549
|Seção: Relato de Experiência|
DOI: http://dx.doi.org/10.18764/2446-6549.e202034

INTERESPAÇO
Revista de Geografia e Interdisciplinaridade

URBAN AND COMMUNITY AGROFORESTRY: an experience in Campo Grande, West Zone of Rio de Janeiro

AGROFLORESTA URBANA E COMUNITÁRIA: uma experiência em Campo Grande, Zona Oeste do Rio de Janeiro

AGROFORESTERÍA URBANA Y COMUNITARIA: una experiencia en Campo Grande, Zona Oeste de Río de Janeiro

Cristiane Pimentel Victório
Doutora e Mestra em Ciências Biológicas (Biofísica) pela Universidade Federal do Rio de Janeiro – UFRJ. Professora do Programa de Pós-Graduação em Ciência e Tecnologia Ambiental do Centro Universitário Estadual da Zona Oeste – PPGCTA/UEZO/Rio de Janeiro.
cris.pvictor@gmail.com / http://orcid.org/0000-0002-2815-3725

Mayara Grazielle Consentino Ferreira da Silva
Mestranda em Ciência e Tecnologia Ambiental pelo Centro Universitário Estadual da Zona Oeste – PPGCTA/UEZO/Rio de Janeiro.
mayaragrazielle@yahoo.com.br / http://orcid.org/0000-0003-0610-3513

Recebido para avaliação em 14/08/2020; Aprovado para publicação em 08/12/2020.

ABSTRACT

The present study reports on an urban and community agroforestry project implemented in 2016, in a square located in Campo Grande, West Zone of Rio de Janeiro. We observed the results and performed a survey of plant species used. Observations showed that the collective agroforestry system combined production with environmental recovery, thus making a socio-environmental contribution to the community who visit the square, live in its immediate vicinity and members of the agroforestry task force, by establishing a place for interaction between people and between people and nature. Therefore, community agroforestry has the potential to be a space for environmental education.

Keywords: Community Agroforestry; Environmental Restoration; Social Interaction; West Zone of Rio de Janeiro.

RESUMO

O presente estudo relata um projeto agroflorestal urbano e comunitário implementado em 2016, em uma praça localizada em Campo Grande, Zona Oeste do Rio de Janeiro. Observamos os resultados e fizemos um levantamento das espécies de plantas utilizadas. As observações mostraram que o sistema agroflorestal coletivo combinou produção com recuperação ambiental, trazendo assim uma contribuição socioambiental para a comunidade que visita a praça, mora em suas imediações e integrantes do mutirão agroflorestal, estabelecendo um local de interação entre as pessoas e entre as pessoas e a natureza. Portanto, a agrofloresta comunitária tem potencial para ser um espaço de educação ambiental.

Palavras-chave: Agrofloresta Comunitária; Restauração Ambiental; Interação Social; Zona Oeste do Rio de Janeiro.

RESUMEN

El presente estudio informa sobre un proyecto agroforestal urbano y comunitario implementado en una plaza ubicada en Campo Grande de la Zona Oeste de Río de Janeiro en el año 2016. Se realizó un relevantamiento de las especies vegetales utilizadas, las observaciones mostraron que el sistema agroforestal colectivo combinó la producción con la recuperación ambiental. Constituyendo así un aporte socioambiental a la comunidad. En el que los habitantes frecuentan la plaza, viven en sus inmediaciones y miembros del grupo de trabajo agroforestal, al establecer un lugar de interacción entre las personas entre sí y con la naturaleza. Por tanto, la agrosilvicultura comunitaria tiene el potencial de ser un espacio de educación ambiental.

Palabras clave: Agroforestería Comunitaria; Restauración Ambiental; Interacción Social; Zona Oeste del Río de Janeiro.

INTRODUCTION

Community agroforestry was implemented in 2016 in a square located in Campo Grande, West Zone of Rio de Janeiro. Previously, the site was composed only of grass, and the soil was relatively degraded and compacted. However, with the implementation of the agroforestry system, the area now shows signs of environmental recovery owing to the establishment of different plants. The site has a slope and occupies an area of approximately 340 m². It is frequented by people who play sports, walk with pets, participate in sporting events, such as skateboarding competition, as well as cultural events, such as the rap battle.

The initiative was taken by the *Instituto Permacultura Lab*, a nongovernmental organization, or NGO, whose objective is to test the implementation of an agroforestry in a public space, to contribute to urban forestation, to produce food, to promote socio-environmental well-being, and to bring people closer to the natural elements.

The task force implemented the project with the idea of restoring a degraded urban environment through an agroforestry system, combining production with environmental recovery. From a practical standpoint, agroforestry produces healthy food since it adopts the principles of agroecology, but it also establishes an environment with higher biodiversity, and, consequently, greater ecological relationships. In addition to the environmental factor, agroforestry also has a social aspect because it created a space for social interaction, both for members of the agroforestry task force and those who visited the square. Therefore, this could be termed a collective agroforestry in that it promotes interaction between people and between people and nature.

URBAN AND COMMUNITY AGROFORESTRY

Simple and inexpensive methods were used to implement agroforestry. During planting, hydrogel was used in the hole to help retain water in the root rhizosphere. This technique reduces the need for irrigation. Organic fertilizer, produced by domestic composting, was also used as a source of nutrients. Limestone helps to correct soil acidity. The use of straw as mulch is a way to protect the soil against water and wind erosion, against sunlight, thereby keeping the temperature lower in order to retain more moisture, and against the leaching of nutrients. Straw also increases organic matter, and, finally, wood delimits the planting space.

In the agroforestry system, native species from the Atlantic Forest, fruit trees, agricultural crops, ornamental and medicinal plants, spices (condiments) and also species used in green fertilization were planted. Some species were planted using seeds, such as "feijão-guandú", pigeon pea (*Cajanus cajan*), a green manure, and other species were planted using seedlings, such as citrus trees.

During the setup of this agroforestry system, planting was done by members of the *Permacultura Lab*, and also by community residents who brought their own plants.

In all, five agroforestry task forces were carried out between 2016 and 2018. Participants were recruited through events on social networks (Facebook), among residents of the neighborhood, or even other regions, such as the Baixada Fluminense (Rio de Janeiro Metropolitan region). However, it is unclear how many people have actually participated in these task forces. It should be noted that a case of vandalism occurred in April 2019. Thereby, twenty native and fruit plants were harmed, and the apical parts of the stem were kept in place. Trees were harmed, but regrowth was noticed after 8 months (December 2019).

In order to encourage people who live in the surroundings or who frequent the square to plant, harvest and care for the agroforestry system, signs were placed, such as "help watering" and "straw is not garbage" to prevent its removal. Straw protects plants and serves as soil cover. On one occasion, *Comlurb* (Municipal Urban Cleaning Company) removed the straw. The revitalization of the space used for agroforestry included graffiti as artistic expression, this being a component that awakens sensitivity to the importance of a preserved and healthy environment. Therefore, the construction and the maintenance of the space is a collective effort. For all these reasons, it is possible to think about the use of the community agroforestry system as a environmental education space, although this idea was not a part of the original implementation.

Figure 1 - Community agroforestry system: A. The blank circle shows the straw used as soil cover. Plants, such as "mamoeiro", papaya (*Carica papaya*), "bananeira", banana (*Musa* sp.), "mandioca", cassava (*Manihot esculenta*), "feijão-gunadú", pigeon pea (*Cajanus cajan*) and "abacaxi", pineapple (*Ananas comosus*) can be observed. B. Biodiverse agroforestry (species diversity within a space of approximately 340 m²); spontaneous vegetation, including herbaceous plants, such as grasses (Gramineae, Poaceae), can be seen amid planted vegetation, such as fruit trees like "bananeira", banana trees (Musa sp.), "coqueiro", coconut tree (*Cocos nucifera*) and "mamoeiro", papaya (*C. papaya*). C. Members of the 5th agroforestry task force are pictured, including members of the Permacultura Lab, some residents of the neighborhood and even a resident from the South Zone of Rio de Janeiro. D. Signs like "collective space", "help care", "plant", and "take care of the square". E. The blank arrows indicate signs that remind visitors that "straw is not trash; it's protection for plants" and to "help watering," encouraging collaborative community participation. F. "Bananeira", banana tree (*Musa* sp.) fallen after vandalism.

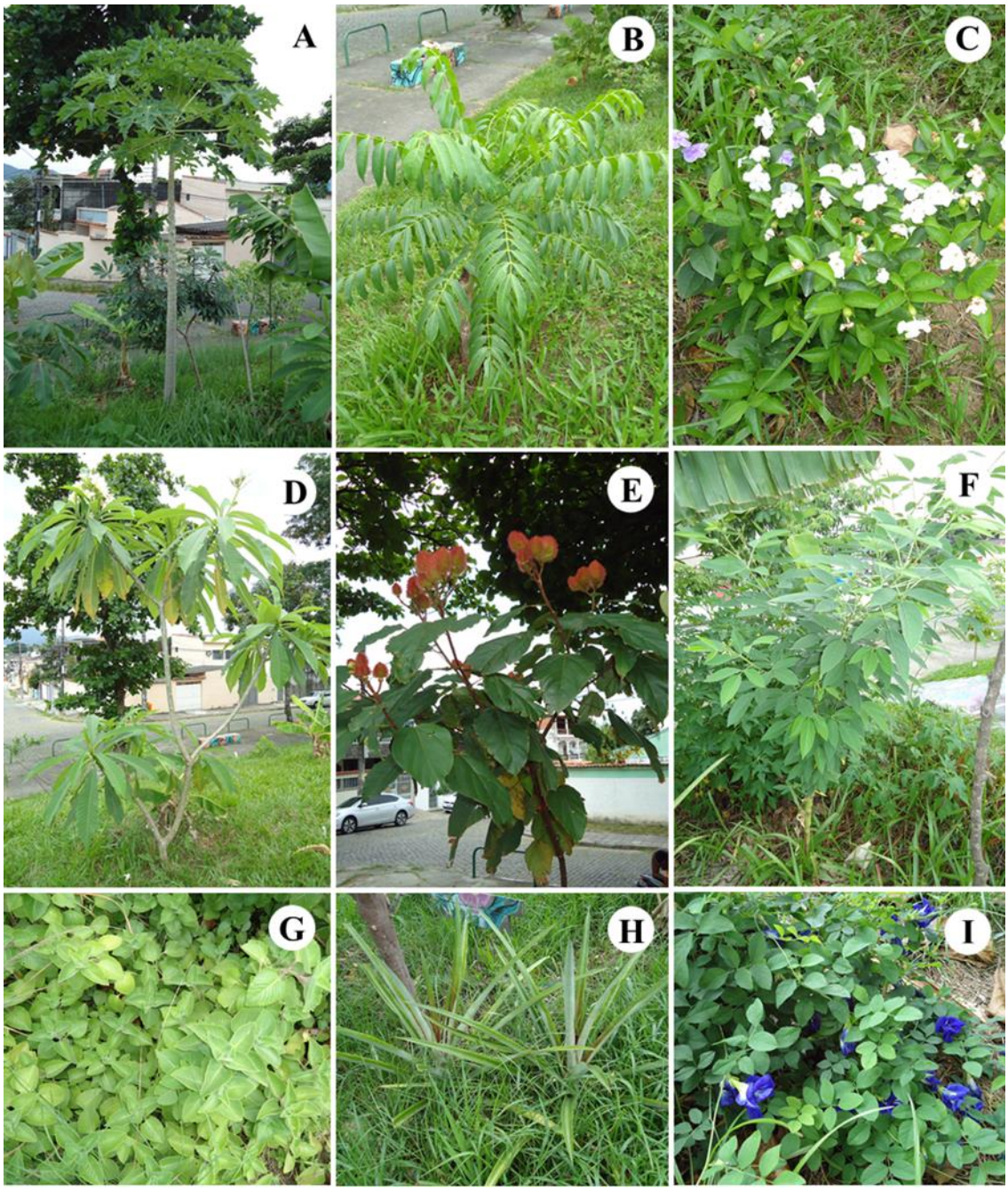

Figure 2 – Some species planted in the agroforestry space: A. "Mamoeiro", papaya (*Carica papaya*), shrub plant of emergent stratum and belonging to the successional ecological group of secondary species, the predominant use of which is food. B. "Cajazeiro", yellow mombin (*Spondias mombin*), arboreous plant of high stratum and belonging to the successional ecological group of primary species, the predominant use of which is, again, food. C. "Manacá-de-cheiro" (*Brunfelsia uniflora*), a typically ornamental species. D. "Jasmim-manga", frangipani (*Plumeria rubra*), according to Kinupp and Lorenzi (2014), is a Non-conventional Food Plant (PANC). Its flowers are edible, especially in the form of cooked salad or jam, although it is also widely used for ornamental purposes. The dried flower is used in tea making and in the cosmetic industry in the production of moisturizer and body cream. E. "Urucueiro", achiote (*Bixa orellana*) has several uses. According to Florien (2016), it is used by Brazilian Indians as a raw material for the manufacture of dye, both for use in ceramic objects and for painting their own bodies, using it simultaneously against mosquito bites and sunburn. According to Florien, it also has several medicinal uses and is used in the preparation of paprika. F. "Feijão-guandú", pigeon pea (*Cajanus cajan*), shrub plant, of high stratum and belonging to the successional ecological group of pioneer species, widely used in agroforestry as green manure and also as a food species. G. "Boldo-do-chile", boldo (*Peumus boldus*), plant used mainly for medicinal purposes. H. "Abacaxizeiro", pineapple (*Ananas comosus*), herbaceous plant of low stratum and belonging to the successional ecological group of secondary species with food as its primary use. I. "Clitória", clitoria (*Clitoria ternatea*), according to Kinupp and Lorenzi (2014), is a Non-conventional Food Plant (PANC). Its flowers are edible and can also be used as food coloring, fertilizer (fixed nitrogen) and for ornamental and medicinal purposes.

Below is a table (*Chart 1*) with the species present in the agroforestry collective and data, including popular name, scientific name, botanical family, origin, habit, life cycle, organs - parts of plants used popularly - and uses. The survey was carried out in December 2019. It is important to note that other species were also planted; however, they are no longer present, some because they did not establish and others because they had already ended their life cycle. Still others were vandalized, as noted above. It is worth remembering that not all species were planted by the agroforestry task force. Anyone is free to plant in these public spaces.

In the community agroforestry system, 35 species belonging to 23 botanical families were found, including several pioneer plants, such as "feijão-guandú", pigeon pea (*C. cajan*) and "feijão-de-porco", jack bean (*Canavalia ensiformis*). These plants were important in the initial stage of ecological succession of the (agro)ecosystem as they create conditions for species from other stages of ecological succession to establish themselves on the site, mainly in the case of a degraded area, together with secondary plants, such as "mandioca", cassava (*Manihot esculenta*) and "urucueiro", achiote (*Bixa orellana*), and primary plants, such as "cajazeiro", yellow mombin (*Spondias mombin*) and "mangueira", mango (*Mangifera indica*). Currently, the vast majority of species are perennial since this agroforestry is based on ecological succession. Thus, short-cycle plants, over time, vanish from the agroforestry system. In addition, native (including endemic), naturalized and exotic plants commonly grown in Brazil are found in these public spaces, notable for their importance to humans.

Chart 1 – Plants present in the urban and community agroforestry of a square located in Campo Grande, West Zone of Rio de Janeiro, in December 2019

Popular Name	Scientific Name	Botanical Family[1]	Origin	Habit	Life Cycle	Organs	Uses
"Abacaxizeiro", Pineapple*	*Ananas comosus*	Bromeliaceae	Native and endemic[1]	Herbaceous	Annual[2,3]	Fruit	Food; fauna and pollinator attraction; medicinal[3]
"Aceroleira", West Indian cherry, Acerola cherry	*Malpighia emarginata*	Malpighiaceae	Cultivated[1]	Shrub	Perennial	Fruit	Food; fauna and pollinator attraction[3]
"Alecrim", Rosemary	*Rosmarinus officinalis*	Lamiaceae		Shrub	Perennial	Leaf, Bole	Condiment; medicinal
"Algodoeiro", Cotton	*Gossypium* sp.	Malvaceae	Native[1]	Shrub	Perennial	Leaf, Fruit, Root, Bark, Seed	Textile, cosmetic, food and pharmaceutical industry
"Amoreira", Mulberry*	*Morus* sp.	Moraceae	Cultivated[1]	Tree	Perennial	Fruit, Leaf	Food; medicinal
"Araribá rosa"	*Centrolobium tomentosum*	Fabaceae	Native and endemic[1]	Tree	Perennial	Leaf, Bark, Wood	Ornamental; construction; medicinal;
"Aroeira-vermelha", Brazilian peppertree, Christmas berry*,**	*Schinus terebinthifolia*	Anacardiaceae	Native[1]	Tree	Perennial	Fruit, Leaf, Wood	Condiment (pink pepper); medicinal
"Babosa"*	*Aloe vera*	Asphodelaceae	Exotic	Herbaceous	Perennial	Leaf	Medicinal
"Bananeira", Banana	*Musa* sp.	Musaceae	Naturalized[1]	Herbaceous	Perennial	Fruit, Leaf	Food; handicraft
"Boldo-brasileiro", Brazilian-boldo*	*Plectranthus barbatus*	Lamiaceae	Exotic[1]	Shrub	Perennial	Leaf	Medicinal
"Boldo-do-chile", Boldo	*Peumus boldus*	Monimiaceae	Exotic	Tree	Perennial	Leaf	Medicinal
"Cabeludinha", "Jabuticaba-amarela"	*Myrciaria glazioviana*	Myrtaceae	Native and endemic[1]	Tree	Perennial	Fruit	Food
"Cajazeiro", Yellow mombin, Hog plum**	*Spondias mombin*	Anacardiaceae	Native[1]	Tree	Perennial	Fruit, Leaf, Tuberous roots (young plants)	Food; fauna and pollinator attraction; forage[3]
"Capim-limão", "Capim-cidrão", Lemon grass*	*Cymbopogon citratus*	Poaceae	Exotic/ Cultivated	Herbaceous	Perennial	Leaf	Medicinal; food; condiment; essential oil (widely used in the cosmetic industry)
"Citrus", Citrus tree (orange, lemon, tangerine)	Citrus sp.	Rutaceae	Naturalized[1]	Shrub	Perennial	Fruit	Food; medicinal
"Clitória", Clitoria**	*Clitoria ternatea*	Fabaceae	Naturalized[1]	Herbaceous	Perennial	Flower, Leaf	Food; ornamental; medicinal; fertilizer
"Embiruçu"	*Pseudobombax grandiflorum*	Malvaceae	Native and endemic[1]	Tree	Perennial	Bole	Fauna and pollinator attraction; medicinal[3],

Popular Name	Scientific Name	Botanical Family[1]	Origin	Habit	Life Cycle	Organs	Uses
							wood for pulp and paper production; seed-hair fibre (kapok) for filling pillows
"Feijão-de-porco", Jack bean**	*Canavalia ensiformis*	Fabaceae	Cultivated[1]	Herbaceous	Annual[2,3]	Whole plant	Good producer of biomass; fauna and pollinator attraction; forage[3]; green manure
"Feijão-guandú", Pigeon pea**	*Cajanus cajan*	Fabaceae	Cultivated[1]	Shrub	Biennial[2,3]	Seed, Leaf	Good producer of biomass; food; fauna and pollinator attraction; forage; medicinal[3]; green manure
"Guapuruvu", Brazilian fern tree, Brazilian firetree	*Schizolobium parahyba*	Fabaceae	Native and endemic[1]	Tree	Perennial, semideciduous	Seed, Bole (wood)	Ornamental; handicraft; wood for various purposes, such as production of canoes
"Hortelã-pimenta", Indian borage, Mexican mint**	*Plectranthus amboinicus*	Lamiaceae	Exotic[1]	Herbaceous	Perennial	Leaf	Condiment; medicinal
"Ipê amarelo", Golden trumpet tree**	*Handroanthus chrysotrichus*	Bignoniaceae	Native[1]	Tree	Perennial	Flower, Bole (wood)	Ornamental; wood products; food
"Ipê verde"	*Cybistax antisyphilitica*	Bignoniaceae	Native[1]	Tree	Perennial	Leaf; Wood	Ornamental; construction; medicinal
"Jasmim-manga", Frangipani, Red paucipan, Red-jasmine**	*Plumeria rubra*	Apocynaceae	Cultivated[1]	Tree	Perennial	Flower	Food; ornamental; medicinal; cosmetic industry
"Jenipapo"	*Genipa americana*	Rubiaceae	Native[1]	Tree	Perennial	Fruit	Food; fauna and pollinator attraction; wood; medicinal[3]
"Mamoeiro", Papaya	*Carica papaya*	Caricaceae	Naturalized[1]	Shrub	Biennial[3] Perennial[2]	Fruit	Food; fauna and pollinator attraction; medicinal[3]
"Manacá-de-cheiro"	*Brunfelsia uniflora*	Solanaceae	Native[1]	Shrub	Perennial	Leaf	Ornamental; medicinal
"Mandioca", "Aipim", "Macaxeira", Cassava	*Manihot esculenta*	Euphorbiaceae	Native[1]	Shrub	Biennial[2]	Root	Food
"Mangueira", Mango	*Mangifera indica*	Anacardiaceae	Cultivated[1]	Tree	Perennial	Fruit, Seed	Good producer of biomass; food; fauna and pollinator attraction[3]; handicraft
"Margaridão", Tree marigold, Mexican sunflower	*Tithonia diversifolia*	Asteraceae	Exotic/ Cultivated	Herbaceous	Perennial	Whole plant	Good producer of biomass; fauna and pollinator attraction; forage; medicinal[3];

Popular Name	Scientific Name	Botanical Family[1]	Origin	Habit	Life Cycle	Organs	Uses
							green manure
"Moringa", Drumstick tree, Horseradish tree**	*Moringa oleifera*	Moringaceae	Cultivated[1]	Tree	Perennial	Leaf, Flower, Fruit, Root, Seed	Good producer of biomass; food; fauna and pollinator attraction; forage[3], medicinal; essential seed oil for cosmetics
"Paineira", Silk floss tree**	*Ceiba speciosa*	Malvaceae	Native[1]	Tree	Perennial	Young leaves	Ornamental; food; seed-hair fibre (kapok) for filling pillows
"Pau-brasil", Brazilwood	*Paubrasilia echinata*	Fabaceae	Native and endemic[1]	Tree	Perennial	Bole (gum)	Wood; dyeing
"Sagu-de-jardim", Japanese sago palm, Sago palm, Cycad	*Cycas revoluta*	Cycadaceae	Cultivated[1]	Shrub	Perennial		Ornamental
"Urucueiro", "Urucuzeiro", Achiote, Annatto	*Bixa orellana*	Bixaceae	Native[1]	Shrub	Perennial	Seed	Good producer of biomass; food; fauna and pollinator attraction; forage; medicinal[3]

Source: Reflora[1]; Peneireiro; Brilhante, 2009[2]; Miccolis et al., 2016[3].
*National List of Medicinal Plants of interest to SUS (Sistema Único de Saúde, Unified Health System), public health in Brazil.
**PANC (Non-conventional Food Plants) according to classification of Kinupp and Lorenzi, 2014.

FINAL CONSIDERATIONS

We have seen that public areas can serve as a space for social and environmental interaction, and, therefore, a space for environmental education. Previously, these areas were underutilized and degraded. However, with the implementation of community agroforestry, the space underwent an environmental restoration and became productive. In this way, initiatives like this have the possibility of improving socio-environmental conditions, such as the microclimate and beautification of the landscape, in addition to producing organic food and contributing to the physical and mental well-being of the local community.

ACKNOWLEDGMENT

The authors especially acknowledge Instituto Permacultura Lab for allowing it to investigate its actions in the implementation of agroforestry and for the information provided. We also thank Viviane Grenha, Rosa Helena da Silva and Renato P. Esperanço for species identification.

REFERENCES

FLORIEN. **Urucum**. 2016. Available in: <http://florien.com.br/wp-content/uploads/2016/06/URUCUM.pdf>. Access in: 15 jan. 2020.

KINUPP, Valdely Ferreira; LORENZI, Harri. **Plantas Alimentícias Não Convencionais (PANC) no Brasil**: guia de identificação, aspectos nutricionais e receitas ilustradas. São Paulo: Instituto Plantarum de Estudos da Flora, 2014.

MICCOLIS, Andrew [et al.]. **Restauração Ecológica com Sistemas Agroflorestais**: como conciliar conservação com produção. Opções para Cerrado e Caatinga. Brasília: Instituto Sociedade, População e Natureza – ISPN/Centro Internacional de Pesquisa Agroflorestal – ICRAF, 2016.

PENEIREIRO, Fabiana Mongeli; BRILHANTE, Marinelson de Oliveira. **Proposta de classificação em grupos sucessionais para espécies agroflorestais**. 2009. Available in: <http://tctp.cpatu.embrapa.br/bibliografia/6_classificacao_sucessional%20em%20SAF.pdf>. Access in: 30 mar. 2020.

Como citar este relato de experiência:

ABNT

VICTÓRIO, C. P.; SILVA, M. G. C. F. Urban and community agroforestry: an experience in Campo Grande, West Zone of Rio de Janeiro. **InterEspaço: Revista de Geografia e Interdisciplinaridade**, v. 6, e202034, 2020. Disponível em: <http://dx.doi.org/10.18764/2446-6549.e202034>. Acesso em: 25 jan. 2020.

APA:
Victório, C. P., & Silva, M. G. C. F. (2020). Urban and community agroforestry: an experience in Campo Grande, West Zone of Rio de Janeiro. *InterEspaço: Revista de Geografia e Interdisciplinaridade, v. 6*, e202034. Recuperado em 25 janeiro, 2020, de http://dx.doi.org/10.18764/2446-6549.e202034