

# Utilization of Endemic Fruits in Efforts to Conserve Genetic Resources in Jayapura District

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**Abstract:** Papua is known as an island rich in plant diversity and potential fauna. The problems encountered are that not all types of genetic resources have been explored and identified, limited guidance on the characterization of local plants and some of them are also starting to be difficult to find, especially species that experience rarity and lead to extinction. This study aims to explore and introduce the potential of typical Papuan fruit plants so that it is useful for policymakers for the development of typical fruit plants in the future as a food reserve source of vitamins, and minerals. The location was determined based on where typical fruit plants grow in Papua Province. Data collected include socio-cultural data (local wisdom), its contribution to the economy of farmer households, and growing environment data. The research method used was descriptive exploration, to be able to document community knowledge about the management of typical fruit germplasm requires appropriate information gathering and careful and in-depth study. Information was taken in the yard and land outside the yard/farmer's garden. Activities were carried out from March to December 2019 in Jayapura district. Local plants include fruit plants endemic to the local community, which have been used for generations by the local community.

**Keywords:** Diversity; Local wisdom; Specialty fruit; Papua

## Introduction

Papua is one of the provinces in eastern Indonesia that is rich in biodiversity and endemism (Cámara-Leret et al., 2020). The differences in topography, soil, and climate in Papua have shaped a variety of endemic biodiversity that can grow and adapt well to specific locations. Papua's diverse ecosystems contain up to half of Indonesia's biodiversity, particularly endemic flora and fauna found only in Papua, including a variety of local fruit species found only in Papua (Lahallo et al., 2022).

The high endemic species richness places a responsibility on Indonesia to ensure the survival of irreplaceable biodiversity. This is in line with one of the Sustainable Development Goals (SDGs-15) initiated by the United Nations to protect and halt biodiversity loss. (Pattiselanno et al., 2024; Borelli et al., 2020), especially endemic Papuan fruit species that are still largely unknown for their traditional use and potential. Papua can be described as a 'biodiversity hotspot', with high levels of biodiversity and threats.

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This can be seen in the extent of deforestation, land clearing for oil palm plantations, mining companies, village expansion, illegal logging, and the spread of alien plant species that can out-compete native species. Meanwhile, many endemic fruit species in Indonesia, including Papua, are still growing wild in various forest areas (Nurhasan et al., 2022). This could lead to the extinction of endemic Papuan fruit species. Therefore, immediate efforts are needed to conserve the diversity of endemic Papuan fruit species, one of which is the cultural use of endemic fruits based on the traditional knowledge of the community (Boedhihartono, 2017; Marrero et al., 2023). One of the advantages of the Papuan people is that they are made up of a variety of ethnicities/tribes with unique cultures, including traditional knowledge of the use of endemic fruits. The use of endemic Papuan fruits has been known and consumed by the Papuan people for generations.

Traditional knowledge is expected to accommodate the existence of endemic Papuan fruits (Reddy & Van Dam, 2020; Ishak et al., 2019), explain that cultural identity arises from a sense of belonging to a distinctive ethnic culture, language, religion, way of eating, etc. that can be distinguished from other cultures. In line with this description, Radwan (2022) and Fathaigh (2024), states that cultural identity is also what individuals believe, related to social and cultural aspects that are interpreted through certain signs. This cultural identity can change and be changed according to context, power, and interests (Zárate et al., 2019; Barnett et al., 2021). The culture of using Papuan endemic fruit diversity based on traditional knowledge is one of the efforts to conserve endemic fruit species, especially in Jayapura Regency. Papuan endemic fruits have many benefits. Xia et al. (2018), one of which is the red fruit (*Pandanus conoideus*), which is known to contain nutrients such as carotenoids and high tocopherols (Wulansari et al., 2020; Sirait et al., 2021).

In addition to these species, there are many other interesting Papuan endemic fruits (Heriyanto et al., 2021), but currently, the benefits and traditional uses of the Papuan people are unknown. Therefore, further research is needed to explore the use and potential of traditional Papuan endemic fruit diversity. The use of traditional Papuan endemic fruit diversity is expected to serve as the cultural identity of Indigenous Papuans (Abas et al., 2022; Murphy et al., 2021). Traditional knowledge needs to be explored and studied to enrich the sustainable development process so that it can be used at the local level by local or central government as a basis for policy-making related to food security, human health, and natural resource management.

In addition, the management of Papua's endemic local fruit diversity has not been done well (Van Heist et al., 2015). This is evidenced by the lack of effort in local government programs related to the use and conservation

of local fruits. Furthermore, the lack of active regional genetic resources management commissions (Komda) has resulted in weak regulations for the protection of endemic Papuan local fruits. The importance of these regulations is being pursued by the regional government to prevent erosion leading to the extinction of local endemic Papuan fruits. This research aims to explore and present the use and potential of endemic Papuan fruits based on traditional knowledge. This research is useful for policymakers to develop Papuan endemic fruit plants as food reserves, household items, and sources of vitamins and minerals.

## Method

This assessment took place in Sereh, Ifar Besar, Yahim, Sabeyap Kecil, Dosai, and Kamdera villages in Jayapura Regency (Figure 2). This activity is part of the assessment of characterization and identification of local genetic resources (SDG). Activities were carried out from March to December 2019. The research materials were local Papuan fruit plants planted in residential areas and in the forests of Jayapura Regency. Data collected includes socio-cultural (local wisdom), its contribution to the economy of farmer households, and data on the growing environment of local fruit plants. Tools and materials used include tools for interviews in the form of questionnaires, characterization guidebooks, and tools for identification of sample characterization in the form of color chat (color cards), plastic bags, meters, label paper, stationery, and photography. The selection of priority locations was based on guidance from the local Agriculture Office which is the location of indigenous Papuan settlements, the location of plant growth, and ease of access.

This research used a field survey method with the following working procedures: Conduct a thorough observation of the research location, and population and determine the number of samples; Develop interview guidelines and questionnaire lists. Guidelines for the description of typical plant traits are the descriptor book issued by the International Plant Genetic Resources Institute and the PPVTP Fruit Plant Descriptor Guide; Conduct interviews with informants who have been appointed based on the level of information capacity required (local Agriculture Office staff to find out the location of plant growth in Indigenous Papuan settlements and local communities to find out the important properties of the germplasm; Identify and characterize with the local community the types of fruits typical of the community that have existed, seen and experienced. Utilize and identify according to published literature sources; Analyse data from observations, interviews, and identification characterization. Observation or characterization data were analyzed

descriptively and qualitatively.

### Results and Discussion

Jayapura Regency is located between 129°00'16"-141°01'47" east longitude and 2°23'10" north latitude and 9°15'00" south latitude. It is bounded to the north by Sarmi Regency and the Pacific Ocean, and to the south by Bintang Mountains Regency, Yahukimo Regency, and Yalimo Regency. It is bordered to the east by Jayapura City and Keerom Regency, and to the west by

Sarmi Regency and Mamberamo Raya. The area of Jayapura Regency is 17.514 km<sup>2</sup> which is divided into 19 districts 139 villages and 5 sub-districts with a population of 145.50 in 2011 and a population density of 6.73 persons/km<sup>2</sup>. The largest and densest population is in Sentani District which is 60.531 people (35.39%) with a density of 178.75 people/km<sup>2</sup> and the smallest population/lowest density is in Airu District which is 609 people (1.55%) with a population density of less than 1 person/km<sup>2</sup>.

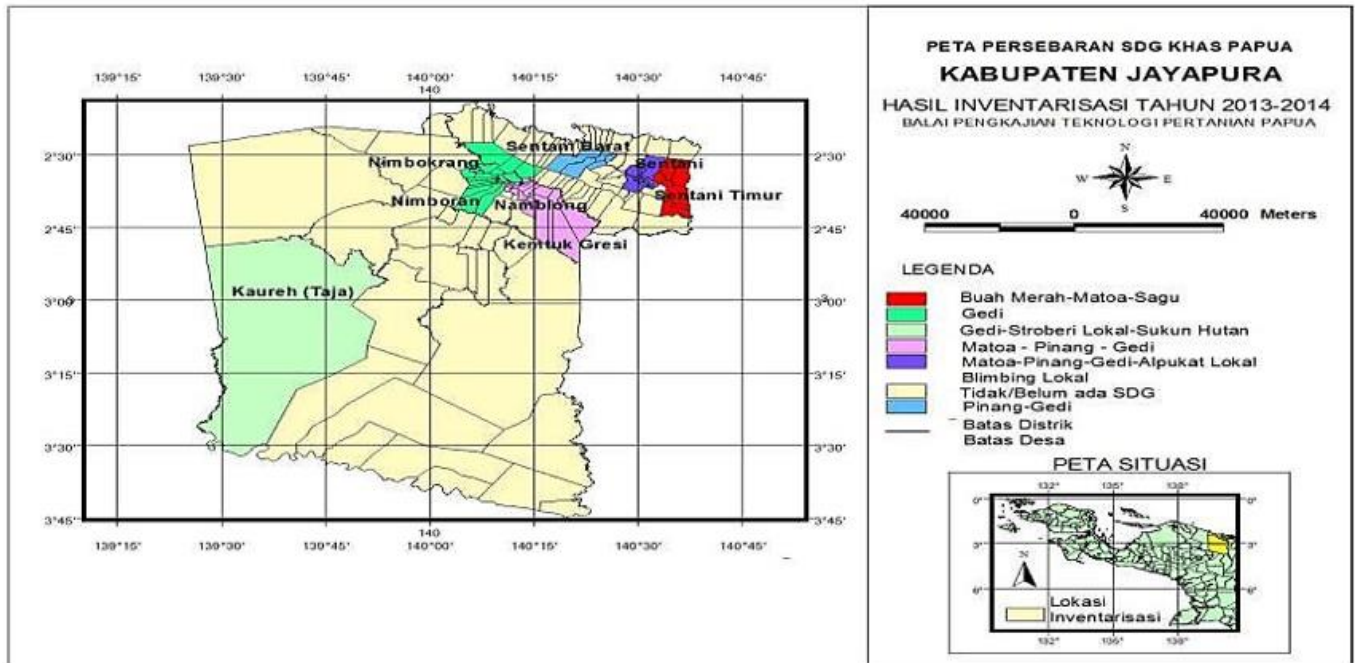


Figure 1. Map of Papuan fruit distribution in Jayapura Regency (Source: BTPP Papua SDG final report)

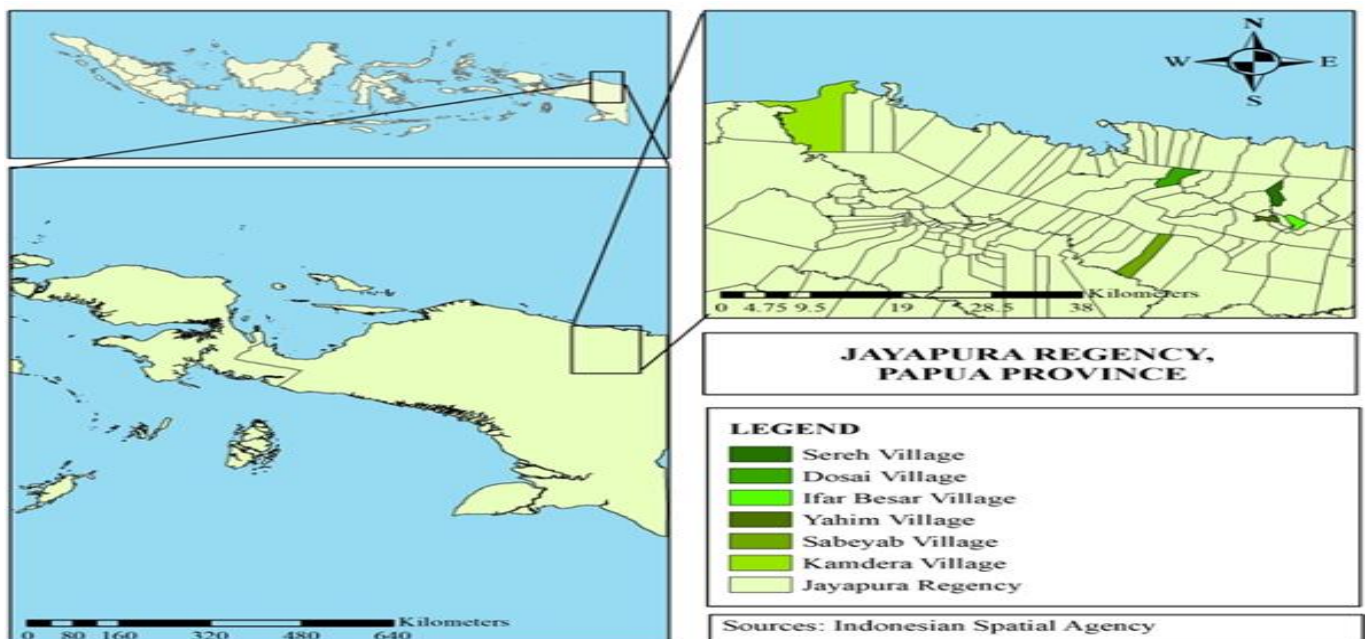


Figure 2. Jayapura Regency Papua province general situation of the exploration site



Discussion

Exploration of Endemic Fruit Plant Species of Jayapura Regency

Based on survey results in Jayapura Regency and coordination with the Jayapura Regency Food Crop

Agriculture Office, there are 15 endemic fruit plant varieties (Table 1). This area is known to have biodiversity in the forest ecosystem, which serves as a source of germplasm to meet the needs of local communities.

**Table 1.** Jayapura Regency Endemic Fruit Plant Species Exploration Results

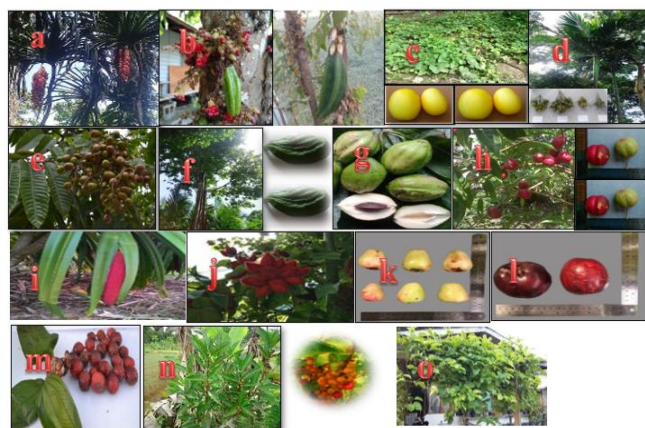
Fruit Name	Family	Local Name	Scientific Name	Information
Papuan grapes	pandanaceae	Dau Tarpi	<i>Sararanga hemsley</i>	Available
Belimbing Asam Panjang	Averrhoaceae	Ololo kokho	<i>Averrhoa dolichocarpa</i>	-
Belimbing Asam Bulat	Averrhoaceae	Ololo Khobouw	-	-
-	-	Khombelu	<i>Cirtullus Lantanus</i>	Available (rare)
Tommy-tommy	-	Tomi - tomi	<i>Flacourtia inermis</i>	-
Matoa	Sapindaceae	Emme	<i>Pometia pinatta</i>	Available
Gayam	Fabaceae	Yengge	<i>Inocapus Fagifer</i>	Available
Nanggayauw	-	Nanggayauw	-	Available (Jarang)
The crown of the gods	Thymelaeaceae	-	<i>Phaleria macrocarpa</i>	Available
Red Fruit	Pandanaceae	Buah Merah	<i>Pandanus conoideus</i> Lamk	Available
-	Bixaceae	Mele	<i>Bixa Orellana/achiote</i>	Available
White guava	Myrtaceae	Ukee	<i>Syzygium malaccense</i> (L) Merr. & Perry	Available
Red guava	Myrtaceae	Puloli	<i>Syzygium malaccense</i> (L) Merr. & Perry	Available
-	-	Sawek	-	Available (rare)
Passionate	Passifloraceae	-	<i>Passiflora flavicarova</i>	Available

Table 1 shows the diversity of fruit species endemic to local communities in Jayapura Regency, including Papua Grape (*Sararanga hemsley*), Ololo (*Averrhoa* sp), Khombelu (*Cirtullus Lantanus*), Areca Nut (*Areca catechu*), Matoa (*Pometia pinnata*), Gayam/Yengge (*Inocapus Fagifer*), Nanggayauw (*Forest Avocado*), Crown of God (*Phaleria macrocarpa*), Red Fruit (*Pandanus conoideus* Lamk), Mele (*Bixa orellana/achiote*), White Guava/Uke (*Syzygium malaccense* (L) Merr. & Perry), Red Guava/Puloli (*Syzygium malaccense* (L) Merr. & Perry), Local Strawberries from Taja, Sawek, Passion Fruit (*Passiflora flavicarova*). Each of these endemic fruits has different morphological characteristics (Figure 3).

(*Pometia pinnata*); Gayam/Yengge (*Inocapus Fagifer*); Nanggayauw (Alpukat Hutan); Mahkota Dewa (*Phaleria macrocarpa*); Buah Merah (*Pandanus conoideus* Lamk.); Mele (*bixa Orellana/achiote*); Jambu Bol Putih/ Uke (*Syzygium malaccense* (L) Merr. & Perry); Jambu Bol Merah/ Puloli (*Syzygium malaccense*(L) Merr. & Perry); Strawberi Lokal Asal Taja; Sawek; Markisa (*passiflora flavicarova*)

The Papuan grape (*Sararanga hemsley*) (Figure 3. a) is a non-woody plant similar to pandanus that does not grow in clumps. This plant grows to a height of 15 - 20 meters with a stem diameter of 12 - 20 cm and an erect, fibrous stem. The leaf shape is a belt (lanceolate-elongated), ribbon, a sword with length = 175 cm -220 cm, width = 8 cm - 9 cm, and smooth leaf surface. The shape of the fruit is irregular (predominantly crescent) with a slightly rough fruit surface with symmetrical markings. The color of the young fruit is green the ripe fruit is red, the fruit shape is spiral and the fruit taste is sweet. According to local knowledge, this plant can be eaten directly and used as jam, juice, and candied fruit. The leaves are made into woven bags and mats, while the fronds of this plant are used to make fire tongs (gata-gata) (Karimah et al., 2021; Purnamasari et al., 2020). This plant has been registered at the Centre for Licensing and Protection of Agricultural Plant Varieties (PPVTP) under registration number 602/PVL/2018.

Ololo (*Averrhoa* sp.) (Figure 3) has a height of about 5.70 m, the color of the stem is greyish brown with a stem circumference of 32 cm, the shape of the leaves is oval with green tapered ends, the length of the composite leaf stem is 47-48 cm, the shape of the flower flowers is small round with the color of the white flower crown with



**Figure 3.** Endemic fruit plant species of Jayapura Regency

Figure 3 displaying endemic fruit; Anggur Papua (*Sararanga Hemsley*); Ololo (*Averrhoa* sp); Khombelu (*Cirtullus Lantanus*); Pinang (*Areca catechu*); Matoa

pink tips, the shape of the young fruit is oval to round with 5 ribs/lingsir and open ends, the size of the young fruit is 9 cm long, 2.70 cm wide, 9 cm, the length of the fruit stem is 0.8 cm with green color. The fruit of this plant is used for thrush medicine, as a sago starch cleanser, curing bleeding gums. The stalk of the plant is used for house poles, house beams, sago crowbar handles (fema), boat building tools (ramokhona) and machete handles (ramiali kho) (Lv et al., 2022; Stubbs et al., 2020), Registered as a local variety at PPVTPP with registration number 1073/PVL/2019.

Khombelu (*Cirtullus Lantanus*) (Figure 3.c) is a seasonal plant that contains high levels of antioxidants that can counteract free radicals. This plant has oval leaves with smooth leaf edges, forked and lobed tendrils and serrated leaf edges, green young leaves, and unpolished leaf surfaces. The flowers are yellow. The fruit is round-oval, green when young, and yellow when ripe. The local use of this plant is for consumption as a thirst-quenching fresh fruit (Natadjaja & Yuwono, 2023). Khombelu is also one of the fruits included in the food supply, along with yams, bananas, and sago, for sisters who marry out or are called hou. This crop has been registered and has a registration number of PPVTP 616/PVL/2018.

Areca nut (*Areca catechu*) (Figure 3.d) has compound leaves and is an entirely leafy plant with short, semicircular petioles with deeply grooved upper surfaces. The leaves are spherical with pointed tips. The leaves are dark green with a glossy smooth surface, 60-150 cm long, and 20-50 leaflets. The stems are perennial or herbaceous, round with ribbed surfaces showing traces of leaves. The upright growth direction can reach a height of 25 m with a diameter of 15 cm, although some are larger. The fruit of the areca nut has a rounded oval or inverted ovoid shape, elongated with a length of 3.5 - 7 cm, and a fruit diameter of 2.2 - 3.0 cm. The color of the young fruit is green and the old fruit is yellow-orange-red with filamentous fruit walls (Kapoor et al., 2022; Garrido et al., 2023). The number of fruits in a bunch or mayang is 60 - 90 fruits. For people in Jayapura Regency, chewing betel nut is not something new, it is almost part of every community activity in Jayapura Regency (Arisjulyanto et al., 2022).

Betel nut has many health benefits. The significance of chewing betel nut for the Sentani people is as a symbol of friendship and togetherness, as a symbol of peace and cheerfulness (in meetings or gatherings to resolve disputes in customs such as disputes, land disputes, and others). The tradition of chewing betel nut is compulsory in performing arts activities (morale booster); to show dignity and tradition; and for health. Matoa (*Pometia pinnata*) (Figure 3) has a cylindrical stem shape, upright, grey-white color, rough surface, sympodial branching, oblique to flat branch direction, and stem height reaches

50 m with a diameter of 140 cm. Compound leaves are arranged alternately, 4-12 pairs of leaflets, young leaves are bright red, after aging they become solid green. Leaflets are julienned to ovate, 30 - 40 cm x 8 - 15 cm in size. The fruit is round or oval with a length of 5-6 cm, colored green, red, and even black. Round seeds are light brown (Abtahi et al., 2022; Ren et al., 2017). The use of matoa plants; the wood can be used for house and bridge building, furniture, flooring, molding, shipping, and sports equipment (Zulfahmi et al., 2023). Pepagan/bark is used as a medicinal material. Young leaves are used as wound and asbestos/ulcer medicine. The fruit can be consumed directly or juiced. This plant has been registered at PPVTP 1682/PVL/2021.

Gayam/Yengge (*Inocapus Fagifer*) (Figure 3.f) is a typical Papuan fruit plant, reaching heights of tens to tens of meters. The leaves are elliptic with a pointed tip and a blunt base. The edges of the leaves are flat, the upper and lower surfaces of the leaves are smooth and smooth, and the leaf bones are pinnate. The stem is round with a smooth surface. Dark green leaf color, cream leaf bone color with brownish-orange stem color. Average leaf length 21.50 cm, width 7.50 cm, and stem length 0.70 cm. Fruit shape is round, flat, and irregular with an uneven and rough surface. The fruit oxidizes very quickly and turns brown when split. The fruit is generally 7 cm long, 3 cm wide, and 15 cm in circumference. The weight per fruit is about 50 grams. The trunk is used for household utensils and furniture, while the fruit is eaten.

Nanggayauw/Forest Avocado (Figure 3. g) has a plant height of up to 12 meters with a smooth dark green leaf surface with tapered leaf tips and light green leaf bones. The fruit is light green with an uneven surface and is oval with a tapered base. There are 2-3 fruits on each stalk, with the fruit measuring 7 cm long, 6 cm wide, and 20.5 cm in circumference. The seeds are oblong and flat, with both ends slightly tapered and brown. The rough seed surface is 4 cm long and 2 cm wide. Local uses of the plant include the trunk or wood of the nanggayauw tree, which is made into beams, house walls and boards. The fruit is used as a fresh dessert and juice.

Mahkota Dewa (*Phaleria macrocarpa*) (Figure 3. h) can reach a height of up to 6 meters if left untreated but generally grows to an average of 1 to 2.5 meters. This plant has a greenish-brown stem color, a round stem shape, and a stem diameter of 15 cm. The leaves on this plant have short stalks and the positions of the leaves are opposite to each other, the edges of the leaves are flat or not serrated. The color of the leaves is dark green, the surface of the leaves is smooth and glabrous, and the tips and bases of the leaves are tapered. The length of the leaves is 7 - 10 cm and the width is 2 - 5 cm. The Crown of God plant has a round fruit with a diameter of 3 - 5

cm, the surface of the fruit is smooth and grooved. The color of the young fruit is green, the ripe fruit is red. The local use of this fruit is the rind and pulp of the fruit for stomach pain, anti-cancer, and hypertension, while the leaves are used for skin diseases (Nistor et al., 2024; Patil et al., 2023; Wahab et al., 2018). Red Fruit (*Pandanus conoideus* Lamk.) (Figure 3. i) is a native Papuan plant found in the mountainous areas of Jayawijaya (Wamena and Tolikara), Manokwari, Jayapura, Timika, Nabire and Sorong. Red fruits can also be found in parts of North Maluku, from the coastal areas to the highlands. Local uses; The fruit is used as a medicine for all diseases in the form of red fruit oil, sauce, sambal, and pulp for animal feed. While the leaves are made into woven nokens and mats.

Mele (*Bixa orellana*) (Figure 3.j) is commonly called the lipstick tree and is used by Papuans as a dye to decorate hair or to decorate the face, hands, and feet. The decorations are used on the body during traditional celebrations, such as the inauguration of tribal chiefs, or when performing welcome dances. This plant is a tree whose fruit seeds are used as dye on the body during traditional celebrations such as make-up for dancers at the inauguration of a great tribal chief (ondo-folio) or when welcoming guests of honor. Make-up is also used for dancers during other public celebrations such as dances at the annual Lake Sentani Festival (FDS) (Aher et al., 2012).

Jambu Bol Putih/Uke (*Syzygium malaccense* (L) Merr. & Perry) (Figure 3. k) is a tree-like plant with a height of 11-13 meters, a dark brown stem color, a stem diameter of 30-40 cm and a round stem shape. This plant has a green leaf color, flat leaf edges, a leaf length 25-29 cm, a leaf width of 10.8-12 cm, number of branches 16-25. Fruit shape round, fruit diameter 8.7-10 cm, fruit color SPP (Strong Purplish Pink), flesh thickness (ariolade) 1.9-2.5 cm. Number of seeds with spheroid shape and seed diameter 3.8-4.5 cm (Jaeger et al., 2023); (Wallace et al., 2020). Registered under registration number PPVTP 1845/PVL/2022. Jambu ukee is found in the urban area of Jayapura, Sentani and on the shores of Lake Sentani. This plant has also begun to decline in numbers, where the fruit is used as fresh fruit and made into salad.

Jambu Bol Merah (*Syzygium malaccense* (L) Merr. & Perry) (Figure 3. l) is an erect tree with an average height of 11-13 meters. This plant has green leaf color, flat leaf edges, leaf length 25-29 cm; leaf width 10.8-12 cm, dark brown stem colour, stem diameter: 30-40 cm, round stem shape, number of branches 16-25. Fruit round shape, fruit diameter 8.7-10 cm, thick flesh (ariolade) 1.9-2.5 cm, number of seeds 1. The local use of the fruit is as an edible fruit. The local strawberry of Taja origin (Figure 3.m) is a plant that grows on peat bogs or between oil palms. The plant does not reach 1 meter in height and

bears fruit every year. The fruit has a sweet taste and is eaten fresh or made into juice. The morphological characteristics of this plant are a round stem with a spiny surface from the base to the middle of the stem. The stem is also hairy, round from the base to the middle of the stem, and also round from the middle to the end of the stem, and brown. Leaves are pinnate with tapered helical tips and a notched base. The leaf margins are lobed with a smooth surface and the leaf margins are pinnate. Flowers white with 5 corollas. The style is yellow and the stamens are pale green. The fruit is red and round. The surface of the rind is rough with a few hairs. The color of the pulp is red with a sweet taste, when eaten the mouth turns red. The local use of this plant is to be eaten as a fresh fruit to quench thirst.

Sawek (Figure 3. n) is a shrubby plant with a round stem shape, brown stem color, and smooth stem surface. The leaves are elliptic with a tapering tip and a pointed base. The shape of the leaf edges is flat, the leaf surface is slightly rough, and old leaves are quite thick and stiff, the leaf bone pattern is pinnate and the leaf color is dark green. The average leaf length is 7-10 cm, width 3-5 cm, and stem length 1 cm, with the leaf axils overgrown with fruit. The surface of the stem is smooth and rounded and the leaf bones and petioles are yellow-green. The fruit is small with a circumference of about 2.5 - 3 cm. The young fruit is brownish green and the ripe fruit is blush red. The fruit tastes sweet and is safe to eat. Local use: The fruit is eaten fresh. Young leaves or shoots are used as a vegetable.

Passion fruit (*Passiflora flavicarva*) (Figure 3.o) grows as a vine with round green stems. Young leaves are pinnate and light green, while older leaves are palmate and dark green. Young leaves are about 13 cm long and 10.5 cm wide. Older leaves are about 13 cm long and 19.5 cm wide. The flowers are purplish-white. The fruit is round, green with white spots when young, and light purple with white spots when old. The skin is tough, and hard to split with thicker skin. Fruit weight is lighter compared to Wamena Passion Fruit. Fewer seeds with thicker flesh. The flesh color is light yellow. The fruit is about 6.3 cm long, and 6 cm wide and weighs 67.80 grams. The flavor is sweet and sour.

The growing locations of various local fruit species in Jayapura Regency are relatively capable of growing in almost all regions of Papua. In this case, most of the fruits that have been identified do not require specific growing conditions between each region in one province both in terms of soil and climate (Tchonkouang et al., 2024; Grigorieva et al., 2023; Duchenne-Moutien & Neetoo, 2021). However, the variation in environmental conditions and topography of Papua with a relatively more diverse range of highlands and lowlands provides a more diverse variety of local Papuan plants both



cultivated by residents and growing wild (Prabawardani et al., 2023).

## Conclusion

Jayapura Regency, Papua has a rich diversity of endemic fruit plants, with as many as 15 endemic fruit plants found in this area, including Papua grape, sour star fruit (ololo), local cucumber (khombelu), matoa (emme), areca nut (phelauw), tomi-tomi, gayam (yengge), forest avocado (nanggayauw), mahkota dewa, red fruit, mele, water guava (ukee), red guava (puloli), strawberry, passion fruit. Increased human activities, such as the construction of houses and shops, and changes in land use, have led to the decline of endemic fruit plant species in their natural habitat. The use of endemic plants is based on local knowledge and is used as medicine, fresh drinks (thirst quenchers), dyes, household utensils and to make boats (for sea transport). Local cultural wisdom on the use of Papua's endemic fruit diversity based on traditional knowledge is one of the efforts to conserve endemic fruit species that play an ecological role as well as cultural values of the people of Jayapura Regency. In this case, it is hoped that the protection of endemic fruit species in various ecosystems in Papua, including Jayapura Regency, will be maintained from extinction. There is a need to protect endemic fruit types in various ecosystems in Papua, including Jayapura Regency, so that they are protected from extinction.

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## Author Contributions

Conceptualization, M.O.; methodology, B. M.; validation, M. K. R.; formal analysis, M. N.; investigation, K. F.; resources, S. M. K.; data curation, E. K. R.: writing—original draft preparation, F. M.; writing—review and editing, R. A. P.: visualization, M.O. All authors have read and agreed to the published version of the manuscript.

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## Conflicts of Interest

The authors declare no conflict of interest.

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