

## Ethnobotany of suweg, *Amorphophallus paeoniifolius*: Utilization and cultivation in West Java, Indonesia

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**Abstract.** *Mutaqin AZ, Kurniadie D, Iskandar J, Nurzaman M, Partasasmita R. 2020. Ethnobotany of suweg, Amorphophallus paeoniifolius: Utilization and cultivation in West Java, Indonesia. Biodiversitas 21: 1635-1644. Amorphophallus paeoniifolius (Dennst.) Nicolson, locally known as suweg, is a bulbous plant that has many benefits, but has not been cultivated as intensively as other species from the Araceae family. Suweg grows scattered in various rural areas in Indonesia, including West Java. Some suweg plants are cultivated by villagers, while the others grow wild in forested areas. Suweg is commonly cultivated in several types of agroecosystems, such as home gardens (pekarangan) and gardens (kebun), using traditional ecological knowledge inherited from generation to generation. This study aims to investigate the utilization and cultivation of suweg by a community in Cisoka Village, Cikijing Sub-district, Majalengka District, West Java. This study used a qualitative method using ethnobotany approach, i.e. an emic analysis of the perception and local knowledge of community on suweg, and then validated using scientific or ethical knowledge. Field data collection was done by observation and semi-structured interviews with key informants chosen purposively considered having expertise and knowledge about suweg. The results showed that suweg has long been cultivated or growing naturally in Cisoka Village. The species has been culturally utilized by the rural community as additional food sources of carbohydrates, fish feed, and traditional ceremonies. However, the use of traditional ceremonies has been lost its importance. Suweg is generally used by the elderly, with certain groups, such as rural fish farmers and some younger age groups or children who like suweg. The rural people of Cisoka Village also mentioned that suweg was not cultivated as intensively as other. This is partly because it is considered not to have a high economic value as other agricultural commodities.*

**Keywords:** *Amorphophallus paeoniifolius*, cultivation, ethnobotany, Sundanese people of West Java, utilization

### INTRODUCTION

Indonesia is a country that has a very high diversity of plants. The diversity of plants in Indonesia is part of the Malesiana flora which is estimated to have around 25% of flowering plant species in the world with the number of species reaching 20,000 and of which 40% are endemic (Kusmana and Hikmat 2015). In rural areas, a variety of plants are considered useful, both growing wild in forest or cultivated by residents in various types of agroecosystems, such as home garden (*pekarangan*) and garden (*kebun*). In the home garden and garden systems, annual food crops are usually mixed with various perennial plants, as such the vegetation structure is very complex, resembling that of forest (Iskandar and Iskandar 2011, 2016; Njurumana 2016; Prihatini et al. 2018; Iskandar et al. 2017). Therefore, these systems play important role in delivering ecological services, including plant biodiversity conservation, maintaining soil fertility, soil erosion protection, and maintaining hydrological system of watershed (Iskandar 2017).

Rural ecosystems in Indonesia are usually composed of residential areas inhabited by villagers and agricultural lands. These ecosystems are influenced by various environmental factors (e.g. soil, climate, and water) which can affect their livelihood patterns as agrarian communities

in such place (Development Team of Ministry of Education National 2011). In other words, villagers in their daily lives always have a very close reciprocal relationship with the environment or its ecosystem (Iskandar and Iskandar 2011; Iskandar 2017). The long experience of villagers interacting with their environment produces imagination and stories about their environment, including the species of plants, which form a very typical local knowledge system so-called Traditional Ecological Knowledge (TEK) (Cotton 1996; Iskandar 2018; Iskandar et al. 2019; Partasasmita et al. 2019). TEK has various peculiarities, such as being holistic, subjective and experiential; inherited by ancestors from generation to generation using mother tongue; learned by trial and error in interacting with environment, very deep but local, and vulnerable to extinction because it is not written (Ellen and Harris 2000; Sillitoe 2002; Berkes 2008; Iskandar 2018).

Specifically, TEK knowledge of rural communities in several regions of the world is cross-culturally related to names, folk classification, utilization, and traditional conservation of plant species. Zambrana et al. (2014) stated that the diversity of local names or TEK about plant species among them is influenced by several factors such as ethnicity, gender, and age. For example, Bari ethnic men in Venezuela have TEK about forest species rather than

women. The reason is, Bari men have more experience dealing with plant species in the forest than the women (Zambrana et al. 2014). In contrast, the women of Matsigenka, Peru, have more in-depth TEK about species of medicinal plants than the men (Lizarralde 2004). The reason is, these women are usually more concerned with children and the health of women compared to men.

Related to TEK, the use of plant species by each ethnic is unique, meaning that it has its own principles and methods. Maroyi and Cheikhoussef (2015) state that there are some similarities and differences in the use of plants in different countries in the context of the species of plants, organs used, how to prepare and the purpose of their use. Likewise, Mustafa et al. (2015) reveal that there are some differences in the use of plants by several ethnic groups related to the type of utilization and traditional knowledge in regard to the ecology of plants. Mardiyansih et al. (2010) inform that there are differences in agricultural systems in different places, mainly related to agrarian social structures such as land tenure patterns, work organization, production transactions, allocation of human resources, and planting culture rituals.

*Amorphophallus paeoniifolius* (Dennst.) Nicolson or *suweg* is widely spread and used in Indonesia (Yuzammi et al. 2017). Santosa et al. (2017) inform that *suweg* grows on several islands in Indonesia, such as Sumatra, Java, Bali and Lombok. *Suweg* has economic value for rural population as an additional staple food for carbohydrate sources, vegetables, and drugs such as anemia (Singh et al. 2010). *Suweg* can also be used for traditional medicinal including to treat bronchitis, asthma and dysentery, and ailment for poisonous snake bite (Ramanathan et al. 2014; Girardi et al. 2015; Dharmadasa et al. 2016). There are various methods of management system for *suweg*, but in

general, it can be divided into two systems: grow naturally and being cultivated (Anil et al. 2011; Suja et al. 2012). For example, Mutaqin et al. (2020) mentions that *suweg* plants grow in West Java are found in several types of agroecosystems, such as home garden, garden, rice field, and pond edge, and grows wild in forest ecosystems.

Although *suweg* has many benefits, this plant has not been intensively cultivated by villagers. Therefore, studies on ethnecology about *suweg* are very important. This study aims to investigate the utilization and cultivation of *suweg* (*Amorphophallus paeoniifolius* (Dennst.) Nicolson) by the community in Cisoka Village, Cikijing Sub-district, Majalengka District, West Java. This research is a follow-up study of folk classification, habitat, and traditional conservation of *suweg* plants in Cisoka Village.

## MATERIALS AND METHODS

### Study area and period

This research was conducted in Cisoka Village, Cikijing Sub-district, Majalengka District, West Java Province, Indonesia (Figure 1) in June-October 2019. It is at an altitude of 611 meters above sea level and located about 40 km from the district center, and 3 km from the sub-district center (Central Statistics of Majalengka District 2019). Administratively, Cisoka village has an area of 4.11 km<sup>2</sup> and consists of 3 hamlets, 10 neighborhood residents (RW), and 21 neighborhood units (RT). The land use of Cisoka village consists of 14.76 Ha of residential area, 194.19 Ha of paddy fields, 183.23 Ha of plantations, 3.65 Ha of yards, 0.45 Ha of offices, 1.9 Ha of cemeteries, and 28.71 Ha of paddy fields (Cisoka Village Government 2016).

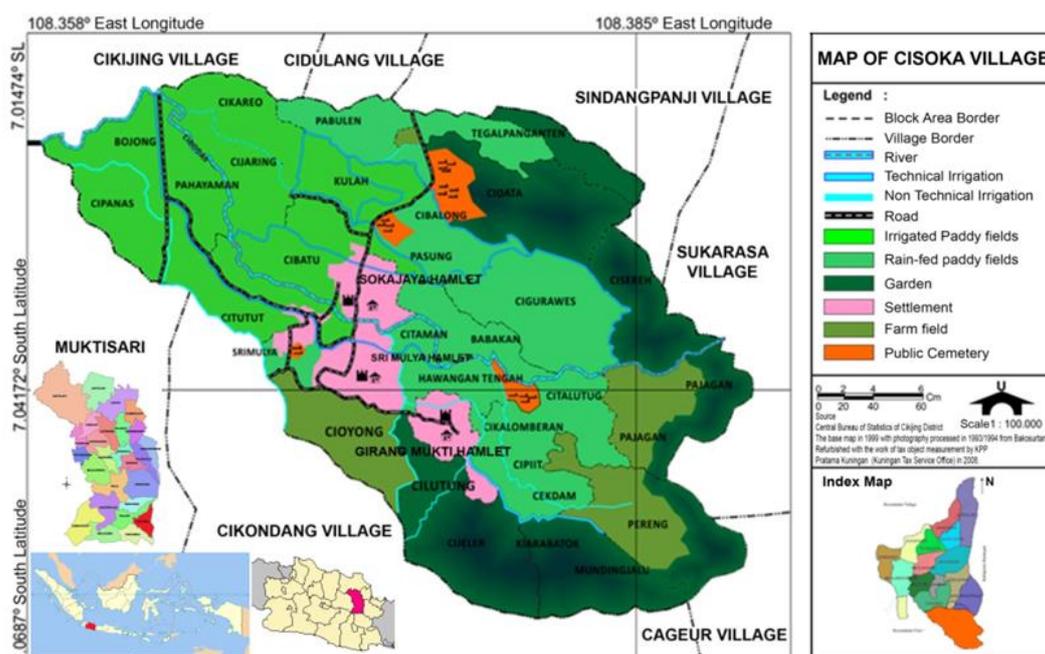


Figure 1. Location of research in Cisoka Village, Cikijing Sub-District, Majalengka District, West Java, Indonesia (Mutaqin et al. (2018)

Based on population data in 2018, Cisoka Village has a population of 1,982 people, consisting of 981 men and 1,001 women, and a population density of 478/km<sup>2</sup> (Central Statistics Agency of Majalengka District, 2019). The livelihoods of the population in Cisoka consist of 1078 farmers, 65 farm workers, 18 private workers/employees, 43 civil servants, 35 handicraft industries, 77 traders, 10 village officials, 11 animal breeder, 9 fish farmers, and 24 other livelihoods (Cikijing Sub-district Agricultural Counseling Center 2019).

The agricultural commodities in Cisoka Village are mainly rice (*Oryza sativa* L), shallots (*Allium cepa* L), guava (*Psidium guajava* L), hot pepper (*Capsicum frutescens* L), water spinach (*Ipomoea aquatica* Forsk), cucumber (*Cucumis sativus* L), cayenne pepper (*Capsicum annum* L), and tomatoes (*Solanum lycopersicum* L) (Central Statistics Agency of Majalengka District 2019). In addition, several potential agricultural commodities are ginger (*Zingiber officinale* Roscoe), clove (*Syzygium aromaticum* (L) Merr and Perr), nutmeg (*Myristica fragrans* Houtt.), and coffee (*Coffea arabica* L.).

### Procedures

This research is qualitative research with ethnobotany approach (Martin 1995; Cotton 1996; Cunningham 2001; Iskandar 2018). Field data collection was done using the methods of observation and semi-structured interviews. Observations were made through researchers observing the existence of the *suweg* in several types of agroecosystems, such as home gardens, gardens, and forest ecosystems. Meanwhile, the semi-structured interview was intended to gather information from the community about the use of *suweg*. Semi-structured interviews were conducted using snowball sampling technique by selecting informants who were considered competent. To explore local experts in Cisoka village, one could choose to work only with local experts representing a group of individuals who are socially legitimated as holders of a particular knowledge on *suweg* (cf. Albuquerque et al. 2014). The first informants interviewed were key/pivotal informants (*informan pangkal*), such as local government and community leaders. Subsequent interviews were conducted with other informants who were deemed to have knowledge about *suweg* with various backgrounds, who were recommended by the pivotal informants or previous informants. Some informants in this study were the village head, village staff, hamlet heads, elders and women farmers, ponds owners, and livestock owners. In semi-structured interviews, informants gave extensive responses to a series of general questions in relation with present of the *suweg* in several types of agroecosystem, including home garden and garden/mixed garden system; and various utilization of *suweg*, some of which had been prepared in advance and some of which were naturally given during the course of the conversation.

### Data analysis

Data analysis was performed using an emic and ethical approach that was narrated descriptively through cross-checking, summarizing, and synthesizing (Newing et al.

2011; Iskandar 2018). Cross-checking is the stage to validate or correct the data obtained from various informants and the results of field observations. Summarizing is a stage to summarize data from informants or informants who have been validated. Synthesizing is done to make conclusions from data from informants or informants who have been validated and summarized. Next, a descriptive narrative analysis was made in sequence.

## RESULTS AND DISCUSSION

### History of *suweg* in Cisoka Village

In general, informants from Cisoka informed that *Amorphophallus paeoniifolius* (Dennst.) Nicolson, also known as local name is *suweg*, had been popular or had grown in the area where they lived since at least the 1950s, but it was not known exactly where it came from and since when it had been grown in the village. Various informants stated that the species that grew in several types of agroecosystems, such as their home gardens and/ or gardens, were unknown as to when they existed or were grown. The informants also informed that the presence or growth of *suweg* on their lands might at some time have a family member ever planted or removed the remaining skin or shoots of the *suweg* tubers in these types of agroecosystems. There were also several informants who inform that maybe someone else who dumped the remaining skin or tubers of *suweg* on their lands. In addition, various informants informed that existing *suweg* plants in their lands are allowed to grow to be used at a later time or harvest season when needed by their owners.

Related to the history of utilization, informants said that *suweg* had been used from generation to generation from its ancestors, although it was not known in a timely manner when it was used. Various informants also mentioned that *suweg* had been a staple food, besides rice, until around the 1970s, especially during the dry season or when the rice not yet harvested. They also stated that *suweg* is still used until nowadays, although in general the use is limited to certain community groups, namely most older people, pond owners, and young people or children who like *suweg*. For young people or children who use *suweg*, their consumption is because of the many and various alternatives of food.

Regarding the unknown origin of *suweg* on community land and when it began to grow is in line with what was informed by Santosa et al. (2017) that this plant grows semi-wild. Plants that are wild or semi-wild, are different from plants that are cultivated by people who are generally of the origin of the seeds and the time of growth is known or cared for. For example, Makruf and Iswadi (2015) inform that the cultivation stages of taro, a plant biosistematically related to *suweg*, include the preparation of seeds, land preparation, planting, fertilizing, maintenance, control of plant pests, and harvesting. This is also in line with ethnobotany researchers that residents have local knowledge about the names of plants and uses, mainly because they get this knowledge inherited from

their ancestors or based on personal experience during their lives in intensively interacting with these plants (Cotton 1996; Balick and Cox 1997). In other words, given the absence or scarcity of the story of the *suweg* plants from their ancestors and the plants had not been intensively cultivated by villagers, information about ecological history of *suweg*, such as when and how it was introduced, is less known.

The rationale for the use of *suweg* by the community until now is due to the benefits provided by the tuber. Various tubers of plants, including *suweg* tubers, have long been used by rural communities in West Java for various purposes. For example, Wigna and Khomsan (2011) mentioned that based on ecological history, in the past cassava tubers had been used by the people of Cireundeu Hamlet -Cimahi, West Java as staple food as a substitute for rice. Until now, the habit of consuming cassava as a substitute for rice still exists in the community of Cireundeu Hamlet-Cimahi, especially by the older generation. Similar to cassava, *suweg* in the past in the lean season was once used as a source of food for increasing food staple rice. But unlike the case of cassava food in Cireundeu, nowadays *suweg* is not consumed intensively by residents of Cisoka Village. Darpan et al. (2013) suggested that additional food sources of other carbohydrates, such as cassava or *suweg*, are important during famine season (i.e. season where staple food, e.g. rice, is in shortages) in rural populations. For example, Lukitaningsih et al. (2012) concluded that *suweg* (*Amorphophallus paeoniifolius* (Dennst.) Nicolson), *walur* (*Amorphophallus variabilis*), and *porang* (*Amorphophallus oncophyllus* Prain) tubers are alternative carbohydrate sources to substitute rice.

The results of the study showed that younger people did not use *suweg* more than the old age group. This is likely due to the erosion of TEK on *suweg* by the younger generation, or because of changes in their views on environment, including *suweg* plant species, and changes in the population of village subsistence livelihood. Several factors can cause the loss of traditional knowledge including formal education, bilingual, and subsistence modes (Lizzaralde 2004; Iskandar 2018). Meanwhile, Iskandar and Iskandar (2011) states that changes in the view of a community on its environment are due to several factors including formal education, religious education, and market economic factors.

#### Utilization of *suweg* in Cisoka Village

The community in Cisoka Village mentioned that *suweg* are often used for various purposes, namely food additives, fish feed, and traditional ceremonies (Table 1).

The existence of the use of *suweg* is proof that there is a community relationship with the surrounding environment. For example, Handavu et al. (2019) conclude that there is a strong dependency between local communities on the resources in their environment.

In general, *suweg* tubers that are used by people in Cisoka Village for supplementary food/ snack are generally consumed (*jajabur* in local language) for themselves and their families (subsistence) or shared with others in need such as neighbors. *Suweg* used as supplementary food is generally served or consumed together such as when mutual works, guest visits, or certain rituals in carrying out religious orders.

The informants in Cisoka Village also specifically informed the *suweg* tubers processed by steaming or in local terms called *diseupan*. The steaming is through several stages as follows: the tubers are peeled outside, then the tuber flesh is sliced/cut into thin pieces for 2 fingers or a portion of citrus fruit (about 3 cm), not thick so that it does not itch. Then, the tubers are washed with water (preferably with running water to get rid of itching) and the tuber steamed (about 30 or 60 minutes). Lastly, the steamed tubers are given grated coconut and salt to be served/eaten. Steamed tubers served with grated coconut and salt in local terms are called *urab*. The steamed/cooked tuber is a fresh tuber or the period is not long after it is harvested, so that it tastes good because if it is not cooked it is immediately unpleasant or *teu puleun* (in the local language). Processing tubers for food is rarely boiled or *dikulub* (in the local language) because it can cause the destruction of the tubers. A more detailed description of *suweg*'s tuber processing for supplementary food can be seen in Figure 2.

People also used *suweg* to feed fish, especially *gurame* (*Osphronemus goramy*), *mujaer* (*Oreochromis niloticus*), *nilem* (*Osteochilus vittatus*), and *mas* (*Cyprinus carpio*). Utilization for fish feed is done if the leaf strands have started to appear (about 1 month after the emergence of shoots) and if the tubers will not be used in the season. This is because the strands/ leaf stems of *suweg* are still in the process of growth and if being cut it will cause the tuber not to grow well. Descriptions regarding the use of *suweg* for fish feed can be seen more clearly in Figure 3.

The use of *suweg* tubers by the community for traditional ceremonies, including the traditional ceremony in building a house (locally called *ngadegkeun bumi*), in the overtime (*ngarot*), and 4- or 7-months pregnancy (*babarit*). For all those traditional ceremonies, the raw *suweg* tubers are generally served or stored directly in the container/place of offerings or cooked (steamed made *urab*) first before serving.

**Table 1.** Utilization of *suweg* by the community of Cisoka Village, Majalengka District, West Java Province, Indonesia

Type of utilization	Parts of plant used	Reason for utilization	Utilization technique
Supplementary food/ snack	Tuber	It tastes good, makes you full	Steamed
Fish feed	Leaf and petiole	Low cost, liked by fish	Leaf blades and petioles are directly given to fish in ponds or chopped first
Traditional ceremony	Tuber	As one of 7 tubers that must be present	Tubers are served directly or cooked first



**Figure 2.** *Suweg* tubers used as food. A. *Suweg* tuber, B. Stripping the tuber skin, C. Washing the tuber skin, D. Sliced tubers, E. Boiling process of *suweg* tuber, F. Serving steamed *suweg*, G. Consuming steamed *suweg*



**Figure 3.** *Suweg* as fish feed. A-B. Cutting petiole and leaf blade of *suweg*; C-D. Throwing *suweg* leaves to feed fish in a pond

The use of *suweg* by the community in Cisoka is in line with some other scientific information (ethical views). Mandal et al. (2016) state that *suweg* are essential plants for food security in several developing countries. Yuzammi (2018) states that *suweg* can be developed into food crops. Erskine (2015) mentions that this plant is used by the people of Timor-Leste for food. Meanwhile, Mukherjee et al. (2014) inform that *suweg* are edible plants.

Utilization of *suweg* for food is quite rational because *suweg* tubers contain phytochemical compounds such as carbohydrates (De et al. 2010; Singh et al. 2013). Septiani et al. (2015) state that *suweg* tubers have a high carbohydrate content of 86.6-90.2%. More specifically, An et al. (2010) stated that *suweg* has glucomannan content. This compound is a carbohydrate with the main constituents are D-mannose and D-glucose (European

Commission 2001; Tester and Al-Ghazzewi 2013). Glucomannan content in *suweg* tubers is around 1-19% of dry weight (Mekkerdchoo 2016). In addition, Dey et al. (2017) state that this plant contains several phytochemical compounds such as carbohydrates, proteins, steroids, flavonoids, tannins and other phenolic compounds, glycosides and alkaloids, amino acids, fats and oils. Singh et al. (2016) also mentioned that *suweg* has nutritional content such as carbohydrates, flour, ascorbic acid, protein,  $\beta$ -carotene, and total phenol. Quantitatively, Srivastava et al. (2014) stated that the tubers of the *suweg* plant contain 11.53% protein, 3.52% fat, 70.75 carbohydrates and 14.32% crude fiber, 2.24  $\mu\text{g/g}$  nitrogen, phosphorus 4.53  $\mu\text{g/g}$ , potassium 38.1  $\mu\text{g/g}$ , magnesium 119.2  $\mu\text{g/g}$ , zinc 23.1  $\mu\text{g/g}$ , chromium 8.9  $\mu\text{g/g}$ , copper 32.6  $\mu\text{g/g}$ , iron 340.2  $\mu\text{g/g}$ , and manganese 6.6  $\mu\text{g/g}$ .

The use of *suweg* in Cisoka for subsistence living is in line with Irwan et al. (2018) that plants grown in home garden serve as family food. More generally, Molebatsi et al. (2010) stated that plants that grow in home garden are aimed at food sources. Meanwhile, processing *suweg* by Cisoka's community to be used as food, this is commensurate with processing *suweg* by the community elsewhere. Hasanah et al. (2014) states that the people in Bantarkawung Sub-district, Brebes District utilize *suweg* to be processed into food by boiling and making compote, and making flour.

Regarding the knowledge that before steaming *suweg* needs to be thinly sliced and washed to relieve itchiness, this is in line with Chairiyah et al. (2016) that variations of calcium oxalate contained. Calcium oxalate rafida can cause itchiness in the skin, mouth and throat (Bradbury and Nixon 1998; Lewu et al. 2010; Singh et al. 2018). Meanwhile, Lukitaningsih et al. (2012) find that *suweg* tubers contain calcium oxalate which can cause itchiness when in contact with the skin, so it needs to be removed through the washing process. Widari and Rasminto (2018) concluded that tubal oxalate levels could be reduced through boiling at 80° C in 8% NaCl solution for 25 minutes. Dewi et al. (2017) state that the levels of oxalate in taro tubers, plants that are related to *suweg*, can be reduced through steaming by the addition of activated charcoal. The knowledge that steamed *suweg* can be added salt, apart from to enhance the taste, is also likely not to adversely affect kidney function (Singh et al. 2018).

The use of *suweg* in Cisoka for fish feed is in line with what was informed by Mutaqin et al. (2018) that *suweg* and several other plants belonging to the family *Araceae*, such as *Colocasia esculenta*, *Xanthosoma sagittifolium*, and *Alocasia macrorrhizos* are commonly used for fish food. Darmayanti (2015) also mentioned that the leaves of taro, plant that is closely related to *suweg*, contain crude protein which can be used as fish food. Dorothy et al. (2018) state that the source of protein for fish feed derived from plants is low cost and environmentally friendly.

Related to common knowledge (emic views) *suweg* in Cisoka is used for some traditional ceremonies is in line with the results of other studies in which *suweg* is one of

species from *Araceae* family which is used as a complement to traditional Hindu religious ceremonies (Warseno et al. 2013). Asih and Kurniawan (2019) mention that *suweg* tubers in Bali are used in traditional ceremonies, namely the *Adult Ceremony*, *Rsi*, *Human*, *Pitra*, and *Bhuta Yadnya*. In addition, Ayuningtyas and Hakim (2014) find that this plant is one of 62 species used in a series of ceremonies to welcome the *Sura* month in Sedudo waterfall, Nganjuk District, East Java Province. People in Cisoka also used *suweg* as one of the 7 tubers that must be present in a traditional ceremony. Darpan et al. (2013) mention that tubers used in traditional ceremonies include sweet potatoes, cassava, sago, and taro. These tubers in traditional ceremonies are often locally termed as *polo pendem* or underground plants (Fauza 2010; Hakim 2014).

### Cultivation of *suweg* in Cisoka Village

The informants said that in Cisoka *suweg* is not actually cultivated intensively, so that its management is also relatively low cost. The informants informed that the main reason causing *suweg* not to be cultivated intensively was partly because *suweg* did not have economic value as it is not commonly traded. Several stages in *suweg* cultivation in Cisoka Village is presented in Table 2.

Traditionally, in *suweg* cultivation, residents usually grow seedlings from bud/tubers and peeled tubers. The buds or peeled tubers are not treated specifically, for example, covered with ash, soaked, or given a fungicide. *Suweg* seedling sources that are intentionally planted can come from family or neighbors. Land preparation for *suweg* seedling that is intentionally planted in agroecosystem types, such as home gardens and gardens, follows land preparation for other staple crops. *Suweg* planting techniques generally are by burying buds or peeled tubers in a hole in the soil (up to a depth of about 10-15 cm, with a hole width depending on the size of the seed) or left on the ground. *Suweg* that grow or are intentionally planted on cultivated land types are not specifically treated. There is no or lacked fertilization or pest/weed control specifically. If *suweg* grows on cultivated land, then the treatment of the staple crop will directly or indirectly affect the growth of the *suweg*. The treatments include controlling weeds, or in the local language commonly called *ngored*. In addition, tubers can be harvested if *suweg* is at least around 4 months or one planting season, during the dry season, and the stems have withered or fallen. If *suweg* tubers are harvested during the rainy season, the tubers are not tasty and watery or *beueuy* (in the local language). Another thing, if the tubers are harvested when the stems have not withered or are still in its infancy, then the tubers are itchy, small in size, not tasty and hard or *cangor/jagreug* in local language. Likewise, if the tubers are not harvested in one season, then the tubers should be turned over so that they get bigger. Harvesting does not special preparation such as traditional ceremonies or certain forms of ritual. The cultivation stage can be seen in Figure 4.

**Table 2.** Stage and cost of *suweg* cultivation in Cisoka Village, Majalengka District, West Java Province, Indonesia

Stages	Processing	Cost
Seedling preparation	Performed by workers in the family	There is no specific cost
Land preparation	Performed by workers in the family	There is no specific cost
Planting and maintenance of plant	Performed by workers in the family	There is no specific cost
Harvest	Performed by workers in the family	There is no specific cost

**Figure 4.** Planting *suweg* seed: A. Preparation of hole; B. Planting seeds in the hole; C. Covering seeds with soil

The information gathered from the informants above can be explained with some results of scientific studies (ethical views). The absence of intensive cultivation is possible, this may be due to an intensive market economy penetration into rural areas which causes changes in the food consumption patterns of villagers (Iskandar and Iskandar 2015). Nevertheless, the village community still has knowledge about the use of *suweg*. Oliveira et al. (2019) state that loss of access to resources is not directly related to loss of knowledge about resources. Furthermore, in general, Iskandar et al. (2018) state that the existence and genetic diversity of plants is determined by local cultural and ecological factors. Sulistyowati et al. (2014) concluded that economic factors influence crop cultivation or population. Blancas et al. (2013) inform that the availability of quantity and quality of uses underlies crop management. More specifically, Anil et al. (2011) informed that some species grow wild and some are cultivated. Likewise, Erskine (2015) revealed that the *suweg* in Timor-Leste is a wild plant.

Related to information from public knowledge (emic view) that *suweg* is propagated by using tubers and peeled tubers, this is in line with the opinion of Cahyaningsih and Siregar (2013) that the propagation of the *suweg* is originated from the tubers and the tuber slices containing the buds, where tuber cubs are the best source that produce more number of buds that germinate more. Ravi et al. (2009) allude to seeds originating from tubers or tuber slices, where their size affects growth. Hasanah et al. (2014) inform that seed originated from tuber saplings, buds on tuber skin, or seeds. Sulistiyo et al. (2015) informed that prospective tuber buds are on the surface of tuber skin.

Land preparation for *suweg* cultivation in Cisoka follows the land preparation for other staple crops. Mutaqin et al. (2018) inform that the people of Cisoka generally prepare the land at the beginning of the rainy season in September and October. For example, the cultivation preparation of taro, plant which is related to *suweg*, is done by the following stages: firstly, the soil is cleared of weeds; secondly, the cleared soil is plowed using hoes; thirdly, bunds of soil are made while the soil is cleansed from the roots of weed plants; finally, holes with a distance of 50 cm from another are dug.

The informants in Cisoka said that for germinating *suweg*, the buds/peeled tubers are buried in the ground. This is in line with what was informed by Mutaqin et al. (2008) related to planting taro, a plant from similar family with *suweg*, although there are differences in planting techniques for each species. In general, the Cisoka community plant crops from Araceae family using the following steps: first, the hole is made with size of 20 x 20 x 20 cm; second, each seedling is placed in the hole; third, fertilizer is sown on each hole that has been planted with seedling; fourth, the hole that has been planted with seedling and added with fertilizer, filled with soil until the surface is the same as ground level.

Associated with the statement of the community that the treatment of staple crops will have an impact on plant growth, this is in line with the statement of Sekhar et al. (2017) that grass control, especially mulching with black politeness will affect all growth periods of *suweg*. Likewise, Kuamr et al. (2019) concluded that the use of herbicides to control weeds can increase plant growth and *suweg* tubers.

Related to the opinion of the community that harvesting *suweg* is done in one planting season or during

the dry season or when the *suweg* stalk has fallen, this is in line with the statement of Ravi et al. (2009) that *suweg* tubers will be maximum harvested after around 8 months. Kumar et al. (2015) inform that *suweg* is ready for harvest at 7-8 months after planting. Narayan et al. (2018) mention that *suweg* is commercially harvested after 6-7 months depending on market demand, but for the purpose of being harvested seeds after 9-10 months. Chairiyah et al. (2014) informed that the tubers of *Amorphophallus muelleri* Blume, plants that are related to *suweg*, are harvested when the plants fell, because they have high glucomannan content. Likewise, Hasbullah and Umiyati (2017) inform that some characteristics of *suweg* root flour such as edible portion, bulk density, and starch are higher in the dormant phase than in the vegetative phase, where the dormant phase occurs during the dry season and the vegetative phase occurs during the rainy season. In addition, Chairiyah et al. (2011) informed that tuber organs, leaf blades, and leaf stalks of *Amorphophallus muelleri* Blume, which are related to *suweg*, have calcium oxalate crystals, especially those that grow in areas exposed to sunlight.

In general, planting *suweg* begins with the following process: tuber sliced into pieces are used as planting material and take 3-4 weeks timer for the development of sprouts. Plants can be vegetatively propagated through corms that can be planted in the prepare pits (40 cm x 40 cm x 40 cm) filled with decomposed cow dost compost and sandy loam soil (Misra et al. 2002; Singh and Wadhwa 2014). In more detail, Kumar et al. (2015) informed that the cultivation practice of *suweg* is as follows. The land is prepared by thorough plowing in different directions. The land is leveled after removing the weed twigs and rocks. Ridges and furrows are made at 73 cm apart. The tubers are sown 63 cm apart in the furrows, immediately the land was irrigated through the furrows. As a result of this, there will be 73 cm apart from row to row and 58 cm plant to plant. Before planting, the corms are air-dried for about 40-45 days, when they are placed in field areas, after drying period the corms are vertically cut into pieces (approximate size- 750-100g) and each piece bears apical bud. *Suweg* corm is having central bud situated on the top of the corms. Due to apical dominance, it sprouts first and earliest, other buds remain dormant, retaining the portion of the central buds vertical cut, is essential for higher percentage of sprouting. Corm set of 100g sizes could be prepared from whole tubers by cutting vertically. Thus, obtained tuber pieces are dried in shade for 24 hours. Afterward planting material is buried vertically in the furrows. This is followed by digging interspaces and light earthing up, one month later, along with intercultural operations like de-weeding, earthing up. Tuber starts sprouting after 2-3 months. The crop matures in 6-8 months after planting indicated by yellowing followed by complete drying of the pseudostem.

Based on the results of this study it can be concluded that *suweg* (*Amorphophallus paeoniifolius* (Dennst.) Nicolson) has been known and utilized by the people of Cisoka Village, Cikijing Sub-district, Majalengka District since the beginning until nowadays. This plant is used by the community for various purposes, namely supplementary food, fish feed, and traditional ceremonies.

Special use of traditional ceremonies is rarely done. *Suweg* is generally used by old age groups or certain groups such as pond owners. *Suweg* in Cisoka Village is not cultivated intensively since it lacks economic value or does not become an agricultural commodity.

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