

Development of Organic Medicine Plants as Solutions for Improving The Economy and Health in Penatih Village During COVID-19

Anak Agung Putu Agung Mediastari^{1*}, Ni Luh Gede Sudaryati², Anak Agung Komang Suardana²

¹ Department of Health Ayurveda, Faculty of Health, Hindu University of Indonesia, Denpasar, Indonesia

² Department of Biology, Faculty of Information Technology and Science, Hindu University of Indonesia, Denpasar, Indonesia

Email: ^{1*}agungmediastari66@gmail.com, ²sudaryati@unhi.ac.id, ²suardanaunhi@gmail.com

Abstrak– Pandemi COVID-19 telah menimbulkan banyak masalah sosial, terutama menurunnya kualitas kesehatan akibat minimnya sumber pendapatan masyarakat. Budidaya tanaman obat organik di masyarakat merupakan solusi untuk meningkatkan derajat kesehatan dan membantu pemulihan ekonomi masyarakat. Masyarakat tidak memiliki pemahaman dan kemampuan untuk membudidayakan tanaman obat organik dan menggunakannya sebagai obat dan sumber pendapatan. Program ini bertujuan untuk meningkatkan pemahaman, kemampuan, dan implementasi metode budidaya tanaman obat organik, pengolahan pasca panen, dan penggunaannya sebagai obat serta menghasilkan nilai ekonomi tingkat rumah tangga. Proses pendampingan berlangsung selama enam bulan di Desa Penatih. Pendampingan dilakukan dengan memberikan pemahaman, pengetahuan, dan praktik dalam pengembangan tanaman obat organik melalui lokakarya dan pendampingan tata kelola penggunaan lahan, hasil budidaya, serta penggunaannya untuk obat dan nilai ekonomi. Evaluasi pengetahuan, pemahaman, dan keterampilan masyarakat dilakukan melalui wawancara pasca program. Hasil pendampingan menunjukkan bahwa masyarakat merasakan dampak dari bibit tanaman obat organik yang diberikan. Penanaman tanaman obat herbal organik dan menghasilkan bahan baku obat herbal yang bernilai ekonomis tinggi, seperti *empon-empon* (rimpang), untuk meningkatkan pendapatan keluarga masyarakat meningkatkan pengetahuan, pemahaman, dan kemampuan mereka tentang tata kelola pengelolaan lahan. Kegiatan ini dimaksudkan agar tahan lama sehingga Desa Wisata Jamu Organik dapat dibangun di Desa Penatih dan membantu perekonomian daerah.

Kata Kunci: COVID-19, Kesehatan Tradisional, Pemulihan Ekonomi, Tanaman Obat Organik

Abstract– The COVID-19 pandemic has caused many social problems, especially the decline in the quality of health due to the lack of people's sources of income. The cultivation of organic medicinal plants in the community is a solution to improve the degree of health and help the community's economic recovery. The community does not have the understanding and ability to cultivate organic medicinal plants and use them as medicine and a source of income. This program aims to promote understanding, capability, and implementation of methods for cultivating organic medicinal plants, post-harvest processing, and their use as medicine and generate household-level economic value. The mentoring process lasted for six months in Penatih Village. Assistance is carried out by providing understanding, knowledge, and practice in developing organic medicinal plants through workshops and assisting the governance of land use, cultivation results, and their use for medicine and economic value. Evaluation of the community's knowledge, understanding, and skills is carried out through post-program interviews. The assistance results show that the community feels the impact of the organic medicinal plant seeds provided. Planting organic herbal medical plants and generating herbal medicinal raw materials with high economic value, such as *empon-empon* (rhizomes), to raise people's family income increases their knowledge, understanding, and abilities of land management governance. This activity is meant to be long-lasting so that the Organic Herbal Medicine Tourism Village can be built in Penatih Village and help the area's economy.

Keywords: COVID-19, Traditional Health, Economic Recovery, Organic Medicinal Plants

1. INTRODUCTION

The COVID-19 pandemic has resulted in various problems in society, especially in the health and economy (Susilo et al., 2020). In addition, the high incidence of SARS-CoV-2 infection cases and high-speed transmission has resulted in people carrying out all activities at home to suppress the transmission of COVID-19 (Adnyana et al., 2022; Nidom et al., 2021). The immediate impact of the pandemic is the decline in economic activity, which negatively impacts the global economy. One of the affected provinces is Bali Province, with an economic growth rate in 2020 of minus 12% (BPS, 2021). In line with this, increasing mortality and morbidity rates have resulted in people trying to maintain the body's immune system by utilizing natural ingredients (Adnyana & Sudaryati, 2023; Mediastari, 2021a). However, not many people have basic knowledge regarding using natural ingredients (medicinal plants) for personal use. During the COVID-19 pandemic, the prospect of developing traditional medicines made from plants is an excellent opportunity to improve the economy at the household level (BPOM, 2020b; Yulia et al., 2021)

Education and fundamental practices need to be provided to increase public understanding related to the correct use of traditional medicine, starting from determining raw materials, serving doses, how to use, how to use, and how to process, which will be used as a source of the new economy during a pandemic (Sambara et al., 2016). The high interest of the public to understand the governance of traditional medicine by utilizing natural ingredients and the potential for the development of an Organic Herbal Tourism Village in Penatih Village, East Denpasar District, Denpasar City, makes it essential to carry out the service process while simultaneously fostering community members in realizing Penatih Village as one of the plants pilot villages (Mediastari, 2020). Organic medicine in Denpasar City. In the future, the village can be used as an educational center for organic medicinal plants in Denpasar City and small efforts to grow and restore the economy at the household, village, urban and local levels (Kementerian Pertanian, 2019; Mediastari, 2021a, 2021b).

A preliminary study was conducted in April 2021 in Penatih Village, East Denpasar, Denpasar City, which shows that the village has a unique natural village that is beautiful, cool, and fertile. In addition to having promising agricultural

potential, community members also have land ownership as an asset that can be managed to generate economic value in the pandemic era (BPOM, 2020a). However, the community encountered several obstacles, namely capital and a lack of knowledge about the cultivation of organic medicinal plants. It requires experts who can assist on an ongoing basis. People are eager to find a way to help the family economy by making a breakthrough. The agricultural sector is currently only 10% cultivated, which is a very appropriate sector as a cultivation climate to revive the local economy (Dwisatyadini, 2020; Rais & Darwanto, 2016; Sedana, 2020).

In line with these problems, ideas and guidance are needed for the community to manage unproductive land into productive land to improve the community's economy during the COVID-19 pandemic, improve health degrees through the cultivation of organic medicinal plants, and build and introduce village-based ecotourism opportunities under the name "Organic Herbal Tourism Village." Activities to increase public knowledge and understanding related to the cultivation and post-harvest processing of organic herbal medicinal plants through workshops with service participants. Improving skills and practices is carried out by cultivating directly and starting from the seedling process to crop management. With this mentoring activity, the community understands the cultivation of organic herbal medicinal plants with an intercropping model starting from the process of land preparation, seeding, and post-harvest management. In addition, the community is expected to be able to manage, process, use, and recognize the benefits of organic herbal medicinal plants that are cultivated to be converted into herbal medicines to improve public health. The benefits of this mentoring program are introducing the cultivation system of organic herbal medicinal plants, procedures for use and processing, and the benefits of each ingredient. Through this program, in the future, Penatih Village will be used as a pilot village to cultivate organic herbal medicinal plants packaged in village-based ecotourism to attract tourists and improve the economy.

2. RESEARCH METHODOLOGY

2.1 Timeline and research design

The qualitative-descriptive method was used in this study to explore, study and interpret as well as carry out thorough observations of the mentoring community related to the availability of land, the realization of land cultivation, and the ability of the mentoring participants to implement the program (Darwin et al., 2021). The mentoring process was carried out for six months (June-December 2021) in Penatih Village, East Denpasar District, Denpasar City. In this service, the seeds planted by partners are temulawak, red ginger, white turmeric, temu giring, temu ireng, lemongrass, patchouli, Gotu kola, gunitir, chili, and peanuts. The selection of these plants is widely used for treatment at home, significantly improving the immune system during the COVID-19 pandemic (Mediastari, 2021a).

2.2. Research's structure and timeframe

The activities carried out in this community service are providing knowledge, practice, and assistance to the community in developing organic medicinal plants using agricultural land and cultivation, assisting the management of the use of agricultural products, and evaluating community knowledge, understanding, and skills related to the development of medicinal plants at scale households in Penatih Village as a solution to improving the economy and health during the COVID-19 pandemic. The service stages are divided into several stages, including 1) Land survey and community availability; 2) early-stage processing; 3) early fertilization; 4) nursery; 5) planting organic medicinal plants; 6) maintenance; 7) results in management and 8) program evaluation.

2.3 Analyzing data and evaluating outcomes

Evaluation of knowledge, understanding, skills, and practices of the community is carried out through interviews during the implementation of the program in the field and after the program's implementation. Evaluation materials were obtained from all service components, including land management procedures, land preparation processes for harvesting, processing, and managing crops; appropriation of crops; and the benefits of organic herbal medicinal plants for health, accommodated by traditional medicine experts. All service data are presented in the form of images and narrative results.

3. RESULTS AND DISCUSSION

3.1 Development of organic medicinal plants

Organic medicinal plants are medicinal plants that are cultivated naturally or organically without using chemicals (Setiawan, 2017; Suarsana et al., 2015). Fertilizers and pesticides used in cultivation techniques are in the form of organic fertilizers and pesticides that are biological to maintain fertility, ecological balance, and plant health (Febriansah, 2017). Organic fertilizers aim not to use chemicals to produce medicinal plants free from residues of chemical fertilizers and chemical pesticides (Mediastari, 2021a). In Hindu belief, medicinal plants are called "*Ausadha*," which means plants with medicinal properties (Sutomo & Iryadi, 2019). According to BPOM (2020), medicinal plants that can function to increase the body's immune system during the COVID-19 pandemic to prevent infectious diseases caused by viruses and other pathogens include red ginger rhizomes (*Zingiber Officinale Var Rubrum Rhizoma.*), Temulawak (*Curcuma zanthorrhiza*), white turmeric (*Curcuma zedoaria*), turmeric (*Curcuma longa*) and other spices. In addition, the Indonesian government, through the Food

and Drug Supervisory Agency, recommends that the public consume herbal or herbal medicines to maintain the immune system so that the prospect of developing organic medicinal plants on a household scale has the potential to be developed (Kementerian Pertanian, 2019; Salim & Munadi, 2017).

The development of organic medicinal plants is not just replacing chemical drugs with medicinal plants or plants but is included in improving health and correcting metabolic imbalances in the body (Setiawan, 2017). Through community service programs, it is hoped that it will strengthen local cultural entities, especially in land management, the development of organic medicinal plant cultivation, and the wise use of medicinal plants to support the economy and public health, especially in Penatih Village, East Denpasar, Denpasar City, Bali. Community service activities related to the cultivation of organic herbal medicinal plants in Penatih Village, East Denpasar, are presented in Figure 1.



Figure 1. The process of organic medicinal plant cultivation activities in Penatih Village, East Denpasar, Bali Description: land clearing and land preparation process (a); land that is ready for planting seeds of organic herbal medicinal plants (b); seeds of organic herbal medicinal plants (c); medicinal plants that have flourished (d); monitoring of land and organic herbal medicinal plants on community land (e); yield of organic herbal medicinal plant cultivation (f).

3.2 Medicinal plants were developed, and the results were obtained

Medicinal plants are developed organically using organic materials to maintain the medicinal plants' quality, quality and efficacy. Types of plants developed in Penatih Village, East Denpasar Denpasar City, in the form of empon-empon or rhizomes include; red ginger (*Zingiber Officinale Var Rubrum Rhizoma.*), temulawak (*Curcuma zanthorrhiza*), white turmeric (*Curcuma zedoaria*), turmeric (*Curcuma longa*), temu giring (*Curcuma heyneana*), temu ireng (*Curcuma aeruginosa*); lemongrass (*Cymbopogon nardus*), patchouli (*Pogostemon cablin*), Gumitir or marigold (*Tagetes erecta* L), cayenne pepper (*Capsicum frutescens*) and nuts. The planting process is carried out after processing the land in plots and making waterways. It was planted for rhizomes in seeds two months old in polybags. Maintenance and care are carried out routinely by using solid and liquid organic fertilizers during plant growth; six months after planting, harvesting is carried out with the community. The development of organic medicinal plants developed with partners is presented in Figure 2.

The results obtained from harvesting activities that have been carried out with the community include: 1) Red ginger 0.25 – 0.5 Kg per tree, the total yield of 100 trees is 28 Kg; 2) White turmeric 0.5 -0.75 Kg per tree, the total yield of 100 trees is 57 Kg; 3) Temulawak 0.4-0.60 Kg per tree, the total yield of 100 trees 51 Kg; 4) Turmeric 0.5-0.65 Kg per tree, the total yield of 100 trees is 54 Kg; 5) Temugiring 0.4-0.5 Kg per tree, the total yield of 100 trees 46 Kg; 6) Key gathering 0.3-0.4 Kg per tree, the total yield of 40 trees 14 Kg; 7) Temu ireng 0.5-0.6 Kg per tree, the total yield of 10 trees is 5.7 Kg; 8) Lemongrass bokashi 0.2-0.4 Kg per tree, the total yield of 25 trees is 7.5 Kg; 9) Patchouli 0.25-0.3 Kg per tree, the total yield of 100 trees 28 Kg; 10) Gunitir 0.5 -0.75 Kg per tree, the total yield of 100 trees is 62 Kg; 11) Chili 0.25-0.5 Kg per tree, the total yield of 50 trees 14 Kg; 12) Peanuts 0.15-0.25 Kg per tree, the total yield of 100 trees is 16 Kg. These results show that proper land management supported by adequate facilities and resources can make Penatih Village, East Denpasar, a pilot village for organic herbal tourism village while maintaining the essence of local wisdom and utilizing space conditions that can generate and stabilize the economy public.

The increasing tendency of the community to develop traditional medicines, especially plant-based ingredients as natural food and drink ingredients for health, beauty, fitness, and boosting the immune system during the COVID-19 pandemic has resulted in the development of organic herbal medicines that are important and useful to support the needs of the community as a whole. Through the community service program, it is hoped that the community will manage land for daily needs, including providing continuous and sustainable herbal medicinal plants.



Figure 2. Development of organic medicinal plants during the service stage. Description: A= Plants 2 months old; B = 3 month old plant and; C = 4 month old plant.

3.3 Procedures for developing organic medicinal plants in Penatih Village

Developing organic medicinal plants in Penatih Village, East Denpasar District, Denpasar City goes through several stages. The local community and the community service team are developing weapons and intercropping plants to increase economic and health value during the pandemic. These plants are easy to cultivate and significantly impact community needs. In addition, the content of the plant is efficacious as a medicinal ingredient, so it supports its development to improve the quality of public health when consumed in the correct dose with regular intensity (Febriansah, 2017; Yulia et al., 2021).

Land preparation is carried out for ten days before planting. A week before planting, use a solid organic fertilizer to loosen, fertilize, and provide nutrients to the soil to aid absorption while growing organic medicinal plants. Fertilization at the beginning of the planting period can suppress the intensity of fertilization and increase the nutrients in the soil for

plant development (Dewi & Widiyawati, 2019; FAO, 2014). Land preparation is carried out for ten days before planting. A week before planting, use a solid organic fertilizer to loosen, fertilize, and provide nutrients to the soil to aid absorption while growing organic medicinal plants. Fertilization at the beginning of the planting period can suppress the intensity of fertilization and increase the nutrients in the soil for plant development (Paramitasari, 2011).

Gumitir, chilies, and peanuts are sown in an intercropping pattern between the empon-empon plants to improve the function of the land. While waiting for the empon-empon harvest, farmers pick chilies, gumitir flowers, and peanuts. Intercropping yields can provide a real contribution from selling chili peppers, gumitir flowers, and peanuts to the community's economic growth, starting from the household level to the village level. Furthermore, the procedures for processing and utilizing organic medicinal plants are converted into health drinks, snacks, instant foods, powders, capsules, and spa products. Medicinal plants combine rhizomes, leaves, roots, stems, flowers, fruit, and ready-to-drink herbs such as jamu turmeric acid, jamu temulawak, herbal rice kencur, and instant turmeric acid, instant white turmeric, instant red ginger, and instant temu giring. Temugiring rhizome is used to scrub lemongrass into aromatherapy oil (Setiawan, 2017).

Organic medicinal plants developed by the people of Penatih Village continue to provide understanding and education to the community regarding how to use, store, process, and utilize them. Apart from being an attraction (promotional material), medicinal plants are also used to prevent, treat and maintain health; organic herbal ingredients can also improve the immune system, fitness, and cosmetology. Maintaining and maintaining health, including strengthening the immune system with organic medicinal plants, can reduce the risk of viral infections, including SARS CoV-2. Herbal ingredients and dietary supplements used in traditional medicines must meet the requirements for safety, quality, and efficacy, so strategic efforts are needed to raise public awareness in post-harvest management so that the medicinal plants produced have good benefits after harvesting. The consequences of the services provided include attempting to assist the Penatih village community in improving the quality of health through the supply of medicinal plants that may be utilized separately or in combination. Furthermore, the use of land that the community can manage in an intercropping manner has the potential to have a positive impact on the community's economy, particularly in terms of restoring family income from the harvest obtained; then, storage and utilization of medicinal plants are appropriate so that they have high usefulness and economic value; and the development and preservation of local culture is a strategic effort to restore the community's economy, particularly in Bali. The sustainable development of organic medicinal plants can strengthen the local economy based on organic herbal plants at the village level.

4. CONCLUSION

The mentoring and service activities provided to Penatih Village, East Denpasar, and Denpasar City communities are beneficial for the community. Through the assistance that has been carried out, the local community can understand and apply the given management procedures related to the use of land for planting organic herbal medicinal plants in order to improve the health status of the community during the COVID-19 pandemic and help restore and improve the community's economy starting from the home level—ladder to the province. In the future, further assistance and evaluation are needed to be related to post-harvest management of organic medicinal plants to help the community from upstream to downstream.

5. ACKNOWLEDGMENTS

The community service implementation team would like to thank the Institute for Research and Community Service for the funding that has been provided through the Hindu University of Indonesia Internal Research Grant in 2021.

REFERENCES

- Adnyana, I. M. D. M., Azhari, F. S. S., & Sudaryati, N. L. G. (2022). Prevalence of Dengue Hemorrhagic Fever In Bali from 2015 to 2020 and During the COVID-19 Pandemic. *Jurnal Berkala Epidemiologi*, 10(2), 169–178. <https://doi.org/10.20473/jbe.v10i22022.169>.
- Adnyana, I. M. D. M., & Sudaryati, N. L. G. (2023). Phytochemical Analysis of the Antioxidant Compounds of Baper Tea and Its Potential as an Immunomodulatory agent and Candidate for Standardized Herbal Medicine. *Trends in Sciences*, 20(1), 6391. <https://doi.org/10.48048/tis.2023.6391>.
- BPOM. (2020a). *Langkah Strategis Badan POM dalam penanganan Obat COVID-19* (1st ed.). Badan Pengawas Obat dan Makanan Republik Indonesia.
- BPOM. (2020b). *Pedoman Penggunaan Herbal dan Suplemen Kesehatan dalam Menghadapi COVID-19 di Indonesia* (1st ed.). Badan Pengawas Obat dan Makanan Republik Indonesia.
- BPS. (2021). *Pertumbuhan Ekonomi Bali Semester I – 2020*.
- Darwin, M., Mamondol, M. R., Sormin, S. A., Nurhayati, Y., Tambunan, H., Sylvia, D., Adnyana, I. M. D. M., Prasetyo, B., Vianitani, P., & Gebang, A. A. (2021). *Quantitative approach research method* (T. S. Tambunan, Ed.; 1st ed.). CV Media Sains Indonesia.
- Dewi, S. P., & Widiyawati, I. (2019). Introduction of Medicinal Plant Cultivation as an Effort to Yard Utilization in Pabuwaran Village, Purwokerto, Central Java. *Panrita Abdi : Jurnal Pengabdian Kepada Masyarakat*, 3(2), 107–111.

- Dwisatyadini, M. (2020). Utilization of medicinal plants for the prevention and treatment of degenerative diseases. *Optimalisasi Peran Sains Dan Teknologi Untuk Mewujudkan Smart City*, 237–270.
- FAO. (2014). *ASEAN Standard for Organic Agriculture*.
- Febriansah, R. (2017). Empowerment of Family Medicinal Plant Groups Towards Healthy Families in Sumberadi Village, Mlati, Sleman. *BERDIKARI : Jurnal Inovasi Dan Penerapan Ipteks*, 5(2), 80–90. <https://doi.org/10.18196/bdr.5221>.
- Kementerian Pertanian. (2019). *Tanaman obat warisan tradisi nusantara untuk kesejahteraan rakyat* (1st ed.). Balai Penelitian Tanaman Rempah dan Obat, Kementerian Pertanian Republik Indonesia.
- Mediastari, A. A. P. A. (2020). *Local Wisdom Traditional Medicine for the Health and Beauty of Postpartum Mother in Denpasar City, Bali Province, Indonesia*. Universitas Hindu Indonesia.
- Mediastari, A. A. P. A. (2021a). Development of an Organic Medicine Garden as a Solution for Bali's Economic Recovery in the Mas Tourism Village, Ubud. *Indonesian Journal of Educational Development*, 2(1), 19–27. <https://doi.org/10.5281/zenodo.4781841>.
- Mediastari, A. A. P. A. (2021b). *Pengobatan Usada untuk Perawatan Bayi dan Ibu Pascapersalinan*. Widina Bhakti Persada Bandung.
- Nidom, R. V., Indrasari, S., Normalina, I., Nidom, A. N., Afifah, B., Dewi, L., Putra, A. K., Ansori, A. N. M., Kusala, M. K. J., Alamudi, M. Y., & Nidom, C. A. (2021). An updated investigation prior to COVID-19 vaccination program in indonesia: Full-Length genome mutation analysis of SARS-COV-2. *BioRxiv*, 27(3), 1–11. <https://doi.org/10.1101/2021.01.26.426655>.
- Paramitasari. (2011). *Panduan Praktis, Lengkap, dan Menguntungkan Budidaya Rimpang Jahe, Kunyit, Kencur, Temulawak*. Cahaya Atma.
- Rais, M. R., & Darwanto, D. (2016). Organic Farmer Experience Analysis: Exploration of Organic Farmer Experience With Interpretative Phenomenological Analysis. *Jurnal Penelitian Ekonomi Dan Bisnis*, 1(2), 86–99. <https://doi.org/10.33633/jpeb.v1i2.1998>.
- Salim, Z., & Munadi, E. (2017). *Info Komoditi Tanaman Obat* (Vol. 5, Issue 4). Badan Pengkajian dan Pengembangan Perdagangan Republik Indonesia. <https://doi.org/10.7748/ldp.5.4.28.s16>.
- Sambara, J., Yuliani, N. N., & Emerensiana, M. Y. (2016). Utilization of Traditional Medicinal Plants by the Community of Merdeka Village, East Kupang District 2016. *Jurnal Info Kesehatan*, 14(1), 1112–1124.
- Sedana, G. (2020). Urban Farming as Alternative Agriculture in Overcoming Economic Problems During and Post-Covid-19 Pandemic. *Prosiding Seminar Nasional Fakultas Pertanian Universitas Dwijendra*, 1–6.
- Setiawan, T. (2017). *Tanaman Berkhasiat Obat* (1st ed.). TS. Publisher.
- Suarsana, I. N., Kumbara, A. A. N. A., & Satriawan, I. K. (2015). *Tanaman Obat : Sembuhkan Penyakit untuk Sehat* (1st ed.). Swasta Nulus.
- Susilo, A., Rumende, C. M., Pitoyo, C. W., Santoso, W. D., Yulianti, M., Herikurniawan, H., Sinto, R., Singh, G., Nainggolan, L., Nelwan, E. J., Chen, L. K., Widhani, A., Wijaya, E., Wicaksana, B., Maksum, M., Annisa, F., Jasirwan, C. O. M., & Yuniastuti, E. (2020). Coronavirus Disease 2019: Tinjauan Literatur Terkini. *Jurnal Penyakit Dalam Indonesia*, 7(1), 45. <https://doi.org/10.7454/jpdi.v7i1.415>
- Sutomo, S., & Iryadi, R. (2019). Konservasi Tumbuhan Obat Tradisional “Usada Bali.” *Buletin Udayana Mengabdikan*, 18(4), 58–63. <https://doi.org/10.24843/bum.2019.v18.i04.p11>.
- Yulia, Y. A., Octaviani, A., & Utomo, A. (2021). Assistance in Improving the Creative Economy to Promote Toga Products through Digital Marketing and Packaging in Sumber Bulu Karanganyar Village. *Wasana Nyata: Jurnal Pengabdian Pada Masyarakat*, 5(1), 69–74.