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# Ethnomedicine Education and Willingness to Pay for the Preservation of Traditional Medicine in Oenoni I Village, Kupang Regency

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### ABSTRACT

Ethnomedicine knowledge in Oenoni I Village, Kupang Regency, is currently facing the threat of extinction due to modernization, necessitating conservation strategies based on community engagement. This community service project aimed to educate the public on the benefits of local medicinal plants while measuring their Willingness to Pay (WTP) to support sustainable preservation efforts. The approach utilized participatory education and a health economics survey through the Contingent Valuation Method (CVM) involving 45 respondents. The results demonstrated a clear shift in knowledge levels, with the proportion of residents in the "Good" category jumping from 32.4% to 75.6% post-intervention. From an economic perspective, residents showed a tangible commitment with a WTP range between Rp5,000 and Rp20,000 per month. With an average WTP value of Rp12,500 per household, the potential aggregate economic value could reach Rp30,000,000 per year. Although only 35% of residents were willing to contribute financially, the majority (65%) preferred non-monetary contributions such as labor, seedlings, and land provision. This study concludes that integrating health education with economic valuation effectively fosters community independence in maintaining ethnomedicine through village "living pharmacies." Moving forward, the program recommends establishing village-based enterprises to ensure both economic value and the legal safety of the herbal products produced.

### INTRODUCTION

Indonesia is blessed with extraordinary biodiversity, which serves as the foundation for the development of ethnomedicine among local communities. In the East Nusa Tenggara region, particularly in Oenoni I Village, Kupang Regency, traditional healing practices using medicinal plants have long been the mainstay of community health amid limited access to formal healthcare services. However, the people of Oenoni I currently face a serious challenge in the form of the degradation of local knowledge due to a lack of documentation and standardization efforts, as well as the absence of a self-managed medicinal plant conservation scheme at the village level. Without a structured conservation strategy, these natural resources and intellectual

property are at risk of being lost, making it necessary to develop a strategy capable of securing the community's tangible commitment.

Several previous community service initiatives have explored the potential of ethnomedicine in the surrounding region. Ethnobotanical studies in the villages of Huilelot and Uiasa, for example, have confirmed the diversity of medicinal plant species and patterns of their use (Nomleni et al., 2021). From a quality perspective, literature reviews on phytochemical screening emphasize the importance of identifying bioactive compounds to ensure plant efficacy (Safitri et al., 2025). Additionally, the literature indicates that the safety of natural medicine management and empowerment through the cultivation of Family Medicinal Plants are crucial factors for village health self-reliance. This aligns with national regulations establishing strict standardization of Good Manufacturing Practices (GMP) for traditional medicines to ensure consumer quality (BPOM, 2019). Although these various studies provide a strong clinical and botanical foundation, there is a significant gap where there has been no integration between ethnomedicine education and the economic valuation aspects from the community's perspective. The absence of analysis based on willingness to pay in medicinal plant utilization programs has so far resulted in the financial and social commitment dimensions of local communities remaining unmeasured. Without mapping of subjective economic value, conservation efforts are often temporary because they are not grounded in the community's genuine willingness to contribute sustainably (Yuda et al., 2022).

The novelty of this community service initiative lies in the integration of ethnomedicine education with a Willingness To Pay (WTP) analysis to measure the extent to which residents are willing to allocate personal resources, whether material or labor. This WTP approach is crucial for creating a self-sustaining village conservation model, where communities are encouraged to actively take on the role of conservators that is, those responsible for safeguarding and tending to medicinal plants due to their recognition of the economic value and health benefits. By employing the Contingent Valuation Method (CVM), which has proven effective in mapping community participation in ecosystem conservation (Argarani et al., 2025), this initiative offers a solution based on empowerment through subjective economic value. This community-capacity-based contribution assessment serves as a crucial tool for predicting the sustainability of community service programs, ensuring that the local groups formed can continue to operate independently after the mentoring period (Rianti S et al., 2025).

Based on the challenges faced by Oenoni I Village, this Community Service activity aims to improve residents' understanding of the safe use of ethnomedicine and to map the community's concrete commitment to the conservation of medicinal plants through the WTP approach. Through this activity, it is hoped that a collective awareness will be fostered to independently maintain the sustainability of natural medicinal resources in the village.

## **IMPLEMENTATION METHOD**

This community service project integrates community education methods with descriptive surveys using a health economic valuation approach. The project targets 45 residents of Oenoni I Village, Amarasi Subdistrict, Kupang Regency, consisting of community leaders and health cadres. Participants were selected for their strategic roles as family decision-makers and custodians of local knowledge. Oenoni I Village was chosen as the location because it possesses an abundance of ethnomedical flora that is currently threatened with extinction. The activity was conducted on February 14, 2026, utilizing visual aids such as samples of fresh medicinal plants and informative leaflets as the primary educational media.

The implementation process begins with problem identification and coordination with village officials. In the core phase, participatory outreach sessions were conducted on the clinical benefits and safety of managing medicinal plants, followed by group discussions regarding commitments to land conservation. Evaluation was conducted by comparing pre-test and post-test results, followed by mapping the potential for village-based businesses centered on

ethnomedicine. Data collection utilized tests and surveys through validated structured questionnaires.

The evaluation instruments included ten knowledge statements and a Willingness to Pay (WTP) questionnaire using open-ended questions. Using the Contingent Valuation Method (CVM), respondents were asked to specify the monetary amount or form of non-monetary contribution (labor and seeds) they were willing to provide. Data analysis was conducted using quantitative descriptive methods. Knowledge levels were analyzed through percentage frequency distributions, while WTP data were processed by calculating the mean and village aggregate values to obtain an objective picture of the estimated community resource commitment to maintaining the sustainability of the living pharmacy in Oenoni I Village.

## RESULTS AND DISCUSSION

This community service activity was held in Oenoni I Village, Amarasi Subdistrict, Kupang Regency, on February 14, 2026. A total of 45 residents participated, accompanied by a service team from Citra Bangsa University consisting of faculty members and students. The Participatory Rural Appraisal (PRA) method is an approach that emphasizes the participation of local communities in collectively identifying problems, potential, and opportunities for program development, so that the planned interventions have a higher level of acceptability and sustainability (Subhan et al., 2025). Educational interventions include raising awareness of local ethnomedicinal potential, safe processing techniques for herbal materials, and economic valuation education regarding the conservation of biological resources. Participatory health education approaches have proven highly effective in improving community literacy and practical knowledge regarding the use of family medicinal plants (Burhan et al., 2024). Through this participatory method, community empowerment is not merely a transfer of knowledge but also a key strategy in building sustainable family health self-reliance rooted in local wisdom (Annisa et al., 2022).



Figure 1. Ethnomedicine Education Activities in Oenoni I Village.

Quantitative findings indicate a significant increase in understanding. Based on the analyzed questionnaire data, the distribution of community knowledge levels is presented in Table 1.

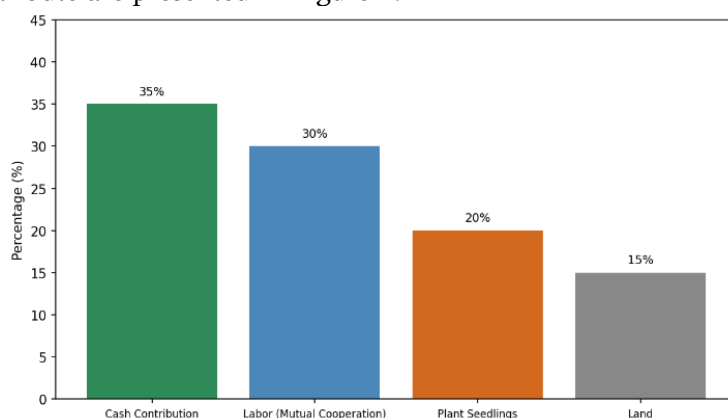
Table 1. Distribution of Knowledge Levels Among PKM Participants (n=45)

Knowledge Category	Pre-test (%)	Post-test (%)
Good	32.40	75.60
Fair	45.20	20.40
Insufficient	22.40	4.00

The data in Table 1 show a 43.2% increase in the percentage of participants who achieved a "Good" level of knowledge following the intervention. This dramatic increase confirms that the structured delivery of material, combined with two-way discussion forums, is capable of transforming ignorance into solid practical understanding at the community level (Purba et al., 2024). From a practical pharmaceutical perspective, this increase in literacy is crucial because the use of herbal medicines without adequate pharmacological understanding can pose risks of side effects, contraindications, and drug interactions (Aprillia et al., 2025).

Qualitatively, the community has begun to recognize the challenges of land degradation in NTT that threaten the existence of endemic species. Knowledge regarding the content of bioactive compounds such as flavonoids and tannins is crucial so that the community can utilize plants optimally (Surya et al., 2023), in line with global strategies to integrate traditional medicine into primary health care systems (WHO, 2019).

The innovative aspect and the pharmacoeconomic focus of this community service project is the measurement of the economic value of conservation using the Willingness to Pay (WTP) approach with the Contingent Valuation Method (CVM). WTP is an efficient indicator for measuring the economic value of goods or services that do not have an official market price. This aligns with community empowerment efforts through the management of local resources, such as the utilization of medicinal plants, which has been proven to enhance community health self-reliance in a sustainable manner (Nabela et al., 2026). Ethnomedicine in Oenoni I Village is viewed as a health commodity with potential economic value. The WTP approach was used to estimate the monetary value of the non-market benefits derived by the community from the existence of the village's "Living Pharmacy." The results of the analysis of the community's willingness to contribute are presented in Figure 2.



**Figure 2.** Percentage of Public Willingness to Pay (WTP) for Conservation

Figure 2 presents the distribution of community contribution preferences, providing a specific overview of the economic dimension of ethnomedicine conservation. The analysis results show that cash contributions were chosen by 35% of respondents, with an average willingness-to-pay (WTP) of Rp12,500 per month per household. On a macro level, this figure reflects the potential for the village to accumulate self-managed funds of Rp30,000,000 per year (based on an estimate of 200 households). The presence of this nominal value underscores that ethnomedicine in Oenoni I Village holds tangible economic value (use value) in the eyes of the community, transcending mere traditional heritage. The application of the CVM method aligns with studies on the economic valuation of non-market commodities, where the nominal value obtained represents the community's recognition of the health protection function and direct benefits from the local medicinal plant ecosystem (Doris & Wang, 2018). The financial commitment of rural communities in this context also demonstrates that the subjective economic value of traditional knowledge can be converted into community-based conservation financing instruments (Tadele et al., 2025).

However, cumulatively, non-monetary contributions (in-kind contributions) actually accounted for the majority at 65%, consisting of the willingness to contribute labor (30%), seeds (20%), and land (15%). The high figure for non-monetary contributions indicates the presence of strong 'social capital,' where the community is more inclined to allocate physical assets and services rather than financial liquidity. Based on the data obtained, the willingness to allocate these resources demonstrates a utility value regarding the availability of medicinal plants. Although this form of non-monetary contribution dominates, the accumulation of nominal economic value represented through the conversion of labor and land assets still reflects the community's real WTP toward the sustainability of medicinal plants (Lestiani et al., 2022). However, given the limited sample size in this study, these findings tend to serve as an initial

indication that ethnomedicine has the potential to be a cost-saving alternative for preventive health protection, which still requires further testing on a broader population scale (Despitasari et al., 2026).

A more in-depth analysis reveals that the WTP value is influenced by perceptions of scarcity. Communities that are aware of the risk of losing access tend to have a higher WTP value to ensure the option value (future value) and bequest value (inheritance value) of these traditional medicines (Malik et al., 2020). In Kupang Regency, the use of medicinal plants has become integrated with family health resilience, making conservation an effort to preserve cultural heritage (Nomleni et al., 2021). This subjective economic valuation demonstrates that the community is ready to transform into active conservators. The combination of local financial awareness and cultural ties is the primary driver in fostering community self-reliance to maintain the medicinal plant ecosystem without continuous dependence on external stimuli (external sources) (Rahayu et al., 2026).

The implementation of this activity was not without obstacles, particularly regarding scheduling challenges that affected residents' mobility, as well as the need to strengthen students' communication skills when interacting with the local community. However, these coordination challenges could be mitigated by leveraging the high level of social capital reflected in the survey results. Mobilizing social capital through community cooperation has proven effective in overcoming operational challenges and strengthening acceptance of health programs at the village level (Kumar et al., 2025). In line with the finding that the majority of the community (65%) prefers to contribute in the form of labor (30%) and land provision (15%), the proposed sustainability strategy is not merely a normative appeal but the formation of an Ethnomedicine Working Group (Pokja) at the village level. This Working Group will manage the land that residents have committed to collectively as a center for medicinal plant cultivation, so that monitoring of the living pharmacy no longer depends on the physical presence of the service team in the field. Institutionalizing local cadres through such working groups has proven effective in maintaining the program's activity rhythm while serving as agents driving post-mentoring health self-reliance (Argarani et al., 2025). This model of collective management through local groups is crucial for ensuring sustainable knowledge transfer and program self-reliance following community service activities (Suharmiati et al., 2021).

To ensure the safety of these cultivated products, the implementation of quality standards for the production of traditional medicines on a household scale remains an absolute requirement. This is in accordance with guidelines for post-harvest processing and good manufacturing practices for traditional medicines to ensure the safety and efficacy of herbal products produced by the community (BPOM RI, 2024). Beyond technical aspects, raising consumers' legal awareness regarding product quality and labeling is a crucial preventive measure in protecting public health (Astanti & Sulistyowati, 2020). The long-term success of this program heavily depends on strategic partnerships between academics, village governments, and the community to ensure the operational sustainability of the Working Group post-activity. This multi-stakeholder collaboration acts as a bridge for technology transfer and the strengthening of local institutions, ensuring that community service programs do not cease once the mentoring period ends (Ginting et al., 2025). This WTP-based empowerment model, which combines financial capital (35%) and social capital (65%), is expected to serve as a concrete reference for the self-sustaining preservation of ethnomedicine in the NTT region through the optimization of such institutional support.

## CONCLUSION

The community service program in Oenoni I Village has proven effective in improving community health literacy, with 75.6% of participants now having a good understanding of the safety and management of local ethnomedicine. In addition to increasing knowledge, this initiative successfully identified residents' tangible commitment to preserving medicinal plants, as evidenced by an average Willingness to Pay (WTP) of Rp12,500 per month and social capital support including the provision of labor and land at 65%. As a strategic step toward sustainability, it is recommended that periodic technical assistance be provided regarding the

standardization of herbal extracts and the strengthening of the management of living pharmacies through village working groups. This is crucial to ensure that the potential of local ethnomedicine can be optimized into safe, high-quality, and beneficial economic commodities for the long-term health and economic self-reliance of the community in Oenoni I Village.

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