JISE 8 (2) 2019 : 108 - 115

Journal of Innovative Science Education

http://journal.unnes.ac.id/sju/index.php/jise

Identifying Medicinal Plant in Local Custom Nasinoah Forest to Develop Local Wisdom Based Learning Material

Marisa Fonny Pit'ay[1,2]✉, **Yustinus Ulung Anggraito**[2], **Sri Ngabekti**[2]

[1] STKIP Soe Nusa Tenggara Timor, Indonesia
[2] Universitas Negeri Semarang, Indonesia

Article Info

Article History:
Received April 2019
Accepted May 2019
Published August 2019

Keywords:
Traditional forest Nasioah, medicinal plant species diversity, mnanet.

Abstract

Biloto villagers who are living nearby Nasinoah forest have strong interaction with the environment. The interaction brings about skills in managing the natural resource to be useful for life particularly making use of any plants as traditional medicine done by mnanet (traditional medical experts). This study aimed at: 1) Identifying and documenting the species of medicinal plants in Nasinoah forest; 2). Creating material and other teaching and learning instruments of biological variety and the use of natural resource based on identification and documentation result; 3) Testing validity and legibility of the material and instruments. The data gathered were the species of medicinal plants and local skills in managing the plants. Interview, survey, and literature were the instruments used to gather data. The study revealed that there were 33 kinds of plant identified as medicinal plants classified into 25 different familys which were used by Biloto villagers. Then, learning material about medicinal plants was arranged as contextual material based on the data. The study concluded that there were variety of medicinal plants used by Biloto villagers as medicine and the contextual teaching and learning instruments were valid and applicable.

✉ Alamat korespondensi:
Karang Siri, Soe City, South Timor Tengah Regency, East Nusa Tenggara
E-mail: fonnypitay12@gmail.com

p-ISSN 2252-6412
e-ISSN 2502-4523

INTRODUCTION

Indonesia is a tropical country with various high plants. It is supported by the climate condition and fertilize soil. More than 20.000 types of plants are found and proved to have medicinal plant potency. That natural source potency must be protected because it is useful to guarantee society's health and is seen as national economic supports. Although medication in Indonesia has been modernized but there are some societies using traditional medications (Katno & Promono, 2010).

Realizing the benefit of natural medication to cure various diseases and their effectiveness, efficiency, safety, and economics, it is important to be socialized to societies continuously so there will be a habit to use natural medication as equal selection to clinical medication (Tudjuka et al. 2014). However, there are some societies, especially students, whom have not realized and been aware of the information about various herbal medication proved to be easily gotten in their environment so they have lower understanding, especially in traditional medication and needs to be documented.

One of the characteristics of growing country is still has traditional elements dominating their lives. This situation is supported by various living creatures gathered into various types of ecosystems, in which their utilization have experienced long historical experience as one of the parts of cultures. One of the largest activities is using plants as medication by various tribes or groups of societies living in remote areas. The tradition of medication in one society will not be separated by the local custom.

The forest terrains surrounded by society's livings is a living aphotic for the people. It can be seen from the existences of Mnanet (a medicaster), with expertise in midwifery, Mnanet for broken bones, Mnanet for ankle problem, Mnanet for internal health problems, and Mnanet for outer health problems whom utilize traditional potions from plants. The information about plant varieties in LCNF is still limited. Meanwhile, the varieties of plan medication in the area has potency to be developed so it needs to be identified and developed so it can be known by public and become learning source for students.

The use and management of LCNF has not been legalized in written rules in the form of rules, the still holds onto local wisdom and belief (Takandewa & Rufinus, 2012). The local society still uses the forest sources and still keeps the condition and do not use the source in large amount, it is proved by the existence of complete LCNF condition because of their local custom and belief. Therefore, this research is to identify the species varieties of medicinal plants and the local custom based LCNF preservation.

The data gained from the identification of the species varieties of plan medication in LCNF will be used as contextualized learning source for X graders in second semester in Timur Tengah Selatan Regency. The learning source provides understanding to keep the local wisdom of the society in Biloto village in utilizing various types of medicinal plants in the students' surrounding, and to give understanding about rare plants to be kept from exploitation and to conserve it. The learning source is also educative, meaning the learning source is only available in Timor Tengah Selatan regency.

The relationship between this biological content learning materials to social condition will be strong values to enrich biological studies. By taking the condition of society into biological learning at schools will help students to recognize their local potencies and cultures around them. It can be realized through the development of learning materials used at schools. Recently, the learning materials at schools based on local wisdom have not been developed. In learning biology, books and student worksheet are still used. Then, the learning source with specification on plant based on local wisdom also has not been developed.

Primack (2013) explains that written textbooks based on local wisdom are able to contribute high biodiversity. The integration of local medicinal plant as learning materials is a great conservative step to introduce biodiversity conservation by using content and local

language. The students can learn the materials and develop their local potencies.

One of the ways to answer the challenge is by identifying the medicinal plants in LCNF as local potencies and develops it into learning materials based on local wisdom. The learning materials are expected to provide knowledge to students about local potencies and local wisdom in utilizing the potencies around them. For that sake, this research titiled "Identifying Specieis Varieties of Medicinal plants in Nasinoah Forest to Develop Learning Materials of Biodiversity based on Local Wisdom".

Based on the explanation, it is seen to be important to investigate ethno botany of medicinal plants in Biloto. The research is an effort to reveal the local tradition heritage in Timor Tengah Selatan regency. Besides that, it is done to supplement actual learning in learning biological creature varieties for students in Senior High Schools in TTS regency.

The objectives of the research are to: 1) identify and document the varieties of medicinal plant species in NF; 2) create learning material and biology learning instruments about biological creature varieties and the effort to keep and also to utilize the natural sources based on local wisdom according to identification and documentation results of medicinal plant species in LCNF; 3) test the readability of learning material and its developed instruments.

METHODS

This identification research about medicinal plants in LCNF uses science research approach. The qualitative method is used while collecting the data on the field. After all data were collected, their validities were tested and analyzed by meaningfully and briefly describing (Rich and Thick Description) (Rachman, 2011:171). Then, the descriptions were developed into learning instruments, consisting of syllabus, lesson plan, and supplementary materials in the form of medicinal plant species varieties in LCNF by using Research and Development model.

The validation of the product was done by three experts. The assessed aspects are learning instrumentations, content material, and language. The validations of the experts toward the development of learning instrumentation was used to revise the weaknesses of the learning instruments. The validation score calculation is analyzed by using this formula.

$$Va = \frac{N}{t} \text{ x A}$$

Notes:
Va = Final Score
N = The Gained Scores
t = Maximum Score

From the calculation, it is gained validity percentage scores of learning materials and learning instruments. The validity level is implemented based on validity criteria presented on the Table 1 below.

Table 1. The Validity Criteria of Learning Materials and Learning Instruments

Interval%	Criteria
25 < P ≤ 40	Invalid
41 < P ≤ 55	Less
56 < P ≤ 70	Sufficient
71 < P ≤ 85	Valid
86 < P ≤ 100	Highly Valid

The steps in developing learning materials only proceeded until small scale trial run step. The content of the learning material was tested to biology teachers and the students to find out the level of readability.

RESULTS AND DISCUSSION

The Use of Medicinal plants in Biloto

Based on the interview with Mnanet in Biloto, it was gained 33 species of medicinal plants from 25 different family. The most frequent families used for medication are acanthaceae, poaceae, apocynaceae, dan euphorbiaceae. The interview results with society using the services of Mnanet said one

reason why they selected traditional medication. It was because they still believed that Mnanet has supernatural ability to accelerate medication. They also stated the cost was cheaper compared to hospital. According to them, the payment does not burden and for those whom could not afford can credit the payment after they go home. Other reason is traditional medication is easy to get.

The Categorization based on the Used Parts of the Plants

The used parts of the plants are leaves, roots, bark, sap, fruits, and the whole parts of plants. Leaves are the most frequently used as medication. From Figure 1, it can be seen the use of leaves is 58%, fruit 15%, and roots and peels of trunks with equal percentage 9%, and sap 3%.

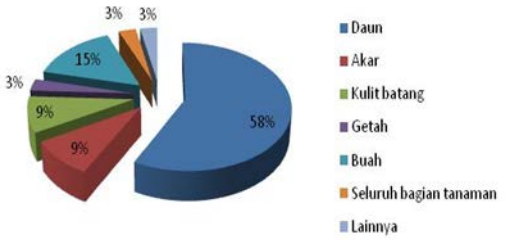

Figure 1. The Diagram of the Used Parts of Plants as Medication

A study by Darsini (2013) also states the most frequently used parts by society of around Merapi volcano is leaves, with amount 47 types and the fewest used part of plant is root, only 1 type of plant. It also aligns with Hidyat's (2010) study (stating that from 292 types of plants used by society in local custom kampong in Garut, Western Java, 110 types of leaves are the most frequently used (37.67%).

The Categorization of Medicinal plants based on the Process

The processing techniques of medicinal plants into medications by *Mnanet* is still simple, by boiling, rubbing, applying, or consuming and directly drinking. The technique of processing the traditional medications can be seen in Figure 2.

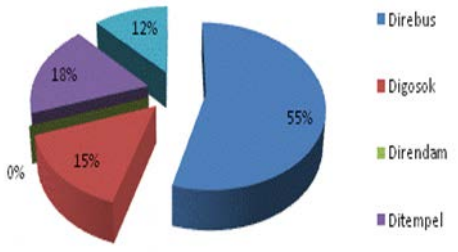

Figure 2. The Diagram of Processing Techniques of Medicinal plants into Medication

The Preserving Techniques of LCNF based on Local Wisdom

Some prohibition in LCNF, such as *bunuk,* a local custom prohibition in the form of applying poison by the chief to keep the bearing fruit plants. The sanctions, for those taking the fruits or consuming the, they will be poisoned. *Banu* is a massive prohibition from an local custom agreement to protect a certain type of fruit. After the harvesting time comes, it can be harvested together. But if it is not the harvesting time, and any people steals the fruit then he will be local custom sanction in which previously agreed, it is by replacing 10 times what is being stolen in LCNF or by feeding all the people in Biloto.

One of the ways to keep LCNF, the elders and chief will plant *"kese"* as protective plants. This plant can cause itches with deadly effect for both humans and animals, intentionally or unintentionally touching the leaves. When it is touched by humans intentionally to breach LCNF, then he will be let as his punishment to breach the rule. The elixir is only known by elders and chief.

The strong and structured supports from local custom society, the practice of LCNF preservation and its surroundings, traditionally is positioned as *oele matan ma hune baan.* It means water spring and root of the grass (Takandewa & Rufinus, 2012). The local wisdom implemented in utilizing those two natural sources are summarized into expression "*miun oel naikan te lule, muah ma'u naikan te ba'an.*". It means to drink the water but not to let

the water dirty and to eat the grass but not to eat the roots. This point of view is defined to not destroy the vital areas as wellbeing sources. Besides that, the remark custom for LCNF is *pahe kulin, pahe nakan.* Forest is assumed to be the crown of earth. Now, this understanding is said to be naturally continuation utilization patterns, especially the utilization of forest bees in which have been a long time ago becoming one part with nature. Biloto People have recognized this ecosystem by cultural remark *one ma sisi minik ma haumeni*, meaning honey, meats, candle, and sandalwood (Takandewa & Rufinus, 2012).

Contextual Learning Instruments

After gaining the data from the field, then it is analyzed and the learning instruments are designed. The learning instruments are learning materials, syllabus, lesson plan, and worksheet with contextual nature toward the material – biodiversity, especially the varieties of medicinal plants located in Biloto. The developed learning materials are supplement in learning the material, in which will cover 3 from 5 indicators on the competency to understand the benefit of biodiversity. Therefore, teachers are still able to develop other learning media to achieve all indicators. The learning material is validated by three experts: educational, material, and biology experts. Small scale trial run for students and teachers are done to get the responses from them.

Validity of Learning Material and Learning Instruments

Based on the results of three validators in Table 2, the learning materials and instruments are categorized highly valid. The reliability of learning material design is due to all assessed aspects have met the requirements on all components of learning material design. It is shown by each aspect gaining minimum score, 3 or categorized as appropriate.

Table 2. The Result of Learning Material Validity

No.	Components	Validators			Average (%)	Criteria
		1	2	3		
1.	Content Reliability (%)	98,07	100	98,07	98,71	Highly Valid
2.	Validity (%)	97,82	95,83	95,83	96,49	Highly Valid
3.	Presentation (%)	92,5	97,5	80	89,70	Highly Valid
4.	Graphic (%)	100	95	100	98,33	Highly Valid
Average (%)		97,09	96,97	93,47	95,80	Highly Valid

Table 3. The Results of Lesson Plan, Syllabus, and Worksheet Validations

No.	Types of Instruments	Validators			Averages (%)	Criteria
		1	2	3		
1.	Lesson Plan	94,23	96,15	98,08	98,15	Highly Valid
2.	Syllabus	95,83	97	97,92	96,91	Highly Valid
3.	Worksheet	94,23	94,64	98,21	95,69	Highly Valid

Based on the Table 3, the validation of lesson plan gains average score 98.15%. It is highly valid. The lesson plan has covered all components. According to Permendikbud Number 41. Year 2007, the explanations of core competence into the indicators have been accurate. Good indicators have these criteria: covering all basic measured abilities, covering measurable operational verbs; having relation to learning materials, being able to be stated in the form of certain tasks (Widyoko, 2014).

Teacher's and Students' Responses toward the Learning Materials

The teacher's responses are done by one biology teacher of Benlutu Public Senior High

School. The result is 88.75% and is included into very reliable. Table 4 is the recapitulation of teacher's responses done by the teacher.

Table 4. The Recapitulation of Teacher's Responses toward Each Component

Categories	Scores	Percentage	Categories
Component of Content Reliability	46	88,46	Very Reliable
Language Component	41	85,41	Reliable
Presentation Component	36	90	Very Reliable
Graphic Component	19	95	Very Reliable
Average	142	88,75	Very Reliable

The responses from X graders of science program taken from 8 students is 86.72%, (very reliable). Table 5 is the recapitulation of the students' responses based on scores upon the addressed questions.

Biodiversity is a material which has biodiversity context existed in nature. The concept of the learning provides initial knowledge for students to recognize the creature varieties on earth, especially in their living places. The direct learning involvement to the object of the learning will make the students more understand because of the contextual material.

The learning in natural society is a potential learning source. Sukarno in Nugroho (2013) states learning outside of class will enrich students by first experience but not with second experience delivered by teachers or books. The directly involved students into the object in real environment will provide freedom to observe, identify, analyze, and conclude the object of learning.

Table 5. Recapitulation of Students' Responses

Categories	Respondents 1	2	3	4	5	6	7	8	Scores	Percentages	Categories
Language Component	18	19	19	16	17	18	18	18	143	89,38	Very Reliable
Presentation Component	40	34	34	34	35	37	37	38	289	90,31	Very Reliable
Graphic Component	30	29	29	28	29	31	31	29	206	80,47	Very Reliable
									Averages: 86,72		Very Reliable

The use of environment as learning sources can be directly implemented or firstly modified into learning materials. Learning materials is one of modification from learning sources. Learning materials are arranged based on research in which is an alternative to enrich the knowledge of learning material by looking for local potencies in Timor Tengah Selatan, especially Biloto. The strength point of learning materials is the materials to arrange the module are mostly process and product closed to the students' lives. It is expected that the students can recognize the environment and local potencies in the area. It aligns with a study done by Kasrina et al. (2012) and Wibowo et al. (2013) whom used the field research about biological phenomenon as learning source for students.

Learning with learning materials in the real natural environment puts teacher as facilitator and organizer, so the students will be more active to learn. The learning will focus for

students to get knowledge from their own effort. It aligns with modern educational principles where students are positioned as active learners. It is expected the students to be able to cope the problems and figure out the solution. The utilization of LCNF as learning source aligns with Sitepu's (2008) argument about learning source, all information containing information to facilitate learners in achieving the needed information in their learnings.

LCNF in this case provides learning experience in the form of plant varieties, forest ecosystem, biotic and abiotic factors. All learning experiences have potencies to be learning objects for the students to develop their learning experiences about the phenomena and biodiversity. The completeness of learning experience will be the foundation to arrange the process and product of the research as independent learning guidance for the students.

The innovative aspect of the developed learning material is on the facts about medicinal plants and the ecosystem from the findings of the research, and also most of the figures attached are personal documentation. The learning material is based on facts around the students' environment (in an area). The learning uses learning materials by having outdoor class activity has better result. It aligns with Purnomo et al. (2013) study the developed module from the findings on the field will significantly influence toward cognitive, affective, and psychometric aspects of the students.

CONCLUSION

Based on the identifications and documentation of medicinal plant species varieties in Local Custom Nasinoah Forest, the design of learning materials and its instruments, the validity test, and readability of the learning materials and its instruments are medicinal plants species varieties in LCNF are identified and documented to have 33 types with 25 different families, based on the findings, it has been developed learning instruments covering from learning materials, lesson plan, syllabus, and worksheet based on local wisdom, and the validity and readability levels of the learning material and instruments of medicinal plant species varieties are highly valid and highly reliable.

REFERENCES

Darsini, N., N. 2013. Analisis Keanekaragaman Jenis TumbuLCNF Obat Tradisional Berkhasiat untuk Pengobatan Penyakit Saluran Kencing di Kecamatan Kintami, Kabupaten Bangli. *Jurnal Bumi Lestari*, 13 (1): 159-165.

Hidayat, D. & Hardiansyah, G. 2012. Studi Keanekaragaman Jenis TumbuLCNF Obat di Kawasan IUPHHK PT. Sari Bumi Kusuma Camp Tontang Kabupaten Sintang. *Vokasi,* 8(2):61 68.

Irwandi. 2009. Pengaruh Pendekatan Kontekstual dalam Pembelajaran Biologi melalui Strategi Inkuiri dan Masyarakat Belajar pada Siswa dengan Kemampuan Awal Berbeda terhadap Hasil Belajar Kognitif di SMA Negeri Kota Bengkulu. *Jurnal Kependidikan Triadik,* 12(1): 33-43.

Kasrina, I.S. & Jayanti, W.E. 2012. Ragam Jenis Mikroalga di Air Rawa Kelurahan Bentiring Permai Kota Bengkulu sebagai Alternatif Sumber Belajar Biologi SMA. *Jurnal Exacta*, 5 (1): 36-44.

Katno & Pramono, S. 2010. *Tingkat Manfaat dan Keamanan Tanaman Obat Tradisional*. Fakultas Farmasi Universitas Gajah Mada.Yogyakarta.

Kunwar & Bussmann. 2008. Ethnobotany in the Nepal Himalaya. *Ethnobiology and Ethnomedicine*. 5 (4): 24-27.

Nugroho, A.S. 2013. Optimalisasi Pemanfaatan Cagar Alam Ulolanang Kecubung sebagai Sumber Belajar Keanekaragaman Hayati. *Bioma*, 2 (1): 1-17.

Permendiknas Nomor 41 Tahun 2007 tentang Standar Proses Untuk Satuan Pendidikan Dasar dan Menengah. Jakarta: Depdiknas

Pramitasari, A., Indriana, Y., & Arianti, J. 2011. Hubungan antara Persepsi terhadap Metode Pembelajaran Kontekstual dengan Motivasi Belajar Biologi Siswa Kelas XI IPA SMAN 1 Pangkalan Kerinci, Riau. *Jurnal Psikologi Undip (JPU),* 9(1): 92-102.

Primack, R. B. 2013. Locally Adapted Textbooks Can Help Biodiversity. *Bio Science,* 63 (12): 60-67. (Online). diakses tanggal 12 Maret 2015.

Purnomo, D., Indrowati. M., & Karyanto, P. 2013. Pengaruh Penggunaan Modul hasil Penelitian

Pencemaran Di Sungai Pepe Surakarta Sebagai Sumber Belajar Biologi Pokok Bahasan Pencemaran Lingkungan Terhadap Hasil Belajar Siswa. *Jurnal Pendidikan Biologi*, 5 (1): 59-69

Rachman, M. 2011. *Metode Penelitian Pendidikan Moral.* Semarang: Unnes Press.

Rahayu, M., Sunarti, S., Sulistiarini, D. & Prawiroatmodjo, S. 2006. PemanfaatanTumbuLCNF Obat secara Tradisional oleh Masyarakat Lokal di Pulau Wawonii, Sulawesi Tenggara. *Biodiversitas*, 7(3): 245-250.

Sitepu, B.P. 2008. Pengembangan Sumber Belajar. *Jurnal Pendidikan Penabur*, 2: 79-92.

Suryana, Y., Iskandar, J., & Supratman, U. 2014. Studi Pensapuan Lokal Tanaman Obat pada Agroekosistem Pekarangan dan Dinamika PerubaLCNLCNFya di Desa Cibunar Kecamatan Rancakalong Kabupaten Sumedang-Jawa Barat. *Bionatura-Jurnal Ilmu-ilmu Hayati dan Fisik,* 16(1): 19–25.

Takandewa, Y & Rufinnus. 2012. Mutiara Hijau di Bumi Cendana, Pengelolaan Hutan Adat di Timor Tengah Selatan dalam Santosa, A. (Ed.), *Kehutanan Masyarakat.* Jakarta

Tudjuka, K., Ningsih, S., Toknok, B. 2014. Keanekaragaman Jenis Tumbuhan Obat Pada Kawasan Hutan Lindung di Desa Tindoli Kecamatan Pamona Tenggara Kabupaten Poso. *Warta Mimbar*, 2 (1): 120-128.

Wibowo, H., A., Wasino, Dewi, L., S. 2012. Kearifan Lokal dalam Menjaga Lingkungan Hidup (Studi Kasus di Desa Colo, Kecamatan Dawe, Kabupaten Kudus). *JESS*, I (1): 26-30.

Wibowo, P.H., Indrowati, M., &Sugiharto, B. 2013. Pengaruh Penggunaan Modul Hasil Penelitian Bentos pada Pokok Bahasan Pencemaran Lingkungan terhadap Keterampilan Proses Sains Siswa Kelas X SMA Negeri 1 Mojolaban Tahun Pelajaran 2011/2012. *Jurnal Pendidikan Biologi*, 5 (1): 70-80.