



**LOCAL WISDOM AND LABORATORY EXPERIMENT-BASED
EXTENSION BOOKLET DEVELOPMENT FOR *WADI* MAKERS OF
ELEMENTARY-EDUCATED AND DROPOUT SOCIETY
IN CENTRAL KALIMANTAN**

I.S. Dewi^{*1}, U. S. Hastuti², U. Lestari³, H. Suwono⁴

¹Departement of Elementary School Teacher Education Universitas Muhammadiyah Palangkaraya, Indonesia

^{2,3,4}Departemen of Educational Biology- Post Graduate Program Universitas Negeri Malang, Indonesia

DOI: 10.15294/jpii.v9i4.23166

Accepted: January 22nd 2020. Approved: December 28th 2020. Published: December 31st 2020

ABSTRACT

Wadi is one of traditionally fermented food types using basic materials of fish, salt, and *lumu*. As nutritive traditional food, *wadi* quality needs to be developed and maintained through social education. *Wadi* production innovation has not been done yet by the *wadi* makers since their information is limited on production techniques for better quality *wadi*. To promote local wisdom conservation, non-formal education for low educated-*wadi* makers is needed using simple media. Laboratory experiment and local wisdom-based booklet development is intended to broad their mind and skill in *wadi* production in the rural areas of Central Kalimantan. This development followed the model of Peck (1988). It contained non-formal product oriented-education materials for the *wadi* makers. The booklet has been validated by experts in community education, biotechnology, and learning media, and applied to *wadi* producing communities. Assessment instruments for booklet validation refer to non-textbook assessment instruments (enrichment books). The results showed that the booklet could be well accepted by the users and possessed very good criteria of understanding and readability value.

© 2020 Science Education Study Program FMIPA UNNES Semarang

Keywords: local wisdom; laboratory-based extension booklet; *wadi*; quality development; rural area

INTRODUCTION

Dayak communities in Central Kalimantan have made *wadi* through generations as one of food security efforts (Riwut, 2003). In general, *wadi* is made from basic material of terrestrial animal's meat, such as pork, deer, cow, or fish, mixed with salt and *lumu*, and stored for 7 to 15 days, and then can be kept longer before consumed (Riwut & Nila, 2007; Dewi et al., 2017). Salt and *lumu* put in *wadi* production give typical taste of the *wadi* (Restu, 2013; Dewi et al., 2017), i.e. mixture of salty and sour taste. *Lumu* is made from rice roasted up to brownish cooked, then finely ground. Fish meat-based *wadi* is the most common *wadi*, since Central Kalimantan is

very rich in fish resources, both freshwater and marine fishes. *Wadi* is produced by considering weather conditions that do not always support the fish preservation requirement for salt fish production in high fish abundance season. Very high number of fish in fish season will be able to result in problems if there is no effort for storage and preservation in long period of time. Fish preserving technology in the rural area of Central Kalimantan has still employed traditional techniques, such as drying, smoking, and fermentation (Adawyah, 2007; Riwut & Nila, 2007), because electricity has not reached all rural areas, and thus refrigerator or freezer is not available yet.

Community's food security program is an integrated part of Indonesian economic security influenced by many factors, one of which is

*Correspondence Address
E-mail: inasari13@gmail.com

education level. Dewi et al. (2017) found that the educational profiles of *wadi*-making communities were heterogeneous enough, 6.52% did not finish elementary school, 33.33% passed elementary school, 7.24% did not finish secondary school, 22.46% passed secondary school, 8.25% did not finish high school, and 23.18% passed high school. Some of the factors that cause school dropouts include early marriage, financial problems, poverty, lack of family support, and juvenile delinquency (Burrus & Robert, 2012; Kurebwa & Mabhandha, 2015; Njagi & Mwanja, 2017; Videnović & Lazarević, 2017). However, the last education level of the community is one of the important indicators of the community's educational achievement that could reflect the capability of the human resources (Devkota & Bagale, 2015; Kurebwa & Mabhandha, 2015; Njagi & Mwanja, 2017). Reading and counting abilities are one of the basic measures to assess the level of education success (Putri & Setiawina, 2013). Education level is closely correlated with knowledge insight concerning nutrition sources and good food types for family consumption (DKP, 2015).

According to Health Services of Central Kalimantan (2012), reading-writing ability of 10 years old-females and older in Central Kalimantan is less than males, 38.81% and 39.58%, respectively, while most *wadi* producers (99.8 %) are females. Their knowledge on making *wadi* has been generated through generations from their mothers and surrounding communities, and their production technique has not used proportional doses of the material composition (Petrus & Suprayitno, 2013; Restu, 2014; Dewi et al., 2017). Material composition dose-related information is also different among sources. Different material concentrations and storage time length for *wadi* production be relatively different, economically less profitable, and yield *wadi* different organoleptic responses. Good storage technique for safe consumption has not also been understood by most of the *wadi* makers.

Therefore, *wadi* production-related knowledge and skill efforts need to be considered as one of the community's *wadi* production-related local wisdom conservation and food security efforts. This study was aimed to create learning media for *wadi*-producing communities. This is bearing in mind that the activity of making *Wadi* at this time is also less desirable by the younger generation, besides that the ways to make *wadi* are not taught openly by parents to other than family members. *Wadi* production-related educa-

tion (non formal), as one of the laboratory experiment implications, is important to do, using booklets as learning media. Other studies found that the booklet media utilization is more effective than leaflet media to develop the adult learning process (Zulaekah, 2012; Safitri & Fitranti, 2016; Yustina et al., 2020). According to Novrianda et al. (2015) and Pratiwi & Puspitasari (2017), adult learners have knowledge and skill development after they have got learning activities through talk and booklet media. Booklet of *wadi* is written simply using attractive design, in the hope that it could become one of learning media of the *wadi* producers, so that the information of the booklet can stimulate the users to take positive ideas of the booklet content, besides it could also be used as socialization media for *wadi* development to other communities. The extension media of the booklet can distribute information to people of long distant localities in the short time. It is a thin book with complete information and easy to bring with anywhere. The booklet media are simple and easily understood to use as information media and could result in positive impacts on the learning target, including the adults (Rehusingma et al., 2017). Considering the importance of education for *Wadi* making communities with a profile of the average level of dropout education, *Wadi* making communities need an easily understood and implemented simple booklet to bring anywhere. The extension booklet as educational media entitles "*Wadi: Healthy and Nutritive Traditional Fermented Food from Central Kalimantan*". The booklet contains cultural aspect of the *wadi*, raw materials, production procedure, storage technique, nutritive content, benefit of hygiene in *wadi* production and storage, packing technique and marketing strategy, and enrichment material in the form of *wadi*-based food recipes.

METHODS

This study is a development research of Peck's model (1988). Sampling was done in 17 villages of 9 districts in Katingan regency and Palangka Raya municipality, Central Kalimantan province, using 300 respondents. The instrument used were poll of necessity analysis, validation sheet of material expert, learning media expert, community non-formal education expert, and user's validation sheet of booklet readability (Figure 1). The instrument was validated by two experts in the field of Biological Education. The instrumental guide followed Perbukuan (2012).

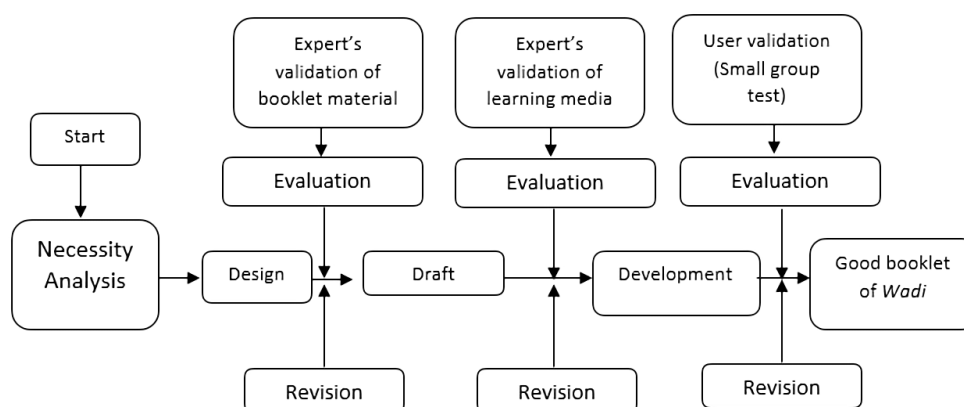


Figure 1. The Booklet Production Process

The community necessity analysis was carried out through distribution of poll sheets to the communities, 300 people who know and can make *wadi*. This activity was done and published (Dewi et al., 2017). The booklet comprised 3 chapters: chapter one contains introduction (20%), chapter 2 contains main material (60%),

and chapter 3 contains supporting material (20%). The end of chapter 3 contains creativity-related enrichment material. Main material of the booklet contained findings of *wadi* laboratory experiment. The overall structure of the booklet can be seen in Table 1.

Table 1. Structure of the Booklet

Booklet Content	Booklet Component
Front page (cover)	Booklet title <i>Wadi: Healthy and Nutritive Traditional Fermented Food from Central Kalimantan.</i>
Preface	Preface
Table of contents	Load the Preface Page, all chapters, and sections in the booklet.
Chapter I. INTRODUCTION	Get to know <i>Wadi</i> , Traditional Food from Central Kalimantan Know Lumu as a Basic Material for Making <i>Wadi</i> <i>Wadi</i> As One Kind of Fermented Food Nutrient Content in <i>Wadi</i>
Chapter II. MAKING <i>WADI</i>	Tools Used Materials Used Steps for Making a <i>Wadi</i>
Chapter III. PACKAGING	Plastic Jar Mica Plastic Glass Jar Plastic Bag
Chapter IV. MARKETING STRATEGY	Minimarket Bazaar Culinary center Center of souvenirs On-line
Chapter V. PROCESSING OF <i>WADI</i>	Pais <i>Wadi</i> Hampap <i>Wadi</i>
About the Author	Short Biography of the Author

The results of the experiments contained in the booklet are information that wadi is one of the fermented food involving the work of bacteria, the nutritional content of the wadi, the nutritional adequacy rate of the wadi, a good and hygienic storage method, the length of fermentation time and the composition of the dose ratio of luminous ingredients, salt and fish meat, to produce the best nutritional and organoleptic value. The booklet validation was carried out by 3 experts, revised, and piloted in a small group as a validation form of the booklet readability of the users.

RESULTS AND DISCUSSION

Food consumption pattern is dependent upon the household's education, the higher the formal education is, the better the knowledge on food quality consumed by the community to improve health and the more varied the food consumed will be. These food consumption variations are expected to yield better nutritive needs and health. Factors affecting food consumption diversification patterns to promote rural household's food security are income, food price, and number of family members (Coelho et al., 2018; Diehl et al., 2019). Low education level and income rate result in notoriously higher insecurity food due to low purchasing power (Mohammad et al., 2016; Videnović & Lazarević, 2017). *Wadi* making communities consisted of housewives with heterogeneous educational backgrounds and most did not pass the elementary school (Dewi et al., 2017). It makes *wadi* development towards an innovative flagship food product of Central Kalimantan is difficult to do. Highly heterogeneous education

level influences the *wadi* producing technique of the community. They make *wadi* just following what has been taught by mothers, grandmothers, friends, or surrounding communities.

There is no specific effort yet to introduce the people outside Kalimantan about production development, marketing strategy, and *wadi* processing towards different food type variations. Nevertheless, these could be done through non-formal education using the booklet and several adult educational concepts. Booklet is a learning material consisting of no more than 48 pages compiled with the cover page (Al Muhdhar, 2011). The learning media use more figures and symbols to be easily understood by the users, including the illiteracy. Thus, the booklet is filled with illustrations and explanations. Figures used as illustrations can be taken from the environment and cultural symbols inherent in the target society (Wagiran, 2012).

The necessity analysis (Dewi et al., 2017) found that proper learning media selection to educate the *wadi* makers is very important. It could be conducted through non-formal education referring to several concepts of adult education facilitated with the right learning media. One of the considerations is the heterogeneity of the *wadi*-producing community's education level profile. Therefore, the appropriate learning media for the *wadi*-producing communities should be simple, easily understood, and systematic. One of the suitable learning media forms is booklet.

The booklet is structurally composed and validated by experts. The booklet design validation by the experts and the users is presented in Table 2 and Table 3.

Table 2. Expert's Booklet Validation

No.	Validator	Evaluation aspects	Mean score	Criterion
1	Booklet material expert	Content component	3.80	Very good
		Teaching component	3.60	Very good
		Language component	3.83	Very good
		Mean total score	3.74	Very good
2	Community education expert	Content component	3.75	Very good
		Teaching component	3.54	Very good
		Language component	3.75	Very good
		Mean total score	3.68	Very good
3	Learning media expert	Graphical component	3.78	Very good
		Teaching component	4.00	Very good
		Language component	3.80	Very good
		Mean total score	3.86	Very good

The evaluation on the content, teaching, and language components gives very good criteria (Table 2). It means that the validated booklet released by the material experts, the community's education experts, and the learning media experts as an educational media for the *wadi*-producing communities makes the booklet be worth to be used. The material component is systematically written, simple and easily understood. It also stimulates the readers to try positive things of the material presentation through *wadi* development as local wisdom-based product. The booklet contains packaging technique, marketing strategy, and processing technique of *wadi* to make several kinds of food. Figures/photographs are presented following the research findings and support the information in the booklet. The materials also disclose the local wisdom values with typical characteristics and national culture. The layout and the design of the booklet content is situated with the educational profiles of the booklet users.

Colors and figures are well selected, appropriate and easily readable. The figures are presented following the theme and explanation that make the booklet materials be clear. The language used is polite and interesting, and communicative employing standard Indonesian language.

The booklet users are adult *wadi*-producing communities. The adults are considered to be able to distribute the communication networks, have desire to follow the education and to have better living standards (Suprijanto, 2011; Novrianda et al., 2015). The outcome of the study is expected to be able to have positive contribution to *wadi* producers, especially the low-educated housewives, to be empowered through non-formal educational activities. It is also expected that the *wadi*-producing housewives could make better quality of *wadi* with longer durability, higher nutritive content, and be organoleptically accepted at high preference.

Table 3. Booklet Readability of User Communities

No.	Evaluation aspects	Mean score	Criterion
1	Good booklet appearance, suitable color, and clear and easily read characters used.	3.75	Very good
2	Language used in the booklet to address information on <i>wadi</i> could be easily understood.	3.70	Very good
3	Figure provided in the booklet is obvious, attractive, and suitable for the addressed information.	3.75	Very good
4	Booklet is not bored, easily studied, and carried.	3.80	Very good
5	Informasi on <i>wadi</i> in the booklet is useful to add information and skill in making <i>wadi</i> .	3.75	Very good
6	This booklet helps learning <i>wadi</i> production through clear, easily understood and followed procedures.	3.72	Very good
7	There is new information on <i>wadi</i> obtained from the booklet and it adds the reader's insight.	3.70	Very good
8	This booklet gives interesting idea about <i>wadi</i> packing and marketing.	3.72	Very good
9	Guide to good storage technique for consumption is easily understood and followed.	3.67	Very good
10	Information about <i>wadi</i> processing technique to be several types of food is easily understood and followed.	3.67	Very good
	Mean	3.72	Very good

The booklet revision needs to do following the expert validator's recommendations. It is very important to conduct that the objective of the booklet preparations could be effectively and efficiently achieved. The booklet is situated with the last education profile of the targeted *wadi*-producing community. In general, *wadi*-producing

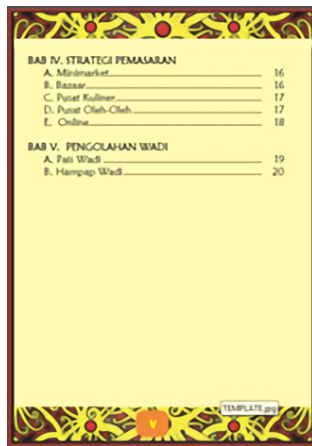
communities have education profiles of elementary school, secondary school, high school, and the dropouts. The expert's validation (biotechnology and community's education) on the booklet product in this study showed that the booklet had very good content, performance component, and language usage. Based on this validation, the

booklet developed in this study is appropriate to use as *wadi*-producing community's learning media in non-formal education in Central Kalimantan. This booklet is expected that the information on the benefit of the *wadi* and its processing could be used and easily socialized. It is practical and attractive with systematic illustrations of the fi-

gures (Al Muhdhar, 2011; Smaldino et al., 2019), so that the *wadi* producers would easily utilize it and distribute it to many places in Indonesia as traditional processed food of Central Kalimantan. The revised components of the booklet are presented in Table 4 and Table 5.

Table 4. Booklet Revision Based on Material and Community Education Expert's Recommendations

No.	Suggestions for improvement	Revision
1	The booklet needs to add benefits (the impact of wadi marketing) if the community uses wadi as an alternative to increase their income so that they can become an entrepreneurial alternative with not big capital.	Adds a profit calculation when using wadi as an alternative to entrepreneurship.



Before revision



After Revision

- 2 Mention the source of the material used for the booklet. Mention the source of the material used for compile the booklet (picture, writing sources, etc).



Before Revision




After Revision


Moreover, the booklet is also made a revision based on learning media expert's recommendations that is presented in the table 5 below.

Table 5. Booklet Revision Based on Learning Media Expert's Recommendations

No.	Suggestions for improvement	Revision
1	The selection of fonts in the chapter CHAPTER I (heading) like the name of the type of animal, should be considered to be replaced with clearer fonts.	Choose the right typeface to clarify the purpose of the writing.



Before Revision



After Revision

Through this research-based booklet, it is expected that *wadi* could be developed and conserved for food security program of Central Kalimantan communities in particular and Indonesian in general. It is in line with Indonesian Government's Program (Kemenkes, 2007; DKP, 2015), in the hope that human nutrition could be met and makes the Indonesian young generations be healthy, smart, and qualified through sufficient nutrition.

CONCLUSION

The booklet produced as learning media for *wadi*-producing communities possesses very good readability. Its usage is implemented to the adult learners through non-formal education program. This finding is expected to be able to increase their knowledge and skill in *wadi* production, and therefore, it needs development in order to support the food security for Central Kalimantan communities in particular and Indonesian in general.

REFERENCES

- Adawyah, R. (2007). *Pengolahan dan pengawetan ikan*. Bumi Aksara.
- Al Muhdhar, M. H. I. (2011). *Pengelolaan Sampah Terpadu melalui Pendidikan Masyarakat Berbasis Pembudayaan 6M. Naskah Pidato Pengukuhan Guru Besar Bidang Ilmu Pendidikan Lingkungan, Fakultas Matematika dan Ilmu Pengetahuan Alam (FMIPA), Universitas Negeri Malang. Disampaikan pada Sidang Terbuka Senat Universitas Negeri Malang Tanggal, 14.*
- Burrus, J., & Roberts, R. D. (2012). Dropping out of high school: Prevalence, risk factors, and remediation strategies. *R & D Connections, 18*(2), 1-9.
- Coelho, F. C., Coelho, E. M., & Egerer, M. (2018). Local food: benefits and failings due to modern agriculture. *Scientia Agricola, 75*(1), 84-94.
- Devkota, S. P., & Bagale, S. (2015). Primary Education and Dropout in Nepal. *Journal of Education and Practice, 6*(4), 153-157.
- Dewi, I. S., Hastuti, U. S., Lestari, U., & Suwono, H. (2017, May). The effects of kinds of lumus and the storage period on the quality of patin *wadi* based on the results of nutrient tests. In *AIP Conference Proceedings* (Vol. 1844, No. 1, p. 030003). AIP Publishing LLC.
- DKP, W. (2015). Indonesia-food security and vulnerability atlas 2015. *Dewan Ketahanan Pangan (DKP) of the Republic of Indonesia and the World Food Programme (WFP) of the United Nations, Jakarta.*
- Diehl, J. A., Oviatt, K., Chandra, A. J., & Kaur, H. (2019). Household food consumption patterns and food security among low-income migrant urban farmers in Delhi, Jakarta, and Quito. *Sustainability, 11*(5), 1378.
- Health Services of Central Kalimantan. (2012). *Central Kalimantan Health Profiles of 2012*. Palangka Raya.
- Kemenkes, R. I. (2007). *Basic Health Research 2007 (Riset Kesehatan Dasar 2007)*. Jakarta: Kemenkes RI.

- Kurebwa, M., & Mabhanda, W. (2015). Dropout in the primary school, a cause for concern: A case of Shurugwi South Resettlement Primary School 2006 to2013. *International Journal of Education*, 3(4).
- Mohammad, A., Ajami, M., Abdollahi, M., & Kolahi Ahari, G. (2016). A review of the relationship between obesity and food insecurity. *International Journal of Medical Reviews*, 3(1), 381-388.
- Njagi, S. N., & Mwanja, D. J. M. (2017). Parenting styles as predictors of drop out rate among selected public secondary school students in Embu County, Kenya. *International Journal of Education and Research Vol. 5 No. 12 December 2017*.
- Novrianda, D., Lucida, H., & Soumariris, I. (2015). Perbandingan Efektivitas Pendidikan Kesehatan terhadap Pengetahuan dan Kemampuan Ibu Merawat Balita ISPA di Puskesmas Padang Parsir dan Pauh. *Jurnal Sains Farmasi & Klinis*, 1(2), 159-169.
- Peck, K. L. (1988). *The design, development & evaluation of instructional software*. Macmillan Publishing Co., Inc.
- Perbukuan, P. K. D. (2012). *Penilaian Buku Nonteks Pelajaran*. Jakarta: Pusat Kurikulum Dan Perbukuan Balitbang Kemendikbud.
- Petrus, P. H., & Suprayitno, E. (2013). Physicochemical characteristics, sensory acceptability and microbial quality of WadiBetok a traditional fermented fish from South Kalimantan, Indonesia. *International Food Research Journal*, 20(2), 933-939.
- Pratiwi, Y. F., & Puspitasari, D. I. (2017). Efektivitas Penggunaan Media Booklet Terhadap Pengetahuan Gizi Seimbang Pada Ibu Balita Gizi Kurang Di Kelurahan Semanggi Kecamatan Pasar Kliwon Kota Surakarta. *Jurnal Kesehatan*, 10(1), 58-67.
- Putri, A. D., & Setiawina, D. (2013). Pengaruh umur, pendidikan, pekerjaan terhadap pendapatan rumah tangga miskin di Desa Bebandem. *E-Jurnal Ekonomi Pembangunan Universitas Udayana*, 2(4), 44604.
- Rehusisma, L. A., Indriwati, S. E., & Suarsini, E. (2017). Pengembangan Media Pembelajaran Booklet dan Video sebagai Penguatan Karakter Hidup Bersih dan Sehat. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, 2(9), 1238-1243.
- Restu, R. (2013). Pengaruh Pencucian Daging Ikan Toman (*Channa micropeltes*) Setelah Penggaraman Terhadap Citarasa Wadi. *Jurnal Ilmu Hewani Tropika (Journal Of Tropical Animal Science)*, 2(1), 31-34.
- Restu, R. (2014). Pengaruh Penambahan Gula Aren (*Arenga pinnata* Wurmb Merrill) Terhadap Citarasa Wadi Ikan Patin (*Pangasius sp.*). *Jurnal Ilmu Hewani Tropika (Journal Of Tropical Animal Science)*, 3(1), 12-16.
- Riwut, T. (2003). Maneser panatau tatu hiang: menyelami kekayaan leluhur. *Palangka Raya: Pustaka Lima*.
- Riwut, T., & Nila, R. (2007). Kalimantan membangun: Alam dan kebudayaan. Sleman.
- Safitri, N. R. D., & Fitranti, D. Y. (2016). *Pengaruh edukasi gizi dengan ceramah dan booklet terhadap peningkatan pengetahuan dan sikap gizi remaja overweight* (Doctoral dissertation, Universitas Diponegoro).
- Smaldino, S. E., Lowther, D. L., & Mims, C. (2019). *Instructional Technology and Media for Learning*.
- Suprijanto, H. (2011). *Adult education from theory to application*. Jakarta: Bumi Aksara
- Videnović, M., & Lazarević, L. B. (2017). Familial and individual reasons for student dropout: schools' perception. *Psihološka istraživanja*, 20(1), 71-88.
- Wagiran, W. (2012). Pengembangan Karakter Berbasis Kearifan Lokal Hamemayu Hayuning Bawana (Identifikasi Nilai-Nilai Karakter Berbasis Budaya). *Jurnal Pendidikan Karakter*, 3(3).
- Yustina, Y., Halim, L., & Mahadi, I. (2020). The Effect of 'Fish Diversity' Book in Kampar District on the Learning Motivation and Obstacles of Kampar High School Students through Online Learning during the COVID-19 Period. *Journal of Innovation in Educational and Cultural Research*, 1(1), 7-14.
- Zulaekah, S. (2012). Pendidikan gizi dengan media booklet terhadap pengetahuan gizi. *KEMAS: Jurnal Kesehatan Masyarakat*, 7(2), 127-133.