

Digital Empowerment of MSMEs as a Community-Based Strategy to Mitigate Stunting in Tegalmade Village, Sukoharjo

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Abstract

Local economic development activities through digitalization of MSMEs as a strategy to reduce stunting in Tegalmade Village are very important, given the increasing need for management of existing resources and potential. The PKK of Tegalmade Village is used as an activity partner because of several things, including: management of MSME management that is not yet optimal, limited human resources and infrastructure that support the digitization of MSMEs, and low community participation in supporting local economic development as a strategy to reduce stunting in Tegalmade Village. The purpose of this activity is to increase public awareness about the importance of balanced nutrition in preventing stunting in children and strengthen the ability of MSME players to utilize increasingly advanced digital technology in developing and marketing their products. This activity will not only reduce the level of stunting but can encourage the level of economic growth in Tegalmade Village by increasing sales of MSME products both in local and international markets. The output of this activity shows that the digitization of MSMEs can be one of the effective strategies in stunting prevention. Aloe vera processed products, such as juice, jam, or healthy snacks, can be promoted and marketed digitally, providing access to nutritional products that are useful in preventing stunting.

Keywords: digital; MSME; stunting

1. Introduction

Tegalmade Village, Mojolaban Subdistrict, Sukoharjo Regency is located between 110°49'52.3"-110°51'06.0" and 7°36'22.6"-7°37'04.2"(Pemerintah Desa Tegalmade, 2024). Geomorphologically, it is located on the fluvial plain of the Samin River, so it has a flat physiography, fertile soil and abundant water. Tegalmade Village consists of the hamlets of Dudan, Kesongo, Nawud, Soko, and Tegalmade (BPS, 2025). The northern boundaries are Laban and Wirun villages. The western boundaries are Telukan and Kadokan villages in Grogol sub-district. The southern boundaries are Pranan village, Karangwuni village, and Bugel village in Polokarto sub-district. The eastern boundary is Karangwuni village in Polokarto sub-district and Wirun village. Tegalmade Village has challenges in terms of children's health, particularly the problem of stunting. Stunting is a condition of failure to thrive in children under five due to chronic malnutrition, resulting in children who are too short for their age. Some of the factors that influence stunting in Tegalmade Village include a lack of nutritional knowledge, low access to nutritious food, and less than optimal health programs available. According to the Head of Tegalmade Village, Mr. Wawan Rubianto, the stunting rate among children under five is still relatively high. PKK mothers have an important role in the family, but not all have adequate knowledge about nutrition and child health. Existing health programs have not been fully effective in reaching all levels of society.

Another important condition is to increase the potential of the village, especially in the agricultural sector (Anna & Sari, 2025). Tegalmade Village has great potential in the fields of Aloe vera and organic farming, but has not been fully optimized. Agriculture is one of the main sectors that support the village economy, but there are still several obstacles such as traditional farming methods, lack of access to modern agricultural technology, and limited knowledge of farmers about more efficient agricultural techniques. The current condition of the Tegalmade Village community still uses conventional and less

efficient agricultural methods. Agricultural yields have not been maximized due to a lack of knowledge about modern agricultural techniques (Hartati, 2020). The lack of access to advanced agricultural technology and resources, especially for the distribution of agricultural products.

MSMEs in Tegalmade Village also have an important role in the local economy, especially in the field of stunting prevention based on processed aloe vera. However, the distribution and sales of these products are still limited to the local market and have not been digitally integrated, which results in low income and limitations in reaching a wider market. Aloe vera products in Tegalmade Village have long been planted in front of each resident's housing and are expected to become superior products in the future.

Low utilization of digital technology for product marketing and distribution. Lack of knowledge and skills in using digital platforms for product sales. In addition, the results of observations with the Muhammadiyah Branch Leader, Mr. Sugiyo, the community requires submission of halal certification for Tegalmade village MSME products and submission of a sustainable business NIB. Figure 1 provides information on the current existing conditions of agricultural potential in Tegalmade Village which requires Village Governance assistance based on a prototype for a means of selling processed products made from aloe vera raw materials.

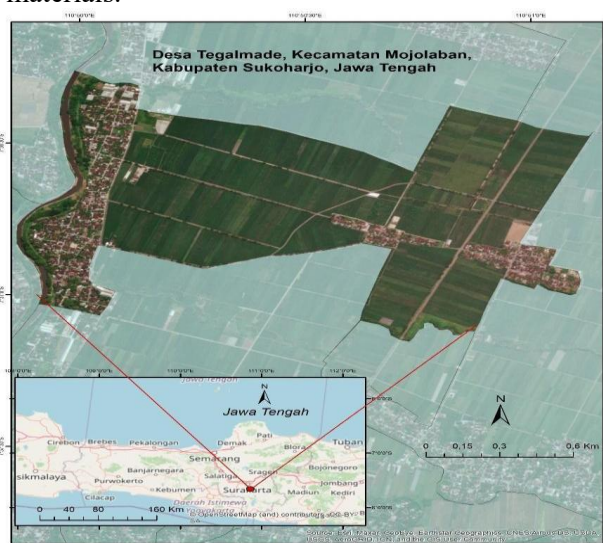


Figure 1. Location Map of Tegalmade Village, Mojolaban

Problems faced by partners at this time include: (1) high levels of stunting due to lack of knowledge related to child nutrition and non-optimal health programs; (2) MSME products from agricultural products are still limited due to lack of knowledge and skills in the use of digitalization; (3) There are products made from aloe vera which are expected to become superior products of Tegalmade Village. It is hoped that with assistance to partners, a Stunting Awareness group will be formed that focuses on increasing public understanding of the importance of balanced nutrition to prevent stunting in children. In addition, this program also aims to encourage the digitization of MSME products, especially local processed products that have high nutritional value and the uniqueness of Tegalmade Village. These products are expected to attract interest not only in the local market but also in the global market through e-commerce platforms (Priyono et al., 2024). This assistance will also include strategies to capture great opportunities both offline and online, so that village MSMEs can develop more widely and sustainably.

2. Methods

The methods used in this MSME digitalization activity as a Stunting Prevention Strategy are through socialization, training, mentoring. This socialization activity aims to inform the PkM program to the community. Training activities are carried out in order to form a program regarding stunting awareness, workshop programs regarding modern technology in agriculture and the development of MSME products in digital technology.

The activity will be divided into 4 stages or steps in carrying out this PkM activity, including: Phase 1 consists of socialization to partners and the community, and licensing. Stage 2 consists of workshops

on village potential and population, workshops on stunting, and aloe vera processing training. Stage 3 consists of the application of e-commerce technology for MSMEs, halal certification assistance and business NIB. Stage 4 consists of monitoring and evaluation, program sustainability, and reporting/publication. In detail, the stages of these activities are as follows:



Figure 2. Flow of methods in Community Service

2.1. Stage 1

2.1.1. Socialization and Licensing

The socialization activity aims to inform the community about the PkM program, especially about the importance of understanding balanced nutrition to prevent stunting and the benefits of digitalization for MSMEs. This socialization will also include information on modern technology in agriculture, including the use of supporting digital tools and applications to improve the efficiency of production and distribution of agricultural products.

2.2. Stage 2

2.2.1. Workshop on Village Potential and Population

This workshop is used to increase knowledge about population geography and understand strategic locations for MSMEs. Tegalmade Village has quite diverse village potential, especially agricultural products that can be utilized as a superior program planning in Sukoharjo District.

2.2.2. Workshop on MSME assistance for Stunting Prevention

MSME mentoring activities for stunting prevention will be carried out to assist participants in empowering MSMEs for stunting prevention. The participants of this training activity are representatives of PKK mothers, Aisyiyah cadres and local residents who have MSME businesses and plan to develop superior aloe vera products based on organic agriculture.

2.2.3. Aloe Vera Processing Training

The training was conducted to train the community, especially MSME players and farmers, on proper nutrition management to prevent stunting as well as skills in utilizing digital technology. The training is to raise awareness of the importance of nutrition in children to prevent stunting, workshop programs for the introduction of modern technology related to agriculture and training programs on how to utilize digital in marketing MSME products and distribution of agricultural products.

2.3. Stage 3

2.3.1. Application of technology for MSMEs

Technology applications (meetings 4-7) will include the implementation of a web-based management system for waste management, as well as a digital platform for MSMEs. For stunting, technology will be used to monitor child health and distribution of nutrition information. For MSMEs, technology will assist in product digitization and development of online marketing strategies. The application of technology will also include the use of modern agricultural tools, such as advanced tractors, automated harvesting machines, and automated irrigation systems. These technologies aim to

improve agricultural efficiency and productivity in Tegalmade Village, as well as support farmers in implementing more effective and innovative farming techniques.

2.3.2. Overview of science and technology

The description of science and technology applied in this service is the digitalization of MSMEs through e-commerce sales, empowering PKK groups for stunting prevention, and digitalization for making halal certification and NIB for MSME businesses. In addition, a mapping of the potential of Tegalmade village will be carried out to become one of the copyright outputs for Tegalmade village in utilizing agricultural products in the region.

2.3.3. Assistance to MSMEs for Halal Certificates and Business NIBs

This halal certification and business NIB activity (meeting 4-7) will be carried out to assist MSMEs in agriculture, halal certification, and business NIB conducted with activity partners. Participants in this training activity are community members who have MSME businesses.

2.4. Stage 4

2.4.1. Program monitoring and evaluation

Monitoring and evaluation of MSME assistance activities are carried out once a month through visits to Tegalmade village hall (meetings 8-12). Monitoring and evaluation is carried out by the person in charge of the implementer accompanied by the University. The indicators of success include: the number of participants or members, the value of economic potential obtained, and the value of program benefits for partners. Monitoring and evaluation will be carried out by providing a questionnaire through google form related to the success rate of the program. After going through monitoring and evaluation, program sustainability is carried out by providing the creation of village potential. This service program will continue to be sustainable: (a) partners actively participate in every stage of the implementation of activities, (b) there has been a transfer of technology and knowledge from the implementer to partners and the community, (b) the distance between the location of the implementer and the partners is very close, making communication easier, and (c) the establishment of an MoU between partners and implementers will strengthen the cooperative relationship.

2.4.2. Program Sustainability

Evaluation activities for local economic development through digitalization of MSMEs as a strategy to overcome stunting in Tegalmade Village, Mojolaban District, Sukoharjo are carried out every Wednesday or Friday in the last week of each month, starting from March to July. The evaluation will be carried out by asking about the sustainability of the program and the progress for making aloe vera-based MSME products. This program will continue because: (a) partners actively participate in every stage of the implementation of activities, especially the existence of Aisyiyah cadres who are agents of making MSME products, (b) there has been a transfer of technology and knowledge from the implementer to partners and the community, (b) the distance between the location of the implementer and the partner is very close, making communication easier, and (c) the establishment of an MoU between partners and implementers will strengthen the relationship of service cooperation with other themes.

2.4.3. Partner Contribution

In this activity, partners as recipients of training and empowerment have a contribution to prepare agents or cadres who will later become strategic intermediate targets to ensure that the knowledge/skills taught are not lost. The agents here are the village head and several Aisyiyah cadres in the economic sector in Tegalmade Village. Partners also contribute to ensuring activities run smoothly related to licensing and scheduling regular meetings.

2.4.4. Reporting and publication

Reporting is carried out to UMS as a funder and service partner, namely the Tegalmade village office. Condition reporting will be carried out independently in the sixth month. Meanwhile, reporting activities carried out by PKM implementers will refer to the provisions of this program. Publication

activities of the results of activities will be carried out by implementers together with partners in the form of: (a) articles in journal publications, and print or online mass media, and (b) videos that will be posted on YouTube. The following is a description of the duties of each service member.

3. Results and Discussion

3.1. Assistance in digitizing MSMEs and Village Potential

The material regarding the potential of Tegalmade Village and the digitalization of MSMEs in Tegalmade Village based on businesses that are already farming in Tegalmade Village was given by Dewi Novita Sari, S.Si., M.Sc. Assistance in digitizing MSMEs and developing village potential is a strategic step in improving community welfare and local economic competitiveness. In the era of digital transformation, village MSMEs often face challenges in marketing, financial recording, and access to information. Through the mentoring program, MSME players can be provided with training on the use of digital technology such as social media, marketplaces, financial applications, and local product branding strategies. In addition, village potential such as agricultural products, handicrafts, tourism, or culinary specialties can be raised and promoted through digital platforms, which opens wider market access.

This assistance can also include the creation of digital village profiles, MSME product catalogs, and digital literacy training for the community. With the right technological support and guidance, digitalization can become a driving force for an inclusive, modern, and sustainable village economy. Tegalmade Village PKK has generally practiced planting aloe vera in their respective home yards, which will require further assistance for processing and marketing the resulting products.



Figure 3. PKK training and mentoring to prevent stunting

3.2. Population

Population material on Family Planning (KB) was given by Nirma Lila Anggani, S.Si., M.Sc. Population material on family planning is very important as part of efforts to control population growth and improve the quality of family life. The family planning program not only aims to regulate the number and spacing of children, but also to create a healthy, prosperous, and productive family. In this material, the community is introduced to various contraceptive methods, both short-term and long-term, along with their advantages and disadvantages, so that couples of childbearing age can choose a method that suits their conditions and needs. In addition, family planning materials also cover aspects of reproductive health, family life planning, and family planning rights. Family planning education is provided through counseling at posyandu, schools, community groups, and digital media so that information can be spread widely and evenly. With a good understanding, the community is expected to make wise and responsible decisions related to family planning, which ultimately contributes to human development and demographic balance.

3.3. Aloe vera product processing for stunting prevention

The material about the nutrients contained in Aloe vera or aloe vera was given by Sudrajah Warajati Kisnawaty, S.Gz, M.Gz. Aloe Vera is a plant rich in essential nutrients, such as vitamins A, C, E, and B12, as well as minerals such as calcium, magnesium, and zinc, which play an important role in children's growth and development. The essential amino acids and antioxidants in Aloe vera also help the cell regeneration process and boost immunity. With its potential nutritional content, Aloe vera can

be processed into various functional food products that are useful to support stunting prevention efforts. Some products that can be developed in Tegalmade Village include Aloe vera juice fortified with honey or iron-rich fruits, Aloe vera jam or jelly enriched with vegetable protein, to healthy snacks and toddler porridge based on Aloe vera extract. These products are not only nutritious, but can also help improve a child's gastrointestinal tract and increase appetite, which are important factors in preventing chronic malnutrition. However, in the processing of Aloe vera, safety aspects need to be considered, especially by removing the latex part which is laxative and ensuring hygienic processing to make it safe for children to consume. With proper formulation and safety testing, processed Aloe vera products have the potential to become local food innovations that support stunting prevention programs in Indonesia (Dhaifullah & Kisnawaty, 2025).



Figure 4. Aloe Vera plant and pudding as a product to prevent stunting in children

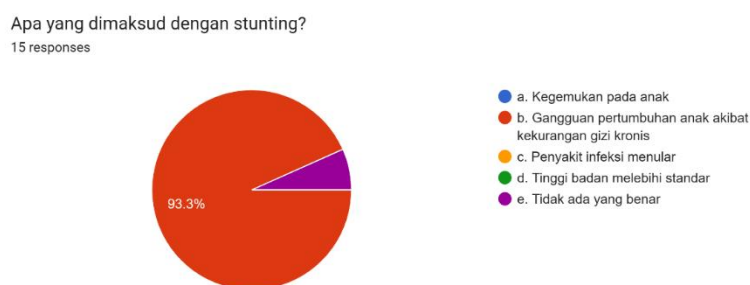


Figure 5. PKK knowledge questionnaire on stunting

Based on the survey results of 50 respondents from PKK regarding their understanding of stunting, the majority of respondents (93.3%) answered correctly that stunting is a child growth disorder due to chronic malnutrition. This shows that most respondents have a good understanding of the definition of stunting. However, there were still 6.7% of respondents who answered "None of the above", indicating that there are a small number of respondents who do not understand the concept of stunting correctly. This finding can be the basis for improving education or socialization related to stunting, especially to reach groups that do not have a correct understanding.



Figure 6. Local food questionnaire

Furthermore, when asked about examples of local foods that can be used for stunting prevention according to Figure 6, it was found that the majority of respondents (80%) chose all correct answers. These options included sago (Papua), corn (NTT), sorghum (Java) and cassava (all of Indonesia) as local foods that could potentially support stunting prevention. A total of 13.3% of respondents chose sago (Papua), while 6.7% chose sorghum (Java). No respondents chose corn or cassava separately. These results show that most respondents understand the importance of diverse local food sources as part of the stunting management strategy. However, there is still a small proportion who only recognize one type of local food, indicating the need for further education regarding the potential of all types of local food in supporting child nutrition.

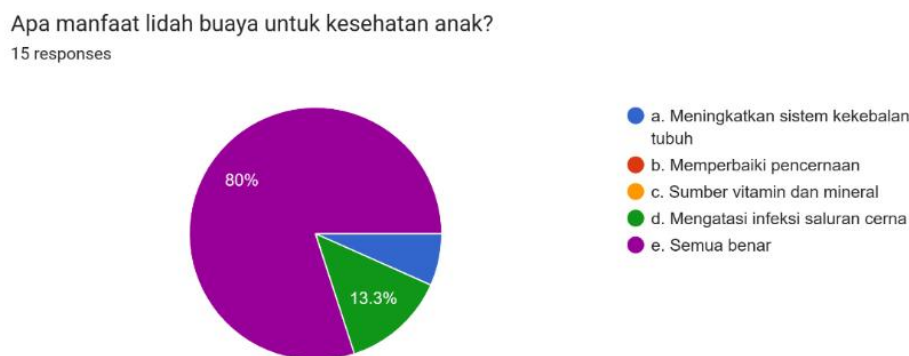


Figure 7. Questionnaire on the benefits of aloe vera for children

Results from Figure 7 regarding the benefits of aloe vera for children's health, 80% of respondents chose the answer "All true", which includes the benefits of boosting the immune system, improving digestion, being a source of vitamins and minerals, and overcoming gastrointestinal infections. A total of 13.3% of respondents chose the benefit of overcoming gastrointestinal infections, while another 6.7% chose the benefit of boosting the immune system. No one chose the other benefit options separately. These results show that most respondents have a comprehensive understanding of the various benefits of aloe vera for children's health. However, there are still a small number of respondents who do not fully understand the benefits, so education about herbal plants such as aloe vera still needs to be improved.



Figure 8. Questionnaire on effective strategies for stunting

Based on Figure 8 above, 93.3% of PKKs in Tegalmade Village selected all options for effective strategic measures to address stunting, including: nutrition education through posyandu, food fortification program, sanitation and hygiene counseling, and balanced food demonstration. Meanwhile, the rest only chose the first option. This is certainly in line with community service activities regarding the digitalization of MSMEs for stunting strategies in Tegalmade Village.

Apa peran pangan lokal dalam penanganan stunting?
15 responses

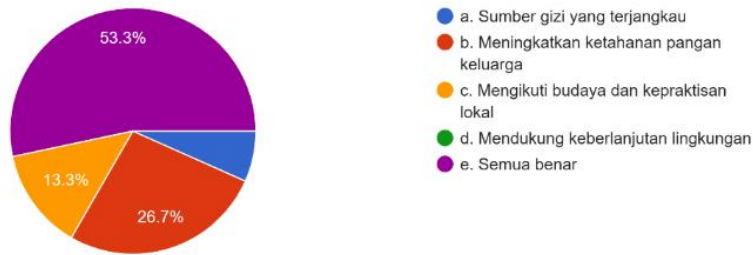


Figure 9. Questionnaire on the role of local food for stunting management

Furthermore, according to the questionnaire results in Figure 9 above, respondents had different views on the role of local food in handling stunting in Tegalmade Village. Most, 53.3%, answered all options correctly. While others, namely: 26.7% answered to improve family food security, 13.3% answered to follow local culture and practicality, and the remaining 6.7% answered food as affordable nutrition.

3.4. Halal certification and Business NIB

The material on business legality was delivered by Nur Hidayah, S.E, M.E. Business legality is also called business licensing. It is a document that must be owned by a company to legalize itself so that it is legal in the eyes of the law and society and gets a legal umbrella (legal protection) from the authorized government. The importance of business legality can help MSMEs in legal protection, access to funding and investment, customer and business partner trust, and minimizing the risk of legal sanctions (Perwithosuci et al., 2024).

The practice of making NIB for MSME businesses is carried out using smartphones from several PKK members who have MSME businesses. The following is an example of training material for making NIB for MSME businesses. The link for making business NIB in more detail can be seen in the tutorial that has been made at the following link: <https://youtu.be/qBQ8kCAY7xI?si=QfESYbooe VXVRMF>.

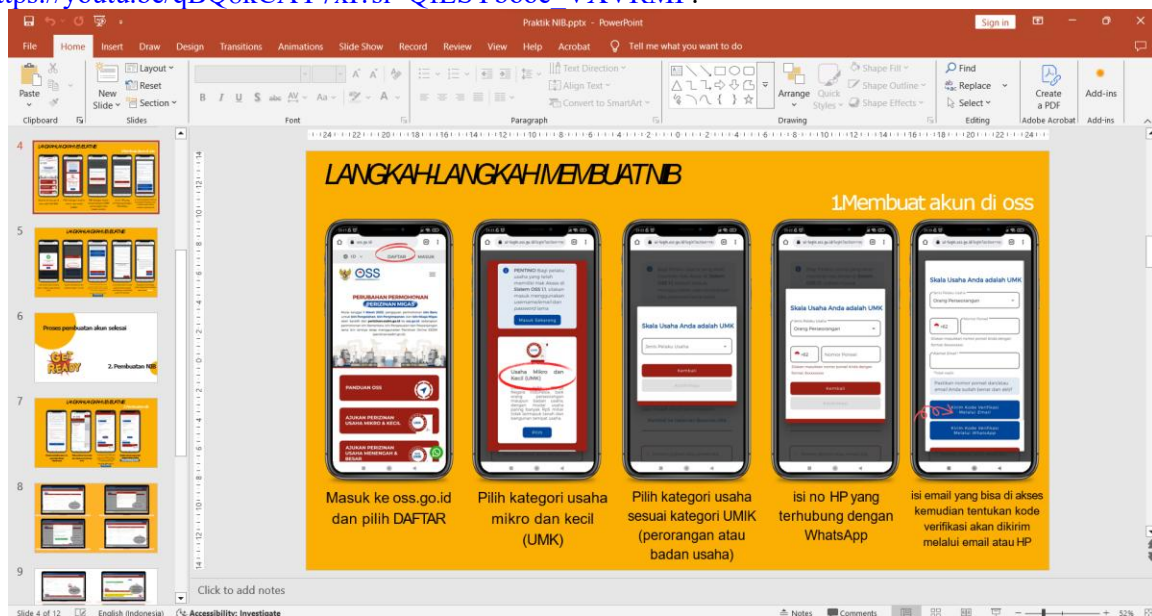


Figure 10. Practice of making NIB for MSME businesses



Figure 11. Documentation with Tegalmade Village PKK participants

4. Conclusions

The conclusion of local economic development through MSME digitalization in Tegalmade Village, Mojolaban Sub-district, Sukoharjo, shows that MSME digitalization can be one of the effective strategies in stunting prevention. By utilizing digital technology, village MSMEs can increase market access and productivity, which in turn can increase family income and support the fulfillment of better nutritional needs. One potential product that can be developed is Aloe vera, which is rich in vitamins and minerals essential for child growth. Aloe vera processed products, such as juice, jam, or healthy snacks, can be promoted and marketed digitally, providing access to nutritional products that are useful in preventing stunting. Aloe vera has ingredients that support nutrient absorption and improve digestive health, which are needed by children in the first 1,000 days of life. With increased income from MSMEs and healthy products such as Aloe vera, families will be better able to meet the optimal nutritional needs of their children, which plays an important role in preventing stunting. Therefore, collaboration between economic development through MSMEs, digitalization, and the utilization of local resources such as Aloe vera can produce mutually supportive impacts in the development of quality of life in villages, especially in overcoming nutrition and stunting problems. Suggestions from this activity need to be followed up for further assistance in processing aloe vera-based products in Tegalmade Village.

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