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Enhancing Production Capacity and Work Ergonomics at Cemilan Wety through the VGC-J300 Slicing Machine and The High-Pressure Stove

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ABSTRACT

This community service activity aims to apply appropriate technology, namely VGC-J300 slicing machines and high-pressure stoves, to increase production capacity, productivity, and ergonomics at Cemilan Wety in Medan. Before the intervention, the production process relied on manual equipment, particularly during the slicing stage, resulting in prolonged processing times, limited output, and high physical workloads. The implementation method involved field surveys, partner discussions, equipment procurement, hands-on training, and monitoring and evaluation. The success of the program was evaluated by comparing before- and after-intervention conditions in terms of production capacity (kg per day), time efficiency, and changes in physical workload during the production process, as assessed through observations and interviews with partners. The technological solutions provided included a VGC-J300 slicing machine and a high-pressure stove. The results demonstrated a significant increase in production capacity across all product lines: cassava chips increased by 66.67% (from 30 kg to 50 kg), and Mustofa potato (spiced matchstick potatoes) increased by 48.15% (from 22.5 kg to 33.33 kg). In addition, productivity improved, and the slicing process became faster and more consistent. Meanwhile, the frying process became more efficient through stable heat output. Furthermore, work ergonomics improved as the physical workload decreased, creating a more comfortable work environment. In conclusion, the effective application of appropriate technology has improved production efficiency, production capacity, and the quality of work processes in a sustainable manner.

Keyword: Production Capacity, Work Ergonomics, Appropriate Technology, MSMEs.

ABSTRAK

Kegiatan pengabdian masyarakat ini bertujuan untuk menerapkan teknologi tepat guna, yaitu mesin pengiris VGC-J300 dan kompor bertekanan tinggi, untuk meningkatkan kapasitas produksi, produktivitas, dan ergonomi di Cemilan Wety di Medan. Sebelum intervensi, proses produksi mengandalkan peralatan manual, terutama selama proses pengirisan, menghasilkan waktu pemrosesan yang lama, output terbatas, dan beban kerja fisik yang tinggi. Metode implementasi melibatkan survei lapangan, berdiskusi dengan mitra, pengadaan peralatan, pelatihan langsung, serta pemantauan dan evaluasi. Keberhasilan program dievaluasi dengan membandingkan kondisi sebelum dan sesudah intervensi dalam hal kapasitas produksi (kg per hari), efisiensi waktu, dan perubahan beban kerja fisik selama proses produksi, yang dinilai melalui observasi dan wawancara dengan mitra. Solusi teknologi yang disediakan termasuk mesin pengiris VGC-J300 dan kompor bertekanan tinggi. Hasil penelitian menunjukkan peningkatan kapasitas produksi yang signifikan di semua lini produk: keripik singkong meningkat sebesar 66,67% (dari 30 kg menjadi 50 kg), dan kentang Mustofa (kentang korek api berbumbu) meningkat sebesar 48,15% (dari 22,5 menjadi 33,33 kg). Selain itu, produktivitas meningkat, dan proses pemotongan menjadi

lebih cepat dan konsisten. Sementara itu, proses penggorengan menjadi lebih efisien melalui keluaran panas yang stabil. Selain itu, ergonomi kerja meningkat seiring berkurangnya beban kerja fisik, menciptakan lingkungan kerja yang lebih nyaman. Kesimpulannya, penerapan teknologi tepat guna yang efektif telah meningkatkan efisiensi produksi, kapasitas produksi, dan ergonomi kerja secara berkelanjutan.
Keyword: Kapasitas Produksi, Ergonomi kerja, Teknologi tepat guna, UMKM.

1. Introduction

Micro, Small, and Medium Enterprises (MSMEs) play an important role in supporting national economic growth, particularly in generating employment opportunities, increasing community income, and developing local food products [1]. The processed food sector, including snack products such as chips and peyek, continues to grow due to stable market demand and broad opportunities for product diversification. However, many food MSMEs still face challenges related to limited technology, production efficiency, production capacity, and work ergonomics [2].

Cemilan Wety is a home-based business located in the Medan Tuntungan District of Medan City, producing various snack products such as banana chips, cassava chips, potato chips, potato mustofa, and peanut peyek. Founded in 2020 by Mrs. Suweti, the business already holds a Home Industry Food License (P-IRT) and halal certification, which guarantee the legality and safety of its products. Despite having diverse products and legal certification, Cemilan Wety still experiences several production-related constraints. The slicing process is performed manually using basic tools, resulting in longer processing times, limited production capacity, and higher physical workload for workers. In addition, the frying process still uses conventional low-capacity stoves, resulting in inefficient frying times and limiting the ability to meet increasing market demand.

Therefore, the application of appropriate technology is essential to improve production capacity and work ergonomics at Cemilan Wety. Sudarsono [3] reported that the use of slicing technology in Puasana Village improved work efficiency and production capacity. Likewise, Lutfi [4] Found that using a high-pressure stove produces more stable heat, which speeds up the frying process on tempeh chips. In line with these findings, the application of appropriate technology in the form of slicing machines and *high-pressure* stoves is expected to increase production capacity while improving work ergonomics at Cemilan Wety. A slicing machine can speed up the slicing process and produce a more uniform slice, while a *high-pressure* stove provides more consistent heat, thereby speeding up the frying process. The combination of these two technologies is expected to increase production capacity while reducing the physical workload of workers.

Based on these conditions, this community service activity provided a VGC-J300 slicing machine and high-pressure stoves to accelerate the production process and increase production capacity. This reduced the physical workload of workers. The programme also included training and technical assistance to ensure optimal equipment was used. Ultimately, this initiative aims to improve production capacity and work ergonomics in the production process at Cemilan Wety through the implementation of appropriate technology.

2. Methods

The method of implementing this community service activity includes field surveys and discussions with partners to identify challenges in the chip production process, especially in the aspects of production efficiency and work ergonomics. The results of the identification are the basis for the preparation of service programs, the determination of solutions, and the scheduling of activities. These activities include socialising with partners, the preparation of tools and materials to be donated to partners, providing training, providing tools and technology to partners, monitoring and evaluation, and planning programme sustainability.

Implementation began with a socialization event focusing on increasing productivity and the application of the principles of work ergonomics to the production process. This was followed by the handover of the VGC-J300 slicing machine and high-pressure stove, accompanied by training on the practical use and maintenance of the equipment. Increased production capacity is achieved through the application of the VGC-J300 slicing machine, which is able to speed up the slicing process and produce slices with a more uniform thickness than the manual method. The use of a high-pressure stove will produce more stable heat, so that it can speed up the frying time. The reduced time at the slicing and frying stage allows an increase in the number of products produced in the same working time, so that it will increase the production capacity in Cemilan Wety (kg per

day). Improved work ergonomics is achieved through a reduction in manual activity during repetitive slicing. The use of a slicing machine reduces the frequency of repetitive movements during the slicing process, while a *high-pressure stove* speeds up the frying process so that workers do not have to stay in front of the heat source for too long. These conditions reduce the physical workload, reduce the potential for fatigue, and improve work comfort during the production process.

The final stage in the form of monitoring and evaluation was carried out to assess the effectiveness of technology implementation by comparing conditions before and after the intervention. The evaluation focused on changes in production capacity (kg per day), processing time efficiency, and ergonomic working conditions of partners, as assessed through observation and interviews with partners, in order to determine the success of the programme.

2.1 Program Implementation

In the initial phase of the project, the implementation team conducted a field survey at the partner's location to identify business conditions, production workflows, and operational challenges (Figure 1). This was done through direct observation and discussions with the partner to gather information about issues at each stage of production. From these discussions, it was identified that the chip-slicing process was still done manually using simple tools, and the frying process used conventional stoves with relatively low thermal efficiency. These conditions resulted in long production times, suboptimal production capacity, and limited business productivity, necessitating the application of appropriate technology to improve production process efficiency. These findings served as the basis for determining the appropriate technology that met the partners' needs.

Based on the results of the problem identification, the implemented solution involved appropriate technology, namely a slicing machine and a high-pressure stove. The slicing machine was chosen because it can speed up the slicing process and produce slices with a more uniform thickness, thereby supporting a more even frying process. This is in line with Ezeanya et al. [5], who state that the use of a slicing machine aims to improve process efficiency and produce slices of uniform thickness ranging from 5 mm to 6 mm.

Manual slicing poses health risks to workers. They adopt a hunched posture with their necks and backs bent downwards and perform repetitive movements while slicing. Using a slicing machine could improve workplace ergonomics at Cemilan Wety. Research by Nurlina et al. [6] Supported this; the use of a slicing machine eliminates the need for workers to maintain a static, repetitive posture while slicing bananas. Slicing can be done while seated, thereby reducing fatigue.

High-pressure stoves with inner and outer flame settings are used to improve frying efficiency through more stable heat and a higher level of combustion than conventional stoves. These conditions accelerate the attainment of frying temperatures, thereby reducing processing time and thereby reducing workers' physical workload. The use of high-pressure stoves was also reported by Lutfi et al. [4] Using high-pressure stoves can speed up the frying process for tempeh chips, preventing them from sticking together.

Figure 1. Initial survey and discussion with the owner of Cemilan Wety.

After the activity proposal was approved and funded, the team coordinated further with the partners to finalize the implementation plan. At this stage, both parties agreed upon specific solutions tailored to business needs, focusing on enhancing production efficiency and occupational comfort. Furthermore, the team procured the necessary equipment and supporting materials, ensuring that the specifications of the chip-slicing machine and high-pressure stove aligned with the partner's capacity and requirements. Specifically, regarding the slicing machine, the partner requested a model capable of producing elongated, matchstick-shaped slices with adjustable thickness settings. Once all preparations had been finalised, the activity proceeded with the official handover of the equipment, followed by hands-on training to ensure the partner could operate the tools properly and effectively.

The activity continued with the handover of equipment, specifically a VGC-J300 slicing machine and a high-pressure stove, followed by practical training sessions (Figure 2). At this stage, the partners were directly involved in hands-on practice to ensure they could operate the machinery correctly, safely, and effectively (Figure 3). The chip-slicing machine is equipped with two types of interchangeable blades. These allow for variations in slice thickness and product shape, making the production process more flexible and ensuring more uniform product sizes. The implementation of the slicing machine is expected to significantly speed up the slicing process, while the high-pressure stove improves frying efficiency by providing more stable and consistent heat.

Figure 2. Handover of the VGC-J300 slicing machine and High-pressure stove

The final stage of the activity involved monitoring and evaluation by the service team to assess progress following the implementation of the provided tools. Monitoring was conducted through direct observation and discussions with the partners regarding changes in the production process. The evaluation results showed a significant increase in productivity, improved production time efficiency, and enhanced work ergonomics compared to the conditions before the intervention. Consequently, this community service activity has had a positive impact on Cemilan Wety by increasing production capacity and improving the quality of work processes sustainably.

Figure 3. Demonstration and hands-on training for the VGC-J300 slicing machine and High -pressure stove

3. Results and Discussion

Cemilan Wety produces different types of snacks with different stages of processing, depending on the product being produced. The flow of the production process can be seen in Figure 4. The flow of the cassava chip production. The process begins with the selection of good-quality cassava. Then the cassava skin is peeled and washed clean, and then the cassava is sliced to an adjusted thickness. Next, it is soaked in a specific solution to help retain color, reduce sap, and produce a better texture after frying. The next stage, frying, uses hot oil until the chips reach the desired level of doneness. Then rinsing is carried out to reduce the remaining oil in the product. Once the chips have cooled, they are packaged and labeled with their product identity. The final stage is the marketing and delivery of products to consumers.

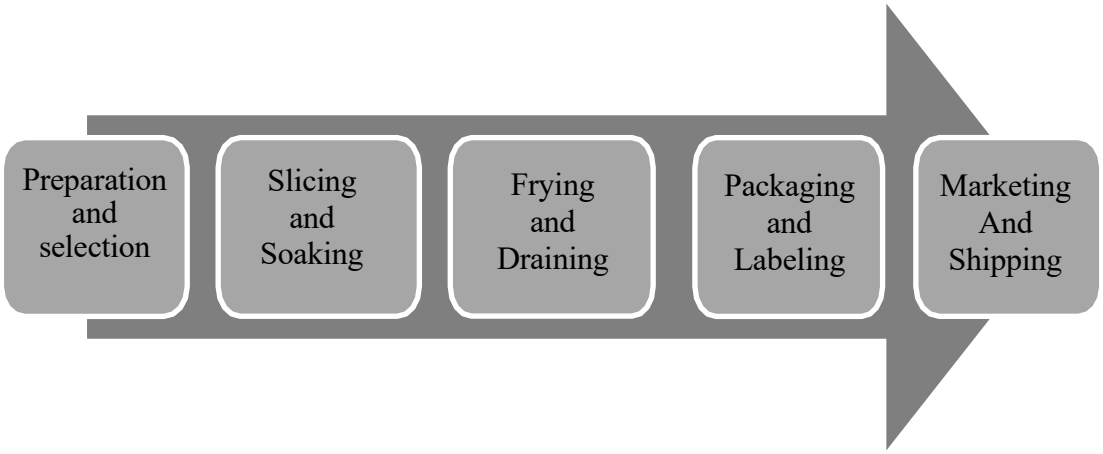

Figure 4. The flow of the cassava chip production

The results of the monitoring and evaluation activities carried out by the community service team indicate that Cemilan Wety's production capacity has increased. These results are presented in Table 1 and Figure 5.

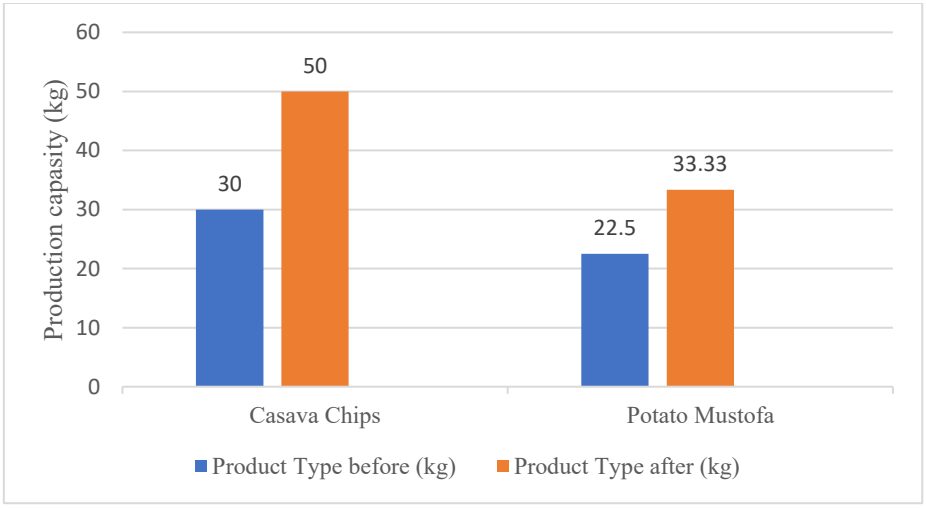

Figure 5. Comparison of production capacity before and after technology implementation

Table 1. Production Capacity of Cemilan Wety

Product Type	Average Production Capacity		Increased Production Capacity (%)
	before (kg)	after (kg)	
Casava Chips	30	50	66,67
Potato Mustofa	22,5	33,33	48,15

As can be seen in Figure 5, the production capacity has increased following the intervention. Using a slicing machine has had a positive impact on the production capacity at Cemilan Wety. More detailed results are presented in Table 1. For cassava chips, the average production capacity increased from 30 kg before the intervention to 50 kg after implementation—a significant increase of 66,67%. This improvement demonstrates that the equipment accelerates the production process, allowing a larger volume of raw materials to be processed than with manual methods. This aligns with Pratomo [7], who noted that slicing technology accelerates the cutting process and produces more uniform results, enabling higher output in a shorter timeframe [8], [9]. Similarly, for mustofa potato, the average production capacity rose from 22,5 kg to 33,33 kg following the introduction of the tool, representing a 48,15% increase. This indicates that the application of the slicing machine effectively improves processing efficiency and reduces labour time for potato mustofa production. These findings are consistent with Surbaktilah [10] who stated that manual chip processing is time-consuming, whereas the implementation of a slicer machine enhances efficiency, ensures consistent slice thickness, and allows for easy adjustments based on consumer preferences [11].

In addition, based on interviews conducted after the slicing machine was implemented revealed that the slicing process had become faster and the results more uniform. Overall productivity increased, and the partners' physical workload decreased compared to the previous manual methods. Furthermore, the application of this technology allowed for the introduction of a new product line: sweet potato chips. Using a high-pressure stove also made the frying process more efficient due to its stable heat output and shorter frying times. This aligns with Safruddin [12] who stated that high-pressure stoves are capable of producing higher heat more rapidly. In terms of work ergonomics, the partners reported that the process became more comfortable and less physically demanding, allowing for greater operational effectiveness. Thus, this community service program successfully provided a practical solution to the partner's primary challenge of limited production equipment, while simultaneously improving work efficiency, production capacity, and the overall quality of the manufacturing process.

4. Conclusions

The provision of chip-slicing equipment and high-pressure stoves has significantly increased production capacity and productivity, while also making conditions more comfortable. These tools have reduced the physical workload and shortened production times. Consequently, this community service programme has meaningfully supported the business partner’s production capacity and work quality. Furthermore, the implementation of this technology has enabled the partner to diversify its offerings and create new products tailored to market needs. To ensure long-term sustainability, it is recommended that Cemilan Wety continue to optimize the use of the provided equipment to maintain production efficiency and achieve sustainable business growth.

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References

[1] S. Ramadani, D. A. Ramadhani, M. Ikrom, and L. Muda, "Peran Strategis UMKM dalam Mendorong Pertumbuhan Ekonomi Berkelanjutan di Indonesia," J. Ekon. Bisnis dan Manaj., vol. 4, no. 1, pp. 158–166, 2025, doi: 10.58192/ebismen.v4i1.3183.

[2] M. R. Febriyani et al., "Efisiensi Produksi UMKM Keripik Dengan Menggunakan Alat Pengiris Umbi-Umbian Dengan Mata Pisau Berputar," Krepa: Kreat. Pada Abdimas, vol. 7, no. 6, 2026, doi: 10.9765/Krepa.V218.3784.

[3] Sudarsono, Deniyatno, I. Nurjannah, Heriansyah, P. Aksar, and Aminur, "Intervensi Teknologi Alat Pengiris Bahan Kripik Dalam Upaya Peningkatan Pendapatan Ekonomi Masyarakat," J. Pengabdi. Masy. Ilmu Terap., vol. 6, no. 2, pp. 112–118, 2024.

[4] Lutfi, Azhar, Sumardi, J. Harahap, and H. Mahyar, "Peningkatan Produktivitas dan Kualitas Keripik Tempe Ibu Dahlia dengan Menggunakan Mesin Pengiris Keripik dan Kompor Gas Tekanan Tinggi," J. Vokasi, vol. 9, no. 1, pp. 55–63, 2025.
[5] Ezeanya and N. Charles, "Development and Performance Evaluation of a Slicing Machine for Selected Vegetables," Greener J. Phys. Sci., vol. 6, no. 1, pp. 1–9, 2020.
[6] N. Nurlina, A. D. M. B, and M. Wahyu, "Optimalisasi Desain Mesin Perajang Keripik Pisang Mempertimbangkan Nilai Ergonomi," J. Teknol., vol. 19, no. 2, pp. 140–148, 2021, doi: 10.37031/jt.v19i2.171.
[7] T. Pratomo, M. Muharom, N. Kholili, A. Nugroho, M. Muchid, and D. Khusna, "Efforts to Increase Tempe Slicing Capacity Through the MSMEs in West Surabaya," J. Pengabdi. Masy. dan Inov. Teknol., vol. 2, no. 1, pp. 66–71, 2023.
[8] D. A. Zatika, A. Yohanson, and Yuniwati, "Upaya Peningkatan Produktivitas Kinerja Karyawan UMKM Keripik Lampung Ibu Satih Desa Baturaja Kecamatan Way Lima Kabupaten Pesawaran," J. Pengabdi. Masy. Tapis Berseri, vol. 4, no. 1, pp. 128–134, 2025, doi: 10.36448/jpmtb.v4i1.147.
[9] B. Hermanto, M. Anwar, Fatmawati, R. Santosa, and M. Kurdi, "Pendampingan Pemberdayaan UMKM Zarafa Dalam Meningkatkan Produktifitas Hasil Produk," J. Pengabdi. dan Pemberdaya. Masy. Sos. Ekon., vol. 3, no. 2, pp. 3–6, 2023.
[10] Y. Subaktilah, N. Al Indis, E. Kurniawati, R. P. Putri, and N. Zuhroh, "Implementasi Teknologi Mesin Slicer untuk Meningkatkan Efisiensi dan Produktivitas Usaha Rumah Tangga Keripik Singkong di Desa Sumberwaru Kecamatan Sukowono Jember," J. Kesehat. Surya Nusant., vol. 9, no. 2, pp. 2411–2416, 2026, doi: 10.56338/jks.v9i2.10185.
[11] Luthfi, H. Mahyar, Mursyidah, Azhar, and Sumardi, "Peningkatan Kualitas dan Produktivitas Keripik Pisang UMKM IBDA Lhoksukon dengan Menggunakan Mesin Pengiris Keripik Pisang," J. Vokasi, vol. 10, no. 1, pp. 69–78, 2026.
[12] Y. N. Safrudin, D. Caesaron, and S. A. Salma, "Pelatihan Penggunaan Teknologi Tepat Guna untuk Meningkatkan Kapasitas dan Kualitas Produksi Keripik Singkong," vol. 5, no. 4, pp. 2273–2280, 2024.