

## Transforming Cost Accounting Literacy in the Community-Based Fish Cracker Industry

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**Keywords:** Cost Accounting; Cost of Production; Home Industry; Participatory Action Research (PAR).

**Abstract.** This community service program was conducted to address inaccuracies in the calculation of the Cost of Production (COP) among Cuwe fish cracker home industries on Tidung Island, Thousand Islands, Jakarta. Most business actors calculated production costs conventionally and often excluded maintenance, electricity, and packaging expenses from factory overhead costs, resulting in underestimated production costs and less accurate pricing decisions. Therefore, the program aimed to improve participants' understanding of COP calculation and equip them with practical skills to determine production costs systematically in order to strengthen business competitiveness. The program adopted a Participatory Action Research (PAR) approach involving 18 home-industry actors and was implemented through four stages: preliminary understanding, socialization and education, knowledge strengthening, and implementation with post-training assistance. Activities included training on cost accounting concepts, identification of production cost components, application of the full-costing process method, and simple bookkeeping practices. Evaluation results showed a substantial increase in participants' competencies, with average pre-test and post-test scores improving from 42 to 86. Cost-recording consistency also increased from 20% to 80%, while participants became capable of identifying all cost components involved in COP calculations. The program contributed to improved production management capacity, a transition from trial-and-error costing practices to a systematic full-costing approach, and greater business resilience in responding to market fluctuations. The findings revealed a healthy cost structure, with direct raw materials accounting for 47% and direct labor for 31%. Although challenges remain, particularly weather dependency and high logistics costs, the program successfully transformed informal business practices into a more structured and professional cost management system.

**Katakunci:** Akuntansi Biaya; Harga Pokok Produksi; Industri Rumahan; Participatory Action Research.

**Abstrak.** Pengabdian kepada masyarakat ini dilaksanakan untuk mengatasi ketidakakuratan perhitungan Harga Pokok Produksi (HPP) pada industri rumahan kerupuk ikan Cuwe di Pulau Tidung, Kepulauan Seribu, Jakarta. Sebagian besar pelaku usaha masih menghitung biaya produksi secara konvensional dan sering

*mengabaikan biaya perawatan, listrik, serta pengemasan dalam perhitungan biaya overhead pabrik. Akibatnya, nilai HPP yang dihasilkan lebih rendah dari biaya sebenarnya sehingga memengaruhi ketepatan penetapan harga jual dan keuntungan usaha. Oleh karena itu, program ini bertujuan meningkatkan pemahaman pelaku usaha mengenai perhitungan HPP serta membekali mereka dengan keterampilan menghitung biaya produksi secara sistematis untuk memperkuat daya saing usaha. Program ini menggunakan pendekatan Participatory Action Research (PAR) yang melibatkan 18 pelaku industri rumahan dan dilaksanakan melalui empat tahapan, yaitu pra-pemahaman, sosialisasi dan edukasi, penguatan pemahaman, serta implementasi dan pendampingan pascapelatihan. Kegiatan meliputi pelatihan konsep akuntansi biaya, identifikasi komponen biaya produksi, penerapan metode full costing berbasis proses, serta praktik pembukuan sederhana. Hasil evaluasi menunjukkan peningkatan kompetensi peserta yang signifikan, ditandai dengan kenaikan nilai rata-rata pre-test dan post-test dari 42 menjadi 86. Konsistensi pencatatan biaya juga meningkat dari 20% menjadi 80%, sementara peserta mampu mengidentifikasi seluruh komponen biaya yang membentuk HPP. Program ini berhasil meningkatkan kapasitas pengelolaan usaha, mendorong peralihan dari metode penentuan biaya berbasis perkiraan menuju pendekatan full costing yang lebih sistematis, serta memperkuat ketahanan usaha dalam menghadapi fluktuasi pasar. Temuan menunjukkan struktur biaya yang sehat dengan proporsi bahan baku langsung sebesar 47% dan tenaga kerja langsung sebesar 31%. Meskipun masih menghadapi tantangan berupa ketergantungan pada cuaca dan tingginya biaya logistik, program ini berhasil mentransformasikan praktik usaha yang sebelumnya informal menjadi sistem manajemen biaya yang lebih terstruktur dan profesional.*

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## 1 Introduction

The sustainability of tourism and the development of Micro, Small, and Medium Enterprises (MSMEs) on Tidung Island are closely interconnected, as MSMEs serve as the primary providers of accommodation, culinary products, souvenirs, and tourism-related services that support the local tourism ecosystem (Purnomo & Purwandari, 2025). Among these enterprises, the Cuwe fish cracker home industry plays a significant role in maintaining the supply chain of local tourist souvenirs and contributes to the broader tourism sector in

the Thousand Islands, which accounts for 6.65% of the Gross Regional Domestic Product (GRDP) of DKI Jakarta (Badan Pusat Statistik, 2023).

Despite their economic importance, many MSME actors still face managerial challenges, particularly in financial management and production cost calculation (Gupta & Kumar Singh, 2022). Initial surveys revealed that 90% of business owners possess low accounting literacy, 96% do not maintain adequate financial records, and most continue to mix personal, family, and business finances. In addition, the calculation of the Cost of Production (HPP) for Cuwe fish crackers is generally carried out based on intuition rather than systematic accounting methods, resulting in inaccurate pricing decisions, weak cost control, and reduced business competitiveness. In response to these challenges, a community service program was implemented to strengthen the understanding of cost accounting and enhance the production capacity of home industry actors through training in systematic HPP calculation using the process costing method.

Tidung Island, which is divided into Tidung Besar and Tidung Kecil, is 200 meters wide and 5 kilometers long. It offers a variety of processed fish products, and Cuwe fish crackers are popular for their affordable price, high nutritional value, and protein and omega-3 content, which are beneficial for heart health (Hanidah et al., 2018).

This program is important because Cuwe fish crackers have significant market potential as a typical souvenir of the archipelago, but their development is hindered by the low cost-accounting literacy of business actors, as shown by 90% of respondents. The selection of Tidung Island as a partner location is based on the island's economic dependence on the MSME and tourism sectors. Therefore, strengthening the management of production costs for Cuwe fish crackers will directly increase product competitiveness, business income, and the sustainability of the marine resource-based economy.

The production of Cuwe fish crackers on Tidung Island is carried out on a household scale by housewives using conventional methods and operating at limited economies of scale. Nevertheless, this activity contributes to reducing unemployment and improving people's living standards. The fundamental weakness lies in the management system,

as business actors calculate Cost of Goods Sold HPP and determine selling prices based on subjective considerations using traditional methods. This approach is not in line with the principles of good business management from a cost and financial accounting perspective. In cost analysis, calculating the cost per unit is necessary to determine the actual cost incurred in producing an item and to evaluate budget efficiency (Wouterse et al., 2023). Thus, the traditional production methods implemented have not been supported by an adequate cost management system, which could harm businesses in the long run (Fatimah et al., 2023).

This phenomenon occurs mainly because of the limited understanding of accounting and finance among business actors, who are generally housewives. Trial-and-error HPP determination and selling prices based on intuition are often found, as these actors have long relied on empirical experience in managing the home industry (Latif, 2021). As a result, it is difficult for them to implement proper production methods accurately because they ignore maintenance, electricity, and packaging costs when calculating factory overhead.

. This condition has the potential to cause various errors, ranging from the input stage, such as the use of raw fish materials, to the production process and the final output of cracker products. These errors include inaccurate determination of the cost per unit (Kementerian Koperasi dan UKM, 2022a), incorrect cost allocation, selling prices based on intuition, unreliable financial statement preparation, and inappropriate tax reporting.

In a preliminary survey conducted on Tidung Island, Thousand Islands, the community service team found that 90% of respondents had low levels of accounting and financial literacy. Furthermore, regarding financial reporting, 96% of home industry players do not maintain adequate financial accounting records or implement effective cost management practices. The team identified several problems faced by Cuwe fish cracker business actors, including: (1) lack of literacy in financial and cost accounting; (2) inability to determine the cost of goods; (3) lack of organized financial accounting records; (4) the merging of personal, family, and business finances; and (5) lack of understanding of

financial statements. These findings specifically highlight weaknesses in day-to-day costing and financial management (Mahbubi, 2022). Therefore, prioritizing training in determining production costs is a strategic step toward improving accounting literacy and broader cost management practices.

Given the low accounting understanding and problematic HPP calculation practices among home industries on Tidung Island, the PkM program carries a dual mission. First, it aims to improve the cost and financial accounting skills of actors in the Cuwe fish cracker business so they can manage their businesses professionally. Second, it seeks to build a sustainable empowerment ecosystem by making participants agents of change who can transfer their knowledge to other business actors in the archipelago. Through targeted training and mentoring in HPP calculation, this program not only equips participants with technical skills but also fosters awareness that accounting is a strategic tool for surviving amid market fluctuations

## 2 Method

The community service program targeted 18 home-industry producers of Cuwe fish crackers on Tidung Island, Thousand Islands, Jakarta. To address their challenges in cost calculation and financial accounting, the program employed a Participatory Action Research (PAR) approach, which emphasized the active involvement of participants in identifying problems, formulating solutions, implementing actions, and evaluating outcomes. By utilizing local potential through the processing of Cuwe fish into crackers, the program strengthened business management and community economic empowerment. The PAR process was conducted cyclically through observation, reflection, action planning, implementation, and evaluation, ensuring continuous improvement toward sustainable community development. The implementation of the program was carried out in four stages, as illustrated in Figure 1.

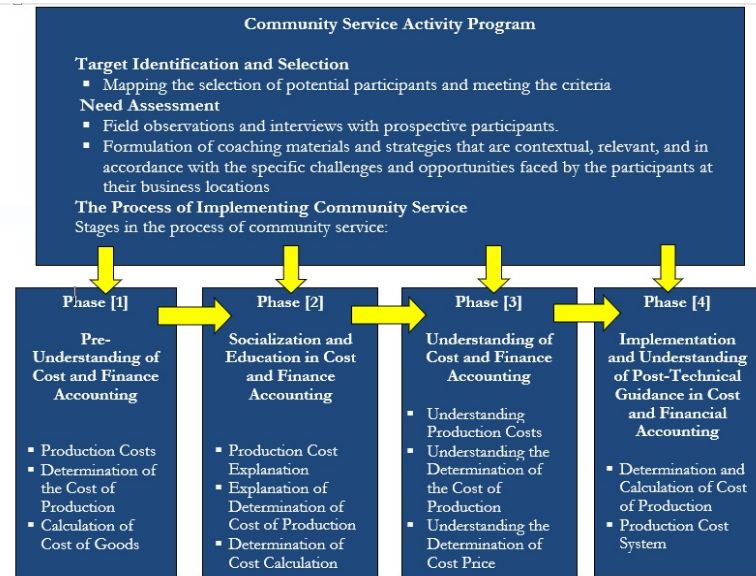


Figure 1. Stages of the Community Service Program

The figure illustrates the implementation stages of the community service program designed for Cuwe fish cracker home industries on Tidung Island. The program began with target identification and selection, followed by a needs assessment through field observations and interviews with prospective participants. Based on the findings, training materials and assistance strategies were developed to address the specific challenges and opportunities faced by the participants. This preparatory stage ensured that the program was relevant to local business conditions and participant needs.

The implementation phase consisted of four sequential stages. Phase 1 introduced participants to the basic concepts of cost and financial accounting, including production costs, cost of production determination, and cost calculation. Phase 2 focused on socialization and education regarding production cost components and cost determination methods. In Phase 3, participants developed a deeper understanding of cost and financial accounting, particularly in determining production costs and selling prices. Finally, Phase 4 provided post-training technical assistance to support the practical application of cost-of-production calculations and production cost systems in managing their businesses. This staged approach enabled participants to

gradually build their accounting knowledge and apply it effectively to improve business management practices.

### 3 Results

The implementation of this community service activity was based on Participatory Action Research (PAR), which aimed to support community empowerment efforts. The activity was carried out in four stages, as follows:

#### **Education on Cost and Financial Accounting**

The implementation team then conducted socialization and educational sessions on cost and financial accounting to provide Cuwe fish cracker home industry actors with a more comprehensive and systematic understanding of business cost management. Building on the basic concepts introduced in the previous phase, this stage aimed to strengthen participants' knowledge through detailed explanations of cost classification, cost-of-production (HPP) components, and practical calculation methods. To enhance understanding, the sessions incorporated applicable calculation simulations based on participants' actual production activities, enabling them to apply accounting concepts directly to their business operations.

The activity began with an explanation of production costs, in which the implementation team taught participants how to classify costs into three main categories: direct raw material costs, including fresh Cuwe fish and tapioca or sago flour; direct labor costs, including wages for cleaning, milling, molding, steaming, slicing, and drying processes; and factory overhead costs, including spices, LPG gas, electricity, equipment depreciation, and logistics transportation costs. Participants were also taught how to separate business costs from household costs, which was an important practice they had never applied before. Next, the team introduced a simple HPP calculation method suitable for home industries, namely the full costing method, which included all production costs.



Figure 2. Education on Cost and Financial Accounting

Using a real-life case study from one of the participants, the team simulated the COGM calculation step by step. First, the team calculated the total production cost for one period, namely one 10-day production cycle. Second, the team calculated the number of cracker units produced in the same period, which was 400 packs per cycle. Third, the team divided the total cost by the number of units to obtain the HPP per pack. To facilitate understanding, the team used visual media, such as posters and examples of simple recording formats specifically designed for the Cuwe fish cracker business. Participants were also given worksheets to practice cost classification directly based on their respective business data. At the end of the session, participants calculated that the HPP of Cuwe fish crackers per pack weighing 250 grams was Rp5,635, with direct raw material costs accounting for 47%, direct labor for 31%, and factory overhead costs for 22%. These findings demonstrated a healthy and efficient cost structure and served as the basis for participants to set competitive selling prices by adding reasonable profit margins (Rezazadeh et al., 2023).

### **Understanding of Cost and Financial Accounting**

In the third stage, the implementation team conducted cost and financial accounting understanding activities, focusing on deepening and internalizing concepts through hands-on practice. Unlike the previous two phases, which were more theoretical and socialization-based, this phase positioned participants as active subjects who not only listened to explanations but also independently practiced HPP calculations based on their respective business data.

The activity began by strengthening participants' understanding of production costs using worksheets prepared by the team. Participants

were asked to record and classify all costs incurred in one production cycle, namely 10 days, into three main categories: direct raw material costs, including fresh Cuwe fish and tapioca or sago flour; direct labor costs, including wages for family members; and factory overhead costs, including spices, gas, electricity, equipment depreciation, packaging, and transportation. The facilitator team accompanied each participant individually to ensure that no cost component was missed. This was a critical step, given that many costs had never been calculated before.

Furthermore, in the cost of production determination session, participants gradually calculated the HPP of their Cuwe fish crackers with step-by-step guidance. The facilitator team taught a simple formula:  $\text{HPP per unit} = \text{Total Production Cost} \div \text{Number of Units Produced}$ . Participants applied this formula using real data from their businesses. The calculation results showed that the average HPP of Cuwe fish crackers was IDR 5,635 per pack (250 grams), with a cost structure of 47% for direct raw materials, 31% for direct labor, and 22% for factory overhead costs. These findings reinforced that their operating cost structure was healthy and efficient, as overhead costs did not dominate the total production cost.

After the HPP was identified, the next session focused on determining a realistic selling price. Participants were invited to discuss and determine a reasonable profit margin above the HPP, taking into account the market price on Tidung Island and tourists' purchasing power. The team guided participants in calculating several selling price scenarios, for example, with margins of 80% (IDR 10,143), 100% (IDR 11,270), and 150% (IDR 14,088). Participants then compared these prices with the selling prices they had previously set through trial and error. Many participants were surprised to learn that they had been selling their products below the cost of goods sold or with margins too thin, resulting in suboptimal profits.

This phase also included question-and-answer sessions and joint corrections. Participants who understood the material more quickly were asked to help those still struggling, fostering a collaborative learning environment. The facilitator team provided immediate corrections when calculation errors were found, such as double-counting

costs or excluding certain cost components. At the end of this phase, participants began to recognize cost patterns and identified costs that could be controlled for efficiency, such as purchasing raw materials in larger quantities to obtain wholesale prices or reducing LPG gas usage. Figure 3 depicts this activity.

Figure 3. Technical Guidance on Costing for Cuwe Fish Crackers



### Implementation and Post-Technical Guidance Understanding

In the fourth and final stage, the implementation team conducted implementation and post-technical assistance activities to ensure the sustainability of the knowledge and skills acquired by participants during the previous stages. The activities began with independent practice sessions in which participants calculated the Cost of Production (HPP) under various business scenarios, such as increases in the price of Cuwe fish, rising raw material costs due to logistical constraints, and higher production volumes during holiday seasons. Through these simulations, participants learned that HPP is dynamic and must be adjusted according to changes in production costs. In addition, they were introduced to a simple and sustainable production cost recording system through daily or weekly bookkeeping, covering raw materials, labor, overhead costs, production volume, HPP, selling prices, and net profit

To support the long-term application of the training outcomes, each participant received a bookkeeping notebook and guidance on recording production data independently. The team also established a WhatsApp group as a platform for post-training consultation and technical assistance, enabling participants to seek support when encountering difficulties in HPP calculations or financial recordkeeping. The primary focus of this stage was to foster discipline in financial recordkeeping as a foundation for better business decision-making. The

results showed that participants were not only able to calculate HPP independently but also began to adopt a culture of financial recordkeeping as an integral part of professional business management. This marked a successful transformation from informal business practices to a more structured and sustainable approach to cost management (Kementerian Koperasi dan UKM, 2022b).

### **Determining and Calculating the Cost of Production of Cuwe Fish Crackers**

Cuwe fish crackers are a traditional processed product typical of the Thousand Islands, made with local anchovies, known as Cuwe fish (*Stolephorus* sp.), as the main ingredient. The production process combines traditional techniques passed down from generation to generation with adaptations to the archipelago's geographical conditions, such as sunlight and sea breezes. These crackers have a naturally savory taste, a crunchy texture, and a distinctive marine aroma. There are three components in the calculation of Cuwe fish cracker production costs, as follows:

#### **Component 1: Production Baseline Data**

The flagship product of Tidung Island, Thousand Islands, is the Thousand Islands Original Cuwe Fish Crackers, available in original or savory flavor, packaged in a thick anti-moisture PP plastic weighing 250 grams. In one production cycle, lasting 10 days, home industry players can produce 400 packs, equivalent to 100 kilograms of dry raw crackers. With a capacity of three production cycles per month, total monthly production reaches 1,200 packs. The cost system used is the process costing method with batch adjustment, which follows the natural drying cycle. It should be noted that this production process is highly dependent on the availability of fresh Cuwe fish and sufficient sunny weather to dry the cracker dough completely.

## Component 2: Production Cost Components for One Cycle, or 400 Packs

### Direct Raw Materials [BBL]

Table 1. Raw Material Requirements

Material Name	Units	Amount per Cycle	Unit Price (Rp)	Total Cost (Rp)	Captions & Local Resources
Fresh Cuwe Fish	kg	40 kg	15.000	600.000	Catch of local fishermen. Prices fluctuate depending on the season.
Tapioca/Sago Flour	kg	20 kg	18.000	360.000	Purchased from land (Jakarta). The price is more expensive because it includes shipping costs.
Garlic	kg	1.5 kg	30.000	45.000	Purchased from an island market.
Fine Salt	kg	1.0 kg	10.000	10.000	Flavor balancer.
Granulated Sugar	kg	0.3 kg	17.000	5.100	Flavor balancer.
It's Batu	kg	10 kg	3.000	30.000	The critical need to maintain the temperature of the dough. Make your own or buy.
Total Direct Raw Material Cost				1.050.100	≈ 58% of Total Production Cost

**Direct Labor (TKL) in the Home Industry.** The direct labor wage system in the Cuwe fish cracker home industry on Tidung Island involved several production activities, including cleaning, milling, molding, steaming, slicing, and drying. This business was run using a family business model with a clear division of roles among family members.

The production time for each cycle, which lasted 10 days, required 24 working hours spread over three to four active working days, excluding the drying process wait time. The wage structure used was a "time value equal wage" system to recognize the contribution of each family member. In this system, the head of the family, as a skilled worker, received a wage of Rp35,000 per hour, while mothers and adolescents who assisted in the production process each received Rp25,000 per hour. This system ensured that all family members involved in the production process were fairly compensated for their roles and skill levels.

Table 2. Direct Labor Costs

Position	Number of People	Hours / Cycles	Hourly Equivalent Rate (Rp)	Total Cost (Rp)
Head of Family (Member)	1	10	35.000	350.000
Mother (Manager)	1	10	25.000	250.000
Teenager (Helper)	1	4	25.000	100.000
Total TKL Fee		24 Hour		700.000

**Factory Overhead Costs.** Factory overhead costs were supporting costs strongly influenced by the archipelago's geographical conditions. These costs consisted of fixed factory overhead costs (fixed BOP), allocated per production cycle, and variable factory overhead costs (variable BOP), per production cycle.

Table 3. Fixed Overhead Costs

Fee Type	Monthly Total (Rp)	Allocation per Cycle (Rp)	Remarks
Equipment Depreciation	150.000	50.000	Blender/Chopper (crucial), Steamer, Knives & Cutting Boards, Large Basins, Bamboo Racks.
Rental/Producti on Space & Drying	0	0	Use your own yard/patio. (Location advantages)
PIRT Permit & MSME Packaging	41.667	13.889	Amortization of licensing fees and packaging design.
Total Fixed BOP	191.667	63.889	

Table 4. Variable Overhead Costs

Fee Type	Total per Cycle (Rp)	Typical Description of the Islands
Gas LPG 3kg	80.000	For the steaming process 40-50 baking sheets. Gas prices on the island.
Plastic Packaging (400 pcs)	200.000	Thick PP plastic OBLIGATION. High cost to protect against high marine air humidity.
Ship Transportation	60.000	LOGISTICS Costs. Shipping cost of flour, plastic, etc from land to island.
PLN/GenSet Electricity	75.000	For blenders and lighting. Electricity costs on the island are often higher.
Cooking Oil (Sample)	15.000	For frying samples quality control.

Plastic Strap & Clip	10.000	To bind the packaging.
<b>Total BOP Variable</b>	<b>440.000</b>	

Thus, the total Factory Overhead Cost (BOP) per cycle was calculated by adding the fixed BOP allocation and variable BOP:

$$\text{Total BOP per Cycle} = \text{Fixed BOP} + \text{Variable BOP}$$

$$\text{Total BOP per Cycle} = \text{IDR } 63,889 + \text{IDR } 440,000 = \text{IDR } 503,889$$

Meanwhile, the BOP rate per unit was calculated based on the number of units produced, as labor was not the main cost driver:

$$\text{BOP Rate per Unit} = \text{Total BOP per Cycle} \div \text{Units Produced}$$

$$\text{BOP Rate per Unit} = \text{IDR } 503,889 \div 400 \text{ packs} = \text{IDR } 1,260 \text{ per pack}$$

**Component 3 - Calculation of Cost of Production (HPP).** The total production cost per cycle, or 400 packs, was calculated as follows:

Table 5. Total Production Cost Per Cycle

Cost Component	Amount (Rp)	Percentage
Direct Raw Material Cost (BBL)	1.050.100	46.6%
Direct Labor Costs (TKL)	700.000	31.1%
Factory Overhead Cost (BOP)	503.889	22.3%
<b>Total Production Cost</b>	<b>2.253.989</b>	<b>100%</b>

The cost of production per unit for one 250-gram pack is IDR 2,253,989 divided by 400 packs, resulting in IDR 5,635 per pack.

Thousand Islands cuwe fish crackers have a production cost of IDR 5,635 per 250-gram pack. The main strength lies in access to cheap, fresh raw materials and the free use of natural resources, such as sunlight and wind. The biggest challenges are the logistics costs of incoming materials and dependence on the weather. This cuwe fish cracker product is highly competitive as a typical souvenir of Tidung Island. With a reasonable markup of 80-150%, this business can provide a decent income for fishing families while preserving sustainable traditional fish processing. The success of selling cuwe fish crackers depends on maintaining quality, particularly crispness and taste, and building strong branding as an authentic product of Tidung Island, Thousand Islands.

The findings of this community service activity also show an increase in costs and financial accounting literacy among home industry

actors on Tidung Island, Thousand Islands. This improvement requires more than conventional knowledge transfer. The results of the training revealed a cognitive shift in reconceptualizing costing determination considerations into a more structured understanding of cost accounting and process costing calculations. This shift was greatly influenced by the personal guidance of mentors, who translated costing principles into the complex production realities of home industry businesses. Knowledge of universal principles is necessary but not enough, because their value is revealed only when they can be applied in the more specific operational context of MSMEs (Pancane & Adriati, 2025). This addresses a gap noted in the broader literature supporting entrepreneurship (Prakoso, 2020).

Overall, the findings of PkM show that all programs contributed to improving the costing of cuwe fish cracker products and supporting better price decision-making among home industry players. The main changes observed before and after the intervention are summarized in Table 6.

Table 6. Key Changes After Cost of Production Price Training

Aspects	Before	After	Upgrade Key
Cost and Financial Literacy	Limited understanding of cost behavior and cost structure [42%]	Improved understanding of cost behavior, product costing and margins for selling price [86%].	Higher cost and financial accounting knowledge
Determination of the Cost of Products	Informal method through consideration and trial error [40%]	Able to determine the cost structure of cuwe fish cracker products [85%]	Better determination of the cost of products
Calculation of Cost of Products	No analysis with the trial error method [Unable to Afford]	Analysis with the Process Cost method [Highly Capable]	Better production cost calculation
Decision Making Confidence	Estimated financial decision-making to be low [0%]	Increased confidence and accuracy in decision-making. [100%]	Decision ability with strong consideration.

The practical implications are profound and require a redesign of support program management. First, interventions must be long-term and based on reciprocity to create a sustainable, integrated mentoring program through partnerships with local governments. Second, a simple

accounting program should be developed for home industries based on local wisdom and resources, in accordance with the literacy levels and time constraints of micro-entrepreneurs. Third, the design of learning programs should form a network that can provide ongoing support rather than follow a formal project cycle.

#### 4 Discussion

The healthy production cost structure of the cuwe fish cracker business on Tidung Island is characterized by the dominance of two main cost components: direct raw materials (BBL), which account for 47%, and direct labour (TKL), which accounts for 31%. This composition shows that the business is production-intensive and relies on manual skills, a typical pattern for a healthy home industry. The dominance of BBL, which accounts for almost half of the total cost, reflects that production is highly dependent on the quality and availability of the main raw material, namely cuwe fish, which is both a strength and a vulnerability of the business. Meanwhile, a significant portion of TKL, accounting for almost one-third of the total cost, indicates that the production process still relies heavily on manual labour and human resources, which add value to the product. This proportion actually shows efficiency because factory overhead costs, such as electricity, gas, and equipment depreciation, do not dominate the total.

The existence of Tidung Island as part of an archipelago, as well as a fishermen's settlement area, creates the most fundamental location advantage: direct access to primary raw materials. Cuwe fish, as the main raw material, can be obtained at a very competitive price and in optimal fresh condition directly from the local Fish Auction Place (TPI). This very short supply chain, from the sea to the production site, eliminates significant transportation and storage costs, which entrepreneurs on the mainland typically have to bear (Xu et al., 2023). The freshness of the fish directly affects the final quality of the crackers, including taste, aroma, and texture (Tokarczyk et al., 2025). Economically, this means that direct raw material costs (BBL) can be reduced without sacrificing quality, thereby increasing profit margins or creating room for a more competitive pricing strategy (Anwar Ul Alam et al., 2025). In addition,

close socio-economic relationships with local fishermen often allow purchases on credit or at special prices, which greatly helps micro-business cash flow management.

The open location of Tidung Island, with its wet tropical climate, provides abundant sunlight and sea breeze, which are critical to the production process of cuwe fish crackers. The process of drying cracker dough, a crucial stage for achieving a crispy texture and distinctive flavour, relies entirely on traditional sun-drying aided by the sea breeze (Assam Agricultural University et al., 2020). This method eliminates the need for capital investment and operational costs associated with mechanical dehydrators, including equipment purchases, electricity, and maintenance. Natural drying not only requires zero energy costs but is also believed by business actors to produce a better cracker texture, making the crackers crispier and less hard while maintaining the original distinctive taste of sea fish. The coastal location provides a substantial production cost advantage and also becomes part of the product's value proposition, namely naturally dried crackers. This also aligns with the principle of environmentally friendly production.

The home industry business model run by household actors on Tidung Island utilises non-commercial spaces, such as parts of the house, including the yard, terrace, or additional rooms, as production locations. The use of existing assets eliminates one of the largest fixed-cost components in conventional business structures, namely rental costs or credit payments for commercial premises [Makarenko et al. 2019]. This reduction in the fixed cost burden has profound strategic implications. First, the business's break-even point declines, allowing it to achieve profitability with lower sales volume. Second, the overall cost structure becomes lighter and more flexible, increasing business resilience to fluctuations in demand. Third, capital that would otherwise be allocated to rent can be redirected to other productive purposes, such as improving the quality of raw materials, purchasing auxiliary equipment, or enhancing packaging. This model represents the efficiency advantage of household-based microenterprises, in which the boundary between domestic and productive space becomes a resource for maintaining business sustainability.

The production process of cuwe fish crackers, which relies heavily on natural drying, makes weather a determining factor and a main source of vulnerability (Hanich et al., 2018). This business faces a high production risk during consecutive rains lasting 2 to 3 days, which is the critical drying period for cracker dough. Crop failure, or production failure, due to weather can cause large material losses, including damage to or rotting of entire batches of dough containing fish, flour, and spices. In addition to the loss of raw materials, there is also direct labour waste incurred during the mixing and moulding process. These risks are systematic and difficult to control, creating uncertainty in production and sales planning (Browning et al., 2023). The implications include potential revenue fluctuations and difficulty fulfilling orders in specific quantities and within certain timeframes (Defraeye et al., 2025). These challenges highlight the need for risk management, such as installing a shaded, well-ventilated emergency drying room or exploring energy-efficient drying technology as a backup (Gladdys et al., 2025).

The coastal environment of Tidung Island, with high year-round humidity, forces business actors to adopt higher packaging standards. To prevent dried crackers from reabsorbing moisture and becoming soft, non-crispy, or mouldy, plastic packaging with better barrier properties is needed (Owusu-Apenten & Vieira, 2023). In practice, this means using thicker/or layered polypropylene (PP) plastic or vacuum packaging, which is significantly more expensive than the regular polyethylene (PE) plastic used in dry areas. This increase in packaging costs directly affects the HPP per unit (Pamula & Ramachandran, 2025). In addition, the risk of packaging failure in protecting products in humid environments can lead to a decline in product quality upon reaching consumers and may cause customer complaints, ultimately damaging the brand's reputation (Sicakyüz, 2023). This challenge requires greater investment in packaging as part of non-negotiable quality assurance, even though it is costly.

The business environment in which home industries operate is dynamic and often unpredictable, as they face significant challenges such as market fluctuations, changing consumer preferences, and economic uncertainty, which can make it difficult to implement production cost

strategies (Peñarroya-Farell & Miralles, 2022). For example, inflation raises prices and increases production costs, while climate change disrupts the availability of raw materials for cuwe fish crackers. These factors can interfere with the production process and increase production costs. Another challenge is limited access to financial reporting resources and tools. Many home industry players lack the necessary software and accounting systems to effectively manage their businesses' finances and performance. On the other hand, other challenges also occur, namely a chronic lack of time, very low literacy in costing of cuwe fish crackers, and the habit of mixing business and personal finances.

The program successfully achieved its goals optimally, as shown by several transformative achievements, namely: [1] There was a significant increase in the production capacity of home industry players. Previously, their skills were limited to determining the cost of cuwe fish crackers through trial and error. Through program intervention, they now have the competence to determine and calculate the cost of production of cuwe fish crackers systematically. This directly contributes to business resilience and competitiveness amid ever-changing market fluctuations; [2] A critical aspect that was successfully addressed was the standardization of the cost price calculation of cuwe fish crackers. Previously, the cost price of cuwe fish crackers was calculated using the trial-and-error method. After participating in the training, there was a change in the discourse and operational practice of costing cuwe fish crackers. These home industry players now apply the standard cost calculation for cuwe fish crackers using the process costing method. This method was selected because it is easy to apply and can handle mass production, in which products are homogeneous or identical. It divides the total production cost in one department by the number of units produced to obtain a highly accurate average cost per unit. Process costing also allows management to monitor costs at each stage of production and provides high transparency, which is useful for formulating future budgets and making profit projections.

## 5 Conclusion

This community service program successfully achieved its objectives through the Participatory Action Research (PAR) approach by improving cost accounting literacy and strengthening the production capacity of Cuwe fish cracker home industries. Following the training, participants were able to calculate the Cost of Production (HPP) systematically using the full-costing process method, resulting in significant improvements in accounting knowledge, HPP determination, and confidence in financial decision-making. The findings revealed a healthy cost structure, with direct raw materials accounting for 47% and direct labor for 31%, while also highlighting competitive advantages in local resource availability alongside challenges related to logistics, weather dependence, and packaging costs. Therefore, sustainable mentoring, the development of simple accounting tools, and the establishment of peer-learning networks are recommended to support long-term business development.

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