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Increasing Utilization of Government-Assisted Patchouli Distiller in West Pasaman Regency

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ABSTRACT

The patchouli plant has great economic potential for society because it is one of the priority industries. The government continues to encourage the development of the patchouli oil agro-industry. One of the supports provided by the government to improve the quality of patchouli oil is the provision of a stainless-steel distiller to several farmer groups in West Pasaman. Unfortunately, this distiller is no longer used even though it is still in good condition. This research proposes appropriate policies to increase government-assisted patchouli distillation equipment use in West Pasaman Regency. The policy direction was formulated based on the solution to the obstacles using the Fuzzy Delphi Method (FDM). From the research results, stainless steel distillers are generally better than conventional ones. Still, farmers in West Pasaman Regency do not use government-assisted distillers one hundred percent. Farmers have switched to using traditional distillation. The obstacles to the use of stainless-steel distiller in West Pasaman Regency are community habits, the large capacity of the distiller, the remote location of the distiller, ownership status, the permanent nature of the distiller, the design and mastery of the distiller, technology, and changes in economic sectors. The policy directions related to assistance with stainless steel distiller obtained from the results of this research are: a). The government involves experts in designing and procuring distillers. b). The government conducted a comparative study to determine the appropriate distillation tool specifications. c). Create a policy regarding the number of members of farmer groups. d). Provide technical guidance to farmers regarding the use of stainless-steel distillers. e) Formation of sales cooperatives.

Keywords: Patchouli Oil, *Stainless Steel Distiller*, *Fuzzy Delphi Method*, *Policy*

Introduction

Patchouli oil is an essential oil that can fixate and control the etheric properties of perfume so that the perfume's aroma lasts longer. Essential oils are used as raw materials for perfumery products, pharmaceuticals, cosmetics, preservation, and industrial needs. [1]–[5]. Essential oils are substances obtained from extracting the stems and leaves of crucial plants. [6][7], [8]. Various plants produce essential oils, including patchouli, citronella, vetiver, cananga, cajuput, cloves, sandalwood, and pepper. (paper), jasmine oil (jasmine), and Fragrant Wood Oil [9][10]. Patchouli is one of Indonesia's export commodities. Indonesia supplies around 70% of the world's patchouli oil needs from Indonesia. [11], [12].

West Pasaman is the district with the most significant patchouli oil production in West Sumatra. As the main area producing patchouli oil in West Sumatra, more than 92.4% of West Sumatra's patchouli oil is produced in this area. Furthermore, 5.7% is produced from Pasaman Regency, followed by Solok Regency and Tanah Datar Regency with 0.4% [13]. The patchouli planting area in West Pasaman Regency has continued to increase in recent years. An increase in planting area certainly has a positive effect on increasing patchouli oil production. [14], [15]The number of small and medium industries producing patchouli oil has also increased in recent years.

This patchouli plant has great economic potential for society.[16]. The patchouli oil agroindustry benefits local communities if developed well. [17]. Regarding raw materials, the agroindustry can increase the added value of patchouli plants that have yet to be utilized optimally.[18]It can increase labor absorption, which will benefit the regional economy. From a technological

perspective, relatively simple processing technology is also very suitable for the level of education of the people in the West Pasaman Regency.

Patchouli oil is a regional superior commodity in the West Sumatra Province Industrial Development Master Plan for 2018-2038. Because it is one of the priority industries, the government continues to encourage the development of the patchouli oil agroindustry. One of the supports provided by the government is patchouli distilling equipment for several farmer groups in West Pasaman. The existence of a patchouli oil industry with stainless steel distillers will guarantee standardized patchouli oil quality and ensure the supply of patchouli for industries that use patchouli oil raw materials for cosmetics, health, and other products. [19][20]. With product standardization, the government hopes the patchouli oil agroindustry in West Pasaman will develop.

Based on data from the West Pasaman Regency Agriculture and Plantation Service, the government provided 18 units of patchouli distilling tools to farmer groups in ten sub-districts in the West Pasaman Regency from 2003 to 2015. Unfortunately, a 2017 survey conducted by the department concerned found that only 50% were functioning.

This research proposes appropriate policies to increase government-assisted patchouli distilling equipment use in West Pasaman Regency. Policy direction is determined by identifying obstacles to using government-assisted distillers and providing solutions.

Research Method

The government-assisted distillation tool is made from stainless steel. Formulate appropriate policy directions to increase the use of government-assisted patchouli distiller in the West Pasaman Regency. Policy direction can be formulated through solutions to why stainless-steel distillers are not used.

Determine the main reason why the government assistance still needs to be fixed. A guide for government assistance tools can be used by selecting the main factors from the reasons for using distillers in the previous stage. The selection of primary factors is carried out using consensus from experts. The experts in this research have the criteria for experience in patchouli oil refining and the patchouli oil business. The experts in this research are:

a) Chairman of the West Pasaman Regency Patchouli Farmers Association
b) Functional Industrial and Trade Extension Officer for the Department of Trade, Cooperatives, and SMEs in charge of West Pasaman Regency Industry
c) Head of the Facilities and Processing Division of the West Pasaman Regency Plantation and Forestry Service
d) Head of the Essential Technical Services Unit, West Sumatra Province Industry and Trade Service.
e) Collectors, Exporters, and Members of the Essential Council.

The method used to determine the primary factors why government-assisted distillers are not used is the Fuzzy Delphi Method (FDM). The Fuzzy Delphi Method (FDM) is favored for this type of research due to its unique capabilities. Unlike traditional Delphi methods, FDM accommodates uncertainty by allowing experts to express opinions in linguistic terms, thus facilitating a more nuanced understanding of complex research areas. Moreover, FDM integrates qualitative and quantitative inputs, enabling a comprehensive analysis combining diverse perspectives. Through iterative refinement processes, FDM enhances the reliability of findings by reducing biases and uncertainties over successive rounds. Its structured approach supports complex decision-making by systematically navigating ambiguity and synthesizing expert insights. Overall, FDM offers a flexible and adaptive framework for eliciting, aggregating, and analyzing expert opinions, making it a valuable tool for research where traditional methods fall short.

Questionnaire design Generating ideas from experts was carried out through direct interviews. Researchers explain the research objectives and basic knowledge about current developments. The reasons why government-assisted distillers are not used are divided into five classes: Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. Using linguistic variables makes it easier for experts to fill in the Delphi instrument. The following describes the linguistic variables that determine the main factors for which the government is not functioning. This research uses the geometric mean model of the general mean model used by Chen (2012)[21] To identify the main attributes of personalization. The stages carried out are as follows.:

1. Determine the Triangular Fuzzy Number

This stage converts the linguistic variables used into Triangular Fuzzy Numbers. The value conversion consists of three parts: the lower limit value (l), the middle value (m), and the upper limit value (u).

Strongly Disagree/STS (u ; l ; m) = (0 ; 0 ; 0.2)
Disagree/S (u ; l ; m) = (0 ; 0.2 ; 0.4)
Neutral/N (u ; l ; m) = (0.2 ; 0.4 ; 0.6)
Agree/S (u ; l ; m) = (0.4 ; 0.6 ; 0.8)
Strongly Agree/SS (u ; l ; m) = (0.6 ; 0.8 ; 1)

2. Determine the Fuzzy Weights Number
   The Fuzzy Weight Number (W) can be determined after obtaining each main factor's Triangular Fuzzy Number value. The fuzzy weight number is determined to get a single lower limit value (l), middle value (m), and upper limit value (u) for the main factor.
3. Defuzzification
   Defuzzification (Si) is carried out to obtain a single value for each main factor to determine whether it is selected. The Si value is the average of the three values U, L, and M.
4. Selection of Main Factors
   The defuzzification result is a single value compared to the threshold value of 0.5. Main factors with a Si value below 0.5 are not selected because they show expert agreement in rejecting the main factor. In contrast, those with a value equal to 0.5 are selected main factors because they show expert consensus or agreement to accept the main factor.
   The general equation for the calculation stage can be seen as follows:

$$W_{ij} = \left(l_{ij}, m_{ij}, u_{ij}\right) \quad (1)$$

$$l_j = Min\left(l_{ij}\right), i = 1,2, \dots, n; j = 1,2, \dots . m \quad (2)$$

$$m_i = \left(\prod_{i=1,j=1}^{n,m} m_{ij}\right)^{\frac{1}{n}} \quad i = 1,2, \dots, n; j \text{ V } = 1,2, \dots . m \quad (3)$$

$$u_i = Max\left(u_{ij}\right), i = 1,2, \dots , \quad = 1,2, \dots . m \quad (4)$$

$$S_i = \frac{i_i + m_i + n_i}{3} \quad (5)$$

Policy direction is made based on the main obstacles obtained in the previous stage. It will be based on several solutions made, and solutions will be selected by considering expert opinions. The expected output from the results of this research is recommendations for the government regarding the appropriate mechanism for assisting distillers and the appropriate capacity of distillers so that they can be utilized optimally by the community.

Result and Discussion

The people of West Pasaman have been familiar with the process of making patchouli oil for generations. The distillation process is quite simple and easy to master, which is one of the reasons why many local people depend on making patchouli oil for their living. Patchouli oil is made from distilling patchouli plants, where the patchouli plants have been dried first. The people of West Pasaman carry out the distillation process by steaming patchouli in a round kettle. The types of distillers used in West Pasaman Regency are:

1. Conventional distiller
   Conventional distillers are a type of distiller that uses a used drum as a place to steam the patchouli.
2. Stainless steel distiller
   Conventional distilling tools are a type of distilling tool that uses stainless steel patchouli oil as a patchouli holder.

Based on interviews conducted on 19 November 2023 with several farmers (four farmers) and two heads of farmer groups, Table 1 shows differences between conventional and stainless-steel distillers.

Table 1. Differences between Conventional and Stainless-Steel Distillers in West Pasaman Regency

No	Differentiation	Conventional Distiller	Stainless Steel Distiller
1	Price of Equipment (40 Kg capacity)	IDR 2,500,000	IDR 65,000,000
2	Economic age	Six months	> 10 years
3	Dried Patchouli Capacity	40 Kg	Varies: 40 Kg, 60 Kg, 100-500 kg, > 500Kg
4	Ownership	Personal	Group
5	Length of Distillation Time	5-6 Hours	4-5 Hours
6	Fuel	Firewood, Used oil	Firewood, Corn Cobs
7	Patchouli oil color	Tends to be darker	Tends to be light
8	Patchouli Alcohol (PA) Content	29 – 31	30 - 34
9	Cost of Production of Patchouli Oil	IDR 230,000 for one distillation with a capacity of 40 kg	IDR 200,000 - IDR 230,000 for one distillation capacity of 40 Kg
10	Current Selling Price of Patchouli Oil	IDR 820,000	IDR 820,000

Based on the results obtained in Table 1, it can be concluded that the patchouli oil produced from stainless steel distillation is of better quality, as can be seen from the color and PA content produced. The yellow color of patchouli oil from a stainless steel kettle meets SNI standards, and the PA content of patchouli oil meets standards above 30% [22][23]. Meanwhile, the refining time for a stainless steel kettle requires a shorter time, according to research conducted by Fauzia (2023) [24]This is because stainless steel kettles are relatively strong and can transfer heat well. The rate of heat transfer in the condenser does not decrease. Meanwhile, in terms of economic life, stainless steel distillers last longer than drums because the drum must be replaced after six months. The difference between stainless steel and conventional equipment can be seen in the following variables.

1. Production Capacity

   a. Distillation Equipment Capacity: The capacity of the distillation equipment is determined by the amount of dried patchouli that can be processed in the still. The data show varying capacities of stainless-steel distillation equipment across the West Pasaman District, ranging from 40 to 500 kilograms of patchouli dry weight. Notably, the largest capacity observed was 500 kilograms, while the smallest was 40 kilograms. The most common government-provided distillation equipment in West Pasaman Regency had a capacity of 60 kilograms, accounting for 43% of the total, followed by 29% with a capacity of 40 kilograms, and 14% each for capacities of 100 and 500 kilograms. This contrasts with the capacities observed in Southeast Sulawesi, a major patchouli oil-producing region in Indonesia, where community distillation equipment has a capacity of approximately 450-500 kilograms per distillation process.

   b. Yield: The yield of patchouli oil, measured by the percentage of oil obtained from the patchouli, was found to be consistent across both types of distillation equipment, ranging from 0.8% to 1.2% for a single production process involving 40 kilograms of patchouli dry weight. Factors influencing yield include the type of patchouli variety, harvest duration, and plant part used. Notably, the Nilam Tuan variety cultivated in West Pasaman Regency is known to yield good results, while the optimal harvest age for high yields is eight months. However, due to plant susceptibility to diseases, farmers only conduct one harvest per plant, decreasing oil quality if a second harvest is attempted.

2. Member Participation and Involvement

   a. Group Members: Initially, farmer groups in the Pasaman District comprised 25-40 members. However, these groups were not exclusively focused on patchouli cultivation; they also included corn and palm oil farmers.

   b. Patchouli Farmers and Involvement in Distillation: Initially, an average of 10-15 farmers participated in distillation activities, but this number has since declined. Initially, the agreed-upon concept for using large-capacity distillation equipment was a collective system involving 2-3 farmers per distillation process. In contrast, smaller-capacity equipment would be used individually on a rotational basis. Farmers would contribute to equipment rental fees, albeit at lower rates than those for conventional drum stills. However, this arrangement has become less common, with farmers increasingly opting for conventional drum stills, leading to decreased group participation over time. The study reveals a declining trend in farmer group involvement,

contrary to previous research findings emphasizing the importance of active group participation in agricultural development.

3. Product Quality
   a. Color: Color indicates patchouli oil quality, with oils from stainless steel distillation equipment exhibiting lighter hues than those from conventional drum stills. The darker color of oils from drum stills is attributed to iron contamination from the drum walls during distillation.
   b. Patchouli Alcohol (PA) Content: PA content, another quality indicator, was higher in patchouli oil produced using stainless steel distillation equipment than drum stills. PA measurements conducted by the West Sumatra Quality Certification and Testing Center indicated PA levels ranging from 30-34% for stainless steel-distilled oil and 29-31% for drum-distilled oil. These findings demonstrate the superior quality of patchouli oil produced using stainless steel distillation equipment.
4. Efficiency
   Distillation efficiency was measured by duration, with stainless steel distillation processes requiring 4-5 hours compared to 5-6 hours for conventional drum distillation. This efficiency advantage is attributed to the even heat distribution in stainless steel stills, as confirmed by previous research. Additionally, stainless steel stills are durable and offer efficient heat transfer properties, contributing to shorter distillation times.
5. Patchouli Farmers' Income
   Farmers' income was calculated based on production costs and selling prices. While production costs were similar for both types of distillation equipment, stainless steel equipment offered cost-saving advantages due to reduced fuel consumption. However, the selling price of patchouli oil remained the same regardless of the distillation method used.
6. Technology Mastery
   Farmers reported ease of use and water-saving benefits associated with stainless steel distillation equipment. Unlike conventional drum stills, which require replenishing steam water for each distillation process, stainless steel stills allow water reuse for up to two cycles.
7. Equipment Usage Status
   A survey of stainless-steel distillation equipment revealed that although 90% remained in good condition, it still needed to be used. Instead, farmers predominantly utilized conventional drum stills for distillation activities. The reasons for this shift in equipment usage require further investigation.

Main Obstacles to Using Stainless Steel Distiller

An expert agreement can determine the main obstacles to using stainless steel distillers. The experts used in this research must have experience in the patchouli oil refining process and have contributed to the management of patchouli oil production. Experts are asked to fill out a questionnaire with five levels: strongly disagree, disagree, neutral, agree, and strongly agree.

Table 2 shows the results of the assessment of obstacles to using stainless steel distillers for each expert.

Table 2. Results of the Assessment of Obstacles in Using Stainless Steel Distiller

Factors	Code	P1	P2	P3	P4	P5
Habit	K1	S	SS	S	SS	SS
Large capacity	K2	N	SS	SS	S	S
The selling price is the same or lower	K3	SS	S	S	N	STS
Sales at the collector level are not concerned with PA levels	K4	SS	TS	TS	STS	STS
The tool is permanent.	K5	SS	SS	S	S	TS
The location of the stainless distiller is far away	K6	SS	S	S	S	N
Complicated sales procedures	K7	TS	TS	S	N	TS
Ownership status	K8	SS	S	S	S	N
Transition of economic sectors	K9	S	N	S	S	N
Design and Mastery of technology	K10	TS	SS	SS	S	S

Next, each expert's assessment is determined and translated into a triangular fuzzy number. The next stage is Defuzzification. Defuzzification (Si) is carried out to obtain a single value for each

constraint to determine whether the factor is selected or not. The following is how to calculate each geometric mean.

Habit

L = MIN (0.4; 0.6; 0.4; 0.6; 0.6) = 0.4

M = $\sqrt[5]{0.6\ x\ 0.8\ x\ 0.6\ x\ 0.8\ x\ 0.8}$ = 0.71

U = MAX (0.8; 1; 0.8; 1; 1) = 1

Si = $\frac{0.4 + 0.71 + 1}{3}$ = 0.7

Large capacity

L = MIN (0.2; 0.6; 0.6; 0.4; 0.4) = 0.2

M = $\sqrt[5]{0.4\ x\ 0.8\ x\ 0.8\ x\ 0.6\ x\ 0.6}$ = 0.62

U = MAX (0.6; 1; 1; 0.8; 0.8) = 1

Si = $\frac{0.2 + 0.62 + 1}{3}$ = 0.61

The complete defuzzication results for each obstacle are presented in Table 3.

Table 3. Defuzzification of the Obstacles to Using Stainless Steel Flutes

No	Factors	Code	Rata-rata Geometries			Si
			L	M	U	
1	Habit	K1	0.40	0.71	1.00	0.70
2	Large capacity	K2	0.20	0.62	1.00	0.61
3	The selling price is the same or lower	K3	0.00	0.00	1.00	0.33
4	Sales at the collector level are not concerned with PA levels	K4	0.00	0.00	1.00	0.33
5	The tool is permanent	K5	0.00	0.54	1.00	0.51
6	The location of the stainless distiller is far away	K6	0.20	0.59	1.00	0.60
7	Complicated sales procedures	K7	0.00	0.29	0.80	0.36
8	Ownership status	K8	0.20	0.59	1.00	0.60
9	Transition of economic sectors	K9	0.20	0.51	0.80	0.50
10	Design and Mastery of technology	K10	0.00	0.54	1.00	0.51

The defuzzification result is a single value compared to the threshold value of 0.5. Constraints with a Si value below 0.5 are not categorized as selected constraints. Table 4 shows the selection of constraints when using stainless steel distillers.

Table 4. Selection of constraints when using stainless steel distillers

No	Factors	Code	Si	Description
1	Habit	K1	0,70	selected
2	Large capacity	K2	0.61	selected
3	The selling price is the same or lower	K3	0.33	not selected
4	Sales at the collector level are not concerned with PA levels	K4	0.33	not selected
5	The tool is permanent	K5	0.51	selected
6	The location of the stainless distiller is far away	K6	0.60	selected
7	Complicated sales procedures	K7	0.36	not selected
8	Ownership status	K8	0.60	selected
9	Transition of economic sectors	K9	0.50	selected
10	Design and mastery of technology	K10	0.51	selected

After that, the selected obstacles are ranked to obtain a sequence based on expert agreement. Table 5 shows the obstacles to using a stainless-steel distiller in West Pasaman Regency.

Table 5. Sequence of obstacles to the use of stainless-steel flutes in West Pasaman Regency

No	Factors	Code	Si	Description
1	Habit	K1	0.70	selected
2	Large capacity	K2	0.61	selected
3	The location of the stainless distiller is far away	K6	0.60	selected
4	Ownership status	K8	0.60	selected
5	The tool is permanent	K5	0.51	selected
6	Design and mastery of technology	K10	0.51	selected
7	Transition of economic sectors	K9	0.50	selected

Solutions to the Problems of Using Stainless Steel Distiller

The policy direction regarding government distiller assistance is prepared based on solutions to the obstacles to using stainless steel distillers, which were discussed in the previous section. The solutions provided to existing obstacles were obtained through discussions with experts. The following solutions are provided for each obstacle.

1. Solutions to habit obstacles
   Habits are difficult to change, but they can be changed. Based on discussions with experts, the solution that can be given to this problem is to send several farmers for replication studies to another distiller. Currently, Southeast Sulawesi is the largest producer of patchouli oil in Indonesia, where refining is done using stainless steel. Seeing firsthand the distillation techniques in this area is hoped to change the mindset of farmers in West Pasaman Regency. Farmers who take part in replication studies can transfer knowledge to other farmers. Another solution can be provided by the government's participation in marketing patchouli oil, for example, through cooperatives. The existence of cooperatives as a place to sell patchouli oil can be used as an alternative to break the patchouli oil business chain. Cooperatives can reduce the number of actors involved in the patchouli oil supply chain. Cooperatives can also adopt policies regarding the quality of patchouli oil to be purchased; for example, the PA content determines the price of patchouli oil. With the cooperative policy as the only place to market patchouli oil for farmers, farmers will try to increase the PA of the oil produced directly. One way is for farmers to switch to using stainless steel distillers.
2. Solution for large capacity
   Obstacles related to the large capacity of distillers have been overcome by the government, where since 2012, distillers' assistance has been provided according to the needs of farmer groups. The capacity of the stainless steel provided is 40 kg and 60 kg. However, large-capacity distillers are still in good condition and can still be used. Farmer group members can share in using the distillers by committing first.
3. Solution to problems with the location of stainless-steel distillers that are located far away
   The group's distillation tool is placed in one place and is permanent, making it difficult to move it to the plantation location. The solution that can be provided is to design a portable stainless-steel distiller to be taken to the plantation location. The design of this portable distiller must require a standard operational procedure (SOP) that is clear and easy for users to understand.
4. Solution to ownership status problems
   The solution to the constraints of stainless-steel location, permanent location, and ownership status is to increase the assistance for each farmer group. Currently, the number of members of the farmer group is 10-15 people. This means that 15 farmers can use one tool in turn. This number is undoubtedly ineffective; the number of farmers in the group should be reduced, and the amount of distiller assistance increased. Furthermore, after assisting with distillers, the government should continue to provide assistance and evaluation of the distillers provided, not just leave them as they are. Monitoring the use of distillers can be carried out periodically, and rewards can be provided to farmer groups who consistently use stainless steel distillers.
5. The solution to permanent distiller problems
   Due to its location far from plantations, permanent stills make it difficult for farmers who want to distill in the garden. For this reason, it is best to design portable stainless-steel tools.
6. Solutions to design constraints and level of technological mastery
   According to several experts, namely experts from the collector/award council and the Department of Trade, Cooperatives, and SMEs, farmers do not find suitable yields in stainless steel distillation due to the imperfect design of the tools and the low level of farmers' mastery

of the tools. The solution that can be given to overcome this problem is for the government to be more selective and detailed in selecting the distillers that will be provided. The government can study the types of distillers before procuring goods. The government can also conduct replication studies in other regions implementing stainless steel refining technology, such as Southeast Sulawesi. Not only assisting with distillers based on previous habits, there must be evaluation and improvement. The government can also involve experts in choosing the right distilling equipment; experts can come from exporters or members of the Essentials Council. Apart from providing the correct type of distiller, the government also needs to train farmers to use this distiller. This aims to ensure that farmers master and find the appropriate yield in distilling.

7. Solutions to obstacles to transitioning economic sectors
   The transition in economic sectors can be overcome by providing a guaranteed market for patchouli oil. Patchouli farmers tend to switch to corn or other commodities because the price of patchouli oil fluctuates. Currently, the price of patchouli oil is up to IDR 820,000 per kilogram; farmers consider this price quite good. However, if patchouli oil prices fall below IDR 500,000 per kilogram, farmers will feel a loss. One of the things that can be done regarding the patchouli oil market guarantee is for the government to form a cooperative for the sale of patchouli oil. So, farmers no longer sell to collectors. Cooperatives can collaborate with exporters.

In addressing the obstacles to using stainless steel distillers in West Pasaman Regency, this research proposes several policy recommendations. Firstly, the involvement of experts in designing and procuring distillers is emphasized, aligning with established practices that ensure the equipment meets local needs effectively. Additionally, conducting comparative studies, as suggested, mirrors strategies seen in other regions to adapt successful models and tailor specifications accordingly. Moreover, the proposition to regulate farmer group sizes resonates with existing research on optimizing collective action in agriculture, aiming to enhance efficiency in distiller utilization. Providing technical guidance to farmers, as highlighted, echoes the importance of capacity building and ongoing support in agricultural development, a common theme in similar studies. Lastly, the proposal to establish a cooperative for marketing purposes aligns with the recognized role of cooperatives in enhancing market access and value chain management for smallholder farmers, showcasing the potential of collective action in addressing market challenges. Based on the research results, stainless steel stills are excellent because they can improve the quality and quantity of patchouli oil. However, farmers must master the use of this flute tool well. The government must also assist with targeted tools and policies obtained from research results. Government assistance tools have been proven to increase agricultural yields. Research conducted by [25]Increasing agricultural productivity through agricultural mechanization carried out by the Palopo City government, Indonesia, is a policy to meet farmers' needs in developing their farming businesses.

Conclusion

The research results show that stainless steel distillers are better than conventional distillers. Still, one hundred percent of government-assisted distillers are not used by farmers in West Pasaman Regency. Farmers have switched to using conventional distillers. There are ten obstacles to using stainless steel distillers obtained from various sources. Furthermore, after receiving the expert agreement, seven obstacles were agreed upon. The barriers to the use of stainless-steel distillers in West Pasaman Regency are the habits of the community, the large capacity of the distiller, the remote location of the distiller, ownership status, the permanent nature of the distiller, the design and mastery of the distiller technology and changes in economic sectors. The policies related to assistance with stainless steel distillers obtained from the results of this research are: a. The government involves experts in designing and procuring distiller equipment; b. The government conducts comparative studies to determine appropriate specifications for distillers, c. Create policies regarding the number of farmer group members; d. They provide technical guidance to farmers regarding using stainless steel distillers and Building sales cooperatives.

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