A FEASIBILITY OF LEMONGRASS VALUE CHAIN APPLICATION FOR POVERTY ELIMINATION: A CASE STUDY CHANUMAN DISTRICT, AMNAT CHAROEN PROVINCE

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This research aims to: 1) investigate the demand for and production capacity of lemongrass in the study area; and 2) analyze the economic feasibility of lemongrass production in the area. The findings will be used to encourage poor people in Chanuman District, Amnat Charoen Province to participate in the lemongrass value chain. The goal is to alleviate poverty among target households by utilizing both demand-side and supply-side data on lemongrass. The analysis results will inform the development of strategies to improve supply to meet market demand, leading to increased income for participating poor households and ultimately, poverty alleviation.

A survey of lemongrass production and sales among a group of farmers revealed the following findings: There were a total of 10 farmer groups involved in the study. The total amount of lemongrass sold was 102,500 kilograms. The production costs for both fresh lemongrass and dried chopped lemongrass leaves were relatively high. Some or almost period, the selling price of fresh lemongrass is lower than the production cost, resulting in losses for the farmers. However, there are opportunities to mitigate the risk of price fluctuations by processing lemongrass into dried chopped lemongrass leaves and lemongrass essential oil. Nevertheless, dried chopped lemongrass leaves should not be produced and sold if the price is below 14 baht per kilogram. Similarly, lemongrass essential oil should not be sold if the purchase price is below 10,200 baht per liter. Linear programming model was employed to determine the optimal production plan over a two-year period. The optimal produce and sales per rai over a two-year period resultby linear programming method indicated that selling 4,853 kilograms of fresh lemongrass, 12,500 kilograms of dried chopped lemongrass leaves, and 6.25 liters of essential oil would yield the maximum profit of 228,788 baht.

Research Background

The Amnat Charoen Provincial Development Plan 2018-2022 identified poverty and debt as the fourth most pressing issue among the province's residents (The Office of Strategy Management Northeast S2, 2022). This is largely attributed to the predominantly agricultural occupation of the population, with primary income derived from agricultural product sales. The lack of supplementary income sources for farmers has resulted in low household incomes. Despite advancements in various sectors, such as employment and income stability, which have led to a decrease in poverty rates, underlying structural economic and social issues remain largely unaddressed.

Poverty is primarily driven by low incomes and low returns from agricultural production. Government policies promoting commercial crops have forced farmers to incur high production costs, while agricultural product prices remain volatile and often low. The World Bank (2022) mention that this underscores the complex interplay of structural factors contributing to persistent poverty.

The Amnat Charoen Herbal Value Chain Project, initiated in 2020, aims to alleviate poverty among households by targeting a 20% increase in income for impoverished families in Pa Kao Subdistrict, Chanuman District by 2024. The project focuses on operationalizing the Amnat Charoen Herbal Value Chain model using demand-side data to align supply with market demands. This is expected to facilitate the entry of poor households into the value chain, encompassing activities from cultivation, harvesting, processing, and commercialization. Ultimately, this increased participation is anticipated to elevate the incomes of target households and alleviate poverty.

Research Objectives

1. To assess the demand for and supply of lemongrass for Chanuman District, Amnat Charoen.
2. To evaluate the economic viability of lemongrass cultivation as a means of poverty alleviation for poor people in Chanuman District, Amnat Charoen.

Research Methodology and Operation

This qualitative research employs a design thinking approach by involving poor households, local enterprises, and community leaders in a collaborative network. This network fosters symbiotic relationships and enables systematic knowledge exchange. Research tools include collaborative actions and both formal and informal focus group discussions.

Research activities encompass 1) collective lemongrass cultivation, 2) joint processing of fresh and processed lemongrass, and 3) the organization of debriefing workshops. A design thinking iterative process is employed to identify shortcomings and enhance capabilities through ongoing provision of experiences and knowledge to impoverished households.

This research is classified as action research. Data analysis primarily relies on qualitative research methods, focusing on the processes and tools employed. As such, hypothesis testing is de-emphasized. Instead, the analysis is based on observed and recorded data from the processes and tools used. Data is categorized, compared, and analyzed within the context of the study area. Statistical analysis, including frequency, percentage, and linear programming, is also utilized. The research sample consists of 54 impoverished individuals from the AmnatConnext (www.amnatconnext.org) database residing in Chanuman District, distributed across 10 collective lemongrass plots.

Research Results

1. The Demand of Lemon Grass

Research conducted over the past 2-3 years has revealed that the cultivation and wholesale sale of fresh lemongrass to purchasing operators have been highly successful. The purchase price was as high as 12-17 baht per kilogram, leading to an increase in lemongrass cultivation among project members and other groups. However, in 2024, the wholesale price of fresh lemongrass decreased to 2-5 baht per kilogram. The research team has therefore sought ways to increase sales to accommodate this unexpected situation and has identified a new market: the purchasing market for dried, chopped lemongrass leaves and dried chopped lemongrass stalks for export to the People's Republic of China. Details of the market and demand for lemongrass in 2024 and 2025 by survey are as follows:

Area	Product of Lemongrass	Demand/Quantity	Average Price (Baht/Kg)
Nongbualampu Province	Fresh Lemongrass	year-round procurement	2-4
	Dried chopped lemongrass leaves	year-round procurement	30
Pratumthani Province	Fresh Lemongrass	year-round procurement	2–5
Nakhon Ratchasima Province	Fresh Lemongrass	year-round procurement	2–4
Pitsanulok Province	Fresh Lemongrass	year-round procurement	17
Ubon Ratchathani Province	Fresh Lemongrass	year-round procurement	2 –5
Surin Province	Dried chopped lemongrass leaves	2,000 kg /year	15
Bangkok	Lemongrass essential oil	year-round procurement	21*

Table 1: Demand of Lemongrass in Thailand, 2024-2025.
***Baht/liter**

Table 1 shows that there is no data available on the wholesale or retail markets in Amnat Charoen Province. This is due to the small size of the provincial market, which can be attributed to the low population in the area.

As a result, local product collectors (middlemen) are small-scale operators who do not generate significant income for the project's lemongrass growers compared to out-of-province operators who collect lemongrass for wholesale to markets outside Amnat Charoen Province.

Additionally, market demand data indicates that processed lemongrass products, such as dried chopped lemongrass leaves and lemongrass essential oil, have higher market value compared to fresh lemongrass.

2. The Supply of Lemon Grass: Previous research has shown that low-income individuals were unable to independently cultivate and sell lemongrass due to a lack of necessary resources. To address this issue, a strategy was implemented to support low-income individuals by integrating them into production and marketing groups led by individuals with greater opportunities, such as community leaders, community enterprises, community volunteers, and local entrepreneurs. As a result, 10 lemongrass-growing groups were formed to collectively cultivate lemongrass on a combined area of approximately 37 rai, with a production capacity of 102,500 kilograms. A total of 54 individuals participated in these groups, of which 24 were low-income individuals, accounting for 44.44%.These data shows that the production capacity or supply of fresh lemongrass in the area is

102,500 kilograms per six-month production cycle, indicating a potential oversupply of lemongrass.

Group	Integrated Planting Area (Rai)	Supply (kg)	Number of members in group	Poor People in group (person/percent)
1	4	10,000	6	3/50%
2	7	17,500	5	3/60%
3	2	5,000	5	3/60%
4	3	7,500	8	3/37.5%
5	8	20,000	7	1/14.28%
6	2	5,000	3	1/33.33%
7	3	7,500	1	1/100%
8	4	10,000	3	1/33.33%
9	4	10,000	6	4/66.66%
10	4	10,000	7	4/57.14%
Total	37	102,500	54	24/44.44%

Table 2 : Detail of lemongrass-growing groups

3. Break-even point of lemongrass production and sales

Based on market demand data for various lemongrass products, considering the purchasing price factor, the market for essential oils has the highest value, followed by dried chopped lemongrass leaves and fresh lemongrass, respectively. The research team has conducted a backward cost analysis to plan for diverse product production and marketing. Furthermore, the team has transferred knowledge and skills to lemongrass growers, emphasizing the importance of diversifying product production and marketing plans to manage fluctuating product prices. The cost analysis for each lemongrass product is as follows:

- **Production cost of fresh lemongrass**

The analysis of the production cost for fresh lemongrass revealed that the average yield per rai is estimated to be between 2 and 3 tons, with a mean of 2.5 tons or 2,500 kilograms. The harvest cycle for lemongrass is approximately six months.

- **Production cost of dried chopped lemongrass leaves**

Optimal production of dried chopped lemongrass leaves requires harvesting leaves from plants that are at least 3 months old. The conversion rate is estimated to be 1 kilogram of dried chopped lemongrass leaves per 5 kilograms of fresh leaves. With a harvest cycle ranging from 20 to 25 days, and a total cultivation period of two-years, resulting in approximately 25 harvest cycles, it is expected that 12,500 kilograms of fresh lemongrass can be processed to yield 2,500 kilograms of dried chopped lemongrass leaves. The total production cost is calculated to be 14 baht per kilogram.

- **Production cost of lemongrass essential oil**

A linear programming model was developed to optimize the production and sale of three lemongrass products: fresh lemongrass, dried chopped lemongrass leave, and lemongrass essential oil. With a planning horizon of two years and considering specific constraints such as the minimum age of lemongrass plants for essential oil extraction, the analysis using QM for Windows software indicated that the optimal production quantities are 4,853 kilograms of fresh lemongrass, 12,500 kilograms of Dried chopped lemongrass leaves, and 6.25 liters of essential oil. This production plan is expected to maximize profit at 228,788 baht over the two-year period.

- **Analysis of optimal production levels for lemongrass to maximize returns**

A linear programming optimization was conducted to determine the optimal production quantities of fresh lemongrass, dried chopped lemongrass leaves, and lemongrass essential oil, considering a two-year production cycle. Constraints such as the minimum aging period of two-years for dried leaves and 18 months for essential oil production were incorporated into the model. Using QM for Windows software, the analysis revealed that the optimal production plan consists of 4,853 kilograms of fresh lemongrass, 12,500 kilograms of dried chopped lemongrass leaves, and 6.25 liters of essential oil, yielding a maximum profit of 228,788 baht over the two-year period.

CONCLUSION

A market study conducted for the years 2024-2025 revealed significant fluctuations in lemongrass demand. In early 2022, the demand for fresh lemongrass surged due to the peak summer season, driving prices up to 12-17 baht per kilogram. However, by 2024, the price of fresh lemongrass had dropped to a mere 2-5 baht per kilogram, because ofthe increased production from a growing number of farmers.

A burgeoning market for lemongrass has emerged, primarily centered around the export of dried chopped lemongrass leaves and stems to the People's Republic of China. Several companies are actively purchasing these products, offering prices ranging from 15-30 baht per kilogram and often accommodating custom orders. Notably, demand exists for both fresh and Dried chopped lemongrass leaves, with the export market for Dried chopped lemongrass leaves exhibiting particularly strong and sustained growth.

Despite this positive trend, domestic prices for fresh lemongrass remain highly volatile, influenced by seasonal production variations. To mitigate risks associated with price fluctuations, lemongrass farmers should consider diversifying their operations by processing lemongrass into value-added products such as Dried chopped lemongrass leaves. It is recommended that farmers avoid selling Dried chopped lemongrass leaves below 14 baht per kilogram and lemongrass essential oil below 10,200 baht per liter.

The study examined the production and sales of lemongrass among a group of ten farmers. A notable finding was that the quantity of lemongrass sold significantly exceeded the production volume by 144.44%. This discrepancy suggests a robust market demand for lemongrass products or the implementation of highly effective marketing strategies. Despite this positive indication of successful production and sales, the research also highlighted several challenges faced by the farmers.

Production costs for both fresh lemongrass and dried chopped lemongrass were determined to be relatively high. Moreover, the selling price of fresh lemongrass was found to be lower than the associated production costs, resulting in financial losses for the farmers. However, the study identified the potential of dried chopped lemongrass as a value-added product with a more stable market. This presents a promising alternative for farmers to increase their revenue. Nonetheless, it is essential for farmers to carefully evaluate production costs and anticipated yields before venturing into this market segment.

The overall findings of the study suggest that while lemongrass cultivation can be a profitable endeavor, it necessitates meticulous planning and a comprehensive understanding of market dynamics to ensure long-term sustainability. Farmers must carefully consider factors such as production costs, market demand, and pricing strategies to maximize their returns and mitigate risks.Elevating the incomes of farmers in impoverished regions will incentivize the poor to participate in the agricultural value chain, particularly in the herbal agricultural products of Amnat Charoen province. The development of herbal agricultural products should not be limited to the sale of fresh goods but should focus on value-added products. The application of technology in processing can help reduce production costs and increase selling prices(Yeritsyan et al, 2024). This aligns with the increasing demand for herbal agricultural products in countries such as the People's Republic of China and India, both now and in the future. Studies conducted in various regions with diverse social, cultural, and environmental contexts consistently indicate a growing trend in the demand for herbal agricultural products (Kumar, Singh & Mittal, 2011).

The Thai government should promote and support more systematic cultivation and production of herbal agricultural products that meet market demands. The lemongrass production in Chanuman district, Amnat Charoen province, serves as a suitable example of aligning with global market trends. Consequently, the number of impoverished individuals participating in the value chain will increase, leading to improved incomes and living standards for the target poor population.

REFERENCES

[1] Kumar, A., Singh, H., Kumar, S., Mittal, S., (2011). Value chain of agricultural commodities and their role in food security and poverty alleviation, Agric. Econ. Res. Rev. 24 (1).169–181. https://doi.org/10.22004/agecon.109516.

[2] The Office of Strategy Management Northeast S2. (2022). Strategy of Northeast S2 2018-2022Planning.

[3] The Office of Strategy Management Northeast S2.https://www.amnatcharoen.go.th/index.php/

[4] The World Bank. (2022). Thailand Rural Income Diagnostic, Challenges and Opportunities for Rural Farmers October 2022. https://documents1.worldbank.org/curated/en/099005010202299399/pdf/P1775991e5f180ee130cf14572184e61f60735628d80.pdf

[5] Yeritsyan, A., Tabares, E., Ishdorj, A., Mjelde, J., Mishra, V., Foster, M. & Norton, R. (2024). Policies Enhancing Agricultural Value Chains in Developing Countries: An Evidence GapMap.Journal of Agriculture and Food Research.18. December 2024. https://doi.org/10.1016/j.jafr.2024.101418

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