



Department of Agribusiness Management Faculty of Agricultural Sciences Sabaragamuwa University of Sri Lanka

POLICY INSIGHTS 2022 ISSUE - I

Department of Agribusiness Management Faculty of Agricultural Sciences AHEAD ELTA ELSE Faculty Development Project AHEAD/RA2/ELTAELSE/UNI/FAC/OVAA 02 Sabaragamuwa University of Sri Lanka

| First Edition: | March 2022 |
|----------------|--|
| ISSN: | ISSN 2792-1425 |
| Barcode: | 9 772792 142008 |
| Publication: | Policy Insights 2022 Issue -I Department of Agribusiness Management Faculty of Agricultural Sciences Sabaragamuwa University of Sri Lanka |

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| Printing: | New Asiri Printers |
|-----------|--------------------|
| | 12A |
| | Waraketiya Road |
| | Maharagama |

Cover Page Design and Page Layout: Mr. A.M.S.I. Bandara

Published by: Department of Agribusiness Management Faculty of Agricultural Sciences AHEAD ELTA ELSE Faculty Development Project Sabaragamuwa University of Sri Lanka

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| Content | | |
|--|----|--|
| Message from the Vice Chancellor, Sabaragamuwa University of Sri Lanka Prof. R.M.U.S.K. Rathnayake | I | |
| Message from the Dean, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka Prof. P.M.A.S. Karunarathne | П | |
| Message from the Head, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka Prof. D.A.M. De Silva | Ш | |
| Policy Briefs | | |
| Fresh Organic Vegetables for a Healthy Lifestyle Fernando, M.C.L., Esham, M., and Wahala, W.M.P.S.B. | 01 | |
| Opportunities beyond Constraints: Mushroom Cultivation for Rural Women Kalubowila, K.D.S.G, Amarasinghe, S.T.C., and Jayatunga, S. | 05 | |
| Market Landscape and Upgrading Potential of the Coconut Oil Industry Nipunika, M.L.D., and De Silva, D.A.M. | 09 | |
| Development of a New Breakfast Cereal from Jackfruit Seed Flour, Brown Rice Flour and Arrowroot Flour Tennakoon, T.M.A.P.M., Malkanthi, S.H.P., and Mahanama, R.P.S.S. | 14 | |
| Drinking Yogurt Enriched with Taste Piriyanga, V., Wijeratne, A.W., and Chanthuru, T. | 18 | |
| Export Performance of Sri Lankan Desiccated Coconut Bhagyani, M.A.D.M., Wattage, P., and Abeynayake, T. | 21 | |
| Production and Marketing of a New Type of Yogurt with Sunflower Oil and Kithul Treacle Hettige, A.S., Malkanthi, S.H.P., and Karunarathna S.H. | 26 | |
| How Do We Value the Performance of Value-Added Tea Export? Wathsala, P.W.U., Wattage, P., and Perera, V. | 30 | |
| Is It Necessary to Evaluate Tea Farmers' Knowledge Regarding Organic Farming? Anjalika J.K.M.R., and Wattage, P. | 34 | |
| Impact of HRIS on Performance of the Company Jayawardhane, J.M.C.K., Wattage, P., and Ariyarathne, I.M.K. | 37 | |
| Is It Necessary to Maintaining Service Quality for Improving Customer Satisfaction at Farm Outlet Shops? Madhusanka, S.A.C., Rathnayake, K.K.H.M., and Sumanasiri, A.P. | 40 | |
| The Impact of Motivational Factors on Improving Employee Performance in Farm Sector Shashiranga, R.I.L., Rathnayake, K.K.H.M., and Ranasinghe, I.G.L.C. | 43 | |
| How to Make Traditional Roasted Curry Paste Ground in Grindstone Development Successful? Kangara, K.M.S.G., Malkanthi, S.H.P., and Deraniyagala, I. | 47 | |
| | _, | |

| Improving the Process of Physical Quality Parameters on Nutmeg Quality Ranasinghe, A.D.D.A., Amarasinghe, S.T.C., and Deraniyagala, I. | 51 |
|--|-----|
| Conquering the Consumer Market Owned By the National Livestock Development Board through E-Marketplace Jayasinghe, J.A.K.D.K., Basnayake, B.M.R.L., and Ranasinghe, I.G.L.C. | 55 |
| Development of a Spice Incorporated Concentrated Yogurt Spread for the Local Market in Sri Lanka Karunarathna K.M.O.N., Rosairo, H.S.R., and Karunarathna, S.H. | 58 |
| Does the Marketing Mix Influence the Sales of Palmyrah Pulp-Based Edible Products? Thanabalasingam S., Rosairo, H.S.R., and Suganja, T. | 62 |
| Understanding the International Market for Ceylon Cinnamon Oil Hettiarachchi, H.G.D.S., Jeewanthi, R.K.C., and Bodhipaksha, V. | 66 |
| How to Reduce the Time Required for Spices to Get From Farmer to the Factory? Premasiri, K.W.L.H., Amarasinghe, S.T.C., and Deraniyagala, I. | 70 |
| Financial Viability of On-Farm Concentrate Production Lakshika, K.Y.D., Wijeratne, A.W., and Amunugama, N. | 73 |
| Impact on Work Engagement on Organizational Commitment? Sandaruwani, P.G.N., Wijeratne, A.W., and Ilangasinghe, V. | 76 |
| How to Make Delay in Banana Ripening Rate by Using Natural Treatment? Elapatha, G.S., Malkanthi, S.H.P., and Chinthaka, E.N. | 79 |
| Value-Added Dairy Products Dharmathilaka R.M.P., Basnayake, B.M.R.L., and Amunugama, N. | 82 |
| Development of Plant-Based Meatball for the Sri Lankan Food Dilrangi, S.P.H., Basnayake, B.M.R.L., and Samaraweera, S. | 85 |
| Evaluate the Quality of the Service in Public Sector Nisansala, W.A.N., Rathnayake, K.K.H.M., and Wickramasinghe, W.S. | 88 |
| Development of Ready to Make Mixture for Traditional Dosa Arulnesavasan, K., Wijeratne, A.W., and Chanthru T. | 92 |
| Does Mushroom Cultivation Contribute to the Economic Empowerment of Rural Women? Dilrukshi, W.S., Amarasinghe, S.T.C., and Jayatunga, S. | 95 |
| Valorization Opportunities in the Fruit and Vegetable Supply Chain Nisthamin, F.A., Jeewanthi, R.K.C., and Dharmarathne, N. | 99 |
| How Nature of the Organic Products is Important to NOCU? Nawarathna, R.M.H.T., Jeewanthi, R.K.C., and Perera, V. | 103 |
| Organic Fresh Fruits and Vegetables Retailing in Semi-Urban Areas in Sri Lanka Bhashini, A.A.P., Esham, M., and Wahala. W.M.P.S.B. | 108 |
| How to Enhance the Performance of the Documentation Process Using 5S and Document Numbering System Gunathilaka, V.D., Jeewanthi, R.K.C., and Madusha, L. | 112 |

| Is Ozone a Good Alternative Sterilization Agent to Steam Sterilization for Moringa Leaf | |
|--|-----|
| Powder Production? Lakshan, L.W.S., Jeewanthi, R.K.C., and Deraniyagala, I. | 115 |
| Is It Necessary for Dairy Sector Staff Members to Receive Learning and Development | |
| Programs for Achieving Higher Employee Performance? | |
| Perera, J.D.T.B.D., Rathnayake, K.K.H.M., and Sumanasiri, A.P. | 118 |
| How Can Underutilized Jackfruit be Turned into a Beneficial Product? | |
| Wijesinghe, U.M.D.L, Malkanthi, S.H.P., and Jayasundara, G. | 122 |
| What are the Factors that Affect Employee Job Performance at Sehani Deshiya Ousada (Pvt) Ltd? | |
| Madhumini, S.M.U., Basnayake, B.M.R.L., and Sumangala, W.M.D. | 126 |
| Developing a Marketing Strategy to Increase Volume Sales of UHT Fresh Milk | |
| Avishka, H.S.P.D.Y., Esham, M., and Nuwan, A. | 130 |
| Does Brand Equity Applicable to Local Spice Market? | |
| Bernadeen, W.L., Esham, M., and Madushani, R. | 133 |
| Traceability for Ceylon Tea | |
| Madhushika, K.M.T.L., and Basnayake, B.M.R.L. | 137 |
| Brown Rice and Hal Seed Composite Flour for Diabetic Patients | |
| Kulathunga, K.A.K.M., Rosairo, H.S.R., and Mahanama, R.P.S.S. | 140 |
| An IT-based New Approach on the Fertilizer Stock Management | |
| Bandara, A.M.N.S., Rosairo, H.S.R., and Bandara, W.M.A. | 143 |
| Why is the British Retail Consortium (BRC) Food Quality Management System Importance in | |
| Cinnamon Industry? | |
| Karunathilaka, M.W.V.D., Jeewanthi, R.K.C., and Prasanna, L. | 146 |



It is with great pleasure and privilege to issue this message of good wishes and congratulations to the 1st issue of the "Policy Insights 2022".

This is an unprecedented time that we are facing as the challenges in the wake of COVID-19 pandemic across our globe. Despite all hardships, the creative and Innovative academic contribution of you being dedicated researchers is highly commendable. You, our researchers are the true heroes of today and we are witnesses many inspiring examples emerged across the University.

This publication would provide a platform to present and publish research work carried out by final year B.Sc. Food Business Management Students of the Faculty of the Agricultural Sciences under the guidance of the academic staff and the outside subject experts. Most of the researches conducted are applied research that address most of the issues directly related to the development of the country. It is evident that the quality of researches and proceedings have reached a commendable level showing the commitment of the academic staff and the students to develop the research culture in all faculties in the University.

There is a tremendous amount of work to be accomplished in the future for our country, to build mutual respect, accept diversity and make progress as a nation. Hence, Policy level contribution is a paramount need for these accomplishments for the betterment of the nation. In this context your constant contribution is highly valued

I wish you every success in your future endeavors!

Message from the Dean, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka Prof. P.M. Asha S Karunaratne



I am delighted to issue this message for the Policy Insights 2022-Issue I based on the research outcomes of the BSc in Food Business Management students. I am happy to mention that the Policy Insights 2021 was a success and delighted to be informed that Policy Insights 2022 consists with 41 policy briefs.

Organizing such kind of publication reinforces our objective of developing an environment of exchange of ideas towards the development of the agri food sector. The hard work and dedication of all the members of organizing committee during the preparation of this publication is highly appreciated. Without them the event would not have been possible.

Finally, I wish all the best for the organizers to make their effort a success by disseminating these research outcomes to enhance the university connectivity with the community and empower the decision making.

Message from the Head, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka Prof. D.A.M. De Silva



Our aim is sharing research wisdom among wider networks. Policy Insights, a book of policy briefs prepared from final year students is our vehicle to bring the message. It is indeed a great pleasure for me to pen for and on behalf of enthusiastic team of academics and undergraduates who has passion on research and dissemination. Policy Insights 2022, made of fresh research work of first batch of B.Sc. food Business Management students along with the guidance of academic staff and external supervisors of their industrial training placements.

Beyond the traditional boundaries of university frame we, Department of Agribusiness Management, initiated the venture of sharing research outcomes with the stakeholder community. Our duty as a national university, to contribute to empower people through knowledge sharing is partially fulfilled through the publication of Policy Insights. At the end, there's special mention on kind hands that carry this difficult task even in dark hour of the country. Ms. Sulochana Senevirathne, Dr. P. Wattage, Mr. Indika Banadra heartiest thanks for your contribution and dedication to complete the book. Further, my sincere thanks go to the Prof. R.M.U.S.K. Rathnayake, Vice Chancellor, Sabaragamuwa University of Sri Lanka, Prof. Asha Karunarathne, Dean, Faculty of Agricultural Sciences, Prof. S.K.Gunathilake, Director, OTS, Dr. Kumudika Boyagoda, Lead academic expert, OMST and AHEAD world Bank grant for their facilitation.

Congratulations for all contributors!

Fresh Organic Vegetables for a Healthy Lifestyle

Executive Summary

Fresh organic vegetables have taken a unique place in the international organic food industry. Organic food, including fresh organic vegetables, is cultivated without using artificial chemical compounds, which include human-made pesticides and fertilizers, and no longer contain genetically modified organisms (GMOs). In the Sri Lankan context, there is a 'niche' market for fresh organic vegetables. Recent studies show consumers in the urban areas are gradually shifting to organically produced food, especially considering the health and nutritional benefits.

Besides, consumer awareness and purchasing intention are critical factors the consumer considers when making a purchasing decision. Therefore, it is essential to measure the effects of consumer awareness on fresh organic vegetables. Purchasing intentions and organic food certifications may help consumers buy fresh organic vegetables and determine consumer buying behavior. And it is vital to educate consumers more about fresh organic vegetables and implement effective marketing tactics to build consumer awareness and promote the new organic vegetable market.



Figure 1: Conceptual Framework of the study



This Policy Brief is prepared based on undergraduate research on "Factors Affecting Consumer Buying Behavior towards Fresh Organic Vegetables in the Colombo District". This study mainly aims to investigate the major factors affecting consumer buying behavior of fresh organic vegetables in the Colombo district. Moreover, this study investigates the variables of consumer awareness about fresh organic vegetables, consumers' purchasing intention, and consumer level of awareness regarding organic food certifications that affect consumer buying behavior. This study was conducted in the Colombo District using a structured questionnaire covering a sample of 110 consumers visiting main fresh food outlets. The data was collected by both physical and online modes. The findings of the study revealed that consumer awareness about fresh organic vegetables, organic food certifications, and consumer purchasing intention towards organic vegetables positively influenced consumer buying behavior.

Key features

- Most consumers (95%) in the Colombo district are aware of the fresh organic vegetables available in the market.
- According to the survey, most consumers (67%) have purchased fresh organic vegetables at least one time in their lifetime.
- Most consumers (60%) are aware of fresh organic vegetables through the internet.
- Fresh organic vegetables are mostly purchased (66%) by consumers from supermarkets.
- The survey results revealed that consumers buy fresh organic vegetables considering the health and nutritional benefit it takes (69%).
- Most consumers (31%) are more likely to purchase leafy vegetables in the new organic vegetable category.
- The survey results investigated that most consumers (48%) purchase 500g of vegetables at once from each vegetable type.
- According to the statistics of the survey, most consumers (51%) are likely to purchase organic tea & tea-based products in addition to fresh organic vegetables.
- The survey results revealed that most consumers (88%) have a good level of awareness about organic food certifications, which significantly affects their purchasing behavior.
- Among the organic food certifications, most consumers (77%) are aware of the Sri Lanka Organic certification. The following higher percentage (65.5%) of consumers are aware of the United States Department of Agriculture organic food certification.
- This study reveals consumer awareness of fresh organic vegetables, consumer purchasing intention, and consumer awareness of organic food certifications significantly affect consumer buying behavior.

Benefits

From the consumer perspective, organic vegetable consumption is healthier and more nutritious than the consumption of non-organic vegetables. Organic vegetable consumption leads to reducing the risk of different kinds of diseases. And organically produced vegetables are rich in nutrients compared to non-organic vegetables. From an environmental sense, the cultivation of organic vegetables is best for the soil and air. Further, organic vegetable cultivation encourages smart farming. Also, it helps to reduce soil erosion. Organic agriculture supports both human beings' and animals' welfare. Moreover, organic vegetable cultivation discourages global warming and encourages bio-diversity.

From an economic perspective, organic vegetable cultivation supports minimizing all forms of pollutants. Consequently, organic vegetable cultivation facilitates to boost of the local economy.

Costs

Currently, the cost of production for organic vegetable cultivation is typically higher. And the labor cost is also high in organic farming. Organic certified products usually are more expensive than non-organic vegetables. Since the small volume of organic vegetable production, the price is high. Therefore, farmers have to bear an increased cost when cultivating organic vegetables than in nonorganic vegetable cultivation.

Policy enabling features

In the Sri Lankan context, the demand for organic food is increasing as people are concerned about the health and nutritional benefits that it gives organic food. Currently, In Sri Lankan government has banned the importation of agrochemicals, and the government supports encouraging organic farming by establishing policies to build a healthy society.

Furthermore, to ensure the credibility of Sri Lankan organic food production and to use the term "Organic" for the food products should be produced according to the mandate of the National Organic Control Unit (NOCU) and National Standards for organic production and processing. The Department of Agriculture has created organic agriculture regulations to strengthen the framework of organic agriculture. "Organic agriculture is based totally on the sustainability precept. This means fulfilling the requirements of the existing generation without compromising the potential of future generations" -Coleman-



Figure 2: Organic Vegetables at Good Market

Policy disabling features

In the Sri Lankan context, the organic market is slowly growing. And Sri Lanka has a "niche marketplace" for organically grown food. Organic vegetables take high prices than conventional vegetables. Therefore, for some consumers bearing the cost might be challenging. The consumers' low level of awareness (5% of consumers are not aware of fresh organic vegetables) and their unconsciousness about fresh organic vegetables is another issue that negatively affects the development of the organic vegetable market.

Furthermore, another drawback is the less availability of fresh organic vegetables. According to the comments received from the survey, some consumers are welling to buy fresh organic vegetables. Lack of availability and accessibility is the issue that they have faced. Hence, these issues discourage the growth of the organic vegetable market.

Moreover, the lack of awareness about organic food certifications is another issue that can see currently. According to the study results, 12% of consumers are unaware of organic food certifications. Fairtrade and Bio Suisse organic food certifications are not famous among the consumers are drawbacks that can see in this industry.

Present policy context

As a policy, the Sri Lankan government has banned the importation of agrochemicals. The purpose of the government in prohibiting the importation of agrochemicals is to encourage the consumption of organic food to build a healthy generation.

Presently, National Organic Control Unit (NOCU) is the regulatory framework that monitors organically produced food to ensure its credibility of organic food. Also, the United States Department of Agriculture (USDA) is the investigator of the National Organic Program (NOP) regulations and standards related to organic food labels.

Moreover, Sri Lanka Accreditation Board (SLAB) has accredited all the third-party agencies which give organic food certifications. Also, all the third-party companies have supervision by the Sri Lanka Accreditation Board (SLAB).

Policy recommendations

The survey results recommended a need for awareness campaigns to accomplish a high conscious level of the consumers of organic food and organic food certifications. Marketers should craft effective strategies to grab the hearts and minds of consumers.

Besides, organic tea and tea-based products are more likely to purchase by consumers in addition to fresh organic vegetables. Therefore, the study recommends producing various organic food products to uplift the organic food industry.

Furthermore, the study suggests expanding the distribution channels of organic food and establishing the storage and transportation facilities better while maintaining availability and accessibility.

"Health requires healthy food" -Roger Williams-

Citation:

Fernando, M.C.L., Esham, M., and Wahala, W.M.P.S.B. (2022). Fresh Organic Vegetables for a Healthy Lifestyle. *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

I would like to express my special sincere gratitude and appreciation to my internal supervisor Prof. M.Esham, the Professor, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. Also, I would like to express my special thanks and appreciation to my external supervisor, Dr. Sampath Wahala, the Chairman, of the Sri Lanka Accreditation Board (SLAB) for their valuable support and guidance.

Opportunities Beyond Constraints: Mushroom Cultivation for Rural Women

Executive Summary

Over 70% of Sri Lankans reside in rural areas, where agriculture and associated occupations provide most of their income. Agriculture generated 8.36% of the national GDP in 2020. Mushroom farming is usually a family business in Sri Lanka, and it has recently gained popularity among farmers as a profitable side business. However, the mushroom industry is affected by different constraints such as marketing constraints (Poor access to local market, less remunerative price, lack of organized marketing channels), technological constraints (High incidence of insect pest and diseases), and situational constraints (Unavailability of spawns and straws on time, unsuitable climate conditions). Possible solutions to break down rules and reach opportunities such as establishing a cooperative hub, value-added mushrooms to improve market adaptability, consumer demand analysis, enhancing production facilities, and standardized technical training are in practice to promote and uplift the rural women mushroom cultivation.

Key features

- All farmers (100%) were SLCDF-funded rural women.
- The majority (50%) funded women farmers' average monthly income range between 25,000-30,000 LKR.
- Women farmers understand the importance of good hygiene practices, but they are unsure how to implement them.



This policy brief is based on the findings of an undergraduate research thesis titled "Constraints and Opportunities for Mushroom Cultivation by Rural Women." The four mushroom clusters in the Weeraketiya DS division are the focus of this study. The study relies on a survey of thirty female mushroom farmers. This study's activities included in-depth interviews, focus group discussions, and interviewer-administered pretested semi-structured questionnaires.



Figure 1: Women farmer in Weeraketiya DS division

- The majority of rural women have experienced mold visibility (80%), yellow blotch visibility (60%), and bacterial rot visibility (80%) on mushrooms.
- Mulana Training Resource Centre is the place where training is provided.
- Out of the three main constraints, marketing constraint has been identified as the most affective for mushroom cultivation by rural women.

Benefits

- The new promotional campaign for valueadded mushrooms has been introduced for rural women mushroom farmers to improve market adaptability through the involvement of SLCDF.
- The trainer's arrival in the field has focused the women's attention on the quality requirements of mushrooms.
- SLCDF has assisted some selected women farmers in buying spawns and straws in other areas at a reasonable price.
- The appointment of field officers in the same village and the passage of their reports significantly contributed to directing women to finance and subsidiary schemes.
- By getting help from stakeholders related to the mushroom industry, farmers can acquire low-cost access to production facilities such as machinery, equipment, and safety nets.

How do we break down the constraints to reach the opportunities of mushroom cultivation?

The majority of farmers have to suffer from various kinds of constraints. Most of the time, farmers can get a fair price by selling mushrooms through a cooperative hub. Because the cooperative commits to uplifting and encouraging the livelihoods of farmers. We reserve shelves and refrigerators for farmers' mushroom products and links made with large-scale growers. To develop mushroom cultivation, the cooperative should do justice to all parties by setting up stalls selling only mushroom products for growers, introducing value-added mushroom products, and providing price control. It is essential to give both theoretically correct technology and practical activities to develop the technical knowledge required for mushroom growers and to implement grower experience sharing programs through field visits in various areas. There is also a need to improve the spawn factory to improve the quality of the spawns, increase the monthly spawn production, and use new methods like a courier.



Figure 2: Mushroom Cultivation



Costs

The high startup cost for rural women is the establishment of the mushroom farming shed.

The women farmers have to bear a high cost to acquire quality spawns and sawdust on time. Most women farmers cannot get spawns from Mulana Training Resource Centre on time. So, they have to spend more to get spawns from other areas with transportation.

The SLCDF organization currently devotes a lot of money to various training programs. As the training program evolves and grows, the organization will incur further costly development costs.

Various organizations are providing significant assistance in the development of mushroom cultivation.

Policy enabling features

According to the results revealed through the study, they have the potential to reap the benefits from training programs, promotional activities, and workshops.

The mushroom cultivation shed can be built quickly in their living area. Also, any family member can assist in the activities related to the cultivation.

The Mulana Training Resource Centre has organized a 2-day training at the premises. All the women who participated in it were given a valuable certificate.

These women will then have the opportunity to apply for loan installments to develop mushroom cultivation through the respective societies. The institute of SLCDF will take the lead in providing those loan installments.

Policy disabling features

Consumers examine hygiene, freshness, and whether or not the mushrooms are spoiled before purchasing. Women farmers are aware that they must wash their hands and use clean equipment before harvesting. Women farmers understand the importance of good hygiene practices, but they are unsure how to implement them.

The mushrooms have a market. According to the findings, it is clear that there is a high demand but a limited supply. Due to low-paying consumers, the farmers were not motivated to utilize the available resources in the environment.

There are no sufficient research institutions and laboratories to test more about mushrooms in Sri Lanka than other crop production.

They have also stated insufficient support from the officials involved in mushroom cultivation. The majority of female farmers grow only a few types of mushrooms (American oyster and Abalone). As a result, all farmers are trapped in a similar market segment, with no access to higherend markets such as supermarkets, restaurants, and hotels.



Figure 3 Women in Mushroom Cultivation

Present policy context

The Departments of Agriculture and Agrarian Services also have a good network of mushroom spawn producers that supply the spawn across the entire island.

The supporters of the mushroom field (Mulana Training Resource Centre, Department of Agriculture, Department of Agrarian Services) do not provide market information on mushrooms. Across the entire island, the Department of Agriculture offers numerous market-based incentives, such as funds and credit facilities, to smallholder agribusiness partnership program participants to begin mushroom cultivation.

Furthermore, the Department of Agriculture provides insect resistance nets and funding to establish a proper mushroom shed.

Policy recommendations

Women mushroom farmers are not organized as cooperative.

In the second step, there is a need to identify the potential buyers of mushrooms, such as restaurants, hotels, and supermarkets in the Weeraketiya division and Hambantota district.

The third phase is to build rapport with identified buyers. This will be accomplished by forming a marketing committee that will do market research on the buyers that have been placed.

The fourth phase is to give women farmers the tools they need to increase the quality of their mushrooms. This can be accomplished by having professionals in the field of mushrooms provide instructions on hygienic techniques throughout the entire process.

Citation:

Kalubowila, K.D.S.G., Amarasinghe, S.T.C., and Jayatunga, S. (2022). Opportunities beyond Constraints: Mushroom Cultivation for Rural Women, *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

The author likes to express her heartfelt appreciation to Dr. (Mrs.) S.T.C. Amarasinghe, Senior Lecturer, Internal Supervisor, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. Thanks also offer to the Executive Director, Mr. T.L. Wijetunga, and Programme and Administrative Officer (External Supervisor), Mr. Sanath Jayatunga at SLCDF (Sri Lanka Centre for Development Facilitation).

Market Landscape and Upgrading Potential of the Coconut Oil Industry

Executive Summary

Coconut oil is one of the world's oldest mainstream edible oils extracted from crushing dried kernels which has a natural sweetness and aroma that can add flavors and varieties to the diet. Coconut oil surged in popularity as a Health food and became a miracle superfood Marketed globally. People start to appreciate its unique physical and chemical characteristics. More than 90% of its fatty acids content is used to treat cardiovascular diseases, viral infections, fat-related disorders, cancers, etc., used coconut oil for both edible and non-edible applications. Coconut is the most widely consumed (56%) edible oil in Sri Lanka due to consumers' consciousness of health and nutritional aspects in local and global markets. As one of the leading coconut oil manufacturers and exporters, it is developing proper strategies in a nontraditional belt is vital. However, increased demand leads to stiff competition within and outside the sector.

Key features

- Coconut growers, collectors, copra processors, coconut oil millers, traders, exporters, household consumers, and industrial buyers were the key market participants in the coconut oil value chain.
- Unequal benefit distribution among value chain participants due to a large number of middleman involvement, complex networks, and information asymmetry
- Middlemen have the power over farmers and negotiate the product prices through the value chain.
- Both micro and macro-level institutions;



This policy brief is based on the undergraduate research on "Marketing orientation in the coconut oil industry: marketing innovation and firm performance in Sri Lanka". The research focus is to identify the shape structure and functions of the coconut oil landscape in Sri Lanka. A series of telephone interviews, field visits, and pre-tested structured questionnaires were conducted in the study. The research uses a hundred randomly selected branded coconut oil consumers and thirty coconut oil processors representing large, medium, and small scale. Labels of 50 coconut oil brands under seven categories were obtained for label analysis.



for capacity building, regulatory bodies, intergovernmental organizations, and nonprofit organizations influence the value chain.

- Complex institutional structures, overlapped regulatory activities, the conflict between institutional objectives with facilitate of trade, fragmentation of ministerial portfolio, lack of national food control system were some of the weaknesses that stem from institutional environment contribution toward coconut oil value chain.
- Label analysis revealed that prestigious standard certification guarantees in writing that the production process or product meets legal requirements demanded human consumption such as source, composition, freshness, etc.
- U.S.A, Canada, Australia, U.K, and western European countries were key export market destinations of Sri Lanka as the Middle East and Africa, the Asia Pacific, and Latin American markets were emerging markets for Sri Lanka.
- Consumer preference toward branded coconut oil revealed that quality, price, brand, promotion, health and nutrition attributes, and packaging and labeling were key marketing elements concern.
- The industry analysis revealed market insight and imagination where key market antecedents contribute to a firm's innovations.
- However, marketing innovations on coconut oil do not significantly impact a firm's performance in the industry.

Benefits

The institutional context of the coconut oil market landscape transforming fragile coordination substantial institutional into market opportunities by implementing а robust coordinating mechanism with more minor bureaucratic procedures, private-public partnerships, clear institutional strategies, a conducive legal framework that will facilitate for transforming information, triggering knowledge, access toward potential markets, and possibilities of attracting investments, etc.

Immediate concern on safety and quality in both local and international value chains influence the

development of national-level standards based on international standards with clear, proper, informative labeling and which is one of the most up-to-date topics in the food industry particularly important for producers and exporters to meet societal and market needs and compete effectively in global markets.

An effective promotional campaign is vital by considering market variables; quality, price, product attributes (taste, aroma, brand), promotion, health, and safety standards, and packaging and labeling explore new market opportunities and create a competitive edge for processors and competitive edge for both processors and distributors.

The vast scope of value addition and technology improvements enhance market access of coconut oil processors by creating more quality and adequate demand for the products to compete with national and international brands.

Costs

Although there are a high-quality recognition and demand for Sri Lankan coconut oil products in overseas markets, they are pretty expensive compared to other competing products due to the increased cost of production (high labor cost, shortage of raw materials, etc.)

Low yield of coconut production intermediaries' negotiation power over the value chain is disrupting the equal distribution of benefits among upstream value chain participants, scarcity of skilled labor (tree climbers, dehusked, and deshelled), fluctuation price of raw materials, and finished products, which is not common in other vegetable oils affect adversely to the industry productivity.

The Coconut oil industry in Sri Lanka is based mainly on small and micro-scale processors. However, their contribution to local and foreign markets in a systematic manner is prevented by the lack of capital to invest, traditional techniques, dependence on family labor and infrastructural support, lack of contact with market players, asymmetric information dissemination, etc. Favorable preference of consumers suggests an increase in the likelihood of purchasing and willingness to pay for branded coconut oil products. However, consumer preference may not necessarily lead to an actual purchase in the future.

Market innovations in the coconut oil industr are primarily affiliated with coconut oil processor targeting overseas markets. According to th local market consumers' perspective, coconu oil is always used as a raw material for their dail cuisine.

Policy enabling features

Sri Lanka is a tropical country with favorable factors for growing coconuts. Still, it's doubtful whether this will produce the expected yield since Sri Lanka cannot have anticipated coconut oil demand both in local and global markets due to the raw material shortage. As a result, there is a risk of being taken out over market share by other competing needs. This reflects the importance of taking necessary steps to minimize the gap between demand and supply by empowering market participants throughout the value chain. Consumers keen on quality and safety highlight the need for proper strategic or systematic procedures to increase quality and safety from plant to plate.

Regulations and policies, focal effort on controlling large scale coconut oil processors while small and medium scale processors represent the majority of the market share without any formal regulatory mechanism highlight requirement of national policy and regulatory framework.

Coconut oil institutional environment, public sector institutions retain a central position. However, it shows a lack of overall coordination due to the fragmentation under ministerial portfolio conflicts between institutional objectives and facilitates trade as barriers for developing a national policy and control system highlight the proper institutional environment with appropriate coordination and clear separate institutional mandates.



Innovations developed and commoditization of new products which bring new benefits perceived by the consumer and provide an incentive to make the purchase.

In the global market context, there is a huge demand for value-added coconut oil products as a functional food with high nutritional and health benefits (EDB, 2019).

However, when comes to the local context coconut oil has an image of being used as raw material in food preparation. Considering only raw materials, consumers always focus on getting conventional form coconut oil products in the market. Value-added products (organic, RBD, virgin, etc.) were limited to a niche market.

Coconut oil as a homogeneous product valueadded marketing is important which provides potential customers a greater perceived value. Building strong brands increase value just by adding their logo to a product, qualitative preference (standard and certifications), labeling and packaging, etc. were marketing variables that give a clear edge over the competitors.

Policy disabling features

Several safety and quality issues have arisen in the local market in recent months. Aflatoxin became one of the most researched words in Sri Lanka due to the substandard imported coconut oil. This is mainly due to the consumers' and processors' lack of awareness.

Sri Lankan, the coconut oil industry is comprised of a large number of small and medium-scale processors and few commercialized or large-scale processors. Although small and medium scale processors contribute significantly to the sector, their product quality is not maintained correctly, such as the lack of proper labels and packaging materials and being marketed as an unbranded product, etc. However, large-scale processors systematically sell their products. Acquiring authenticity and credibility issues were prevalent in the recent past due to the lack of a proper traceability system covering plantations to plant.

Present policy context

The coconut oil industry is directly supported by the coconut oil research institute (CRI), coconut development authority (CDA), and coconut cultivation board (CCB), responsible for generating knowledge, improving productivity and processes, providing market opportunities, increasing technology, and overall upliftment of the industry, etc.

The government has implemented tariff policies and import limitations on substitute oil to control competition with local coconut oil products and secure and encourage local coconut oil production.

Recent quality and safety issues increased the attention of all the parties toward the coconut oil industry into many laws regulations; various authorities have issued policies. The following are some of them.

• All prospective miller manufacturers and manufacturers require raw materials to be registered under the Coconut development authority since copra importation is generally banned in Sri Lanka and only allowed under certain circumstances.

• The consumer affair authority recently provided directions that bans blending or adulteration of edible coconut oil with any other substitutions.

Moreover, the coconut development authority developed training programs to direct coconut oil millers to produce high-quality oil. And proper quality systems have been introduced in collaboration with Sri Lankan Standard Institute (SLSI) and Food advisory committee, with awareness programs being carried out from time to time.

There is no specific regulation or standard that controls and markets edible oil and fats. However, the primary legislation about food labeling is food (labeling and advertising) regulations (2005) which in line with the basic Codex Alimentarius, specially regulate the geographical origin by implementing a declaration as "any edible oil should present clearly and conspicuously its common name and source of origin" and any declarations on the blended form of edible oil as giving the name of the oil which constitutes more than 75% of the blend.

Policy recommendations

The coconut industry in Sri Lanka has reached a transitional stage since significant demand has developed. Therefore, it is necessary to create a strategic plan to increase nut production by improving cultivars with seedling production with high yield and biotic resistance, replanting programs, promoting and dissemination technology, etc.

The majority of small and medium-scale coconut oil processors are produced at the household level using traditional machinery and extracting methods, while commercial-scale large scale processors using advanced technologies and extraction methods that provide excellent quality and fetches favorable market acceptance highlights the importance of facilitating integration with modern technology and machinery and other infrastructures through the provision of financial assistance, knowledge, training, etc. Transform fragile coconut oil value chain and institutional environment coordination into substantial market opportunities by implementing proper institutional mechanism implementing under policies with faster and less bureaucratic procedures stimulate collaboration throughout the value chain while increasing transparency and governance.

Despite the high demand and better price for coconut oil, there were issues with customer trust since processors do not follow basic product requirements. The case study on National Livestock Development Board (NLDB) states institutions engaged in coconut oil production have great control over production since they have their plantations, processing units, and a large customer base; however, there is an issue with how they claim and maintain to basic product requirements expected by the market. For example, their product labels contain just a few simple label declarations not sufficient to understand whether the product follows basic market requirements, etc.

Recommend that all food processors follow good manufacturing practices (GMP) and hazard analysis and critical control point (HACCP) food safety standards certification handling control in primary production to final consumption by providing a systematic approach to production assure and transparency that processors following the essential requirement over time.

Citation:

Nipunika, M.L.D., and De Silva, D.A.M (2022). Market Landscape and Upgrading Potential of the Coconut Oil Industry. *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

Special gratitude to the internal supervisor Prof. Achini De Silva, Head of the Department of Agribusiness Management, Faculty of Agricultural Sciences, the Sabaragamuwa University of Sri Lanka, for her continuous guidance and external supervisor, Mr. A.P Sumanasiri, Deputy Chairman of NLDB, facilitate for my research completion since this work is an outcome of final year undergraduate research.

Development of a New Breakfast Cereal from Jackfruit Seed Flour, Brown Rice Flour and Arrowroot Flour



Executive Summary

Breakfast is the most important and first meal of the day for any person. So, it should be essentially nutritious food. In the world, there are various types of breakfast habits that can be seen. They are whole grains, low-fat dairy, fruits, and vegetables, etc. But due to the busy lifestyle, people often skip their breakfast or go for instant food or fast food.

Jackfruit seeds and arrowroots are powerhouses of healthful nutrients. But people go for a product related to those ingredients very rarely due to unawareness and limited availability of valueadded products. Therefore, this study tried to use and promote usage of that underutilized ingredients to develop an alimentary breakfast cereal. The policy brief is prepared based on "the undergraduate research project on study on developing a breakfast cereal from jackfruit seed (*artocarpus heterophyllus*) flour, brown rice (*oryza sativa*) flour & arrowroot flour (*maranta arundinacea*)." This study was conducted with the objective of developing an alimentary breakfast cereal to be introduced to the market. During this study sensory evaluation, proximate analysis and market survey were conducted.



Key features

- Main ingredients used in the production of this new product were jackfruit seed flour, brown rice flour & arrowroot flour.
- All preliminary trials and manufacturing of cereal were carried out at the research laboratory of Wijaya Products (Pvt) Ltd, Dodangoda in Kaluthara district.
- In the preliminary studies, four formulations were developed for sensory evaluation.
- In the sensory evaluation, 15 trained panelists who have been working under the R &D department at Wijaya Product (Pvt) Ltd have participated.

Figure 1: Jackfruit seeds



Figure 2: Arrowroots

- They evaluated the color/ appearance, aroma, taste, mouthfeel, and overall acceptability of the four formulations of cereals using a nine-point hedonic scale.
- Based on the sensory evaluation, formulation 1 (ratio- 1:1:1) was selected as the best formulation and it was used for further developments & tests.
- The necessary chemical analysis was carried out at the food science laboratory of the Faculty of Agricultural Sciences at the Sabaragamuwa University of Sri Lanka, Belihuloya to determine moisture content, ash content, crude fat content, crude fiber content.
- It was determined moisture content 3.31%, ash content was 2.4%, crude fat 1%, and crude fiber was 3.81%.
- Then a market survey was conducted to study consumer attitude towards the product. Under that survey, the data was collected from 100 respondents in the Gampaha district from an online questionnaire by using a convenience sampling technique.
- The survey results revealed that out of the 100 respondents, 75% of respondents like to consume breakfast cereals.
- According to the survey results it was showed 18.4% consumed breakfast cereals for convenience, 23.7% cited to stay healthy, 26.3% cited for diet and 31.6% cited all of the above were reasons to buy breakfast cereal products.
- The study revealed that 20.6% did not consume breakfast cereals due to not having an effective diet, 17.6% of people were not ing breakfast cereals due to bad taste and smell and unsafety of the product. 35.3% of people were not consuming due to all of those reasons.
- According to the results majority of respondents know about jackfruit seeds and their benefits. But many of the respondents don't know about arrowroots and their benefits.

Benefits

Breakfast is known as the main and most important meal of the day. It is normally taken after a long interval of about eight or nine hours. So, it must be a very strong meal. The day started with a cereal-based breakfast is a good choice taken by the people. Because cereal-based products are high in protein, fiber, vitamins, minerals, and other essential nutrition. So, it is easy to get all the nutrients a person needs from breakfast cereal products. Also, cerealbased breakfasts are high in nutrition value and health safe than the other breakfast products in the market.

This study tried to develop a breakfast cereal from jackfruit seed flour, brown rice flour, and arrowroot flour. Today the jackfruit seeds and arrowroots are the underutilized food items in the world. So, through this study researcher tried to bring a new concept for the use of arrowroots and jackfruit seeds and promote their usage.



Figure 3: Jackfruit

Costs

Currently, the company offers several categories of food products. Spices are the main item of the company and now the company produces pasta products, flour products, beverage products, seed products, etc. At the moment the company offers more than twenty product categories to the market. So, if the company goes to commercialize this new product, it will have to bear another high cost for the new development.

Policy enabling features

Breakfast cereals are very popular among people as a balanced breakfast dish in Western countries and are now becoming popular in Asian countries as well due to their high nutritional value. Therefore, as a result of the developing trends in the breakfast cereal market, additional policies connected to the industry's development will be adopted. The study revealed that the majority of respondents (81%) are willing to consume this newly developed breakfast cereal due to the good concept and uniqueness of the product and utilization of underutilized indigenous ingredients.

When considering breakfast cereals available in the market, many of the respondents (53.3%) mentioned that need to improve the existing products or introducing a new type of cereal products, 29.3% of respondents mentioned some breakfast cereals available in the market are not good for the health. This consumer dissatisfaction has a positive effect on taking this new policy.

As well as the widespread of jackfruit seeds and, arrowroots, enabled the production of this new product.

Policy disabling features

The main ingredients used in the production of this new product were jackfruit seed flour, brown rice flour, and arrowroot flour. According to the research findings majority of respondents don't know about arrowroots. It represented 71%. So, some respondents fear to going for this new product due to unknown pros and cons.

The jackfruit is known to be the world's largest edible fruit. But in some times people don't like to consume jackfruit related foods due to some personal reasons. According to the research findings, the consumers 16% do not consume breakfast seeds.

Present policy context

Mainly breakfast cereals are prepared using corn, wheat, rice, oats, etc. so, the breakfast cereals contained a good source of nutrients including carbohydrates, proteins, fiber, etc. But the study revealed the majority of respondents seek innovations or improvements and many of the respondents are dissatisfied with the current breakfast cereal products.

Nowadays breakfast cereals are one of the major

& growing industries. The various food-related companies currently provide various breakfast cereals under the different brands to the market such as Kellogg's, Nestle, CBL...etc. According to the survey results, CBL is the most popular brand in Sri Lanka.

Policy recommendations

The results of this study revealed that jackfruit seed flour, brown rice flour, and arrowroot flour can be effectively utilized as a raw material to develop a nutritional breakfast cereal.

According to the findings, there are several recommendations, for the food industry. Because the food sector is a highly competitive field, with new product coming almost every day. Therefore, it is essential to do innovations or improvements related to food products in order to run a successful business in the food industry. So, the following suggestions are made for food companies.

Many people today prefer to eat high-quality alimentary foods instead of fast or instant food. This is a good opportunity for food businesses in the food industry to introduce new foods or improve the existing food items to consumers. Through this study, it is suggested to develop a nutritional breakfast cereal using underutilized jackfruit seeds and arrowroots with brown rice. The mixture of the 3 ingredients has more uniqueness. In addition to that study revealed that consumers prefer to eat jackfruit seed add with another food or develop new food than consume them directly. Therefore, producing a breakfast cereal containing these ingredients may affect to increase the profitability of the business.

Citation :

Tennakoon, T.M.A.P.M., Malkanthi, S.H.P., Mahanama, R.P.S.S. (2022). Study On Developing a Breakfast Cereal from Jackfruit Seed (*Artocarpus heterophyllus*) Flour, Brown Rice (*Oryza sativa*) Flour & Arrowroot Flour (*Maranta arundinacea*). *Policy Insights 2022 Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

The author wants to express her deepest gratitude to Prof. S.H.P. Malkanthi, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. Thanks also to her external supervisor Mr. R.P.S.S. Mahanama, Quality Standard Executive, Wijaya Products (Pvt) Ltd, who supported completing the research.

Drinking Yogurt Enriched with Taste

Executive Summary

Drinkable yogurt is a growing area of interest due to its ability to deliver all health benefits, nutritional benefit of regular set yogurt or stirred yogurt.

Drinking yogurt has become one of the most popular beverage options for youth due to its health and taste appeal. drinking yogurt having just entered the market is making tremendous inroads into the impulse beverage category offering young adults and children a healthier and tastier beverage option.

Drinking yogurt is among the consumers due to the convenience, and health benefits.

This study mainly focuses on identifying whether the consumer preference for healthy drinking yogurt has been developed for young adults and children. Because of that research focus on identifying pattern and model of development processes in drinking yogurt, mainly for healthy drinking yogurt line to meet best practice in product development.

Key features

- The study revealed that mango flavor was selected as the best flavored drinking yogurt.
- The proximate composition of drinking



The policy brief is based on the undergraduate research on *"development of drinking yoghurt enriched with taste"*. This study was conducted with the aim of developing drinking yoghurt towards the improved organoleptic and nutritional properties.

Sensory quality evaluation was done to select the best formulation and chemical analysis was done to identify the nutrition properties including sugar, salt and fat content. Consumer perception data were collected in 100 respondents through the questionnaire using simple random sampling.





yogurt contained sugar 20.5%, salt 0.3%, and fat content 4.6%.

- Microbial analysis, pH, and syneresis were measured during storage at 4°C for initial, 7th, and 14th days after preparation.
- According to consumer perception survey most of the diabetic patients (28%) and gastritis (19%), cholesterol (17%), high blood pressure (15%) cardiovascular diseases (9%), and other diseases 12%.
- Opinion of the developed drinking yogurt according to the results 35% of the respondents have the perception that this will be a very good and 38% considered this would be a good product
- Respondents who are willing to pay a higher price for these product account for 76% of respondents who preferred to have a glass bottle as the packing 61% incorporated drinking yogurt.
- Overall, in this study indicated that the respondents likelihood consume this drinking yogurt and that the majority (99%) preferred to purchase this developed drinking yogurt, so this is a success of the company's business growth.

Benefits

The number of people suffering from Non-Communicable Diseases (NCD) such as diabetes, high blood pressure, gastritis, cardiovascular disease and cholesterol has been dramatically increasing in recent years in Sri Lanka. There is a desire for healthy beverage consumption as one means of controlling chronic disorders. Drinking yogurt is available in the market for many years, recently there has been a spike in the popularity of drinking yogurt among consumers due to the convenience, handiness, and health benefits.

Drinking yogurt is considered as a low viscosity stirred yogurt, which could be consumed rather than a drink. Hence it is just for the taste and refreshing drink which can be positioned as a breakfast beverage, a sport or wellness energizer, or a snack to fill the gap between meals and digestive aid. This study will help food business owners detect market gaps and generate new ideas from those gaps. As for potential and future researchers, they can learn how to perform product development research. As a result of this study, students learned about the product development process, the essential tests to be performed in laboratories, and statistical analysis to analyze the acquired data.

One of the most strategic decisions in the company to win the competition is to develop a strategy of product development.

The aim of the study is to identify the pattern and model of development process in drinking yogurt, mainly for healthy drinking yogurt enriched with taste and nutritional benefits.

Costs

After the initial fixed cost of acquiring simple machines and utensils such as blender, pots fermenting containers, mixer, muslin cloth, thermometer, water bath, measuring cylinder, plastic and aluminum containers, the production cost of 10L of yogurt from each source of milk and each type of coagulant was compared, taking into consideration the cost of the raw milk, the coagulant, sugar and fruit flavor added, packaging bottle and labor.

Policy enabling features

Overall, this study indicated that the respondents (99%) preferred to purchase this new product based on its health benefits. The result revealed that the majority of the patients prefer to buy this yogurt drink in the market and youth, adults, and children are also interested to purchase this product, as well as 76%, are willing to pay more. The result revealed that the majority of people 99% prefer to buythis drinking yogurt in the market.

Policy disabling features

The introduction of the new product to the company of Kilinochchi district was limited to the Palai administrative area. Therefore, evaluating the preference of drinking yogurt at different regions and social groups of Sri Lanka was limited.

As well as due to the COVID-19 pandemic, gathering data from consumers at the Palai area and the company's local customers was complicated.

Present policy context

Drinking yogurt provides and preserves nutrients, different flavors, aromas, and textures, enhances organoleptic properties, and increases economic value.

North Lanka Family Foods (Pvt) Ltd currently producing various products to the market. The company strives to connect the region's small farmer communities to local & global markets producing well branded, innovative products adding value to Agro-produce from this conflict affected region of Sri Lanka.

Policy recommendations

Drinkable yogurt is a growing area of interest due to its ability to deliver all of the health benefits, nutritional benefit of regular set yogurt or stirred yogurt. Moreover, drinkable yogurts meet consumer demand for portable, hand-held meals or snacks that fit an on-the-go lifestyle.

Development process experiments were to examine the influence of skimmed milk flour as a stabilizer on the properties of drinking yogurt. Chemical composition, viscosity, sensory evaluation, and shelf-life studies were done with a control sample

The results identified the factors affecting the purchase decision of the respondent, According to the results, consumers selected taste as the most important factor they consider when purchasing yogurt. Quality, price, package was ranked as second, third, and fourth respectively. Size of the product (weight) was the least considered factor when purchasing yogurt according to the respondents.

Future research can be conducted related to developing fruit pulp mixing drinking yogurt from these ingredients.

In this study to help understand factors how to contribute the future product development process efficiently and effectively.

Citation:

V.Piriyanga., A.W.Wijeratne, and T.Chanthuru (2022). Drinking Yogurt Enriched with Taste, *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

I would like to offer my sincere and deepest gratitude to Prof. A.W. Wijeratne, Internal supervisor, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa university of Sri Lanka, and Mr. T.Chanthuru, External supervisor, Operation Manager, North Lanka Family Foods (Pvt) Ltd, Iyakachchi, for the continuous support given throughout the period.

Export performance of Sri Lankan **Desiccated Coconut**

Executive Summary

Sri Lanka is a country that is naturally gifted with coconut plants. Throughout the year Sri Lankan people use coconut for their daily meal preparation and the rest of the coconut is subjected to export. Sri Lanka has acquired a distinct place in international markets for its coconut and coconut-based products. This study mainly focuses on desiccated coconut which is made out from shredded coconut kernels. Desiccated coconut is highly used in bakery and confectionary industries. Sri Lanka is considered as the third largest Desiccated Coconut exporter in the world, also well known for its fine texture and high quality. Desiccated coconut is the second highest exporting commodity among all the other coconut and coconut-based products. Though it is one of the highest exporting commodities, Sri Lanka covers only 8% out of the total demand in the European Union as well as only 5% covers of total demand for fresh and dried coconuts in the world (Export Development Board, 2020). So proper identification on the market is compulsory to make further decisions to upgrade the coconut exporting in Sri Lanka.

This research was mainly based on the Desiccated coconut export markets of Sri Lanka, and analysis has done using the Boston Consulting Group (BCG) Matrix which is widely used as a business strategy model & portfolio management tool. The purpose of this research is to classify the export markets into four quadrants in terms of a cash cow, star, question mark, and dog. These quadrants represent milking the cash, empower the position, invest/discard and divest respectively. For conducting this research 20 export market destinations have been used.



This Policy Brief is prepared based on undergraduate research on "Analysis of desiccated coconut export markets of Sri Lanka. Application of Boston Consulting Group Matrix" The purpose of this study was to identify the export markets and its potential. This research is based on secondary data from 2016-2010 and top 20 export markets have been evaluated using BCG Matrix.



Key features

- Sri Lanka leads the market for desiccated coconut in Iraq, Spain, Portugal and Jordan.
- Lowest market share for Lankan DC shows in the United Kingdom and it is expressed as 6.75% market share.
- From remaining destinations Egypt, Japan, Iran and Chile show more than 50% of market share for Sri Lankan desiccated coconut.
- According to the results of the research only 8 destinations show the positive growth percentage for the Sri Lankan desiccated coconut. Those are the USA, Canada, Netherland, Japan, Australia, Brazil, Chile, Belgium and turkey.
- Highest growth rate shows in Chile & as a percentage it presents 85.36%.
- Remaining 12 destinations show a negative growth rate. Those destinations are Germany, Egypt, Iraq, Spain, France, Saudi Arabia, Portugal, Iran, Pakistan, UK and Jordan. Pakistan shows the highest negative growth and as a percentage it expresses -21.48%.
- Chile export market lies on the star quadrant which can be interpreted as having increasing market share and market growth for the Sri Lanka Desiccated coconut. Thus, this destination should be properly maintained without letting the rivalries take over the market.
- According to the research, Sri Lanka has four countries in the cash cow quadrant. Those are Iraq, Portugal, Spain and Jordan. So, these destinations bring more revenue since they have a good market share relative to its competitors and in these destinations growth rate is decreasing. Therefore, there are less chances for the competitors, newcomers to enter into these destinations. Also, they require small investments and that is also for maintaining the market normally.
- Question mark is the quadrant which represents the low market share but having an increasing growth rate. Since having low market share, export markets in this phase are poor at generating revenue but they consume large sums of money to protect their market positions due to increasing growth rate. As the results which have been generated in the

research, Brazil, Turkey and Canada lie on this. Among these three market destinations, Canada is at a potential risk to falls in to the dog category.

• Dog quadrant is the most unfavorable quadrant in BCG Matrix because it is poor at generating revenue since it is having low market share. And also, it is at the level which has low market growth. According to the results of BCG Matrix, it shows that Iran, Pakistan, Saudi Arabia, France, Germany, Australia, UK, USA, Belgium, Netherland, Japan and Egypt are in the dog quadrant.



Figure 1 Desiccated coconut

Benefits

Desiccated coconut is one of the highest export commodities under the category of coconut and coconut-based products. Also Desiccated coconut exports is claiming for a long history since the 1890s. Moreover, Sri Lanka is considered as the third largest DC exporter in the world. AT the beginning we were the market leaders for DC but unfortunately the Philippines and Indonesia have overtaken us and invaded the market in large numbers. So, we have to strategically compete with these market leaders and even have to protect our place in the DC from the upcoming rivalries.

First of all, we have to have a proper identification of our export markets. So, in this research top 20 export markets for Sri Lankan DC have been analyzed in order to get an idea of export market growth, market share and potential of these top 20 export markets. Therefore, it brings good

insight that will be important to come up with new strategies and policies. Policy makers can consider the profitability of these current DC export markets and they can modify or create new policies which lead to uplift the DC industry of Sri Lanka as well as DC export products. They also can take a look at these conventional export markets and find out the most profitable export markets for our DC products. Moreover, these results help local DC producers to go for strategic marketing decisions by identifying the weaknesses in those markets or take the decisions to move to new profitable export markets after proper exploration. If we can improve our DC industry in a way that is profitable, it opens the door for local people, entrepreneurs to have more opportunities in this industry as employees as well as business owners.



Costs

According to the results of the research it shows most of the export markets are in an unfavorable condition in terms of market share and market growth. So as a government as well as local DC producers have to take relevant steps to overcome these issues and there is a need of identifying new profitable markets for our DC products. Market exploration is something that makes sense of cost itself. Therefore, to take necessary steps, relevant authorities have to invest money on different types of market analysis and as well as should invest to improve our dc products to match with the right demand of each export market. Also, it takes considerable time to go for a change. Also, there is a risk when identifying new profitable markets since wrong decisions can make our DC industry down and might be caused to lose the current markets.

Policy enabling features

We are the pioneers of desiccate coconut in the world and still Sri Lankan DC is well known for its fine texture and light colors. Therefore, we are not a newcomer for the international market and as well as we have a lot of experiences in DC export in past years. Considering these advantages all together Sri Lankan government as well as local producers should take necessary steps to uplift this industry and should implement the right policies and strategies to find the right market place for our DC products. Moreover, government support is so important to promote Sri Lankan DC products in the international market through various trade fairs and formulating favorable policies to lose the trade barriers open gates for our DC products to be more available in the international market.

Policy disabling features

Still Sri Lanka has not identified the potential of Sri Lankan desiccated coconut in the international market. Throughout the past years we have focused on usual markets rather than grabbing opportunities in the other markets. Therefore, we cannot see a good improvement in the current export markets. Only a few countries show the positive potential for our DC products while the rest from the top 20 DC export markets have unfavorable markets. What we have as policies for the moment should need changes to adopt more useful and practical implements. Rather than focusing on overall coconut export, special attention is required for each sub category such as the desiccated coconut industry to formulate the most suitable policies. After observing the support of local producers as their individual contribution to the industry it seems there is a need of promoting our DC products in the international market well and more than their individual policies, consolidated policies should be followed to improve the overall demand for Sri Lankan DC.

Present policy context

The government of Sri Lanka has established its own institutions to promote coconut exports and coconut productions. Though the production is owned by the private sector, the government has taken the authority and power to regulate the coconut industry and exports. Mainly the Coconut Development Act (Act No. 46 of 1971) provides the legal backup for the coconut industry. Coconut Development Board, Coconut Research Institute and Coconut cultivation Board are institutions which are established by the Sri Lankan government to assist in the efficient and accurate operation of coconut production and export.

Moreover, the government is taking steps to establish an agency for international trade intention to negotiate in trade agreements. Sri Lanka is also having GSP+ (Generalized Scheme of Preferences) and it supports Sri Lanka to export more to the European union. Sri Lanka has signed into several trade agreements to experience free trade, lower tariffs and enhance the export. Mainly Sri Lanka has an agreement with India (Indo Sri Lanka Free Trade Agreement), With Pakistan (Pakistan- Sri Lanka Free trade Agreement) and also is a member of SAAC Preferential Trade Arrangement, South Asian Free Trade Area and Asia Pacific Agreement. For instance, Sri Lanka allows foreign direct investments and facilitates who is willing to invest in Sri Lanka.

Sri Lanka has got their own national trade policy and other than their national trade policy now Sri Lanka is coming up with a National Export strategy that was initiated by the Export Development Board collaborating with the government and private sector. This is a Five years-oriented action plan which aims development in trade and competitiveness. And these export strategies are based on different sectors and each sector has got their own strategies to implement. Here desiccated coconut is coming under the process food and beverages strategy. (Sri Lanka Export Development Board.)

Policy recommendations

- Government should come up with new policies which are more specialized to the Sri Lankan Desiccated coconut industry.
- Policies should be formulated to encourage the small and medium entrepreneurs to give their maximum contribution to increase the scale of current desiccated coconut industry. Therefore, concessional policies should be formulated.
- Policies should be formulated in such a way that all the institutions approved by the government for regulating the whole coconut industry work not only individually but also jointly. The government of Sri Lanka has deployed several institutions for regulating cannot see consolidated activities to uplift the sub categories of coconut industry.
- The government should focus on foreign policies that minimize barriers to export specially in countries where DC products will be highly marketed.
- It is advisable to maintain and go for trade agreements with countries that are having favorable market for Sri Lankan desiccated coconut.
- Appropriate policies should be formulated for the trade fairs which introduce the Sri Lankan desiccated coconut to the international market.
- Should formulate policies that assist to identify and understand the international markets broadly and help to improve the marketing aspects.
- Formulating favorable policies in research and development to identify the right features of the DC products and produce the most suitable DC products which can compete with the rivalries' products.
- Government should present policies to protect coconut lands from fragmentation.
- Policies should be formulated to create a conducive environment for DC exporters to have more consolidated activities together.
- Policies should be formulated to implement various programs that will always protect local DC exporters and enable them to successfully cope with foreign markets.

Citation:

Bhagyani, M.A.D.M., Wattage P., and Abeynayake T. (2022). Export performance of Sri Lankan desiccated coconut. *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

Offer my sincere gratitude to the internal supervisor Dr. Premachandra Wattage, consultant, Department of Agribusiness management, Faculty of Agricultural sciences, Sabaragamuwa University of Sri Lanka and external supervisor Tharanga Abeynayake, Human Resource Manager at Cocotana Coconut Products, Negombo for the constant guidance, advice, encouragement throughout the research.

Production and Marketing of a New Type of Yogurt with Sunflower Oil and Kithul Treacle



Executive Summary

Yogurt is the most popular and widely consumed fermented milk product all over the world. However, with the increasing rates of noncommunicable diseases, people choose nutritional care and the demand for health-promoting foods has risen drastically in recent years. The shifts in consumer preferences towards diets have affected the demand for yogurt as well and people started to seek options such as low saturated fat and low/no added sugar in yogurt products. The Sri Lankan dairy industry must be revitalized with new creative products, based on these newly acquired customer experiences. Therefore, this study aimed to develop a set yogurt with reduced saturated fat and refined sugar without harming the quality aspects of the yogurt. It attempted to create a foundation for a new value added product incorporating natural ingredients with various health benefits. It can expand the production of fermented milk products from those traditional yogurt types to a completely new market segment.

Key features

- Manufacturing of a new type of yogurt with sunflower oil and Kithul treacle and the preliminary trials and analyses related to it were carried out at the research laboratory at Milco Private Limited, Digana, Kandy.
- In preliminary study 1, a sensory evaluation was conducted using 15 panelists to determine the best sunflower oil incorporation.
- Four samples with 50%, 60%, 70% and, 80% sunflower oil percentages were developed and 50% (w/v) sunflower oil was chosen as

This policy brief is prepared based on the undergraduate research on "Development of a sunflower (Helianthus annuus) oil and Kithul (Caryota urens) treacle incorporated set yogurt". The main objective of this study was to develop a set yogurt with reduced saturated fat/ sugar without harming the quality aspects of the yogurt. Thus, the study was concerned with develop a yogurt product with higher organoleptic acceptability and determine its shelf life by evaluating physicochemical and microbial properties.



Figure 1: Sunflower oil



Figure 2: Kithul treacle
the best percentage to incorporate with highly acceptable organoleptic properties.

- Preliminary study 2 was conducted to find out the most preferable ratio of sugar and Kithul treacle to incorporate with set yogurt by a sensory evaluation using 20 panelists.
- Five samples were developed with 0:1, 1:1, 2:1, 1:2, and 1:0 sugar: Kithul treacle ratios to determine the best ratio and the sample with 0:1 (sugar: Kithul) ratio was chosen as the best with the highest mean values for all the organoleptic attributes.
- Physicochemical and microbial properties of the samples were analyzed during refrigerated storage at 4oC for 20 days at five days intervals.
- According to the microbial analysis, the shelf life of all the samples was 15 days when stored at 40 C without any contamination.
- Physicochemical and microbiological properties of all five samples were within the acceptable limits for 15 days.
- Therefore, the best sample was selected in accordance with the results obtained from the sensory evaluation.
- The sample made with 50% (w/v) sunflower oil and 0:1 (Sugar: Kithul treacle) ratio was chosen as the best sample by evaluating all the tested attributes.
- A consumer survey was conducted using 100 individuals to measure the acceptability of the product concept and willingness to purchase.
- According to the consumer survey, 99% of the respondents like to buy this product and 65% of the respondents were willing to pay a higher price for this product.
- 72% of the respondents preferred a plastic cup with an aluminum foil lid as the packaging.

Benefits

In recent years, there has been a growing interest among consumers in the usage of natural and nutritious foods in terms of maintaining health and they are willing to try out innovative products with additional health benefits. Low consumption of refined sugars, saturated and trans-fats set examples as good dietary practices. Vegetable oil has a better absorption property than milk fat, is cholesterol-free, is less expensive, and is less impacted by seasonal fluctuations. Milk fat substitution by vegetable oils provides a healthier saturated and unsaturated fat balance for yogurt. Due to their lower melting point, unsaturated fatty acids have a lower probability of being deposited in the body and from a nutritional standpoint, is a healthier option to replace milk fat.

Kithul treacle is nutrient-dense; consisting of simple sugars thus, the sugar does not become stored in the body. Kithul treacle is in great demand due to its natural origins and organic food production processes. It is well known for its health-promoting effects such as anti-aging and anti-rheumatic activities. Kithul treacle is classified as a low glycemic index (GI) food and its glucosidase inhibitory activity has indicated that it has anti-diabetic effects thus people with diabetes can consume it without any negative health impacts.

Costs

Sunflower oil and Kithul treacle are somewhat expensive in Sri Lanka, thus, the price of the product will be higher than the current price of regular yogurt. If the company goes to commercialize this new product, there will be additional costs to bear with raw materials, machinery, human resources, and packaging.

Policy enabling features

The prevalence of non-communicable diseases (NCDs), mainly cardiovascular disease, cancer, diabetes, and chronic respiratory disease has become a serious health concern all over the world. Dietary recommendations result in changes in consumer dietary patterns, as consumers try to limit the consumption of saturated fats, more crucially, low-density lipoprotein cholesterol, which is linked to the risk of coronary heart disease. Consumer awareness of health has motivated them to move toward healthy eating and a rise in interest in food composition and nutritional value. The food industry has been prompted to reduce ingredients such as fat and sugar due to the growing demand for fermented dairy foods with improved nutritional qualities.

Moreover, as a subsector of the livestock industry, dairy farming has played an important role in Sri Lankan society for decades, by providing livelihoods and sustenance to the community. The dairy industry is a powerful tool to achieve economic growth, food security, and poverty reduction in Sri Lanka. With the use of novel technologies, dairy farming is evolving greatly through improving efficiency, reducing costs, and complying with its corporate social responsibilities. With unmet human wants, the manufacturing industry has become extremely challenging. Converting livestock into а variety of high-value products provides various opportunities in the dairy market while fulfilling those unsatisfied customer desires. In this context, Sri Lankan dairy products manufacturers have the potential to develop new products with added health benefits to cater to consumer demand. This new product, which was created to satisfy the native Sri Lankan predilection with sunflower oil and Kithul treacle, can create a new experience in the potential market. It has the potential to help extend the production of fermented milkbased products to a completely new market sector, as well as offer a new experience for the target consumer. Additionally, this product can be used to meet the growing customer demand for healthier dairy products.



Policy disabling features

Incorporating vegetable oils with yogurt is a completely new concept in Sri Lanka. Sunflower oil is popular cooking oil, but the consumers can feel it to be different to find it in their yogurt and to be very different from the products available in the market.

Sunflower is not commercially grown in Sri Lanka; therefore, the price for obtaining an adequate supply can be difficult.

Small and medium scale manufacturers have lack of understanding of new product concepts around the world and lack of facilities, resources, and knowledge can hinder them from manufacturing this product.

Present policy context

The Food Act No. 26 of 1980 is the main legislation governing food safety in Sri Lanka. Other than that, Sri Lanka Standards (SLS) and Codex standards for fermented milk are considered important legislations to ensure food safety. Food (Milk & Milk Products Standards) Regulations (2003), are governing the manufacturing of milk and milk-based products in Sri Lanka. It has mentioned the required compositions of every milk-based product.

According to the Food (Milk and Milk Products Standards) Regulation- 2003, full-fat yogurt must contain not less than 3% milkfat and not less than 8.25% milk solids-non-fat (SNF). Food (Labelling and Advertising) Regulations (2005) is the legislation that regulates the packaging of every food product.

Policy recommendations

The results of this study revealed that sunflower oil and Kithul treacle could be effectively utilized as raw materials to develop a nutritious set yogurt.

As the food sector is a highly competitive field, new products are introduced almost every day. In order to operate a successful business in the food sector, it is critical to carry out innovations or improvements linked to food products. Consumers today prefer to eat high-quality and highly nutritious foods, hence, this study suggested developing a sunflower oil and Kithul treacle incorporated set yogurt with similar organoleptic properties to regular full fat set yogurt as consumers prefer the texture of full fat yogurt even they try to limit the saturated fat consumption.

Therefore, a policy is required to regulate the manufacturing of this product, as there are no legislations in Sri Lanka with regard to fermented dairy products with vegetable oils and sweeteners like Kithul treacle.

Citation:

Hettige, A.S., Malkanthi, S.H.P., and Karunarathna S.H. (2022). Production and Marketing of a New Type of Yogurt with Sunflower Oil and Kithul Treacle. *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

The author wants to express her deepest gratitude to Prof. S.H.P. Malkanthi, Senior Lecturer, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka and Mrs. S.H. Karunarathna, External Supervisor, Executive (QA), Milco Private Limited, Digana, Kandy, for their expert guidance and support to make this research a success.

How Do We Value the Performance of Value-Added Tea Export?



Executive Summary

The tea industry provides considerable assistance to the Sri Lankan employment rate. In 2020 Sri Lanka exported 11% Ceylon tea for the global market (Sri Lanka Export Development Board, 2020).

Even though Ceylon tea is very famous globally, Sri Lanka has still obtained only 10% market share from the global tea market (Sri Lanka Export Development Board, 2020). Moreover, most value-added tea exporters fail to identify the most effective strategies that enhance the performance of value-added tea export. Empirically there is much research investigating the impact of competitive scenarios on a company's performance. But in the Sri Lankan context, there is limited research considered about the impact of competitive strategy on value-added tea export performance. So, it is essential to identify the most effective methods that enhance the performance of Sri Lanka's value-added tea export. This study will provide the answer to how do we value the Performance of value-added tea export? And what are areas that need further development to enhance the company's performance?

Key features

The study found that production cost enhances the value-added tea export sales revenue under cost leadership strategy. But distribution and employee training costs do not contribute considerably to improving sales revenue of the value-added tea export.



This policy brief is based on the undergraduate research on *"The worth of value-added tea export:*" special reference to the amazon trading (Pvt) Ltd". The study focused on the performance of value-added tea export in Sri Lanka. Under that mainly focuses on competitive strategies such as cost leadership strategy, differentiation strategy, and focus strategy used by valueadded tea export companies and the impact of competitive strategies on values added tea Export Company's performance. The study selects the secondary data collection method as the most suitable data collection method. Under that in this study, secondary data were collected through the reports of the accounts department, marketing, and sales department. According to that, 5 years of monthly data (2016 April – 2021 March) of Amazon Trading (PVT) Ltd were used to conduct this research.

- Under the differentiation strategy, three factors were considered. Among them, the cost for blend and flavor provides a considerable contribution to enhancing sales revenue. The other two factors are product development cost and marketing and promotion cost. Those two do not significantly impact the company's sales revenue.
- Focus strategy is another strategy considered in this study. Under focus strategy, the value of tea exports enhances the sales revenue of the value-added tea export.
- According to that, the study shows that implementing strategies in the company will help enhance the company's performance.
- The result revealed that the company must further consider implementing suitable strategies to enhance the company's performance. It is better to focus on arranging awareness programs for employees, using new technologies for production, investing in innovation, considering new marketing strategies, and organizing employee training programs.
- Through implementing employee training programs, value-added tea export companies can enhance their performance, and it will help to reduce waste during production.

Benefits

Implementing strategies in the value-added tea export company increase the company's sales revenue.

As a result of organizing an employee training program to enhance the company's performance, the following benefits can obtain for the company.

- Increase the quality of products
- Reduce the unnecessary cost and waste
- Reduce employee faults
- Improve the employee's satisfactions
- Increase the profit of the company

Through the establishment of new technology, the quality of the products will increase. Then the demand for Ceylon tea will increase in the global market, and it will help enhance the economic growth of Sri Lanka. By implementing differentiation strategies in the value-added tea export sector, companies produce new value-added tea production to the market. Then it will be helpful for Ceylon tea to compete in the global market with other international competitors. Furthermore, it will create a valuable brand in the worldwide market. And it will also help to increase the foreign earning to the country.

Moreover, to get quality tea materials, it is essential to provide correct guidance and organize rural development programs to motivate the tea farmers. Then the company can get quality tea materials for production. Furthermore, it will develop the farmer's livelihood, and it will help to rural development of the country.

Costs

There is a high cost for implementing new technology in value-added tea production, and the development of quality standards and certification is a significant barrier for most tea exporters.



Tea export is the main foreign income earning unit in Sri Lanka by providing a significant contribution to Sri Lanka's economic growth. According to that 2020 Ceylon tea contributed 0.14% contribution for Sri Lanka GDP (Sri Lanka Export Development Board -2020). Not only that tea industry provides a considerable contribution to the Sri Lankan employment rate. In 2020 Sri Lanka has exported 11% Ceylon tea for the global market (Sri Lanka Export Development Board -2020). According to the Sri Lanka tea board, Sri Lanka exports more than 50% of value-added tea to the global market. The value-added tea range includes green tea, flavored tea, Organic tea, instant tea, ice tea, and ready-to-drink tea.

Sometimes, some raw materials can't grow in Sri Lanka when engaging in innovation. There are not enough raw materials in Sri Lanka to produce those products.

The company has to bear the high cost of importing those raw materials from foreign countries.

Moreover, the company must bear the considerable cost of employee training and the awareness program for the framers.

Policy enabling features

It is better to provide a high awareness, knowledge, and education for employees and farmers. Then it will help to enhance the sales revenue of the company. Tea companies arrange training programs and awareness programs for their employees and farmers. Moreover, tea companies mainly engage in CSR programs to encourage and enhance the sustainability of the community. There is a high demand for agricultural communities of Ceylon tea in the world market. Therefore, increasing the quantity and quality of the production can be the primary strategy to obtain the advantages of the global market. Now organic tea production has become the central part of tea production.

Now, most companies are converting to organic tea production. This also creates value for Ceylon tea production.



Policy disabling features

There is high competition in the global tea market, and sometimes there may be illegal things in the market. There is a barrier to continuing to new tea producers, and multinational companies create obstacles for small value-added tea producers. There is a high cost for quality standards and certifications. For example, tea export companies have to bear high costs to gain quality standards for the products.

Present policy context

In Sri Lanka, the government plays the leading role in introducing and implementing new policies in the value-added tea export sector. The government organizations are the tea export development board (TED), the Export development board (EDB), and the Tea board. These government institutes always consider the performance of Sri Lanka's tea production and provide some solutions to develop the tea industry in Sri Lanka. The export development board controls the policy regarding tea exports. Export development boards always try to enhance the value-added tea production in Sri Lanka.

The reason is that now most consumer preferences are changing to value-added tea consumption. Moreover, there are quality standards for tea production such as ISO, GAP, Soil certification, Organic tea certification, etc.

Through that Sri, Lanka government tries to develop Ceylon tea products' quality.

Policy recommendation

To improve the quality of the value-added tea export sector, it is essential to introduce new technology for tea production. And provide some loans to purchase the machines with the latest technology. Then companies can enhance the value-added tea export quality, and it will help increase the company's profit. Moreover, it is helpful to arrange workshops and training programs for employees in tea production companies. It will be challenging to convert new technical machines for their process at once. Try achieving the company's goals and making necessary arrangements to improve the company's effectiveness and get better results. It is better to arrange some awareness programs for tea export companies to provide correct information about the competition in the market and how to face it correctly.

Citation:

Wathsala, P.W.U., Wattage, P., and Perera P. (2022). How Do We Value the Performance of Value-Added Tea Export? *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University Sri Lanka.

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Acknowledgements

I wish to express my profound gratitude to Dr. P. Wattage, my research supervisor and the Consultant of the Department of Agri-Business Management, Faculty of Agriculture sciences, the Sabaragamuwa University of Sri Lanka, and I would like to be thankful to my external supervisor Mr. Priyantha, in Amazon Trading (Pvt) Ltd for providing a vast and valuable guide, support and inspiration to complete my project within the limited time frame.

Is It Necessary to Evaluate Tea Farmers' Knowledge Regarding Organic Farming?

Executive Summary

The tea smallholding sector is one of the leading sectors in national tea production in Sri Lanka. Tea is one of the main cash crops in Sri Lanka & since establishing tea cultivation in Sri Lanka that has been popular among all over countries as Ceylon Tea. The tea industry in Sri Lanka Significantly contributes country's economic development through various ways such as foreign exchange earnings, GDP, employment & consumption; resulting tea industry has been recognized as a dynamic sector in economic culture. Due to the structural changes in tea production in 1950, the tea smallholding sector has come forward quantitatively and qualitatively, showing its performance effectively. This paper aims to estimate how farmers' knowledge applies to reducing chemical fertilizer during their farming practice for protecting biodiversity using a choice experiment method (CE). These include the protection of the long-term fertility of the soil, using Mechanical intervention carefully, and marketing value of certified organic products. A literature review and government policies guided the design of the choice card. The study used SPSS software to generate orthogonal main effects for CE design to analyze the data collected.

Key features

- The study found that tea farming is the most helpful & promising income source for farmers.
- This study evaluates farmers' revenue, cost of production, profit & yields to previous seasons.
- Results revealed farmers' knowledge, perception, and motivation towards organic



This policy brief is based on the undergraduate research on "Is it necessary to evaluate tea farmers' knowledge regarding organic farming? in Sri Lanka". The research focus is to identify the how farmers' knowledge applies to reducing chemical fertilizer during their farming practice for protecting biodiversity using a choice experiment method (CE). These include the protection of the long-term fertility of the soil, using Mechanical intervention carefully, and marketing value of certified organic products. A literature review and government policies guided the design of the choice card. The study used SPSS software to generate orthogonal main effects for CE design to analyze the data collected.



Figure 1: Organic Tea Plantation

farming.

- Moreover, this result revealed farmers' choices between different farming practices.
- When comparing the organic and non-organic farmers, revealed differences between their knowledge, perception, and motivation.
- Majority of farmers have not practiced their farming activities with machinery.

Benefits

Through these programs, farmers will be able to

- I. Gat good understanding about organic farming
- II. Increased tea production
- III.Increased revenue
- IV.Increased profit
- V. Enhance farmers' living standards

These benefits allow tea farmers and the company to increase farm productivity and efficiency while increasing farm productivity and efficiency while contributing to the nation's agricultural economy. Further, identifying farmers' knowledge helps the company revise and design the training program and other extensive programs to address the need and fill the gaps in farmers' knowledge. Moreover, those programs will yield various socio-economic benefits directly for the farmers. Providing skills and knowledge for farmers will be able to motivate farmers to enter into organic farming and further improve farmers' living standards.

Costs

Currently, the country allocates a significant proportion of money, time, and other resources for arranging training programs, extensive programs, and other knowledge improvement programs. However, most farmers are faced with different challenges these days. The fertilizer issue is the main issue from those challenges and lack of funding, lack of labor, low Yield, lack of extension agents, and quality issues. Therefore, a country must invest significant financial costs to arrange and formulate flexible rules and regulations and other strategies matched with tea farming activities.

Policy enabling features

Many farmers (65.4%) are engaging in tea farming as secondary income, while 34.6% of farmers have joined tea farming as the main occupation. Meanwhile, all of the farmers have a moderate level of education. Therefore, farmers have considerable knowledge, skills, and farming practices. The tea industry in the world is growing in the future due to its best popular drink. Therefore, the growing trends in the tea industry will allow for adopting more policies related to the sector's development. Further, cultivating tea only requires a considerably low level of resources. Those advantages of the plant and the requirement of fewer management practices will help the policy implementation related to the training programs.

Policy disabling features

Most farmers have not maintained proper farm records like soil test reports, fertilizer reports, and chemical reports. Further, there is a lack of networking and interaction between the extension workers. The government also taking immediate action is not a comfortable process for all farmers due to fertilizer issues production issues. That's why farmers are not preferred to move from chemical farming practices to organic farming. Therefore, the government should take decisions that are matched with farmers' practices.

Present policy context

In Sri Lanka, the government plays an essential role in setting and implementing new policies and strategies. Therefore, both private and public sector organizations give institutional assistance to the tea industry. The government also arranges several programs, purposing build up a sustainable environment within the country. They result in an organized awareness program to improve farmers' knowledge regarding organic farming practice. They trained all extension workers in the agriculture field to enhance the skills of all farmers. The government also offered different loan schemes for improving the agriculture field.

Policy recommendations

- 1. Conducting workshops for farmers.
- Firstly, we need to understand the farming context; we should identify the farm audience when referring to it. Farmers, as well as farm educators (extension personnel, farm advisors, or those who provide support for agri-environmental schemes), are included in farm audiences. When conducting actual workshop presentations for farmers, it is better to use scientifically trained farmers, NGOs, agricultural extension agency personnel, and researchers who excel at communicating directly with farmers. Direct communication will be able to grab challenges that farmers in their farming practices face.
- 2. Arrange field visit

Farm educators can arrange field visits to organic tea estates. However, it is better to participate in both farms. Because organic farmers have any issues regarding their farming practice, they received additional information. At the same time, conventional farmers may also be motivated to convert to organic farming. Furthermore, build their perspective on the practice and associated ecosystem services and answer questions directly from other farmers.

3. Technical and financial resources

It is better to provide direct linkages to universities, extension, governmental agencies, and NGOs beyond the demonstration and educational phase. Because it helps farmers obtain technical or financial assistance for the ecosystem service-driven practices being promoted on private farmlands or farmland commons. Through this process, we will be able to overcome the economic issues of farmers.

So application of these strategies needs to change farmers' behavior to engage organic farming. According to the results, opening up immediate policy interventions help build farmers' resilience in Sri Lanka. Hence, policy interventions would include: (i) encouraging farmers' for entering organic farming through farm subsidies or access to credit facilities to buy and maintain equipment. (ii) Improving linkages between producers, markets, and consumers, by creating and strengthening value chains and facilitating the flow of produce from organic farming; (iii) expanding the use of organic farming technology nationally by initiating and promoting relevant extension activities, such as the creation of demonstration sites across the country (iv) facilitating access to land suitable for organic farming. However, this should go along with massive public enlightenment campaigns among farmers about the benefits of such technology.



Figure 2: Organic Tea Cultivation

Citation:

Anjalika, J.K.M.R., Wattage, P (2022) Is It Necessary to Evaluate Tea Farmers' Knowledge Regarding Organic Farming? *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

I wish to express my profound gratitude to Dr. P. Wattage, my research supervisor and the Consultant of the Department of Agri-Business Management, Faculty of Agriculture sciences, the Sabaragamuwa University of Sri Lanka, and I would like to be thankful to my external supervisor Mr. Priyantha, in Amazon Trading (Pvt) Ltd for providing a vast and valuable guide, support and inspiration to complete my project within the limited time frame.

Impact of HRIS on Performance of the Company

Executive Summary

Over the last decades there has been a considerable increase in the number of organizations gathering, storing, and analyzing information regarding their human resources using human resource information systems (HRIS). Today, many organizations transform their HRM functions from the manual work processes to the computerized work processes. Furthermore, this study pays attention toward the determining the functions of the HRIS. Its impact to the performance of company and identifying the problems when maintaining implementing the HRIS. Furthermore, this study tries to find out the current usage of this portal to the company and what is the preferable function of the company are in HRIS.

Mainly investigates the impact of five factors, i.e., E-Recruitment, E-Training, E-Payroll, E-Performance Appraisal Module and Employee self- service module on the HRIS System. An organization's human resources are its greatest asset, and the effective management of its human capital is a fundamental source of competitive advantage. When the HRIS function was computerized, fast decision making was able to take place in the development, planning, and administration of HR because data became much easier to store, retrieve, update, classify, and analysis.

Key features

• This study examine each dependent variable(performance of company) and independent variable(E-Recruiting, E-Training, E-Payroll, E-performance Evaluation, E-Payroll and



This policy brief is an outcome of undergraduate research on '*The impact of Human Resource Information System on performance of the Rasoda Dairies PVT limited.*' This study intends the find out impact of human resource information system on performance of the company. According to that found out the factors of HRIS and how to effect E-Recruiting, E-Training, E-Payroll, E-performance Evaluation, E-Payroll and Employee self service module to performance of the company. This study examined data from 120 permanent employee whose use Human Resource Information system in company Employee self service module) When study the company performance it measure via cost management, time management, human resource department performance

- Results of the research are all independent variables are directly impact of the performance of the company. And HRM is one of the most important strategic areas for the development of an company. Since their front office employees are in continuous interaction with clients and back office employees are responsible for the tasks oriented to constant service, product improvement and competition with other companies. This is where adequate HRIS is significant
- The study therefore recommends for Rasoda Dairies PVT limited should adopt human resource information system as it was found to give updated quality information. The study also recommends that there is need for RDPL to invest in technology and training as this will effectively enhance their performance.

Benefits

There are more benefits consist in the research. Improve relevant technologies of HRIS /Increase effectiveness and efficiency/Increase performance of Human Resource department HRIS is software. Therefore upcoming technology is most important. Via the study identify what is the variable that need of high technology. According to the study find out the How to impact HRIS on performance of the company. Results of the research are all variable are directly impact the performance of company. Time to time coming many updates of the system and when it use the right way company can enhance the effectiveness and efficiency.





Costs

Currently the company allocates a significant proportion of money to HRIS. If continuously use the system and get more effective output, company has to bear another high cost of the development. Because HRIS is system and it engage the high technology. And also there are so many updates of the any system and company has to invest for that.

Policy enabling features

When use the HRIS system employee as well as staff members want to know about the system. As a company they give fully knowledge about HRIS to staff members and employees. And also they want know what incident that they use the HRIS. In present time period they all are fallow the system in relevant time

Policy disabling features

As a system they do not follows updates of the HRIS system and some are do not know about what is system. Not only that sometimes some parts of software do not work properly and they did not get action quickly. After that as a company did not action regard that.

Present policy context

HRIS is most popular system and all company follows the system. In modern business has high competition and as a company must adopt these kind of system. All are desire doing work easily and smart way without handling documents.

Policy recommendations

HRM is one of the most important strategic areas for the development of an company. Since their front office employees are in continuous interaction with clients and back office employees are responsible for the tasks oriented to constant service, product improvement and competition with other companies. This is where adequate HRIS is significant. It can be more than a tool for following the employees basic demographic data and working hours. It can be a tool for identifying highly potential employees and directing them to areas of their working interest. It can give the management the information of not only what was done, but who had done it. It also enables it to give feedback and not just take disciplinary, but also rewarding actions towards employees. Online recruiting offers a variety of tools including pre-employment screening, personality assessments and testing to screen candidates to allow selection of qualified candidates who match the organization's values and culture with minimal human interaction. Many recruiting software packages offer a variety of these services that can be customized to meet organization's specific needs for each job.

Online recruiting reaches a much larger or more targeted audience than other methods do. E-training will equip the employees with knowledge and skills to effectively and efficiently carry out the tasks which will in the long run enhance performance. E-payroll administration will help the organization perform calculations that have effects on the business as a whole including reduction of costs in HR functions thereby enhancing the overall performance. Employee self- service module will offer a variety of tools including employee self-information collection, self-induction services and selfleave apply services and thereby it improves the company performance.

The study therefore recommends for company should adopt human resource information system as it was found to give updated quality information. The study also recommends that there is need for invest in technology and training as this will effectively enhance their performance. However HR department are less likely to update with the emerging technology. The organization should facilitate the department with providing the necessary infrastructure such as network equipment, servers, terminals etc. along with the upcoming technology changes. However HRIS developer should provide quality and user friendly human resource information systems to their clients which are able to enhance the effectiveness of human resource functions. I also need to provide necessary and adequate information regarding HRIS modules to their clients for encouraging them to utilize those modules.

Citation:

Jayawardhane, J.M.C.K., Wattege, P and Ariyarattne, I.M.K. (2022). Impact of HRIS on Performance of the Company. *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural sciences. Sabaragamuwa University of Sri Lanka

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Acknowledgements

Offer my sincere gratitude to the internal supervisor Dr. Premachandra Wattege, consultant, Department of Agribusiness, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. And my external supervisor Mr. I.M.K Ariyarattne, Production manager at Rasoda Dairies PVT Limited.

Is It Necessary to Maintaining Service Quality for Improving Customer Satisfaction at Farm Outlet Shops?

Executive Summary

Quality is the imperative concept in the current business environment. The business should be maintained its quality whether is a productbased or service-based business. The Retail Service Quality Model (RSQS) is a model which measures the service quality in the industry. It covers physical aspects, reliability, personal interaction, problem-solving, and policy.

This study tried to determine the relationship between service quality and customer satisfaction and the relationship between customer satisfaction and sales performance at farm outlet shops. During the study, the service quality gaps were determined. Also, influencing power of service quality factors were determined. According to the findings, the physical aspect has more influencing power on retail service quality rather than the other four dimensions. Also, physical aspects, reliability, and personal interaction positively influence on customer satisfaction. However, the policy dimension has negative influence power on customer satisfaction.

Key features

- According to the results, customers received satisfying service quality from the employee aspect.
- Customers are moderately disappointed in the reliability and problem-solving aspect of the retail outlet. Also, the physical appearance and general policies of the farm outlet shop are providing weak service to the customer.
- Results revealed that the physical appearance of the farm outlet shop is highly influencing on customer satisfaction rather than reliability, employee, problem-solving, and general policy aspects.
- Also, physical aspect, reliability, and personal interaction dimensions have a positive



This Policy Brief is prepared based on undergraduate research on "*The Application* of Retail Service Quality Scale (RSQS) on Improving Sales Performance: A Study in NLDB Sales Centres". The main objective of this study was to find out underperforming service quality dimensions according to RSQS model and suggest suitable solutions for improving sales performance of NLDB sales centres. This study examined data from 215 NLDB sales centre customers and gathered their thoughts and expectations on the service quality at NLDB sales centres.



Figure 1 – Adequate vehicle parking area isn't provided

relationship with customer satisfaction.

• However, the policy dimension has a negative relationship with customer satisfaction.

Benefits

The industry can identify weak service areas of the farm outlet shops and they can take necessary steps to avoid those weaknesses and provide a better service for their customers. This may help to increase the sales revenue by satisfying their customers. Also, it will create a group of delighted customers with the farm outlet shop.

From the customer side, customers will receive a better service from the farm outlet shop. It may help to save their time, money while receiving a better shopping experience. Also, customers can experience better, quality, and healthy products.

"As consumers, always we are looking for quality, safety foods for lower prices. We can trust NLSD's product quality rather than private manufacturers since NLDB is a government owned business. Also, if this is a government business it should be think on its service and provide a competitive service to the customers. Then it can attract more customers and expand its market share gradually."

-A customer of NLDB sales centre-

Costs

The major cost of farm outlet shops is rebuilding the physical facilities at the shop. The shops need to purchase some equipment and utensils to provide better service for the customer. Also, A proper marketing campaign has been performed to attract new customers and retain current customers.

Policy enabling features

Employees of the farm outlet shops are maintaining a good relationship with the customer. Also, they have sound knowledge of their duties. Moreover, the farm outlet shop maintains good showcase arrangement and quality of the products. On other hand, the farm outlet shops provide convenience for its customers from operating in a convenient time for customers and providing continuous service to the customer,

Policy disabling features

The farm outlet shops are maintaining poor service quality in providing physical facilities, seating arrangements, providing vehicle parking facilities, and electronic payment facilities.

The physical appearance of a business is very crucial and it may assist to attract potential customers to the business. However, the physical appearance of the farm outlet shop is not attractive. Also, customer problem-solving practices are needed to improve for providing better service to the customer.

Previous research revealed that a vehicle parking facility is a critical feature for a farm outlet shop. However, farm outlet shops are not providing adequate vehicle parking facilities and electronic payment methods.

Present policy context

National Livestock Development Board has taken a few steps to improve the service quality of its own farm outlet shops.

They had changed their marketing policy to attract new customers. Under this, they renovated and established four mega-type outlets. Also, they planned to purchase new equipment and utensils for providing a better customer experience. Further, they had established a roadmap to rebranding farm outlet shops in 2022.

Policy recommendations

This study suggested that the farm outlet shop needs to improve its physical appearance in a few manners. The signboard should be attractive. Also, a juice dispenser machine can be used to display and store cool fresh milk. A bottle display cooler can be used to store and display chill products. Further, a comfortable seating area can be provided. Also, since farm outlet shops operated as a retail chain, it's better to introduce a standard product display layout for all farm outlet shops.

Moreover, farm outlet shops need to improve reliability features. Under this, farm outlet shops should provide a continuous service for their customers and ensure product availability at the shop.

Furthermore, the general policy of the farm outlet shop needs to be improved for providing a better customer experience. Hence, the vehicle parking area is a crucial feature in the Sri Lankan context, farm outlet shops also have to provide adequate vehicle parking areas for their customers. Also, an electronic payment system should be implemented and function at the retail farm shop.

"Quality is never an accident, it is always the result of intelligent effort." -John Ruskin-

Citation:

Madhusanka, S.A.C., Ratnayake, K.K.H.M., and Sumanasiri, A.P. (2022). Is It Necessary to Maintaining Service Quality for Improving Customer Satisfaction at Farm Outlet Shops? *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.



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Acknowledgements

The author wants to express his deepest gratitude to his internal supervisor, Ms. K.K.H.M. Rathnayake, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka, Furthermore, he wants to thanks his external supervisor, Mr. A.P. Sumanasiri, Deputy Chairman, National Livestock Development Board, for the continuous support given throughout the period.

The Impact of Motivational Factors on Improving Employee Performance in Farm Sector

Executive Summary

Employee motivation is the enthusiasm, energy level, commitment, and creativity that an employee brings to the organization daily. There are two types of motivation, intrinsic and extrinsic. An organization needs to understand that not all employees are clones; they are individuals with different traits. Thus effectively, motivating employees will need to acquire a deeper understanding of motivation's different types and ways. Intrinsic motivation means that an individual is motivated from within. The employee desires to perform well at the workplace because the results follow the employee's belief system. Individual motivation stimulated by external factors, rewards and recognition are extrinsic motivation. Some people may never be motivated internally, and only external motivation would work with them to get the tasks done.

The employees in the farm sector require special attention to be paid, as their working conditions are not comparable with those of employees working in any other field. The main characteristics of agricultural work are compulsory overtime during the busy season and the irregularity of work during the day. Sometimes, during seasonal work, the workers in agriculture do not have days off. This situation is one of the reasons why agricultural work is considered physically more demanding than other types of work. Furthermore, work productivity is much lower, and there is also an adverse effect from climatic conditions on the workers.

Key features

• The study found that most farmworkers do



This Policy Brief is prepared based on undergraduate research on "*The Impact of Motivational Factors on Improving Employee Performance: A Case Study of NLDB Melsiripura Farm.*" The study intended to find out the relationship between motivation and employee performance and determine challenges towards effective motivation practices. Primary data for the study derived from the responses of 94 casual workers in National Livestock Development Board Melsiripura farm.



Figure 1 : Counting nuts

not have at least primary level education, 66% of the total casual employees. In addition, 59.6% of employees had more than 05 years of working experience in the farm sector.

- However, 60.6% of employees responded that the farm does not provide the current motivation package adequately.
- Findings of the study revealed a more significant impact on the employees' performance from the extrinsic motivation factors 85.1% than the intrinsic motivation factors 14.9%.
- Moreover, results revealed a pessimistic influence on employee performance of 60.6% with the existing motivation package.
- Also, the study found the motivation hindering factors at the firm. It revealed the following factors are the hindering factors for motivation practice at the farm organization policy 39.4%, lack of management willingness 28.7%, and the shortage of resources 31.9%.
- Further, results revealed a positive impact of motivational factors on employee performance on the farm.
- Finally, the study suggested upgrading the existing motivation package, providing proper sanitation facilities in the workplace, providing a working and safe equipment free of charge.

Benefits

According to the results of the study, the benefits of the motivated employee will

- 1. Increase employee attendance
- 2. Improve employee capacity
- 3. Enhance employee efficiency
- 4. Increase employee constancy
- 5. Improve employee punctuality
- 6. Improve employee enthusiasm

And the overall employee performance will be increased. These benefits allow the employee and the farm to increase the farm's profitability and efficiency while contributing to the nation's agriculture economy. Further, identifying the effect of motivation on employee performance will help the farm revises and designs the employee motivational tools to fill the gaps in employee performance. Moreover, employee motivation will lead to various benefits directly for the farm and employees. For instance, improving the performance of employees results in an increment in their job satisfaction and loyalty to the organization.

The majority of employees regarded their salary and allowances as underestimated compared to responsibilities given. This situation necessitates salary review in the farm sector to reflect the employee has given responsibility and the current economic environment, which may help provide reasonable extrinsic motivational factors that may improve employee's performance. Management ought to adopt mixed motivation approach that incorporates intrinsic and extrinsic motivation so could modify employees to perform at a high level.



Figure 2: Milking at the milking parlor

- " As a result of lack of motivation practices at the farm, the , a number of employees have been leaving the farm."
- Casual employee at NLDB Melsiripura farm -

Costs

One way of figuring out the cost of lack of motivation is the percentage of the payroll method. It depends on the premise that employees are not motivated to do a good job. As a result, they do not work up to their potential. When they give less than 100% of effort, employees are short-changing the farm because the farm is still paying them 100% of their salary.

Currently, the farm allocates a significant proportion of money to different motivational tools. However, as these motivational tools continue to change and thrive, the farm will have to bear another high cost for employee motivation.

The time allocated for farming activities is set aside for these motivational development programs as an opportunity cost.

Policy enabling features

Many of the employees, 59.6%, have more than five years of working experience. On the other hand, only 40.4% of employees have less than five years of working experience in the farm sector. Employees who have years of experience in the farm sector will understand and adopt new guidelines as they are aware. Besides, the employees do not have experience in the farm sector. Generally, they are flexible in policy changes since it was not too challenging to change the policy. This situation is because of attitudes, methods, and practices towards new policies of both experienced and no experience employees. National Livestock Development Board (NLDB) farms are government institutes. The government mostly thinks about public well-being rather than making a profit. The government can zip up the performance gap by enhancing the employee motivational factors by investing resources in National Livestock Development Board farms.

Policy disabling features

According to findings, there was no positive organizational policy for improving employee motivation, including lack of resources to enhance employee motivation and management involvements for developing employee motivation in the farm.

Moreover, bureaucracy with the farm staff, not caring much about the human resource in the farm, and political interest factors also will be significantly affected to disruptive the new method and practices towards new policies.

Present policy context

National Livestock Development Board farms currently provide intrinsic and extrinsic motivational factors to motivate their employees. However, these factors are not functioning well due to the current geriatric situation. Therefore, the sizable gap is still there.

Moreover, there is no particular position or person to handle human resource activities on the farm premises. For example, field officers and executive staff handle human resource issues on the farm. As a result, the employee might not be satisfied sometimes with the solutions related to their problems at work.

Policy recommendations

This study suggested that the employees' motivation on the employees' performance should be more effective than the current status. Therefore, the farm should reconsider enhancing the motivational tools by using different approaches.

They are achieving these goals and making arrangements improve necessary to and communication networking between employees and the farm staff for better results. It also advised implementing the strategies to utilize available resources efficiently, following optimum conditions needed to acquire employee performance and minimize wastage of resources. Therefore, farm management should adopt a mixed motivation approach that incorporates intrinsic and extrinsic motivation to modify employees to perform at a high level.

However, this could achieve through having a positive perspective towards human resources improving employees' recognition and involvement in management.

Citation:

Shashiranga, R.I.L, Rathnayake, K.K.H.M. and Ranasinghe, I.G.L.C. (2022). The Impact of Motivational Factors on Improving Employee Performance: A Case Study of NLDB Melsiripura Farm.Policy Insights 2022-Issue I, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University 45 of Sri Lanka.

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Acknowledgements

I want to express my deepest gratitude and heartfelt respect to my internal supervisor, Mrs. K.K.H.M. Rathnayake, Lecturer, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. She dedicated her time to supervising me, providing correct guidance for my research to achieve a good outcome and complete this research successfully. I would like toexpressmygratitudeandrespecttomyexternal supervisor, Mr. I.G.L.C. Ranasinghe, Assistant Manager, National Livestock Development Board Malsiripura Farm, Malsiripura. For his dedication and the facilitation to complete this research successfully.

How to Make Traditional Roasted Curry Paste Ground in Grindstone Development Successful?

Executive Summary

Sri Lankan spices play an important role in improving processed foods' taste, aroma, and flavor. Sri Lanka exports around 30000 tons of various spices annually (EDB, 2019). Sri Lanka is the ninth most crucial exporter of spices (specifically cinnamon, pepper, cloves, cardamom, and nutmeg) globally. Curry powder is the most preferred among powdered blends, and it is the combination of many spices. Many homemakers are more interested in the taste and aroma of food than ever before. Although they also like to cook traditionally, they have no time to prepare curry paste ground in grind-stone. The benefits from this research could promote traditional roasted curry paste grounded in grindstone while helping those who like to consume curry paste from grounded in grind-stone.

Key features

- Four samples were prepared with various ingredients combination of spices for sensory evaluation, one of them selected using organoleptic attributes, namely color, odor, flavor, appearance, and overall quality.
- Chemical, physical, and microbial analyses were done for the selected sample by sensory evaluation.
- Chemical analysis revealed 36.9% of moisture content, 4.26% of ash content, 5.2% of crude fat content, and 31.2% of crude fiber content.
- Under the physical analysis, pH values revealed that traditional roasted curry paste ground in grind-stone can be classified as a low acid food category.
- · Color values showed as the color was light-



This Policy brief is prepared based on undergraduate research on *"Study on Development of Traditional Roasted Curry Paste Ground in Grind-stone"*. The main objective of this study to develop a successful traditional roasted curry paste using grind-stone and also identified respondents of sensory evaluation in terms of color, odor, flavor, appearance, and overall quality in traditional roasted curry paste; identified chemical, microbial, and physical properties in traditional roasted curry paste; consumer preference towards traditional roasted curry paste.



Figure 1 : Curry Paste

green-yellow with L*, a*, and b* values of 29.88 ± 0.28 , 1.62 ± 0.04 , and 1.43 ± 0.11 , respectively.

- Microbial load in traditional roasted curry paste ground in grind-stone increased during the testing period. Still, the microbial growth rate was decreased that may be antimicrobial properties in spices inhibit the growth of microbes.
- Then, the study collected 110 respondents' ideas about traditional roasted curry paste ground in grindstone from a consumer survey using 83% female respondents and 37% male respondents.
- 75.6% presented by manufacturing and expired dates consider buying spices as the essential characteristic of herbs.
- 71.8% of the respondents considered the taste for choosing the brand.
- When considering the product development, 59.5% of respondents mentioned that traditional roasted curry paste ground in grindstone is an excellent product. 36.9% of respondents noted that it is a good product.
- 36% of the respondents currently do not use curry paste ground in grindstone for daily cooking because of their busy lifestyle. Also, 31.5% mention it as time-consuming.
- 93.7% of respondents liked to buy traditional roasted curry paste ground in grind-stone from the market.
- 67.6% of respondents liked to pay a higher price for a product than regular curry powder.

Benefits

Consumers can buy traditional roasted curry paste ground in grind-stone from the market.

It helps homemakers' busy life more straightforward and time-saving.

Using this product, Sri Lankan traditional foods taste, the aroma can be expanded to other countries.

The company can attract new customers. And also increase their profit.

Also, the company can face market competition successfully.

Greenfield Bio Plantation client say,

"We here at Herbal goodness have been working with GFB for almost 10 years and we can truly say that we appreciate their consistent quality, responsiveness and overall great prices. We have visited the farms in Sri Lanka and met with the owners and staff. We enjoy working with such an amazing and professional team. They provide great customer service. We have never been disappointed. We would not hesitate to recommend them."

-USA-

Costs

Currently, the company hasn't owned a laboratory, so they should be paid for outsourcing laboratory testing.

This process needs a higher employment rate than machinery for preparing the paste.

The company should be conduct more sanitary practices than before in the production area.

The consumer must be paid a higher price than the regular products.

Policy enabling features

Field officers in the company collected raw materials. And they provide training and workshops for farmers to prepare knowledgeable farmers.

The company has its processing units for production and implements HACCP and ISO practices.

The company think that they are a part of a big family and they establish some principles,

- They are ethical to their peoples,
- They are organic to their land
- They are sustainable to the environment through regenerative organic farming.

The Sri Lanka market has some curry paste, but those are not traditionally prepared using

a grindstone. Many respondents liked to buy this kind of product from the market and pay a somewhat higher price.

As Bio Suisse, EU Organic, Fairtrade, NASAA, NOP Organic, JAS organic, and FSSC 22000 certifications have been obtained by the company; they can produce this product under those certificates.

"The new revolution in cooking can be viewed in two ways. One is that you can take any traditional food and apply modern techniques. The other approach is to create food that is quite different than anything that has existed before."

- Nathan Myhrvold-

Policy disabling features

Sri Lanka doesn't have regulatory standards for the export of spices. Currently, the real threat is from poor quality standards and Phyto-sanitary standards in companies in Sri Lanka.

The company hasn't implemented GAP GMP practices in processing units. And also, the company hasn't laboratories for analyzing the product's physical, chemical, and microbial properties. The company has to be hired new employees for this new production. It may increase training costs and wages for them.

According to the findings, some consumers are not like to try to buy new products from the market because they are loyal to some existing products. Some consumers haven't idea about traditional food innovation and haven't trusted innovative products.

Present policy context

The Gazette of the Democratic Socialist Republic of Sri Lanka, THE FOOD ACT, No. 26 OF 1980, division five, included general curry powder (condiment powder) conditions.

Sri Lanka's National Export Strategy (NES) seeks to stimulate growth by aligning with the National Trade Policy, being an economic catalyst, and enhancing the ability of spice companies to export and compete in the foreign spice market. NES empowers the emergence of new export industries and services beyond the traditional export industries.

the policy Among elements, improving productivity, reducing production costs, strengthening research development, and classifying local spices protection for specific spices such as cinnamon, and increasing employment opportunities are particularly important.

The industrialist points out that far-reaching policies are more valid because the agricultural benefits are relatively long-term.

Policy recommendations

The government can be improved more policies regarding traditional/ local food product development supporting activities in the country. Encouraging GMP and GAP enable small players in the industry to benchmark themselves with the best players.

According to the findings, the study results showed that traditional roasted curry paste could help homemakers ease their daily cooking activities and increase the conventional taste of foods, as well as most of the consumers liked to buy standard roasted curry paste ground in grindstone from the market to reduce their busy life schedule for preparing curry paste in grindstone.



Citation:

Kangara, K.M.S.G., Malkanthi, S.H.P., Deraniyagala, I. (2022). Study on Development of Traditional Roasted Curry Paste Ground in Grind-stone. *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

I express my deepest gratitude to Prof. S.H.P. Malakanthi, Senior Lecturer, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka, and Mr. Indika Deraniyagala, External supervisor, Greenfield Bio Plantation (Pvt) Limited, 45/23, Braybrooke Street, Colombo for giving support, advice, and continuous encouragement for my research study.

Improving the Process of Physical Quality Parameters on Nutmeg Quality

Executive Summary

The modern world in emerging and global markets is turning into an organic concept like Greenfield Bio Plantations (Pvt) Ltd. Nutmeg is a tropical, evergreen tree in the Myristicaceae family. The scientific name is Myristica fragrans, and the spice is made of its seed. A delicate aroma annotates quality nutmeg. The highest nutmeg cultivation is in the Matale and Kandy districts. Nutmeg cultivation covers 2788ha in Sri Lanka, with small and mid-scale farmers owning 80% of the plantations in the Kandy district. The export quantity was dynamic due to the central bank's reports. In 2017-2018, 141 MT were reduced.

The Department of Export Agriculture introduced standard quality specifications due to physical quality issues. Molds and insects in Grade I must not exceed 3% by mass in either grade. Or else, molds and insects in Grade II must not exceed 8% by the group in either grade. The physical quality issues are badly affected by the quality of nutmeg. If the solutions to the material quality issues are provided, it will increase the value of nutmeg products and earn more on export and import. Thus, this study intends to find out and identify the physical quality parameters and provide solutions according to the action plan.

Key features

- Smallholder nutmeg farmers were utilized only organic methods to cultivate nutmeg.
- Males have the most decision-making power, according to the findings.
- The quality parameters were identified, including flavor and color, extraneous vegetable matter, foreign matter, visible



Figure 1: Organic nutmeg with shell

"Process improvement of nutmeg quality: Exploratory research on nutmeg suppliers in Matale and Kandy districts" is a policy brief of an undergraduate research thesis. The sample was composed size of 27 smallholder nutmeg farmers in the Matale and Kandy districts. A survey strategy was utilized to collect primary data. Primary and secondary data were utilized for the research study. A multi-stage cluster sampling technique was used. Males have the most decision-making power, according to the findings. The physical quality parameters are flavour and colour, extraneous vegetable matter, foreign matter, visible mold, dead insects, insect fragments, rodent contamination, live insects, and mammalian or other excreta. Hazard analysis charts and action plans were identified as tools for process improvement. Implementation of preventive programs, effective drying methods would help for further process improvement of nutmegs.



Figure 2: Fresh organic nutmegs

mold, dead insects, insect fragments, rodent contamination, live insects, and mammalian or other excreta.

- This study found that visible mold was the most influential factor for organic nutmeg farming in Matale Kandy districts.
- The potential causes are standard GMP practices, fewer sterilization methods, poor drying, drying temperature, drying days, and processes.
- Required measures for visible mold are set up a traceability system and quality certification by training implement of preventive programs and obtain suggestions from experts in the field.
- The control measures for insects and rodent contamination are steam sterilization and set insect control plans.
- The required measures for foreign matter, extraneous vegetable matter, and mammalian or other excreta are needed to address a HACCP plan and through Standard Sanitation Operation Procedures and prerequisite programs and magnetic separation.

Benefits

Due to process improvement on nutmeg quality, identified the solutions for quality issues. It can minimize the physical quality parameters that affect organic nutmeg quality.

The benefits to the nutmeg farmers from the action plan are enhanced product quality and reduced wastages of nutmegs.

The corporations can be built up to discuss the problems of the nutmeg farmers. Throughout the traceability system, they can be provided quality certifications to encourage them to cultivate nutmegs by reducing quality issues.

All of them can be enhance the knowledge flow of nutmeg farmers. Organic nutmeg is not more cost than other inorganic methods.

It is intended to complete nutmeg drying days and methods to get well-dried organic nutmegs for customer demand. The demand for organic nutmegs by consumers is increased because of the quality. The majority income of nutmeg farmers can increase due to implementing these solutions.

Share the thoughts of Field officers at Greenfield Bio Plantations (Pvt) Ltd, Colombo

There are more on visible mould on organic nutmegs. All of us used sun-driers for drying nutmegs and sealing at the room temperature. One of fresh nutmeg fruit can earn 5 LKR and 1 kg can earn 500 LKR. We plucked 250 kg fresh nutmeg fruits per tree.

"The most effective case for nutmeg is visible of Aflatoxin on dried nutmegs. We should be dried nutmegs in Kosgama factory with ourselves. It can be eliminating that issue and firstly nutmegs should be dried from sun-dry and after machinedriers should be used."

-A field officer at Greenfield Bio Plantations (Pvt) Ltd.-

Costs

Nutmeg farmers dry nutmegs from sun-drying, but it is more effective within five to six days, firstly doing sun-dry and after machines-drier used. Machinery is more costly to set up.

There was a cost of wasting nutmegs due to physical quality parameters. There is a cost to obtain suggestions from the experts in the field to set up a corporation.

Setting the insects' control plans and magnetic separation for magnetic metal reduction will be a cost. Even though this reduces their quality issues but, long-term costs will be high.

Policy enabling features

Ceylon Nutmeg cultivated in Sri Lanka has acquired an intricate organic composition and a flavor complex based on the country's distinct climate season and is classified under the geographical indicator. The Kosgama factory maintained a processing unit to add values on nutmeg quality such as nutmeg powder and nutmeg tea-bag-cut.

Smallholder nutmeg farmers are used organic methods for reducing cost, enhancing profit, and supplying customers' demand in a healthy manner.

Nutmeg trees produce about 10,000 fruits per tree per year. One nutmeg tress can earn 30,000 LKR per month. One fresh nutmeg fruit can earn 5 LKR. There are high prices for one kilo for farmers.

Policy disabling features

The wastages are higher on mold visible regarding other quality parameters. They are graded by the Department of Export Agriculture according to visible mold and insects.

There is not a corporation to discuss the nutmeg farmers' problems and any opinion. They connected with only the field officers.

Nutmeg farmers are not much attention, inadequate skills and knowledge on new product development such as nutmeg chutney, nutmeg health drinks, nutmeg jam, nutmeg sauce, etc.

Present policy context

In Sri Lanka, government organizations such as the Department of Export Agriculture helped to provide training and nutmeg plants to the nutmeg growers.

The physical quality parameters are identified according to the Codex Online Commission System, 2020.

The organic certifications are included such as NASAA Input for Organic Production, JAS, FDA, BIOSUISSE ORGANIC, Rainforest Alliance certification, USDA Organic, ISO, and HACCP.



Figure 3: Organic certifications

Policy recommendations

This study aims at providing suggestions for the process improvement of nutmeg quality in the processing stage. Therefore, the company should reconsider improvements of the training programs by using action plans.

There are recommendations for preventing visible mold. There are effective mechanisms to monitor and implement the programs for quality certifications.

The value chain actors should be followed to maintain the HACCP plan from harvesting/ plucking, washing and cleaning, separating/ stripping, drying, cracking, sorting, grading, packing, and storing stages.

Though, 27 smallholder nutmeg farmers have to contact the company, field officers, and experts in the field to set up training programs. Therefore, strategies should be implemented to identified and reduce quality issues regarding nutmegs. Furthermore, many nutmeg farmers used only sun-dry but, within the five to six days, firstly doing sun-dry and after machine-driers should be used.

Therefore, all these areas should be considered and proper attention to implementing the required policies related to the action plan.



Figure 4: Peeling Nutmeg

Citation :

Ranasinghe, A. D. D. A., Amarasinghe, S.T.C., and Daraniyagala, I. (2022). Improving the Process of Physical Quality Parameters on Nutmeg Quality. *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

The author wants to express her deepest gratitude to internal supervisor,Dr.Mrs. Dr. S.T.C. Amarasinghe, Senior Lecturer, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. Furthermore, thanks also for her external supervisor, Mr. Indika Daraniyagala, Production and planning manager, Greenfield Bio Plantations (Pvt) Ltd, Colombo, Sri Lanka.

Conquering the Consumer Market Owned by the National Livestock Development Board through E-Marketplace

Executive Summary

The National Livestock Development Board is one of the leading dairy producers in Sri Lanka. With the confidence of the Sri Lankan consumer community, they have been continuously selling in the Sri Lankan market for over four decades. But with the expansion of COVID 19 like many other businesses in the world, they also had trouble selling their products to consumers. Because of that they lost so many profits of the products and they could not control their wastage of milk.

As the solution for that problem this study focusses on introduce design and implementation new e-market platform for the National Livestock Development Board. It is better way to reduce their cost and earn profits in their organization during this pandemic situation. Also, it is hoped that introduce of this e-market system will give them the opportunities to continue.

Key features

- This study enabled consumers to connect with the National Livestock Development Board during the current COVID 19 expansion to identify product price preference through an online marketplace.
- During the expansion of COVID 19, the National Livestock Development Board saw a reduction in the profit margin as it was unable to sell its products to consumers.
- The results of a survey of this study found that the majority of NLDB users were in Kurunegala, Colombo, Gampaha, and Kandy.
- During the COVID 19 epidemic, 45% of



Figure 1: Products Categories

This policy brief is prepared based on undergraduate research on "*Road to Digitalization: Development of online market platform for National Livestock Development Board*". The study aims to create an e-market place where National Livestock Development Board can successfully and effectively reach its products to customers, despite the challenges facing NLDB, and to enable them to generate more revenue. consumers in NLDB were inclined to buy products and 55% were unable to purchase products.

- One of the reasons why consumers were unable to stay consistent with NLDB was that NLDB did not have an online marketplace.
- In creating an online marketplace, for the company had the opportunity to study four key factors that influence it: Organizational, Technical, E-Market adaptation and E-Commerce adaptation factors.
- Buyers, Certification authentication, National Livestock Development Board, Logical Organization, Financial institution and Internet service providers are involved in creating the online marketplace for NLDB.

Benefits

According to the results, the benefits of this study included,

- Easy and fast entrance to new markets.
- Faster detection of new buyers for lower costs.
- Selling at every time.
- Possibilities for sales increasing.
- Can be increased profits in the organization.

Also, when consider about buyer side, they can be achieving these benefits after this study,

- For selecting of best offer
- Fast purchasing without long term relationship contract.
- Lower negotiation cycles.
- Ordering at any time and easy changing of order.

Also, lower transaction costs, lower marketing costs, faster time of new products to the market, lower production time, and more efficient production can be introduce as potential benefits of the e-marketplace.

Costs

In creating the online marketplace for NLDB, the company incurred the following costs for the design work. Accordingly, the company's capital expenditure includes the market design costs, the cost of the payment gateway, the cost of the SMS service required to provide customers with information about their purchases, and the cost of obtaining the domain name required for the company.

Policy enabling features

Designed for NLDB, this online marketplace has the potential to attract a large new customer base around the company.it will also help the company to earn a higher profit margin and enhance the reputation of the company. It also enabled them to continue to operate successfully in the competitive market system as a wellknown institution in the country to continue to manufacture their products and sell them to consumers in the face of the COVID 19 epidemic, and to maintain a consistent profit as well as market share.



Policy disabling features

The main problems identified in this study were the lack of adequate study sources and the inability to obtain proper survey information from the public during the COVID19 pandemic. Further consideration was the lack of staff with the necessary technical skills to operate in this market.

Present policy context

NLDB currently, sells its products through its outlets and does not have opportunity to reach a large number of customers, but sells its products to customers who visit their outlets. Through this, they have been able to generate revenue institutionally from the beginning to the present and continue to increase their market share by making more profits through this online marketplace which has been active since this year.

Policy recommendations

One of the possible proposals for NLDB is the introduction of new value- added products to the market. Accordingly, in addition to the products currently offered by NLDB, new products can also be used to attract more customers. A proper customer needs study can also be used as an opportunity to improve products and launch new products in the market as an opportunity to make a big profit institutionally. It is also a matter of urgency to maintain a consistent distribution network for a proper online marketplace.

Citation:

Jayasinghe, J.A.K.D.K., Basnayake, B.M.R.L., and Ranasinghe, I.G.L.C. (2022). Conquering the Consumer Market Owned by the National Livestock Development Board through E-Marketplace, *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

The success of this was not an individual effort and it required the guidance and support of the many people and I would like to take this opportunity to remember those valuable people. First and foremost, I would like to express my gratitude to my internal supervisor Miss Ruvini Basnayake for the guidance, advice, encouragement provided in overall journey of this research. I would like to extend my gratitude to my external supervisor Asst. Manager of Melsiripura Mr. Chamara Ranasinghe to provide guidance and encouragement throughout the research. I would like to thank Melsiripura Farm general manager Mr. Vidanapathirana, NLDB Welisara farm manager Mr. Anjana Dushmantha and all NLDB staff. Heartfelt thanks to Mr. Sathuta Sellapperuma, ICT instructor of Faculty of Agricultural Sciences to making this work a success. And I would like to express my gratitude to all the lectures in my faculty of Agricultural Sciences. Finally, I would like to express my gratitude to all other who supported me to complete this research success



Development of a Spice Incorporated Concentrated Yoghurt Spread for the Local Market in Sri Lanka

Executive Summary

The 21st century has witnessed a series of health problems, one of which is the overconsumption of sugar in many fast foods. This problem is mainly seen in the adult population. Excessive sugar consumption and artificially preserved food products have led to many health issues such as non-communicable diseases. Promoting healthy diets and lifestyles to reduce the global burden of non-communicable diseases necessitates a multisectoral approach involving all relevant societal sectors. Chemical preservatives are currently widely used, but repeated use of such preservatives may lead to various health problems. To prevent non-communicable diseases, natural and nontoxic products are in high demand among today's consumers. Therefore, nutritionally well-balanced, sugar-free, naturally preserved food items will be a solution to these problems. This study attempted to develop a concentrated yoghurt spread by replacing all the sweeteners including sugar and other flavoring agents, with salt and spices (pepper and mustard).

Key features

- Food spreads had a total global market volume of 46.6 million tons and a US \$ 56 billion as a food category in 2016.
- The global food spread market identifies market opportunities after exploration of new sources and applications of food spreads.
- Increasing applications in food products, rising demand for food spread products from young consumers, consumer preference for quality and safety, natural products, and those containing natural ingredients are expected to drive the growth of the global food spread



This policy brief is prepared based on an undergraduate research titled "Development of a spice (pepper and mustard) incorporated concentrated yoghurt spread". The primary goal of the study was to develop a concentrated yoghurt spread replacing sweeteners including sugar and other flavoring agents with salt and spices (pepper and mustard) and is intended to be consumed as a food item with bread as sandwiches.



Figure 1: Concentrated Yoghurt Spread

market in the future.

- Concentrated yoghurt or strained yoghurt is a semi-condensed milk product derived from yoghurt from which a part of whey has been drained away.
- Concentrated yoghurt is also known as labneh, Greek yoghurt, Greek-style yoghurt, strained yoghurt, or yoghurt cheese.
- Concentrated yoghurt is becoming more popular in many countries, including USA, Northern European Countries, UK, Middle East, and India because it has a richer texture than unstrained yoghurt and is lower in fat.
- There are several methods of producing concentrated yoghurt, including ultrafiltration of regular yoghurt, fermentation of milk concentrated by using a cloth bag, reverse osmosis treatment of regular yoghurt, and centrifugal separation of the whey from normal yoghurt.
- Traditional Labneh is made by straining natural or plain full-fat yoghurt in cloth bags until the necessary total solids content is reached.
- The traditional procedure of making Labneh type concentrated yoghurt was selected to develop the focused yoghurt as a spread in this study.
- The study was conducted in three phases. The first phase determined the best salt concentration for saltiness and texture.
- Results revealed that one percent (w/w) salt concentration was the best salt level for manufacturing concentrated yoghurt spread.
- The Second phase determined the best level of pepper and mustard mixed in equal proportions.
- A 0.75% (w/w) pepper and mustard were selected as the best spice level for manufacturing concentrated yoghurt spread.
- Microbiological and physicochemical analyses estimated the product could be kept until 15 days at four degrees Celsius without any contamination; hence safe for human consumption.
- Consumer preference survey concluded that more than half of the respondents did not want to pay a premium price over the other food spreads.
- Respondents preferred a glass/ plastic jar as

the packing material for this product. Along with that, the respondents recommended 100g of portion size.

Benefits

Consumption of nutritious and healthy spreads free of additives and preservatives, gluten, and trans-fat increased as consumers become more health-conscious and preferred natural, low fat, and low sugar or sugar-free spreads.

Consuming full yoghurt spread incorporated with spices will give plenty of health benefits.

Concentrated yoghurt spread has a low lactose content that makes it suitable for lactose intolerants.

Concentrated yoghurt is an excellent protein, carbohydrates, vitamins, and minerals source.

Strained/concentrated yoghurt is also high in calcium, which helps to build strong bones.

And mostly, spices have a medicinal value, an added advantage for the product.

Antimutagenic, anti-inflammatory, antioxidative, and immune-modulatory properties of spices assist and improve human health.

Black pepper is a food additive with a prolonged shelf life without any artificial preservatives.

Mustard contains various nutrients and phytochemicals, such as glucosinolates and phenolic compounds.

Mustard seed also contains various minerals including calcium, manganese, copper, iron, selenium, and zinc that are beneficial to human health.

Costs

The production of this product may incur a production cost. The company has to bear the cost of outsourcing laboratory testing. Simultaneously, the company has also considered more sanitary practices in the production area. Further, the employees need to be trained in the production process. Investments also have to be made for conducting promotional activities. On the other hand, the consumer must be paid a higher price than a regular yogurt product.

Policy enabling features

The dairy industry is expanded vitally from farm to door with its convenient sub-sectors, including the farm sector and production sector. The production sector has been more complicated with unsatisfactory human needs and wants. Diverse dairy-based products can be seen in the current market, specifically designed to meet human requirements diversely.

Novel food product strategies aim to ensure food security and increase the consumption of adequate quantities of safe and high-quality foods that make-up a healthy diet.

This new product was developed to meet the native Sri Lankan preference for spicy flavor to create a vibrant place in the future market.

Sri Lanka has imported 102,000 tons of milk and milk products and spent 61,933 million rupees in 2020. Still, Sri Lankans have the opportunity to create new dairy products for the local market. It will help to reduce the money outflow from the country. And this study was conducted using the "traditional method" which anyone can produce this product at a low cost of production. Thus, it will generate some employment opportunities as well.

Policy disabling features

This new product will create a new marketplace for a product originated in the Middle East and has not been introduced to the Sri Lankan market by any Sri Lankan dairy company.

This is a staple food and a primary protein source in the main meal in many countries. However, the name 'concentrated yoghurt spread' is also bizarre according to some buyers. As a result, there is a risk of market demand for this product. Unhygienic condition in the straining stage, the length of the production process, high labor requirement in the process, and the difficulty in giving a low yield due to residues left in the bag are some of the drawbacks of the traditional cloth bag method. Small and medium-sized companies also lack facilities, resources, and expertise in developing this product using ultrafiltration, reverse osmosis treatment, and mechanical separator methods.

Present policy context

Regulatory standards of yoghurt are primarily based on the product's chemical composition. They may differ from one country to another. The Food Act No. 26 of 1980 is the primary legislation in Sri Lanka governing food safety.

Other than the Food Act, Sri Lanka Standards (SLS) and Codex standards for fermented milk are other legislations governing food safety in Sri Lanka.

Food (Milk and Milk Products Standards) Regulation- 2003 monitors the standards and



compositional requirements that need to comply with milk and milk products. Accordingly, concentrated yoghurt or semi-solid yoghurt must contain not less than 0.5% m/m and not more than 3.0% m/m of milk fat, and not less than 8.0% m/m milk solids-non-fat (SNF).

Packages and labels convey information about using, transporting, recycling, or disposing of the box or product. Food Act No. 26 of 1980 is the primary legislation in Sri Lanka governing packaging and labeling. The product and its packaging should comply with these legislatives.

Policy recommendations

- The study's findings revealed the salt concentration of one percent (w/w) and 0.75% (w/w) pepper and mustard (in equal proportions) incorporated concentrated yoghurt spread was suitable as a novel product which is ready for the market. In addition, the study has resulted in the following specific recommendations.
- If this product; pepper and mustard incorporated into the concentrated yoghurt spread, is going to be launched into the market, it is recommended to evaluate its nutritional composition.
- In addition, there is a need for further study on formulating different combinations or ratios incorporated into concentrated yoghurt spread to find out the best pepper and mustard ratio.

Citation:

Karunarathna, K.M.O.N., Rosairo, H.S.R., and Karunarathna, S.H. (2022). Development of a spice incorporated concentrated yoghurt spread for the local market, *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

I gladly express my sincere gratitude towards my supervisors Prof. H.S.R. Rosairo and Mrs. S.H. Karunarathna, all the staff members of Milco Private Limited, Digana, and all the academic staff of the Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka for their continuous guidance given throughout the study.

Does the Marketing Mix Influence the Sales of Palmyrah Pulp-Based Edible Products?

Executive Summary

Palmyrah is considered one of the oldest and native cultivations from the Northern province, especially in the Jaffna district. Starting from the top of the Palmyrah tree to its bottom, every part is utilized to make valuable products. It offers a number of economic benefits in return; hence it could be defined as the treasure of the Northern province. Beyond the monetary value, Palmyrah has tremendous medicinal uses proven scientifically. Its pulp is famous for curing many diseases. The Palmyrah edible products can be classified into three groups: sap-based, pulp-based, and tuber-based products. Among them, Palmyrah pulp-based edible products are widely available. Several edible products made of Palmyrah pulp are available in the market.

products Some pulp-based are panam paniyaaram, preserved pulp, pulp cordial, pulp drink, Pinattu mixed yoghurt, and pulp ice cream. The Palmyrah fruit pulp is enriched with fiber, protein, vitamin C, and energy. Palmyrah pulp is a bit bitter, and people who are not used to it might not like the Palmyrah pulp-based edible products because of the bitterness. Marketing plays a vital role in selling the products effectively to the customers. The knowledge of the marketing mix would help come up with better product offerings. Studies on the product, price, place and promotion (collectively known as the 4Ps) for palmyrah pulp-based edible products have shown significant results. The marketing mix's product and price mix elements had a positive impact on the purchase decision toward the Palmyrah pulpbased edible products. This study will be helpful



This Policy brief is prepared based on undergraduate research on "*The importance of marketing for Palmyrah pulp-based edible products among Jaffna people*". This project was carried out with the aim of investigating the influence of marketing mix elements on the purchase decision towards the Palmyrah pulpbased edible products.


to the producers and manufacturers of such products.

Key features

- Data required for the study were collected from 115 respondents through a questionnaire.
- Sixty two out of 115 respondents were males.
- Majority of the respondents (26 per cent) were between the age group 51 to 60 years.
- People are likely to consume the *panaddu* and *panam paniyaaram*, which is a kind of traditional food product made of Palmyrah. Though the pulp-based products developed are available in the market, people still like to consume only the products they used to drink from earlier times.
- Most consumers perceive the Palmyrah products as fewer standard products and are not satisfied with the quality of such products.
- Most respondents are not interested in purchasing the Palmyrah pulp products and rarely consume these products.
- There are a considerable number of people still like to purchase pulp-based products available in the market.
- Facebook has been mentioned as the effective medium to share information about Palmyrah pulp-based products.
- People consume the Palmyrah pulp-based products for their taste. People are not satisfied with the appearance of these products.
- Majority of the consumers purchase palmyrah pulp-based products from the grocery shops (33.9%). Grocery shops will be more accessible because consumers don't need to spend much time searching for the palmyrah pulp-based products.
- Price reduction will encourage the consumers to purchase more Palmyrah pulp-based based products.
- Developing the already existing promotional activities for these products will positively impact the purchase decision towards the Palmyrah pulp-based edible products.

Benefits

Palmyrah pulp-based products offers a range of economic value, and it has medicinal properties.

Palmyrah doesn't require any specific cultivation methods and needs no maintenance. Each part starting from the top to the bottom of the tree is helpful, and many edible and non-edible products can be made.

The production of Palmyrah products will contribute to the regional economy, so it will help uplift the standard of living of the people who depend on Palmyrah cultivations. It will also provide employment opportunities.

A study on the marketing mix will be helpful to the manufacturers and producers of Palmyrah products. A stable market can be created for traditional food products like the Palmyrah pulpbased products.

It would be an opportunity to add value to the naturally available resources like the Palmyrah.

Industries related to the Palmyrah products will be able to serve their customers better and understand what the customers expect from them. It would help maximize the profit by coming up with better marketing mix strategies for these products.

Costs

The production of Palmyrah products may incur a production cost. Industries need to acquire machinery, which will be considered the cost to the industries related to the production of Palmyrah products. Then the employees need to be trained in handling the equipment.

They have to make arrangements for getting more qualitative Palmyrah pulp-based products because people are not happy with the quality of the existing products. Investments also have to be made for conducting awareness programs to produce Palmyrah products. A tapping cost is also involved. Promotional activities may demand initial investments.

Policy enabling features

Palmyrah is a natural resource with tremendous economic value and possesses many proven medicinal aspects. People from the Northern province bond with the Palmyrah; thus, they tend to support the production of these products as they don't like to give up on their traditional food items. Research is being carried out on the Palmyrah to enhance their product features and add value to the Palmyrah.

The government has been supporting the production of Palmyrah pulp-based products, and it has established the research institute and sales outlets for Palmyrah related edible and non-edible products.

People still prefer the Palmyrah products, and they love the unique taste (although bitter) of these products, which other products can't give. Some stakeholders want to be partners with the industries that undertake the Palmyrah productsrelated activities. There are private companies that produce Palmyrah pulp-based products and try to export several developments abroad.

Palmyrah trees don't require specific conditions; thus, the cultivation is relatively more straightforward, and they don't need maintenance. Both edible and non-edible products can be made of Palmyrah.

Policy disabling features

People have forgotten about Palmyrah, and they don't have time to think of Palmyrah products.

The market is full of fast-food varieties; thus, products like Palmyrah struggle to compete with those products.

People have changed their lifestyles, and so do their eating habits.

There is a lack in promotional activities for the Palmyrah pulp-based products, hence people are very much less aware of these products.

These products have not been made to match with the current trend. Marketing activities for these products are at a lower level, and efforts have not been taken to communicate the merits of consuming the traditional products like the Palmyrah pulp-based products.



Present policy context

The Palmyrah Development Board is there to support the production of Palmyrah pulp-based products.

Palmyrah Research Institute engages in the research activities related to these products to come up with value-added products that the consumers will demand.

Palmyrah Research Institute helps the potential producers of the Palmyrah products develop better pulp-based products.

Policy recommendations

As Palmyrah has many medicinal aspects, it is needed to communicate the merits of the pulpbased products to the consumers.

The taste of these products has to be enhanced, and they should be made capable of competing with the fast-food items available in the market.

The pricing of Palmyrah pulp-based products has to be done systematically, and the price should be affordable.

Understanding the consumer insights for already existing Palmyrah pulp-based products and developing better products would be important.

The quality of the pulp-based products should be enhanced and the customer satisfaction should be guaranteed.

The already existing promotional activities have to be modified, and the specific merits of the Palmyrah products have to be communicated to the consumers.

Citation:

Thanabalasingam, S., Rosairo, H.S.R., and Suganja, T. (2022) Does the Marketing Mix Influence the Sales of Palmyrah Pulp-Based Edible Products? *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

Heartfelt thanks to supervisors, Prof. H.S.R. Rosario, Department of Agri-Business Management, Faculty of Agricultural Science, Sabaragamuwa University, Sri Lanka, and Miss Suganja Thuraisingam, Research Assistant, Palmyrah Research Institute for useful guidance.

Understanding the International Market for Ceylon Cinnamon Oil

Executive Summary

Sri Lankan spices have been world-renowned through the centuries and have been a significant exporter of exotic spices throughout history. Among the many spices exported from Sri Lanka, Ceylon cinnamon holds the top spot accounting for more than 40% of spice exports. Sri Lanka holds a monopoly over the Ceylon cinnamon world export market with over 90% market share. However, Ceylon cinnamon has not been able to cope with the pressures from its primary rival, cassia cinnamon, dominating the world export market. Value addition such as essential oil extraction has been proposed to boost the income of Sri Lankan manufacturers. For the full potential of the export market to be realized, a deeper understanding of the customer segments and needs is needed.

Key features

- Direct involvement of management promoted the practical validity
- 38 foreign business organizations participated, of which 63% were product manufacturing organizations and 37 were trades and distributors.
- The study results revealed the Sri Lankan exporters preferred to market to B2B organizations that were already buying Ceylon cinnamon oil and did not wish to compete with organizations sourcing cassia oil.
- The study also revealed that the exporter preferred targeting organizations involved in the personal care and flavor industries. The exporter chose to engage in business with B2B organizations with a minimum order quantity of 1 Kg.



This policy brief is prepared based on the undergraduate research on "Development of a Market Segmentation Model for Ceylon Cinnamon (Cinnamonum zeylanicum) Oil Industry – A Case Study on Samagi Organics (Pvt) Ltd". This research aimed to develop a market segmentation model for Samagi organics cinnamon oil products by identifing the characteristics of the target segments and the gaps between the current product offering and customer needs.

- Respondents from the trade and distribution segment displayed characteristics such as being medium to large-scale organizations, operating in the flavor and personal care industry, price-oriented buying behavior with order quantities above 10 liters.
- Respondents from the manufacturing segment were medium to small-scale organizations, where medium scale organizations were operating in personal care and flavor industries, and small-scale manufacturers mainly were used in the fragrance industry.
- Trade and distribution segment displayed a higher awareness (78.5%) of the difference between Ceylon cinnamon and cassia cinnamon than the manufacturing segment (29%).
- The survey of the buyers' organizations identified essential product requirements that need to be addressed by exporters to serve the market demands better. The specified condition was online product information availability, clear communication with suppliers, and specific quality standards.
- Development of a website with product catalogs, implementation of CRM software to better handle client accounts, and acquiring Fairtrade certification was recommended to the exporter to meet the buyer requirements.

Benefits

Future success depends on the level of understanding a business has about its customers and the broader marketplace in which it operates. The development of evidence-based marketing strategies is required if the Sri Lankan exporters capture a significant share of the spice export market. Insights from the study applied in the proper industrial context will provide the exportoriented organizations with a view of the needs of the customers they are serving and how to achieve a product-market fit. The study will also support future development activities such as further value addition activities, reaching deeper down the supply chain, and finding new marketing communication channels.

Developing the spice export industry in Sri Lanka will increase the inflow of much-needed foreign currency to the Sri Lankan economy. It will also contribute to the development of the farming sector, which will increase the income for all players in the supply chain, especially for smallholder farmers and farming communities, thus developing rural areas of the country.

Costs

The direct costs that the exporter holds are related to maintaining the marketing department. Hiring experienced professionals in accounts handling, business development, and business analytics is a significant cost factor.

Another high cost is the cost of acquiring business intelligence services. Having access to highquality global market information and research material is vital for the success of an exporter. Receiving regular price updates, finding new market opportunities, and diversification can all be supported by a well-established marketing information system. The monthly costs for highquality market intelligence services can range from 500\$ to 1500\$.

Meeting customer requirements means establishing quality procedures and acquiring quality certifications. Getting quality certifications is a high recurring cost that export organizations must face to meet their buyers' expectations.

Policy enabling features

The willingness of buyers to consider online sourcing as a method of supplier selection provides an opportunity for local exporters to reach the international market cost-effectively. Traditional methods of identifying potential buyers, such as trade shows, have higher costs than online channels. Online trade platforms provide a viable way for suppliers to reach potential customers. Online channels allow organizations to disintermediate supply chain members and go deeper into the international supply chain. Export organizations can take advantage of connecting with potential end-users in an exciting new market channel.

High level of profitability in exporting value-

added products compared to exporting raw ingredients. The export of cinnamon oil will result in more profitable ventures to promote further growth of export organizations.

Encouragement of Agri exports by local authorities provides a positive atmosphere within the country, encouraging organizations in the industry to expand operations while prompting smallholders to enter this market.

Policy disabling features

Lack of information flow in international markets hinders the ability of exporters to make more informed market decisions and develop effective strategies. Sri Lankan organizations are not provided adequate information from market intelligence services. More emphasis should be placed on developing marketing intelligence services in organizations and the industry for better performance of exporters.

The difference between Ceylon cinnamon and cassia has less awareness among buyers globally. Ceylon cinnamon is considerably more expensive than cassia. The misrepresentation of cassia as true cinnamon has led to consumers either not being aware of the difference or believing they are getting a similar quality product for a lower cost. This severely harmed the potential to expand global market share.

For example, the use of technology, management software has not fully penetrated the export organizations, resulting in poor performance by the companies. The use of new and innovative practices will lead them to better-performing companies.

Exporters do not fully understand the impotence of investing in marketing activities. Maintaining relationships, finding new leads and customers, and exploring new market opportunities are vital functions performed by an organization's marketing function. Still, most export organizations have failed to understand the importance of maintaining such processes, thus not being able to reach their full potential.

Present policy context

The "Agriculture sector modernization project" organized by the export development board promotes value addition in the cinnamon oil industry.

Tax programs aimed at incentivizing Agri exports have effectively promoted the development of export-oriented organizations.

Market intelligence information provided to export organizations from government entities, chamber of commerce, export development board, department of agriculture, etc., is not consistent or adequate to meet the vast amounts of data required to develop internationally competitive export organizations.



Policy recommendations

Providing market intelligence to exporters will enable them to make better management decisions. Government-led programs promoting research activities and information services are vital for the future development of the cinnamon export industry.

We are carrying out market development campaigns targeted toward different market segments, thus providing a better response from the market segments.

Collaboration with marketing agencies in export destinations will better understand the context of a market by being familiar with the local context. If Sri Lankan export organizations are to regain their market share, intentional export market support from local organizations is vital.

Exporters must obtain quality certifications that meet the needs of the customers. The quality of Sri Lankan export products such as cinnamon oil has come under scrutiny. Although Ceylon cinnamon oil is naturally superior to any other product in the market, business malpractices such as adulteration have led to the international community losing trust in Sri Lankan products. To regain the international community's trust, proper quality practices and certifications must be observed.

Implementation of modern marketing information systems and management systems will lead to better efficiency, thus improving the profitability of export organizations.

Citation :

Hettiarachchi, H.G.D.S., Jeewanthi, R.K.C. and Bodhipaksha, V. (2022). Understanding the International Market for Ceylon Cinnamon Oil. *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

The author wants to express his gratitude to Dr. R.K.C. Jeewanthi, Senior Lecturer, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka and Mrs. V. Bodhipaksha, External Supervisor, General Manager – International Business, Samagi Organics, Matara Road, Akuressa for their continuous support in the completion of this research.

How to Reduce the Time Required for Spices to Get from Farmer to the Factory?

Executive Summary

Achieving a minimum lead time for the supply chain is a competitive advantage for a business. Time, rather than money, is a more valuable component of the performance determinants of the manufacturing and exporting business activities. Decreasing the lead time to achieve an efficient and flexible supply chain is a significant point for customer satisfaction and operational excellence. The time difference between the order placed and the order receipt refers to the lead time. A company's competitiveness can be increased by reducing the lead time and achieving quick delivery. There was the most significant contribution of spices to the country's economy, and Spices have always been important in producing foods. DAMIC is a sixsigma methodology used to develop an existing process by systematically solving a problem. The delay of checking details and selecting a farmer by field officer is a most focused problem of the high lead time in the spice supply to the factory. An information automated software may be implemented as a developed process due to the DMAIC approach.

Key features

- At the Define phase in DMAIC, the SIPOC diagram defines the current process of the business.
- The highest weighted value of 276 has been taken at the delay of sourcing the spices under the measuring stage.
- In further analysis, the delay of checking details and selecting a farmer by field officer was the most focused problem in this study.
- At the analysis stage, the cause and effect



This policy brief from undergraduate research on "*Process development for minimizing the lead time period of spice supply*". The study focused on determine the existing process of the spice supply, measure the sources which may be affected for the lead time of spice supply, analyze the root causes of the focused source, identify the creative solutions and develop a process and create a procedure for continuously maintenance of the developed process. The study sample consists of 40 participants who are involved in the spice supply chain from farmer to the factory.

"The term "lead time" refers to the amount of time it takes for something to happen between the time of placing an order and the time of receiving it" (Li, 2000) diagram was selected the five leading root causes of the focused problem.

- Solutions were gathered by brainstorming with the selected participants, and the affinity diagram was established in the solution category of 'systematic way to manage data' under the improvement stage.
- 0.69669 highest 'W matrix' value of introducing software was the optimum solution due to the AHP matrix.
- An information automated software was developed at the improvement stage as the result of this study
- Under the control stage in DMAIC, a control plan was introduced to maintain the developed process continuously.

Benefits

Due to this process development, the firm can exceed its competition with quicker and more efficient production, and then gaining a competitive advantage is always possible. And also faster stock restocking to minimize stockouts, missed revenues and lost customers. The spice delivery procedure is always on time and without delay. Others are the organization was able to fulfill deadlines regularly and easily after reducing the lead time of the spice supply & the exporting sector of businesses is expanding in parallel with the improvement in product quality.

Costs

More extended lead periods can limit the supply chain's capacity to respond to shifting demand, unpredictability, and uncertainty. Conduction of training programs or any other manner is a cost of implementing this automated information system. And the export division ultimately failed due to the long lead time and the loss of foreign exchange.

Policy enabling features

The highest ordering frequencies within August in 2021 have been taken for the spices category, so spices were selected. The majority of the participants have over a year of experience in the field. So, the probability of excellent accuracy in this research study was demonstrated. The majority strongly agreed upon changes or developments in the existing process.

Policy disabling features

This research has given the best solution for targeting only the focused, most related root cause. But other defects or sources may also be impacted. This process development has been done for the category of spice ingredients because this study is focused on the category-wise lead time & it is better to study the product-wise lead time. The company resources should be allocated to implement this information automation software practically.

Present policy context

The field officer, leader farmer & farmer used the existing documented information collected through field visits monthly or yearly & there was no proper & updated documentation.

Policy recommendations

Because of the new process development, the technology adopted should be accessible to the user. So, Technical information should be provided through training programs or other ways. The organization's resources should be devoted to putting this information automation software. There should be a strong control plan or a proper maintenance system to guarantee that the created process is under control.

Citation:

Premasiri, K.W.L.H., Amarasinghe,S.T.C., and Daraniyagala,I. (2022). How to Reduce the Time Required for Spices to Get from Farmer to the Factory? *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of agricultural sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

I want to express my sincere gratitude and most profound appreciation to my internal supervisor Dr. (Mrs.) S.T.C. Amarasinghe and external supervisor Mr. Indika Daraniyagala, the production & planning manager at the Green Field Bio Plantation (Pvt) Ltd, Braybrooke Street, Colombo, for helping me throughout my study period.

Financial Viability of On-Farm Concentrate Production

Executive Summary

Milk production depends on several factors among those; cattle feeds take priority. An average of 60-70% of the total production cost must be allocated for feeds in commercial dairy farming. Scarcity of feed and fodder impacts the potentiality of livestock, interruption of the continuous feed supply during the Corona pandemic hurts cattle production. The shortage and imbalanced nutrition of meals had created a trend of compound feed, one of the most usable compound feed concentrates.

As a result of the Global COVID -19 pandemic, a trend of self-sufficient domestic agriculture has risen. Therefore, NLDB Ridiyagama farm can maintain its supply chain by producing the required feed. The farm has the potential to possess the necessary infrastructure, machinery, human resources, and funds needed to run its business. On-farm concentrate production plan uplifts the financial position from the current situation by evaluating different rations. Further, it ensures continuous feed supply and productivity.

Key features

- The highly viable production decision analysis is based on two rations such as barley-based ration and maize-based ration.
- The profitability analysis based on the projected income statement indicated a higher gross profit of 25.6%, net profit of 22.7%, and operating profit of 22.96% in the barley-based ration production decision. At the same time, the maize-based ratio obtained 16.6% gross



Figure 1: Maize - based Concentrates feed

This Policy brief is prepared based on undergraduate research on "Analysis the financial viability of on-farm concentrate production on behalf of purchasing from commercial producers: In case of Ridiyagama Dairy Farm". The aim of this study is to improve profitability by reducing feed cost, maintain continuous feed supply without interruptions and ensure high nutritive quality feed to cattle. The study based on the feed section at Ridiyagama Dairy Farm.



Figure 2: Feed Making Machine at Weerawila Farm

profit, 15% net profit, and 14% of operating profit.

- Lower operating ratio of 70% and 77% of expenses also accrued to the barley-based ration production.
- Both the project appraisal techniques and the payback period can cover their essential investment as a barley-based ration was two months and 15 days, and maize-based allocation was three months and 26 days.
- According to discounted payback period, a barley-based ration covers three months and one day, whereas a maize-based allocation is incapable of covering up their investment within a quarter.
- The positive NPV value determines the success of a project, and barley-based ration has a positive NPV value, and maize-based allocation has a negative value.
- Every project considers the cost-benefit ratio; both are viable as they have more than 1 BCR.
- According to IRR, both rations have a higher value than the interest rate, at 55% for barley-based allocation and 68% for the maize-based percentage.
- According to the sensitivity analysis, the first case, as the increasing cost of capital revealed that, from a 15% to 20% interest rate situation, the investment in feed production is profitable through high BCR and positive NPV.
- When increasing the production cost, barleybased ration can be implemented at 10% and 20% cost increment situations, but maizebased allocation shows negative BCR and NPV by 20%. Hence, barley-based ration risk avoidance has more success than maize-based ration.
- In The case of benefit reduction, both decisions show negativity at 20% of that critical point. Finally, the project's overall implementation can be accepted with some changes.

Benefits

The on-farm concentrate production decision benefits are not limited to the Ridiyagama dairy farm.

Generally, the commercial feed purchasing cost of the farm is higher. The study revealed that on-

farm concentrate production decisions would be more profitable than purchasing.

As the On-farm production depends on the requirement of the feed on the farm, it ensures a continuous supply without unexpected price increments.

Unfortunately, the lower quality of feed damages the outcome of cattle. The decision ensures the need for higher trustworthiness to maintain the excellent feed quality.

Further, an analysis of alternatives for ingredients revealed the most profitable and effective option. And also, a feed production plan creates job opportunities for people to uplift their lives. Further, trainees will get the chance to learn the process and create livestock development in the future.

Farm profitability means the improvement of the livestock sector. It increases the contribution of agricultural sectors to the National Gross Domestic Production.

Costs

The concentrate production plan identifies two major cost categories, namely direct and indirect. In production, barley-based ration has to spend Rs.74.38 as ingredients cost and maize-based cost as Rs.81.73. Indirect cost occurs in depreciation, electricity, packaging, labor cost, and storage.

Here, to start the production on the farm, it is necessary to have the required facilities like the building for production, storing raw materials, and final outputs. Hence have to have the land for construction machinery for grinding, mixing, and packing the feed.

Further, in the production line, waste can be occurred and have to pay attention to minimize errors; thus training program is required for laborers as they don't have previous experience on the farm.

Beyond that, environmental costs may occur through using scarce resources and waste removal.

Policy enabling features

Ridiyagama farm is the largest farm in South Asia. They already have capital, labor, technology, and lands with fodder, maize, and other feed crops required for their production lines.

Generally, farm monthly feed requirement is higher in the high milking herd, low milking herd, and dry cow. So, maintaining its production line is significant and does not create financial wastage.

And also, knowledgeable and skillful management is necessary to maintain an effective and continuous feed production line. The farm has a management team with prior experience in the feed production industry.

Policy disabling features

They are not concerned about competitive advantages because they focus only on fulfilling the farm feed requirement.

Today, new technological equipment makes operations easy and has to be updated with the technological changes, but it would be higher, and it can be said as an issue.

Further, Maize and other crop cultivation face threats from animals, especially from elephants, and climate changes reduce the outcome.

Moreover, low-quality ingredients damage the total quality of final production, so; greater attention is required to procurement.

Present policy context

At present, Ridiyagama farm evaluates the onfarm feed production using one ration type. That is assigned with one herd to check the milk production improvement.

And also, crop cultivation is improving and is being spread into many lands available to produce hay to ensure continuous feed supply.

Policy recommendations

Analyze the cost of various ration formula production to minimize feed cost and evaluate alternatives for high-cost ingredients.

Uplift crop cultivation by using new technologies and identifying strategies to minimize threats to ensure the continuous supply of ingredients.

Implement an effective procurement procedure to maintain the pre-determined quality of feed. Further study of on-farm production and costminimizing methods.

Citation:

Lakshika K.Y.D., Wijeratne A.W., and Amunugama N. (2022). Financial Viability of On-Farm Concentrates Production. *Policy Insights 2022-Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

I want to extend my heartfelt thanks to my Internal Supervisor, A.W. Wijeratne, Professor of the Department of Agri-Business Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

I would also like to extend my special tribute to Mr. Namal Amunugama, Assistant General Manager, NLDB Ridiyagama Dairy Farm, who provided the proper guidance to the External Supervisor.

Impact of Work Engagement on Organizational Commitment?

Executive Summary

The poultry industry is the fastest-growing livestock industry in Sri Lanka. For 2020, poultry contributed 64% of the total GDP contribution of the Sri Lankan livestock sector. However, human resources are an essential asset in an organization for success. Managers in organizations usually stimulate the engagement of their employees at work to perform. Hence, the management in an organization must understand how to enhance employee engagement within their operation aims. However, it appears that employees are underperforming work. It is on this score that it has become necessary to assess the effect of employee engagement on employees' organizational commitment in the poultry sector in Sri Lanka.

In addition, employee engagement would be critical to the poultry sector regarding increased efficiency, productivity, employee relations, turnover, and the workforce's health and wellbeing. The obtained knowledge could be utilized to enhance the productivity of the company's workforce and achieve the ultimate target of getting higher productivity. Hence, organizational management would bring the opportunity to use the research findings to design their future line of action that would help them ensure their longterm success in the human resource management process and their overall company operations.

Key features

- In connection with the poultry company, 44% of the employees were in the age group of 26-35 years, Male was in the highest gender category of 82.9%, and 47% of tenure were in 1 to 05 years, and the majority were married which indicated 54.3% in demographic profile.
- This poultry company currently states that; 37 percent of the employees were engaged,



This policy brief is prepared based on an undergraduate study on 'Does Employee Work Engagement Enhance Organizational Commitment? A Case Study on Selected Sri Lankan Poultry Company.' This study aimed at examining the impact of employee work engagement on organizational commitment of a selected Sri Lankan Poultry company, to assess the level of work engagement among employees in a selected Sri Lankan poultry company, to investigate the relationship between work engagement and organizational commitment among employees in a selected Sri Lankan poultry company, to determine which extent the sub-dimensions of work engagement (vigor, dedication , absorption) impactton organizational commitment , to suggest best human resources practices needed to improve work engagement and organizational commitment in selected Sri Lankan poultry company. Primary data was collected in a survey using 70 employees in selected Sri Lankan poultry company.

50 percent were not engaged, and 13 percent were actively disengaged.

- Finding revealed a significant relationship between overall work engagement and organizational commitment.
- Results investigated the absorption has a significant positive effect on organizational commitment. Also, the overall work engagement has a significant positive impact on organizational commitment.

Benefits

Human capital in the form of employees is vital for any organization. Retaining employees is a challenge in the present era due to high employee turnover and increased levels of absenteeism due to covid situation.

Employee engagement is essential for any organization to maintain higher productivity, citizenship behavior, employee satisfaction, and ultimately higher performance.

Hence, employee engagement would be critical to the poultry sector to increase efficiency, productivity, employee relations, turnover, and the workforce's health and well-being. The obtained knowledge could be utilized to enhance the productivity of the company's workforce and achieve the ultimate target of getting higher productivity.



Costs

Due to employees' low level of engagement, most of them are currently unable to commit to achieving organizational goals and objectives. Therefore, to boost employee engagement and organizational commitment, the management, and human resource department should rechange their HR policies. Thus, the organization must allocate a relatively high cost for future training and development programs, financial rewards, and non-financial reward schemes based on employees' age, gender, position, and experience.

Policy enabling features

One of the most vital policies enabling features is the age group and tenure in this selected poultry organization. As a result, the ability to benefit from training and development programs and flexibility for policy changes in the company.

Another policy enabling feature is boosting employee engagement and organizational commitment by considering financial and nonfinancial rewards.

According to the results, overall work engagement has a significant positive effect on organizational commitment. Thus, it enables policymakers to implement proper policy tools to stimulate the poultry industry in Sri Lanka.

Policy disabling features

According to the survey results, 50% of employees were not engaged. The current condition is not suitable for this poultry company. Employees suffer from job-related stress that will be a barrier to growing the business and adopting new policies.

Another policy disabling feature is a low level of work engagement. Therefore, introducing new approaches to increase work engagement and organizational commitment will not be easier.

Present policy context

The selected poultry company currently provides various training programs to employees to build the knowledge, capabilities, and skills to improve their job performance and productivity. Furthermore, the company organizes multiple teamwork activities to increase the interrelation between the department and the overall organization. Due to the company cost reduction policy, the company reduces some benefits and intensives for the employees, which would be the primary reason for the low level of engaged employees in this poultry company.

Policy recommendations

The study indicates low levels of the dedication of employees. However, the study recommends that this can be enhanced if employees are given sophisticated training and development programs that will enable them to understand what is required of them in their jobs. The company should perform a well-structured training needs assessment to allow line managers to identify and address the disadvantaged areas in which employees require training. In addition, the organization should invest in the training and development of employees to maximize their skills and productivity of the employees.

Additionally, the study indicates low levels of vigor in employees. Thus, this study recommends that this can be enhanced by continuing motivating employees by rewarding them with financial incentives and recognition and acknowledgment from supervisors or senior management.

Furthermore, the study also indicates moderate absorption levels in employees at the poultry company. Thus, this study recommends that this can be maintained by clear, consistent, and continuous communication. In addition, managers or supervisors who communicate effectively and constantly with their subordinates enable them to understand better what is required of them. Communication given to employees helps clarify the objectives and goals required of them by their managers. This current study also indicates that some participants cannot focus on their work due to their surroundings. The study recommends that the organization provide a favorable work environment for workers to concentrate and focus on their work activities.

Citation:

Sandaruwani, P.G.N., Wijeratne, A.W., and Illangasinghe, V. (2022). Impact of Work Engagement on Organizational Commitment. *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.



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Acknowledgments

I want to express my profound gratitude and deep regards to my internal supervisor Prof. A.W. Wijeratne for his moral guidance, monitoring, and constant encouragement throughout the research study period. I want to express my heartfelt gratitude to Mr. V. Illangasinghe, the external supervisor for executing the time, words of encouragement, motivation and valuable guidance that were valuable for completing this study.

How to make Delay in Banana Ripening Rate by Using Natural Treatment?

Executive Summary

Banana exporting is a significant source of income and foreign exchange for Sri Lanka. However, Sri Lankan exporters face difficulties in delivering a high-quality product to the final consumers due to the lack of proper methods of controlling banana ripening. So, the banana export industry is affected by challenges such as high ripening rate and maintaining quality, high cost of controlling banana ripening, and lowprofit margins for smallholder exporters. This study attempted to assess the healthier organic treatments for controlling banana ripening, considering the temperature conditions and time to reach end consumers in those countries. The solution to these problems is to adopt healthy organic treatments to control banana ripening based on its time to get to the final consumer in the importing countries.

Key features

- Banana is a large herbaceous perennial monocot plant that belongs to the genus Musa of the family Musaceae.
- Between 2008 and 2017, global banana production expanded by 15. 76MMT in 2008.
- The distribution of bananas occurs in the hundreds of islands of South and Southeast Asia and West Tropical Pacific Ocean, Sri Lanka, through India, Bangladesh, South and Southeast China, Myanmar, Laos, Vietnam, Cambodia, Thailand, Malaysia, Indonesia, Philippines, and New Guinea.
- World's fresh banana market is characterized as an oligopolistic market.
- The estimated market share of the six major banana producers/marketers in 2009 was 61 percent, following Dole Food Company,



Figure 1: Banana Fruit (Kolikuttu Variety)

This Policy brief is prepared based on undergraduate research on *"Effect of Organic Inputs to control Banana Ripening rate ("Kolikuttu" Banana) based on ambient Temperature and time taken to reach end Consumers.*" The study intended to find out the solution for condoling Banana ripening rate.



Figure 2: Peeled Organges

Chiquita Brands International, Del Monte Fresh Produce, Fyffes, and Exportadora Bananera Noboa, and Reybanpac. The estimated market share of all other companies in 2009 was 39%.

- In Sri Lanka, banana cultivation is under nearly 60,000 ha (20,000ha in wet zoon and 40,000ha in dry + intermediate zones) of land. It covers about 54 percent of the total fruit lands.
- Optimum storage temperature of ripe green banana is 13-14 °C
- The cooling storage is essential and widely used in the export market. However, its initial cost is high, and it is cumbersome, which may not be suitable for small-scale exporters and farmers with their financial situations.
- Ethylene absorbent can be acted as an oxidizing agent, and it can be oxidized ethylene to acetic acid (CH₃CHO), turn to acidic acid, and Acetic acid (CH₃COOH) can be further oxidized to carbon dioxide (CO₂) and water (H_2O) .
- Using ethylene absorbent can be changed to extend the green life of the banana during transport. Shelf life of bananas by controlling the ripening process.
- Gibberellic acid (GA) delays fruit maturation and ripening.
- The GA treatment delays fruit ripening in the whole banana.
- Orange albedo is an agro-industrial wastage that can be used as a suitable cheap substrate for the production of Gibberellic acid (GA)



Figure 3: Treated Sample

Benefits

In this method, the quality of Kokikuttu bananas can be improved in 8 to 12 days.

Due to the delay in the ripening of bananas, the damage caused during transportation, storage, wholesale and retail can be significantly reduced. Avoidance of about 20% of the damage caused by banana exports.

An increase in the country's total export earnings by increasing the export earnings of bananas.

Favorable impact on macroeconomic developments such as the increase in foreign reserves due to the rise in the country's export earnings and the strengthening of the foreign exchange value of the Sri Lankan rupee.

To successfully compete in foreign markets, the quality of bananas exported from Sri Lanka can be maintained at a high level for a long time. And it is being able to develop and protect foreign customer preferences.

This treatment can significantly reduce the cost of storing bananas and export shipping and air transport.

Costs

Orange peel is a waste of the fruit juice production industry, therefore, it can be obtained at a lower cost.

If the exporters go to commercialize this new treatment, there will be an additional cost to bear with raw material, machinery, human resources, and packaging.

Policy enabling features

Sri Lanka has a large export market, and there is a massive demand for fruits exported from Sri Lanka in foreign markets.

Sri Lanka exports a large number of fruits. Of these, bananas occupy a prominent place.

In Sri Lanka, small and medium-scale exporters essentially represent the banana export industry. Sri Lanka exports many varieties of bananas, and Kolikuttu is a major one.

The sweet orange peel used for this treatment must be an agricultural waste so that this treatment can be done at a low cost.

Bananas that have been chemically treated and controlled for ripening are rejected in foreign markets as they are harmful to human health.

Policy disabling features

Sweet oranges are not widely grown in Sri Lanka. Therefore, it isn't easy to obtain an adequate supply of sweet orange peel, the primary ingredient in this treatment.

Lack of understanding of small and mediumscale banana exporters on such a new postharvest mitigation technique.

Small and medium-sized fruit exporters can face a lack of facilities, resources, and knowledge in developing these treatments.

Climate change in many countries where bananas are imported from Sri Lanka significantly impacts bananas' ripening process and quality.

Most medium and small-scale exporters in Sri Lanka are reluctant to adopt new technologies and remedies.

Present policy context

Banana cultivation in Sri Lanka is mainly under the supervision of the Department of Agriculture. All plants exports from Sri Lanka, including bananas, should be subject to the supervision of the National Plant Quarantine Service and adhere to their criteria.

All types of bananas exported from Sri Lanka must obtain written permission from the National Plant Quarantine Service for export.

Research and development activities are being carried out through the Agricultural Research Institutes to improve banana cultivation and minimize post-harvest damage.

The Export Development Board and the Department of Population and Statistics published statistics on exporting agricultural products, including bananas. The Ministry of Agriculture and the Export Development Board jointly implement various programs and strategies to encourage banana growers and small and medium scale banana exporters.

Large-scale banana exporters make up a large percentage of Sri Lanka's banana export market. They also implement various loan schemes and incentive schemes to encourage banana growers to improve their cultivation.

Large-scale banana exporters are also researching to reduce bananas' post-harvest damage and control ripening.

Policy recommendations

By using this treatment when exporting bananas at average room temperature, the taste, color, texture, and quality of the bananas can be enhanced for up to 12 days by controlling the ripening speed of the bananas.

Citation:

Elapatha .G.S., Malkanthi .S.H.P. and Chinthaka .E.N. (2022). How to make Delay in Banana Ripening Rate by Using Natural Treatment? *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

The author likes to express his heartfelt appreciation to Prof. S.H.P. Malkanthi, Internal Supervisor, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. Thanks also offer to the Mr. E.N. Chinthaka (External Supervisor), Quality Assurance Manager, Aloy Expo Pvt (Ltd).

Value-Added Dairy Products

Executive Summary

The dairy industry has immense potential to contribute considerably to Sri Lankan economic development. Milk production also plays a vital role in improving nutritional poverty in all age groups. Mainly when practiced as a business, milk production generates income and employment for many low-income families, reducing poverty. Furthermore, the milk sector promotes women's economic and social roles in communities. As a form of business, the success of dairy farming depends on profitable milk production and marketing.

However, the dairy industry is vital and has tremendous potential in developing the economy in the country where the rural population accounts for over 78% of the total population; it cannot be underestimated because of its contribution to the social and economic empowerment of the rural sector through employment, sustainable income and improved food and nutritional security. In 2019, the estimated total national milk production was 447.6 million liters, of which cow milk and buffalo milk accounted for 374.1 million liters and 73.6 million liters, respectively.

Key features

- Smallholder subsistence farmers dominate the dairy farming sector, and 75% of local milk production comes from smallholder farmers in Sri Lanka.
- There are approximately 250,000 smallholder cattle and buffalo farmers in the country.
- In Sri Lanka 2020, the cattle and buffalo populations were 1,628,771 and 497,316, respectively.



Figure 1: Curd Production

This policy brief is prepared based on undergraduate research on *"Benefit-cost analysis and sustainable model development of value creation in dairy industry; A case of NLDB Ridiyagama farm*". This project was carry out with the aims to figure out the feasibility of establishing a dairy processing unit by analyzing benefits and costs and recommending a sustainable model for implementation. The study based on the Ridiyagama farm.



Figure 2: Yogurt Production

- The total financial requirement to implement the dairy processing unit is 660,000LKR.
- The production capacity was distributed between the yogurt, curd, and milk toffee.
- The capacity of yogurt production is 60,000 per year, curd production 4,800 per year, and milk toffee 2,160 per year.
- ROI of yogurt and milk toffee was higher than that of curd.
- Payback period of yogurt production was one year and eleven months. The payback period of milk toffee production is two months. But curd production cannot recoup the investment within these estimated years.
- NPV of yogurt and milk toffee was positive, and the investment was profitable and can go ahead with the expansion. NPV of curd was negative the investment was denied.
- BCR of yogurt and milk toffee positively added value to the farm. BCR of curd was negative NPV, and it should not be considered.

Benefits

By establishing a processing unit, the rural population could find a good source of income through job opportunities, thereby finding solutions to many of their household economic problems.

Also, the training programs have established the employee knowledge of clean milk production, shed management, feed management, and dairy production and the importance of dairy farms.

As the number of people joining the industry increases, a systematic market is created; higher production can be established.

As well, increased government and nongovernment interventions will reap more significant benefits.

Furthermore, competitiveness in the industry increases, and innovations take place.

A timely solution to unemployment. It is possible to get rid of the dependency mentality and engage in a satisfying job.

Also, consumers have the opportunity to

consume non-toxic dairy products. It will lead to a healthier life.

The expansion of the dairy industry is creating new job opportunities. This will lead to an increase in employment in the country.

Dairy products can considerably contribute to the national GDP and are a better source of livelihood improvement for the poor and small farmers.

Also, dairy processing is an eco-friendly business. It emits far less carbon dioxide than other agricultural uses. The use of organic manure in preparing waste materials is also a by-product.

As well as, establishing a processing unit helps to diversify incomes and alleviate poverty. This raises the economic status of the producer and improves their living standards.



Costs

The cost of milk production was high due to the high cost of feed and veterinarians. Also, dairy production was increased due to the high material cost.

Production should be encouraged by providing tools and equipment, so money must be spent.

Policy enabling features

The farm has received high-yielding produce dairy products.

As well as value addition to farm's raw milk by producing dairy products.

The dairy farm has formed since the NLDB. Thus, this has facilitated the government's implementation of mass-scale projects.

Due to the milk collection center, there will be no barrier from market unavailability to production.

Policy disabling features

Significant changes in the cost of materials and also that price is fluctuation.

Also, the farm lacks facilities and resources for value-adding products. Also, low hygienic conditions for producing dairy products.

Present policy context

Ridiyagama farm has produced a low amount of yogurt products for a sale center in the current situation.

Dairy marketing institutions and dairy feed manufacturers are the private intuition bodies supporting the dairy sector's development.

Also, the Department of Animal and health offers different training programs at their training centers for livestock officers, livestock development officers, livestock farmers, Veterinarians, and semi-government and private sector participants.

Policy recommendations

This dairy product processing project revealed that depreciation costs, electricity, feed, and health services were the main costs contributing to high production costs and significantly reduced profits on the farm.

As well as low levels of profit efficiencies reveal a tremendous amount of production costs and overhead costs.

Also, the income opportunities of dairying make a strong case for further attention to promoting market-oriented dairying as an essential path to achieving poverty reduction. This project can recommend the value addition of raw milk can get profit on the farm.

Citation:

Dharmathilaka R.M.P., Basnayaka B.M.R.L, and Amunugama N. (2022). Value-Added dairy products. *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

The author want to offer her sincere gratitude to Ms.B.M.R.L.Basnayaka, Lecture (probationary), Internal supervisor, Department of Agribusiness Management, Faculty of Agricultural sciences, Sabaragamuwa University of Sri Lanka. Thanks also external supervisor Mr.Namal Udugama, Asistent General Manager of NLDB Ridiyagama Farm. Who supporting completing this research

Development of Plant-Based Meatball for the Sri Lankan Food

Executive Summary

Though meat is the primary traditional ingredient used in meatball production, there is an increasing demand in the present market for plant-based meatballs due to the health hazards that lead to high meat consumption. Button Mushroom (Agaricus bisporus) is a common mushroom used in many dishes such as salads and pizza due to its taste and texture. Button mushrooms have a high nutritional value due to their high levels of vitamins and proteins and their non-saturated fatty acids. The consumption of Button mushrooms reduces cholesterol levels remarkably and has also been attributed to anticancer properties. Hence, the study was carried out to develop a new meatball for the Pussalla Meat Producers (Pvt) Ltd and determine its sensory values and proximate analysis.

Key features

- Manufacturing a new type of meatball with mushrooms and the preliminary trials were carried out at Pussalla Meat Producers Privet Limited, and analyses related to it were carried out at the Livestock laboratory, Sabaragamuwa University of Sri Lanka.
- In a preliminary study, a sensory evaluation was conducted using 30 panelists to determine the best meat and mushroom combination.
- Two samples with 10% and 20% mushroom percentages were
- Developed and 10% mushroom was chosen as the best percentage to incorporate with highly acceptable organoleptic properties.
- The best sample was selected by the results obtained from the sensory evaluation.
- The sample made with 10% mushroom and 90% meat was chosen as the best sample by evaluating all the tested attributes.

This Policy brief is prepared based on undergraduate research on "*Development of mushroom based meatball*". The primary goal of the study was to develop an unique white meatball to gain a competitive position to Pussalla Meat Producers(Pvt) Ltd. Thus, the study was concerned with develop a meatball with higher organoleptic acceptability and determine its physiochemical properties.



Figure 1: Button Mushroom



Figure 2: Mushroom Based Meatball

- A consumer survey was conducted using 100 individuals to measure the acceptability of the product concept and willingness to purchase.
- According to the consumer survey, 93% of the respondents like to buy this product, and 61% of the respondents were willing to pay a higher price for this product.

Benefits

There has been a growing interest among consumers in using nutritious foods to maintain health in recent years. They are willing to try out innovative products with additional health benefits.

Consumption of nutritious and healthy meatballs, free of Sodium Nitrates, artificial additives, and preservatives, increased as consumers became more health-conscious.

Mushrooms have a high nutritional value since they are high in protein, have a high quantity of vital amino acids and fiber, and have a low-fat level.

Consumption of button mushrooms reduces cholesterol and is attributed to anticancer properties.

Several spices have been used in preparing this meatball, and they have a medicinal value which is an added advantage for the product. Antimutagenic, anti-inflammatory, antioxidative, and immune-modulatory properties of spices affect human health.



Costs

Button mushrooms are somewhat expensive in Sri Lanka. Thus, the product's price will be higher than the current price of regular meatballs. If the company goes to commercialize this new product, there will be additional costs to bear with raw materials, machinery, human resources, and packaging.

Policy enabling features

The prevalence of diseases, especially cardiovascular disease, cancer, diabetes, and chronic respiratory disease, has become a primary worldwide health concern. Consumers' dietary patterns change due to nutritional recommendations as they strive to increase their nutritious consumption. Consumer health knowledge has led to a shift toward healthier eating habits and increased interest in nutrient content and nutritional value.

The meat industry plays a vital role in the livestock sub-sector of Sri Lanka, and chicken meat contributes about 70% to this sub-sector. The Poultry industry is a powerful tool to achieve economic growth, food security, and poverty reduction in Sri Lanka.

With unmet human wants, the manufacturing industry has become highly challenging. Converting livestock into a variety of high-value products provides various opportunities in the meat industry while fulfilling those unsatisfied customer desires. In this context, Sri Lankan meat products manufacturers have the potential to develop new products with added health benefits to cater to consumer demand. This new product, which was created to expand the product portfolio of Pussalla Meat Producers Private Limited, can create a unique experience in the potential market. Additionally, this product can be used to meet the growing customer demand for healthier comminuted meat products.

Policy disabling features

Incorporating button mushrooms with chicken meat is an entirely new concept in Sri Lanka. Button mushroom is commonly used in dishes such as salads and pizzas, but the consumers can feel it be different to find it in their meatball and separate from the products available in the market.

There are very few Button mushroom cultivators in Sri Lanka due to the high cost of production; therefore, the price for obtaining an adequate supply can be difficult.

Small and medium scale manufacturers lack understanding of new product concepts worldwide, and a lack of facilities, resources, and knowledge can hinder them from manufacturing this product.

Present policy context

The Food Act No. 26 of 1980 is the primary legislation governing food safety in Sri Lanka. Food (Meat and Meat Products) Regulations (2018) manage the manufacturing of meat and meat-based products in Sri Lanka.

According to the Food (Meat and Meat Products) Regulations- 2018, comminuted meat products such as meatballs must contain not less than 60% m/m total meat and must not contain more than 20% m/m fat.

Food (Labelling and Advertising) Regulations (2005) is the legislation that regulates the packaging of every food product.

Policy recommendations

According to the findings of this study, Button mushrooms could be effectively utilized as raw material to make a fantastic meatball.

Since the food industry is very competitive, new products are introduced regularly. It is necessary to carry out innovations or improvements related to food products to run a successful food business. Consumers today prefer to eat highquality and highly nutritious foods. Hence, this study suggested developing a meatball without adding sodium nitrates and incorporating them with button mushrooms to give a new experience to the consumers. If this product is going to be launched into the market, it is recommended to evaluate the new product's microbiological acceptance and shelf life.

In addition, there is a need for further study on formulating different combinations or ratios incorporated into a new meatball to find out the best mushroom percentage.

Citation:

Dilrangi, S.P.H., Basnayake, B.M.R.L., and Samaraweera S. (2022). Development of Plant-Based Meatball for the Sri Lankan Food Market. *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

The author wants to express her deepest gratitude to Mrs. B.M.R.L. Basnayake, Lecturer (prob.), Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka and Mrs. S. Samaraweera, External Supervisor, Quality Assurance Manager, Pussalla Meat Producers Private Limited, for their expert guidance and support to make this research a success.

Evaluate the Quality of the Service in Public Sector

Executive Summary

The techniques of measuring service quality have become the most important aspect during the past few decades due to the increasing importance of the service industry. As a result, the service quality needs to improve to create customer satisfaction. It is concerned about perception and expectations when service providers can understand which factors influence customer satisfaction and the easiest way to design and deliver selected market demand.

The Improvement of the service industry, many government organizations all over the country, pay attention to improving the quality of their services, especially those concerning the private sector. Further, Service quality and customer satisfaction are the most crucial concept in the food service industry. When service providers provide services to the customers in the service delivery, sometimes, there will be some differences between the customer expectations and the organization's perceptions of customer expectations.

That helps to investigate the evaluation and conceptualization of service quality and its interactive impacts on customer satisfaction. It provides some positive and constructive proposals to make up the service gap in government sector organizations. It offers preliminary results supported by the SERVQUAL model to measure the mutual interactions between service quality and customer satisfaction. The help of quality dimensions has studied service quality and customer satisfaction, and some suggestions are offered for improving service quality in foodrelated service providers.

Good service makes the difference!

This Policy brief is prepared based on undergraduate research on "*The impact of Service quality perspectives of food service providers on customer satisfaction: a case of Department of fisheries and Aquatic resources Sri Lanka.*" The study intended to find out the gap between the actual and expected service from the food service providers and customers and how improve the quality of the service in food *service providers.* Primary data for the study derived from the responses of 50 fish exporting companies in Sri Lanka and 3 quality control officers in the department of fisheries and aquatic resources.





Key features

- Out of 50, the customer sample composition by the No of employees are working in the seafood exporting companies. Here 30 -50 employees (28.0 %) category gave the highest contribution to the selected sample, and less than 10 - 20 employees (2.0 %) showed the lowest contribution.
- Sample composition of how many times customers do you get the services from the department. The highest percentage took one year and more than five years (30%), and then the lowest rate took to get the six months (18.0%)
- Tangible SERQUAL scores given the highest gap took the waiting area consist with enough seat (-0.79), and then lowest gap value took to get the government officers are well dressed. (0.2). that has no gap between the actual and expected status. that was a good improvement of the service quality in the division.
- According to the Reliability SERQUAL scores highest gap took the government officers to provide service at the time promised (-0.64), and then the lowest gap value took get officers are providing services during working hours effectively and efficiently (-0.3).
- Responsiveness SERQUAL scores show the highest gap took the government officers are always trying to prevent the waiting lines (-0.64). The lowest gap value took get officers are trying to give correct service at the first time. (-0.72)
- Further, Assurance SERQUAL scores given the highest gap took the government officers always provide error-free service (-0.86) and then lowest gap value took to get the service delivered to the customer at the time promised. (-.058).
- Empathy SERQUAL scores show the highest gap took the government officers are well educated and have expertise related to this field. (-0.96) and then lowest gap value took get officers are reliable when providing services to the customers. (-0.74).

Example: success story of service providing officer in public sector

Government officer thought the service in his organization is good, but not perfect. The reason for the weakness is there exits some urgent situations that they need to solve, for the whole organization, officers all try best to provide good service to customers and deal with the difficulties as soon as possible, make every customer satisfied. If the customers do not satisfied with their work, they could send e-mails or call the service division, so that the officers will know their work performance as soon as possible, and make up efficiently for that situation, So the officers could come up with ideas to deal with their difficulties efficiently. "We afraid of our service work could not be satisfied by every customers, that is also the challenge for every government organization I think, because there are some unavoidable situation happened in our work, maybe you have a perfect and complete systematic rules in work, we also need to be more flexible and innovative in our work, we always try our best to meet their need." We will consult with the customers and help problems as soon as possible.

Benifits

According to the results of the study, the benefits of motivated service providers will

- 1. Increase self-motivation toward the work.
- 2. Improve Service providing capacity
- 3. Enhance service efficiency.
- 4. Improve service providers' punctuality
- 5. Improve enthusiasm of the service staff

And the overall organization performance will be increased. These benefits will help to revise and design to fill the gaps between service quality and customer satisfaction. Moreover, satisfied customers will support the development of the country's GDP.

"The quality of the service in our organization is good. But not perfect." - One of the interviewee -





Costs

One way of figuring out the cost of lack of training programs and service staff. It is based on the premise that officers are lazy to do their work when serving ice. They do not work up to their potential.

The time allocated for awareness programs to customers is set aside for these training programs and awareness programs as an opportunity cost. Policy enabling features

As a government organization, the fisheries and aquatic resources department plays an essential role in setting and implementing new policies. The quality control unit of the department of fisheries and aquatic resources is the only government organization that gives validation to export fish and fishery products.

Due to that quality of the service at the department of fisheries and aquatic resources is essential. The Department of fisheries and aquatic resources provides different awareness programs and training programs to their customers.

To further improve their service quality, the quality control unit gives training programs to officers. As well as scholarships to officers for learning and upgrading knowledge related to the fish exporting industry.

Policy enabling features

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Policy disabling features

Though the department offers different training programs, it is not up to a sufficient level. At the same time, the officers are not working efficiently and they lack communication skills. Therefore, lack of training, negative attitudes, and lack of skills can be attributed to the issues in policy implementation.

Present policy context

The Department of fisheries and aquatic resources currently provides various services development of the fisheries sector. Such as Organizing and conducting awareness programs on the quality & safety of fish and fishery products and inspection of the fishery establishments. However, these factors are not functioning well, which helps to minimize the service quality gap.

Moreover, the quality control unit must ensure the high standard of fish and fishery products exported to the international market from Sri Lanka for human consumption and implement policies in the Fish Handling and Distribution process.

Policy recommendations

The overall idea of the current study gives a better understanding of evaluating the service quality perspectives of foodservice providers on customer satisfaction in the public sector.

Achieving these goals and making necessary arrangements to improve communication and networking between customers and the service-providing officers for better results.

It also advised implementing the strategies to utilize available resources efficiently and improve the quality of the service at the public organizations.

By improving the quality of the service, an organization can provide service online and the service promptness. As well as give training to the working staff, motivating the team toward their workload.

Citation:

Nisansala, W.A.N., Rathnayake, K.K.H.M., and Wicramasinghe, W.S. (2022). Evaluate the Quality of the Service in the Public Sector. *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

I want to express my deepest gratitude and heartfelt respect to my internal supervisor, Mrs. K.K.H.M. Rathnayake, Lecturer, Department Agribusiness Management, of Faculty Agricultural Sciences, Sabaragamuwa of University of Sri Lanka. She dedicated her time supervising me, providing correct guidance for my research to achieve a good outcome and complete this research successfully. I want to express my gratitude and respect to my external supervisor, Ms. Sepalika Wicramasinghe, Director - Quality control, Department of Fisheries and aquatic resources, Sri Lanka. For his dedication and the facilitation to complete this research successfully.

Development of Ready to Make Mixture for Traditional Dosa

Executive Summary

Food is one of the necessities that play a vital role in human life. Food consumption habits in Sri Lanka have rapidly changed over the last two decades. Unhealthy dietary habits have been linked to metabolic disorders and a higher risk of noncommunicable diseases (NCDs).

Generally, people tend to consume nutritious foods to stay healthier than ever. This indicates that there may be a market potentiality for healthy foods. Even though there is a growing demand for healthy foods, whether there is enough supply is questionable. This study mainly focuses on developing an easy mixture of traditional food for the younger generation. The research focuses on identifying whether there is an untapped opportunity in the marketplace for healthy and convenient food in this area.

Key features

- The study revealed that the 2:1:1 ratio of black gram, cowpea flour, and wheat flour was the best flour ratio for the composite flour.
- The proximate composition of composite flour contained moisture 6.02%, ash 5.78%, fat 6.16%, fiber 13.5%, and sugar content was 0%.
- According to the market survey, most consumers (70%) preferred that ratio of composite flour.
- Further, market survey results revealed that 59% like very much to use new composite flour and 31% like to use it.
- According to the market survey, most consumers (70%) preferred composite flour.
- Proximate analyses of dosa were performed. Moisture 11.46%, protein18.2%, carbohydrate 58.7%, and energy 373.2 (kcal/100g) were determined.

The policy brief is based on the undergraduate research on "Development of Ready to make mix for Traditional Dosa "Vigna mungo, Vigna unguiculata". This study was conducted with the aim of making an easy mixture of a traditional food for the younger generation. In fact traditional foods are disappearing among younger generation. Mostly youngest prefer latest fast food items. Making this traditional mix has healthy and fresh ingredients it will make the consumer feel satisfied. Normally these traditional mixture ingredients have not artificial color and flavors. Sensory quality evaluation was done to select the best formulation, and nutrition properties, including moisture content, carbohydrate, protein, and energy content. A market survey was conducted with North Lanka employees to investigate the consumer preferences towards this new product. Data was gathered from 50 respondents using simple random sampling.





- In a shelf-life study High, density polythene (HDPE) bag was selected as suitable packing materials to store dosa flour.
- The total price of the dosa mix was Rs.141.5 /200 g in 202, which is below the available product in the market.



Figure 2: Prepared Dosa

Benefits

This food is widely used in catering industries as well as at home. Instant foods have become popular with time because of less cost, time and energy-saving, convenient preparation, and busy life consumption. It is a boon for working people who can save time, energy, and money by using this food.

Especially in this covid19 pandemic, the demand for ready mixes is growing. I hope to develop this prepared to make a traditional Dosa mix that is more helpful to be prepared for breakfast or dinner within a short time at home. Due to changing scenarios in the market, the demand for ready mixes is increasing.

This study will help food business owners detect market gaps and generate new ideas from those gaps. As potential and future researchers, they can learn how to perform product development research. As a result of this study, students learned about the product development process, the necessary tests in laboratories, and statistical analysis to analyze the acquired data.

Through this study, try to promote the use of black gram flour and cowpea flour ` a m o n g people. Furthermore, this study will assist small and medium-sized business owners to develop new business ideas.

Costs

Wheat isn't produced in Sri Lanka; the amount and type of grain are imported. That is controlled by demand, domestic supply of close substitutes, and government rules that govern wheat trading, marketing, and pricing.

Due to lagging black gram and cowpea output and limited substitution, high consumer wheat subsidies, and the Sri Lankan economy's comparatively solid performance.

Policy enabling features

Completing flour from black gram incorporated cowpea flour and wheat flour resulted in numerous new products and flavors.

According to the proximate analysis, the composite flour sugar content was 0%, and it was determined that this product was beneficial.

Overall, this study indicated that the respondents (75%) preferred to purchase this new product based on its health benefits.

The result revealed that most of 75% of composite flour is available in Sri Lanka.

The result revealed that the majority of people, 61% prefer to buy this flour in supermarkets, and 17% prefer to buy retail shops and street shops.

Policy disabling features

This study indicated that the respondents (50%) were ignorant of the Ready to make the mixture for Traditional Dosa because of nutritional quality and sensory attributes.

The introduction of the new product to the consumer is limited to the Kilinochchi area. Therefore evaluating the preference of composite flour, the blended flour taste is different without adding east.

As well as, due to the COVID-19 epidemic and increasing household expenditure Dosa

mix ingredients price is high, so collecting raw materials was complicated.

Black gram (*Vigna mungo*) originated in South Asia, where it has been in cultivation from ancient times and is one of the most highly prized pulses of Sri Lanka.

Present policy context

Ready-mix is high in carbohydrates, protein, vitamins, minerals, and Calcium. It has a low fat and cholesterol content as well.

North Lanka Family Foods (Pvt) Ltd is currently producing dairy products, including peanut butter, turmeric powder, and milling products.

Policy recommendations

Large milling companies should adopt large-scale production of black gram flour and cowpea flour to reduce the dependence on imported wheat to prepare products that are very popular in the country.

This research recommends preparing a valueadded ready mixture for dosa. Yeast level is not exceeding consumed level is added. Pure water is recommended for mixing the flour because it will ferment quickly.

To explore consumer acceptability of the composite flour in the different regions, samples need to be distributed to prepare the market for blended flour.

Further work should be conducted for black gram flour and cowpea flour composite flour with the addition of improvers.

Citation:

Arulnesavasan, K., Wijeratne, A.W., and Chanthru T. (2022). Development of Ready to Make a Mix for Traditional Dosa, *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

I would like to offer my sincere and deepest gratitude to Prof.A.W Wijeratne, Internal supervisor, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa university of Sri Lanka, and Mr. T. Chanthru, External supervisor, Operation Manager, North Lanka Family Foods (Pvt) Ltd, Kilinochchi, for the continuous support given throughout the period.

Does Mushroom Cultivation Contribute to the Economic Empowerment of Rural Women?

Executive Summary

Mushroom cultivation is a women-friendly profession. It has been identified as a viable business opportunity that can be done without neglecting family responsibilities. Mushrooms are an indoor, simple, low-cost crop that uses a small amount of water compared to other crops that can be operated under any environmental conditions. Makes a massive contribution to job creation. It is also possible to earn a higher income by selling raw mushrooms. It improves the economy of families and contributes to the diversification of livelihoods. Mushroom cultivation can be confirmed as an appropriate approach to empower women economically. It can be considered a bridge that takes them to a new business world. Furthermore, it will also create entrepreneurs or be a source for entrepreneurial opportunities.

Funding, training, knowledge, attitudes, guidance, and counseling can empower women and lead to better employment opportunities, higher incomes, social acceptance, and self-esteem. By-products can also capture a different market and focus on new avenues to gain competition. Also, risk sharing, strategic planning, innovation, and job expansion can be seen when expanding a business individually or as a group. Such processes are empowerment strategies that allow them to break the dependency mentality and work towards their goals.

Key features

- The majority of women (53.3%) were between 41-and 50. 90% of women were married, and 70% were well educated.
- NGOs contribute and intervene to enhance the business activities of women mushroom growers.



This Policy brief is prepared based on undergraduate research on" *The Economic Empowerment of Rural Women in the Hambantota District through Mushroom Cultivation*". This project was carried out with the aim of investigating whether economic empowerment can be achieved through mushroom cultivation. For this purpose, 30 rural women engaged in mushroom cultivation in Weeraketiya Divisional Secretariat were used.



Figure 1: Preparing Mushroom Pots

- In terms of the income distribution, it was revealed that the majority (80%) earn more than Rs. 20,000 per month. The remaining 20% is reaching the expected revenue level.
- It is noteworthy that 3.3% of those who reached the expected income level earned more than Rs. 30,000 per month.
- In the business profitability analysis of growers, everyone could reap the highest benefits.
- Growers have all received positive returns on the return-on-investment ratio. It expresses the ability to reap benefits beyond costs.





Benefits

Through the intervention of SLCDF, the rural women were able to find a good source of income through mushroom cultivation, thereby finding solutions to many of their household economic problems.

Training programs, supply of raw materials, etc., have provided great relief to the growers, and the funds provided have been a great relief to the expansion of the cultivation.

Increased government and non-government interventions will reap more significant benefits. Competitiveness in the industry increases, and innovations take place. Cultivation requires less land area. This is a home industry. Has high returns relative to cost. A timely solution to unemployment. It is possible to get rid of the dependency mentality and engage in a satisfying job.

Has a relatively high social acceptance. Growers, therefore, have a place in society. It will help the woman build self-esteem.

Consumers have the opportunity to consume non-toxic foods.

The expansion of the mushroom industry is creating new job opportunities.

Product diversification enables the consumer to purchase a variety of products. It allows you to break free from monotony and experience different things.

Mushroom production can contribute to the national GDP and is a better source of livelihood improvement for the poor and small farmers.

Entrepreneurship in the mushroom sector has low risk and high profitability as it has a promising future scope.

Mushroom cultivation is an eco-friendly business. Mainly wood powder use. It emits far less carbon dioxide than other agricultural uses.

Product diversification or value addition can be used to market the product and earn foreign exchange.

Costs

There is a variable cost for seeds, sawdust, packaging, etc., required for cultivation. A packet of mushrooms costs 18 rupees.

Cultivation promotion programs are organized, and resource persons have to be involved.

As a cultivation fund, SLCDF provides Rs. 30,000 and has increased it to Rs. 60,000.

The cost of fungicides and insecticides has to be borne as disease control measures have to be implemented.

Provides systematic marketing facilities and technical support to avoid post-harvest losses.

Policy enabling features

There is access to quality raw materials, including suitable climatic conditions and seeds for cultivation. Quality seeds can be obtained from the Root Training Center. Growers can also receive formal training.

Cultivation has the lowest operating cost that can be implemented in a home. It can also be used as an additional source of income as less attention should be paid to this.

Due to the high sales, the product does not need to be retained, thus minimizing post-harvest losses.

Proper management and regulation of crops can reduce the adverse effects of fungi on crops. This is done in collaboration with the Department of Agriculture and other institutions.

Sponsored by SLCDF, rural mushroom societies have been a great comfort to growers. It enables them to achieve their goals.

Due to the efforts and commitment of women, they have been able to reduce the labor costs incurred for their cultivation activities.

Maintaining a systematic sales network enables growers to market their products without interruption.

Policy disabling features

Mushrooms are food with a maximum shelf life of 2 or 3 days. Initially, some people were reluctant to participate in this cultivation due to its rapid quality deterioration.

Because it's a food business, it's sometimes necessary to pay more attention to the safety and hygiene of the operation.

Raw mushrooms have to be used in large quantities to prepare by-products. So they do not care about value-adding methods. It creates problems for income diversification. It is also a hindrance as the technology is also high. The benefits of direct marketing are lost on the availability of product intermediaries. Sometimes it is impossible to get a modest income because a portion has to be set aside for intermediaries.

It is difficult for growers to gain a competitive advantage by spreading in the same area, cultivating co-varieties, and using homogeneous production and packaging methods.

Present policy context

In the current scenario, SLCDF has increased the funding available to encourage mushroom growers. In addition, a suitable economic level has been set for growers to obtain loans from any financial institution.

The Government Institution is committed to providing the necessary knowledge and technology to promote cultivation. The Ministry of Agriculture of the Southern Province, the Provincial Department of Agriculture, the Provincial Agrarian Services Department, and the Divisional Secretariat are working together.

Organizes workshops at the regional level through active mushroom societies under GN Divisions, strengthen growers and evaluates them.

Working with the Divisional Secretariat to obtain legal recognition for the mushroom business.

In the face of the ongoing Covid-19 crisis, field officials have constantly contributed and facilitated further action.



Policy recommendations

This is a food business area, there should be a hygienic operational process, and proper advice should be given.

The behavior of the business environment in providing financial benefits should be studied. It is the main reason to encourage cultivation.

The training program should not be limited to one day but should be implemented, and the necessary practical and technical assistance should be provided. It should also cover packaging, conversion, storage, and marketing.

These businesses, which operate on a small scale, need the support of government agencies to gain legal recognition.

It should provide an opportunity for business innovation and help create a conducive market.

Work should be done to create a better relationship between the customer and the manufacturer.

Citation:

Dilrukshi, W.S., Amarasinghe, S.T.C., and Jayatunga, S. (2022). Does Mushroom Cultivation Contribute to the Economic Empowerment of Rural Women? *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

I want to extend my heartfelt thanks to my Internal Supervisor, Dr.(Mrs.) S.T.C. Amarasinghe, Senior Lecturer, Department of Agri-Business Management, Faculty of Agricultural Science, Sabaragamuwa University, Sri Lanka.

I would also like to extend my special tribute to Mr. Sanath Jayatunga, Senior Programme, and Administrative officer, SLCDF, who provided me with the proper guidance for the External Supervisor.
Valorization Opportunities in the Fruit and Vegetable Supply Chain

Executive Summary

In the Sri Lankan context, agriculture is considered one of the most common employment. Onethird of the world's food production is wasted on the way from farm to plate. The most significant component of the waste stream includes the unconsumed vegetables that are discarded by food processing industries. Sri Lanka is facing a lot of issues due to food insecurity. Most companies worldwide have been trying to reduce the total cost and wastages across their supply chain. The present food industry needs to focus on waste management and ways to contribute to economic growth. Large amounts of vegetables are wasted due to inadequate post-harvest handling techniques.

As vegetable wastages are a great source of income, industries are promoting new strategies to use this valuable resource to increase their profits and productivity. Thereby it directly supports the economic growth in the food sector. The companies in the fruit and vegetable industry need to promote strategies to reduce vegetable waste problems in the supply chain and maximize their profits by using waste as a resource.

Key features

- Out of the 35 GAP Certified farmers, 68.6% were male, while 31.4% were female and the majority of the GAP Certified farmer's monthly household income was above Rs.50000, which accounts for 60%.
- Out of the total employees, 70% were male, while 30% were female. Out of the sample, 50% of staff, and the rest of the 50% are associated with the company's operational team.
- Overall, whole fruit and vegetable wastages in



This Policy brief is prepared based on undergraduate research on "A Strategy Development in Waste Management at the Intermediary Level in Fruit and Vegetable Industry: A Case Study with Biyo Natural Pvt Ltd". The objective of this study is to provide strategic solutions for the fruits and vegetable wastages of the supply chain by identifying the potential factors for the wastages. This study was conducted by employing a case study. Responses will be collected through interviews from 10 employees, questionnaires from 35 GAP certified farmers, and direct observations.



Figure 1: GAP certified vegetables in supermarket

the supply chain are between 8% - and 20%.

- Out of the fruit and vegetable varieties, tomato, cabbage, and leek create a high percentage of wastages throughout the supply chain as leafy vegetables and vegetables with high moisture content are highly prone to wastage due to their high perishability nature.
- When considering the company's supply chain of fruits and vegetables, grading waste, storage waste, field waste, and transport waste significantly impact the fruit and vegetable supply chain.
- There is a high waste generation when transporting fresh fruits and vegetables. Because farmers usually use gunny bags and polypropylene bags to transport their products.
- Lack of cold storage utilization was considered a significant reason for wastages at the processing stage, while Inappropriate storage facilities were a substantial cause for wastages at the farmer level.
- The intentional losses play a significant role in generating fruit and vegetable waste at the processing and field levels.
- The fruit and vegetable wastes generated in this company that cannot be used for human consumption are used for composting. The out-of-specification fruits and vegetables that can still consume are graded and redistributed.
- As food valorization opportunities, the fruits and vegetable wastages that cannot be used for human consumption can be used for animal feeding and compost manufacturing, and Out of specification, fruits and vegetables that are still able to consume can be used to manufacture value-added products like dehydrated products, jams, chutneys, etc.

Benefits

Identifying strategies to minimize fruit and vegetable wastage is an excellent opportunity to develop the fruit and vegetable industry in Sri Lanka. Vegetable wastages provide many potential economic, social, and environmental benefits.

Fruit and vegetable waste reduction will help reduce greenhouse gas emissions. From an

economic perspective, fruit and vegetable wastages are a great source of income for industries as it helps to increase their profits and productivity. According to a social view, food insecurity is a huge issue globally. Therefore, finding solutions to fruit and vegetable wastage will help to reduce the food insecurity problem. As fruits and vegetables are highly perishable, it is timely to understand the requirements in each stage of the supply chain to reach quality fruits and vegetables for the final consumer.

With the optimization of the supply chain, the efficiency of the whole fruit and vegetable supply chain has increased. The farmers can yield a high-quality harvest; consumers can get a good quality product. Finding sustainable strategies to reduce wastage enhances the socio-economic development of the country.



Figure 2: GAP Certified Farmers

Costs

Fruit and vegetable waste is a massive problem for the environment, economy, and food security. The initial investment in identifying new developments creates a considerable cost. Because for the latest products they need technology, facilities, and knowledge.

Lack of knowledge among the key stakeholders in the fruit and vegetable supply chain creates enormous losses. They did not take the maximum benefits from this valuable resource. These wastages are dumped into the ground without any usage. Thus, it has limited their capacity to move into new industries. Therefore, the growth rate in the fruit and vegetable industry is insufficient.

Identifying the root causes of fruit and vegetable wastage is a massive problem because of the improper traceability system in the supply chain. Therefore, it creates an additional burden for the customers and sellers because of the high price. Moreover, the post-harvest handling techniques are not up to the Sri Lankan fruit and vegetable industry standards.

Lack of awareness about the transportation facilities creates a considerable wastage in the fruit and vegetable industry. Therefore, it creates a barrier to optimizing the fruit and vegetable supply chain.

Policy enabling features

In this study, the stakeholders in the processing level have a high level of knowledge and experience on the causes of fruit and vegetable wastage. Therefore, they can easily recognize new developments and technologies and optimize the supply chain by finding fruit and vegetable valorization opportunities.

Through this study, the fruit and vegetable industry companies can adopt sustainable strategies to reduce fruit and vegetable wastage and maximize their profits by using waste as a resource. And also, it will reduce the cost of production as this study focus on the causes of fruit and vegetable wastages in the supply chain. Conducting training programs about Good Agricultural Practices (GAP) for farmers from authorized institutions will help make awareness of post-harvest handling techniques, which help reduce wastages. Thus, this exercise broadens the scope of policies by enabling farmers to move for quality fruit and vegetable production.

There is a high market potential for the fruit and vegetable industry. Thus, the enterprises can promote their business by introducing new value-added products to the market. "Our company is dedicated to make a healthier life for humanity by delivering GAP certified fruits, vegetables and organic fertilizer. As well as we are contributing to enhance agricultural production and ensure a healthy food supply. We are working hard to improve the competitiveness of local agriculture and add high value to products based on our experience"

- Message from the CEO of the company

Policy disabling features

Even though this study suggests several strategies to reduce fruit and vegetable wastage in the supply chain, some limitations need to consider. One of the limitations is the lack of proper integration between the stakeholders in the fruit and vegetable supply chain in Sri Lanka. Therefore, it creates additional costs in the supply chain due to high fruit and vegetable wastage.

Another limitation is the lack of technology to optimize the fruit and vegetable supply chain. When considering the supply chain, one of the main issues is the lack of cold storage facilities, which leads to substantial storage wastages. As Sri Lanka is still a developing country economic status of farmers is not well off. Therefore, they could not invest in technologies to optimize the fruit and vegetable supply chain. And at the same time, a lack of awareness among farmers creates colossal fruit and vegetable wastages, which adversely affects the optimization of the supply chain.

In addition, the government did not take necessary actions to enhance post-harvest handling and consequently improve the living standards of the stakeholders in the fruit and vegetable supply chain. Another significant barrier to reducing fruit and vegetable wastage is the lack of guidance and lack of investment in new product development in the fruit and vegetable industry in Sri Lanka.

Present policy context

In Sri Lanka, a GAP certification scheme and farmer registration program were implemented with the help of the Department of Agriculture. Implementing GAP during farm and production activities will help ensure a secure food supply chain.

Sri Lanka is facing a lot of issues due to food insecurity. A large amount of fruit and vegetable are wasted in the various stages in the supply chain. However, the fruit and vegetable industries pay only the slightest attention to highly perishable agricultural products like fruits and vegetables in the Sri Lankan context. Because of the improper supply chain management, customers did not get the right quality product at the right time. Moreover, they will have to pay a high price due to wastages in the supply chain in the fruit and vegetable sector.

However, there was no comprehensive strategy to identify the causes of wastages in the supply chain and provide strategic solutions for the wastages due to improper integration among the critical stakeholders in the fruit and vegetable supply chain in Sri Lanka.

Policy recommendations

Before providing solutions for fruit and vegetable wastages in the supply chain, it is essential to pay great attention to occurrences of fruit and vegetable wastage along all the stages in the supply chain.

They can integrate well between all fruit and vegetable supply chain stages. Good communication within the supply chain facilitates the reduction of wastage. Proper integration enables delivering the products on time, providing better service and market information.

It is recommended to use plastic trays and corrugated trays as the secondary packaging formats to prevent colossal fruit and vegetable waste when transporting their products to the final market.

It is essential to use appropriate technologies for grading, cleaning, and packaging at the processing stage. At the farmer level, it is suggested to use new cultivation techniques, post-harvest infrastructure, and harvesting methods to reduce wastage and optimize the supply chain.

Moreover, they can establish a sound traceability system in the supply chain to quickly find the defects, tackle the problem, and take corrective actions.

Citation:

Nisthamin, F.A., Jeewanthi R.K.C, and Dharmarathne, N. (2022). Valorization Opportunities in the Fruit and Vegetable Supply Chain. *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

The author wants to express her deepest gratitude and warmest appreciation to Dr. R.K.C. Jeewanthi, Senior Lecturer of the Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. Furthermore, she thanks her external supervisor, Mr. Nuwan Dharmarathne, Executive director of Biyo Natural (PVT) Ltd, for the continuous support, advice and encouragement given throughout the period.

How Nature of the Organic Products is Important to NOCU?

Executive Summary

Organic concept of food is a trending concept in Sri Lankan community due to the promised safeguard for the healthy life since the noncommunicable diseases patients tend to increase globally. Organic products export industry is well-established in Sri Lanka but organic product availability in local market is too little and unorganized. National Organic Control Unit (NOCU) is the authorized body, which has a power to take decisions regarding production and exportation of all the organic products in Sri Lanka.

However, NOCU also do not have much details of local market. This study emphasizes the range of organic products in the local market with the certifications owned by each organic product, labeling requirement fulfillments according to SLS 1324:2018 and Export Development Act No. 40 of 1979 and packaging materials that used to pack the organic products. The analysis focused on local food markets in Colombo District.

Key features

- Researcher categorized all organic and natural products into two categories. Category one represent mainly fresh foods, processed foods, and raw foods. There are 21% of fresh foods, 64% of processed foods, and 15% of raw foods available in the Colombo District's local market.
- The majority of organic and natural products available in the Colombo District's local market are processed foods.
- Category two represent mainly 14 subcategories named beverages, desserts



"It's time to transition beyond our fossil fuel addiction to a just economy based on green jobs, renewable energy, and local organic food."

-Winona LaDuke-

This policy brief is based on undergraduate research on "Comprehensive study of currently available organic/natural products in Sri Lankan market for a supportive database to Export Development Board's promotional campaign on organic products". This study attempt to determine the range of organic products available in the Colombo District's local market, organic certifications, labelling and packaging requirements of organic products. Data collected from 25 shops located at Colombo District. & baking, cereal, spreads, flour, seasoning, condiments, confectionary & snack, processed & preserved fruits & vegetables, sauce, fruits/ vegetables & green leaves, oil/fat, meat & egg, and other.

- The majority of organic and natural products come under the seasoning items category and as a percentage, it is 26% out of the total presence.
- Spices and condiments sector represents the seasoning items category's high presence (71%).
- Mostly available organic and natural beverages in the local market are expected, and flavored tea, as a percentage, is 72% of the total presence.
- Desiccated coconut (25%) and treacle (21%) are the most available organic/natural dessert and baking items.
- More than half of the fresh items (63%) come under the organic vegetable category. Fresh fruits represent 27% of the market, and the green leaves category represents only 10% of the market.
- Oil/fat category consists of 91% organic and natural oils (coconut oil varieties and sesame oil). The overweight category consists only of coconut butter, 9% of the total presence.
- More than half (62%) of the products have at least one organic certification on their label.
- Eight types of organic certifications recognized after data collection. USDA, EU, JAS, Australian certified organic, Canada organic, OSA, Kosher, and Sri Lankan organic logos.
- Among them, EU and USDA are more prevalent in the local market.
- Only one product displays Sri Lankan organic logo on the label.
- More than half (90%) of the organic/natural products were correctly addressed the labeling requirements according to SLS 1324:2018 and Export Development Act No. 40 of 1979.
- There are mainly four name tags used to categorize products. The majority of the products (74%) are labeled as "Organic," and only 13% of the effects come under the "Certified Organic" name tag.
- Paper pouches, polythene packages, and glass bottles are the most used packaging materials in the market, and it is 23% of the real presence.



Figure 1: Data collection at Kenko 1st Organic

Benefits

The entire world is moving from conventional food consumption to organic food consumption due to the spread of non-communicable diseases like cancers, heart diseases. Consumers who lived around the world are paying more attention to "what they eat and buy from the shops".

Though the world is moving healthy lifestyle, Sri Lanka was not adopted that concept earlier. But the recent government decided to ban all pesticides and agrochemical imports to the country. With that decision, the concept of organic become more important.

In Sri Lanka, the National Organic Control Unit (NOCU) is the authorized body that has the power to take decisions and actions of all organic food production and exportation. Though NOCU become the responsible party, they did not have many details of the organic food market in Sri Lanka. Without detailed information, they cannot take decisions and actions to promote Sri Lankan organic logo within the country.

After doing this research, the researcher provides the database of the organic and natural product market in Colombo District to NOCU. They can use this database as reference material when taking random samples of their annual market surveillance.

This database is very beneficial for them to develop their website market overview part. The website should display more details regarding the organic market because most of the parties visit this website to get an overall idea of the Sri Lankan organic food market. By using this information, NOCU can decide on training programs to promote Sri Lankan organic logo and they can provide guidance, assistance, and consultancy programs to organic food producers to raise organic food production within the country.

Costs

Most of the products available in the local market used the word "organic" on their products' labels without certification marks. The label did not display the percentage value of organic ingredients clearly. Those may be misleading consumers. It creates a bad image regarding organic products. It is a kind of cost that badly affects for the organic food industry.

When NOCU planning to promote the Sri Lankan Organic logo within Sri Lanka, they have to bear a lot of costs including documentation costs to successfully implement the logo in the local market.

By using this database, NOCU hopes to develop its website. Website development is a costly process because it should be accurate and organizations' image depends on their website.

Doing market surveillance also become a costly project. Here, NOCU officers went to the selected shops, collect samples and check the quality of the organic products. In this survey, NOCU uses the researcher's database as reference material to collect samples. It also includes the cost.

When conducting assistance, guidance, and consultancy services to promote organic products within Sri Lanka to organic food producers, NOCU has to bear the cost of providing the above services.



Policy enabling features

The study identified that there is a high potential for the organic food sector to become more sustainable through upgrading existing regulations and providing guidance, assistance, and consultancy programs to organic food producers.

Some products have used the word "Organic" on their label without displaying any certification mark. Some products display PGS, SriCert certification on their label and used the word "Organic" on the label. But those are not organic certifications. This kind of fraud things have the ability to mislead consumers and it can damage the image of the organic industry. There is high potential for implementing strict regulations to monitor Sri Lankan organic foods.

When considering the spread of organic certifications in the local market, the majority of the products have EU, USDA, and JAS certifications. Only one product (out of 442 products) was displayed the Sri Lankan organic logo on the product label. As a percentage, it is 0%. NOCU has the goal to export Sri Lankan organic products to the world in 2028 only with the Sri Lankan organic logo. To reach this goal NOCU has to promote Sri Lankan organic logo to Sri Lankan organic food producers. Here, there is a high potential to implement proper policy to provide assistance, guidance, and consultancy services to motivate producers to obtain the Sri Lankan logo.

Some products come under the "Natural" and "100% Natural" name tags. It is better to establish guidelines to convert those products into organic products.

Policy disabling features

Issues related to the organic standards change according to the value chain actors. For example, producers have to bear the high costs in the implementation of organic certifications. On the other hand, producers lack awareness and insufficient financial aid for adhering to organic certifications.

Figure 2: Good Market

According to findings, most of the fruits, vegetables, and green leaves producers (20%) and some processed food producers (4%) did not acquire the organic certifications for their products. They grow or produce those products without applying any agrochemicals. Here, the producer defines the word "Organic" himself.

Any authorized body was not inspecting those production lines yet. But they used the word "Organic" on their label. Therefore, lack of awareness of the organic certification is a significant drawback in obtaining organic certifications.

Some organic products (38%) use the word "Organic" on their label without having any organic certifications. It is the most significant barrier to maintaining the quality and status of the organic food industry. Lack of awareness of legal background has become another limiting factor that creates a bad image in the mind of consumers regarding organic food.

Only one product was displayed Sri Lankan organic logo on the label. As a percentage, it is 0%. It means most of the producers are not aware of the Sri Lankan organic logo. Even NOCU has not published the website with detailed information regarding the organic industry yet. Without Sri Lankan organic logo producers can sell their products in the local market. There is not any limitation to selling the products. Therefore, producers are not coming forward to obtain the Sri Lankan organic logo.



Figure 3: Kenko 1st organic shop

Present policy context

National Organic Control Unit is the authorized body that has the power to take decisions and actions regarding the production and exportation of all the organic products in Sri Lanka. They monitor the organic product industry according to SLS 1324:2018 and Export Development of Organic Product Regulation 2014. As an initial stage, NOCU was registered 20 small and medium farmers under Export Development Board Assistance. These farmers can use the Sri Lankan organic logo when marketing their products.

There are another 24 farmers who apply for Sri Lankan organic logo and it is processed under Control Union's supervision.

NOCU has also started to develop a website for aware producers in Sri Lanka. But it is not published yet.

Unfortunately, organic food producers are unaware and do not care about the importance of obtaining organic certifications. Though fraudulent organic labeled products are available in the market, the authorized party did not take any legal actions against them. However, only a few training programs were conducted to aware of Sri Lankan organic logo.



"I followed B. Sc. Agriculture degree in Japan. I came to Sri Lanka in December 2022 as a JICA volunteer. I worked with 60 farmers in Anuradhapura, Puttalam, Kandy, Nuwara-Eliya,

Badulla, Monaragala, and Colombo. We have grown all the fruits, vegetables, and other edible products without using any agrochemicals. But we do have not organic certification yet. If Sri Lanka plans to introduce an organic logo, we are hoping to get that logo for both our fresh foods and processed foods. I think it is more cost-effective than getting an international certification mark. As a local market targeted producer, it is very beneficial to me to market my products in the local market. It would be better to conduct assistance programs to aware us of this logo".

Policy recommendations

By using a database prepared by the researcher, NOCU can clearly identify who are the producers that promote their products as organic without any organic certification on their label. This information is very important to the regulatory works. NOCU can send this information to Consumer Affairs Authority to take legal actions against these product owners.

After taking fraudulent product lists and product owners lists, NOCU can provide assistance programs to convert those products into certified organic products with the organic certification.

NOCU started to create the website to provide a clear picture of the Sri Lankan organic industry and they hope to publish it this year, most probably in May. Here, NOCU can use the database of this research to create an overall picture of the Sri Lankan organic product market.

The cost of attaining international certification is a little bit high. There is no purpose to attain international certifications to organic food products that consume only in Sri Lanka like orid dhal. There is high potential to introduce an organic logo focusing on the local market. NOCU can promote Sri Lankan organic logo within Sri Lanka at a low cost. Then local producers can easily attain this certification.

NOCU can introduce the Sri Lankan organic logo as a compulsory organic certification when sending organic products into the local market. Then all local market-targeted producers tend to attain this logo on their label.

Based on the database, NOCU can create a video that explains Sri Lankan organic crops, the quality level and status of the crops, and the Sri Lankan organic logo. Then they can send this video to foreign countries via embassies to aware foreigners regarding the nature of the organic industry and Sri Lankan organic logo. NOCU can convey Sri Lankan organic logo to the world in this way very easily.



Figure 4: Mal Organic Products

Citation:

Nawarathne, R.M.H.T., Jeewanthi, R.K.C., and Perera, V. (2022). How Nature of the Organic Products is Important to NOCU? *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

I want to express my greatest heartfelt and sincere gratitude to my internal supervisor Dr. R.K.C. Jeewanthi for her moral guidance, monitoring and constant encouragement throughout the research study period. I want to express my heartfelt gratitude to Ms. Vinoka Perera, my external supervisor, for executing the time, word of encouragement, motivation, valuable comments and guidance were beneficial me to complete this study.

Organic Fresh Fruits and Vegetables Retailing in Semi-Urban Areas in Sri Lanka

Executive Summary

Consumer perception nowadays is turning towards organic foods due to modern people's health and environmental concerns. In other words, people have keen on purchasing organic foods for their day-to-day food requirements since they have an attitude as organic foods are safe; produced through a chemical-free healthy manufacturing process.

According to the statistical report of the world of organic agriculture - FIBL & IFOAM (2021); total organic agriculture lands in the year 2019 are 72.3 million hectares (1.5% as a percentage of entire agriculture lands), it was 11 million hectares in the year 1999. However, Sri Lanka has the secondlargest organic land area in the Asian region, amounting to 70,436 hectares in 2019 (2.5% of total agricultural lands), and 591 hectares belong to organic fruits cultivations, while 121 hectares contributed to cultivating organic vegetables.

As a result of the emerging and growing situation, organic retailers also have opportunities in the organic food market. Retailers have progressive potential to enter the organic food market, and there are plenty of marketing strategies that retailers can implement. Supermarkets already have organic food retail approaches, while still there is a lack of smallholder retailers in the organic food market.

Since retailers are the closest and direct products, information suppliers of the consumers the future of the organic food market in urban and rural areas, domestic organic foods are majorly dominant in urban society.

Because of the several constraints in the rural economies, organic food retailing is not much



This policy brief based on the findings of an undergraduate research thesis titled "Opportunities and challenges in marketing of organic fresh fruits and vegetables from the perspectives of consumers and retailers: A case study in Kalutara District". 210 customers in four divisional secretariat divisions and 27 organic fresh fruits and vegetables retailers of the district focused on the study. The study conducted based on data collected by faceto-face interviews, E- mails using structured questionnaires.



prominent in agrarian societies. Still, the organic market in Sri Lanka has been identified as a niche market.

Key features

- The study was conducted to investigate the opportunities and challenges of organic fruits and vegetable marketing in the Kalutara District. The five factors that impact consumer purchasing intention are product quality, service quality, health consciousness, price fairness, and customer loyalty.
- The statistical result shows that all five variables significantly impact customer purchasing intention. Health consciousness and product quality were the two variables that mainly affected consumer purchasing intention. Furthermore, it was noted that the most negligible impact was from the price factor. Consumers generally consider prices fair given the health benefits, high production costs, and eco-friendly aspects.
- When purchasing organic fruits and vegetables, consumers consider the quality of service provided by the retailers. Further, consumers also consider organic certifications and labeling of the product.
- The findings of the retailers' survey revealed that there is less knowledge and awareness regarding the organic concept and certifications among the retailers. However, organic consumers belong to a highly educated and high-income group.
- Their purchasing behavior was influenced by family members, friends, and preferences. The study revealed that marketing, especially promotional efforts were minimum. Generally, organic retail shops were small in scale except for supermarkets.
- The result indicates that initial investment for startup organic retail establishment is relatively higher than conventional fruits and vegetables retailing. On the other hand, it was found that organic supplies' prices were higher than conventional produce.
- This can be attributed to the high cost of transportation and margins of intermediaries. The current study concludes that it's significant to make long-term and efficient solutions to overcome challenges.

Benefits

Since organic fresh fruits and vegetables retailing is not well established in the Kalutara District, this study will be a resource for influencing the current retailers to become well established in the industry. They can better identify how customer perception and intention have been cast in the area and develop strategies to promulgate the current business placement since there is a lack of organic food retailers in the area.

In this study, organic food retailers and consumers have represented the data set Kalutara District of the Western Province. If there are potential buyers or retailers, they can utilize this study for their SWOT analysis in the future.

In addition, this study is essential to authorized parties in Sri Lanka's government, those involving policy-making for organic agriculture development in the country. They can identify the current market situation and take relevant actions for loopholes in the organic fruits and vegetable value chains.

Costs

Organic fruits and vegetable retailers have to spend extra costs for establishments comparatively. Not only has the price of suppliers also been higher than conventional stocks. Organic fruits and vegetables yield relatively lower, requiring specific agro-inputs and skilled labor. When authorities establish a national policy promoting organic agriculture, it is needed to utilize many resources and finance to achieve the expected outcome.

It is essential to maintain a quality framework and proper standardization and certifications. Several institutions are available in the organic industry that provides certificates and standardizations. It requires dedication and individual expenditure from national authorities and organic food manufacturers.

Policy enabling features

Since current government policy turned towards green agriculture, educated customer group have enthusiasm for organic food categories. On the other hand, there is a niche in the retailer's market due to the number of organic retailers in semiurban areas. So the Kalutara District is supposed to establish organic fresh fruits and vegetables retail shops to fulfill the demand and stimulate potential customers.

The customer group belongs to a highly educated and high-income level. They expect standards and certifications, quality, packaging and labeling, and the outer appearance of products.

By improving advertising and marketing practices of organic consumption and increasing the market availability, retailers in the area can reach maximum advantage of the current situation.

But some of them consider whether the product/ supplier or farmer has organically certified. Additionally, consumers are concerned about labeling the product as purchasing other goods. They are buying organic foods because of their passion or the influence of family members/ closer relatives. There is a lack of promotional or marketing efforts. Additional promotional campaigns and awareness sessions for both retailers and consumers would be the need of the hour.

Policy disabling features

Current economic controversy and pandemic situation negatively affected the data collection. The actual situation differs from the current situation of the organic fruits and vegetables retailing industry. In addition, a sudden increase in the whole price level of fruits and vegetables in the country impacted the value chain.

The study is based on the community Kalutara district in the Western province, which consists of a comparatively urban and semi-urban population than other provinces. It is easy to promote the organic retailing concept in the western province but challenging to implement in other rural provinces since income levels highly impact demand.

High input costs and lower production generally lead to increased organic category prices.

Therefore, it negatively impacts customer perception, buying patterns, and purchasing quantity.

The situation in the country regarding the organic fertilizer importation issue has created a kind of mentality among the public and farmers who are currently engaged in conventional farming methods.

The data sample consisted not only of day-to-day purchasers of organic fruits and vegetables but consisted of occasional buyers also. Instead of taking the sample as a whole, both two customer groups can have two kinds of intentions. The retailers' sample also consisted of two main groups: supermarkets and specialty organic shops, since their perspectives are different in several cases.

Present policy context

In the current Sri Lankan context, the government has moved to the green agriculture policy by appointing a Presidential Task Force on "green agriculture." The policy change came after the policy of banning synthetic fertilizers and shifting organic fertilizers immediately. The task force and new policy will be responsible for looking into the overall organic fertilizer requirement in the country and the quality of organic fertilizer production.

As a responsible authority on behalf of the government, the Department of Agriculture has been engaged in distributing organic fertilizers, providing subsidies for organic farming, educating farmers, and identifying the chemical fertilizer mafia in the country.

National Organic Control Unit (NOCU) was established under the Export Development Board (EDB) as per the regulations published in section 29 of the Export Development Act no. 40 of 1979 in the extraordinary gazette no. 1870/71 dated July 11, 2014. NOCU is mandated to control and monitor all organically related activities such as cultivation, processing, trading, certification, laboratory testing, import and export of organic products to stream the local and export markets to ensure the credibility of the organic agriculture products in Sri Lanka.

Policy recommendations

The main motive for conducting a consumer purchasing intention survey was to identify the opportunities remaining in the organic fruits and vegetables retailing sector. The main factor in organic fruits and vegetable purchasing was health consciousness. The consumers' premium price was fair since organic foods are considered free from synthetic agriculture residues. Potential and current vendors in the area should implement their marketing and promotional efforts focusing on that.

Consumers and retailers should have enhanced their knowledge and awareness of organic foods. Mainly they are not aware enough of organic certifications as well. Certification bodies and relevant authorities have to take enough actions to conduct extension programs.

Besides, it reduces fraud and dishonest behaviors in the organic market.

Customers' surveys have revealed that they consider retailers' service, product labeling, brand, and certification. Etc. Therefore, organic shops can consider improvements in-store atmosphere, certified products, attractive and truthful labeling, and the hereafter.

Both consumers and retailers don't have positive intentions about the new agriculture policy of the government. So government intervention should rely on encouraging the elements of organic fruits and vegetable value chain and avoiding malpractices in the market not to force coercively because eventually those impact to develop malpractices in the market.

Some organic retail shops (supermarkets) are located in the countryside, remote from the main towns. It should be considered and established where people can reach easily. Availability and store location influence the potential customers. In other words, the quality of store location, infrastructure, and quality of items are opportunities to stimulate the upper-middleclass community in the district. It should be mentioned that there are hesitations among retailers regarding input suppliers. It is of utmost importance to understand their value chains and take actions to position trustworthiness and loyalty among consumers' minds.



Figure 01: Data Collection

Citation:

Bhashini A. A. P., Esham, M., and Wahala W. M. P. S. B. (2022). Organic Fresh Fruits and Vegetables Retailing in Semi-Urban Areas. *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

I express my sincere gratitude to my internal supervisor, Prof. M. Esham, Senior Lecturer, Department of Agribusiness Management, Faculty of Agricultural Sciences, the Sabaragamuwa University of Sri Lanka, for his valuable guidance and encouragement. Further, I would like to dedicate this study to my external supervisor, Dr. Sampath Wahala, Chairman, Sri Lanka Accreditation Board, Colombo 08, to provide thoughtful advice and immense support to end this study successfully.

How to Enhance the Performance of the Documentation Process Using 5S and Document Numbering System

Executive Summary

5S is a Japanese system used in organizations enhance the organization's to efficiency, effectiveness, and performance. This system tries to keep everything to make the place clean and tidy. The documentation process is one of the main parts of an organization. It is a method of capturing all the necessary information and adequately executing a business process. It is a continuous activity. A document control system is a process of organizing, routing, tracking, authorizing, and distributing all documentation involved in the design, development, and manufacture of products.

Implementing 5S for the documentation process in the organization is one of the essential steps toward continuous improvement. Implementing 5S ensures consistent improvement results in better safety standards. The document control numbering system is a crucial element of the document management process. It is a method of identifying documents that are relevant and essential information that can be created, organized, shared, and stored correctly. Making and implementing a document management system is crucial for any business.

Key features

- This study was carried out using the documents within the company's quality assurance department.
- Before implementing 5S and the document numbering system, several issues were identified regarding the documents within the department.
- Employees within the department need



Documents and records serve as evidences that the company is following a good manufacturing and document management practices required for quality and regulatory compliances.

This policy brief results from the undergraduate research on *"Implementing 5S and the Document Numbering System to Enhance the performance of the Documentation Process within the Quality Assurance Department of HJS Condiments Limited"*. This study attempts to solve the issues identified in the documentation process of the HJS Condiments Limited through implementation of the 5S and the document numbering system. And also, this study tries to enhance the performance of the documentation process through implementing these two systems. to regulate and organize all the files and documents within the department to make their work easier.

- According to the results of this study, the average time for file picking has been reduced by 64% after implementing the 5S and the document numbering system.
- Overall performance of the documentation process has been increased by 40% after implementing two procedures.
- When considering each step of the 5S, every step has enchased its performance. Sort 41.4%, Set in Order 48.8%, Shine 49.2%, Standardize 24%, Sustain 28.4%.
- After implementing 5S and the document numbering system, day-to-day work within the organization has been well organized and easier than before.
- Employee motivation towards their responsibilities has enchased because of the implementation of these two systems.

Benefits

Implementing 5S and the document numbering system has many advantages, such as improved productivity, improved safety, reduced wastage, enhanced employee motivation, and a pleasant working environment within the organization.

Implementing the 5S in an organization makes a cleaner and more efficient workspace. Through that, efficiencies of the companies increase, and it helps the county and the society as a whole.

From this study, 5S and the document numbering system have enhanced the documentation process's performance by the 40%. And also, the time of file picking has been saved from the 64.3%. These two systems have made the documentation process more organized and efficient.

Costs

5S and the document numbering system implementation is a cost for a company. They need to arrange separate training and workshop regarding the 5S and the post 5S practices within the organization. Employees need to adjust to a new working routine, and it will make time cost for the company. And it can take effect on the whole society also.

It is more time-consuming to implement 5S within an organization. Nowadays, companies need to adopt excellent manufacturing practices and the 5S. Therefore, companies have to bear the costs incurred with these implementations.

Policy enabling features

5S implementation within the organization has become a significant part of quality aspects. Employees within the quality assurance department are diploma or degree holders who know the 5S and the essential quality improvement tools within a company.

Because of that, the implementation of these two systems has become more accessible and well planned. According to the study results, performance and employee motivation have been enhanced significantly within the organization.

The employee opinion survey has shown that employee motivation for the work has increased, and the overall performance of the documentation process has increased significantly.



Figure 1: Files kept in order after implementation of 5S and document numbering system

Policy disabling features

Though the employees were motivated toward implementing the 5S and the document numbering system, some factors acted as barriers to the implementation.

The main thing was there was a fear for the resistance to change as they were thinking the files and the documents could be misplaced. And also, as the study was conducted during the covid situation, time became a limiting factor for the implementation.

These two factors severely affected the successful implementation of 5S and the document numbering system in the documentation process of the company's quality assurance department.

Present policy context

Almost all of the organizations within the county must have a proper documentation process to have evidence of their work. It is a must to maintain a good and well-maintained documentation procedure to enhance its performance.

Sri Lankan law has become a regulatory requirement to conduct a documentation process for all of the companies within the county.

Many studies have shown that 5S implementation significantly affects the documentation processes' efficiency and performance.

Another study has mentioned that implementing 5S and the document numbering system could save time, enhance the company's performance, and create a pleasant and clean place for the employees to work.

Policy recommendations

The results of this study facilitated the organizations to adapt to the 5S and the document numbering system to enhance the performance of their documentation process.

The implemented system should be well maintained and followed correctly to get the maximum benefits out of it.

Continuous improvements within the system are a must to continue the implemented systems smoothly and regularly.

To have a successful documentation process

through the 5S and document numbering implementation, there should be awareness programs and post 5S training sessions for companies.

After implementing the quality improvement tool for the documentation process, audits should be done to validate and regulate the operations, identify the issues regarding the documents, and check whether the implemented strategies continue regularly.

This study recommends that adopting the 5S system to the documentation process can make the company life more successful.

Citation:

Gunathilaka, V. D., Jeewanthi, R.K.C. , and Madusha, L. (2022) Implementing 5S and the Document Numbering System to Enhance the Performance of the Documentation Process in the Quality Assurance Department of HJS Condiments Limited. *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

This work is an outcome of a final year research project completed with the guidance of Dr. R.K.C. Jeewanthi, a lecturer of Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. Facilitation for the research was given by the M.Lakmali Assistant manager quality assurance at HJS condiments limited.

Is Ozone a Good Alternative Sterilization Agent to Steam Sterilization for Moringa Leaf Powder Production?

Executive Summary

Due to the lower shelf life of the fresh Moringa leaves, it is generally processed as powder. Powdered form Moringa is mainly used in food products, including at all levels of processing, from raw materials to inclusion in convenience foods. Because of its agricultural origin, Moringa is often naturally contaminated with various microorganisms. Therefore, they often constitute a microbial hazard due to poor sanitation practices during growth, harvest, drying, processing, and storage. Sterilization is the primary step in export-oriented Moringa leaf powder processing. The Application of suitable sterilization technology and selecting appropriate conditions are essential. The use of ozone is an entirely new technology that is a more effective method of chemically decontaminating herbs and spices. The study was developed processing steps for the Moringa leaf powder.

Key features

- Mainly, Europe has an attractive market for organic Moringa suppliers in developing countries.
- The coronavirus crisis is positively affected by stimulating demand for immune-boosting supplements and organic products such as Moringa powder.
- Higher damage to the sensory and physical characteristics has occurred with steam sterilization, which is currently practiced at the commercial level in Sri Lanka.
- Especially during the steam sterilization process, the volatile compounds in the Moringa leaf powder are being damaged, adversely affecting the retain the natural color of the leaf.



This Policy brief results from undergraduate research on "Developing an effective sterilization method for moringa (Moringa oleifera) leaf powder production". The main objective of that research was to examine the effectiveness of process integrated ozone sterilization treatments. Washing and drying steps were included in the ozone sterilization process.

- Especially during the steam sterilization process, the volatile compounds in the Moringa leaf powder are being damaged, adversely affecting the retain the natural color of the leaf.
- Ozone integrated washing and drying sterilization was significantly different from steam sterilization.
- Ozone sterilizer and air condition Ozone dehydrator machines were newly introduced.
- Ozone is a potent oxidant disinfectant that has higher reactivity and solubility. But it is not characterized as a carcinogen or mutagen.
- Bacteria, fungus, viruses, yeasts, and mold can be decontaminated with relatively low ozone concentrations and a short contact time.
- Many studies have shown that ozone treatment improved the quality of various meats, fruits, vegetables, spices, and herbs.

Benefits

Ozone integrated washing and drying sterilization was recorded with lower moisture (8.49%) and ash (7.36%) percentages.

The ozone sterilized Moringa powder had greater quality characteristics measurements (Water absorption capacity: 6.31 ± 0.02 , Organic matter: 84.15%, Bulk density(gcm-3): 0.2418 ± 0.00 , pH: 6.52 ± 0.00). It had the lowest microbe count and growth rate, indicating more effectiveness than steam sterilization.

Especially Process integrated ozone sterilization had retained the more natural green color of moringa leaves.

Costs

There should be investing more funds for Ozone integrated washing and drying sterilization process than steam sterilization.

Policy enabling features

Sri Lanka has a large export market, and there is a massive demand for immune-boosting supplements, herbs, and spices exported from Sri Lanka to foreign markets. There is a trend toward non-thermal sterilization in the food industry, aiming to reduce energy demand and preserve heat-labile components.

Process integrated ozone sterilization helps develop current market demand and reach existing moringa leaf powder production markets. The use of ozone is an entirely new green technology that is a more effective method of chemically decontaminating herbs and spices.

Ozone is approved by the United States Food and Drug Administration (FDA) as generally recognized as safe.

Ozone affects the Salmonella spp, Bacillus cereus, Escherichia coli, yeast, and mold.

Policy disabling features

Most exporters in Sri Lanka are reluctant to adopt new technologies and remedies.

Lack of understanding, facilities, resources, and knowledge on developing these types of sterilization treatments such as Ozone.

There is no technology alone to decontaminate all types of microorganisms with minimal loss of nutrients and sensory properties.

Present policy context

Contamination of food with microorganisms is one of the most significant public health problems and an important cause of human suffering worldwide.

While European Union (EU) legislation has no definite microbiological standards for spices and herbs such as Moringa leaf powder.

But different mandatory microbiological standards are established by national authorities of other countries.

Most Moringa leaf powder exportation was conducted under the buyer and seller agreements.

Policy recommendations

Ozone integrated washing and drying sterilization steps for the Moringa leaf powder (Figure 01).



Figure 01: Ozone integrated washing and drying sterilization steps

The Moringa leaf powder processing should be considered below mentioned guidelines.

- Moringa Reserving Fresh Moringa should be collected from the plastic crates, which were properly cleaned. In the transportation to the factory, fresh leaves temperature maintained below 25°C.
- Sorting Should be removed the color damaged leaves and leaves having pests and diseases.
- Washing sterilization It should be used in ozonized water tanks for 10 minutes of washing.
- Draining The washed Moringa leaves on the

food-grade stainless steel mesh should be spared for one hour and draining temperature maintained between 30°C - 35°C.

- Leaves separation Moringa's leaves separated from the barks. All of the contact surfaces should be food-grade material and adequately cleaned.
- Drying sterilization It should be used air condition ozone dehydrator. All of the Moringa contacts surfaces were food grade in the dehydrator machine. The temperature was maintained below 55°C for six hours.
- Pulverizing It should be used. All Moringa contact surfaces have food grade in the pulverizer/ grinder machine.
- Packaging It should be used in food-grade polypropylene packages.

Citation:

Lakshan, L.W.S., Jeewanthi, R.K.C., and Daraniyagala, I. (2022). Is Ozone a Good Alternative Sterilization Agent to Steam Sterilization for Moringa Leaf Powder Production?. *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

I express my deepest gratitude towards my internal supervisor Dr. R. K. C. Jeewanthi, Senior Lecturer, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka for the continuous guidance given throughout the entire research activities. As well, I sincerely express my gratitude to my external supervisor Mr. Indika Daraniyagala, Manager - Production and Planning, Greenfield Bio Plantation (Pvt) Ltd and Thermex Lanka (Pvt) Ltd for their cooperation through setting an appropriate arrangement.

Is It Necessary for Dairy Sector Staff Members to Receive Learning and Development Programs for Achieving Higher Employee Performance?

Executive Summary

Learning and development play an essential role in the organization's effectiveness and people's experiences at work. Learning and development have implications for productivity and personal development. The national livestock development board employing people needs to train and develop its staff. The company is aware of the requirement and invests effort and other resources in learning and development. Investment in learning and development entails obtaining and providing necessary skills and knowledge. If current or potential job occupants can meet the job requirements, learning and development are not essential. Still, it is required to raise the skills levels and increase the adaptability of employees. The probability of any young person learning a job today and having those skills unchanged over many years if his career is improbable or maybe even impossible. In a rapidly changing society, employee learning is an activity that is desirable and an activity that an organization must commit to giving all employees. The national livestock development board provides learning activities that must be related to the organization and the individuals.

Key features

- The study found that learning and development is the most influential source of employee performance
- The study found that Learning and Development is the most influential source of employee performance
- This study focuses on employees' job knowledge, techniques, skills, and abilities, competency, and morale
- When comparing the trained and non-trained



This Policy Brief is prepared based on undergraduate research on *"The impact of learning and development on the performance of executive level employees. A case study of National Livestock Development Board"*. This study examined data from 227 executive level employees in National livestock development board including those who participated in training and those who did not employees, the effect of employees' learning impacts organizational performance.

- Trained employees have more job knowledge, techniques, skills and abilities, competency, and morale than non-trained employees
- National livestock development board is also planning to train all management staff and lower ranks on different aspects of livestock management to inculcate up-todate knowledge on subjects that the team will be able to cope with the latest trends and changing technology.
- However, some staff members have not received learning and development programs up-to-date knowledge on staff-related subjects.
- The findings of this research will be helpful to the future development to conduct them more successfully by further improving it
- Finally, it concluded that the employees' learning and development program could significantly impact employee performance.



Figure 01 : Short term training

National Livestock Development Board focuses on introducing new technology, expertise, capital with better management practices to reduce cost and improve the productivity of farms managed by the Board while increasing the existing market share with better marketing



Benefits

Investment in learning and development increases the employees' productivity and leads to better production quality and higher levels of innovation. Other positive effects include improved work safety, increased employee satisfaction and motivation, lower attrition rates, and lower operational risks. In addition, learning and development enhance the company's reputation and can improve its relations with government and community alike.

Morale improvement provides Employees can upgrade their skills which is essential to improving their productivity. In the organization and external world also necessary to develop employee skills. It also enhances the personal development of each employee and the socioeconomic development.

Costs

A comprehensive learning need analysis is a high cost for the company. Currently, the company allocates a significant proportion of money to different learning and development programs. As these learning and development programs continue to change and thrive, the company will have to bear another high cost for the development. The time allocated for on-thejob training and off-the-job training is increases costs for the company. Different training types have extra associated fees. This involves the labor costs of paying to upskill employees. There are variations in upskills of employees with age, level of education, and employees' experience. Thus the national livestock development board must allocate a relatively high cost for future learning and development programs because of customized training methods to suit employees' skills.

Policy enabling features

The enabling learning and development policy ensures that the organization is resourced at all times with people who have appropriate skills, knowledge, and experience to allow the organization to achieve its organizational purpose. Many employees had considerable expertise in their work. Hence most employees had traditional techniques to engage with their work. Most of the employees have better education. Therefore, it might be easy to adopt new practices, job knowledge, skills, and abilities related to employees' experience and expertise.

Additionally, educated employees with good experience can easily understand new developments and policies.

Policy disabling features

Lack of financial support for the learning and development activities of the staff members is one of the biggest challenges they are facing. It is acting as a policy disabling the feature. The low budget for learning and development is at a deficient level. Therefore, staff members cannot perform their work at an efficient level. According to the findings, staff members are not keen on using learning and development programs. Therefore, a lack of knowledge of learning and development programs will be a drawback when implementing the policies.

Present policy context

The national livestock development board presently provides various learning and development programs for staff members. Learning and development programs are offered to the staff members to build the knowledge, skills, and capabilities to improve their performance and organizational goals. Presently upgrade employees to take up the future challenges through learning and development. The national livestock development board is also planning to train all management staff and lower ranks on different aspects of livestock/crop farming and farm management to teach up to date knowledge on subjects related to the above so that the staff will be able to cope with the latest trends and changing technology.

Policy recommendations

There are several recommendations by considering the conclusion and observation during the data collection period. First, the

board must understand the current issues in the training framework to adjust to the skills gaps. It is advisable to promote the learning and development programs, especially among the new staff members, because they can play a vital role in the dairy sector to change their attitudes towards learning programs providing a framework for teaching programs that influences employee performance. Practical issues have arisen regarding the availability of different programs with the current covid 19 pandemic. Therefore, learning and development programs should organize following the current covid situation. The online platforms of learning programs have more significant potential in strengthening employee skills and knowledge. It is also not make learning curriculum is not updating time to time. Therefore, there is a need to organize a stepwise approach to developing staff members' learning and development programs. It is advisable to strengthen the staff employees and instructors of the learning program relationship by giving them more opportunities to interact with them. It is necessary to establish continuous monitoring and linkage between employees and the organization. Though employees are interested in participating in learning and development programs, some staff members do not apply this knowledge to their work.

Citation:

Perera, J.D.T.B.D., Rathnayake, K.K.H., and , Sumanasiri, M.A.P. (2022) Is It Necessary for Dairy Sector Staff Members to Receive Learning and Development Programs for Achieving Higher Employee Performance? *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.



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Acknowledgments

I want to offer my sincere gratitude to Mrs. K.K.H.M Rathnayake, Internal supervisor, Lecturer, Department of Agribusiness Management, Faculty of Agricultural Sciences, the Sabaragamuwa University of Sri Lanka, for her correct guidance and for spending her valuable time on behalf of me to complete this study and I would like to offer my special appreciation to Mr. A.P Sumanasiri, External Supervisor, Deputy chairman, National Livestock Development Board.

How Can Underutilized Jackfruit be Turned into a Beneficial Product?

Executive Summary

The jackfruit (Artocarpus heterophyllus Lam) is the national fruit of Sri Lanka and underutilized fruit that consists of three parts: bulbs (32%), seeds (18%), and rind (50%) (Fuller, 2011). People around the world commonly consume sweet bulbs. But most of the jackfruits usually are thrown away. There are a few studies on converting jackfruit bulbs into value-added food products. Due to a lack of knowledge about their nutritional potential, jackfruit bulbs are currently neglected in human and animal nutrition. Because of their anti-carcinogenic, antibacterial, antifungal, anti-inflammatory, wound healing, and hypoglycemic properties, the Jack tree's fruits, leaves, and bark have also been widely utilized in traditional medicine. There are only a few studies on the use of jackfruit bulbs. Therefore, this study investigated the market acceptance of string hopper flour made of jackfruit bulbs blended with wheat flour. The production of jackfruit bulbbased string hopper flour with wheat flour would be a positive step toward developing value-added products like string hopper, one of Sri Lankans' most popular breakfast foods.

Key features

- Manufacturing of string hopper flour and all preliminary trials at the Ceylon Agro Industries Limited research laboratory, Seeduwa.
- The Jackfruit were chosen because they were fresh and completely developed but not yet ripe. By cutting and opening the fruit, the jackfruit bulbs were separated. To get consistent small pieces (15 mm X 45 mm), jackfruit bulbs were first trimmed and then inserted into a chip cutting machine. Finally,



This Policy brief is prepared based on undergraduate research on "Value addition to string hopper using jackfruit flour: different version of utilization of jackfruit." The study aims to examine to develop jackfruit bulb based string hopper flour as a value addition product. Three products' formulations studied for identify best formulation with 10 percent bulb flour. an electric mixer was used to grind it into a fine powder.

- In preliminary study 1, a sensory evaluation was conducted using 25 panelists to determine the best jackfruit bulb flour and wheat flour combination.
- In the first preliminary study, three product formulations were examined. The formulation containing 10 percent bulb flour and 90 percent wheat flour was chosen as the best formula for string hopper flour development. The selected recipes were subjected to sensory, nutritional, and functional analyses.
- Sensory evaluation of several jackfruit string hopper flour products containing jackfruit bulb flour and wheat flour at a 1:9 ratio revealed that all three formulations (1:9, 1:4, and 100% wheat flour) produced string hopper flour products of acceptable quality.
- The nutritional value of the created string hopper flour ratio had moisture content, protein, and ash of 13%, 10.9%, and 0.812%, respectively.
- The functional properties of the created string hopper flour had a water absorption capacity and wet gluten of 60.9% and 25.65%, respectively.
- The optimum cooking time when using valueadded flour (16 minutes) is lower than regular wheat string hopper flour.
- In preliminary study 2, a sensory evaluation was conducted using ten panelists to assess the difference by comparing the current established three-string hopper flour brands.
- The results of this study revealed that jackfruit bulb flour could be effectively utilized as a raw material to develop a medicinal, healthy

Benefits

The fresh jack fruit contains trace amounts of vitamin A and flavonoid pigments such as carotene-ß, xanthan, lutein, and cryptoxanthin-ß. The antioxidant and eyesight properties of these chemicals are critical.

Vitamin A is needed to keep mucous membranes and the skin healthy. Jackfruits high in vitamin A and carotene have been shown to protect against malignancies of the lungs and mouth.



Figure 1: String hoppers made from jackfruit based string hopper flour

Jackfruit is a significant source of the antioxidant vitamin C, providing around 13.7mg, or 23% of the recommended daily allowance. It is an uncommon fruit high in vitamins from the B-complex group. Vitamin B-6 (pyridoxine), niacin, riboflavin, and folic acid are present at significant levels. Potassium, magnesium, manganese, and iron are also abundant in fresh fruit. Potassium is a mineral found in cells and bodily fluids that aids in regulating body temperature, blood pressure, and heart rate.

As a result of the current trend of healthconscious consumers, nutrient-rich, various food products are being launched into the marketplace. Furthermore, this study was planned to investigate consumer acceptance of flour made from jackfruit bulbs blended with string hopper flour.

Sri Lanka has a large wheat import market on the economic front, and there is a massive demand for wheat flour imported from other countries. The trend in wheat-based product consumption has increased to 26.2 kg per person in 2016/17. As a result, this research will aid in the utilization of jackfruit waste while replacing a portion of wheat flour, allowing us to save a small amount of foreign exchange. This study can decrease wheat importation as a successful step since we are dependent on wheat importation. As the current status of jackfruit is underutilized, there are so many medicinal benefits and economic opportunities from local and international market perspectives. By effectively identifying those varieties and giving value to the market, we can increase our financial status as a country.

Costs

In Sri Lanka, jackfruit flour is relatively expensive, so the product's price will be more than the current price of conventional wheat flour. If the corporation decides to commercialize this new product, it will incur more raw materials, machinery, human resources, and packaging expenses.

Policy enabling features

Disease prevalence, particularly cardiovascular diseases, cancer, diabetes, and chronic respiratory disease, has become a primary global health concern. Consumer dietary patterns alter due to nutritional guidelines, as consumers aim to improve their intake of nutritional items. Consumer awareness of health has prompted a shift toward healthier eating habits and increased interest in food composition and nutritional value. Growing demand for foods with improved dietary properties has driven the food processing sector to modify traditional foods.

Through promoting value-added products in lowscale ventures, the income generation avenues from products can be diversified. It will increase the income generated from the same quantity of flour the manufacturer had before incorporating innovation into their business. It gives the decision-making power to a manufacturer to reach a reasonable farm gate price.

By adding different ratios of jackfruit flour to regular string hopper flour, it is planned to identify the best balance that can transform jackfruit flour into the most accepted string hoppers by people as a new product. Therefore, this study is more helpful to the food sector of Sri Lanka in enhancing its productivity status as a food industry by introducing its flour.

And this study was conducted using a method called the "traditional method," in which anyone can produce this product at a low cost of production. Thus, it will generate some employment opportunities as well. This new product will create a new marketplace for a product that has not been introduced to the Sri Lankan market by any major players in the Sri Lankan string hopper flour market.

String hopper is a traditional food in Sri Lanka and is used as a primary protein source in one of the main meals. In the case of Sri Lanka, valueadded string hopper flour is still a great product.

Policy disabling features

In Sri Lanka, combining jackfruit bulb flour with wheat flour is a novel concept. String hopper flour is widely used in Sri Lanka to make string hoppers, but potential customers may consider it different from other string hopper flour products currently on the market.

Small and medium-sized businesses lack understanding of this novel post-harvest value addition technique.

Small and medium-sized food exporters lack the facilities, resources, and knowledge to develop these innovations.



Present policy context

The value-added food products businesses in terms of jackfruit cultivation in Sri Lanka are mainly under the supervision of the Department of Agriculture. All the ventures that use jackfruit cultivation are identified as entrepreneurs' ventures in the small and medium category by the department.

Legal standards for flour-based food products are primarily based on the product's composition. They may differ from one country to another. The Food Act No. 26 of 1980 is the primary legislation in Sri Lanka governing food safety. Several laws, such as the Bread and Flour Regulations 1998, keep track of the standards and compositional requirements that blended flour products must meet.

SLS 76: 2014 is the legislation governing the Specification for wheat flour, determining the wheat-based products' moisture level. It pointed out that fortified wheat flour products must not exceed 14 percent moisture level. Jackfruit string hopper flour product results in a 13 percent moisture level.

Research and development activities are being carried out through the Agricultural Research Institutes to improve the utilization of jackfruit.

Policy recommendations

This study revealed that jackfruit bulb flour could be effectively utilized as raw materials to develop a nutritious string hopper flour.

Because the food industry is so competitive, new products are offered regularly. It is necessary to conduct innovations or improvements related to food products to conduct a successful food business.

It is recommended to evaluate the nutritional components of jackfruit bulb flour and wheat flour. Suppose this product is to be released to the market, as this is a novel product that has not been found in the Sri Lankan market yet. Furthermore, it is recommended to find out the medicinal benefits of jackfruit bulb string hopper flour to market it as a functional food with added health benefits.

According to the data presented in this research, jackfruit bulb flour can be used to replace wheat flour up to a significant level.

Citation:

Wijesinghe, U.M.D.L., Malkanthi, S.H.P., and Jayasundara, G. (2022). How Can Underutilized Jackfruit be Turned into a Beneficial Product? *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

The author wants to express her deepest gratitude to Prof. S.H.P. Malkanthi, Senior Lecturer, Department of Agribusiness Management, Faculty of Agricultural Sciences, the Sabaragamuwa University of Sri Lanka, and Mr. Gamunu Jayasundara, External Supervisor, Senior Business Manager, Ceylon Agro Industries Limited, Seeduwa, for their expert guidance and continuous support to make this research a successful one.

What are the Factors that Affect Employee Job Performance at Sehani Desheeya Ousadha (Pvt) Ltd?

Executive Summary

SDO (Pvt) Ltd, which began operations in 2016 as a specialist in the herbal leaves, spices, and fruit export industry, is descended from Sehani Herbals, which has been a leader in the dehydrated herbal leaves industry since 2004.

Approximately 500 direct and indirect employees are currently employed by the company. Employee behaviors such as being absent or late, quitting, lowering commitment, and contemplating retirement, as well as workplace social and psychological conditions such as harassment, conflict resolution, communication, and interaction among employees, all have an impact on employee satisfaction. Employees who are satisfied with their jobs appear to be more involved in their employers and more committed to providing high-quality services and benefiting the company. Employee turnover in an organization is strongly and inversely related to job satisfaction. Employee turnover has increased in recent years, according to SDO HRM reports. SDO (Pvt) Ltd believes that employee turnover has an impact on profit and the overall performance of the company. Employee turnover is assumed to have an impact on profit fluctuation for the company. The study was mainly concerned with "how employee satisfaction factors influence an employee's job performance." Therefore, implementation of the employee benefit plan within SDO (Pvt) Ltd is most important to increase employee performance by providing an organized employee career development program, maintaining a suitable communication system, providing welfare facilities, developing the employee brand, and providing rewards and job quality for employees.



Figure 1 : Processing Line Employees'

The policy brief is based on the undergraduate research on "Study on Factors Affecting for Employee Job Performance: Special Reference to Sehani Desheeya Ousadha (Pvt) Ltd." This study attempts

- a.) To identify the factors affecting for low employee job performance.
- b.) To analyze the relationship between internal marketing factors and employee job performance in SDO (Pvt) Ltd.
- c.) To propose strategies to overcome low employee job performance

Key features

Benefits

- According to the results, most of the respondents (66.0%) are female employees while male respondents are 34.0%.
- Most of them (64%) have primary education level and 24% of Respondents are secondary education and Tertiary respondents are 12%.
- Majority of the employees (73%) are full time workers and 27% of respondents are part time workers.
- Most of the respondents' service time period is in the time period of between 1 Year < 2 Years (47%). The time period of 6 month < 1 Year and the time period less than 6 months have 16%, 21% are in the Above 2 Years.
- The findings of the study showed that factors of internal marketing have a significant and strong relationship with job performance.
- These factors are: direct supervisor's voluntary effort to know whether employees encounter problems at work, giving employees a comfortable work environment, using educational training to express corporate values and goals, Employee recognition program, employee development, and employee confidence.
- Results revealed that the causes of factors of lack of employee perception about the company, poor personal attention of employees, lack of informed management policies and procedures, lack of fulfilment policies and procedures of the company, employee turnover, lack of offering good fringe benefits, lack of organization value and objective sharing, and poor salary process and procedure negatively impacted on employees' job performance.
- Finally, it concluded that the implementation of an employee benefit plan within SDO Pvt Ltd is most important to increasing employee performance as a suggestion for issues that affect employee job performance. It includes organizing employee career development programs, maintaining suitable communication systems, providing welfare facilities, developing an employee brand, and providing rewards and job quality for employees.

Goal achievement is an important factor in employee performance. Successful employees meet deadlines, make sales, and build brands by communicating positively with customers. Employee morale rises when they do their jobs well, and a positive and energetic work environment is created. High job performance may increase productivity, lower employee turnover, improve attendance, reduce accidents, reduce job stress, and reduce unionization.

On the other hand, it has solutions for poverty and economic growth because it improves employee livelihoods and motivates employees to work hard in order to achieve high productivity.

Costs

When there is an underperforming employee in the company, productivity fails. When one employee does a poor job and appears to get away with it, the other employees become frustrated, resentful, and less interested in doing it correctly. It creates a ripple effect in the organization, resulting in employee turnover, absenteeism, lower commitment, retirement considerations, and, ultimately, decreased customer satisfaction. as well as Many costs can be incurred by the company, including the cost of the recruitment process, hiring, training, onboarding, and the final product. Poor job performance has an impact on the quality of employees' livelihoods, the final product, and the company's reputation, all of which have an impact on the country's economy.

Policy enabling features

According to the results, most employees, who are 73% (73) of the respondents, are full-time workers, and 27% (27) of the respondents are part-time workers. It indicates that most of the employees who are working for SDO (Pvt) Ltd are full-time workers. Meanwhile, most of the employees' service time is between 1 year and 2 years of experience and have a moderate level of education. Therefore, employees working full time with a moderate level of service time and a moderate level of education mean the company can provide broad and same benefits so that a large number of employees can be covered, which act as admittance for implementing policies related to improving employee job performance. Also, the research survey was able to identify the factors that led to the decrease in employee performance due to employee satisfaction factors and what employee benefits the company should pay to increase employee performance.

Policy disabling features

On a humanitarian basis, companies also pursue a number of benefit programs for the benefit of their employees in an effort to improve their employees' performance, but if employees begin to regard it as their right, they will begin to campaign for the continuation of any program if it is removed as a matter of urgency. Institutions face serious problems in their work.

According to the results, 27% (27) of respondents are part-time workers, and male employees make up 34.0%. Employee benefits programs are for all employees, but part-time and male employees who do not receive some benefits feel apathetic.



Figure 2: Packaging Line Employees'

Secondary education and tertiary employees are 12% (12). This can sometimes lead to a sense of insecurity among employees, as the company places too much emphasis on the lowest level of employees to implement and administer employee benefit programs, and a lack of focus on existing managers and other office staff in the company, which causes poor job performance.

Present policy content

Currently, SDO (Pvt) Ltd offers only ETF and EPF allowances for permanent appointments, including attendance allowances, transportation allowances, food allowances, and specifically supervisory allowances and leave, with the goal of increasing employee job performance.

Policy recommendations

The study suggested that the established Fund in the form of a financial assistance program that assists SDO (Pvt) Ltd employees who suffer from illness, the death of an employee or family member, or a natural financial crisis, Disasters, or other extreme conditions. It should be funded by both the employee's basic salary and the company fund.

To achieve the company goals need to Organize an employee award ceremony. Companies that provide awards should be independent in their efforts and transparent, which means that every employee should have a better understanding of why they are rewarded and who is rewarded.

Moreover, Counseling for stress-related problems and emotional distress is provided by the Establish Employees Counseling Program. As well as critical workplace events and other personal issues, such as financial, legal, and so on in everyday life.

One of the most valuable benefits is the established pension scheme. Other valuable benefits, such as protection for employees and their dependents if the employee dies or becomes unable to work, must be provided during the employee's pensionable service.

Organize Employee Career Development Programs, which include organizing workshops, seminars, and expert meetings for employees to help them advance in their careers. The HRMd should provide a variety of technical certification courses to help employees improve their knowledge. Encourage employee growth and career development by coaching and assisting employees in achieving their personal goals. Conduct individual development plans and career discussions with employees on an annual basis, and encourage supervisors in all departments to do the same.

During the company's processing, the company should provide a variety of programs to support employee physical health, such as Severance Pay, Health Insurance, Dental Insurance, Life Insurance, Vision Insurance, Temporary and Long-Term Disability Insurance, and Accidental Death.

Citation:

Madhumini, S.M.U., Basnayake, B.M.R.L., and Sumangala, W.M.D. (2022). What are the Factors that Affect Employee Job Performance at Sehani Desheeya Ousadha (Pvt) Ltd? *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragmuwa University of Sri Lanaka.

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Acknowledgements

The author wants to offer her sincere gratitude to Ms. B.M.R.L. Basnayake Lecturer (Probationary), Internal Supervisor, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragmuwa University of Sri Lanaka. Thanks also to her external supervisor Ms.W.M.D Sumangala Managing Director of SDO Pvt Ltd, who supported completing the research.

Developing a Marketing Strategy to Increase Volume Sales of UHT Fresh Milk

Executive Summary

Sri Lanka is a lower-middle-income country in the South-Asian region (The World Bank, 2021). The agricultural sector in the country contributes a significant amount to the GDP of the country. If the government can produce more than the regular production, the excess can be exported to foreign markets. Milk plays a significant role in fulfilling the nutritional requirements of the population. Hence, there is a high demand for Milk within the country.

UHT Fresh Milk is freshly taken milk from the farms and heated at ultra-high temperature to preserve the quality of the milk. In NLDB, this UHT fresh milk is higher in quality than the other competitor brands. Therefore, there must be an effective marketing strategy to increase the sales of UHT fresh milk within a company. The company doesn't have a proper system or a marketing strategy to promote and increase the sales of UHT fresh milk in the modern trade. To find out solutions, this study was conducted.

Key features

- This study results in creating an effective and efficient marketing strategy to increase the sales of UHT fresh milk of NLDB.
- This aims to develop an up-to-date marketing strategy to regulate fresh milk sales.
- The results revealed that the independent variable price and nutrition value positively affect the consumer's purchasing intention. Still, the packaging and food safety variable has not significantly impacted consumers' purchasing intention.
- This study used the Ansoff matrix model for



An effective marketing strategy underline business growth and often its very existence.

This policy brief results from the undergraduate research on "Developing an Effective Marketing Strategy to Increase Sales of National Livestock Development Board (NLDB) UHT Fresh Milk in Modern Trade, A Study Based on Colombo District".

This study attempts create an effective marketing strategy to increase the sales of the UHT Fresh Milk by analyzing the several factors which affects for the sales and the purchasing intentions of the consumers. developing an appropriate marketing strategy. A market penetration strategy was proposed since the NLDB UHT fresh milk product is an existing product in the current market.

- Further, findings imply that product price and nutritional value of the product are significant for increasing the number of milk consumers.
- According to the findings, convenient locations of shops and good availability of fresh milk are significant for increasing the number of milk consumers.

Benefits

Milk could be a balanced food. It consists of various nutrients like macromolecule, calcium, phosphorus, and vitamins. Drinking milk could be a smart habit for humans at each stage in their life.

UHT Fresh milk is a product with the best movement speed in modern trade. Increasing sales can significantly enhance the contribution of the GDP within the country from the Agricultural sector.

With the help of the advancement of technology, companies are more forward to adopting them to increase sales and market share within the respective markets they belong to.



Costs

Developing an effective marketing strategy can be more cost-consuming than the company's current status.

Due to the lack of knowledge, technology, and skills regarding marketing, the product's sales volume is too low compared to the other competitor products in the market. This could lead to market loss for NLDB fresh milk if they did not adopt the new marketing strategy.

Policy enabling feature

Regarding developing an effective marketing strategy to increase volume sales of National Livestock Development Board UHT fresh milk in modern trade, NLDB has not recently done market research on developing a market strategy to increase their sales of UHT fresh milk.

Suppose NLDB analyzes the market more and could have more idea on what factors of consumers' purchasing intention are, what determines purchasing intent among existing brands, and what attributes milk gets priorities highly. What is their market position with the competitors? Here NLDB has no correct idea regarding this matter.

NLDB has the potential to become the market leader by identifying its market presence and presenting its product to the market with an excellent Strategy to respond to that opportunity. NLDB can do that.

Policy disabling features

Firstly, the data will be collected through questionnaires and observations, which may have resulted in sampling bias. Due to the current covid situation in the country, the customer's stay time inside the supermarket is minimal, and they were refused to answer some questions because of health reasons.

Managers of supermarkets mentioned that the Fresh milk buying pattern, or habit, had seen a massive drop in customers. Point out that due to the covid situation in the county, consumers are less likely to buy frozen dairy products.

This sample represents customers from three supermarkets (Keells, Laufs, and Arpico). But now, there are many supermarkets in Sri Lanka, and customers are accustomed to going beyond brand loyalty to any convenient supermarket for them and getting their relevant products.

Current policy context

Nowadays, most customers tend to move away from milk powder and use fresh milk. There is a good demand for every UHT fresh milk under every competing brand name.

The high quality of the NLDB UHT fresh milk and the high nutritional value of the inputs are why the NLDB product is different from other competing brands. And also, NLDB has the strength to present this UHT fresh milk at an affordable price.

NLDB has massive demand in the market for this UHT Fresh milk they cannot fulfill. But there is an enormous opportunity if they analyzed the market more; NLDB could gain more market share and become the market leader in the new milk industry.

Policy recommendations

The current study examined the determinants of developing an effective marketing strategy to increase the modern trade's NLDB UHT fresh milk sales. Those four independent variables that specialized in purchasing intention were selected by referring to previous studies called price, package, food safety, and nutrition value.

As revealed in current research, the most affected variable was price and nutrition value compared with others. So, advertisers can pay more attention to the price and nutrition value of the advertisement than other factors.

Suppose customers are given more productrelated options (product variations). In that case, there is a very high probability that they will be able to get a higher sales quantity than their current sales. For example, currently, they only have full cream fresh milk. But they should introduce at least low fat, zero sugar, and flavors like vanilla, chocolate, strawberry, etc.

Citations:

Avishka H.S.P.D.Y, Esham, M., and Nuwan, A. (2022) Developing a Marketing Strategy to Increase Volume Sales of UHT Fresh Milk. *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka,

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Acknowledgements

This work is an outcome of a final year research project completed with the guidance of Prof. M.Esham, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. Facilitation for the research was given by the Anjana Nuwan Manager of the dairy project, NLDB Welisara.

Does Brand Equity Applicable to Local Spice Market?

Executive Summary

Spices are used as enhancers of taste and food's color enhancers. There is a history for this spice industry born in the Indian subcontinent and southeast Asia around specific spice types like pepper and cinnamon. In the 21st century usage of spices became famous all around the globe, especially in Europe countries. While those countries are the major importation countries of herbs, exporting spices is controlled by South Asia. Sri Lanka is a well-known country worldwide as an exotic, quality spice supplier. This spice sector consider an essential sub-sector of the economy, which contributes to a GDP of 7.0%

Spices are one of the golden reasons that Sri Lanka got the ability to be recognized globally with the highest arising demand for spices from all over the world. Due to the country's favorable weather, spices can be cultivated with fewer obstacles. The economic value of herbs helps generate foreign income and develop the exporting industry in the country. Apart from the taste enhancer for culinary, The health benefits of spices as an antioxidant, popularity of Asian cuisines globally, and sustainable practices have been creating opportunities for spices, especially in the European market. However, gradually, there have been several developments in the local spice market. Rapidly increasing the number of spices brands is one of them.

Key features

• Spices are highly commercially valued commodities Sri Lanka has been exporting to many countries. Besides the international market, spices can be value-added to the local



This Policy Brief is prepared based on undergraduate research on "The Impact of Brand Equity on Consumer Purchasing Intention of Spices: A Study in the Kesbawa Region" The main objective of the study is to find out the impact of brand equity on consumer buying behaviour. According to that geographically targeting, three Grama Niladari divisions of Kasbawa divisional secretariat which are Boralasgamuwa East A, Bokundara and Madapatha were selected. Among the selected geographical locations, 150 of 'consumers who has branded spices purchasing experience' were particularly concentrated. Followed sample strategy was 'stratified sampling' All the selected respondents were belongs to the 'above 18 female category' assuming that particular group are primarily targeting in the spice market.

market through branding.

- The study was based on 'Aaker's brand equity model,' focusing on variables of brand awareness, brand association, brand loyalty, perceived quality, and purchasing intention.
- Data has been collected using survey strategy and analyzed using factor analysis, structural equation model, and descriptive statistics.
- According to the results, three factors were defined as 'brand familiarity,' 'brand resonance,' and 'non-product related attributes.'
- Further found out that there is a significant impact of brand awareness, brand association, and perceived quality on brand loyalty of spices. Further, there is a substantial impact of perceived quality on the purchasing intention of herbs.
- Apart from these findings, the study provides suggestions derived from the collected data. Proposed recommendations for the further devolvement of the commercializing of spices are improving the packaging material to biodegradable, environmentally friendly materials, concerning ingredient branding, and following sustainable trends

Benefits

The study will be helpful to the company to successfully commercialize spices after identifying beneficial factors that directly impact reducing the risk of investment in the product.

Further will be helpful to identify better opportunities and threats of competitors in the spices industry. The study will support developing their strategic decisions, which will ultimately help the company take the lead in the industry. Additionally, this will be helpful to producers to communicate and satisfy current customers' needs and potential customers' needs by applying to validate determinants.

The study will be helpful to identify opportunities which not yet been identified in the spice industry. After revealing the potentiality and determinant factors in spices marketing, the study will encourage interested parties to enter the spice industry.

Furthermore, the study will guide the upcoming

experiments related to the spice industry to develop a product prioritizing consumer preference.

Costs

Branding can lead to a position where businesses will think that there is a positive relationship between pricing and quality and pricing and target audience . when the intention is to target an upper audience, companies will try to increase the price without reason or giving the idea that the product is a high-quality product. which will give the wrong impression about the brand

Moreover, through branding, consumers try to build their self-image and build a different view of the product. Consumer type of lifestyles can be changed as a consequence of this. It can be given both positive and negative outcomes; nevertheless, through the right regulating and following the concept of transparency and accountability, the adverse effects of this can be controlled.

Policy enabling features

The area selected for the study is the sub-urban area where branded spices are heavily available and where consumers are familiar with the branding. All the selected consumers were with sound background knowledge since the highest representation was from graduates (46.7%), assuming they already have proper awareness of the concept of branding. Most consumers do not find branded and non-branded spices as identical products. According to the findings, 57.3% consider branded herbs are different from nonbranded.

According to the packaging type preference, most of the consumer's preferred laminate pouches and the second and third preferred packaging types are bio-degradable packages, which are glass bottles and paper packages, which helps to assume that consumers consider biodegradable packaging as well.

Influential determinants of purchasing behavior are 'brand familiarity,' 'brand resonance,' and
'non-product related attributes.' This means it will be favorable for a business to develop packaging, availability and increase familiarity through promotions. Further identified the impact of perceived quality on the purchasing behavior of spices, which can be created by obligating required quality certifications and using quality raw material, which will be easy to maintain since the country has the favorable climate to cultivate spices and through following necessary traditional, modern farming techniques.



Policy disabling features

Even the branded spices are available in the selected area, several brands available in modern trade are few. thus consumers' awareness is limited only to a few brands.

According to the data, the most preferred brands among the proposed ten brands are Wijaya, Harischandra, and Freelan. These brand names are familiar primarily because of the heavily promotional campaigns.

From another perspective, most companies do not have a good idea to utilize 'branding 'a proper for the betterment of the industry where companies tend to use branding for profit. This harms the parent brand, the company, and the industry.

Lack of intention to further develop the product impedes branding. When producers limit the production only to the traditional end product, as only to market the product as spice powder with no intention of developing it, it degrades the product name in the long run.

Present policy context

To build a strong brand, it is essential to follow effective marketing strategies which do not adequately regulate through any acts or regulations. This can be emphasized as a drawback of the system.

However, the consumer affairs authority and the food act no.26, 1980 in Sri Lanka control marketing strategies to a certain extent. Consumer affairs authority handles consumer complaints and acts as an institute to regulate the anti-competitive system. Under the food act –food packaging materials and articles hold what should print and visualizes on a package.

Unfortunately, even the existing acts and regulations are not implemented properly. Even consumers are not aware of to act when there is any impurity to which institute should be informed. However, since branding can influence consumers' choices and impact their lifestyles, proper regulating of marketing strategies is a must.

Policy recommendations

Communicating the quality and unique features of the product is essential in branding. It is necessary to regulate the quality of the message context. Controlling whether the company presents the reality or exaggerates the situation should be handled. Moreover, on the package, especially what visualizes on the front of the box or whether an illusion should be controlled through a proper mechanism.

Further, it is essential to control the transparency, and the accountability of the product ultimately helps to market the 'real brand.' From raw material purchasing to product availability, the ability to know about the supply chain should be enabled through a supply chain act. Further branding can be more realistic by requiring specific quality certification to be mandatory and regulating and promoting reputable suppliers with (GAP) good agricultural practices or (GMP) good manufacturing practices. Create a memorable brand without following aggressive insulting strategies on competitors. Following methods should be friendly to the target audience as the well.-adverse effect of advertising on children. Moreover, they are selling practices that prioritize all three main languages in the country, as in Sinhala. Tamil and English and uniformity in the message's translated content, especially in advertising, should be regulated.



Citation:

Bernadeen,W.L., Esham,M., and Madhushani,R. (2022). Does Brand Equity Applicable to Local Spice Market? *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

An incomparable appreciation to the internal supervisor Professor M.Esham for the guidance and amending the report throughout the period, and gratitude to the external supervisor Mrs. Ruwani Madushani at HJS Condiments Limited, for providing relevant information.

Traceability for Ceylon Tea

Executive Summary

Sri Lanka has a most diversified agribusiness sector and has provided the international market with agro-industrial products over a long period. In particular, Sri Lankan tea has been referred to for generations as "Ceylon tea" and is reputed globally for its taste and aroma. The traceability of agro-products is crucial as the food with known and guaranteed origin charges a high premium while the authenticity of the food product. The adulteration of agro-products with cheap ingredients or chemicals poses a severe health issue to the consumer. As a result, there is a clear need to demonstrate these authenticity problems with modern analytical techniques. All players in the food chain want to demonstrate their commitment to food quality and safety. A food chain traceability standard helps map and document a product's history, creating trust and confidence toward customers. Today, the new generation is requesting more information about everything in their food products. This means that the food industry has to figure out the content consumers desire to know and how to provide it. Soon, mixing with tea dust in tea bulk exportation can be a massive threat. This kind of unethical marketing occurs in the international market due to a lack of traceability. Authentic Ceylon tea doesn't have a system to prove its identity in bulk tea exportation. Accordingly, why the industry needs a traceability system became a timely, meaningful and relevant issue.

Key features

• The study reveals all tea value chain actors involving the tea plantation to consume the teacup finally.



This policy brief is prepared based on undergraduate research on "Leaves to taste Development of Traceability for Ceylon Tea Value Chain".

This research study helps tea industries to get a better understanding of the traceability system and increase Ceylon tea quality in the international market.

In some certifications traceability is the main component for compliance, such as ISO 22000:2018 and Rainforest Alliances Sustainable Agricultural Standard 2020.



Figure 1: Logging Interfaces for Administrative interface and Customer interface.

- The main traceability drivers are food safety and quality issues and food regulations.
- Traceability system Administrative interface can be used primarily for tea processing factories. A batch profile sub interface helps investigate all the processing information of each stage.

Benefits

The Ceylon tea traceability system can trace a product to its source within a few seconds. The study found that the traceability of the Ceylon tea value chain is the most beneficial for the customers and administrators who work in tea manufacturing companies.

If some errors happen during the processing, the Administrative interface can predict the situations for prevaliling.

This system can make future predictions and can reductions of the happening errors.

Moreover, this system can improve food safety, quality control, and supply chain management.

Differentiation and marketing of foods with Credence Attributes

Costs

The tea manufacturing companies should allocate a significant proportion of money to establish the Ceylon tea traceability system.

The time allocated for system design activities.

Policy enabling features

Nowadays, Consumers are more knowledgeable. Consumers are paying more and more attention to the tea quality and expect to know where tea was planted, manufactured, stored, and transported and consider the origin of the product. Leaves to Taste: Traceability for Ceylon tea.



Figure 2: Customer interface for Ceylon tea



Figure 3: Customer interface when adding a relevant batch number



Figure 4: Customer Interface when adding a wrong batch number

Engaging the consumer more towards the value chain operations monitoring by traceability system will encourage the production of more quality and safe final food products. Implementing effective traceability systems improves the ability to verifiable safety and quality compliance programs. Moreover, traceability allows targeted withdrawals and accurate information, thereby minimizing disruption to trade. It can reduce the recall scope by 50% and even up to 95% in some cases.

Nowadays, Food safety is a worldwide concern due to many food scandals and outbreaks. Tradein agri-food and food commodities are foreseen to see a continued increase. Changes and unethical marketing are happening in the global production network in the trading environment. The supply and value chain structure has evolved towards increased fragmentation and complexity across multiple enterprises. The more significant number of players involved, the unpredictability of the supply and value chain, and the perishable nature of food have heightened the need for quality and safety in food products to ensure traceability and compatibility among food safety measures.

Policy disabling features

The high cost of web-based traceability system design has demotivated tea manufacturing companies.

Through the Sri Lankan Standards of Institutions, International Organization for Standardization and Rainforest Alliances Sustainable Agricultural Standards did not achieve the expected level of performance for Ceylon tea traceability.

Present policy context

In Sri Lanka, the government plays an essential role in setting and implementing new policies; both the Private sector and Public organizations give institutional assistance to the Ceylon tea industry. The government organizations are the Sri Lankan Tea Board, Tea Research Institute, and Ministry of plantation and Export Development Board. Sri Lankan Tea Industry maintains the highest quality in the world tea market, and ISO 3720 is the minimum standard applied for the products. Also, the country can produce the cleanest tea in the world with minimum pesticides residues. In 2012, Methyl Bromide was removed from the tea production process.

Policy recommendations

There are a few recommendations for research in the future; first of all, it is recommended to develop a traceability system for the entire Tea industry.

It is better to include the QR code scan session for the consumer traceability to certify the authentic product. This study focuses on the web-based consumer interface that consists of the batch number to verify whether this product is original or not. Suppose, with the development of information technologies; this is better to have the QR scanner for traceback consumer traceability. The QR codes can be read and understood by even mobile devices.

Citation:

Madhushika, K.M.T.L., and Basnayake, B.M.R.L., (2022). Traceability for Ceylon Tea, *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgments

This work is an outcome of a final year research project completed with the guidance of Ms. B.M.R.L Basnayake, Lecturer of the Department of Agribusiness Management, Faculty of Agricultural Sciences, and the Sabaragamuwa University of Sri Lanka. Facilitation for the research was provided by the Factory Manager, Mr. D.C.N.S Thilakarathne at RTS Holdings.

Brown Rice and Hal Seed Composite Flour for Diabetic Patients

Executive Summary

Food is one of the necessities that play a vital role in human lives. Unhealthy dietary habits have been linked to metabolic disorders and a higher risk of noncommunicable diseases (NCDs). Food consumption habits in Sri Lanka have rapidly changed over the last two decades.

Consumers more and more trust that foods have a direct impact on their health. Furthermore, most individuals today tend to consume nutritious foods due to their fear of many noncommunicable common diseases. This indicates that there is a market potential for healthy foods. Even though there is a high demand for healthy foods, whether there is enough supply is doubtful. This study mainly focuses on identifying whether consumers' preference for a healthy meal has been developed for diabetic patients. Based on that, the research focuses on determining whether there is untapped opportunity in the marketplace for healthy food.

Key features

- The study revealed that the 2:3 ratio of hal seeds flour and brown rice flour was selected as the best flour ratio for a composite flour.
- The novel composite flour contained moisture, ash and fat in equal proportions (six percent each) and no sugar at all.
- According to the market survey, half of the sample of diabetic patients were between the ages of 51 and 70 years.
- The study data revealed that most respondents were diagnosed with diabetes after 40 years of age.



The policy brief is based on the undergraduate research on "Development of potential use for composite flour for diabetic patients from Sri Lankan indigenous fruit: Hal (Vateria *copallifera*)". This study was conducted with the aim of developing a composite flour product for diabetic patients using hal seed flour incorporated with brown rice flour as a substitute for highly refined wheat flour. Sensory quality evaluation was done to select the best formulation, and chemical analysis was done to identify the nutritional properties, including contents of sugar, moisture, ash, crude fat, and crude fiber. A market survey was conducted with diabetic patients in the Matugama administrative area to investigate the consumer preferences towards this novel product. Data was gathered from 100 respondents using a simple random sample.



- The result revealed that most diabetic patients have diabetic-related eye complications (60%) and diabetic feet (45%). Twenty five per cent suffer from diabetic neuropathy, and 27% showed that they have no difficulties.
- Majority (97%) of respondents typically use flour to prepare homemade food, and 3% of respondents do not consume flour products bought from the market.
- Out of the 100 respondents, most (21 %) respondents use rice flour for homemade food preparation, wheat flour and kurakkan flour were used by 19% and 18% of the respondents respectively. Further, 12% consume string hopper flour.
- The results revealed that most diabetic patients used the Harischandra brand (64%), and 49% of respondents consumed the Wijaya brand.
- According to the results, 31% of diabetic patients were not at all aware of the impact of different types of flour on blood sugar levels. Thirty per cent were slightly aware, and 29% were moderately aware.
- Further, market survey results revealed that 59% like to use newly developed composite flour, and 31% like it.

Benefits

The number of people suffering from illnesses such as strokes, diabetes, high blood pressure, and obesity has dramatically increased in Sri Lanka. There is a desire for healthy meals because regulating food consumption is one means of controlling chronic disorders. The hal seed flour is most suitable for diabetic patients due to its high protein and dietary fiber content. Many researchers have proved that the glycemic index of hal seed flour is lower than rice and wheat flour. It is intended by proposing these as alternative flour sources for people with diabetes to prepare traditional homemade foods such as pittu, roti, helapa, string hoppers, and porridge.

This study will help food business owners detect market gaps and generate new ideas from those gaps. Potential and future researchers can learn how to perform product development research. This study established the product development process, the necessary tests to be completed in laboratories, and statistical analysis to analyze the data acquired. This study also promotes the use of underutilized hal flour among people. Furthermore, this study will assist small and medium-sized business owners to develop new business ideas.

Costs

Because wheat isn't produced in Sri Lanka, the amount and type of wheat imported are controlled by demand, domestic supply of close substitutes, especially rice, and government policy that govern wheat trading, marketing, and pricing.

Importation of wheat flour and lagging rice output will not favor this type of composite flour mixes.

Policy enabling features

Completing flour from hal seeds flour incorporated with brown rice flour resulted in numerous new products and flavors.

According to the chemical analysis, composite flour has a considerable crude fiber content (13.5%), suitable for people with diabetes, and sugar content was zero. It was determined that this product was beneficial for people with diabetes. Overall, this study indicated that the respondents (59%) preferred to purchase this new product based on its health benefits.

The results revealed that for most diabetic patients, (55%) prefer to buy 400g packs mainly at a single purchase, 90% were willing to pay a price between Rs 350 and 390 for 400g hal seed composite flour.

The result revealed that the majority of respondents (61%) prefer to buy this flour in supermarkets, and 17% prefer to buy retail shops and street shops.

Policy disabling features

Overall, this study indicated that the respondents (75%) were ignorant of the anti-diabetic properties and health benefits of hal seed flour in the Matugama area.

The introduction of a new product to the diabetic patients of the Kalutara district was limited to the Matugama administrative area. Therefore, evaluating the preference for composite flour, the blended flour taste in different regions and social groups of Sri Lanka was limited.

As well as, due to the COVID-19 epidemic, gathering data from diabetic patients at the hospitals and private medical centers at Mathugama was complicated.

Hal trees grow primarily in Sri Lanka's wet zone, mainly in the districts of Colombo, Kandy, and Matara. The decline in usage of these flour varieties is also because the cultivation of these plants is not systematic, and growth is restricted to a few areas of the country. So, according to this fact, this study did not estimate the supply of hal seeds at commercial levels.

Present policy context

Wijaya Products (Pvt) Ltd is currently producing various nutritious flour products, including kurakkan flour, undu flour, and gram flour. This novel composite flour is high in protein, vitamins, dietary fiber, and complex carbohydrates. It has a low fat and cholesterol content as well.

Policy recommendation

Based on these conclusions, Hal- brown rice composite flour is a viable alternative to wheat flour in the food industry.

Hal seeds flour and brown rice flour can be successfully incorporated into composite flour formulations. Hence, the research on blended flour may provide an opportunity to broaden the base of composite-flour products.

Large milling companies should adopt largescale hal-brown rice composite flour production to reduce the dependence on imported wheat to prepare trendy products in the country.

To explore consumer acceptability of the composite flour in the different regions, samples need to be distributed to prepare the market for blended composite flour. Further work should be conducted for halbrown rice composite flour with the addition of improvings such as sugar-free cookies.

Citation:

Kulathunga, K.A.K.M., Rosairo, H.S.R., and Mahanama, R.P.S.S. (2022). Brown Rice and *Hal* Seed Composite Flour for Diabetic Patients, *Policy Insights 2022 Issue – I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

I would like to offer my sincere and deepest gratitude to my research Prof. H.S.R. Rosairo, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa university of Sri Lanka, and Mr. R.P.S.S Mahanama, Quality Standards Executive, Wijaya Products (Pvt) Ltd, Dodangoda, Kaluthara, for their continuous support given throughout the period.

An IT-based New Approach on the Fertilizer Stock Management

Executive Summary

Food security is one of the Sri Lankan government's strategic priorities. Under the Department of Agrarian Development, Agrarian Services Centers around the country play a critical role in fertilizer distribution to farmers in serving this option. A proper fertilizer distribution strategy is crucial because it will meet the needs of both farmers and officers. All fertilizer issuing and management is currently done manually at Agrarian Service Centers.

Inventory management is a fundamental necessity in any organization. Stock mismanagement can have significant negative effects such as stock expiration, storage issues, and lost revenue. All processes need to be incorporated into an electronic environment during the computer age. Information technology-based systems offer benefits of having the most effective control with the least amount of work, workforce and employee time. After learning about the various difficulties agrarian officers face during the manual fertilizer stock management process and related issues through a survey, an information technology-based new approach was designed and introduced to the Agrarian Services Centers in the Rathnapura District as a solution.

Key features

• The study aimed to identify the barriers and deficiencies in the manual fertilizer stock management process in the Agrarian Services Centers in the Rathnapura District and introduce an information technology-based new approach to remove the obstacles and



This Policy brief is based on an undergraduate research on "Information Technology-based New Approach to Improve the Process of Fertilizer Stock Management in Agrarian Services Centers in Rathnapura District." The main objective of the study was to develop an information technology-based new approach to improve the process of fertilizer stock management in the Agrarian Services Centers in Rathnapura District. This study examined data from 30 Agrarian Services Centers in Rathnapura District to examine the existing method and its' deficiencies before developing the IT-based new approach for fertilizer stock management for Agrarian Services Centers.



improve the efficiency of the process.

- Based on the study findings, time delays, documentation costs, and accuracy were identified as impediments to the manual fertilizer stock management procedure.
- Report preparation was the most timeconsuming task of a manual fertilizer stock management process.
- However, among the report preparation tasks, fertilizer-annual report preparation was the most time-consuming task.
- Findings revealed that after introducing the new information technology-based approach, officers predicted that even fertilizer-annual report preparation could be done within 14 minutes.
- Research findings reveal that all the officers' preference was to use the newly introduced new approach in the workplace.

Benefits

The agrarian officers dealing with the fertilizer stock management process in the Agrarian Services Centers face numerous challenges and difficulties regarding the manual process.

After identifying the barriers, delays, and inefficient practices regarding the manual fertilizer stock management process and introducing an information technology-based new approach to reduce them improves the service quality of the fertilizer distribution stock management process and the full service.

According to the results, the benefits of the newly introduced new approach included,

- (i) Reduction of the documentation cost,
- (ii)Reduction of the time wastage,
- (iii)Improvement of the efficiency of the whole process.

These benefits allow agrarian officers to improve the efficiency of the fertilizer stock management process by removing barriers while serving the farmers.

Costs

Currently, the Agrarian Services Centers allocate a large sum of additional funds for the documentation and updating costs for the fertilizer stock management per year. Furthermore, the study results highlighted that the rural officers had spent lot of time dealing with the fertilizer stock management activities such as report preparation and stock book updating. It is an opportunity cost for agrarian officers in the fertilizer stock management process in the Agrarian Services Centers.

Policy enabling features

One of the features is the considerable training and knowledge of the agricultural officers regarding the use of information technologybased approaches.

The results showed that report preparation was the most time consuming task of a manual fertilizer stock management process.

After introducing the new approach, the officers predicted that even fertilizer-annual report preparation could be done in 14 minutes or below. According to the results, the task of issuing a bill is quite complex when compared to other sections. When a customer comes, the customer's ID should be entered and searched to confirm whether the customer is registered or not. If the customer is not registered, an error message will be displayed saying that 'No Farmer for this ID.' This feature was beneficial to agrarian officers' fertilizer stock management process. With the introduced information technology-based new approach, it is not allowed to issue subsidized fertilizer to non-registered farmers.



Policy disabling features

With globalization, many organizations use new information-technology-based approaches to improve their efficiency. According to the findings, most agrarian officers haven't engaged with information technology in the fertilizer stock management process, even though they have proper knowledge and infrastructure.

On the other hand, the government's day-to-day amendments to acts, policies and circulars is the most significant hurdle or challenge for the agrarian officers. Fertilizer scarcity has become a big concern in recent days, with farmers experiencing various issues as a result.

The introduction process of the information technology-based new approach to the Agrarian Services Centers (ASCs) of Rathnapura district was limited to the 10 ASCs of Rathnapura District. Therefore, obtaining of feedback from the agrarian officers about the new approach was limited to the 10 ASCs in the Rathnapura District.

Present policy context

The Department of Agrarian Development supports farmers by issuing fertilizer for their farming.

Department of Agrarian Development authorized by Paddy Lands Law No. 46 of 1958 and is subject to Agrarian Development Law No. 46 of 2000 and later modifications.

There are now 25 agrarian development district offices and 561 centers across the island.

Policy recommendations

To reduce the barriers and improve the efficiency of the manual fertilizer stock management process, an information technology-based new approach for the agrarian officers was introduced in the Ratnapura District.

According to the study results, 100% of the officers were manually engaged in ordering and receiving the fertilizer, issuing the bill, and updating the stock books. And 100% of agrarian officers in the Rathnapura District were preparing monthly and annual reports. But the preparation of daily and weekly reports was done manually and by mix-method.

And the study results showed that the officer's estimate of the starting steps of the fertilizer stock management process could be done in 14 minutes or less with the new approach. Before introducing the new system, the officers consumed more time on different steps.

Further, all the agrarian officers (100%) preferred to use the newly introduced new approach in the workplace to improve the efficiency of the fertilizer stock management process.

Citation:

Bandara, A.M.N.S., Rosairo, H.S.R., and Bandara, W.M.A. (2022). An IT-based New Approach on the Fertilizer Stock Management, *Policy Insights 2022- Issue I*, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka.

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Acknowledgements

I would like to offer my sincere gratitude to my supervisors Prof. H.S.R. Rosairo, Department of Agribusiness Management, Faculty of Agricultural Sciences, Sabaragamuwa university of Sri Lanka, and Mr. W.M.A. Bandara, Divisional Officer, Department of Agrarian Development, Agrarian Services Center, Pambahinna for their support.

Why is the British Retail Consortium (BRC) Food Quality Management System Importance in Cinnamon Production?

Executive Summary

The food and beverage industry is one of the most significant sectors in Sri Lanka. Because of its great potential to provide numerous benefits to the economy. It is necessary to deliver products that meet industry standards, other industry technical regulations, rules, and the fundamental needs of the relevant export market, which are mandatory to be completed by the industry organizations with the arrival of a developing green economy. Local manufacturers' inability to adhere to international food safety and hygiene requirements is also a significant concern. Even though Sri Lanka is the world leader in cinnamon exports, achieving quality requirements is a big issue for the country's cinnamon exporters.

It is a typical problem identified in the study; production stops due to missed shipments from subcontractors and suppliers that do not meet their part of the established agreements; this might be addressed by adopting a standard in the production.

Key features

- Several findings were identified, divided into two major categories: critical results and non-critical findings.
- It's important to understand where the points destroy the overall product safety, quality, and legality during cinnamon production.
- The actual results include a lack of proper segregation, inappropriate airflow effects; the need for appropriate sanitary requirements; and potential cross-contamination risks.
- Segregations are not effectively managed in



This policy brief is prepared based on undergraduate research on *"Implementation* of British retail consortium (BRC) food quality management system in cinnamon production". The purpose of this study was to analyze the process of applying the British retail consortium global standard to cinnamon production and explore the modifications necessary to adopt the BRC global standard. A qualitative method was implemented in the study due to its qualitative nature and focus on quality management processes. Interviews were conducted, and statements from respondents are significant in conveying a primary perspective into the circumstances. The data was gathered through GAP analysis and the Self-Assessment Tool, which was study was designed to identify GAPs in accordance with the BRCGS (8.0) Food Regulation.

processing sections. An effective segregation method needs to be established to prevent the product contamination

- Air flow effects were not fully controlled. As a result of the lack of proper ventilation, employees were not giving their maximum effort, and stressful status was observed.
- Hand washing requirements are not fully implemented according to the standard.
- A separate hand washing area needs to establish to avoid potential contamination.
- Cinnamon sticks (products) are touched by workers' bare feet.
- There is a great potential to contaminate the product while preparing, and it destroys the food safety and legality of the product.
- Appropriate knowledge to the relevant workers regarding risky practices, proper supervising procedures, and develop the right area or sorting stage may be used.

Benefits

This procedure boosted the company's morale and demonstrated the advantages it provided.

Provide an opportunity for the organization to grow, and "almost all BRC certification is a great marketing tool."

Production issues and failures will reduce, and it will help the organization minimize costs and achieve effective and efficient operation.

Company client's relations improve and well fitted, and their sales will increase.

Costs

Firstly, the cost of quality standards has to be borne.

Initial preparation cost for documentary audits and other paperwork.

A considerable amount needs to invest for the upgrade and refine the production process with the needed implementation based on the standard.

Moreover, staff training, workshops, and meetings represent the amount cost.

The correction cost for critical and other noncritical findings.

Policy enabling features

A certificate was required mainly according to customers' requirements and addressed the European Union and other major exporting destinations, including Mexico, the USA, and Gothamale.

The standards will also lead to recognition, create new market opportunities, and make it easy to compete with the international market. BRC acts as a vital marketing tool for entering the overseas market because of third-party food safety and quality assurance.

System certification affects both the production technology development process and benefits the company.

Increased the engagement of staff and positive effect on the understanding of the production and product-related quality improvement



Policy disabling features

One major issue the company has been facing is that sure of the routines and procedure methods are viewed as more challenging to establish and maintain

We are achieving the total commitment from the lower-level employment and the changing attitude and behaviors on the site.

Developing a quality-oriented culture in the organization is the hardest thing to implement.

Present policy context

The company will benefit from the standard by achieving better control and increased routine operation in production.

The standards will also lead to recognition, create new market opportunities, and make it easy to compete with the international market. BRC acts as a vital marketing tool for entering the overseas market because of third-party food safety and quality assurance.

Adopting the new certification was that all staff in the company involved in the process have the same vision about the implementation and that it is much clear to everyone.

Policy recommendations

Every food production and export company must ensure that food safety and quality are not compromised. Manufacturers have to provide highly accurate information about the product offering so that the targeted consumer can make a better choice.

Exploring the GAPs in the production chain and identifying quality control outliers and modifications is critical for continuous improvement of the system implementation. Therefore, identifying quality-related gaps in the organization respective to the relevant standard and certification is mandatory. Time management, quality planning for implementation, and the highest employee commitment level. A better plan for implementation and robust strategy for changing the attitude and creating a quality culture in the organization will lead to a successful implementation.



British Retail Consortium Global Standard for Food Safety

Citation:

Karunathilaka, M.W.V.D., Jeewanthi, R.K.C., and Prasanna,L.(2022).Why is the British Retail Consortium (BRC) Food Quality Management System Importance in Cinnamon Production? *Policy Insights 2022 Issue- I*, Department of Agribusiness Management, Faculty of Agricultural Sciences of the Sabaragamuwa University of Sri Lanka.

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Acknowledgements

I gladly express my sincere gratitude towards my internal supervisor Dr.R.K.C. Jeewanthi, my external supervisor Mr. Leel Prasanna, I acknowledge all the Quality Management Team and All staff members and all the academic staff of the Department of Agribusiness Management, Faculty of Agricultural Sciences, the Sabaragamuwa University of Sri Lanka for the continuous guidance.





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