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Preface

Policy briefs contained in this booklet were developed from the research conducted by the students in the Department of Agribusiness Management of the Faculty of Agriculture and Plantation Management of the Wayamba University of Sri Lanka. The intension of this publication is of two-fold. First and foremost is the dissemination of research findings in a non-technical way to decision makers and to the public. The second is to train the novice researchers in the Department of Agribusiness Management to discuss the needs of pol icy makers through research that they conduct.

This booklet contains 46 policy briefs emanating out of 46 research projects carried out in a period of six months by final year undergraduates specializing in Agribusiness Management. These research findings were presented in the 18th Agricultural Research Symposium [AGRES] of the Faculty on the 07th of January 2020. The current volume involves policy implications from several studies on usage and popularization of eco-friendly fertilizers; several researches on environmental valuation; studies looking at productivity and efficiency of tea, coconut and rubber sectors; and surveys on consumer preference on milk etc.

Contents

Policy Brief   *01*

- The rate of dengue incidence has grown drastically around the globe in recent decades

- Developing an effective vaccine for dengue control and prevention was essential

- Willingness to pay (WTP) for a dengue vaccine was Rs. 2245.83 and 2296.87 in Colombo and Kurunegala Districts

Authors:

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Willingness-To-Pay for Dengue Vaccine

Introduction

The rate of dengue has increased at an alarming rate in many countries including Sri Lanka. The absence of a specific therapeutic cure has remained as one of the major limitations in controlling dengue epidemics. However, recent advancements in biotechnology and immunology have provided promising results in developing an effective vaccine for dengue. A proper estimation of the Willingness to Pay (WTP) for such vaccine is essential prior marketing, to set a reasonable price for the vaccine. The aim of this study was to assess the WTP for a dengue vaccine among the local communities in Colombo and Kurunegala districts.

Approach

A choice experiment was carried out to evaluate the WTP among the local communities in Colombo and Kurunegala districts. There were six key attributes of such a vaccine *viz.*, Required dose, immunity status, effective period, side effects, availability of certification and price (Figure 1).

An interviewer based pre-tested semi-structured questionnaire was used to collect the relevant information from dengue patients (n=200) and healthy individuals (n=200).
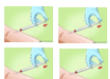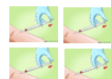
Figure 1: An example of a choice card

Results

Table 1, indicates the summarized outcomes of the choice model. The price attribute of the vaccine was statistically significant showing the expected negative sign. Meanwhile, attributes such as, Immunity Status (IS) and the presence of Side Effects (SE) were statistically significant. Based on the negative sign received by alternatives such as vaccine covering 2 strains and all strains, it was evident that the preference of the study population for a vaccine with immunity to a single strain is higher than vaccines capable of offering immunity against 2 or more strains of dengue (Table 1).

Table 1: Outcomes of the Conditional Logit Model

Attributes	Coefficient	SE	P Value
Constant	0.444	0.278	0.020
2 Doses	-0.172	0.919	0.061
3 Doses	-0.153	0.103	0.106
2 Strains	-0.137	0.735	0.062
All Strains	-0.181	0.734	0.013
IS	0.450	0.674	0.504
SE	0.159	0.655	0.016
Constant	0.297	0.623	0.633
P	-0.198	0.958	0.039

According to the stated preference approach, the WTP for dengue vaccine in the districts of Colombo and Kurunegala were found to be Rs. 2245.83 ± 142.85 and Rs. 2296.87 ± 180.50, respectively. In a recent study conducted in Indonesia, a WTP of US$ 4.04 (Rs.733.10) has been reported, which is lower than in the WTP of Vietnam (US$ 26.1; Rs.4736.11), Thailand (US$ 69.8; Rs.12665.93) and Colombia (US$ 22.6; Rs. 4101.00)

Further, age, education level, income and occupation type were having significant associations with the WTP in both districts, while the marital status was significant only in the district of Colombo (p<0.05 at the 5% level of significance). Several previous studies conducted in Indonesia and Vietnam, have also reported similar associations, where WTP has been positively associated with urban residence, working as a civil servant, having a good knowledge on dengue viruses, a good attitude towards dengue prevention and high level of preventive practices against dengue. Meanwhile, the monthly income and economic status had not shown any association with WTP.

Recommendation

The WTP for a dengue vaccine was found to be 2245.83 ± 142.85 and Rs. 2296.87 ± 180.50 for the districts of Colombo and Kurunegala. Based on the choice experiment, it was noted that a vaccine with no side effects is valued Rs 8000.00 over the price of a vaccine with some side effects. Vaccines produced for two stains and a vaccine produced for all strains were valued Rs 6925.00 and Rs 9152.90 lower than to a vaccine produced for a single strain, respectively. Furthermore, a single dose vaccine was preferred more than Rs. 8682.10 and Rs 7730.90 higher, when compared to a double dose vaccine and a triple dose vaccine, respectively. The findings of the current study could be effectively used by the policy makers and the health sector entities in setting up a price and vaccination programs in Sri Lanka.

Policy Brief   *02*

KEY MESSAGES

- Traditional rice consumption has become a social trend in the Sri Lanka

- Medicinal value, non-organically production, nutritional value and traditional nature are major factors when respondent making choice on traditional rice varieties

- Consumer's willingness to pay depends on medicinal and nutritional value and traditional nature

- Consumers are willing to pay a higher premium for traditional rice

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Willingness-To-Pay for Traditional Rice Varieties in Sri Lanka

Introduction

Rice is the major dietary staple in Sri Lankan. Among the range of rice varieties available in the market, traditional rice varieties (TRV) are highlighted due to the unique features. The consumption of TRV has become a social trend in Sri Lanka in the current scenario due to high awareness about health. The consumption of traditional rice can be shown as a better solution to prevent health hazards. Therefore, there is a growing demand for traditional rice in the local market.

At the present, very limited number of research studies have been conducted in Sri Lanka with related to marketing, consumer preference and acceptance for the consumer segmentation of traditional rice in Sri Lanka. Therefore, this study was focused on assessing the consumers' Willingness to Pay (WTP) for traditional rice varieties while understanding of consumers' awareness, attitude and perceptions towards traditional rice.

Approach

The study was carried out in Colombo district with randomly selected 300 respondents from August to September 2019 by using a pretested semi structured questioner and a planned set of choice cards. A choice experiment was conducted to understand the willingness to pay (WTP) of the consumers for traditional rice. The attributes assessed in the experiment were aroma, brand, certification, medicinal value, non-organically production, nutritional value, price and traditional nature. The questionnaire unveil the demographic data, perception and purchasing behaviour for traditional rice of the consumers.

Results

Majority of the consumers were willing to pay for traditional rice in terms of their unique properties. The most demanded traditional rice variety was "Suwandel". In terms of product characteristics, major concerns were paid to medicinal value, aroma, taste and storage quality of the traditional rice varieties. Medicinal value, non-organically production, nutritional value and traditional nature were indicating a positive influence on consumers' utility and thereby the Willingness To Pay of traditional rice varieties over the other rice varieties available in the market. However, aroma, brand name and certification were not causing a significant impact on the consumers' utility. By the means of marketing aspects of TRV, modern trade plays a key role where super markets were the most preferred source of purchase. However, the poor awareness was identified as a major constraint for the market expansion of traditional rice. According to the results obtained for Marginal Willingness to Pay (MWTP) (Table 1), consumers highly value traditional rice regardless of the price.

Consumer perception		Traditional Rice	Willing to pay	
1st	Medicinal Value		Medicinal Value	1
2nd	Aroma		Nutritional Value	2
3rd	Taste		Organic Production	3

Attributes	MWTP	97.5%	2.5%
Traditional nature	102.08	288.54	31.31
Medicinal value	783.11	1705.12	521.18
Nutritional value	580.02	1269.68	382.36
Non Organically production	-149.25	-85.12	-315.40
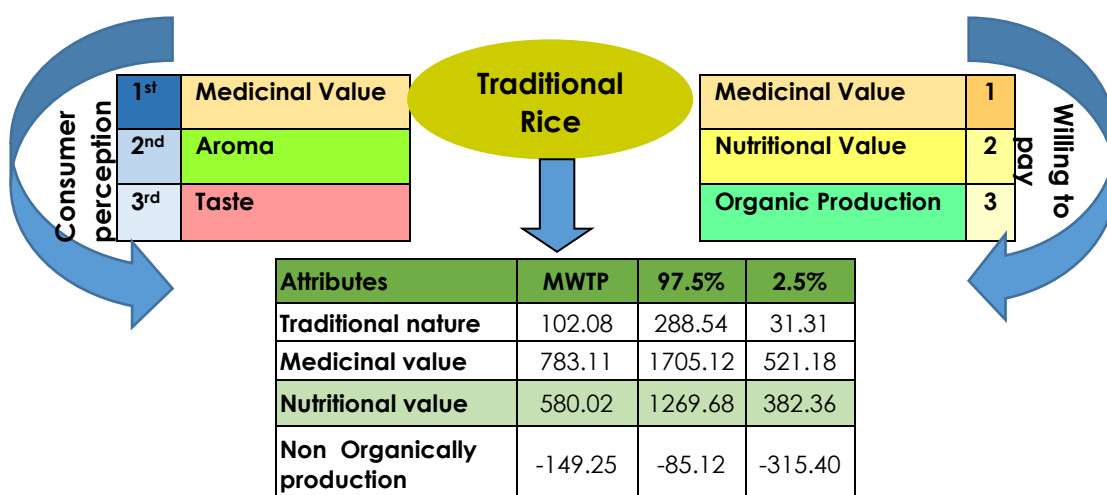
Table 1: MWTP values associated with significant attributes

Recommendation

The study highlighted that there is a potential to expand the traditional rice market as consumers are willing to pay a higher price for the TRV where they highly value both medicinal and nutritional value of TRV. The outcomes from the study can be used to identify the range of price for traditional rice without damaging the existing demand and it is a timely need to introduce new marketing strategies to expand the market segments in traditional rice in Sri Lanka.

KEY MESSAGES

- Labour and Fertilizer are the two most critical inputs that affect productivity

- Increasing labour use efficiency will have a profound effect on estate productivity

- Best to have motivational plans such as incentives to make labourers remain in the sector

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Analysis of Coconut Productivity in a Selected Coconut Estates of Sri Lanka: A Bayesian Perspective

Introduction

Coconut is a major plantation crop that highly contributes to the Sri Lankan Gross Domestic Product (GDP). Sri Lankan coconut productivity has shown a greater variance over the years, which makes investment difficult in the industry as income from coconut varies with production variation. Therefore, it is prudent to analyse the nature of this variation and inputs that may lead to this such as labour fertilizer and chemicals. Thus, this study was undertaken to assess the impact of fertilizer, chemical and labour on the coconut productivity in Sri Lanka.

Approach

Four area estates that belonged to a major plantation company was purposively selected for this study. These area estates were selected because they are situated in the coconut triangle (Kurunegala, Gampaha and Puttlam) which is the largest coconut growing area in Sri Lanka. The final sample comprised of monthly data from 2005 to 2018. Photographs of estates' monthly records were taken to collect secondary data such as coconut production, fertilizer, chemical and labour usage. A production function was estimated to relate productivity with a selected set of inputs.
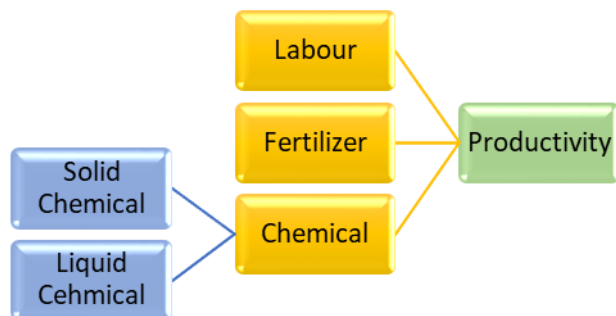
Figure 1: Conceptual framework

Results

Using Markov Chain Monte Carlo (MCMC) estimation, posterior probabilities & coefficients of input variables were estimated. Results shows that all the mean values are higher than zero. Therefore, all the variables show a positive effect on productivity. According to credible intervals, labour, solid chemical and liquid chemical are significantly affecting the coconut productivity. The highest mean value was observed for labour. It means productivity highly depends on labour. Liquid chemical has the lowest mean value. Although Sri Lankan coconut production has a positive trend in past ten years but the selected estates does not show any trend in productivity.
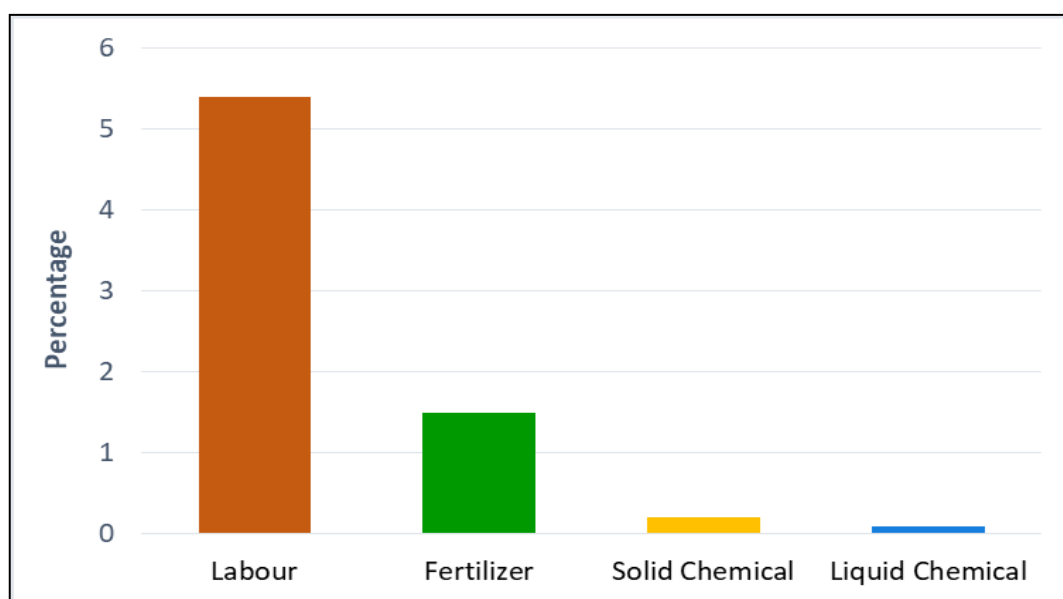
Figure 2: Percentage change in output for a 10% increase in each input

According to the Figure 2, When increasing labour, fertilizer, solid chemical and liquid chemical by 10% productivity will be increased by 5.4%, 1.5%, 0.2% and 0.1% respectively.

Recommendations

According to results, the two critical inputs are labour and fertilizer. Therefore, it is recommended to improve labour use efficiency in estates to increase productivity. Implementing new incentives for labours to motivate them to remain in the estate sector is prudent. Also, following the recommended fertilizer usage will have a profound impact on the coconut productivity in the estates studied.

KEY MESSAGES

- The highest mean cumulative economic burden of dengue was noted in Kaluthara (22,420 LKR), followed by Colombo (16,258 LKR) and Gampaha districts (16,091 LKR)

- Dengue patients are reluctant to spend more money for a dengue free environment when therapeutic cure is available for dengue and when they are asked to remove shrubs and other plants from their premises

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Socio-Economic Costs of Dengue and Willingness-To-Pay to Live in a Dengue Free Environment

Introduction

Dengue, which is recognized as the world's fastest spreading vector borne disease, has resulted a serious health burden on more than 100 counties in the world. It spreads through the bites of infected *Aedes* mosquitoes. At present, dengue has emerged as the major challenge faced by the health sector of Sri Lanka, due to severe seasonal epidemics reported annually. Throughout the past few years around 40,000 to 50,000 cases of dengue have been reported from Sri Lanka, majority of which (>40 %) are accounted by the Western province. Dengue incidence has been initially reported in Sri Lanka in early 1960s. According to the Epidemiology Unit of Sri Lanka, a total of 90,200 dengue cases have been reported in 2019, of which approximately 44.6 % (n=40,237) has been accounted by the Western Province

Patient management, vector control and environmental management are widely used for controlling dengue epidemics. Among these, vector control remains as the most widely focused method in many countries including Sri Lanka, where different controlling approaches (chemical, mechanical and biological) are being utilized. Current study evaluated the economic burden of dengue on patients residing in the Western Province, along with their Willingness to Pay (WTP) to reside in a dengue free environment

Approach

The study was carried out in the Western province of Sri Lanka, considering Colombo, Gampaha and Kaluthara districts. Socio-economic data of 300 stratified randomly selected dengue patients (on a proportion basis) were collected through interviewer based pre-tested semi-structured questionnaire. Willingness to pay for a dengue free environment was estimated using a choice experiment designed and analyzed using support .CE package in R.

In order to elicit the choices, a dengue free environment was characterized by 6 attributes with different levels.

Attributes	Choice 1	Choice 2
Cleanness of the premises	**Clean**	**Do not clean**
Availability of wet containers	**Not available**	**Not available**
Presence of shrubs and other vegetation	**Present**	**Present**
Availability of therapeutic cure	**Not available**	**Not available**
Availability of support from government entities to control mosquito breeding	**Not available**	**Not available**
Preferred payment to reside within a dengue free environment (LKR)	**Rs. 25,000**	**Rs. 10,000**

Figure 1: A sample choice card

Results

The highest direct medical cost of 15,990 LKR per patient, was observed among the dengue patients from Kaluthara, while dengue patients from Gampaha denoted the lowest (6,683 LKR). The caretaker cost remained as the second highest cost category, accounting for more than 16 % of the total cost. Dengue patients in Gampaha reported the highest caretaker cost of 5,603 LKR per patient, while the lowest was observed in Kaluthara (2,700 LKR). Interestingly, the lowest contribution was shown by the post-recovery costs, where dengue patients from Colombo reported the highest as 162 LKR per patient. On the contrary, the lowest was observed in Kaluthara as 31 LKR. The highest average cumulative economic burden of dengue was noted in Kaluthara (22,420 LKR), followed by Colombo (16,258 LKR) and Gampaha district (16,091 LKR). Availability of specific therapeutic cure for dengue, availability of shrubs and vegetation in their premises significantly influenced the WTP for a dengue free environment. Interviewed dengue patients were willing to pay 19,128 LKR less to live in a dengue free environment, when therapeutic cure for dengue is readily available. Further, they were willing to pay 21,492 LKR more, when their premises are free of shrubs and bushes.

Recommendation

The economic burden of dengue in Sri Lanka is very low compared to the other countries in the region. However, a detailed study is needed for a firm conclusion to compensate for any underestimations. People are reluctant to remove shrubs and other vegetation in their premises and invest to reside in a dengue free environment, when therapeutic cure is available for dengue. These are recommended to be considered, when health sector policies are formulated towards prevention of dengue.

Policy Brief 05

KEY MESSAGES

- Kandyan Home Garden owners prefers a payment for ecosystem service to preserve it

- KHG owners prefer to a PES driven by a Government mechanism

- A higher PES is expected by KHG owners whose awareness on ecosystem services is very less compared to those who well aware about it

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Payment On Ecosystem Service (PES) Arising from Kandyan Home Garden

Introduction

Agrobiodiversity is referred to the biodiversity subgroup, which includes crops, livestock, forestry and fisheries that help strengthen agro-ecosystems and agro-ecosystem diversity. The Kandyan Home Garden (KHG) is a highly adapted, diversified and environmentally sustainable forms of land that create a sustainable crop production system specifically located in Kandy district. Most of KHG are mixed crop systems integrated with natural plants and fewer animals. Most of KHGs are degrading ignored by the owners.

Thus a Payment for ecosystem services (PES) can be an important tool for the protection of ecosystem services. In the Sri Lankan context, there is no experience of implementing a PES in support of conservation of biodiversity which will be a motivation to the farmers to conserve KHG and thus conserving agrobiodiversity. This study attempt to identify the possibility of implementing a PES in support of conservation of KHG and thereby conserve associated biodiversity.

Approach
A semi structured questionnaire survey was conducted in the study area for collection of data. Bidding was done for a maximum expected PES using a bidding chart on individual basis during the survey. A total of 300 households were selected at random and the data were collected between August and October 2019.

In this study, revealed preference approach was taken where auctions were set to estimate a PES. Determinants on PES were identified via a multiple linear regression analysis. Moreover, the mode of payments and other important elements of a PRS system were identified by focus group discussions had with the community groups.

Results

The distribution of the estimated PES in both intervened areas and non-intervened areas are given in Figure 1 which depicts significant differences in PES at both communities.
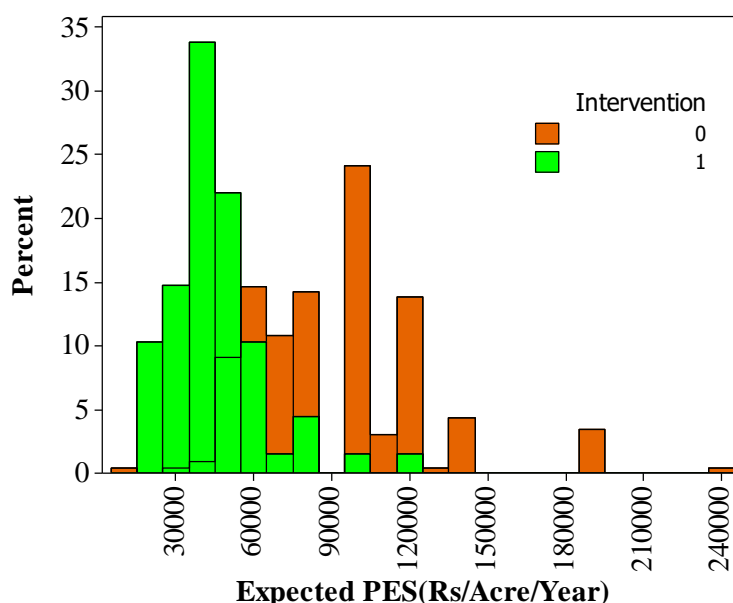
Figure 1 . Intervene and non-intervene area household's contingent value
Note: 0- Non-intervened area, 1- Intervened area

The economic evaluations performed in the present study allowed to identify, payment on ecosystem services for conserving agrobiodiversity in KHG, and estimated PES. The community does not expect high amount of PES when the income from KHG is higher. Consequently, by increasing the productivity of KHG there is a possibility to save the PES paid to the community. Moreover, when the size of the KHG increase the expected PES by the community goes down. In other words, community with comparatively small KHG expects more as PES to conserve it. Compared to farmers employed in government sector and owned a KHG expect comparatively a low amount of PES while those who employed in private sector expect rather a high amount for PES.

Recommendation

It would be timely important to aware farmers that ecosystem services of KHG is significant and motivate them to conserve by increasing the productivity of KHG. In the meantime, seek possibilities of imposing a PES in support of farmers to conserve KHG.

Policy Brief

KEY MESSAGES

- Women are considered as a valuable human resource in the rural agricultural sector of Sri Lanka

- Government and NGO's should appropriately involve to increase the involvement of women participation in agriculture

- Local training institutions and programmes should be established to prove the knowledge about new technologies for enhancing the work knowledge and skills of women.

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Contribution of Women in Agriculture Related Activities in Kurunegala District

Introduction

Agriculture is one of the most important sectors of the Sri Lankan economy. Women constitute approximately 52 % of the total population and are considered to be a valuable human resource needed to be in the rural agricultural sector of Sri Lanka. However, women participation in agriculture is highly constraint by the gender gap and so that they have unequal access relative to men, to productive resources such as land, credit and extension services. Narrowing this gender gap could be enhanced by improving the participation of women in agriculture so that productivity can be increased. Factors influencing women's participation in agriculture and constraints face by them have not been evaluated in previous studies. The absence of information on women participation in agriculture is a big problem in effective policy making and strategic planning.

Approach

Primary data were collected through a survey using a structured questionnaire from a sample of 150 respondents in Kurunegala district which were selected using multiple stage cluster sampling method. Information were collected on socio-economic characteristics of respondents, participation level for different agricultural activities as well as constraints faced by women in participation in different agricultural activities. Data were analysed descriptively and inferentially.

Results

Majority (52 %) of the respondents fall between age ranges of 31-50 years. Majority (89 %) of the respondents were married and 70 % of them have more than three members in their families. Most of them have primary education level (45 %) and 59% percent of the respondent is not suffering from any main non communicable diseases, thus they are in good health. About 47 % of the household own large farm (>3 acres). Further, it is revealed that majority (43 %) have land tenure rights. Most of the respondents (69 %) farm is very close to their house (less than 0.5 km). Most of the women (56 %) have high experience (more than 10 years) in farming. Majority of the respondents (54 %) are not having opportunity to access agricultural inputs considering it as male dominant activity.

Main agricultural activities performed by them are weeding, seeding irrigation, land preparation and harvesting. The overall participation in agricultural activities were obtained and it indicated that 49 % of the women participate the agricultural activities above the average while 31 % participate in average. It is clearly evident that considerable proportion of agricultural activities are shared by women.

Factors significantly influence to level of participation of agriculture activities are age, civil status, household size, education level, health, monthly income , size of the farm, land tenure rights, distance from house to farm, experience in farming, access to inputs, access to credit and access to extension services. Structural modelling shows the positive structural relation with age, health, household size, land tenure rights, experience of farming, access to inputs, access to extension services and negatively related with monthly income level, civil status, education level, size of the farm, and distance from farm to house.

The study evaluated the constraints face by the women when participation in agricultural activities. Most women (86 %) are constrained by lack of access to technological advancements followed by lack of credit facilities (80 %), financial constraints (80%), and limited agricultural inputs (78 %), less market opportunities (72 %), problem from dependents (70%) and lack of access to extension services (67 %).

Recommendation

Local training institutions should be established and programmes should be given the knowledge on new technology to enhance their knowledge and skills on agriculture. Various policies should be established to offer easy finance schemes to strength women's financial status. Government should encourage and assist women by giving them special attention in terms of access to farm inputs and incentives. Credit facilities should be provided to increase the factors of production such as easy access to loans and lands. Government should take action to make the better market place for the women. Legislative initiatives should be developed to promote equality in the wage system, including for more flexible working arrangements, and increase the status of women in agriculture. Legislative and administrative reforms should be undertaken to give rural women, and especially married women, full and equal rights to land ownership.

KEY MESSAGES

- Government entrepreneurship development programmes (EDPs) significantly effect on the business startups & performance of entrepreneurs

- Content of the current programmes significantly impact the entrepreneurship development in Sri Lanka

- Funds provided by the EDPs has high impact and currently providing market linkages have less impact for the entrepreneurship development

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Effectiveness of Government Programmes on Entrepreneurship Development

Introduction

Sri Lanka is a Lower Middle-Income country and the unemployment rate is increased to 4.4 % in 2018. Highest unemployment rates are being reported in females, youth and educationally qualified categories in Sri Lanka. As Sri Lanka is in a situation with a low amount of investments, unemployment rate increase and therefore entrepreneurship of the country's labour force should be increased.

The entrepreneurship development programmes (EDPs) help to develop the entrepreneurial abilities which are the skills that required to run a business successfully. Entrepreneur development programmes play four major roles to increase entrepreneurship among participants and they are stimulatory role, supportive role, sustaining role and socio-economic role which create employment opportunities in micro, small, and medium industries. Several government institutes conduct entrepreneurship development programmes for the youth and educationally qualified groups. When studying the structures of those programmes comparatively similar structures were observed in all government institutes such as NEDA, NAITA, Industrial Development Board etc.,. Therefore in this research NEDA programme, "Entrepreneurship Development Program for University Graduates/UVU (Upadhidari Vyawasayaka Udanaya)" was evaluated as the case with special reference.

Approach

Population was graduates of state universities in the past 5 years who have joined the Entrepreneurship Development Program for University Graduates (UVU).Sample size was 100 beneficiaries. Questionnaire survey, short interviews and telephone interviews were used for data collection. Secondary data were collected from NEDA and other government institutes. Data were collected based on four main categories such as general information about business start-up, performance of business, performance of entrepreneurs and content of the UVU programme. Data were analyzed descriptively and inferentially. Inferential analysis was done using Kruskal Wallis analysis as data were collected based on 5 point Likert scale.

Results

According to the analysis it was identified that nearly 70% of participants of the EDP were males. As Sri Lanka's population consists with higher percentage of females, female entrepreneurs are to be developed. Highest percentage of business startups and highest percentage of graduate entrepreneurs are recorded from agriculture based curriculums and have started agriculture related businesses. In Sri Lanka there is higher capacity to start self-employments in agriculture sector. But due to the unexpected risk engage in agriculture sector, entrepreneurs are reluctant for business start-ups.

 From the businesses started, 65 % of businesses are in age 3-5 years which reflects that EDP has involved for sustainability/establishment of the businesses and not only for the start-ups. 73% of the entrepreneurs have started business after joining the UVU programme which motivates them to start a business with a financial support and 83% of the started businesses are currently functioning. Only 17%of businesses are not functioning currently, due to entrepreneurs' engagement with government jobs, dissolvent of partners, lack of family workers and difficulties to hire workers.

Due to mentioned difficulties faced by entrepreneurs 65% of businesses are conducted as part-time and 39% of entrepreneurs' monthly average income is around Rs. 10,000 to Rs. 25,000 in both years 2017 and 2018. Government EDPs mainly involve for business start-ups, governing and short term follow ups. According to the Kruskal wallis analysis, provided funds, motivation, knowledge, skills, training, governing, supply of equipment's, market linkages and preparation of business plan have significantly effect for the business start-up indifferent intensities. Funds provided by UVU have obtained highest average value for the business start-up and effect from UVU to introduce market linkages on establishing new business start-up has obtained the lowest average value .Government EDPs have significant effect on knowledge development on Marketing management, finance, accounting, technical knowledge, strategic management, confidence to face challenges and innovation for increasing performance of entrepreneurs in different intensities. Effect of the content of the current t programmes on entrepreneurship development has significant effect for the entrepreneurship development by exposal visits, awareness, business counselling, follow-ups, training, technical support, market opportunities, innovation and creativity indifferent intensities.

 Recommendations

Expansion of business should be supported by these entrepreneurship development programmes rather than business start-ups. Business counselling, monitoring and follow ups of the government entrepreneurship programmes are to be developed to increase the effectiveness of programmes. Market linkages provided by current entrepreneurship development programmes have to be increased and follow ups are needed.

Policy Brief   08

KEY MESSAGES

- Education status of plantation sector youth is improving but still remains below that of the general labour force in the country

- Only 10% of the youth in tea plantation sector have got some vocational training

- 50% of the youth are willing to out-migrate from the estate sector at their first opportunity

- No gender discrimination at receiving education, training and jobs by young females in tea plantation sector

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Identifying Current Status and Future Prospect of the Plantation Youth in Tea Sector of Sri Lanka

Introduction

Tea plantation sector contributes significantly to the economy of the country. Operations in tea plantations are labour intensive and thus shortage of labour can adversely impact the industry. It is said that the plantation youth tends to out-migrate from the estates where they have been living over generations. Consequently labour shortage in tea plantation sector can be aggravated in the future. Thus this study aims at identifying present status, future prospects of plantation youth. Also their job satisfaction and what drives them to out-migrate from the tea plantation sector was studied

Approach

Data were collected from the plantation youth through a sample survey (during November – December 2019) where a pre tested semi structured questionnaire was used. Apart from the individual interviews, few focus group discussions were conducted to verify and collect further information. A sample of 100 youth was selected by simple random sampling using a proxy sampling frame and optimizing it to the time and cost function. Data analysis was done using descriptive statistics, Chi-squared test of association and employing an ordinal logistic regression model.

Results

A majority of the youth (> 75%) are living in the current estate since more than two generations. However about 50% of the them willing to out-migrate from the current residence which the majority is young females due to various reasons *viz.* looking for better living conditions, better social acceptance and receiving more education avenues for their children.

Those youth stepping into their middle age get reluctant to out-migrate while the youth at their early ages are very much willing to out-migrate (Figure 2.).
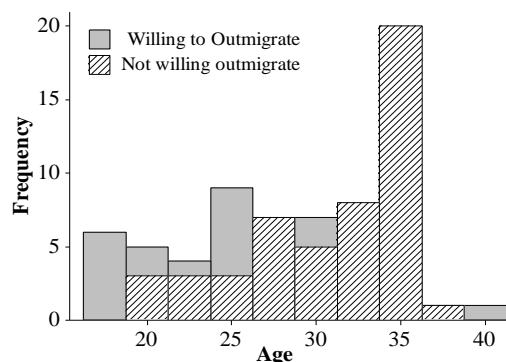
Figure 2: Distribution of age by willingness to outmigration

Table 1: Sample distribution of education status of the plantation youth

Education status	Percentage	Cumulative percentage
No schooling	0	0
Up to grade 8	29	29
Up to GCE (O/L)	42	71
Up to GCE(A/L)	23	94
Passed GCE(A/L)	5	99
Degree/Diploma	1	100

Education status among the planation youth found to be comparatively low compared to that of the general labour force in the country. However no one reported sample who has not received school education which is an improvement apparent in respective community. A 77% of the sample was employed out of which 80% work in the estate and 64% are females. No gender discrimination was reported when female plantation youth getting education and an employment. However about 85% of young females were employed as tea plucks. The majority of them accuse that they are not received employments in the estate based on their education qualifications which a compelling reason for their outmigration. Most of them have not revived any sort of vocational training after their school training and reported only 10 of them have obtained some vocational training. Thus most of youth labour in this sector remains as unskilled labour.

The final result of this study revealed that age and number of generation they have been in the estate affects positively on their satisfaction of the current employment. When they become older, their level of satisfaction of the job increases. When they have lived more generations in the estate, they are more bound to estate work socially and culturally. Thus more the generations lived in the estate higher the satisfaction from the current employment. Those who have highest education status like graduated, diploma holders, get dissatisfied with estate sector employments.

Recommendations

Although contemporary estate sector youth willing outmigration, it is hindered by their low education states, social, cultural and emotional bonds to the estate sector. Their awareness about opportunities for vocational training should be raised enabling their labour be skilled labour. However, ignoring their education at getting a job in the plantation sector, poor living conditions at line houses, poor education facilities available for their children boosts their outmigration. Estate sector decision makers should consider these driving forces towards outmigration of the youth in the estates and make policy decisions to change going plantation sector into a worker dilemma.

Policy Brief   *09*

KEY MESSAGES

- Setting a well-accepted standard and implementing a certification system on organic fertilizer in Sri Lanka is important

- The consideration of relevant authorities should be focused on implementing policies for a proper labelling system

- Concentration of government is required on employing more promotional activities for stakeholders in the sector

Authors:

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Stakeholder Preferences on Quality Attributes and Promotional Instruments of Organic Fertilizer

Introduction

Organic agriculture is a form of sustainable agriculture from both ecological and economic aspects. The reason for that is the worldwide trend towards organic food consumption. Most countries have well accepted quality standards on organic agricultural products to label them as "organic". Nevertheless, in Sri Lanka, there is no accepted standard included in national policies for organic products. In this research, quality attributes which are most preferred by the stakeholders in the organic fertilizer value chain are revealed and specifically attention was exerted on key promotional instruments required by the stakeholders through the value chain.

Approach

Quality attributes of organic fertilizer were classified into three categories as 'Search', 'Experience' and 'Credence' (see, Figure 1). Stakeholders in the organic fertilizer value chain were contacted during September 2019 with the aid of semi-structured questionnaire.

Search Attributes
Information taken by searching and examining

Shine, Color, Odor/Smell, Texture, Shape, Size of package, Packaging material, Size of particle, Labelling, Price, Brand

Experience Attributes
Information obtain by using or past experience

Keepability
Solubility

Credence Attributes
Depends on recommendation of a third party

Heavy metals, Natural toxins, pH, Organic carbon, Sand content, C/N ratio, Viable weeds, Residues, Pathogens, Moisture content, Fortification, Advertising, Certification

Figure 1: Quality attributes of organic fertilizer

Results

The study revealed that stakeholders in the organic fertilizer value chain highly preferred on Credence type quality attributes of the fertilizer product. Other than that, majority of stakeholders pay their uppermost attention on 'fortification' attribute.

As shown in Figure 2, promotional instruments were categorized into 4 categories. Stakeholders in the value chain pay their attention on these instruments in various ways as below.
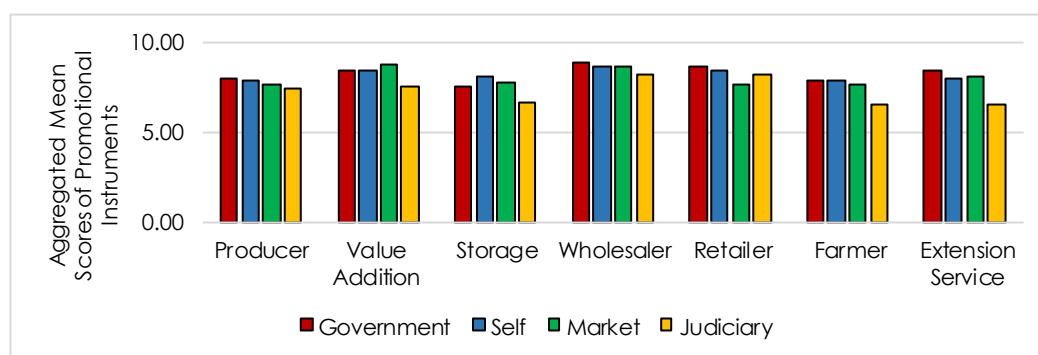
Figure 2: Stakeholders' preferences for promotional instruments

Recommendations

It is important to transform the Credence and Experience attributes into Search attributes which are accessible to stakeholders by implementing a proper labelling and certification system by a reliable third party. Attention of authorities should be focused on showing the 'certification' as a seal or logo.

Results highlight that majority of stakeholders preferred on 'government' promotional instruments. Thus, it is effective that implementing more promotional activities by government or government associated organizations. It will encourage people in the organic fertilizer value chain to produce, use, store or sell organic fertilizer other than inorganic fertilizer.

KEY MESSAGES

- Consumers tend to buy local branded fresh milk based on their health consciousness

- Knowledge regard fresh milk should be enhanced through workshop, TV programme, magazine and etc.

- Consumers perceive that branded fresh milk are highly paid

Authors:

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Factors Influencing the Purchase Intention of Locally Produced Branded Fresh Milk

Introduction

Fresh Milk consumption has recently increased considerably because debatable issues which recently arisen on imported milk powder. However the fresh milk market is yet undeveloped in Sri Lanka. Fresh milk is generally believed as an important source of many nutrients. Recently medical researchers have confirmed that fresh milk is fortified with vitamin D which helps to reduce "Osteoporosis".

Understanding the consumer decision process to buy locally produced branded fresh milk is important to implement better policies for the development of the fresh milk consumption. This study was conducted to identify how perceived knowledge, processed knowledge, health consciousness, certification, attitude and subjective norms drives toward locally produced branded fresh milk purchase intention.

Approach

Data were collected through a structured questionnaire survey by means of face-to-face interviews from the study population Thus, this study was administered at randomly selected six available places from each selected Divisional Secretariats. Five Divisional Secretariats were selected randomly in the Kurunegala District. Data were gathered from 200 consumers in selected places. Customers were selected based on systematic sampling by interviewing each forth customer arrived to the selected places. The questionnaire consisted eight sections: Demographic factors of the consumer, processed knowledge, Perceived knowledge, Health, Subjective norm, Attitude, Certification and Purchase intention of locally produced branded fresh milk. Twenty-five items were used to assess these seven constructs. All items in the questionnaire were assessed using a five-point Likert-type scale, ranging from 1 to 5, where 1 was denoted "strongly disagree", and 5 was denoted "strongly agree". Confirmatory Factor Analysis (CFA) was carried out to determine relationship between variable.

Results

Cronbach's alpha was used to assess the internal consistency of the Likert scale items. The measured Cronbach's alpha was 0.891. It is acceptable because higher than 0.7. All 25 statements which were used as indicators showed that the model fit was insufficient to proceed with the same set of indicators. Thus, it was pruned two indicators (Certification factor) which had low factor loadings results. After that two indicators were removed and re-estimated. The results demonstrated that health consciousness significantly and positively effects on purchase intention of local branded fresh milk among consumers. Consumer health consciousness was measured by using statements which asked about the chemical residues, safeness, and healthiness of the local fresh milk. The results indicated that consumer health consciousness is the major factor that influence purchase intention of locally produced branded fresh milk. Perceived knowledge, processed knowledge attitude and subjective norms do not significantly impact on purchase intention. This result indicated that Sri Lankan consumers tend to buy fresh milk based on their health consciousness. Majority (89 %) of the respondents highlighted that fresh milk price is comparatively higher than powdered milk.

Recommendations

This research provides several recommendations at the policy level as well as industry level. Fresh milk consumption is relatively low among Sri Lankan consumers. And also they have no sufficient level of awareness of fresh milk. Therefore the producers, marketers, certifiers, government and research institutes should provide correct knowledge on fresh milk and credible information through newspapers, TV, research papers, magazines, websites and workshop etc. Those things can support to enhance the consumer knowledge towards fresh milk. This study will help to local companies in Sri Lanka to design product promotion, pricing and marketing strategies to improve the local market.

Policy Brief   11

KEY MESSAGES

- Agricultural fruit market prices change day by day

- The price information of fruit market is very important to all stakeholders in fruit sector

- Real prices of imported fruits shown low price variance compared to local fruits

- Observed increasing trends in fruit prices are mainly driven by the inflation

Authors:

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Identification of Dynamic Behaviour and Forecasting of Prices of Selected Fruits in the Local Market

Introduction

Fruits play a major role in agriculture food market in Sri Lanka. Around fifty fruit varieties grown in different agro climatic regions including home gardens and fields. At present, fruit sector is significantly contributing to agriculture Gross Domestic Product (GDP). Price information of fruit market is vital to all stakeholders who are interested in fruit sector to make their market decision and policy planning. Price fluctuation is very common issue in every market system. Frequent price fluctuations in the fruit sector have created numerous market problems. The main objective of this research study was to identify an appropriate time series model. As a result, to identify dynamic behaviour and forecast future prices of selected fruits in Sri Lanka.

Approach

The study was carried out using secondary data form HARTI. Monthly Colombo retail prices of seven fruit types both locally produced (Banana, Papaw, Mango and Pineapple) and imported (Apple, Orange and Grapes) fruit prices were used in this analysis. Imported fruit prices available from January 2012 to December 2018 and locally produced fruit prices available from January 1996 to December 2018. Both nominal and real prices were analyzed using numerical and graphical summary measured. Auto Regressive Integrated Moving Average (ARIMA) and Seasonal Auto Regressive Integrated Moving Average (SARIMA) time series models were fitted and forecasting efficiency parameters were calculated. Automatic time series forecasting was done for 2019.

Results

Table 1 shows the best fitted models for real prices of different fruit types under investigation. According to the results, least AICc can be seen for orange. It can be identified SARIMA (1,0,0) (0,1,1). AICc of all imported fruits were very low compared with AICc of locally cultivated fruits. The MAPE value of imported fruit of apple, orange and grapes were very low compared to locally produced fruits, so that the forecasting efficiency comparatively high. From this study, it can be identified prices of all local fruits and imported fruits are seasonal in nature due to seasonal nature of production and seasonality in demand.

Table 1: Estimates of the AICc and MAPE of the best fitted models

Fruit type	SARIMA Model	Akaike Information Critera Corrected (AICc)	Mean Absolute Percentage Error (MAPE)
Ambul kesel	$(2,1,3)(2,0,0)^{12}$	1876.05	38.84
Kolikuttu	$(1,1,0)(2,0,0)^{12}$	1974.29	43.30
Seeni kesel	$(2,1,4)(2,0,0)^{12}$	1878.72	12.58
Karthakoloban	$(0,0,2)(0,1,1)^{12}$	2271.77	32.99
Vilad	$(0,1,1)(0,1,1)^{12}$	1748.07	33.92
Bettiamba	$(1,0,0)(2,0,0)^{12}$	1805.28	28.34
Papaw	$(3,1,2)(2,1,0)^{12}$	2041.65	37.68
Large Pineapple	$(1,1,3)(0,0,1)^{12}$	2242.22	40.76
Medium Pineapple	$(1,1,1)(0,0,1)^{12}$	2175.43	35.95
Small Pineapple	$(1,1,1)(0,0,1)^{12}$	2109.08	24.96
Apple	$(1,0,0)(1,1,0)^{12}$	398.57	9.46
Orange	$(1,0,0)(0,1,1)^{12}$	362.12	8.84
Grapes	$(0,1,1)(0,1,1)^{12}$	441.35	7.77

Real prices of selected fruits were forecast for 2019 using fitted best models. According to forecast price it can be identified real prices of all fruits except seeni kesel and bettiamba showed comparatively very highly price fluctuation throughout the year 2019. However, price can be changed due to unexpected reasons that can occur in the fruit market.

Recommendations

Price of locally produced fruits have high price variance. It may happen due to several reasons including seasonality, weather condition, high number of middlemen involvement, and pest and disease problem, etc. However, market and production strategies can be used to control high price fluctuation of fruits, for example Improve control environment facilities, and administrate fruit production sector. Understanding dynamic behavior of fruit prices which facilitates make government decision and policy planning toward the stakeholders and their action.

Policy Brief 12

KEY MESSAGES

- Technical change has not played a key role in tea estate sector in past 18 years

- Within the study period low labour usage is seen. Drastic decline as of labour is observed

- There is a need for innovation in this sector

Authors:

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Has Technical Change been Beneficial to Estate Production in Tea?

Introduction

Tea is one of the major plantation crop in Sri Lanka and it plays a pivotal role in the economy. Tea production is one of the main foreign income earning source in Sri Lanka and it contributes 2 % to the overall GDP. Sri Lanka was the second largest producer with 20 % of shares in the world tea production in 1961. However in the present scenario, the tea industry shows a declining growth rate in last four years. Therefore, Sri Lanka has dropped down to the fourth position of the world largest tea producer. Technological change, also known as technical change, refers to changes in techniques of the production process. Productivity change is an important potential aspect of technological change so that productivity measurement plays a critical role in assessing the effects of technological change in agriculture. The objective of this research was to study the impact of technical change on the production of tea estates.

Approach

Eight estates were selected purposively from Dimbulla region for study considering the availability and accessibility of data records. Panel data were collected from each estate for the time period from 2005 – 2018. Monthly production data were collected from each estate. The translog production function with a time trend representing exogenous technical change was written and then the first derivation of that function with respect to time was taken and it was the technical change. Coefficient estimates of the parameters were obtained using STATA software.

Results

Results show that technical change is increasing up to certain point the rate of technical change does not increase at an increasing rate through time. Therefore, the plantations in the sample had not seen any major technological shift for the past eighteen years.

Results also suggest that chemicals were used excessively over this period but labour was saved. The impact of fertilizer application for the production was very low because the coefficient of fertilizer interacted with time takes a value near zero.
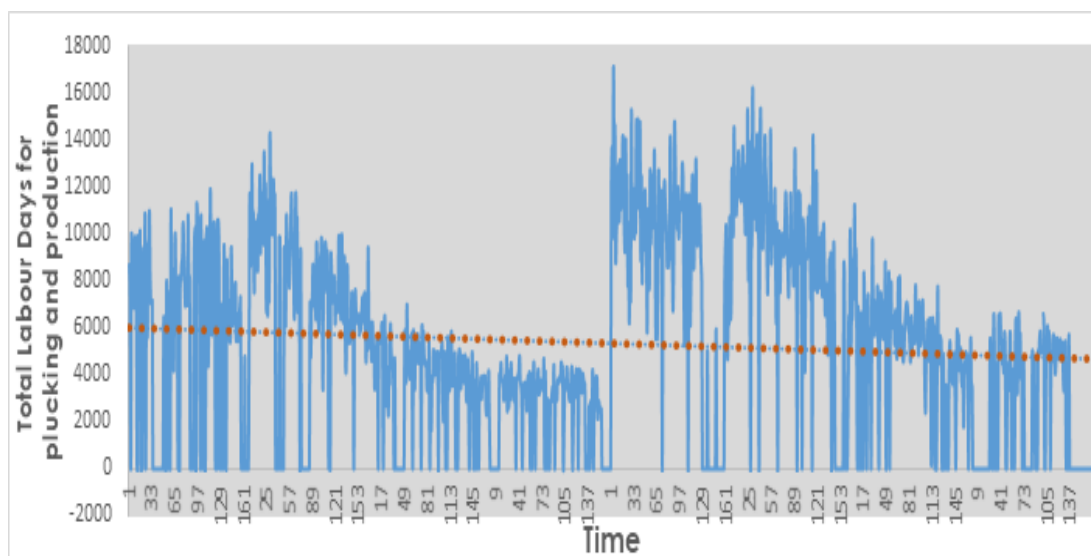
Figure 1: Variation of total labour days for plucking and production with time

The above graph shows that number of labours employed in plucking and production in the estates are not significantly changed within the period of time considered. The results indicate that when increasing labour days, production of tea estates increase, after reaching certain level when increasing number of labor days, production increases at increasing rate. Therefore, currently labourers employed in tea estates are less than the required number.

Recommendations

Because the labour and labour squared variables have taken significant and positive parameters and labour employment in tea estate sector is lower than the required amount in the present, increasing the labour input is recommended for production increment at increasing rate in tea estate sector.

Policy Brief   *13*

KEY MESSAGES

- High grown tea estates show an average of 86.9% of technical efficiency over the 2005 – 2018 period

- An improvement of 13.1% efficiency can be obtained without any additional costs

- Maximum impact to production can be obtained by expanding cultivation

- Important for estates to recultivate abandoned tea lands

Authors:

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Variability of Technical Efficiency in High Grown Tea Estates

Introduction

Being one of the major contributors to the national GDP, tea sector covers more than 202,022 ha in land and 39% of them are belong to the estate sector. While, generating job opportunities to the labour market, tea sector in the country faces many problems such as unskilled manpower, labour trade union actions, labour migration, weather conditions, climate conditions, higher cost of production and changes of the quality of the output. Variation of production can be seen due to those resons. Tea being the major agricultural export, incensement of productivity through efficiency could result more output without increase of cost. Therefor higher profit can be obtained. Thus, this study was carried out to estimate the technical efficiency levels of tea estates in the high grown area of Sri Lanka.
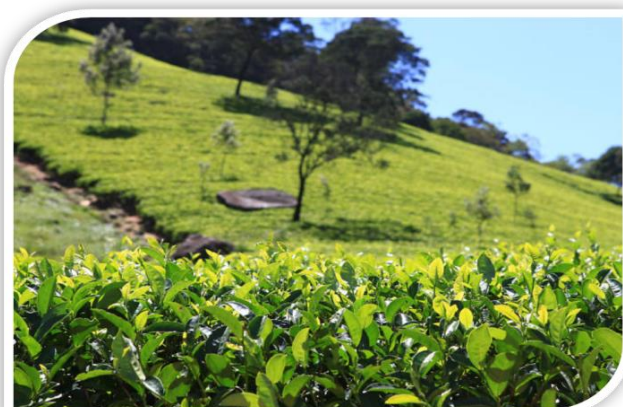
Approach

Data for the study was collected form purposively selected tea estates from Nanuoya region which belongs to the Dimbula planting district. Monthly production data including the green leaf production, labour cost, fertilizer costs, agrochemical costs and the revenue extent of the estates were extracted from the monthly accounts and the progress reports. After that those data was used to form a panel data set that used to analysis a stochastic frontier which included the technical efficiency level as an error term to the Cobb Douglas production function.

The data set was a large panel data set. Therefore, the effect of the time on the technical efficiency can be recorded using that. Also, the estate specific efficiency values can be extracted assuming time variation on technical efficiency cannot be observed. To estimate the effect from the inputs of an estate to the monthly green leaf production, Bayesian analysis was used.

Results

According to the results gained after the analysis, fertilizer cost, chemical cost, labour cost and the extent of the estate have a positive and significant impact on the green leaf production of the estate. So, an increase in the green leaf production can be increased by increasing the extent, use of labour, agrochemical and fertilizer. Also, the average technical efficiency value of an estate was 86.2% and the lowest value was 66.1%. Distribution of the coefficient values are illustrated in below graphs.
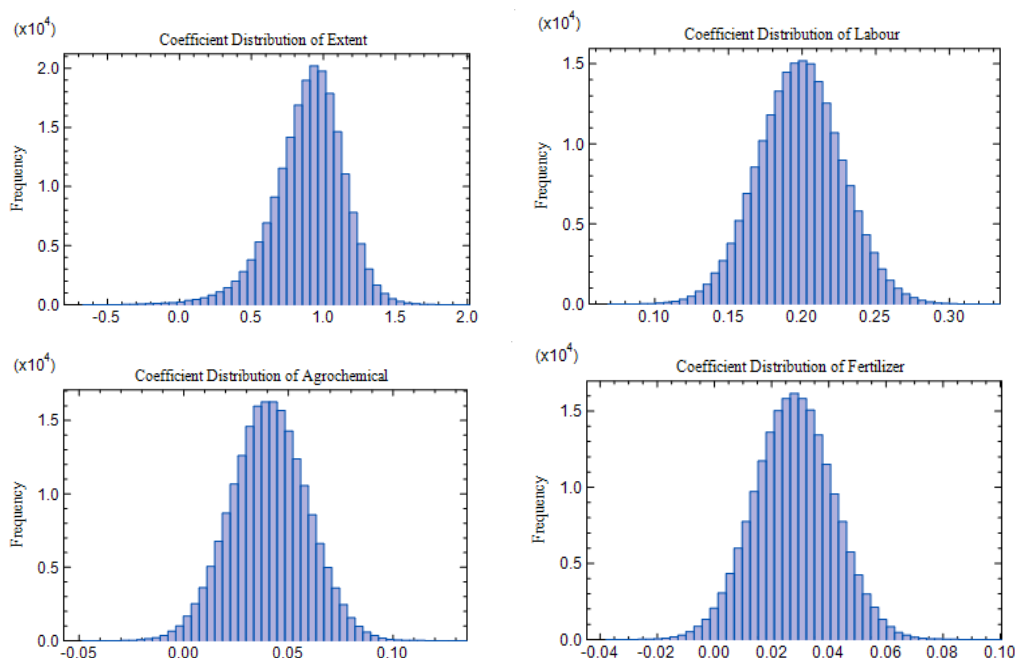
Recommendations

Technical efficiency values can be used to develop a benchmark to maintain the efficiency level of the estates in high grown area. These values can be used to measure the efficient use of the inputs. Production of the estates can be increased using the fertilizer and agrochemical. But agronomically use of these can cause stress on the plants and the soil conditions which lead to a decrease of production. Therefor only the required amount should be used.

Policy Brief 14

KEY MESSAGES

- Regulatory systems should be improved to address the problems regarding adoption

- Technical efficiency and altruism motivate adoption of cleaner production practices

- Firms do not identify commercial pressure and government regulations as important reasons for adoption

Authors:

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Motives for Textile and Apparel Firms to Adopt Cleaner Production Technologies in Sri Lanka

Introduction

Textile and apparel sector is the highest industrial employment generator and the highest foreign exchange earner in Sri Lanka. Despite their economic importance, this industry significantly contributes to environmental pollution. The major environmental effect of the textile industry is the discharge of high amounts of chemical loads. Textile industries could be benefited by implementing cleaner production (CP) Techniques. Technical efficiency, sales and revenue, commercial pressure, government regulations and altruism are some of the incentives used to motivate the adoption.

The overall objective of this study is to understand what drivers determine the implementation of cleaner technologies in the manufacturing industry of Sri Lanka with special focus on the textile and apparel industry. The specific objectives are; to identify the economic incentives to adopt cleaner technology in the textile and apparel industry in Sri Lanka and to suggest recommendations on how the private sector institutions can help improve environmental performance.

Approach

Data on the adoption of cleaner production practices were collected during June 2019 to September 2019 using a pre tested questionnaire.

The decision-makers of the firms were asked to state their response on each incentive on a likert scale. Attitudinal statements reflecting each motive were specified in the questionnaire. Main survey was conducted through two primary data collection methods; in depth interviews and industry survey. Thirty firms were selected for the main survey. Simple random sampling technique was used for sample selection. For these five types of incentives indices were constructed. Confirmatory Factor Analysis (CFA) was done to exclude some statements in the pilot survey. SPSS software was used for the Confirmatory Factor Analysis. A Poisson model which is a count data analysis technique was used to quantify the impact of incentives on the adoption of cleaner production practices.

Results

Out of the 30 factories 23.3 % undertake four cleaner production practices. Only 13.3 % undertake all eight cleaner production practices. Every company undertake at least one cleaner production practice. Final model is statistically significant. Technical Efficiency, Sales & Revenue and Altruism motives have a significant impact while Commercial Pressure and Government Regulations do not. Technical efficiency of the firms leading to a higher adoption rate. Sales and Revenue has a negative impact on adoption.
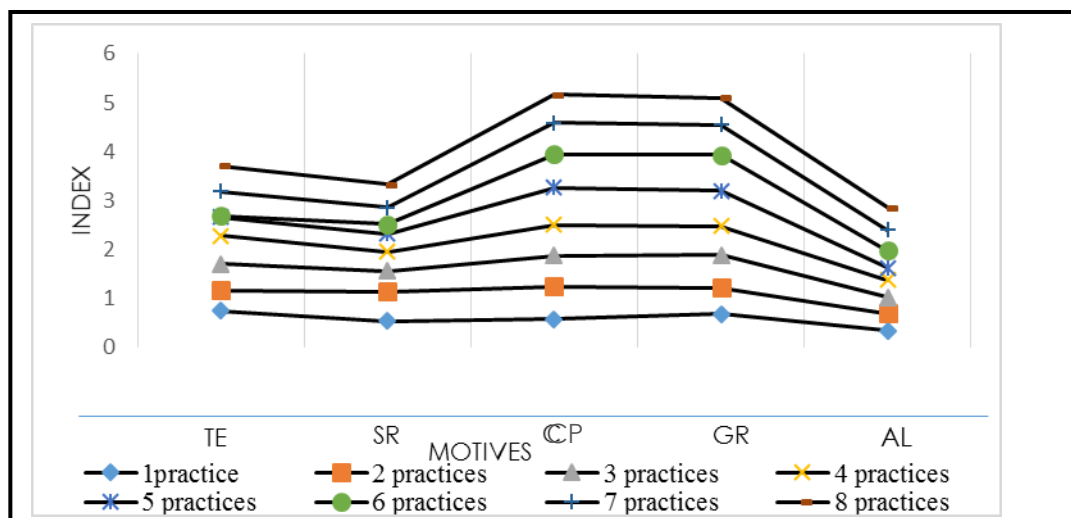
Figure 1: Cleaner production practises adopted and value of incentive index

Recommendation

According to the survey results, technical efficiency of the firms lead to a higher adoption rate of the cleaner production practices. Altruism act as a self-motive and it is associated with adoption. Textile and apparel firms do not see commercial pressure and government regulations as important reasons for adopting cleaner production practices. Stricter government rules and regulations will motivate the firms to adopt cleaner production. Regulatory systems in Sri Lanka should be improved to address the problems regarding adoption of environmental management practices.

Policy Brief 15

KEY MESSAGES

- Estate should take necessary actions to increase the technical efficiency with available resources

- There is a potential to double the coconut production with the effective management of available inputs

- It is necessary to increase the coconut production to meet the national requirement and reduce imports

Authors:

N. Benadict
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Does Coconut Estate has the Potential to Increase the Coconut Production Further?: A Case Study in Gampaha District

Introduction

Sri Lanka is one of the leading countries in coconut production and responsible for a significant share in the world market mainly through the supply of desiccated coconut. Coconut cultivation in Sri Lanka owned mainly by the private sector (95 %). About 70 % of the area under the crop is concentrated in the "coconut triangle" formed by the districts of Kurunegala, Puttlam, and Gampaha. The rest of the area is found mostly in the small home gardens in other districts. Annually 2500 – 3000 million nuts are produced. But it is not sufficient to meet the national requirement. A shortage of nuts increases the local market price of the coconut.

Technical efficiency is how a decision making unit [estate] efficiently produces the out-puts from available inputs. The importance of measuring technical efficiency is to get an overall idea about how far given estate can be expected to increase its outputs by simply increasing its efficiency without absorbing further resources. The paper investigates the changes in technical efficiency in a sample estate in Gampaha district from 2006 to 2018.

Approach

Data were collected from a coconut estate located in Gampaha district. Purposive sampling technique was used to select the state. Estate sector is specifically selected for this study, because of the availability of the data for a period of 13 years. Secondary data such as: total production, cultivated extents and input usage (Fertilizer, Labor, and Chemicals) were collected from 2006 to 2018. Monthly financial reports maintained at the estate were used to extract the necessary data.

Results

As shown in Figure 1. Technical Efficiency of this coconut estate varies during the period of 2006 to 2018 and it is difficult to identify a specific pattern of this technical efficiency change. Annual average technical efficiency values have ranged from 0.26 to 0.67. The average technical efficiency value of this coconut estate for the last thirteen years is 0.48. In percentage it is 48%, this indicates that there is a potential to increase the coconut production of this estate further by 52 per cent without increasing the level of inputs.
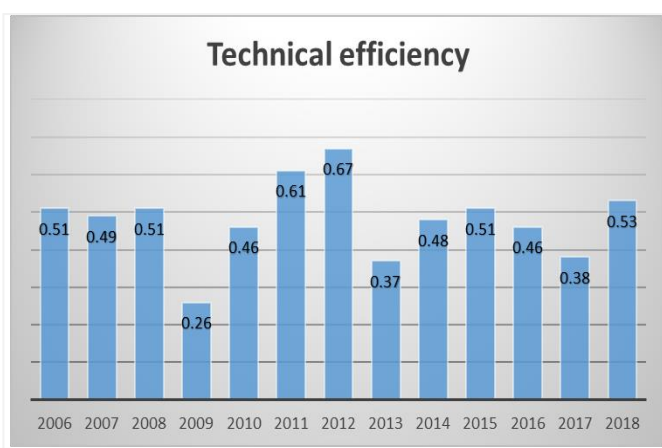
Fiaure 1: Behaviour of TE of estate sector

Recommendations

The study highlighted that TE value of this coconut estate for last 13 years were very low, which indicates that there is a capability of further increasing the coconut production of this estate without increasing the level of inputs. Lower management practices of the estate leads wastage of inputs consequently reduces the production as well as the Technical Efficiency. It is important to take appropriate actions to improve the production level of the estate with available inputs by utilizing the inputs in a more efficient manner by avoiding over usage. Over usage of inputs increases the estate expenses as well. To satisfy the local coconut requirement every estate in Sri Lanka should take necessary actions to increase the production with available resources.

KEY MESSAGES

- Over the last 10 -15 years, all studied estates indicate continuous decline in profitability

- Mature extent is vital towards the coconut profitability

- Increasing in output price (NSA) cause to increase the profit level, decreasing in labour wage rate significantly cause to increase the profitability

- Policies should be implemented to address the problems related output price, wage rate and extent of the land areas

Authors:

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Analysis of Profitability in Coconut Estates

Introduction

As a crop that covers nearly 21 percent of total agricultural lands, coconut cultivation plays a vital role in Sri Lanka's agriculture sector. In last decade prices related to input and output have been continuously getting changed. As a result of that, the profitability of the sector gets directly affected. As a major plantation crop, it is very important to identify how the profitability gets affected and develop adaptations. Otherwise, it will be an arduous task to follow on the sector in the future.

This research attempts to estimate a profit function to coconut estate sector, which illustrated the relationship between profit and major factors affect for the profitability of the sector.

Approach

To illustrate the relationship between changes in related variables (Net Sale Average, Extent, Wage Rate, Fertilizer Price, and Chemical Price) with the profit level in coconut estate sector, estimate a normalized profit function. In literature two major functional forms, Cobb-Douglas and Translog approach. Cobb-Douglas form Identified as the best suited form to estimate the model. The relevant data were taken from monthly records in estates by a survey. Four area estates were selected using purposive sampling technique that represents the three major coconut growing areas (Kurunegala, Puttlam and Gampaha districts) and represent the three climatic zones in the country (Dry, Intermediate and Wet zones). Approximately last 14 years (2005-2018) data were concern for the study.

Results

According to the study it can be concluded that, the vital factor that affect for the profitability of coconut sector is the land extent. When increase the land extent, it causes to increase the profit level in coconut estate sector. Followed by extent NSA (Net Sale Average), labour wage rate and fertilizer price respectively affect for the profitability of the sector. When increase the NSA it cause to increase the profit level and when increase the labour wage rate cause to decline the profitability of estate sector. In all selected area estates, the land extent under mature cultivation decline over the time. Simultaneously labour wage rate increases over time. Although there is a slight notable increase in NSA, it is not enough to balance the effect of labour wage rate and land extent. As a result of that, in all selected estates' profit level have been continuously decreasing over the time.
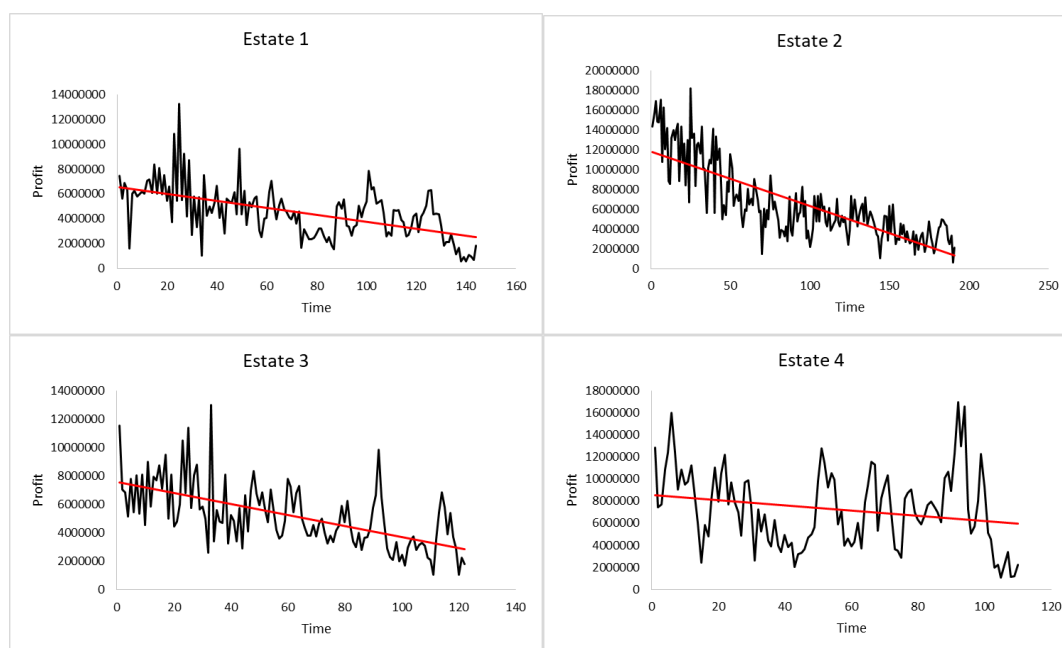
Recommendations

Policies should be implemented towards to overcome the problems that arise due to urbanization. The cultivation lands developed into colonized lands. It majorly causes of reducing the land extents. On the other hand fluctuation in output prices and increasing wage rates directly cause to the reduction of profitability in estate sector.

Policy Brief 17

KEY MESSAGES

- Product factors (taste, quality of the milk powder), availability of the brand and brand attitudes are the main factors which highly affect for consumer milk brand preferences

- Consumers are extremely brand loyal with their brand. Therefore, milk brand producers should make relevant strategies to maintain product quality and the trust of their brands

- Poor availability of the local brands is a major issue for consumers seeking local brands

Authors:

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What Factors Influence on Consumer Brand Preference for Local and Imported Milk Powder

Introduction

Consumption of dairy products in Sri Lanka, particularly powder milk, it has experienced a substantial growth over the last few decades. Milk powder is one of the essential food items of Sri Lankan consumers. Sri Lankan milk powder market is led by a few reputed imported brands and two main local brands. Local production of spray dried milk powder is insufficient for the demand. So, there is a high demand for imported milk powder in the local market. At present several milk powder brands are available in the market as well as new brands introducing to the market frequently. Therefore, in the Sri Lankan context, there is a huge competition within the milk powder industry. But the consumers prefer a particular brand which is much affordable to them.

There are several factors affecting for consumer preference for the particular milk brand. Therefore, it is important to research further the factors influence on the consumer brand selection. Therefore, this research was focused to investigate how consumers' demographic factors, brand attitude, advertising, brand availability, trust on brand, price, product factors, place of origin and subjective norms determine consumer's milk powder brand preference for local and imported milk brands available in the market. And also, to determine the consumer' highest preferred brand in the market.

Approach

A Structured questionnaire survey was conducted to gather primary data from the study population. The main survey was carried out in randomly selected supermarkets and retail shops in five Divisional Secretariats. Divisional Secretariats were selected randomly. Data were collected from 250 customers at selected retails shops and supermarkets. Customers were selected based on systematic sampling by interviewing each third customer arrived to the super market. Thirty-two items were used to assess these nine constructs other than personal information and brand preference.

All these factors   were assessed using a five-point Likert-type scale, ranging from 1 to 5, where 1 was denoted "strongly disagree", and 5 was denoted "strongly agree". Consumer brand preference for selected two local   and seven imported milk brands were assessed by using the ranking order from 1 to 9, where denoted "highest preference" or consumer first choice, 9 was denoted "lowest preference". The Reliability of the instrument was calculated by using Cronbach's Alpha Reliability Coefficient. Confirmatory Factor Analysis (CFA) was conducted to determine whether all observed variables (Indicator variables) appropriately reflect their underlying constructs (Latent variables) and whether the measurement model has acceptable fit to the data by using Analysis of Moment Structure (AMOS) in SPSS 24 version. Factor loading value and p value were taken to determine the significant level and relationship between dependent and independent variables.

Results

According to the results demonstrates that product factor, brand availability and brand attitude are significant and positively enhancing the consumer brand preference for local and imported milk powder. Under the product factor three statements were included which ask about taste, quality of the milk powder and design and type of package. The result indicate that product factor is the major factor of the consumer brand preference. Thus, availability of the brand is highly affected for the consumer preference for particular milk brand. Under the brand attitude two statements were included which ask about brand loyalty and brand switcher habit of the consumer. Advertising, price and subjective norm do not significantly impact on brand preference although they have positive impact on the consumer's brand preference**.** When considering the brand preference 25 % of respondents within the sample preferred to purchase only imported milk brands and 24 % of respondents preferred to purchase only local milk powder. Whereas majority of the respondents (51 %) was preferred to purchase both local and imported milk powder without considering the origin of the product.

Recommendation

Product factors (taste, quality of the milk powder), availability of the brand and brand attitudes are the main factors which highly affect for consumer brand preferences of particular local and imported powdered milk brands. In order to promote milk industry, producers and marketers should consider on the above factors. There is a high demand for the imported milk powder brands due to consumer brand loyalty with their brands. Therefore, milk brand producers should make relevant strategies to maintain product quality and the trust of their brands. Availability of the brand is another major factor for the consumer brand preference. Poor availability of the local brands is a major issue for local milk brand consumers. The most consumers' brand switcher is occurred due to poor availability of their preferred local brands. Therefore, enhancing availability of brands, improving product factors, and creating safeness of local powder milk powder should be implemented to improve the milk powder industry.

Policy Brief 18

KEY MESSAGES

- Maturity, freshness and size of the products, solid non fat hygiene are preffered over labelling & packaging

- Water marked information and output price guarantee are the key areas to intervene to promote technology adoption

Authors:

R.M.P.R.Rajapaksha
U.K. Jayasinghe-Mudalige

Farmer Preferences on Product Quality Attributes and Key Policy Instruments to Promote Technology Adoption

Introduction

Due to the increasing human population with their life expectancy, per capita consumption of foods, per capita GDP and its growth rate, and reduction of poverty levels, domestic demands for foods in Sri Lanka are always on the rise. About 1.65 million smallholder farmers operate an average, less than 2 hectares.

Agriculture sector modernization and diversification are poor in Sri Lanka. Technology adoption is needed for diversification and modernization of quality attributes and policy instruments. Social scientists investigating quality attribute perceptions and key policy instruments perceptions from farmers to initiating or changing agricultural technology adoption policies and decisions.

There were two specific objectives in this research, namely, Identify the farmers' preferences for different product quality attributes of agricultural products and, Examine the policy instruments which farmers preferred to have in place to adopt technology to promote product quality in Sri Lanka.

Approach

The data were collected from a randomly selected sample of 650 farmers via face-to-face interviews using the pre-tested questionnaire in 14 districts. The survey questionnaire consisted of questions that were intended to collect information on personal information of farmers and farmer perceptions on different crop production and livestock produce quality attributes, and also key policy instruments which related to the agriculture sector.

The respondents were asked to provide ranks on a set of ten-point Likert scale statements to state their preferences regarding the attributes and key policies which need technology adoption. This was ranging from 'extremely good' (+10) to 'extremely poor' (0).

The collected data were analyzed using both descriptive and statistical analysis methods. The data gathered on quality attributes and key policies were analyzed using IBM SPSS statistical software (version 29) to identify the most farmer preferences quality attributes and key policies. The mean scores were taken for different categories by using SPSS statistical software.

Results

Crop Produce Quality Attributes arranged in the descending order based on the "Mean Attribute Scores". Judging by the Mean Attribute Scores given by the sample, the farmers were more concerned about the "Level of maturity, Freshness and Size of the product", whereas the least concern were regarding the "Packaging, Smell and Labeling of the Product".

Livestock Produce Attributes arranged in the descending order based on the mean scores given by the farmers. SNF content in the product (milk), Handling and Product hygiene and Pesticides/ Organic of the product were the farmers' highest preference Quality Attributes, whereas they were least concerned about the Packaging, Labeling and the Shape of the final product.

Given that "Key Policy Instruments" (Figure 1) are extremely important, when introducing such modifications to the agriculture sector, it is also important to know which areas the farmers consider as better above others. "Irrigation Water, Information on Market/ Price Conditions, Output Price Guarantee, Fertilizer Subsidy and Product Insurance" are the main aspects that the farmers have prioritized from the key instruments. These key policies were needed higher concern for technology adoption.
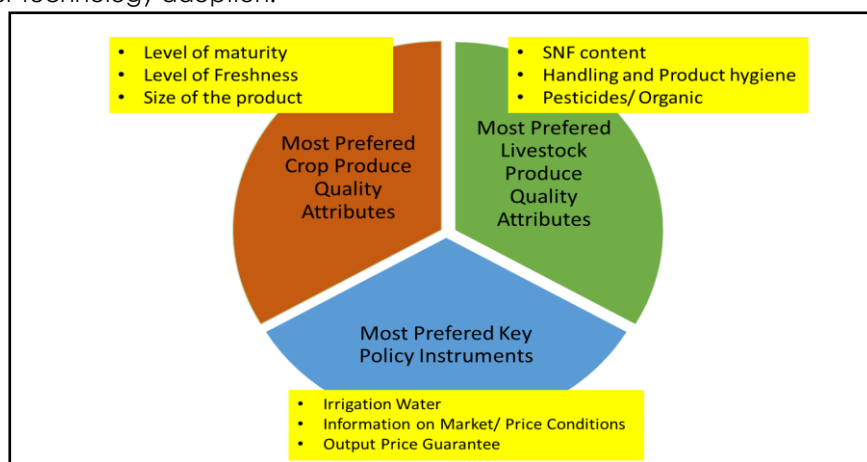
Figure 1: Key policy instruments

Recommendation

Technology adoption was affected for Quality Attributes to diversify the product quality, and technology adoption was affected by Key policies to modernize product quality & productivity. By Investigating highest farmer preference on key policy instruments & product quality attributes, government can promote technology adoption.

Policy Brief   19

KEY MESSAGES

- Trust and the health consciousness are the key factors that consumers concern when buying local milk powder

- Government should implement awareness programs to enhance the consumers knowledge in related to safeness of local milk powder

- Government intervention is essential to enhance the local milk powder production

Authors:

U.M.R.M.I. Senadeera
A.G.K. Wijesinghe

Factors Influencing the Purchase Intention of Local Milk Powder

Introduction

Milk and milk products have always been an integral part of Sri Lankan consumption habits. In Sri Lanka, there is a high demand for milk powder. However, controversial issues of imported milk powder have been able to move consumer preference towards the local milk powder brands. Nevertheless, in Sri Lanka the local milk powder industry is not very much developed.

Identifying the consumers' purchase intention attributes in related to the local milk powder is important to implement better strategies to develop local milk powder industry in Sri Lanka. As well as, that would be beneficial to promote the local milk powder products among the general public in Sri Lanka. The present study was conducted to identify how the product attitude, perceived knowledge, trust, price, availability, health consciousness and subjective norms influence local milk powder purchase intention of consumers.

Approach

Primary data were collected through a questionnaire survey by means of a face-to-face interview from a sample of 250 respondents covering five divisional secretariats in the Kegalle District. This study was administered at randomly selected supermarkets and outlets from five divisional secretariats.

Consumers were selected based on systematic sampling by interviewing of each third customer arrived to the supermarket. The questionnaire consisted of nine sections that are personal information about the consumer, product attitude, perceived knowledge, subjective norm, availability, price, health consciousness, Trust and Purchase intention of local milk powder products. Thirty-five items were used to assess these eight constructs other than personal information. All items in the questionnaire were assessed using a five-point Likert-type scale, ranging from 1 to 5, where 1 was denoted "strongly disagree", and 5 was denoted "strongly agree". Reliability of the instrument was calculated by using Cronbach's Alpha Reliability Coefficient. CFA was done to determine whether all observed variables (Indicator variables) properly reflect their underlying constructs (Latent variables) and whether the measurement model has acceptable fit to the data.

Results

Trust, and health consciousness significantly and positively enhance consumers' local milk powder purchase intention. Under the trust four statements were included which asked about the safeness of local powder milk processing, safe packaging, Safeness of transportation process and safeness of row milk collection. The results indicate that trust of local milk powder is the one of major factor that influence on the purchase intention. Health consciousness was measured by using five statements which asked about the harmful chemical residues (DCD, melamine), health problems (allergies) of the local milk powder and healthiness. Health consciousness also a factor which influence on the purchase intention. Product attitude, availability, perceived knowledge, subjective norms and price does not significantly impact on local milk powder purchase intention. This revealed that Sri Lankan consumers tend to buy local milk powder based on their trust on local milk powder and belief on healthiness of milk powder.

Recommendation

Consumer keep trust on local milk powder than imported milk powder. Thus, the producer has responsibility to maintain customer trust on their product. If producers can enhance the availability of local milk powder without any shortage consumer retention can be increased. Thus, establishing more milk collecting centers and encouraging milk farmers by implementing fixed price for milk could be a better solution for supply increasement. On the other hand, consumers have low knowledge about local milk powder. By making aware the safeness of local milk powder through advertising, promotion programs intercession with health ministry could be beneficial for increasing the number of local milk powder consumers. Technological improvements also important to develop the local milk powder industry.

KEY MESSAGES

- Continuous application of Chemical Fertilizer has degraded the agricultural soil

- Eco- Friendly Technologies are vitally beneficial over Chemical Fertilizer in numerous aspects

- With adequate guidance and support from responsible authorities farmers will prefer Eco-Friendly Technologies to replace Chemical Fertilizer

Benefits and Costs Associated with Use of Eco-Friendly Technologies

Introduction

Overuse of chemical fertilizer in paddy farming has caused many eco system and health problems in Sri Lanka. As a solution for the crisis eco-friendly technologies have been introduced as a product package containing of Bio Char and Bio-fertilizer. The study was carried out to analyse the farmer perception on eco-friendly technologies.

Approach

Benefits and Costs regarding EFTs and the potential Policy Tools, Incentives and Key Instruments were embedded into a classified and structured questionnaire. Farmers registered in the EFT project were selected as the sample and the data collection for the study was carried out in Anuradhapura and Kurunegala areas during August and September, 2019.

Authors:

A.P. Silva
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R.S. Dharmakeerthi
W.S. Dandadeniya
B.L.W.K. Balasooriya
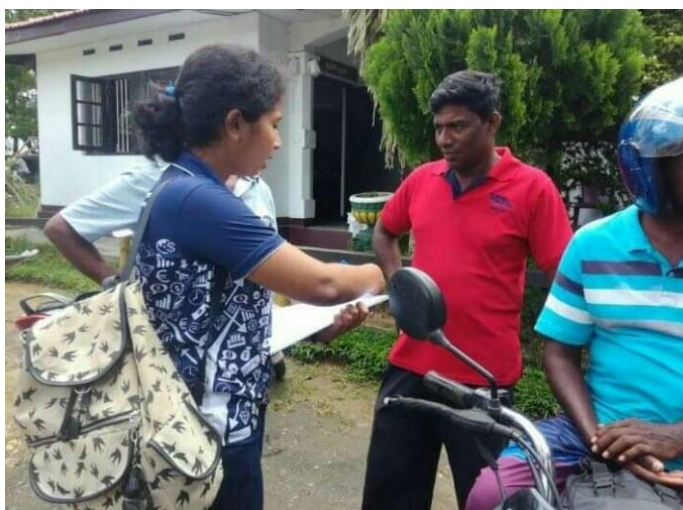
Statements including twenty implying benefits and costs and ten about policy tools, incentives and key instruments were given with mean importance scores to identify priotities of the farmers subjected to the study.
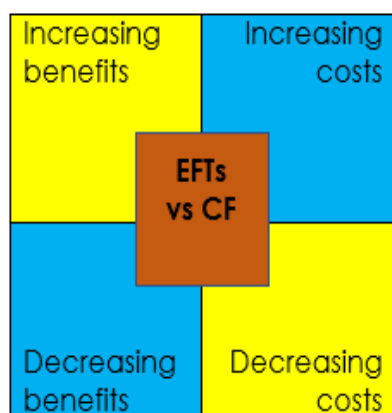
Figure 1. Classification of Benefits and Costs

	Price	Service	Market	Other
Government	7.83	8.01	8.07	6.77
Market	8.16	8.24	7.94	8.91
Judiciary	7.88	8.05	8.01	7.85
Self	5.01	8.41	6.21	5.65

Figure 2: Mean importance scores given by the farmers

Results

As per the perceptual analysis of the farmers based on the scores given for each statement, EFTs are beneficial over CF. Especially the high concerns on environment and in the development of Policy Tools, Incentives and Key Instruments the sample respondents have considered 'Hands on experience', 'training and capacity building' and 'market information' as highly important factors.

Recommendations

To set the platform to launch the product farmers should be given with required knowledge and resources as per the requirement. With the assistance of agriculture officers and officials farmers should be trained to adopt the EFTs over CF. Necessary steps should be taken to establish a proper system to disseminate market information. By securing the farmer mind set the EFTs could be successfully introduced to the market.

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KEY MESSAGES

- Climate change adaptations influence household food security at farm-level

- Most of the adaptive farmers are food secure than the farmers who are non-adaptive

- Social networks, exposure to climate changes, climate changes adaptation and education level have a significant and positive influence on farmers household food security

Authors:

S.D.P. Sithumini
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T.P.S.R. Guruge

Farm-Level Adaptation to Climate Change and Its Implications for Household Food Security in Sri Lanka

Introduction

Climate change stresses make farmer households directly and indirectly more vulnerable specially in terms of food security. In Sri Lanka, there are major three changes of the climate can be identified as gradual increase in temperature, increase in frequency of the rainfall pattern and severity of extreme weather events such as floods, droughts and winds. Sri Lanka faced a severe drought during last two years continuously. Seventeen districts out of twenty-five were in this situation. Anuradhapura district was one of the highly affected districts. They have not received any considerable rain during last two years. As a result, farmers couldn't cultivate and were unable to feed their families.

In this background, this study was aimed at investigating farm-level adaptation to climate change and its implications for household food security in Sri Lanka.

Approach

Cross-sectional data were collected by administering a pre-tested questionnaire via face to face interviews. A stratified sampling technique was used to collect data from 110 farmers in Anuradhapura district. Rambawa and Madawachchiya Divisional Secretariat (DS) divisions and five Grama Niladari (GN) divisions were selected from each GN divisions.

An ordered logistic regression was carried out in order to find out the influence of climate change adaptation at farm-level on the household food security. Household Food Insecurity Access (HFIA) category method was used to divide the farmers into four food security levels as, Food Secure (FDS), Mildly Food Insecure (MIFS), Moderately Food Insecure (MFS), Severely Food Insecure (SFI).

Results

The outcomes of the analysis revealed that most of the adaptive farmers are food secure than the farmers who are no-adaptive. The following graph shows the food secure groups for both adaptive and non-adaptive farmers separately.
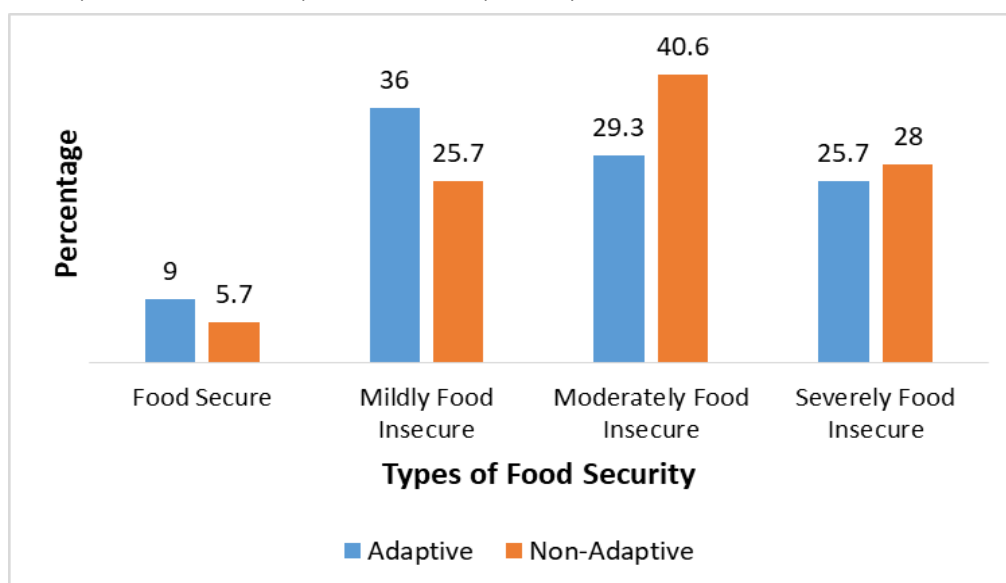
Figure 1: Level of food security of both adaptive and non-adaptive farmers

There were 75 adaptive farmers and 35 non-adaptive farmers in the sample. According to the results of analysis, a significant tendency can be seen in adaptive farmers than non-adaptive farmers. But a variation can be seen in mildly food insecure group. There are several reasons which can affect this particular variation such as, poor financial management or lack of knowledge about food security and nutrition.

Recommendations

The outcome highlights the importance of implementing climate change adaptation and mitigation activities that will ensure availability, accessibility and affordability of food for rural farmer households. Therefore, government intervention to monitor or to carryout awareness programs for households about climate change adaptation strategies. It is essential in order to improve the farmer's food security level. This study can be used to establish policies and regulations about adaptation and mitigation activities which helps to ensure the food security level of rural households in Sri Lanka.

KEY MESSAGES

- Standardized Precipitation Index (SPI) is a valuable tool for quantifying drought at different scales and is able to detect different levels of severities

- Models developed in this study can be used to forecast SPI for different scenarios

- Forecasts from ARIMA/ SARIMA and Exponential Smoothing best fitted models can be mapped to understand spatial distribution of the drought incidences in Sri Lanka

Authors:

N. Sivanathan
W. Wijesuriya
I. V. Kuruppu
H. M. L. K. Herath

Forecasting Drought Incidence in Sri Lanka: Application of ARIMA and Exponential Smoothing Models

Introduction

Drought is a deficiency of precipitation over an extended period of time, which results in shortages of water. Drought may start at any time and reach varying levels of severity. A major concern in Sri Lanka where precipitation levels are extremely variable. Prolonged periods of dry weather are not uncommon in the hydrological history of Sri Lanka; although the occurrence of droughts is not normally expected to be a characteristic feature of the climate of tropical island. In Sri Lanka drought occurs due to the delay of monsoon onset or the temporal variability of the rainfall. It can have a substantial impact on the ecosystem and agriculture of the affected region and harm to the local economy.

The Standardized Precipitation Index (SPI) is used as a drought index. This drought index is an essential tool for explaining the severity of drought events in Sri Lanka. These drought indices are mainly represented in the form of time series and are used in drought modelling and forecasting by using ARIMA and Exponential Smoothing models.

Approach

The precipitation details which are monitored at thirty weather stations are incorporated for calculating the SPI in different time scales: 1 scale, 3 scale, 6 scale, 9 scale and 12-month scale from year 1984 to 2018. The SPI values for different time scales were respectively calculated by following the SPI program of SPI Generator.

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The ARIMA model for the five scales of SPI series were developed in statistical software R by using "auto. arima" function. The exponential smoothing model for all the five scales of SPI series were developed in statistical software R by using "ets" function. The final best model selected based on forecasting efficiency was used to forecast for year 2019.

Results

The SPI has een calculated for 35 years at five different time scales viz.1-month, 3-month, 6-month, 9-m nth and 12-month to quantify both short as well as long term droughts. Annual minimum SPI-1 shows that in Agalawatta station it was -4.72 during November 2003. A minimum SPI at 3-month time scale for the station was observed in January, 2004 (-3.71). An extreme drought with lowest 6-month time scale SPI (-3.21) was observed in November 2016 for that station. In the station, minimum 9-month and 12-month SPI were observed during February, 2017 and May, 2017 with a drought magnitude of -3.15 and -2.48 respectively. According to the Dickey Fuller statistic and corresponding probability level in Agalawatta station, since all the test statistic are significant at 5% level of significance, we can conclude that all the five SPI series are stationary and does not need differencing.

According to the training model by ARIMA, Exponential Smoothing models that all series in Agalawatta station performed well in SARIMA model and Simple exponential smoothing with additive error (A, N, N) respectively. Once the data was validated, these both ARIMA/ SARIMA and Exponential Smoothing models were compared based on forecasting efficiency and the best fitted model for SPI 12 was ARIMA(2,0,3)(2,0,2) . The forecasts by using this best fitted model for SPI 12 represents by the following figure for the year 2019.
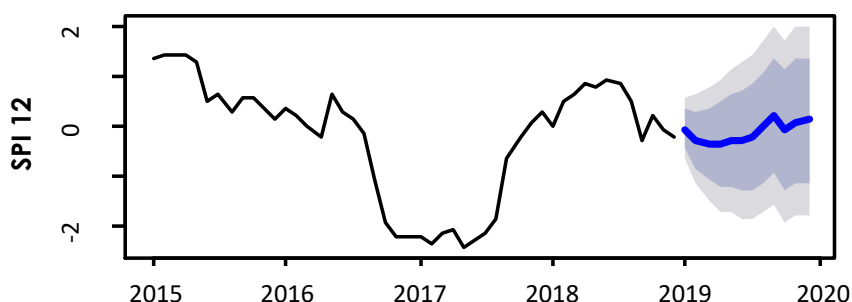
Recommendations

This study indicates that the SPI is a valuable tool tor quantifying drought at different scales and is able to detect different levels of severities. Further, this study investigated the ability of ARIMA/SARIMA and Exponential Smoothing models to forecast different droughts. The best fitted models found in this study can be used for predicting SPI time series of multiple time scales to detect the drought severity of thirty weather stations in Sri Lanka which is useful information for the local administration and water resource planners to take safety measures considering the severity of drought well in advance. Identification of drought condition is an immense importance for agricultural practices and therefore prediction of future drought assures the agricultural sustainability. Moreover, forecasts from these can be used for spatial interpolations and produce GIS maps (surface plots) which can better visualize the spatial distribution of different droughts in the near future.

Policy Brief   23

KEY MESSAGES

- '**Farm gate Price**' is a potential incentive towards a younger crowd rather older farmers

- Forward contracts between farmers and Colombo based wholesalers enhance the efficiency of the value chain

- Proper cultivation of 'Sri Lanka Jumbo' may reduce Chinese imports

Authors:

W. A. V. Sovis
I.V. Kuruppu
A. Jayakodi
H. M. L. K. Herath

Value Chain Analysis of Groundnut Production in Mulativ District

Introduction

It is evident that certain crops are not sufficiently produced in Sri Lanka to compensate the local demand at present. Hence, mismatch that occurs between supply and demand for food crops results in substantial imports from foreign countries. For groundnut, every need for the cultivation is fulfilled. But the production has not reached the maximum capacity. Not having a proper pricing mechanism, which focuses on producers, is identified as one of the key issues behind the problematic circumstance. To add, issues relevant to the pricing mechanism are ignored when it comes to enhancement of the crop production.

Hence, the underlying purpose of the study is to find out the practical issues on implementing a sustainable pricing mechanism for groundnut, with reference to the case of Mulativ district.

Approach

The approach of a Value Chain Analysis (VCA) was incorporated as the primary study method. This study approach facilitates a fine examination of the issue at each specific value point.

The study sample consists of various value chain actors (n=32), with purposive selection, who are involved with groundnut production in Mulativ district. Data collection was carried out as face-to-face and semi-structured interviews.

Calculation of Gross Market Margin (GM) and Index of Market Efficiency (MEI) were also performed.
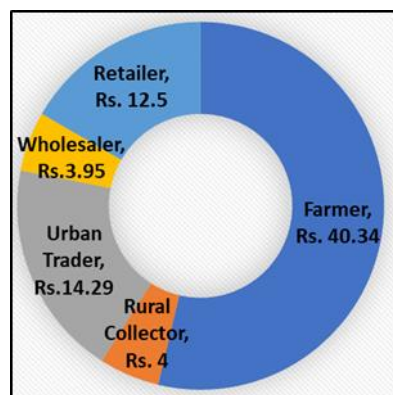
Figure 1: Gross market margin

Results

According to Figure 2, the value chain of groundnut simply elicits the common characteristics of a particular food crop. 'Channel 1' elaborates the traditional value chain, while 'channel 2' elaborates the emergence of an 'Alternative Channel' created via vertical integration tools (Forward Contracts). Channel 3 is a minor value channel exists as a result of under quality products.

Farmers records the highest GM (40.34%) among the value chain actors. (Figure 1)

Considering on market chains, the highest MEI figure (0.23) was recorded by the 'Channel 2'. (Figure 3)

Recommendations

The study highlights that 'farmgate price' is more recommended to use as incentive to the young farmers instead of the older.

Incorporation of vertical integration tools evidently enhances the efficiency of value chain of groundnut.

On the sideline, it is also revealed by the study that 'Sri Lanka jumbo' groundnut variety which was introduced as an alternative to Chinese groundnut varieties in 2015, is not cultivated properly due to lack of farmer awareness. Hence, it is recommended that farmer orientation for cultivating replacement varieties may also reduce foreign imports of groundnut, as a non- price related factor.
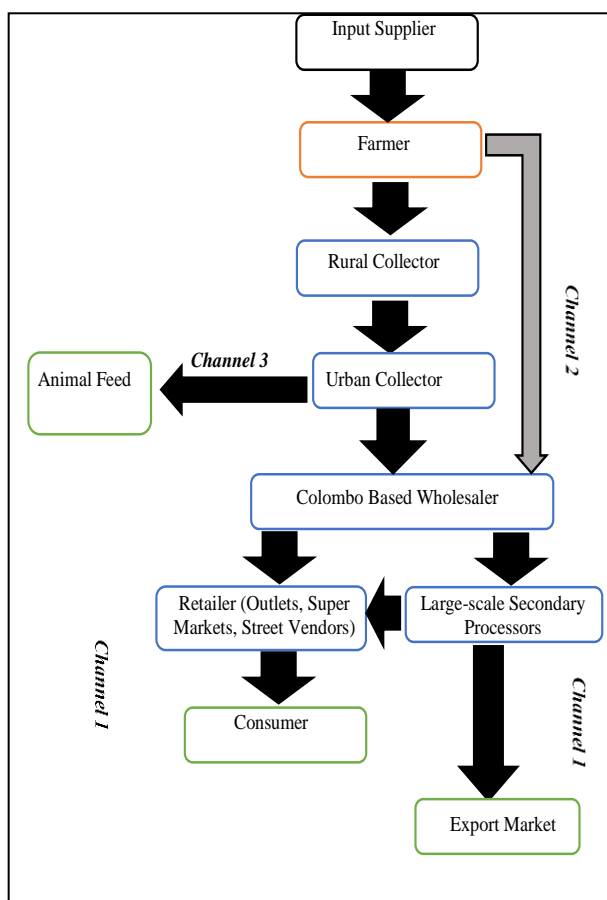
Figure 2: Value chain map
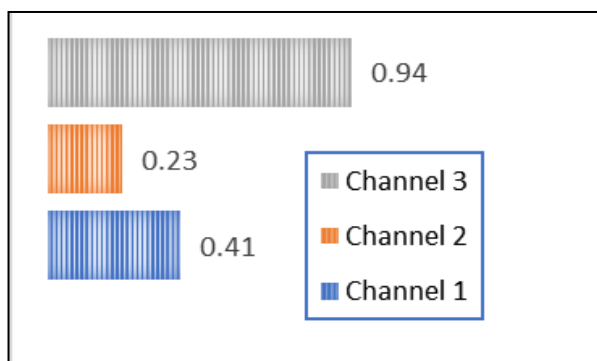
Figure 3: Index of marketing efficiency

KEY MESSAGES

- Key factors influencing the sea food trade value are GDP of importing country, population of exporting country, GDP of exporting country, trade agreements between two countries

- World seafood demand increases annually

- Trade agreements between two countries immensely support a successful seafood trade

Authors:

W.K.L. Weerakkodi
J.M.M. Udugama

Exploring the Determinants of Global Seafood Trade Using a Gravity Model

Introduction

The world seafood market accounted as U.S. $125.44 billion in 2017, $129.705 in 2018 and is expected to touch $155.32 billion by 2023. With the increasing population the need of food also increases. This study explores the factors influencing the international seafood trade (meat, fish and seafood preparations). Seafood is one of the broadly consumed food in the world. So, understanding some major factors affecting the seafood trade value is very important. In this scientific study, we look at the distance between two countries (DIS), trade agreements (TRA), GDP of exporting and importing countries (GDP_i and GDP_j), Population of export and import countries (POP_i and POP_j) and adoption of HACCP (ADP_i). Ten major seafood trading countries such as Sri Lanka, India, Bangladesh, Maldives, Pakistan and five of the world top seafood exporters such as China, Norway, Vietnam, Canada and Chile were selected for the study. According to the past studies, the impact of these factors on seafood trade have not yet been addressed. This study was conducted with the intention of addressing this gap in the literature and to propose recommendations for sustainable seafood trade.

Approach

Cross sectional secondary data were gathered on seafood trade for the year 2018. Those data were collected from the database available at the United Nations Commodity Trade Statistics Database (seafood trade values), world meters data base (population), International Monetary fund's (GDP) and CEPII database (distance Seafood production volumes were taken from www.statistica.com, Ministry of fisheries and resources development and some reputed companies.

The data were analysed using both descriptive and inferential statistics by using a gravity model approach with the SPSS software.

Results

When considering the impact of GDP of importing country, population of exporting country, GDP of exporting country, trade agreements between two countries, showed a significant impact and those variables affect trade values of seafood positively. When considering the effect of distance variable, it has shown a positive effect, but it is not significant (no relationship between distance and seafood trade values). In this study, countries such as China, Norway, Vietnam, Canada and some South Asian countries are the major seafood exporters in the world. Therefore, their techniques used in production processes are very effective. Hence, they trade or exchange large amounts of products so they do not concern much about the distance and adoption of HACCP of export countries is also statistically not significant.

Recommendations

The overall result recommend that the seafood trade value is positively affected by the GDP of exporting country, GDP importing countries, population of export countries and trade agreements with other countries.

Figure 1: Seafood production of world and Sri Lanka

Adoption of HACCP of export countries and distance between two countries also have positive sign but not statistically significant so there is no any relationship between trade value and the population of importing countries.

This result would be helpful to improve the seafood trade value. By using new safety adaptation methods (HACCP, GMP, BRC, and Friend of the sea) and creating new beneficial agreements (bilateral; agreements consist between two countries or multilateral; involve three or more countries) and all other variables/factors would be important for the development of Sri Lanka's seafood trade.

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KEY MESSAGES

- Rumassala sanctuary is identified as an ideal destination for eco-tourism

- The cost, distance and the quality of the park positively and significantly affect the visitation rates

- A consumer surplus of Rs. 9672 per person and a recreational value of Rs. 15797 per person was estimated

- The visitors were willing to pay a mean value of Rs.35 as the entrance fee

Authors:

N.P.M. Wijayanayaka
J.M.M. Udugama
T.P.S.R. Guruge

An Estimation of the Recreational Value of Rumassala Sanctuary

Introduction

Eco-tourism is defined as a responsible travel to relatively untouched natural areas that conserves the environment and improves the well-being of local people. It is one of the most trending revenue generating industries around the world. Rumassala, which is also considered as a protected forest reserve and a sanctuary since 2003 is situated in the south of Sri Lanka. It is an ideal destination for eco-tourism. Due to its unique locality surrounded by hills, forest and the beach, Rumassala is rich in biodiversity making it more attractive for tourists. This attraction itself along with overcrowding and low government budgetary allocation can lead to rapid resource degradation. Therefore, proper valuation of the resource is called for to understand the actual value of the area, if proper regulation and payment are to be enforced. Therefore, the aim of this study was to estimate the recreation value of the Rumassala sanctuary.

Approach

Data were collected from local visitors (n=125) through an on-site survey administering a structured questionnaire which mainly focused on three major areas as; socio-economic characteristics of respondents, respondents' recreational behaviour and willingness to pay. An Individual Travel Cost method was employed to estimate the recreation value, entrance fee as well as factors affecting the visitation rate. The data were analysed using an individual travel cost approach.

Results

Results show that the cost, distance and the quality of the park influenced the visitation rates positively and significantly. The results also revealed the estimated consumer surplus as Rs. 9672 per person. This shows that the value of the benefit that visitors gain through visiting Rumassala, and the recreational value to be Rs. 15797 per person. The visitors were willing to pay a mean value of Rs.35 as the entrance fee (Figure 1). Also; the study represented that the majority of the respondents visit Rumassala for the purpose of swimming rather than relaxing or sightseeing (Figure 2).
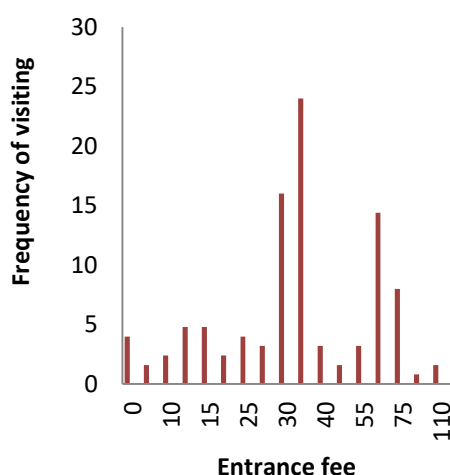
Figure 1: Visitor's Willingness-To-Pay
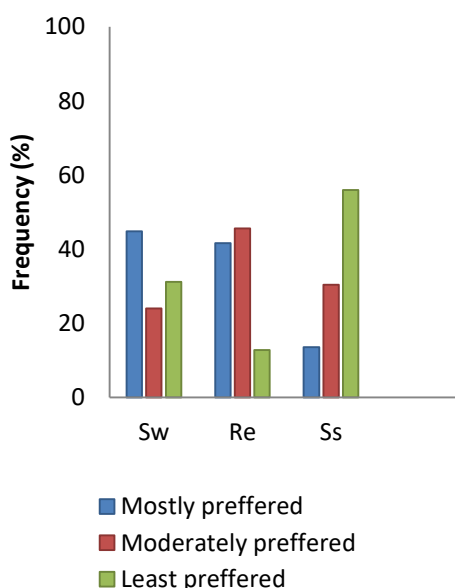
Figure 2: Preference for Recreational

Sw - Swimming, Re - Relaxing, Ss - Sightseeing

Recommendations

The government currently does not charge any entrance fee for entering this site. Therefore, imposing a calculated entrance fee of Rs.35 would be an optimum fee to generate funds enough for the management and conservation of the area. Rumassala is governed under the department of wild life conservation which has no records about the visitation rate of Rumassala. Issuing tickets may be helpful to generate new records on Rumassala. Also, this study estimates the consumer surplus and recreational value per person which can be can be taken for further studies.

Furthermore, the quality of the park, which is rapidly degrading also affects the visitation rate. Therefore, it is better to implement new policies to protect the quality of the site through practices such as prohibiting the use of plastic bags and polythene within the protected area.

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KEY MESSAGES

- Consumers trust on locally produced branded coconut oil is low. Thus, it is essential to build trust by implementing trustworthy labelling system and by providing reliable information certified by Coconut Development Authority

- Knowledge on locally produced branded coconut oil should be enhanced

- Advertising process directly influence consumer brand preference of branded coconut oil

Authors:

A.M.D.P. Hewawasam
A.G.K. Wijesinghe
K.H.M.I. Karunarathne

Factors Influencing Sri Lankan Consumers when Purchasing Locally Produced Branded Coconut Oil

Introduction

Coconut oil is the main source of dietary fat in Sri Lanka. In coconut oil industry, brand preference is more sensitive as compare to any other related industry. Numerous companies have been engaging in manufacturing and promoting of branded coconut oils in Sri Lanka. Therefore, consumers have a collection to select a branded coconut oil.

Understanding the consumer decision process to buy locally produced branded coconut oil is important to implement better policies for the development of the branded coconut oil market as well as promote the branded coconut oils among the general public. This study was conducted to analyse how brand attitude, advertising, availability, product factors, price, trust, knowledge, subjective norm and demographic factors influence brand preference for a particular coconut oil brand in the Sri Lankan market.

Approach

A structured questionnaire survey was used to gather primary data by means of face-to-face interview from a sample of 250 respondents covering randomly selected five divisional secretariats in Gampha district. All the respondents were selected based on systematic sampling by interviewing each 3rd customer arrived to the randomly selected five super markets representing 2 Cargills food cities, 2 *Sathosa* centers and one Keels super from each selected divisional secretariat.

COCONUT OIL BRANDS

The questionnaire was consisted eleven sections that are demographic information of the consumer, revealed information, Attitude, Advertising, Availability, Product Factors, Price, Trust, Knowledge, Subjective norm, and Brand preference of coconut oils. Twenty-four items were used to assess these ten constructs other than demographic information.

All items in the questionnaire were assessed using a five-point likert-type scale, ranging from 1 to 5, where 1 was denoted "strongly disagree", and 5 was denoted "strongly agree". Descriptive statistics were used to analyse the demographic factors of the sample. Ordered Logit (OLOGIT) was used in this study to identify the relationship among brand attitude, advertising, availability, product factors, price, trust, knowledge, subjective-norm demographic factors and brand preference.

Results

The highest mean value (4.88) towards brand attitude which indicates brand loyalty for the preferred brand. Advertising (mean= 3.71) was measured by using four statements which asked about the attractiveness of advertisement, celebrity endorsement and specific messages given by opinion leaders. The results indicate that advertising is the major factor that influence consumer brand preference. Subjective norm (mean= 4.86) was measured by using three statements which asked about influence by family, influence by friends, news and magazines. Consumers scored (mean=1.19) for the authenticity of the information on the label of branded coconut oil. Consumers scored 2.02 for indicators regarding the knowledge of branded coconut oil which indicates the knowledge of CDA certifications of branded coconut oil Brand attitude, knowledge, price, trust and product factors do not significantly impact on brand preference. This results indicates that Sri Lankan consumers tend to buy branded coconut oils based on advertising influences, availability and subjective norm.

Recommendation

Government intervention to monitor the processes in coconut oil productions, labelling and certification is essential to build trust among consumers on brand preference. Through that the Coconut Development Authority (CDA) can certify branded coconut oils by offering CDA certification on labels which represent clear information and quality to the customers. Credible labelling information can be given by displaying how coconut oils are processed and handled and the ingredients percentage in a product. Knowledge on benefit of locally produced branded coconut oil usage and coconut oil production should be enhanced by providing credible information through diversified channels to reach all consumers

Policy Brief   27

KEY MESSAGES

- Local and Foreign visitors are willing to pay more than the current prices for recreational activities and entrance fee

- Conserving the park for the future generation is a major reason influencing the willingness to pay

- Visitors (26.7% of local visitors and 24% of foreign visitors) do not trust the responsible authority for sustainable management

Authors:

W.D.D.A. Jayamanna
J.M.M. Udugama
T.P.S.R. Guruge

Willingness-To-Pay For Conservation of The Hikkaduwa National Park

Introduction

Hikkaduwa coral reef is the first Marine National Park and the first official marine protected area in Sri Lanka. This area which covers 44.5 ha was declared as a marine sanctuary in 1979. After 1998, it was declared as a nature reserve. At that time the protected area was extended to 104 ha and ultimately it was upgraded to the status of a Marine National Park in 2002. The park is situated in the Hikkaduwa coastal town in the southern province of Sri Lanka. The park offers several recreational activities for both local and foreign tourists such as glass bottom boat touring, scuba diving, snorkelling and surfing. Providers have set varying prices for each of these activities. There is no evidence to show how these prices were determined at the beginning. There is no proper evidence to justify whether they have incorporated the value of non-marketable resources to these prices. Thus, it is evident that the current prices do not reflect the actual resource value. Due to this reason, this study was carried out to revalue the aesthetic value of the park by estimating the actual value of the recreational activities.

Approach

Data were collected through face-to-face interviews using a structured questionnaire designed for contingent valuation, from both local visitors (n=90) and foreign visitors (n=70) who visited Hikkaduwa national park from August to September in 2019. Stratified random sampling was used to sample the population. The probit model was used to analyse the responses.

Results

Out of the local and foreign respondents the majority of the local visitors were males (53.3%) and the majority of the foreign visitors were females (54%). This study reveals that 90% of the local visitors and 91.5 % of foreign visitors are willing to pay an increased entrance fee for the conservation of the park. Results revealed that local visitors are willing to pay Rs.30 as the entrance fee and foreign visitors are willing to pay 4 USD as the entrance fee for the park. Further, findings show that local visitors' willingness to pay for recreational activities such as snorkelling, glass boat tour and surfing are Rs.757.00, Rs.1638.00 and Rs.1292.00 respectively. The foreign visitors' willingness to pay for these activities is USD 16, USD 29 and USD 17 respectively. There are several reasons that affect the visitors' willingness to pay. Out of the respondents, 61.1% of local visitors and 35.5% of foreign visitors were willing to pay an additional amount to conserve this park for the future generation (Figure 1).
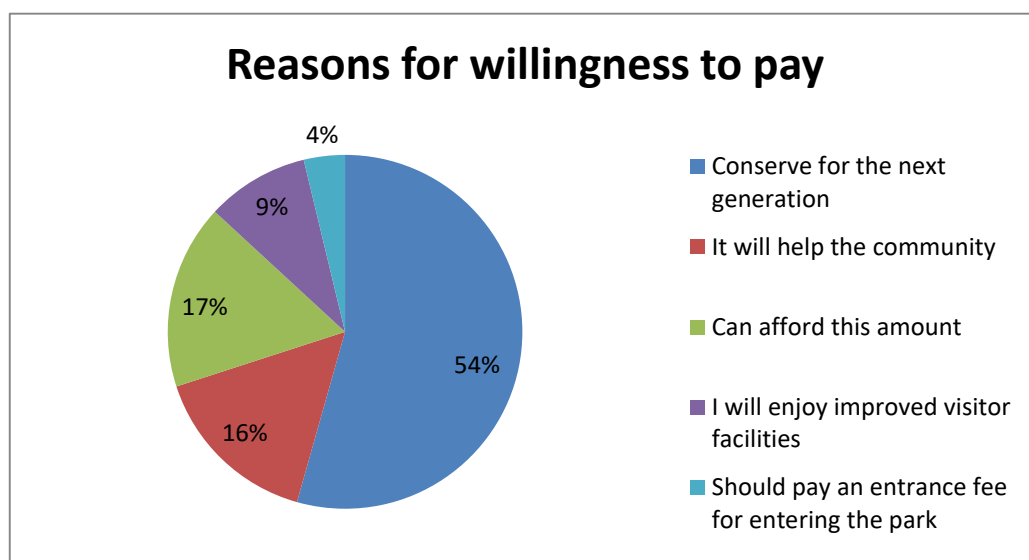
Figure 1: Reasons for willingness to pay

Recommendations

The study reveals that the local visitors are willing to pay Rs.30.00 as an entrance fee while foreign visitors are willing to pay 4 USD. Following this finding, the wild life conservation department can establish a new entrance fee system for the park.

The analysis shows that as both local and foreign visitors are willing to pay more, higher prices will generate more revenue for the park that could potentially be used for conservation and park improvement initiatives.

The study reveals that both the local and foreign visitors are willing to pay more than the current activity prices considering the conservation purpose. As a result, wild life conservation department can establish a new funding system for the conservation of the park.

Policy Brief 28

KEY MESSAGES

- Empowerment percentage in Puttalam district is 29.37%. in agriculture sector

- Most of the household are having male dominant management in the house

- Women participate in different agricultural association, but they don't have leadership and speaking ability in front of the community

Authors:

G.R.A.L. Jayasekara
N.R. Abeynayake

Women's Empowerment in Agriculture Sector in Puttalam District

Introduction

Women in Sri Lanka are approximately 52% of a total estimated population of 21 million. As per the Sri Lanka Labour Force Survey, distribution of employed population by main industry & gender in first quarter of 2019, women in agriculture, industries and services account for 24.7%, 28.3% and 47.1%, respectively. This study was carried out to measure the empowerment of women engaged in agriculture in Puttalam district by developing an index. This index measures the roles and the extent of women's engagement in this sector in five domains: decisions about production, access to and decision-making power about productive resources, control of use of income, leadership in the community and time allocation.

Approach

Data were collected through a survey administrating a well-structured pre tested questionnaire. It consisted of soliciting information about the five domains of empowerment. Data were gathered in several ways from households and individuals.

One hundred and sixty (160) individuals in the agriculture sector in Puttalam district were selected for the survey based on the multistage sampling method. A robust multidimensional methodology which is also known as Alkire Foster method was used to evaluate the empowerment.

Results

According to the empowerment score, 70.63 % of women were not yet empowered in agriculture sector. Therefore, it is clear that only 29.37 % of women were empowered in the agriculture sector. Based on the contribution by the dimension of the disempowerment measures, highest percentage was "leadership in the community" (37.95%). Out of the two indicators in resource domain, highest percentage was recorded by "Group Member" (22.26%). Lowest percentage was recorded by "Control of Use of Income" (5. 06%).

Statistics	Leadership		Time		Income	Production		Resources		
	GM	SP	WL	L	CI	IPD	AP	OA	PSTA	ADC
Censored Headcount	0.588	0.413	0.069	0.081	0.200	0.063	0.325	0.531	0.344	0.575
Contribution to M_0	0.059	0.041	0.007	0.008	0.013	0.006	0.033	0.035	0.023	0.038
Contribution of M_0 (%)	22.26	15.64	2.61	3.08	5.06	2.37	12.32	13.43	8.69	14.53
Contribution by Dimension (%)	37.95		5.68		5.06	14.69		36.65		

Table 1: Decomposition of five domains of the disempowered index by domains and indicators

Note: GM - Group Member, SP - Speaking in Public, WL - Workload, L - Leisure, CI - Control overuse of Income, IPD - Input in Productive Decision, AP - Autonomy in Production, OA - Ownership of Assets, PSTA - Purchase, Sale or Transfer Credit, ADC - Access to and Decisions on Credit

Recommendations

The outcome of this analysis emphasized key areas in which empowerment needs to be strengthened and identified the key areas where empowerment gaps exist. Most of the women show a limited participation in decision making and afraid to lead agricultural associations. It can be proposed to conduct awareness programs to increase decision making abilities and the communication skills of women.

Policy Brief   29

KEY MESSAGES

- Selected sample has mean revenue efficiency of 84 %, so need to improve efficiency by 16 %

- Extent play a key role in obtaining higher revenues. Should promote replanting and utilizing abandoned tea land

Authors:

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Economic Efficiency in the Tea Estate Sector: A Case Study from Dimbula Tea Region

Introduction

Sri Lanka is the fourth world's largest tea producer next to China, India, and Kenya. Being the main agricultural export crop around 150 years, it contributes to the Sri Lankan economy in a significant manner by holding the position of second largest net foreign income earner contributes around 2 % of the Gross Domestic Product (GDP) and contributes directly & indirectly 10 % of employment. But recently Sri Lanka's tea production shows a moderate decline pattern and the export trend is also declining. And the burning phenomena is average price is fallen below the average cost of production causing low profits. Meanwhile contribution to total tea production from the tea estate sector is around 25 % and from the smallholders it is 75.5 % and compared to the smallholder sector tea estate sector is facing many challenges. The high cost of production, scarce of labor, price fluctuations, maintenance, etc. Therefore, it is vital to increase performance of estate sector to enhance Sri Lankan tea industry. Despite having aforementioned constraints some estates maintain their performance level and it is essential to analyse how some firms able to be efficient while others are not. Hence this study aims to analyse variability in the efficiency performance and determinants of revenue.

Approach

Purposively selected seven tea estates in Talawakelle region in Dimbula tea planting district

Extracted required production data (greenleafamount,NSA,Extent,labor,Chemical and fertilizer cost) from estate monthly accounts from 2005 to 2018

Page 57

Results

According to estimated results mature area, extent, NSA and labor significantly affect to the revenue of the tea estates. Which means, when mature areal extent is increased by 1 % revenue will be increased by 1.4 % so the proportionately large amount of revenue can be gained by increasing extent. In this way one percent increments of NSA and labour will increase 0.76 % and 0.072 % of revenue respectively. According to the values obtained, chemical and fertilizer cost do not affect the revenue increment. The following graph shows efficiency levels of selected sample. Predicted results indicate that selected sample is 84 % efficient in selling outputs. And imply that still they need to enhance their performance by 16 %. This graph shows that even though the mean is 84 %, maximum is 96.92 % and the minimum is 68 % showing that inefficiency range is 31.97 % to 3.08 %.And implies that, although the economic conditions and production technology is common for the all firms, performance levels are vary. Some firms are below the average efficiency level some are high.
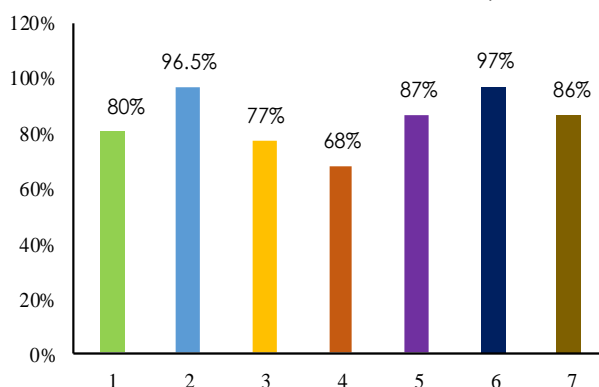
Figure 1: Efficiency Levels for Each Firm

Conclusion

As per the results revenue, extent, NSA and labor influence to the revenue increment. The relatively large impact can be done by increasing mature area extent then NSA. Selected sample shows a mean efficiency level of 84 % indicating that firms need to enhance their performance by 16 %.But still some firms have not achieved even the mean efficiency level while some have achieved higher than the average level.

Recommendation

As extent shows importance in production, Replanting should be promoted. Replanting subsidies might be a useful incentive for this. Secondly, policies to re-cultivate an abandoned area such as outsourcing these areas to outside parties or the labors of the same estate could be done. As higher NSA increase revenue, producing high grades should be considered. Firms can increase efficiency by 16 % on the average without any additional cost.

Policy Brief

30

KEY MESSAGES

- Local community highly contributes in managing marine protected areas

- Local community contribution is effective when managing MPAs

- Government incentive programs are helpful to increase the contribution of the community

Authors:

H.M.A.M. Rathnasiri
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Assessing the Preference of the Local Community for Conserving the Hikkaduwa Marine Protected Area

Introduction

Marine Protected Areas (MPAs) are widely used tool for marine resource management. These MPAs provide benefit for fisheries, local economies, and the marine environment. Conservation of biodiversity and ecosystems, increasing fish populations by protecting critical breeding and raising the profile of an area for marine tourism are the benefits which arise from the MPAs. Fishing, tourism, aquaculture like supporting industries has also increased the beneficiaries and access to the marine environment. Increasing the users of the marine ecosystem creates negative consequences for living organisms and the marine environment as well. Therefore, the marine ecosystem can be threatened, unless proper management actions are taken.

This research study deals with the local communities' (Hikkaduwa marine protected area) 'willingness- to- pay' for different conservation options in order to make better decisions with regards to optimal marine resource management.

Approach

In order to elicit the choices and how much villagers are willing to pay for different conservation options, choice experiment was carried out (Figure 1). The study was carried out with villagers who are in Hikkaduwa town, Hikkaduwa west and Narigama Grama Niladari (GN) divisions. Sixty households were randomly selected from each GN division making up a total sample of 180 households. Apart from the choice experiment, data were collected by administering structured questionnaire-based face-to-face interviews during the period of August to September.

	Choice 1	Choice 2	Choice 3
Boat hour for coral watching	20 minutes	30 minutes	40 minutes
Management	50%, government based, 50% community based	100% government based,	100% community based
Sea urchin control	50% control	No control	25% control
Monthly payment(Rs)	25	0	50

Figure 1: An example of a choice card

Results

The highest willingness to pay value is Rs. 27 which was taken by 25% control of sea urchin compared to the 50% control. When considering the boat hour attribute, higher willingness to pay value was given for 40 minutes boat hour for watching corals. This amount is Rs 14. For 20 minute boat hour, the willingness to pay value is Rs.6. When management attribute considered, they responded with a willingness to accept value because people do not like to pay some amount for it. In Hikkaduwa marine protected area, four environmental services can be seen. Those are biodiversity, sea turtle conservation, fishing and recreational activities. When ranking these services, according to their occupation (fishing & non-fishing), fishing people rank biodiversity and sea turtle conservation as important services. They have proved it by giving first place for both services. Still, people who are engaged in non-fishing (mainly tourism) have considered turtle conservation to be a fundamental service compared to other services.

Recommendation

This study highlighted that the local community of Hikkaduwa marine protected area is willing to pay for the conservation of that area. They were involved in both fishing and non-fishing activities. Majority of the people are engaged in tourism and they prefer to receive enhanced tourist attraction further. Currently these areas are managed by the government. If local communities acquire more benefit, they prefer to sacrifice for conservation more than the current condition. When considering the willingness-to-pay values, people pay higher willingness-to-pay value for sea urchin control. Because villagers complain that these sea urchin populations has increased recently due to poor knowledge of the government. These sea urchins eat the corals and their spines are poisonous. Due to that reason, tourist avoids the place where these species are present. If the government is able to control their population, not totally, but to some degree it is good for conservation of these areas. Most of the time, glass bottom boats damage the corals due to the leakages of kerosene oil. If government can introduce an alternative for kerosene oil boats, it helps to keep corals alive sustainable for a long time.

Policy Brief 31

KEY MESSAGES

- Consumers consider price as an important factor in buying fast food

- Perceived convenience was the major factor that influence on the consumer willingness to purchase fast foods

Authors:

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Factors Influencing Fast Food Consumption

Introduction

Rapid urbanization coupled with busy lifestyle with professions and advancement in technology has greatly changed the way of life of many people both in urban and rural areas in developing and developed countries. These changes have affected the cooking and eating traditions at home. In the meantime, fast foods are very popular among daily sustenance while people are more reliant on ready-to-eat meals, especially taken on the way home or having them from outlets on the way to working places.

The popularity and success of these places are depending on the demand of consumers over the place, quality, attraction, hygienic level, price, genuineness and condition maintained by the keepers. Unlike in the past, the fast food concept has become a profitable enterprise and an easy spreading art in the local society. Earlier the fast food outlets were very low in number and popular with youngsters but today the situation has been changed everywhere.

This research was focused to study how, demographic factors, perceived convenience, and health consciousness influence willingness to purchase fast food.

Approach

A structured questionnaire survey was conducted to gather primary data from the study population. Thus, this study was administered at randomly selected households from each selected Divisional Secretariat. Five Divisional Secretariats were selected randomly. Data was gathered from 250 respondents from the households.

The instrument for primary data collection was a structured questionnaire to ascertain information on (a) Demographic factors of the respondent (b) Perceived convenience of fast food consumption (c) Health consciousness (d) Willingness to purchase. Fifteen items were used to assess these three constructs other than personal information.

All items in the questionnaire were assessed using a five-point Likert-type scale, ranging from 1 to 5, denoting, 1= "Strongly Disagree" and 5= "Strongly Agree". Confirmatory Factor Analysis was used in this study to examine the proposed model by using Analysis of Moment Structure (AMOS) in SPSS 24 version. Confirmatory Factor Analysis (CFA) was carried out to determine whether all observed variables (Indicator variables) appropriately reflect their underlying constructs (Latent variables) and whether the measurement model has acceptable fit to the data. MINITAB 15 was used to analyse the association between demographic factors and variables.

Results

This study demonstrates that perceived convenience was significantly and positively effect to consumers' willingness to purchase fast foods. Perceived convenience measured by using six statements which asked about easiness, price, quickness, dislike of preparation foods themselves, little effort to clean-up and wider selections. The results indicated that perceived convenience was the major factor that influence on the consumer willingness to purchase fast foods. The results indicate that health consciousness does not significantly impact on willingness to purchase fast foods. Mainly consumers consume the fast foods because of Perceived convenience.

Recommendation

Fast food restaurants have become a good business opportunity. Self-employees can improve their business by producing good quality fast foods. Majority of the consumers consider price is an important factor when buying fast food. Fast food chains can develop marketing strategies by focusing more on the employed and unmarried consumers.As respondents are much price conscious fast food chains can develop flexible pricing schemes for the progress of the industry. When introducing new food items to the market fast food chains should focus more on the nutritional value and health status where they can be more transparent regarding the ingredients which have been included into the food items.

Policy Brief 32

KEY MESSAGES

- Most consumers are willing to pay a premium for organic foods

- Warm glow, Social and peer effects and monthly income influence willingness to pay and purchasing behaviour of organic foods

Authors:

H.W.H.L Sandeera
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Factors Affecting Urban Consumers' Green Consumption Behaviour: What are They Paying For?

Introduction

Organic foods are processed with a farming system that avoids the use of Synthetic pesticides, herbicides and fertilizers. Soil and ground water pollution are the main environmental effects of pesticides. Most fertilizers and other agrochemicals affect badly on insect life cycles. It causes the breakdown of environmental equilibrium. Therefore, today, organic food and organic farming has become a global need. These foods also do not contain any artificial ingredients or preservatives. If foods are labelled as 100 % organic they cannot be irradiated or contain Genetically Modified Organisms (GMOs). Organic meat, eggs and Poultry products come from animals that are given no antibiotics, growth regulators or livestock feed additives. All artificial colourings and sweeteners are also banned in organic foods. When organic products come with the organic label certification, it increases the consumer intention to purchase organic food products. This research study deals with consumers' willingness to pay for organic foods.

Approach

To elicit what factors affect the willingness to pay and the purchasing behaviour of organic food, a structured questionnaire based survey was carried out. One hundred and ten consumers were selected as the sample using stratified random sampling technique. Data were collected from urban supermarket customers in Colombo and Gampaha districts from August to November 2019.

Attitudinal statements reflecting influencing factors were provided to the respondents. The results were analysed using a Probit model.

Results

A majority of consumers (81%) were willing to pay more for organic foods, however 19 percent of consumers refused to pay any additional payment for organic foods even though it is healthy and environmentally friendly product. When consumers concern about environment (Altruistic) they tend to purchase organic foods more and they are willing to pay more for organic foods. Most of the people concern about their family members when they buy foods. Especially they concern about their children. Because of that most consumers tend to buying organic foods, and it is not depending on their educational level, age or gender for majority of consumers (77.7%) main motivation for buying organic foods was health concern rather than any other factors. The second most driving factor was the price of the product (Figure 1).
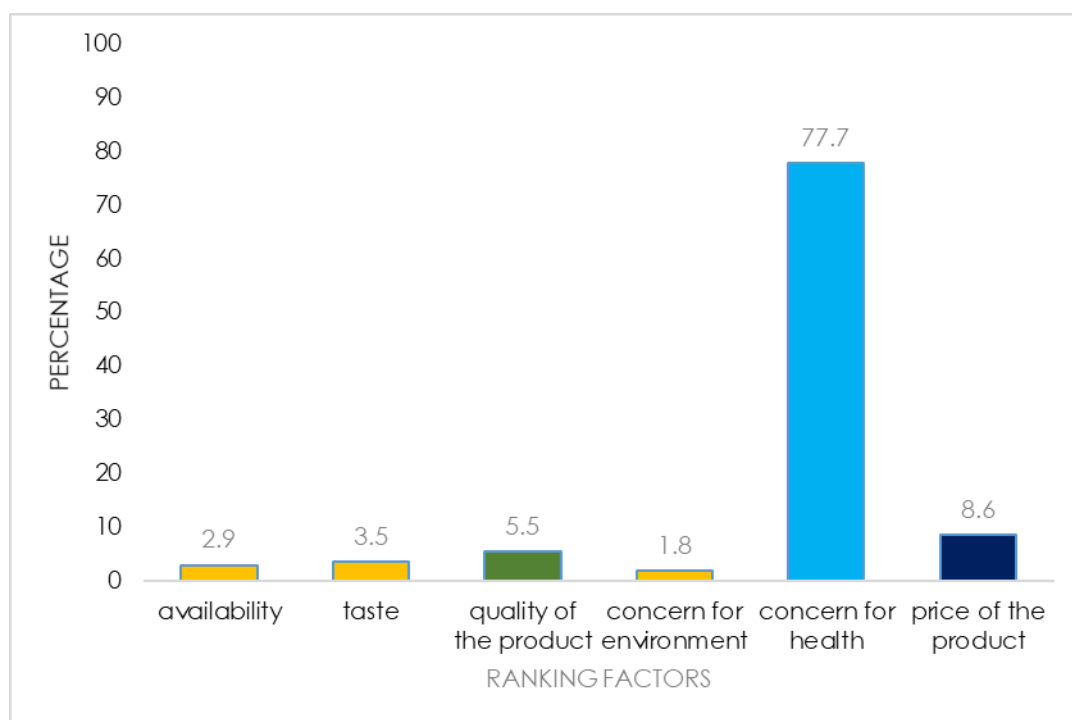
Figure 1: Factors affecting organic product consumption

Recommendations

Findings of this study can be used to highlight some important food marketing and policy related decisions. It further shows that it is a timely need to introduce new marketing strategies to expand the market segments in organic foods in Sri Lanka. And these results can be used to identify the consumer perception and willingness to pay a premium for organic foods and can provide organic foods without damaging the existing demand.

Policy Brief 33

KEY MESSAGES

- Green spaces available in residential area helps to improve quality of life of residents in apartments

- Government and private construction projects pay attention for sustainable development and conservation of urban green spaces

- Residents preferred low distance to the nearby green spaces

Authors:

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Residents' Willingness-To-Pay for Green Spacing Mechanisms in High-rise Apartments

Introduction

Migration of people into urban area has been increased, while Colombo is the city in Sri Lanka which has high dense of population. Green spaces located in urban areas have been minimized because of the apartment construction projects. This study is conducted to assess willingness to pay of residents who live in Colombo metropolitan area for establishment of green spacing mechanisms and conservation of green spaces.

Approach

Primary data were collected from 88 residents who willing to support the survey. Structured questionnaires were given by Face to face interviews. Eight sets of choice cards, each with 2 options were given and asked to select best preferred option. An example choice card was given in Figure 1.

Attribute	Choice 1	Choice 2
Knowledge on green spacing	Low	High
Availability of space for physical activities	Less than 1.5m^2	Greater than or equal 1.5m^2
Indoor air quality & noise level	Unacceptable	Acceptable
Distance to the nearest green spaces	Less than or equal 1.5km	Greater than 1.5km
Designing new or development of existing mechanism to establish green spaces	By developer	By own
Management fee	6000	5000
Preferred choice		

Figure 1: Example of a choice card

Results

Results obtained from the analysis of data were shown in figure 2. Residents' willing to pay highest value for the distance to the nearest green space.

Provide chance to interact with Nature and help to build relationship with neighbours

Provide facility to do physical activities at apartment premises

Distance to the nearest green space

(Rs. 1696)

Available space for person

(Rs. 1000)

Outcome of choice experiment

Help to implement suitable green spacing

Knowledge on green spacing

(Rs. 139)

Way of designing green spacing mechanism

(Rs. 25)

Improve quality of the green space design

Willingness-To-Accept (WTA): Air quality & noise level **(Rs.-266)**

Figure 2: MWTP values by the residents for green spacing mechanisms

Note: MWTP- Marginal willingness-to-pay values per month

Residents are willing to pay for given attributes and they are willing to accept the feature, air quality and noise level, when it giving without any charge. By giving highest MWTP value for the distance to the nearest green space, they prove that they require sustainable development.

Recommendations

This study elicit that the residents have positive attitudes toward implementation of green spacing mechanism in their apartments. Connect to the natural environment reduces stress level and improve health. Having green spaces like parks and garden helps to connect with neighbours and build relationship with them. Establishment of green spacing mechanisms in apartments cause to sustainable development of urban areas.

Policy Brief

34

KEY MESSAGES

- Incubation concept is the most successful method for developing MSME's worldwide

- Distance to Incubation centre is one of the main limiting factors to use incubation centres

- Strategic location of centres should be given priority when setting them up.

Authors:

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Are Incubation Facilities Efficiently Utilized by Small Entrepreneurs?

Introduction

A great attention has been given by the Sri Lankan government to develop micro, small and medium micro, small and medium enterprises (MSME) sector which are considered as the backbone of the economic growth. The Incubator and Technology Transfer Centre (ITTC) at Makandura was opened in October 2017 with the view of providing the state support for the MSME business growth activities. The main purpose of the centre is to evaluate the businesses and then facilitate them with the start-up requirements. MSME might require certain machinery, workspace and other aspects that are crucial at the initial stage. Thus, the ITTC would look into matters to make sure that the parties will achieve the desired long-term results in terms of the business management and start-ups' performance. The ITTC at Makandura offers facilities to small enterprises such as giving the total solution for packaging & manufacturing, physical space, technical assistance, business management services and financial linkage. Focus areas of the centre are food related product and services such as dairy processing, extruded products, bakery sweets, spices, proceed fruit products, proceed vegetable fruit and cereal products.

Approach

Primary data were collected through a survey using a structured questionnaire from a sample among small entrepreneurs in Kurunegala, Puttlam and Gampaha districts. Descriptive statistics were performed to analyse five socio economic and demographic factors that were utilized to identify incubation facilities among small entrepreneurs. Multiple linear regression analysis was employed to find out the relationship among factors before visiting to the centre. The areas and factors that are considered by respondents before doing a trial indicate by percentages.

The incubation facilities related factors that should be developed were identified using scores for the effective utilization of the facilities provided by the centre.

Results

The sample indicates that the factors identified by this research are not related to any specific gender. But effects on both. It indicates 38% of the respondents were between 46 - 55 years and this is the highest represented category. Seventy-five percent of the respondents have started the business and the business operations were ongoing. Out of all, 26% were related to sweet products while another 21% were spices-based businesses. Thirteen of the businesses was related to the processed fruit products as well. Usefulness of machinery, efficiencies of machinery, service coordination, cleanliness of machines, cleanliness of the centre, and legal issues affect on decision to visit the centre. Only 26% of the respondents have done trials at the centre. One of the main reasons for the trials was lack of capital issues and fair charges of the centre. Thus, these are some of the key areas that would drive entrepreneurs to carry out trials. The trials should indicate if these machinery remains capable of meeting of the customer expectations. (Figure1). Transportation related issues were viewed as one of the prominent reasons that the parties would not want to use that machinery. Analysis elicits that, centre need to focus on

Figure 1. The key issues (Trials)

developing sections including Usefulness of machinery, Efficiencies of machinery, Knowledge of the officers, Service ordination, Maintenance, Cleanliness, Cleanliness of the centre, Knowledge about the Centre and Environmental issues.

Recommendations

According to the research findings, it was evident that providing solutions and developing the above mentioned section will appropriately attract more entrepreneurs and increase their level of satisfaction towards the facilities provided by the centre. Based on the research findings, in general, it can be suggested that the above mentioned criteria and their efficiency must be considered when installing more centres related to the MSME field in the future.

Policy Brief   35

KEY MESSAGES

- Mobile apps increase the efficiency of agribusiness activities in modern world

- Several mobile applications were found related to agribusiness activities in Sri Lanka

- Only 11% of smart phone holders use agribusiness apps among respondents

- Enhance government intervention to give awareness about agribusiness apps for farmer community

Authors:

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Attitude of Farmers Toward Usage and Problems in Accessing the Agribusiness Mobile Apps

Introduction

The growth of the agricultural sector is important to the economy of the country. Now agriculture has been commercialized. It is important to create technology related infrastructure for effectiveness and sustainability of the agribusiness sector. Hence, mobile applications are the best amiable technological tool to share information among stakeholders in agribusiness sector. It increases the dynamic nature of trading transactions while improving activeness of the local market and export market.

There are two main parties related to agribusiness network, namely, technology providers and stakeholders in the agribusiness sector. Digital infrastructure facilitates in decision making through mobile apps which are developed to provide diverse information for the agribusiness sector. Technology viability of the agribusiness sector helps technology providers to enhance the attention and investments towards them. On the other hand, more people attract and penetrate to the agribusiness sector, thus, agribusiness activities are well functioning. But both parties have specific opportunities and barriers. It is vital to explore barriers and opportunities of in introduction of mobile apps to the sector. Present study identifies barriers and opportunities to use of mobile apps in the agribusiness sector and ways of finding solution for barriers.

Approach

Primary data for the study were gathered from a sample of 200 respondents who use a smart phone in their farming business. Puttalam including Kalpitiya divisional secretariat was an intensive agricultural area. The main instrument was a structured questionnaire which was developed with the help of National Agricultural Information and Communication Centre (NAICC). Questionnaire was consisted with 3 sections namely, socio economic factors, social problems related to none use of agribusiness apps and technical features of selected two popular agribusiness apps Namely; Govipola and Yield Price SL (YPSL).

Technical featuring questions were designed with Likert scale ranging from strongly disagree 1 to strongly agree 5. Associations among factors were analysed by independent Chi-square test and Likert scale data were analysed by Kruskal-Wallis test by using Minitab.

Results

According to the results, only 11% of the respondents used agribusiness apps while 89% of respondents did not use any agribusiness app. When looking for the reasons for not accessing agribusiness apps by majority, seven social problems were identified as in figure 1. Unawareness of apps and not interest on apps were highlighted among above mentioned social problems. The outcome of the statistical analysis revealed that age and the education level of respondents have made an impact on unawareness and also age, education level and years of experience have made an impact on low interest on such apps.

Out of the respondents who currently use mobile apps, 8% use Govipola app, 3% use yield price SL (YPLS) app while 1% use both apps. This implies consumers are not just looking for market information, they are pointing to the need of a virtual market. Customers evaluated technical features according to the application they used.

Figure 1. Social factors related to unuse of agricultural mobile apps

p1-unawarness of apps, p2-unfamilirity of internet p3-computer literacy related problems, p4-financial problems, p5-language barriers, p6-lack of digital infrastructure, p7-low interest of such apps

The results revealed that regular updating and user friendliness is not in the Govipala app in adequate level. However, the most preferable feature of Govipola app was indicated as download easiness. Inadequate information in YPSL was indicated as the main problem and the most preferable technical feature in YPSL app was indicated as user friendliness.

Recommendations

It is recommended to enhance, government, co-operate sector, community groups, NGOS' intervention on awareness and facilitate on modern technology trends such as mobile applications to senior citizens and people who have been working in agribusiness for a long time. Further, inclusion of knowledge to school syllabus and other courses to promote agribusiness sector through mobile apps can be done. More importantly fFarmer and trading communities should be strengthened to adopt digital culture.
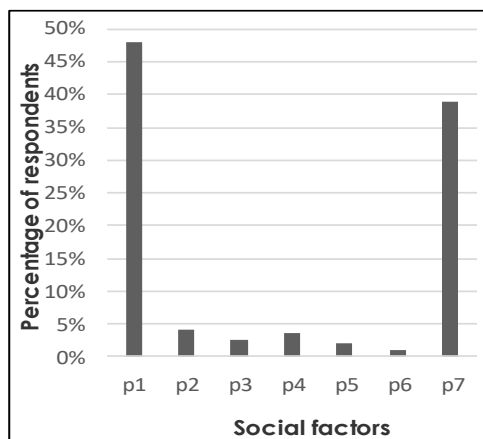
Policy Brief   36

KEY MESSAGES

- A dividend paid by companies is supposed as a factors impacting on stock price movements

- Dividends are not significant in controlling stock price volatility

- In reality, most investors prefer future capital gains instead of current dividend incomes

- Companies prefer to use the additional profit they gain for reinvestments rather than paying them as dividends

Authors:

M.R. Atheeba
D.A.M. Perera
H.M.L.K. Herath

Impact of Dividends on Stock Price Volatility of Agriculture based Companies Listed in Colombo Stock Exchange

Introduction

"Stock Market" is one of the interesting topics to be analysed when it comes to the economy and growth of a country. Investing in stock market has become a trend among people at present as it is like spending money at present because it is like spending money today to earn more money and benefits in the future. Still, stock market is full of risks. Fluctuation of stock prices is one of the major risks faced by them. Stock price volatility is impacted by many factors and dividends are one of the factors that is generally assumed to be having a noteworthy impact on stock price volatility. For many investors, dividends paid by a company seem to be an advantageous option which attracts them towards a company's investment. Meantime, as investors are naturally risk averse, they consider the possible risks they have to undergo before deciding to invest in a company. Thus, this study aims to give a clear understanding whether the impacts of dividends are really significant for the stock price volatility. Further, as a nation where agriculture plays a vital role, the agriculture based companies listed on Colombo Stock Exchange are taken into consideration for this study.


Methods

Secondary data for a random sample of sixteen agriculture based companies were collected based on their active trading in Colombo Stock Exchange and analysis was done in two separate methods for different purposes.

Primarily, a panel data regression for a period of eight years (2011-2018) was performed to determine whether dividends impact stock price volatility. Secondly, a time series modelling for a period of eighteen years (2001-2018) was implemented to understand the common, dynamic movement of stock price volatility.

Results

Panel data regression unfolded the fact that dividends paid by agriculture based companies are not really a significant driver of the stock price volatility as it gives the impression. Meantime, factors such as the size of the companies and their asset growth can have an unavoidable impact on stock price changes. Still, these factors that exist within the stock market have a less overall impact on share price volatility when compared to some external factors such as the political stability of the nation, civil wars, global stock market performance etc. and hence, this study supports numerous other studies that has been already done in Sri Lankan context. Moreover, most investors prefer to increase the value of their shares or the number of their shares in the stock market in future rather than receiving an income at present. On the other hand, companies also prefer to reinvest the additional profit they receive than paying it as dividends for their shareholders, which helps them to avoid any further liabilities.

As dividends were found to be insignificant, the general pattern of how stock price volatility has been moving over the past eighteen years was observed based on real stock prices and nominal stock prices. They were plotted as follows:
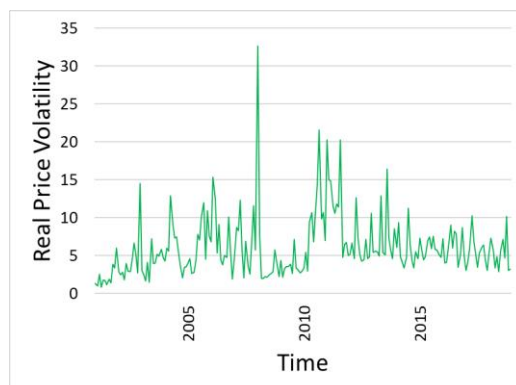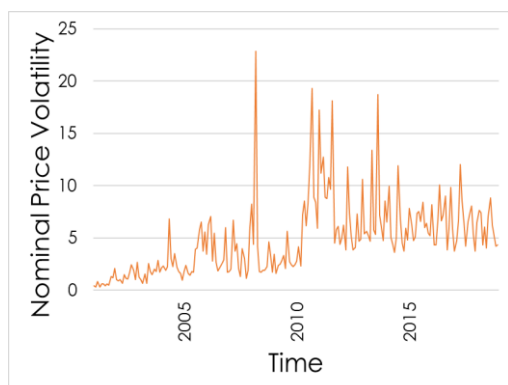
Recommendations

Dividend is a factor found in the internal environment of the stock market and it has not got a significant impact on stock price fluctuations as it seems to be. However, this study is limited to the selected time period. The same study could be done taking different time periods into consideration. Furthermore, impacts of other internal factors on stock price volatility could also be studied in order to understand the factors affecting it.

Policy Brief 37

KEY MESSAGES

- All considered inputs (extent, labour days, fertilizer and chemical) indicate a positive relationship with production of each crop

- The production elasticities of labor is greater in the case of coconut

- The production elasticities of extent is greater in the case of rubber

Authors:

H.E.N. Hewagama
K.R.H.M. Ranjan
A.D.K.S.S. Somarathna
J.C. Edirisinghe

Return for Inputs in Multi-Crop Estate

Introduction

The plantation sector acts as the major export earner in Sri Lanka, where tea, rubber, and coconut has been the major plantation crops that bring a considerable amount of foreign exchange to the country. In present scenario, the Sri Lankan tea industry is in a very critical situation because it reflects an obvious drop in tea production. When referring to the coconut production, it reflects a decline from 2016. In the Sri Lankan context, the production of rubber reflects a declining trend from 2010 to 2017. Consequently, production of plantation crops is starting to decline. Since, plantation sector is one of the major export earners in Sri Lanka, declining production of plantation crops is a vast setback in the plantation industry.

This research attempted to assess the relationship between inputs and outputs of tea, coconut and rubber crops in selected estates and further, to estimate production functions for tea, rubber, and coconut in that selected estates.

Approach

Four estates with more than one plantation crop were purposively selected from Galle and Matara districts. Akuressa, Baddegama, Citrus and Walpita estates were selected to obtain data for the study. Panel data were used in this research for analysis. Production data for the period from 2005 to 2018 were collected from the selected four estates. These Secondary data were gathered from monthly accounts of relevant estates.

Simple Cobb Douglas production function was used to determine the relationship between the outputs and the inputs for three plantation crops. For this study, inputs for all crops are the same. If equations are run separately for each crop, bias occurs due to presence of correlation among

individual crops. Thus, production functions for three crops should be run together as simultaneous equations. Hence, a multivariate regression analysis was done. The statistical estimation of the production functions was carried out by using STATA Statistical software (version 15).

Results

Production functions for all tea, rubber and coconut are significant at 95 percent confidence level. When considering the relationship between inputs and outputs, all the inputs provided the expected coefficient signs, except the total fertilizer real cost in rubber production function, total chemical real cost in tea production function and total chemical real cost in coconut production function. However p-values for above inputs were insignificant.

Coefficients of the variables represent elasticity values since the Cobb-Douglas function is in Log-log form. When total extent is increased in 10 percent, rubber, tea, and coconut production will be increased by 9.14 percent, 4.5 percent and 7.32 percent respectively. When total labour days were increased in 10 percent, rubber, tea, and coconut production will be increased by 0.405 percent, 0.012 percent and 0.535 percent respectively. Likewise, relationship between other inputs and outputs could be assessed.
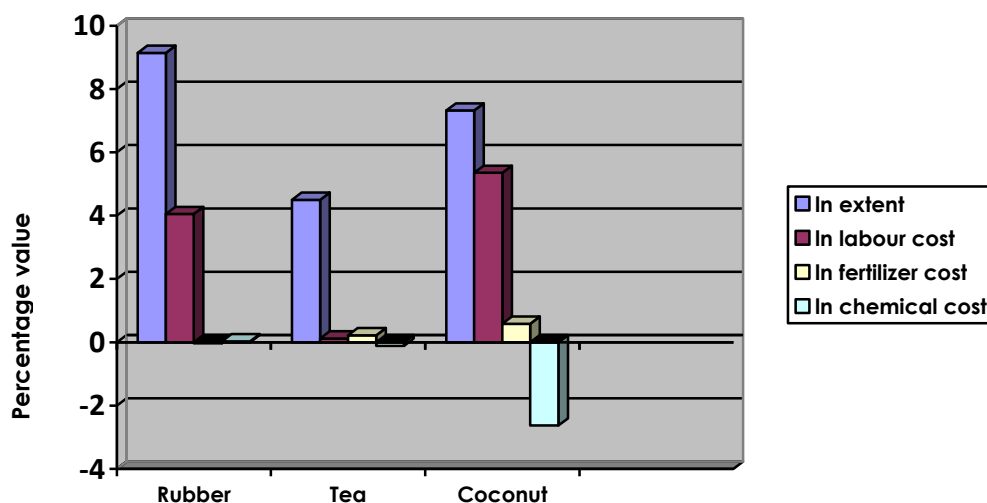
Figure 1: Percentage increase in output for a ten percent increment in inputs for tea, coconut and rubber

Recommendations

The results indicated that the production elasticities of labour are greater in the case of coconut and therefore, the estates may consider this higher return to labour in that particular crop. This may adversely impact the productivity of the other crops. Similar assessments can be made in terms of the other inputs as well. Therefore, it is prudent for companies involved in production of several crops together to consider these changes in maximizing profit.

Policy Brief   38

KEY MESSAGES

- Fertilizer, mature extent, and labour have positive and significant impact on harvested latex amount

- Technical efficiency in rubber estates is very low (58%)

- Production can be improved by 42% without any additional cost

Authors:

D.T.P.R.M.N. Jayasinghe
K.R.H.M. Ranjan
A.D.K.S.S. Somarathna
J.C. Edirisinghe

Technical Efficiency Changes in Rubber Estates

Introduction

Technical efficiency is the effectiveness which an output is generated using a set of given inputs. It is technologically productive when a company produces the maximum output from the minimum amount of inputs, such as labour, resources, and technology. Technical efficiency does not require resource unemployment. By creating the foreign exchange, employment, and protecting the environment, the rubber industry contributes enormously to the country's development. Sri Lanka is the 6th largest exporter of the natural rubber and the 8th largest producer of the world. It contributes 2.5% of the global production rubber production. However, the production of rubber reflects a declining trend from 2010 to 2017.

This study aims to find out the model and predict the changes of technical efficiency in rubber estates in Sri Lanka. This created the need for policy makers to recognize the importance of upgrading the available technology, inputs and knowledge transfer in the rubber estate sector as well as the factors that cause inefficiency.

Approach

Eight rubber estates were purposively selected for this study. The whole sample was restricted to a few estates, because of time limitation and high cost. Panel data were used in this research for the analysis. Production data, such as harvested latex amount, mature rubber extent (ha), total labour and fertilizer cost were extracted by using estate logbooks and monthly accounts for a period of 13 years (2005-2018). The graphical method was used to remove the outliers of the variables.


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Cobb-Douglas production function was used to estimate the technical efficiency changes during the period of 2005 to 2018. For this, Stochastic Frontier Approach (SFA) was used.

Results

All the variables in the estimated frontier production function model had positive coefficients. The positive coefficients imply that any increase in the value of the variable would increase production. The estimated coefficients for Rubber mature extent (ha), total labour & real fertilizer cost were positive and have significant impact on rubber production. This indicates that an increment of inputs will increase the level of output.

The estimated value of the variance ratio (γ) was 0.322. The variance ratio (γ) was close to one, and the difference between the estate latex yield and the efficient yield is mainly due to the technical inefficient. This implies that the technical inefficiency effects were significant in the stochastic frontier model. But in this study γ implies close to one, because of random errors of the data set. The mean technical efficiency of rubber estates was 0.5797 thus there is a possibility to increase the efficiency of rubber production. However, technical efficiency of rubber varies from 48.29 to 76.36 percent. So it indicates that great potential exists for the rubber estate to further increase the rubber production using available inputs and technology.
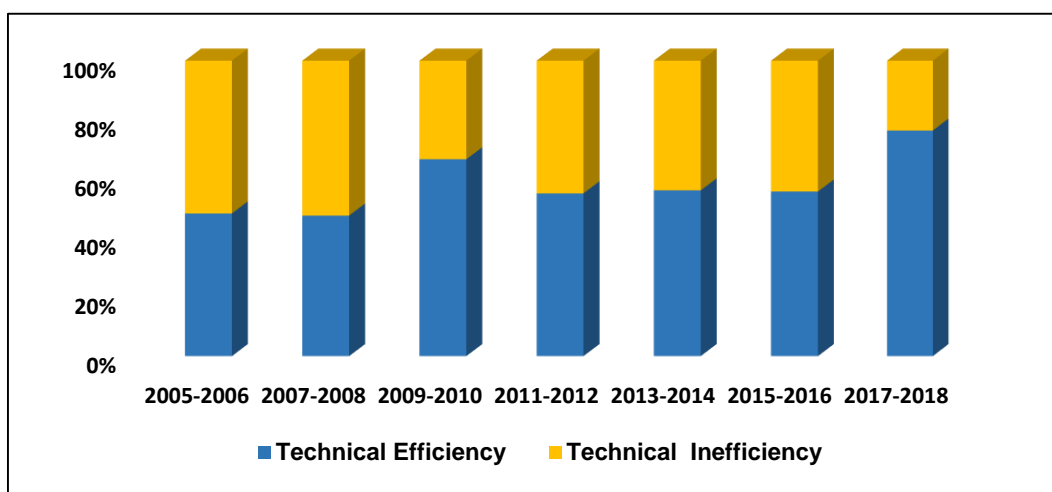
Distribution of technical efficiency in the selected rubber estate 2005 – 2018

Recommendations

The results indicate that real fertilizer cost, rubber mature extent, and total labour days have positive and significant impact on the harvested latex amount. The average technical efficiency of rubber production is 0.58 percent. Therefore, this study creates the need for policy makers to recognize the importance of improving technical efficiency. Further studies recommended to understand the factor affection technical efficiency in the estate sector, So that technical efficiency can be can be improved by making changes to these factors.

Policy Brief

KEY MESSAGES

- Effective measures are needed to reduce the prevalence of child malnutrition in urban Sri Lanka

- Children should be educated about malnutrition and awareness must be raised among parents

- More attention should be paid to the nutrition of primary school aged children

- Prevalence of wasting was seen to be much higher than national and global figures

Authors:

M. T. F. Nuzra
J. M. M. Udugama

Malnutrition and Associated Factors among School Aged Children in Urban Sri Lanka

Introduction

Successive governments of Sri Lanka have paid attention to improving the nutritional status of the nation. However, malnutrition continues to be one of the major problems among children in Sri Lanka. The main nutritional problems of school-aged children in most of the developing countries are stunting, underweight, anaemia, deficiency vitamin A, iodine deficiency and Health problems.

Nutritional status of primary school aged children is more important to a healthy and productive generation in future. Good nutrition can be simply defined as obtaining all the necessary nutrients needed for the growth and maintenance of the human body. Lack of one or more of above factors cause problems in an individual's healthy life. Any nutritional disorder caused by inappropriate dietary intake, is referred as malnutrition. Malnutrition can be categorized into four main groups which are called as over nutrition, dietary deficiency, secondary malnutrition and under nutrition.

Several factors are associated with malnutrition in children and it is not just a problem of food shortage. The overall objective of this study is to understand the malnutrition – related factors among the urban schooling children in Sri Lanka.

Approach

The primary data were collected through a community based cross-sectional study in schools in Colombo, to determine the nutritional status of primary school aged children and assess the socio-demographic factors in the Colombo district. The questions were explained to the parents/guardians. Weight and height of the children were measured to the nearest 0.1kg scale and 0.1cm scale respectively.

All anthropometric measurements were recorded using World Health Organization (WHO) guide for anthropometric measurements using anthroplus software. The children were then categorized into four categories; 'normal', 'stunted', 'wasted' and 'underweight' accordingly. Logistic regression was used to assess the factors which are associated with malnutrition status.

Results

In the sample, 50.3 percent children were normal and 49.7 percent children were malnourished. From the 49.7 percent children 7.3 percent of children were stunted, 18 percent of children were underweight while 24 percent of children were wasted. Analysis revealed that age of mother at child birth and Income of family are significantly and positively associated with a higher risk of stunting, Fruit consumption per week and age of mother at child birth are significantly associated with risk of underweight, was shown to be negative and positive relationship respectively. Fruit consumption per week is significantly and negatively associated with the risk of wasting.
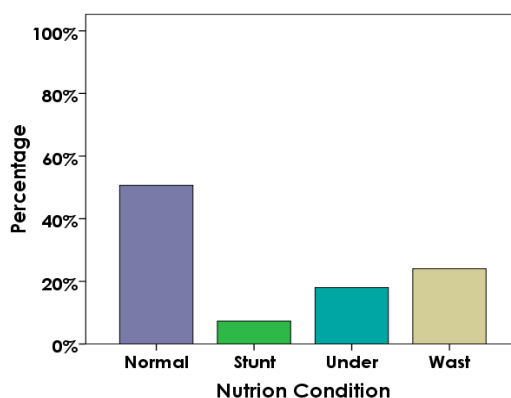
Figure 1: Nutrition level of children

Recommendations

The prevalence of stunting, wasting and underweight is a considerable problem in low- and middle-income families in Colombo. Prevalence of wasting was seen to be much higher than national and global figures. Food consumption rate per week was shown to be negatively associated with wasting and underweight which means consumption of more fruit will minimize the risk of malnutrition.   Age of mother at child birth has a positive effect. Therefore, children of older mothers have higher chance to get malnourished because delay in marriage delays fertility too. As a result, children of elderly mothers are more likely to be born with low birth weight, which affects their child's nutritional status. Income of family also has a positive relationship with stunting, indicating an unhealthy fast food culture in Colombo. Normally people in Colombo are fast food lovers although the price of fast food is higher than healthier options. Therefore, as the income increases, access rate of fast food also increases which is closely related with malnutrition. Therefore, awareness should be raise about the effect of fast food and malnutrition among Colombo low and middle-income households.

Policy Brief *40*

KEY MESSAGES

- Government intervention should be increased towards the vanilla cultivation

- Requirement of new vanilla processing stations, training institutes is important

- The number of vanilla exporters should be increased

Authors:

J.A.D. Suranga
N.R. Abeynayake

Constraints in Small Holder Vanilla Cultivation

Introduction

Vanilla cultivation in Sri Lanka still remains at a home garden crop but according to the world's vanilla cultivation, there are several countries that grow vanilla in large scale, such as Madagascar, Indonesia, Etc. However, over the past few years of time some farmers especially in Kandy, Matale, Kegalle, and Kurunegala have identified vanilla cultivation as a very profitable crop. Those who engage in vanilla farming in Kandy district faced various constraints, such as economic constraints, Production constraints infrastructure constraints, technological constraints, situational/ environmental/ social constraints and marketing constraints etc. This study was conducted to identify such constraints in order to take necessary measures to improve the vanilla cultivation and provide the better livelihood to the farmers.

Approach

Preliminary information on the constraints associated with the vanilla cultivation was identified through focus group discussions. Data were collected from farmers scattered in Kandy district using a sample survey. Cluster sampling method was used to collect data from farmers. It was reported that there are about 700 farmers who cultivate vanilla in Kandy district. Out of them, 100 farmers who settled in 5 divisional secretariat (SD) divisions were selected to this study. Divisional secretariat divisions consider in the study were, Pathadumbara, Panvila, Pojapitiya, Kundasale and Udapalatha.

Results

The outcomes of this study were calculated using standard qualitative analysis method, which uses Likert scores as a ranking factor of constraints pertaining to vanilla cultivation according to their severity. It is revealed that marketing constraints and infrastructural constraints were found to be most severe constraints by the vanilla farmers. Lack of government intervention, lack of exporters and lack of vanilla processing stations were crucial issues that were faced by the vanilla farmers. The results of this study can be illustrated as follows.

1

Marketing Constraints

Lack of exporters

Lack of reliable market information, regulation and distribution channels

Interference of middlemen in the market

2

Infrastructure Constraints

Lack of government intervention

Lack of vanilla processing stations

Lack of Training institutes

3

Technological Constraints

Inadequate availability or shortage of quality disease free planting materials

Lack training mechanisms on the curing of vanilla beans process

4

Economic Constraints

Inadequate availability of credit

Inadequate subsidies for vanilla cultivation

Price fluctuation

5

Production Constraints

Harvest can only be obtained once in a year

More time is spent to get first harvest

Diversity of production systems, which restrains agronomical management

6

Environmental/Social Constraints

Lack of farmer organizations

Non availability of labour

Constraints faced by vanilla farmers

Recommendations

The results of this study would be helpful to policy makers & other responsible stakeholders to take necessary measures to overcome the problems related to vanilla cultivation. The actions that are taken by the relevant stakeholders will eventually be helpful to improve vanilla cultivation & livelihood of vanilla farmers.

Policy Brief 41

KEY MESSAGES

- Selection of a market significantly associated with residence area, Gender, Educational level and Occupation

- Select for supermarket is quality of products and for traditional market infrastructure

- Human resources are not significant for the traditional market

- For supermarket all motivational factors are significant

Authors:

D.W.C.Wasana
N.R.Abeynayake

Motivational Factors of Customer Choice between Traditional Markets and Supermarkets in Hambantota District

Introduction

The market can be divided into two categories as traditional markets and modern markets, depending on their characteristics. The traditional marketplace is where buyers can meet sellers and bargain as well as commodities are the mainstay there. In the supermarket, goods are priced at a fixed price but service is a priority. Traditional market is the most popular market among the rural masses. Because most of the people living in rural areas are farmers, most of them go to the traditional market to buy vegetables and sell them.

Most people today do not have enough time to go to a few shops and compare them and buy goods and services. So they try to buy all products and services in one place. This problem has been overcome by using the supermarket concept. Therefore the objective of this study is to identify the factors considered by the rural and urban customers in selection market type for their purchases.

Approach

The study area of this research is Hambantota district and it consisted of 5.3% of urban area and 94.7% rural area. Six DS divisions (Beliatta, Tangalle, Weeraketiya, Ambalantota, Angunukolapelessa and Katuwana) were selected for the study out of 12 DS division. The questionnaire consisted of two parts, and the first part included the questions to identify the respondents' demographic characteristics such as residence, sex, age, gender, income level, education level, occupation and number of family members. The second part is consisted of 30 different Likert scale questions to identify the factors which are influenced to select the type of market.
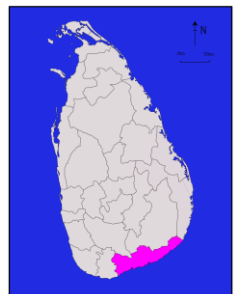
It was categorized as human resource, quality of product, infrastructure and financial matters. The same questionnaire was used collect data from both traditional and supermarket customers. Five hundred questioners were distributed to the customer base on the cluster sampling techniques.

According to the distribution of the *MPI* index, three categories of customers were identified (0-33 % Low preference, 33 – 66 % Average preference, > 66% High preference). Chi-square independent test analysis were performed to evaluate the association between socioeconomic factors and market type.

Results

The summary information of Chi-square independent test between socioeconomic and demographic factors with choice of market type which showed significant associations. Residence, gender, educational level and occupation were showed high association with choice of market type. It clearly shows that rural customers are highly prefer to traditional market while urban customers prefer supermarket. Female more prefer to traditional market and male more prefer to supermarket. According to the female customers, they reluctant to go to supermarket due to curiosity. Tertiary education consumers prefer the traditional market and the secondary education consumers prefer supermarkets. When consider the occupation Government employer prefer traditional market and private employers prefer supermarket. The reason behind this is due to the busy life of private employers' job. Age, Civil status, Number of family members and Income levels are not significantly influence to select the market type.

When consider the overall mean value of the index separately for two marketing type, highest mean value of index was obtained for supermarket. It implies that people more prefer to super market than traditional market. Highest mean value of index of motivational factor for supermarket is quality of the product and that value for the traditional market is infrastructure. It was observed in the study area, traditional market is well developed with all infrastructure than supermarket. Human resources are not significant for the traditional market, but financial aspects, and product quality are highly significant motivational factors to select the market. For supermarket all motivational factors namely, human resources, financial aspects, infrastructure and product quality are significant.

Twelve percent of the respondents were requested the both markets, 36 % of the respondents requested Supermarket, 51 % of the respondents requested the traditional market.

Recommendations

Opportunities should be provided for rural farmers to access the supermarket supply chain. The prices of commodities in the traditional market and super markets should be the same. New technologies should be introduced for farmers to produce vegetables for the super market. Daily flairs should be conducting instead of weekly fairs.

Policy Brief   42

KEY MESSAGES

- Stakeholder awareness about organic fertilizer certification standards is essential

- The government should pay attention towards implementing policies to establish organic fertilizer standards

- A national policy on organic agriculture is required

Authors:

N.PV. Silva
U.K. Jayasinghe-Mudalige
H.A.C.K. Yayathilake

Constraints Faced by Stakeholders in the Value Chain of Organic Fertilizer

Introduction

With the increased use of Inorganic fertilizer in agriculture, acute environmental hazards have been created. Further the farmers were not getting expected benefits from the use of Inorganic fertilizer. In the current world context, there is an increasing demand for organic fertilizer. Nevertheless, to date there is no such standards for national policies are set systematically, which acts as a key constraint for all in the value chain, including the producers and users. Although, those who involve with accessing organic fertilizer face numerous barriers in deal with value chain and such issues will be implement in the four social processes. Such as market, political, judiciary and ethical governing.

Approach

The primary data on the constraints gathered with the stakeholders of organic fertilizer was recognized through focus group discussions with related production and distribution process of stakeholders. Those constraints identified were then recruited as a set of statements and incorporated into a structured questionnaire with a ten point scales to evaluate each accurately.

Results

The outcome of study, which indicated the barriers related to assess the Stakeholders consideration associated with Solid organic fertilizer. The overall outcome of the analysis suggests that constraints which might be associated with the production and distribution of organic fertilizer can be divided in to categories according the perception of the stakeholders (Figure1). Finally there can be identified what is the highly concerned barrier among the stakeholders in the value chain of organic fertilizer.
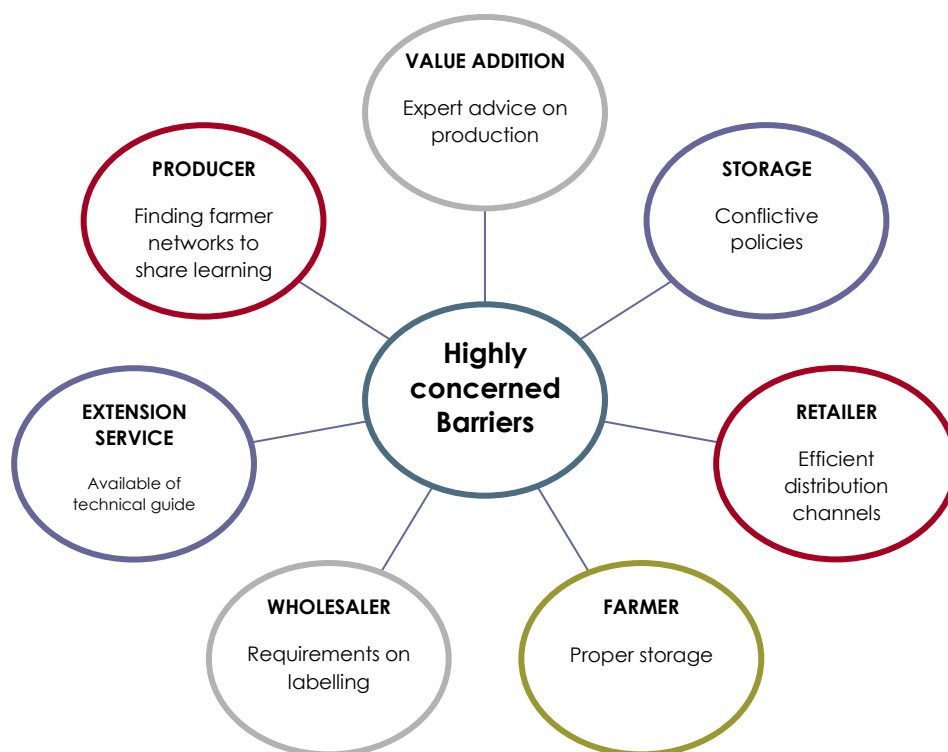
Figure1: Constraints faced by stakeholders

Recommendation

The results highlighted the stakeholders' perception about the constraints of organic fertilizer. In most of Extension service sectors faced technical related barriers which involved with the distribution of organic fertilizer. According the outcome of this, would support to implement new strategies and develop the organic agriculture sector with help of the Government and Private companies.

Policy Brief   43

KEY MESSAGES

- Requirement of government support in terms of subsidies and incentives

- Need Solutions for adverse climatic effects and natural disasters

- Farmers should pay special attention for diseases and pathogens, wild animals problems

Authors:

A.M.S.P. Abeysinghe
U.K. Jayasinghe-Mudalige

Farmers' Constraints on Technology Adoption and Agricultural Production

Introduction

Agriculture sector plays a vital role in Sri Lankan economy. In last few decades, the achievement of agriculture sector occurs to be below the expected level due to less productivity, low investment, low technology adoption and inadequate penetration into the international market. Technology adoption is crucial for high productivity in agriculture. The increasing rate of the technological advancement across the agricultural sector has resulted in increased efficiency of productivity. A growing number of studies have identified several factors, including personal, cultural, social, and economic attributes, as well as characteristics of the technology, which influence technology adoption in agriculture. This research study, with the funding and other facilitative support from the Ministry of Agriculture aimed to address this economic problem.

Approach

Primary data were collected from 650 farmers selected from Kurunegala, Mullaitivu, Kilinochchi, Polonnaruwa, Badulla, Batticaloa, Anuradhapura, Matale, Gampaha, Jaffna, Vavuniya, Ampara, Moneragala, Kegalle districts based on structured questionnaire. A list of commonly occurring constraints were identified and were enlisted as statements in the questionnaire with a Likert scale. Those statements were categorized into seven criteria. Technical feasibility, Economic feasibility, Social, cultural, ethical acceptability, Infrastructure compatibility, Human resource, Environmentally sound and Institution and government acceptability.

Technical feasibility	Economic feasibility	Human resource	Environmental sound	Infrastructure compatibility	Social, cultural, ethical acceptability	Institution and government acceptability

Figure 1: Classification of constraints

Results

According to farmer perceptions the major constraints which affect them are 'Adverse climatic effects and natural disasters', 'Disruption from diseases and pathogens' and 'Disruption from wild animals', 'Illegal activities such as ransom and tips', 'Difficulties in the management of the waste generated', 'High cost of fines and penalties' are the least affected constraints on farmers. Depending on the results, out of seven categories 'Technical feasibility' and 'Economical feasibility' are the highest affected categories of constraints on farmers. 'Social, cultural, ethical acceptability' includes constraints which have less effect on farmers.
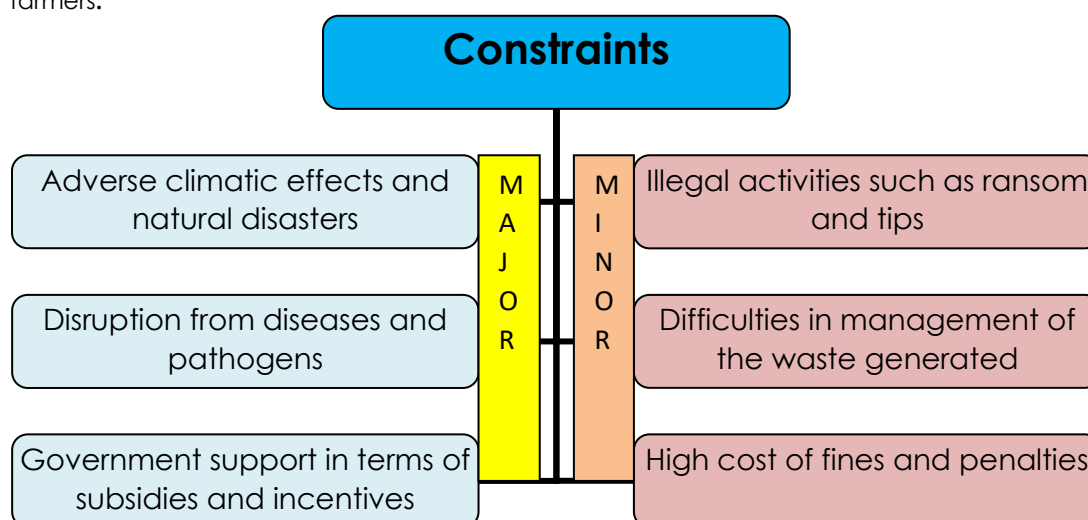
Constraints

Adverse climatic effects and natural disasters	M A J O R	M I N O R	Illegal activities such as ransom and tips
Disruption from diseases and pathogens			Difficulties in management of the waste generated
Government support in terms of subsidies and incentives			High cost of fines and penalties

Figure 2: Major and minor constraints

Recommendation

The study highlighted major constraints faced by farmers regarding technology adoption and agricultural production. Government intervention and discussion of farmer constraints with relevant parties must needed to minimize these barriers. In light of these it is important to pay attention to take appropriate actions to improve technology adoption and production in agricultural sector in Sri Lanka.

Policy Brief 44

KEY MESSAGES

- Wage rate increases negatively affect for the profitability and future well being of the sector

- 10 % increase in wage rate would reduse 1.8 % in profit

- The decline in profit will lead to hire less labor by estates

Authors:

K.H.G.D.N.D. Gamage
A.D.K.S.S. Somarathna
K.R.H.M. Ranjan
J.C. Edirisinghe

## Does Wage Rate Increases Affect for the Labour Demand of Rubber Estate Sector?

Introduction

The rubber industry occupies an important place in the Sri Lankan economy. It is the second highest foreign exchange earner from agriculture. Sri Lankan rubber sector gained 8 % of total national export income and the contribution to Gross Domestic Product (GDP) is 1.5 % according to the central bank report 2018. Revenue from rubber exports, according to the 2018 Central Bank report, was US $ 311 million, accounting for nearly 12 per cent of agricultural exports. Rubber cultivation is an industry which requires the involvement of a large number of labours. Therefore, their contribution to the well-being of this industry is very important.

However, looking back over the last few decades, Sri Lanka's production of rubber and its earnings have shown a gradual decline. Rubber production declined by 0.6 percent in 2018 compared to the year 2017, according to the Central Bank report 2018. The Central Bank report cites a major reason for this is a rise in the cost of production per kilo of rubber industry. In Sri Lanka rubber is considered as a labour-intensive crop. So the cost of labor is heavily influenced by the cost of production in rubber sector.

Despite the situation in the rubber industry, plantation workers have conducted a number of strikes throughout the country over the past few years, claiming that their daily wages are insufficient to meet the rising cost of living and they have asked the estate authorities to double their existing wages. However, the plantation authorities say that such wage increases will cause decline the profit to the rubber cultivation. And also, they said that rubber cultivation was no longer sustainable with these losses. Thus, we conducted this study to examine how the demand for rubber plantation labours to increase their daily wages affects their demand.

Average Daily Wage: Tea & Rubber Estate Workers
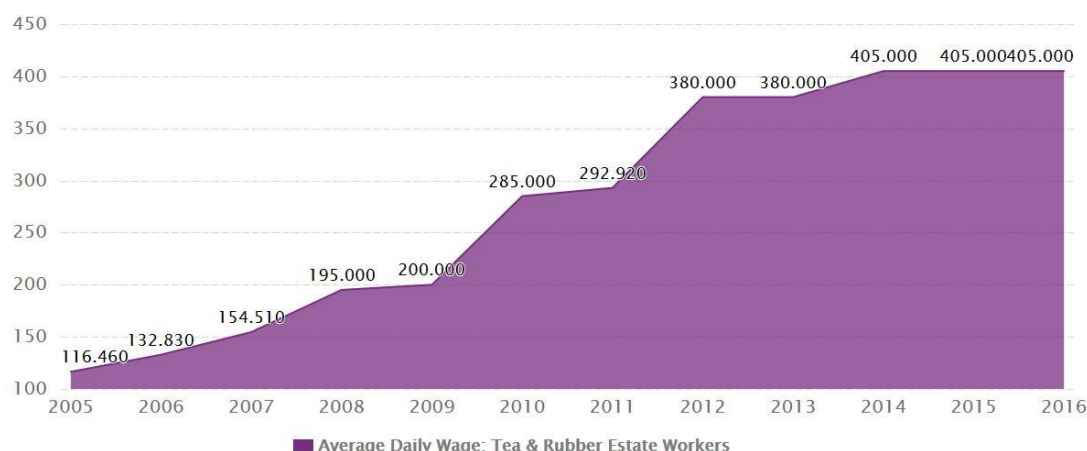
SOURCE: WWW.CEICDATA.COM | Department of Labour

Approach

Due to the shortage of information available on the rubber smallholders and the question of the reliability of that information, we found ourselves, it is more practical to collect the necessary information relating to the rubber estates managed by the plantation companies because they have recorded them in their record books. For this study, we collected monthly data such as wage rates, profit, mature area extent, net sales average and fertilizer prices from 2005 to 2018 from monthly account books in eight rubber estates which have been given their permission for the data collection.

Results

We used translog profit function for the analysis. Then resulted coefficient values is used to derive the demand function for labour. Results showed that the increase in daily wages directly affected the demand for labors of rubber estate sector. In this study, we found that increasing the daily wages of labours is a loss to the rubber cultivation, and maintaining profits and increasing the daily wages of labors are contributing to the decline in demand for labors.

Recommendations

Demand for labor and wage rates are inversely related as in any form of demand. Profits of states decline by 1.8 % if wage rates increase by 10 %. Therefore, the decline in profit would lead to hiring less people by estates leading to job lossess in the estate sector.

Policy Brief 45

KEY MESSAGES

- Opportunity for research and scholarly pursuit enhance the job engagement and organizational commitment of academics

- Job satisfaction, Job engagement and Organizational commitment behave similarly irrespective with the professional ranks

Authors:

A.K.Y Ashwithi
A.G.K Wijesinghe
N.R. Abeynayake

Job Satisfaction, Job Engagement and Organizational Commitment of University Academics

Introduction

Organizational commitment of academics is very important to fast move of the organization. As the body that filters knowledge, wisdom and skills to youth, university academics play a vital role in the universities. This study investigated the effect of factors associated with job satisfaction and job engagement with organizational commitment of academic employees of three universities in Sri Lanka.

Approach

Questionnaire survey methodology was adopted to collect data from the population. Primary data for the study were collected from a sample of 145 respondents from the faculty of Management covering University of Ruhuna, University of Jayawardanapura and University of Kelaniya using a pre tested questionnaire. Universities were selected randomly and respondents were selected by using convenient sampling. Three main variables i.e. Job Satisfaction, Job Engagement and Organizational Commitment were selected for the study. Spearman correlation was performed to evaluate the relationship between job satisfaction, job engagement and organizational commitment. Factor analysis was done to evaluate the level of impact of the factors of job satisfaction, job engagement and organizational commitment. One sample Wilcoxon sign rank test was done to evaluate the skewness of the sample towards the selected variables.

Results

Relationship with immediate supervisor has the highest effect on organizational commitment of academics. Second highest contributing factor in organizational commitment opportunity for research and scholarly pursuit. The third factor contributes to organizational commitment is the independence of work. When considering on job engagement, highest correlation is shown by proximity to research and scholarly pursuit. Next highest correlations are shown by work load and job recognition. According to the wilcoxon analysis, it reveals that measured values for all the factors were towards the positive direction of the selected measurements except the work load. It means that, there is a positive skewness towards job satisfaction. Mean values of the variables were compared between professional ranks. Results depict that there is no impact for job satisfaction, job engagement and organizational commitment from the professional rank they hold on themselves.
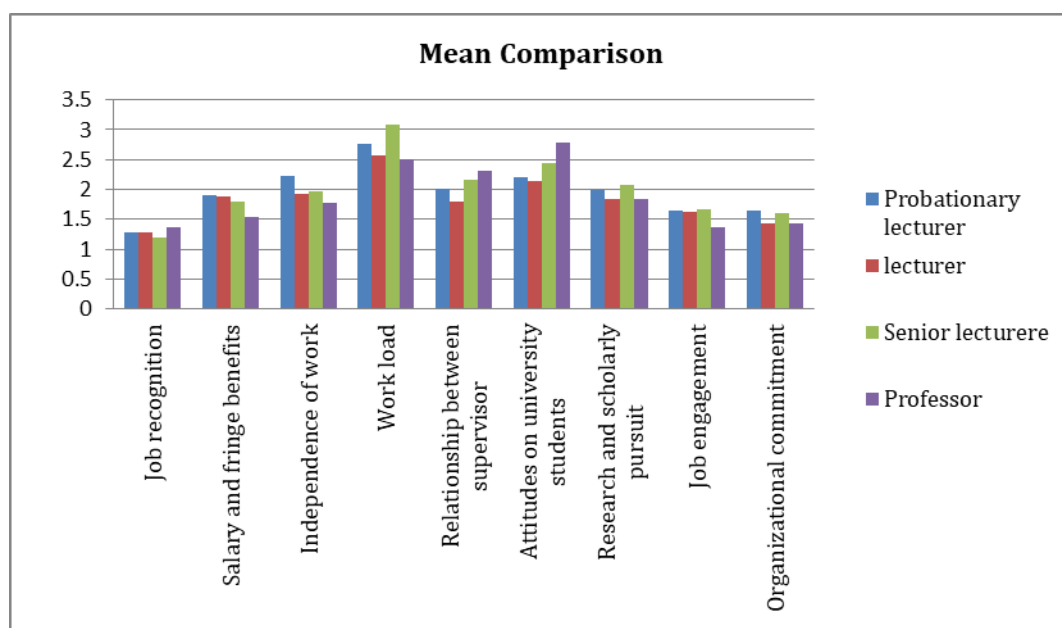
Recommendations

To enhance the organizational commitment of academics further, it is very important to consider on relationship with immediate supervisor and independence of work .As well, proximity to research and scholarly works should be implemented. Work load is a significant factor for job engagement. More academics should absorb into the university system to neutralize the heavy workload. Policy makers, especially the government should consider on these facts when preparing their policies regarding higher education of the country. There should be a friendly environment to conduct research programs, and more funds for research programs.

Policy Brief

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KEY MESSAGES

- Technology adoption in Sri Lankan agriculture sector is below the expected levels

- Policy environment is relevance with their focus areas according to the key terms used in the policy documents

- Attempts should be taken by relevant parties to implement existing policies to enhance technology adoption

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Analysis on the Relevance of Agriculture Policies in Sri Lanka to Promote Technology Adoption

Introduction

Agriculture sector can reach a vast development, advancement and changes by using different farming approaches and techniques. But there are limitations on how to accelerate the process of modern technological adoption to the sector of Sri Lankan agriculture. Agricultural policies are very important aspect to encourage the growth of the sector. In order to design or evaluate new policies, the significance and impacts of existing policies must be understood. This study was conducted to identify Sri Lankan policies in terms of keywords to the area of Technology Adoption and to make a methodical comparison of agricultural policies with other developed and developing countries.

Approach

Policy documents were collected, including a set of 44 local (National) and a set of 43 regional (International), from June to August in year 2019. Then the best set of 34 keywords was selected.

Selected Keywords		
Capacity	Communication	Conservation
Control	Credit	Development
Diversification	E-agriculture	E-commerce
Effective	Efficiency	Employment
Extension	Improvement	Innovation
Insurance	Intensification	Investment
Marketing	Modernization	Network
Operation	Partnership	Processing
Production	Productivity	Protection
Quality	Research	Safety
Sustain	Utilization	Value addition
Value chain		

The gathered documents were then scrutinized for the presence of the each keyword. Then the documents were classified and arranged under 10 Policy Themes. The main 3 keywords were obtained with highest frequency in National policy documents (Table 1). Then the keywords were ranked according to frequency to make a comparison between National and International policies (Figure 1).

Results

'Development' had been frequently used keyword by seven out of ten policy categories in National policy documents. It was revealed that most of the existing agricultural policies have focused on the development of the sector

Table 1: Distribution of keywords among policy categories (National)

Policy Category	1st Keyword	2nd Keyword	3rd Keyword
Credit and Finance	Development	Network	Quality
Environment	Development	Sustain	Production
Food	-	-	-
Institutional	Development	Production	Investment
Land	Development	Conservation	Research
Livestock and Fisheries	Development	Production	Improvement
Marketing	Development	Communication	Quality
Price	-	-	-
Research and Educational	Research	Development	E-agriculture
Trade	Development	Production	Quality

According to the comparison (Figure 1) 'Development' was the highest ranked keyword in National policy documents while 'Research' was the highest ranked keyword in International policy documents. It was revealed that the Sri Lankan policies were more focused on the development of the sector, while International policies were focused on technologies and innovations through research.
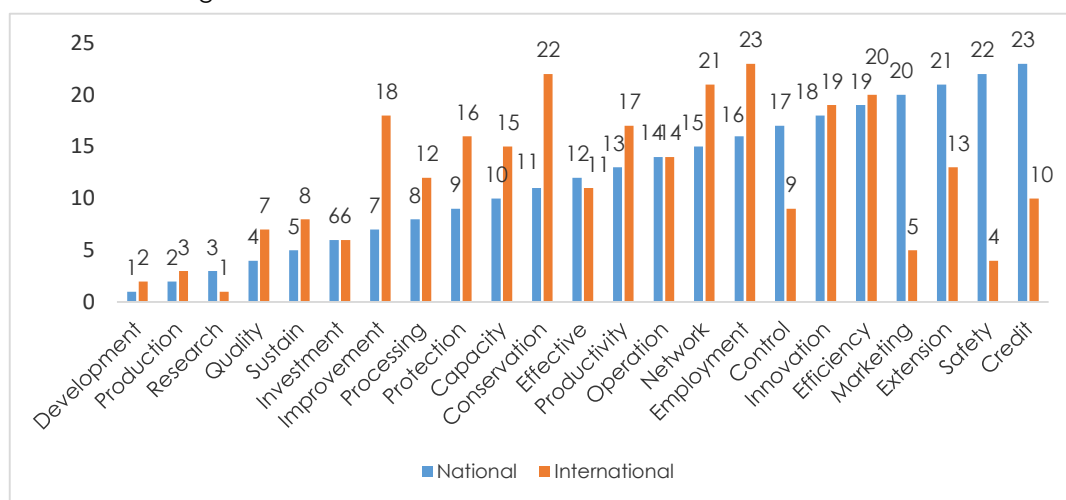

Figure 1: Comparison of National and International policy keywords according to the ranks

Recommendations

Sri Lankan policy environment requires the intervention of the government and other relevant parties to monitor the policy implementation process to promote technology adoption. There should be new policies which are more focus for research to improve the technologies and innovations.