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## Aims and scope

International Journal of Multidisciplinary in Management and Tourism is an interdisciplinary journal seeking an engagement between scholars working across a range of disciplinary fields, including Management, Tourism, critical theory and Interdisciplinary of humanities and social sciences.

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## Editor in Chief



## Editorial Board

# Preface

We are pleased to present the 4th volume, second issue of the 2020 edition of the International Journal of Multidisciplinary in Management and Tourism. This volume consists of six articles.

The first article is rather creative. The author exploits a universally recognized theory of human behaviors, known as stimulus-organism-response (S-O-R), to study the nature and degree of employees' states of psychological conditioning, in the sense of job satisfaction and commitment, from the antecedents and consequential perspectives. The data context is a very important industry in Chiang Rai, which is pineapple industry. Chiang Rai is famous for Phu Lae and Nang Lae pineapples, and the research study bridges the employee-level of contributions in shop floors to organizational level of performance.

The second article focuses on how an entrepreneur succeeds in his pursuit, along the sustainable principle, in organic coffee farming and the marketing, and branding aspects. The author skillfully uses the concept of balanced scorecard (BSC) and strategy mapping, which is a learning-enabled management platform for continuous improvements, and extends with an additional perspective, namely the principle- and value-based motivator. The author also employs the concept of CATWOE root definition of the soft systems methodology in assisting on the case research process. The author is able to demonstrate numerous aspects of contributions, such as the relating to 10Ps structure in BSC and strategy mapping.

While the first two articles focus in the Thai context, and of significant intellectual insights and values to contribute to the discipline of management, the next three articles are relating to Lao PDR, including the last article on renewable energy, which have significant implication values on national policy and economics levels.

The third article has important policy implication to a nation, which relates to the impact of land rights on deforestation in Lao PRD. Based on the 6,020 household sample data collected based on the Laos Expenditure Consumption Survey, LECS 5, in period 2012-2013, from Lao Stat6itics Bureau, the author demonstrates, by using simple Logistic model, the impact of land rights on deforestation. The insight should assist the Lao government, and elsewhere, to carefully scrutinize the land right details and their relevant livelihoods for sustainable preservation and utilization of natural resources.

The fourth article is also macro-economics in aspect, but with a direct application to identifying the factors contributing to overseas tourists' willingness to pay on visiting ecotourism destinations. The research method relies on choice modeling and the conditional logit. The research benefits not only national level but also the marketing and strategic positioning of the factors to contribute to tourists' willingness to pay.

The fifth article drills into the factor determinants of bushmeat consumption patterns in the four provinces in Lao PDR. The research can help the national policy makers and the relevant stakeholders, and organizations, to understand the patterns and factors favorable of bushmeat consumptions, which has become extremely important issue, as it could be an avenue to prevent future pandemic spreading.

The last article is contributed by an independent scholar of rich industrial experiences, on the current states of arts and snapshots of progresses and policy direction of Thailand in the domain of renewable energy. The article is not only informative of the renewable energy policies and initiatives of Thailand, but also illuminates the strategies that the industry and organizations can take to improve energy security and efficiencies.

Once again, we are proud to present the six quality articles in the 4(2) issue of the International Journal of Multidisciplinary in Management and Tourism. As a closure here, we welcome any article contributions, of multidisciplinary nature, that can help improve any aspects of understanding, competences and applications to manage operations, innovation and creativity, or any nature, at any level – individual, team and group, organizational, societal, national, ecosystems or global levels. All papers must be original, had not been published elsewhere, have not been submitted to other publication venues while submitting to us, and should be subjected to plagiarism assessment. Your manuscripts will pass through the editorial review and are sent for double-blind reviews by anonymous independent referees. Apart from research articles, we also accept quality book reviews. All accepted articles, upon appropriately revisions to the required quality and expectations, would be published online in our Journal website, and are downloadable free of charge. We recommend that potential authors review our publishing policies, manuscript requirements and formats, before submitting your manuscripts to our Journal.

Dr. Chai Ching Tan
Editor in Chief

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## Research Articles



## Articles

# The Application of Stimulus-Organism-Response (SOR) Theory for Studying Workforce Contributions in the Pineapple Factories in Chiang Rai

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## Abstract

In this study the SOR (Stimulus-Organism-Response) theory, that is typically used in consumer behaviors, is employed for workforce contribution study of organizational performance, which exploits the theories of job demand-resources (JD-R), motivation and trust as stimuli. The conceptualized model was empirically tested using the phu-lae and nang-lae pineapple manufacturers and traders in the Thasud, Ban Du and Nang Lae districts of Chiang Rai. The surveys were conducted in September-October 2019, which is the low-production season. The structural equation modeling (SEM) analysis shows perfect fits, evidenced with Normed Fit Index (NFI), Comparative Fit Index (CFI), Tucker Lewis Index all closer to 1.0, and RMSEA at 0.051, and the livelihood minimization shows absolute model fit, at p = 0.282, at $\chi^2/2$ = 1.251, much below the threshold number, 5.

**Keywords:** Job Resources-Demand theory; Motivation; Stimuli-Organism-Response.

## Introduction

Thailand is an export-oriented emerging economy, with the majority of the GDP contribution coming from production, contributing 34 per cents of the GDP, while the service sectors occupying around 44 per cents, and agricultural industry at 13 per cents of GDP (National Economic and Social Development Board of Thailand, 2015).

Among the agricultural sectors, pineapple is considered as an important economic crop in Thailand, generating incomes for the communities and the nation (Hasachoo & Kalaya, 2013). Thailand has exported fresh pineapples to China at 81%, Laos 10%, and Singapore 5%. China imports them through Guangdong Province (by sea) and Yunnan Province (by land) as reported from the office of agricultural economics (Sutichaiya, 2018). Two unique pineapple species, Nang Lae and Phu Lae (mini-pineapples), are mostly planted in Chiang Rai. Phu Lae is also registered as a Geographical Indication (GI) of Chiang Rai Province, Thailand (Thu & Huynh). Phu Lae is exported as fresh-cut and mainly to China where such business is done by manufacturers collaborated with traders. Manufacturers manage all the processes needed to be accomplished for the finished goods including

ordering and receiving chopped mini-pineapples, managing production process and dealing with customers. Traders need to follow up the requirements provided by the manufacturers. Pineapple workers perform a series of works, such as peeling, packing, cooling down, quality checking, and final packing.

For the fact of a number of customer requirement variations, and the uncertainty caused by traders, it is important employees are motivated, and their productions and functions are aligned to objectives in order to meet the competitive edge and performance requirement.

In view of the fact that the pineapple industry is still extensively labor-intensive in Thailand, it is important to study how the workers perceive their job characteristics, in terms of job resources and demands, trust and motivation, and how these job characteristics influence their loyalty, satisfaction, commitment, in-role and extra role behaviors, where these can lead to the better performance of the organization. Therefore, this research aims to develop a model that is capable to organize a set of relevant JD-R (Job Demand-Resources) factors, and motivation and trust which can be absorbed into theory of planned behavior (TPB), as a systematic ordered structure, in order to let the company has the systematic concept to exploit opportunities, especially in efforts to improve organizational performance.

This paper extends the early phases of the researchers' efforts in an attempt to structuralize the employee-level factors to explain organizational performances, and the SPACE competitiveness assessment to suggest possible strategic postures for improving return on investment and competitive advantages. The previous efforts demonstrate that JD-R are important perceived behavioral control factors at the job- and operational level, rather than staying at the individual level which involves attitude and personal norms. In addition, intention has very low degree of ability to explain behaviors and performances, and thus is exempted in this research. Instead, a Stimulus-Organism-Response (S-O-R) model is adapted.

## Literature Review

Based on the introductory background, this research is theoretically based on the Stimulus-Organism-Response (S-O-R) theory of consumer behavior (Tan, 2017), which is adapted for studying workforce behaviors. The adapted S-O-R model is shown in Fig.1, which has five hypothetical structures this literature will logically present.

Note that the stimulating factors, consisting of JD-R, trust and motivation, do reflect some of the essential characteristic of theory of Planned Behavior (TPB), noted as follows: When the employees perceive that they are equipped sufficiently with the resources that match the demand of the job, they would feel more satisfied and show higher level of job commitment, and further also can induce in-role and extra-role behaviors to contribute to jobs, and be loyal to the company (Srisuwan and Tan, 2015).

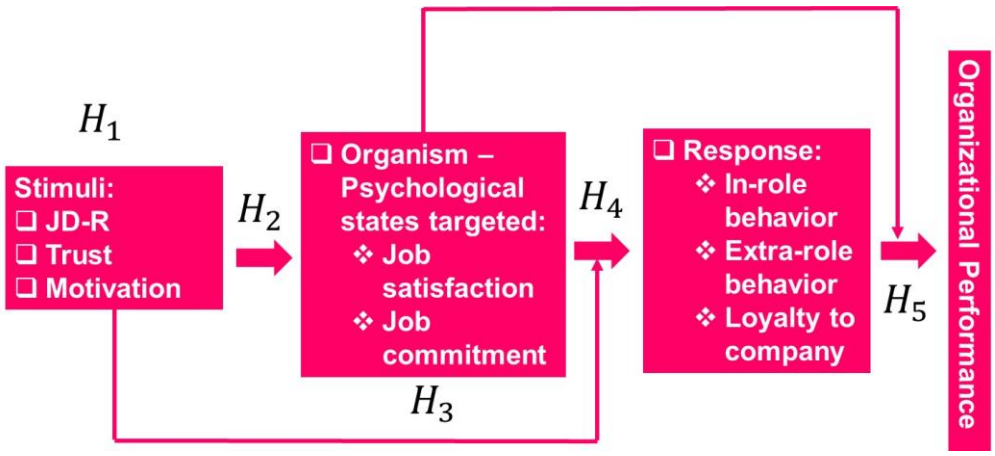


**Fig. 1:** An Extended S-O-R Conceptual Model

Descriptions of the hypothesis structure:

***H1:*** There is a positive interrelationship of the stimuli factors, consisting of JD-R, trust and motivation.

***H2:*** The stimuli positively influence the organism or psychological states of the employees that are manifested in job satisfaction and job commitment.

***H3:*** There is a positive interrelationship of the organism or psychological states namely between job satisfaction and job commitment.

***H4:*** Both stimuli and organism positively influence the response in terms of combined in-role and extra-role behaviors, and loyalty to company.

***H5:*** Both stimuli and response positively influence organizational performance.

The following sections provide the deductive logics supporting the derivation of H1 to H5.

*The Stimuli*

Theory of JD-R was comprehensively discussed in Bakker and Demerouti (2014). Employees can exploit resources reactively and proactively. Reactively, they simply accept the resources as the given that makes them satisfied and show commitment. Proactively, engaged workers can mobilize their own job resources to stay engaged, that is: JD-R not only stimulates the employees to trust, and to motivate them to perform better, but also to have in-role and extra-role work engagement influences, including loyalty, resulting in the hypothesis structure integrating *H1* to *H4*.

The partial contribution of *H4*, due to JD-R, is also supported empirically in that the different nature of job resources and demand can lead to different level of impact on both in-role and extra-role work engagement behaviors. Examples of job resources can include, for instance, social support (Karatepe and Olusegun, 2009), supervisory support and managerial

couching, which induce trust and confidences (Kalkavan and Katrinli, 2014), and also can include personal resources (Brown, William and Slocum, 1998) as manifested in TPB.

Apart from JD-R and trust, as stated above, employee motivation is an important stimulating factor in influencing the organismic or psychological state of employees. It is reported that those who are more motivated, intrinsically and extrinsically, with their jobs, are more satisfied with their organizations and are committed (see *H2*), partly contributable to the intrinsic job interests (Ryan and Edward, 2000). Also, with trust, the employees also show higher level of motivation, leading to more job satisfaction, job commitment, loyalty to company, and in-role and extra-role behavioral efforts (Srirattanaprasit and Tan, 2015).

*Organism or Psychological States*

Job commitment and job satisfaction are the two states of organism considered in this study. Job satisfaction is commonly defined as "the pleasurable or positive emotional state resulting from the appraisal of one's job or job experience" (Locke, 1976), which can be related to also meeting certain expectation such as expectation of job resources and demand (JD-R), and the trust associated with the relationship with supervisors and colleagues. This supports the *H2* logic demonstrated.

In addition, when employees are more satisfied with their jobs, they will show more commitment, and also contributes extra effort on jobs, supporting the internal states structure stated in *H3* and the O→ R structure of *H4*. In other words, satisfied employees would form stronger belief in their job roles (demonstrated in job commitment, as stated in hypothesis *H3*) and show a more willingness to exert considerable effort (both in-role and extra-role behaviors), and a strong desire to maintain membership (loyalty to company) as shown in the stated hypothesis *H4*.

*Responses and Organizational Performance*

Two important responses are loyalty to company and in-role and extra-role behaviors. The latter behavioral terms are coined in *Organizational Citizenship Behavior* (OCB) term. OCB was first introduced by Dennis Organ and his colleagues in early 1980s, and is defined as "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promote the effective functioning of the organization" (Organ, 1988), namely the performances of the organization. This logic extends the previous hypothetical structures to *H5*, as shown in the theoretical S-O-R model in Fig. 1.

In other words, organizational performance is attributable to how an employee behaves, both in-role and extra-role, and also to factors such as the organism or internal psychological states, as job commitment and job satisfaction, which further supports the hypothetical logic *H5*. In a similar vein, employees' organizational citizenship behavior (OCB) supports the effective functioning of an organization, especially the extra-role plays significant role, as managers cannot anticipate all scenarios in the workplaces, and thus, magnifying the extra-role of the employee help and proactiveness (Chen & Brian, 2018).

Now that the logical and deductive logics supported by the available literature are discussed, the next section would present the research method.

# Method

*Questionnaire Design*

The questionnaires were designed based on the empirically proven knowledge and theories of JD-R (Bakker and Demerouti, 2014), TPB (Ajzen, 1991), and adapting the measurement instruments of job satisfaction, job commitment, employees' behaviors, and organizational performance (Srirattanaprasit and Tan, 2015; Organ, 1988; Tan, 2016) in the theoretical context of *stimulus-organism-response* (SOR). Validity and reliability of the constructs are established by means of aligning the constructs to the context of the theories i.e., TPB, JD-R, psychological states targeted, behaviors and organizational performance, the definition of the construct, with applicability to the factory context of this study. Pilot tests were conducted to ensure that the measurement is fit for use, by combining the consensus and insights of the subject experts in both research methodology and HRM discipline, as well as by incorporating the views and opinions of the managers from both the manufacturers and the traders.

A consistent response pattern of the informants provides a basis for validity and reliability of the constructs. The validity and reliability assessments of the measurement instrument are also discussed in the "data analysis and result" section.

*Data Collection*

To test the hypotheses, a sample was selected from the representative factory labor workforces. Understanding them is important as the factory operations are labor-intensive. For reliability in responses, only long-term Thai workforces were engaged. This research purposively excludes the part-timers and short-term contractual workers as they are mostly non-Thai, with deficiency in English and Thai, and translating the questionnaire statements to them will significantly weaken the reliability and validity. This exclusion is also agreed upon by the managers of both the manufacturers and traders.

Specifically, among from the target population of nine manufacturers and twenty traders, the sampling covered five manufacturers and seven traders and 96 valid responses are collected. Table 1 presents the response rate in view of the current manufacturers and traders in the three targeted locations. The choice was made conveniently and aimed to have a uniform share between manufacturers and traders located in only Mueang Chiang Rai under the three sub-districts: Thasud, Ban Du and Nang Lae.

**Table 1:** Population and the Participants

| **Targeted Area** | **Thasud** | | **Ban Du** | | **Nang Lae** | | **Total** |
|---|---|---|---|---|---|---|---|
| | *M* | *T* | *M* | *T* | *M* | *T* | |
| Targeted population | | | | | | | |
| Existing factories | 2 | 12 | 5 | 14 | 4 | 15 | 52 |
| Closed factories during low-production season | 0 | 6 | 1 | 8 | 1 | 7 | 23 |
| Available factories | 2 | 6 | 4 | 6 | 3 | 8 | 29 |
| Sampling/Participated | | | | | | | |
| Factories willing to participate | 1 | 2 | 3 | 2 | 1 | 3 | 12 |
| Distributed questionnaires | 10 | 10 | 30 | 10 | 10 | 15 | 85 |
| Collected questionnaires | 14 | 10 | 27 | 11 | 12 | 22 | 96 |
| **Valid Response Set at 96** | | | | | | | |

Notes: *"M"* refers to Manufacturer and *"T"* refers to Trader

Data collection was carried out through personally administered questionnaire survey. Data collection was conducted during August to September 2019, at low-production periods.

The survey was fully supported by the manager of each respective manufacturer or trader. The first part of the questionnaire survey relates to the demographic and general profiles of the participants. The second part relates to the theoretical direction of this research. Response scale for the second part is five *Likert scale*, spanning from "strongly disagreed" to "strongly agreed".

**Data Analysis and Result**

Data analysis is divided into two parts; 1) analysis of the validity and reliability of the measurement instrument, and 2) analysis of the structural model – the fitness and the explanatory power reflected in percentage explained in the variance of the corresponding dependent variable, and the path coefficients to judge the supportability of the stated hypotheses.

*Descriptive Profile and Cross-Comparative Analysis*

Data were collected from 12 pineapple factories located in Thasud, Nang Lae, and Ban Du sub-districts of Mueang Chiang Rai District. Comparing the locations, Nang Lae's workforces show higher level of perceptions of all the constructs studied, at consistently mean value above 4 of the five *Likert scale*.

The profiles shown in Table 2 can visually infer that lower job resources, trust and motivation are significant factors causing the lower level of perceptual values for both Thasud and Ban Du.

**Table 2:** Demographic Data of the Respondents

| Descriptive | Frequency | Percentage | Job Demand | Job Resource | Trust | Motivation | Job Commitment | Loyalty to Company | Behaviors | Job Satisfaction | Organizational Performance |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Company Type | | | | | | | | | | | |
| Manufacturer | 63 | 65.6 | 4.175 | 4.022 | 4.021 | 4.096 | 4.376 | 4.164 | 4.314 | 4.068 | 4.355 |
| Trader | 33 | 34.4 | 3.919 | 3.830 | 4.232 | 3.828 | 4.060 | 3.920 | 3.882 | 3.866 | 4.273 |
| (t,df) | | | (1.971, 94) | | | (2.024, 94) | | | (4.452, 94) | | |
| Sig. (2-tailed) | | | 0.052 | | | 0.011 | | | 0.000 | | |
| Company Location | | | | | | | | | | | |
| Thasud | 21 | 21.9 | 4.081 | 3.743 | 3.714 | 3.789 | 4.222 | 3.841 | 4.253 | 3.812 | 4.319 |
| Nang Lae | 64 | 66.7 | 4.156 | 4.088 | 4.250 | 4.139 | 4.339 | 4.229 | 4.212 | 4.125 | 4.380 |
| Ban Du | 11 | 11.5 | 3.695 | 3.600 | 3.909 | 3.628 | 3.940 | 3.667 | 3.732 | 3.616 | 4.030 |
| (F, df1, df2) | | | (3.415, 2,93) | (5.605, 2,93) | (5.129, 2,93) | | | (5.207, 2,93) | (5.287, 2,93) | (4.409, 2,93) | |
| Sig. (2-tailed) | | | 0.037 | 0.005 | 0.008 | | | 0.007 | 0.007 | 0.015 | |
| Gender | | | | | | | | | | | |
| Male | 24 | 25.0 | 3.792 | 4.050 | 4.222 | 4.035 | 4.193 | 4.001 | 4.134 | 4.075 | 4.305 |
| Female | 72 | 75.0 | 4.185 | 3.925 | 4.051 | 3.994 | 4.292 | 4.107 | 4.176 | 3.973 | 4.334 |
| (t,df) | | | (-2.8,94) | | | | | | | | |
| Sig. (2-tailed) | | | 0.006 | | | | | | | | |
| Age | | | | | | | | | | | |
| Less than 20 | 16 | 16.7 | 4.208 | 4.000 | 4.374 | 3.931 | 4.168 | 4.044 | 3.833 | 3.871 | 4.271 |
| 20 to 30 | 43 | 44.8 | 3.937 | 3.805 | 4.000 | 3.897 | 4.116 | 3.907 | 4.119 | 3.906 | 4.318 |
| More than 30 | 37 | 38.5 | 4.208 | 4.114 | 4.081 | 4.160 | 4.487 | 4.297 | 4.365 | 4.161 | 4.361 |
| (F, df1, df2) | | | | | | | (4.626, | (3.419, | (7.808, | | |

| Descriptive | Frequency | Percentage | Job Demand | Job Resource | Trust | Motivation | Job Commitment | Loyalty to Company | Behaviors | Job Satisfaction | Organizational Performance |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2,93) | 2,93) | 2,93) | | |
| Sig. (2-tailed) | | | | | | | 0.012 | 0.037 | 0.001 | | |
| Designation | | | | | | | | | | | |
| Peeler | 31 | 32.3 | 4.130 | 4.013 | 3.882 | 4.016 | 4.205 | 4.118 | 4.257 | 3.930 | 4.269 |
| Packer | 49 | 51.0 | 4.013 | 3.910 | 4.204 | 3.940 | 4.347 | 4.076 | 4.121 | 3.992 | 4.374 |
| Production Service | 9 | 9.4 | 4.112 | 4.156 | 4.334 | 4.323 | 4.258 | 4.186 | 4.273 | 4.362 | 4.482 |
| QC (Quality controller) | 7 | 7.3 | 4.380 | 3.771 | 3.950 | 3.986 | 3.999 | 3.810 | 3.936 | 3.877 | 4.047 |
| Work experience | | | | | | | | | | | |
| Less than 1 year | 53 | 55.2 | 3.962 | 3.770 | 3.955 | 3.918 | 4.189 | 3.956 | 4.046 | 3.807 | 4.264 |
| 1-2 years | 29 | 30.2 | 4.069 | 4.097 | 4.253 | 4.060 | 4.253 | 4.139 | 4.286 | 4.179 | 4.358 |
| More than 2 years | 14 | 14.6 | 4.596 | 4.371 | 4.286 | 4.214 | 4.596 | 4.429 | 4.373 | 4.349 | 4.499 |
| (F, df1, df2) | | | (6.615, 2,93) | (4.914, 2,93) | | | (2.800, 2,93) | (2.893, 2,93) | (3.867, 2,93) | (6.294, 2,93) | |
| Sig. (2-tailed) | | | 0.002 | 0.009 | | | 0.066 | 0.060 | 0.024 | 0.003 | |
| Starting working time | | | | | | | | | | | |
| Earlier than 8 AM | 38 | 39.6 | 4.255 | 4.147 | 4.045 | 4.151 | 4.352 | 4.219 | 4.308 | 4.098 | 4.255 |
| Between 8-10 AM | 56 | 58.3 | 3.958 | 3.836 | 4.130 | 3.916 | 4.202 | 3.959 | 4.074 | 3.951 | 4.375 |
| Later than 10 AM | 2 | 2.1 | 4.500 | 3.700 | 4.000 | 3.670 | 4.500 | 4.835 | 4.045 | 3.440 | 4.335 |
| (F, df1, df2) | | | (3.259, 2,93) | | | | | (2.998, 2,93) | | | |
| Sig. (2-tailed) | | | 0.043 | | | | | 0.055 | | | |
| Average working hours | | | | | | | | | | | |
| Less than 8 hours | 2 | 2.1 | 4.000 | 3.500 | 3.665 | 3.500 | 3.665 | 3.500 | 3.875 | 3.625 | 4.500 |
| 8 to 10 hours | 69 | 71.9 | 3.981 | 4.032 | 4.106 | 4.044 | 4.314 | 4.063 | 4.235 | 4.105 | 4.309 |
| More than 10 hours | 25 | 26.0 | 4.386 | 3.784 | 4.093 | 3.933 | 4.187 | 4.174 | 3.999 | 3.733 | 4.360 |
| (F, df1, df2) | | | (4.304, 2,93) | | | | | | | (3.664, 2,93) | |
| Sig. (2-tailed) | | | 0.016 | | | | | | | 0.029 | |
| Living Area | | | | | | | | | | | |
| Near (Within 5 km) | 47 | 49.0 | 4.120 | 4.000 | 4.092 | 4.133 | 4.312 | 4.170 | 4.249 | 4.050 | 4.334 |
| Far (More than 5 km) | 49 | 51.0 | 4.055 | 3.914 | 4.095 | 3.881 | 4.225 | 3.993 | 4.086 | 3.949 | 4.320 |
| (t, df) | | | | | | (2.003, 94) | | | | | |
| Sig. (2-tailed) | | | | | | 0.048 | | | | | |

The female workforces felt jobs more demanded with lower matching of job resources, which is opposite to the male counterparts. Also, the older the workers, the job commitment and loyalty, and thus, the collective in-role and extra-role behaviors also stand higher. This phenomenon also applies to work experience duration – that is, the workers with longer years of the pineapple production experiences state higher for the constructs studied. In this way, the companies may have to take this factor into consideration, and gradually develops them to have strategic alignment and loyalty to the organizations.

An interesting weakness is found for the workforce starting work in between 8-10 AM. While the longer work hours can cause stressful states of the workers, Table 2 shows that, with the appropriate job resources provided and the trusts fostered with the colleagues and supervisors, the situation can be cushioned.

The workers who live further away show less motivated, but its impact to other factors is negligible. Comparing the company type, the employees of the manufacturers perceive higher job demanded when compared to the traders, such as the jobs need to pay high concentration, is very exhaustive, and with higher work load. Nevertheless, the manufacturer groups also show higher level of motivation and higher level of in-role and extra-role behaviors, partly could be attributable to higher level of matching job resources, and higher motivation.

*Validity and Reliability Assessments*

Prior to the SEM path analysis, quality assessment of the constructs is performed. What is not reliable can't be the base for validity. All the constructs met the 0.7 minimum threshold of the Cronbach's Alpha reliability as shown in Table 3.

**Table 3:** Factor and Reliability Analyses of Each Construct

| Constructs | Mean | Std. Dev. | Alpha | KMO | TVE | $\sqrt{TVE}$ |
|---|---|---|---|---|---|---|
| Job Demand | 4.087 | 0.614 | 0.752 | 0.683 | 0.670 | 0.818 |
| Job Resource | 3.956 | 0.729 | 0.887 | 0.865 | 0.696 | 0.834 |
| Trust | 4.094 | 0.697 | 0.777 | 0.650 | 0.695 | 0.833 |
| Motivation | 4.004 | 0.626 | 0.775 | 0.726 | 0.764 | 0.875 |
| Job Commitment | 4.268 | 0.585 | 0.773 | 0.675 | 0.694 | 0.833 |
| Loyalty to Company | 4.080 | 0.686 | 0.780 | 0.684 | 0.700 | 0.837 |
| Behaviors | 4.166 | 0.494 | 0.756 | 0.698 | 0.664 | 0.815 |
| Job Satisfaction | 3.998 | 0.639 | 0.888 | 0.864 | 0.582 | 0.763 |
| Organizational Performance | 4.327 | 0.491 | 0.772 | 0.698 | 0.687 | 0.829 |

Factor Loading: All > 0.7

Criterion for divergent: The diagonal must be higher than the cross-correlations coefficients

Based on the five agreeable *Likert scale* measurement, majority of the responses state above 4.0 scale, with minor weaknesses located in job resources.

The KMO, greater than 0.6, indicates the appropriateness of data reduction in the construct validity assessment.

Square-root of the total variance analysis is used to compare with the cross-correlations coefficients of the constructs, as given in Table 4. With the value more than the cross-correlations coefficients of the constructs, discriminant validity is assured of.

With the square-root of TVE for each of the construct shown exceeding the cross-correlations terms in Table 4, divergent validity is established.

**Table 4:** Correlations Analysis

| Constructs | JD | JR | T | M | JC | LtC | B | JS | OP |
|---|---|---|---|---|---|---|---|---|---|
| Job Demand (JD) | 1 | | | | | | | | |
| Job Resource (JR) | .530** | 1 | | | | | | | |
| Trust (T) | .456** | .717** | 1 | | | | | | |
| Motivation (M) | .494** | .797** | .724** | 1 | | | | | |
| Job Commitment (JC) | .450** | .590** | .644** | .725** | 1 | | | | |
| Loyalty to Company (LtC) | .528** | .672** | .688** | .768** | .800** | 1 | | | |
| Behaviors (B) | .470** | .599** | .435** | .661** | .646** | .602** | 1 | | |
| Job Satisfaction (JS) | .404** | .833** | .767** | .850** | .716** | .739** | .652** | 1 | |
| Organizational Performance (OP) | .394** | .611** | .565** | .635** | .680** | .623** | .572** | .615** | 1 |

**. Correlation is significant at the 0.01 level (2-tailed).
Correlations Coefficients are significant at the 0.01 level (2-tailed) **

With the total variance explained (TVE) exceeding 0.50, factor loading well above 0.70 for each measurement item of the construct, convergent validity is established.

Table 5 is the result proven of robust factor loading for each questionnaire-items. Thus, the questionnaire design is robustly of good quality.

**Table 5:** Factor Loading of the Questionnaire Survey Items

| Constructs | Items | Cronbach's Alpha | Factor Loading | Mean | Standard Deviation |
|---|---|---|---|---|---|
| **Stimulus:** | | | | | |
| **JD-R** | | | | | |
| Job Demand | The job needs me to pay high concentration. | 0.752 | 0.844 | 3.938 | 0.765 |
| | The job is very exhaustive. | | 0.825 | 4.375 | 0.715 |
| | The job has high work load. | | 0.785 | 3.948 | 0.773 |
| Job Resource | The job is fully supervised by supervisor. | 0.887 | 0.858 | 3.750 | 0.962 |
| | The working environment is safe to get the job well done. | | 0.865 | 3.875 | 0.757 |
| | Equipment needed to get the job done is always available in good quality. | | 0.870 | 4.083 | 0.948 |
| | Time provided to get the job done is adequate. | | 0.810 | 4.031 | 0.787 |
| | Team work is adequate to get the job done in good quality. | | 0.764 | 4.042 | 0.917 |
| **Trust** | Trust among colleagues is good. | 0.777 | 0.760 | 4.125 | 0.798 |

| Constructs | Items | Cronbach's Alpha | Factor Loading | Mean | Standard Deviation |
|---|---|---|---|---|---|
| | Trust with supervisor is good. | | 0.843 | 4.052 | 0.899 |
| | Overall, there is good trust atmosphere in this company. | | 0.892 | 4.104 | 0.814 |
| **Motivation** | | | | | |
| Extrinsic Motivation | The job provides good financial incentive to motivate me. | | 0.898 | 3.656 | 1.074 |
| | The company's policy is attractive to motivate me to work hard. | 0.755 | 0.898 | 3.729 | 0.946 |
| Intrinsic Motivation | I feel satisfied when I finish my job on time. | | 0.894 | 4.323 | 0.571 |
| | I feel happy to be able to get a job done with the team. | 0.729 | 0.712 | 4.250 | 0.616 |
| | I feel happy to be able to get a job done in good quality. | | 0.819 | 4.375 | 0.700 |
| **Organism:** | | | | | |
| Job Satisfaction | I am satisfied with overall job situation | | 0.761 | 4.094 | 0.650 |
| | I am satisfied with company policy. | | 0.852 | 3.875 | 0.798 |
| | I am satisfied with safety working environment. | | 0.824 | 3.917 | 0.842 |
| | I am satisfied with relationship with supervisor. | 0.888 | 0.675 | 4.052 | 0.999 |
| | I am satisfied with relations with colleagues. | | 0.676 | 4.146 | 0.740 |
| | I am satisfied with pay. | | 0.776 | 3.823 | 1.142 |
| | I am satisfied with ethics of the company. | | 0.806 | 3.990 | 0.718 |
| | I have work happiness. | | 0.710 | 4.073 | 0.837 |
| Job Commitment | I am willing to do what I can to get the job done well. | | 0.817 | 4.490 | 0.598 |
| | I am willing to do other additional job for benefiting this company. | 0.773 | 0.878 | 4.177 | 0.725 |
| | I am willing to work extra time to benefit the company. | | 0.802 | 4.135 | 0.776 |
| **Response:** | | | | | |
| In-Role Behavior | I do not waste time on job. | | 0.768 | 3.740 | 0.997 |
| | I do not waste resources on job. | 0.793 | 0.875 | 4.094 | 0.872 |
| | I always deliver to job requirement. | | 0.895 | 4.000 | 0.821 |
| Extra-Role Behavior | I am willing to help other when they are in need. | | 0.748 | 4.375 | 0.528 |
| | I am sincere to co-worker. | | 0.689 | 4.438 | 0.595 |
| | I am always willing to share idea with the company | 0.753 | 0.815 | 4.375 | 0.585 |
| | I am always willing to train new comers. | | 0.780 | 4.354 | 0.632 |

| Constructs | Items | Cronbach's Alpha | Factor Loading | Mean | Standard Deviation |
|---|---|---|---|---|---|
| Loyalty to Company | I am proud to tell others about this company. | 0.780 | 0.873 | 4.031 | 0.900 |
| | I would continue on this job for quite a long time. | | 0.792 | 3.927 | 0.849 |
| | I am willing to put in extra effort to deliver the job assignment on time. | | 0.843 | 4.281 | 0.706 |
| **Organizational Performance** | | | | | |
| Job Performance | We often can finish our assigned job on time. | 0.772 | 0.842 | 4.313 | 0.586 |
| | Our works meet the quality standard of our company. | | 0.829 | 4.250 | 0.598 |
| | Our works meet the quality standard of our customer. | | 0.816 | 4.417 | 0.592 |

*Hypothesis testing*

The correlations result in Table 6 provides a support for the first hypothesis relationship stated in *H1*. The other hypotheses are shown to be supported in Table 6 and by the structural path model given in Fig. 2.

**Table 6:** Hypothesis Supporting Details

| Dependent Variable | Independent Variable | Beta | t-value | Sig. | Hypo. | Result |
|---|---|---|---|---|---|---|
| Organizational Performance $R^2 = 0.51$ | Job Commitment | 0.37 | 2.817 | 0.006 | $H_5$ | Support |
| | Loyalty to Company | 0.11 | 0.799 | 0.426 | $H_5$ | |
| | Behaviors (OCB) | 0.16 | 1.542 | 0.126 | $H_5$ | |
| | Job Satisfaction | 0.17 | 0.166 | 0.172 | $H_5$ | |
| Job Commitment $R^2 = 0.60$ | Job Resource | -0.27 | -2.030 | 0.045 | $H_2$ | Support |
| | Job Demand | 0.16 | 1.956 | 0.054 | $H_2$ | |
| | Trust | 0.16 | 1.463 | 0.147 | $H_2$ | |
| | Motivation | 0.38 | 2.743 | 0.007 | $H_2$ | |
| | Job Satisfaction | 0.44 | 2.783 | 0.007 | $H_3$ | |
| Loyalty to Company $R^2 = 0.74$ | Job Resource | 0.02 | 0.179 | 0.858 | $H_4$ | Support |
| | Job Demand | 0.13 | 1.880 | 0.063 | $H_4$ | |
| | Trust | 0.10 | 1.165 | 0.247 | $H_4$ | |
| | Motivation | 0.21 | 1.851 | 0.067 | $H_4$ | |
| | Job Commitment | 0.44 | 5.155 | 0.000 | $H_4$ | |
| | Job Satisfaction | 0.09 | 0.698 | 0.487 | $H_4$ | |
| OCB $R^2 = 0.57$ | Job Resource | 0.10 | 0.704 | 0.483 | $H_4$ | Support |
| | Job Demand | 0.18 | 2.132 | 0.036 | $H_4$ | |
| | Trust | -0.35 | -3.098 | 0.003 | $H_4$ | |
| | Motivation | 0.21 | 1.404 | 0.164 | $H_4$ | |
| | Job Commitment | 0.33 | 3.003 | 0.003 | $H_4$ | |
| | Job Satisfaction | 0.35 | 2.083 | 0.040 | $H_4$ | |
| Job Satisfaction $R^2 = 0.82$ | Job Resource | 0.38 | 4.766 | 0.000 | $H_2$ | Support |
| | Job Demand | -0.12 | -2.261 | 0.026 | $H_2$ | |
| | Trust | 0.23 | 3.357 | 0.001 | $H_2$ | |
| | Motivation | 0.44 | 5.466 | 0.000 | $H_2$ | |

The structural path model in Fig. 2 reveals a satisfactory fit to the data, with the model fit statistics shown in Table 7.

The structural equation model (SEM) is evidenced with absolute model fits:

$\chi^2$= 6.257, $\chi^2$/df = 1.251, p > 0.005 (which signifies significant absolute model fit by the livelihood function), RMSEA = 0.051, and

Incremental fits, as evidenced by NFI = 0.992, RFI = 0.939, IFI = 0.998, CIF = 0.998 (Hair, Joe, Hopkins and Kuppelwieser, 2014).

The ability to explain each of the dependent variable's variances in each of the hypotheses are ranged in between 0.50 to 0.80, which signifies the significant ability of the model to explain the relevant phenomena.

Though the stimuli, consisting of job resources, job demand, trust and motivation, are important, the organistic states of job commitment and job satisfaction, as mediators, should not be ignored, as these mediators significantly influence employee behaviors positively and loyalty to company, which then, forms the basis of organizational performance.

A direct implication to the traders and manufacturers is the strategy they need to develop to improve job commitment, loyalty and satisfaction, and most importantly, to drive employee behaviors that have direct impact on organizational performance.

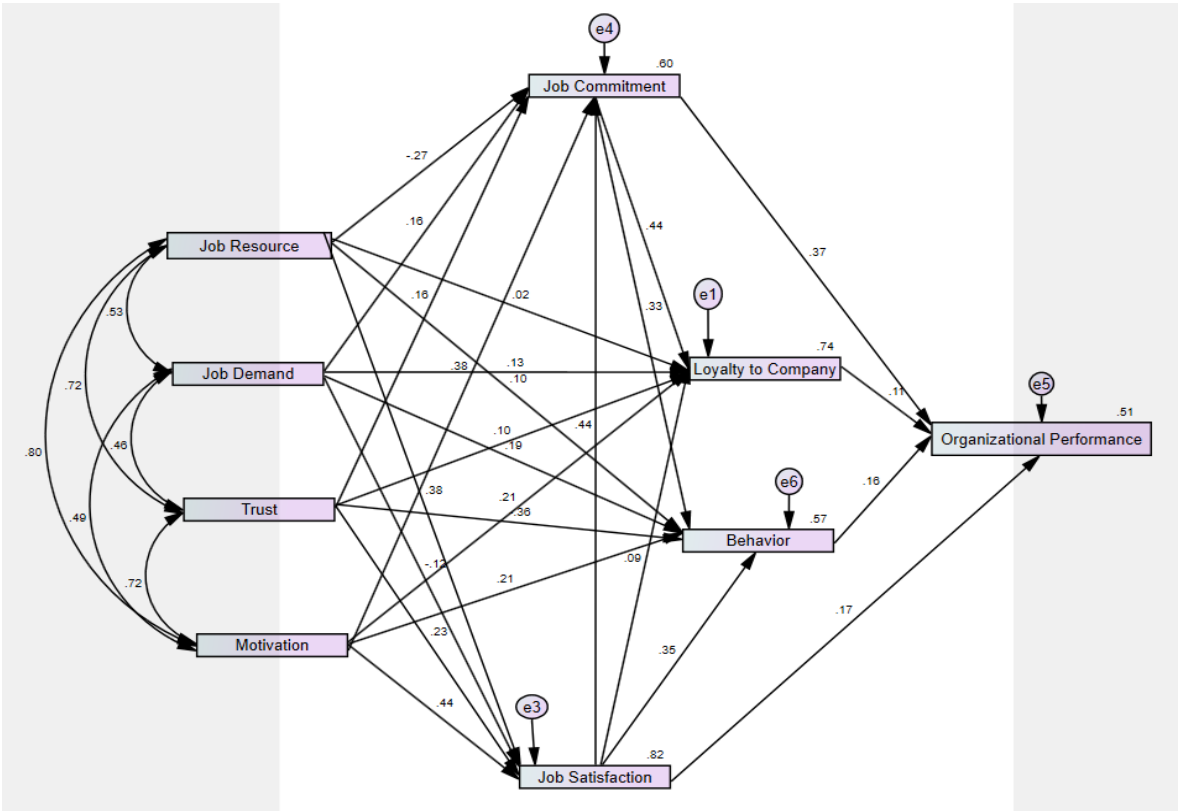


**Fig. 2:** The Validated Structure Equation Model

Table 7 below presents the SEM fit statistics, surpassing all the requirements for a good model fit.

**Table 7**: Model Fit Statistics

**CMIN**

| Model | NPAR | CMIN | DF | P | CMIN/DF |
|---|---|---|---|---|---|
| Default model | 49 | 6.257 | 5 | .282 | 1.251 |
| Saturated model | 54 | .000 | 0 | | |
| Independence model | 18 | 743.894 | 36 | .000 | 20.664 |

**Baseline Comparisons**

| Model | NFI Delta1 | RFI rho1 | IFI Delta2 | TLI rho2 | CFI |
|---|---|---|---|---|---|
| Default Model | .992 | .939 | .998 | .987 | .998 |
| Saturated Model | 1.000 | | 1.000 | | 1.000 |
| Independence Model | .000 | .000 | .000 | .000 | .000 |

**RMSEA**

| Model | RMSEA | LO 90 | HI 90 | PCLOSE |
|---|---|---|---|---|
| Default Model | .051 | .000 | .158 | .412 |
| Independence Model | .455 | .427 | .484 | .000 |

## Conclusion

The Job Demand-Resources (JD-R) theory was empirically shown supported, along with motivation and trust to colleagues and supervisors, to influence the organism or internal psychological states of the employees.

The model proposed and SEM-tested to fit demonstrates an extended S-O-R (Stimuli-Organism-Response) paradigm in working. The S-O-R was popularly used to study consumer behaviors and community behaviors towards a common purpose such as to establish a community-based tourism (CBT). This research demonstrates that S-O-R is equally suitable for studying workforce behaviors and their contributions to organizational performances.

The SEM is laid out in a way to allow the studying of the mediator effect of organism and the response factors to organizational performance. It concludes that organism plays a mediating role, at least partially, to leverage the stimulating factors such as JD-R, motivation and trust. And, both loyalty and behavioral responses are also playing the mediating role in leveraging the relationship between organism and organizational performance.

There are also practical implications demonstrated by the ANOVA and T-tests, which outlines a need of the companies to allocate budgets on human resource development and management (HRD, HRM) for the workforces, especially those who just join, with work experiences less than one year.

Those who work longer hours feel the higher demand stresses, and the organizations should ensure appropriate job resources are matched so as to not negatively influence the organismic states of the employees, which can cause lower level of in-role and extra-role

behaviors for organizational level of contributions. The companies should also pay more attention to female workforces, as they show higher level of job demand with lower job resources matched, which causes lower level of job satisfaction and motivation.

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# A Community-Based Case Study of Coffee Farming in Thailand

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## Abstract

Coffee farming is very important to Chiang Rai, Thailand, and most of the coffee crops are produced in the highlands of ethnicity-crowded communities. Nevertheless, a rich case understanding of how the coffee farming has been practicing is lacking. Relying on in-depth interviews and field observations, this study presents how a specialty-coffee farmer integrates sustainable farming practices and market orientations in a management framework that resembles balanced scorecard (BSC) and strategy mapping concepts. The case illuminated is award-winner which testifies to the central role of sustainability principle and motivators to stimulate learning and growth of the farmer, and in turn, contributes to continuing improvement of farming, coffee-making and marketing processes, to contribute to the sustainability aspects of performances. The semi-structured interview protocols, which provide the guidelines to guide the interviewing process, are facilitated using the CATWOE-guided root definition concept of the soft-systems methodology (SSM) to ensure triangulated coverage of important respondents and the coverage scopes for systemic insights.

**Keywords**: Balanced scorecard; Community; Soft Systems Methodology; Specialty Coffee Farming; Strategy Map; Sustainability.

## Introduction

Community-based case study of coffee *farming business* in Thailand is something not academically reported. An outline of the current states of knowledge available in the extant literature is presented to guide and rationalize how the research is to be organized and approached.

First of all, whether we approach from a commercial perspective, socio-cultural, or ecological perspective, sustainability is a theme for a business, or in particular, a community-based business to sustain its viability. To improve the viability of coffee farming business, researchers and practitioners have shown it is important to focus by integrating a multitude of factors, normatively, based on some proven principles or theories (Galdeano, Aznar-Sanchez, Perez-Mesa, and Piedra-Munoz, 2017), while it is also equally important to derive monitoring and management system, and cultivate the ability to counteract emerging trends and risks

(Tan, 2020). Obvious potential risk factors include climate change, population pressure, low yields of crops, and coffee price volatility (Rahn, et al., 2018).

Community-based cases are of much complication, which involve not only agricultural sustainability issues, but also human activities that traditionally carry various social connotations and localized socio-cultural norms. To tackle socio-technical problem, Jackson (2000) recommends approaches from a soft system rather than hard systems methodology – that is, to approach using systems-oriented problem-solving and research technique with a soft-methodological emphasis. While the hard systems methodology, such as engineering optimization, is based upon an optimization paradigm that is modeled on the natural scientific method, the soft systems methodology (SSM) embraces a paradigm of learning and also needs to concern the socio-cultural connections forged upon from the meanings attributed to a group, and the member of the community. In reality, there is no contradiction to both hard and soft systems methodologies, and the only fact is that the soft systems methodology (SSM) acknowledges the ill-structure of the issues and it gears toward "relationship-maintaining" of the involving parties, and thus, is more human behavior-oriented (Checkland, 1981). Ill-structured context is highly suitable for case research approach, which can rely on in-depth interviews, documentary reviews and field observations, to provide rich descriptions, to explore issues or phenomena not easily discussed in the published literature, and to explain the phenomenon in both surface and deep level (Yin, 1994). Both SSM and case research method are highly suitable to ill-structured research issues and problems, and each has its distinctive advantages, and both can be approach from an interpretative paradigm (rather than positivistic paradigm). Nevertheless, there is a dearth of knowledge combining both SSM and case method, and this becomes a contributory entry-point of this research, which is made possible by using the SSM guidelines, especially the CATWOE root definition to provide a rule- and fact-based protocol for the case method. The CATWOE-based protocol sets up flexibly the question boundaries that help to illuminate the empirical issues with robust theoretical footings.

The steps involved in SSM, which takes root in interpretative paradigm, in order to understand and tackle issues such as sustainability-targeted coffee farming, are given in Fig. 1.

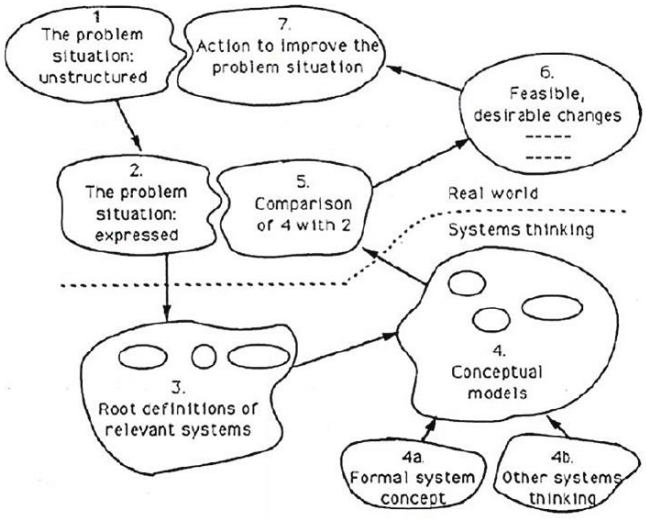


**Fig. 1:** The Learning Cycle of Soft Systems Methodology (Adapted from Jackson, 2000)

In the first and second stages of the SSM, a problem situation is entered and expressed – which relates to a sustainability need and viability of specialty, nature-based coffee farming business. The third activity, as shown in Fig. 1, involves choosing the relevant human activity systems to offer insights into the problem situation, which is enabled by a well-defined root definition by giving consideration to all the elements brought to mind by the mnemonic CATWOE: Customers, Actors, Transforming process, Weltanschauung, Owners, and Environmental constraints.

From a research methodological perspective, CATWOE stands to broaden the considerations of relevant informants, including constraints and the case context, so that the case research procedure would lead to more valid finding and conclusion. The informant-inclusive root definition would enable the researcher to robustly conceptualize the systems-oriented model that describes the case issue. The conceptual model in Fig. 1 would also need to be checked with the informants to ensure that they are not fundamentally deficient (Checkland, 1981), and that the model actually reflects and systematically addresses the expressed problem situation realistically, at Stage five. Stages six and seven are included only as parts of the implications to offer in this research study, and provides the insights and suggestions for the informants to make further improvement. Based on the concept of sustainability as narrated in the literature review section and the interviews, balanced scorecard (BSC) and strategy mapping structures are considered as suitable framework to embrace the key themes identified from the in-depth interviews and numerous field-visit observations and discussions.

In sum, this research exploits SSM approach to guide the case study of a community-based coffee farming business. Coffee production is an important primary economic sector in Chiang Rai, Thailand. As the businesses in Chiang Rai are, in majority, small-scale in nature, understanding how a fund-lacked community member actually performs, wins rewards, obtains certification, and gets brand awareness, is an important piece of knowledge sharing. Specifically, the research objective is:

> to develop a BSC and strategy mapping structure, based on numerous field-visits, observations and discussions, and in-depth interviews, to narrate and explain how a community member has been successful in implementing a sustainability-driven coffee-farming business.

As stated in Huarng and Mas-Tur (2015), each theory is a lens that allows the researcher and practitioners to interpret a certain form of innovation and knowledge, to identify a particular set of problems, and to seek a variety of solutions to those problems. Without a-priori literature evidences of similar context, this study is both exploratory and explanatory in nature.

## Literature Review

The literature review highlights two important theoretical domains, namely sustainability and the concept of balanced scorecard and strategy map to guide the theoretical framework development of the qualitative research.

Traditionally, coffee plantations use shade-based concepts and procedures, under the rain forest canopy, to serve as a habitat for migratory birds as well, and gradually, full sun

farms system is employed under the pressure of mass demand and productivity requirement. Having realized the harmful environmental impact of full-sun farming practice, there is a returning trend, particularly advocated by many NGOs such as Rainforest Alliance and Bird Friendly (Garlough, Gordon and Bauer, 2008), to promote shade-grown certifications.

Specifically, there are two approaches to sustainability-oriented farming, which community-based coffee farming practices can adapt: (1) Sustainability as an approach, and (2) sustainability as a property. Galdeano, Aznar-Sanchez, Perez-Mesa, and Piedra-Munoz, (2017) recognize that the first approach is more normative in nature, and is focused "more on environmental aspects, proposing the most ecological agricultural processes as more suitable alternatives", and the second approach, as property, is "more positive and descriptive in nature, as well as changeable depending on spatial and time context, making sustainability a result of exchange and interrelationships between economic, social and ecological objectives (Kates, Parris and Leiserowitz, 2005).

Whichever the approaches, ecosystem is a necessary systems factor. Coupled with the agricultural development, agro-ecosystem is formed, which differs in various vegetation structure, shade tree diversity, and socio-economic characteristics. Based on the data collected in the three neighboring districts of Mt. Elgon, Uganda, Rahn et al. (2018) discover that shade-tree density appears to be related with smaller plot sizes and lacks of access to credit. Furthermore, when farm size exceeds household food needs, mono-crop coffee systems with little to no intercropping of bananas or shade trees seem more possible.

Depending on spatial and socio-cultural differences, things concluded in Rahn et al. (2018) may not necessarily be applicable to Thailand. For a sustainable crops-environmental integration, Boone, Roldan-Ruiz, Van Linden, Muylle and Dewulf (2019) advocate integrating the three important ecosystem service elements into consideration, namely: $ES_{prov}$, $ES_{reg}$, and $ES_{cul}$:

> $ES_{reg}$, refers to "the supply of cultivated terrestrial plants and the contribution to genetic diversity by agro-ecosystems", $ES_{reg}$ regulates to support the quality of $ES_{prov}$, such as "pollination, biological control, carbon accumulation, soil erosion control, soil formation, nitrogen fixation, and hydrological flow" , and $ES_{cul}$, are strongly related to human values and behavior, and patterns of, for instance, the community-based case organization of its businesses, which can also be adapted to offer community-based tourism (CBT) services (Tan, 2018a; Tan & Sitikarn, 2019).

To better exploit the sustainability principle in coffee-farming, this study suggests using BSC and strategy mapping as an effective management framework, which shares the concept proposed and empirically tested in Tan and Sitikarn (2019) in community-based tourism context, and Tan (2020) for the hotel industry in Indonesia. BSC and strategy mapping are interconnected through a logic that "what gets measured gets managed and accomplished, but strategically, with strategic essence" (Tan, 2018a). On the one hand, organization needs to make explicitly clear of its strategy, which describes how a company intends to create value for its shareholders, customers, and citizens (Kaplan & Norton, 2004), and on the other hand, the organization uses BSC as a measurement platform. BSC was once noted as "among the most significant developments in management accounting and thus, deserves intense research attention" (Atkinson et al., 1997). Organizations implementing according to BSC has resulted in significant economic and performance improvements,

particularly, when the BSC implementation is determined by a "best fit" between the concept and the current conditions of the organizations, such as its contextual condition (Hoque, 2014).

Apart from measurement or monitoring, it is important organization has a clear picture of its logic of competition, and that can be described by strategy map – a causal logic of competitive factors or things emphasized (Tan and Sitikarn, 2019). There are certain logics to follow, as some preliminary theoretical guidelines to acknowledge before entering the case-study field, and the key ones are projected from the four BSC perspectives, summarized as follows:

- To be uniquely different in the farming business, strategy formulation should centralize on a clear set of customer value proposition (CVP). Company uses CVP as focal theme to transform itself (Mahajan, 2016).
- Long-term basis, i.e., a more holistic, sustainability-based conceptualization, as long-term strategy creates more value than short-term focus. To provide more aligned long-term focus, i.e., sustainability, Young and Dhana (2013) recommend approaching to design and implement strategies that correspond to certain "drivers" from a combination of "today," "tomorrow," and "internal". Long-term basis like sustainability orientation becomes urgently important with respect to the limitation of resources and the acceleration of consumption level. To be exact, to sustain business holistically, normatively, organizations are recommended to consider TTL (tripled top-lines), which establishes three simultaneous requirements of sustainable business activities – financial benefits for the company, natural world betterment, and social advantages for employees and members of the local community – with each of these three components recognized as equal in status (Tueth, 2010).
- To enable value creation, internal business process must be incorporated for the strategic and systematic improvement and innovation.
- To accomplish the strategic focus in the BSC and strategy mapping, it is important various strategic themes are used to drive the design and implementation of strategies (Kaplan & Norton, 2004).

## Method

The research method employed is singe-case study method, which exploits an in-depth investigation of a community-based case. The case is exemplary and has demonstrated the full commitment, the competencies and systems approach to realize sustainability in specialty-coffee farming business. Due to the fact the case fits the prescribed nature and the willingness to show the systems details of how it becomes successful, it is chosen.

A single case is descriptively rich, and the ability to share detailed descriptions provide the contents for validity and theoretical generalization. The case selected has won Thailand's specialty, nature coffee reward, and certifications to organic, specialty and nature-based coffees lately, making it an exemplar for others to emulate, particularly when the case represents a single man, alone, learns and grows, and commits to do the right things for himself, his family, his community, and shares the values created with anyone who wants to prescribe on a sustainability-oriented coffee-farming business. Certification is a base providing credible information to consumers about the attributes of the coffee products and its procedure (Ssbunya, Schader, Baumgart, Landert, Altenbuchner, Schmid, & Stolze, 2019).

To approach in examining the case, interpretative paradigm is based, which underpins on a need to get closer to the informants, and describes things from their own views. To further help push forward with a proven systematic approach, soft systems methodology (SSM) guideline is adapted. According to Jackson (2000), systemic modernism, as its name suggests, is identified with the systems approach as a means of both understanding society and programming it for more effective performance. This research uses SSM to not only suggest a model of sustainable coffee farming business, but also to advocate its ability to lead the one who uses it to perform – that is what systems approach is advocating for. To get a rich picture of what is involved with the case issue, the CATMOE-based root definition of the relevant purposeful activity system would first be outlined. The root definition would then guide the interviewing process and the subsequent construction of the conceptual models of the systems. Once constructed, the conceptual models can be checked against with the informants, in order to ensure that they are not fundamentally deficient, which yields, from the research viewpoint, the validity, reliability and theoretical generalizability assurance.

In particular, the empirical basis of the case method is drawn from three important informants, namely the owner, a market manager, and customers. The latter is a voice being reflected in the social media channel of the case. *Josado Coffee Farm* is chosen as the candidate in view of its profile fitness to the research requirement. The farm is located in Ban Mae Chan Tai. The owner resigned his secured job in Bangkok, in year 2014, and started from scratch on a sustainability-targeted coffee-farming business, under the concept of "Think for Sustainability", with four pillars as the cognitive, emotional and behavioral driving forces: 1) Sustainability for environment and nature, 2) Sustainability for coffee farming, 3) Sustainability for farmers, and 4) Sustainability for customers. The interviews and field observations were completed in 2019, which reflected 5-6 years of the case effort working on 100% organic coffee farming, aiming to deliver the quality fruity tastes (i.e., lemon and honey, and Jasmine), healthy coffee to customers and the markets. Brand creation has been in the awareness creation stage for about 2 years. The effort resulted in Josado being awarded the "Thai Specialty Coffee Award" in March, 2019, and Thailand Excellent Coffee 2018 ACID.

## Data Analysis

The model synthesized from the interviews and field observations would be assisted based, fundamentally, on the CATWOE root definition described as follows:

- Customers – The market accepting healthy choice of specialty, nature coffees.
- Actors – Anyone involves in the sustainable farming and business operations.
- Transformation process – a balanced management and measurement approach to the business and farming operations that result in economic success, ecological healthiness of the farming land, and which also benefits the community or other relevant stakeholders.
- Weltanschauung – A belief system, or worldview advocating on "CSV" (Creating Shared Value) and ecological sustainability.
- Owner – The owner can be considered as an agroecological coffee farmer and business entity that relies on principles of ecological sustainability and sharing of value creation with other stakeholders in driving the business.
- Environmental constraint – The community is located in highland, of rich fertile soil that can naturally support the nutrients supplying systems for coffees farming.

The CATWOE root definition provides the fundamental cognitive and reflective basis for the interviews, questioning, field observations, document reviews, and theory development.

Themes identified from the interviews scripts analysis and field observations are grouped into 1) Drivers, 2) Learning and Growth, 3) Business Processes, 4) Customers, and 5) Sustainability, which fits into the extended BSC structure.

The important drivers that stimulate and push forward the commitment for sustainability-driven coffee farming business are: hardship, no-electricity, difficulty during raining season, and forest sustainability:

> "We have applied to government for fund on road maintenance and electricity for six years, and could wait for additional five years. Nevertheless, these hardships will not deter me, and motivated me to work harder."

> "From May to November each year, we generally have the raining season, and we have to rely on 4-wheel to move around, such as to the top of the forest mountain where the coffee crops are there. Never an easy life. To get there during the raining period, we have to be very familiar with the road pattern and situation, such as turn. This is challenge for visitors as well. We also need to protect our forest so we can get solid soil, not using chemical, and so the nutrients are supported and maintained naturally, based on biodiversity of natural plants and the bees in the forests. Thus, sustainability is a central motivator and mission of us when we started the organic farming practices".

> "The forest is maintained by Mae Jan Tai members and not by our government. Thus, we have to pay even more attention to provide a sustainable basis to the forest. The forest is the source and resource for everything possible to us. We know it is not an easy issue, especially we are dealing with a community of large family members – a total of 39 family houses. Thus, Josado decided to be a model of coffee farming that makes use of our natural resources in sustainable way, and not use any chemicals. We can then proudly share our knowledge with our next generation – Organic farming is the way. But we also need to ensure that the organic farming can produce distinctive coffee products known as specialty and natural coffee".

Among the drivers, the environmental constraint is the fundamental driver, which motivates a need to provide ecological services ($ES_{prov}$) to regulate the nutrients and quality of the ecological system in the specialty-coffee farming practices. The motivational factors of the owner of the case in study are tightly linked to the provisional and regulatory functions of sustainability-enabled ecological services:

> "Our mission is to produce organic coffee, advise to community on sustainable coffee-farming practice, to produce best naturally grown specialty coffee, protect upstream forest, focus on brand as one of the

choices for coffee lovers, and sustainability stretches from farm to cup, in making 'Creating Shared Value' (CSV) possible.

The mission stated and reiterated many times by the owner and the marketing manager highlights the suitability of the BSC-structured strategy mapping, with an extended principle- or value-based motivator, as shown in Fig. 2, in driving the learning and growth.


**Fig. 2:** The Four Normal Perspectives of BSC + Principle- and Value-based Motivator as an Extension

The "financial" perspective is replaced by a broader perspective, which is 3P (profit: financial, people: the community, and planet: the forest). The owner stated the core objective as follows:

> "Our objective is simple and straightforward – to be sustainable, along the 'Thinking for Sustainability' slogan. This drives our products and our efforts, even in learning. We want to deliver healthy coffees to our customers. Majority of the coffee in the market is either instant and fresh, with minor 10% plus of the market belonging to premium, and specialty coffee remains even smaller portion. To give our customers healthy coffee is the sustainability at the customer side. If you try to fit into the 3P, I would say the people, but the customer aspect. To sustain, we need to also sustain from the market, and healthiness of customers is the best stable basis for sustainability."

The causal map structure of Fig. 2 reflects the MOST (Mission → Objective → Strategy → Tactics) sequence of strategic management (Tan, 2018a). The case advocates on three sustainability objectives and principles (see the value-based motivator and principle in Fig. 2), which is a concept that integrates the requirements of various stakeholders from farm to table in sustainable way: 1) Sustainability basis: farm to cup – which means sustainability stretches the entire value chain, 2) Naturally grown specialty coffee for healthiness – which highlights the organic operations and the alignment with the forest, and 3) creating shared value (for scaling) – which outlines the intention to scale-up the sharing with people, which is

social-value driven objective in alignment with CSV (Creating Shared Value) concept of Porter and Kramer (2011). Promoting CSV also provides a unique way for brand awareness and recognition management.

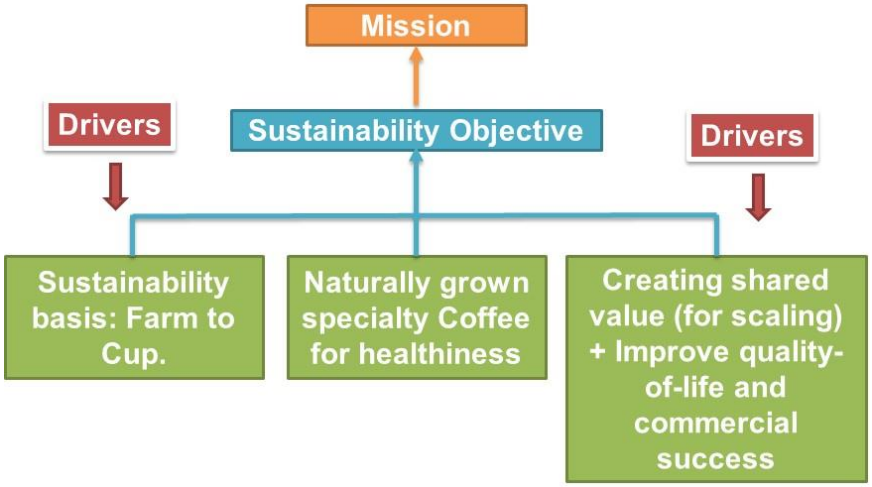


**Fig. 3:** The Three Core Strategic Themes

According to the case, the sustainability principle has helped them develop and sustain their efforts in other perspectives, namely customers, processes, and learning and growth. "Standardization" is particularly emphasized by the case in the process domain of the BSC framework. Stated the owner:

> "Everything we do – from cupping, to our farming operations, even learning procedures, we focus on standardization. When things are standardized, we can repeat. I have shown you the trial zone, and mass production zone, and all these are possible because of our standardization. The standardization of the ways we do, farming, product delivery steps, even communication and presentation to share with others, is made possible by our commitment and effort in continuous learning. Knowledge leads to standardization. Standardization leads to quality and recognition. Our customers slowly and gradually recognize our standardization, our efforts, our persistency, our honesty. Standardization is thus very important."

According to the case, it is learned that CSV (Creating Shared Value) is not only about a principle, but should become a process to manage. Josado believes in sharing value with the community, the customers, the certification body, the experts, and other relevant stakeholders. The case, Josado, has seen, through sharing, adds more knowledge, improves communication skills, gets more ideas, has others to help and support, and most importantly, expands the community memberships who share the same spirit and do the right things together. Stated the marketing manager:

> "We share what we have learned with anyone who is interested to learn and apply the similar concept to their farms. We also need to share our value spirit to others so that we can motivate others to help us. CSV is both ways benefiting".

Apart from standardization and CSV process management, the case reiterates on the brand management aspect as a key process to manage. Stated the marketing manager as follows:

> "Brand building is very important if we want to be sustainable. If no one recognizes our products and the unique way of our efforts, then, what we advocate will be meaningless. Thus, we need to build brand recognition. Many things we need to do. First of all, we need to convince to others that our brand stands for specialty and natural coffee. Second, we also need to understand and focus on the lifestyle of people, customers, so that they recognize that our products can match their lifestyle. With that, we can have consistent or continuing purchases." The marketing manager further noted: "This is how we position ourselves – being unique specialty-coffee, natural coffee farmer and value-added producer. Also, we stress on creating shared value – to share what we created and made successful to other members in our community, or other communities, to our customers, and to anyone that can replicate our successes. We had won specialty coffee award, and you see to yourself the sustainable farming practices we have. Time to enlarge our scale and share with others !!!"

Award-winning is certainly a testimonial of their customer and brand management, and farming operations efforts. Other factors and initiatives in brand and customer management include service qualities, packaging design, and dedication to CSR (Corporate Social Responsibility). According to the case owner, award-winning is a platform for benchmarking, standardization, learning and growth, and process improvement, and evidence that their efforts have succeeded to cause buy-in the markets.

Learning and growing is very much the essential driving force for everything that happens, whether on farming process improvement, standardization, brand creation, and award winning. While learning and growing drives everything on the BSC, it is also stimulated by the principle- and value-based motivators, as shown in Fig. 2. That is, through stimulating the changes of views and take commitment to be fact-driven in management, learning mechanism is able to demonstrate its ability to help an organization engage in transformation (Tan, 2018b). Evidences of learning and growth are numerous:

> Farms are separated into trial farms (learning purpose) and quality-successful farms, as shown in Fig. 4, and through systematic learning and experimentation, they gradually crystallize their farms with sustainable practices and standardization, leading to sound bio-ecological health. They learn the international principles on coffee tasting and the significance of coffee varieties, such as fruity taste of coffees. Both the owner and the marketing managers stated: "Fruity represents healthiness, and provides the product base for us."


**Fig. 4:** Trial Farms and Quality- Standardized Farms

> In terms of learning and growth of the coffee species and varieties, stated the owner: "We now have more than 10 species in our coffee farms. This is important as we can control and customize the tastes that are unique to the markets. We also learn to blend different varieties, and study how to process them, in order to create different types of tastes. We study defect of coffee beans, and roasting operations. We bought a small roaster from Taiwan, and experimented for two years on roasting, and makes us able to better deliver good quality coffees to our customers. When we learn, we really grow, and in many aspects, such as in farm operations, and the processes from farms to cupping."

Josado continues to grow many unique species of coffees, such as "Getcha", which is very valuable and expensive coffee in the world. To do so, they make use of their experimentation and testing farms, and install systematic monitoring, and learn to grow "Getcha". Clearly, through continuous learning, they grow by gaining a wide spectrum of knowledge spanning from farms to cupping. Any stages of the production chain are important, if real value is to be created. Only the knowledge truly gained from learning and growing experiences can they truly share the values to others. On the one hand, they intend to share the good practices, and on the other hand, they also have to preserve unique know-how for differentiation and value-capturing.

## Conclusion

Looking into the ecological nature of the community-based farming practice, it can be said that the vegetation structure is of one of multi-layered, diversified shade (Jezeer et al., 2018), which has only less than a quarter of coffee plantations worldwide (Jha, et al., 2014). The farming-sustainability topic has become increasingly important in research, especially in view of the climate variability that has shown tremendous negative impact on agricultural livelihoods (Mulinde et al., 2019). This study demonstrates how a community member is able to implement a sustainability-oriented specialty coffee-farming business, starting from scratch. This study presents the five-year efforts of the case in BSC-structured strategy map framework.

Specifically, the CSV (Creating Shared Value) principle provides an aspect of aspiration and motivation for the case organization Josado, which can be grouped into three domains, namely:

1) Reconceiving products and markets – to provide the markets with naturally grown, organic and specialty coffees, filled with healthy, natural fruity tastes,

2) Redefining productivity in the value-chain – through making use of natural fertility, and bio-diversity, the ecological service is of quality to support the productive growth of specialty coffees, and

3) enabling local cluster development – by the support of the community, and cross-pollination of ideas and exchanges of knowledge, including a collective commitment for a common movement towards sustainability-oriented specialty-coffee farming businesses.

Through a systematic value-based motivation, it not only provides a focus for internal business process standardization, i.e., in farming to cupping, but also establishes an identity that is uniquely associated with the sustainability and CSV-driven business practices. In a way, the strategy map reflects and extends the marketing mix into 10Ps:

> *Principle (i.e., CSV, sustainability oriented) and Person (i.e., leader of the business, the community, the relevant stakeholders such as the subject experts) → Process (i.e., learning and growth, internal process, including customer and brand management, farming operations, continuing adaptation of farming to cupping) → 4P (Product, Price, Place, and Promotion) → Sustainability 3P: Profit, People, and Planet.*

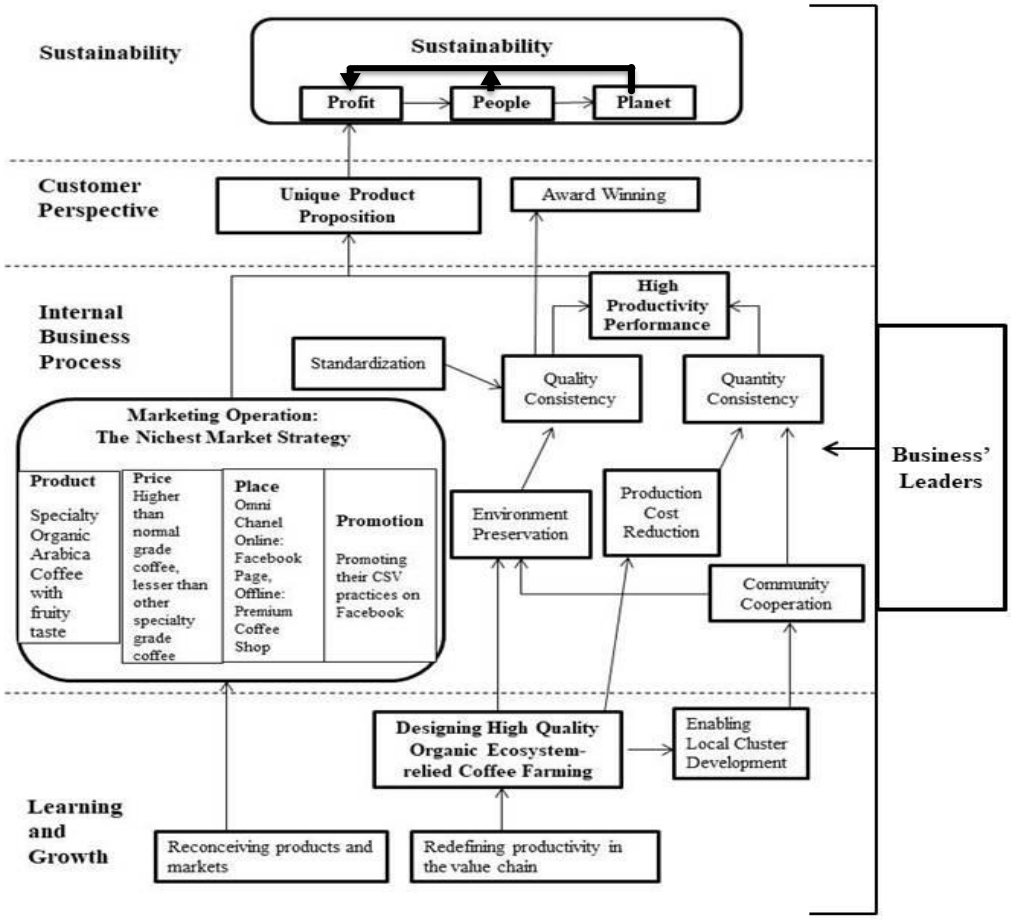


**Fig. 5:** The Detailed Strategy Map Derived from the Case-Study

The *areas of contributions* are highlighted in this research at theoretical, methodological and practical domains.

Methodologically, this research skillfully exploits the systematic approach of soft systems methodology (SSM), owed originally to and to apply to case method, particularly through clear root definition designated by CATWOE, which provides a holistic framework to guide data analysis, conceptualization and inclusions of appropriate informants for triangulation and validity purposes.

Practically, this research articulates a theoretically rich strategy map describing how a fund-lacked community member has systematically conceptualized a system of activities and efforts to create something of large-scale values to the societies. The values created are sustainability-oriented, made possible and multiplied by efforts to create shared values with the customers, the communities and other relevant stakeholders.

Theoretically, this paper extends the BSC (Balanced Scorecard) and its structured strategy map (Thida and Tan, 2019) to include principle- and value-based motivator, with the efforts made towards realizing the mission of the community-based case entity. Another obvious theoretical and practical contribution is the 10P marketing mix initiatives, namely Principle (i.e. CSV, sustainability oriented) and Person (i.e. leader of the business, the community, the relevant stakeholders such as the subject experts) → Process (i.e. learning and growth, internal process, including customer and brand management, farming operations, continuing adaptation of farming to cupping) → 4P (Product, Price, Place, and Promotion) → Sustainability 3P: Profit, People, and Planet.

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# The Impact of Land Rights on Deforestation in Lao PDR*

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**Abstract**

The purpose of this study is to examine whether land rights reduces the deforestation in Lao PDR. The authors use the secondary data collected by LECS 5 (Laos Expenditure and Consumption Survey 5), in period 2012-2013, from Lao Statistics Bureau and use 6,020 sample households in Laos. Logistic regression model is used for the analysis. This study finds that household land rights have a negative impact on deforestation (cutting timbers in surrounding forests) and the impact is statistically significant. The authors conclude that land rights of the households have a huge impact on deforestation in Lao PDR. Land use policy-makers should be aware that land rights and land security hugely reduce the deforestation (cutting of timbers of the households) especially rural households. This finding might have significant impacts on reducing deforestation by households in Lao PDR and provide information for further research in this area. It is the first study to investigate the impact of land rights on deforestation (cutting timbers in surrounding forests by households in Lao PDR) in the Faculty of Economic and Business Management, National University of Laos.

**Keywords**: Land rights; Deforestation, Lao PDR.

## Introduction

Forests and trees make crucial contributions to people and the planet especially supporting livelihoods, providing clean air and water, preserving biodiversity and reacting to climate change issue. Forests operate as an important source of food, medicine, and fuel for more than a billion people (FAO, 2018). Forests cover approximately 30 percent of the world's total land area, but they are vanishing at a jumpy rate. Between 1990 and 2016, the world lost 1.3 million square kilometers of forest which is larger than the area of South Africa (National Geographic, 2019). Land is an essential asset for social, political and economic sustainability that generates livelihood, supplies ecosystem services, and stockpiles

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wealth for the rural communities in developing countries around the world (Bogale et al., 2006; Legesse, 2014; Toulmin, 2008).

The cause of deforestation is definitely multifaceted. However, one of the main causes for deforestation is land tenure (Dolisca et al., 2007; Smucker, 1998; Smucker et al., 2002) and gathering fuelwood for cooking or heating is a major factor in deforestation (Tucker, 1999). Empirical studies confirm that tenure security is associated with less deforestation (Robinson et al., 2014; Dolisca et al., 2007; Etongo et al., 2015). Similar findings were obtained for South America (Araujo et al., 2009) and for Sub-Saharan Africa (Damnyag et al. (2012). Numerous studies show that well-defined land rights have the capability to increase natural resource management, agricultural productivity and sustainable development through supplementing or strengthening landholders' confidence (Abdo, 2013; Bogale et al., 2006; De Soto, 2000; Meinzen-Dick, 2014; Wang et al., 2015). And, research by Alston et al. (2000) along the Brazilian Amazon shows that tenure insecurity results in higher rates of forest clearance. In many parts of the developing countries, tenure insecurity increases deforestation due to forest clearance as a fist in claiming the land rights (Alston et al., 2000; Myers, 1994).

In addition, some studies demonstrate that the insecure land in developing countries might lead to high inefficiency in land investment, credit accession, food security and high inefficiency in labor supply (Legesse, 2014; Macours et al., 2010; USAID, 2007). But, the study by Wunder and Verbist (2003) argue that secure land tenure does not always support optimal natural forest management and it has more positive effects on tree planting and agroforestry than on the management of the natural forest. On the other hand, the study of Robinson et al (2014) showed that tenure security is associated with less deforestation. Therefore, the security of land tenure can act as a vital factor in the decision-making of land use (Wannasai and Shrestha, 2008).

Lao PDR is one of the poorest countries in Southeast Asia. However, with mostly mountainous topography and tropical climate, Laos has an endowment of forest and possesses one of the pristine monsoon forests in South East Asia, which the total forest area is estimated about 13.2 million hectares or 57.4 percent of total land area in 2015. Forest resources are crucial to many stakeholders and contribute pivotally to the rural economy in Laos, as they provide ecosystem services, preserve biodiversity and watersheds, and elimination of carbon dioxide.

Although the proportion of land area covered by forests has increased, the forests of Laos are currently encountering multiple pressures and the quality of the forest has continued to rapidly degrade over the past few decades. Based on measurements by the Lao government, deforestation has denuded large areas of Laos since the 1940s, when the national forest cover was over 70 percent of the country's land area. In the 1990s, that number shrank to less than 40 percent (Open Development Laos, 2018).

Very few empirical studies have examined the factors contributing to land degradation, land use and deforestation in Laos. Land Degradation in the Lao PDR was conducted by Lestrelin (2010). Vongvisouk et al. (2019) studied the shifting cultivation stability and change in Laos to examine the impact of shifting cultivation. Contradictory land use plans and policies in Laos especially tenure security and the threat of exclusion was studied by Broegaar et al (2016). Overall, descriptive statistical analysis was mostly used in many studies regarding land security, land use and policy, shifting cultivation, and land

degradation in Laos, but applying econometrics model to assess the impact of land rights on deforestation in Laos is still very rare.

This study attempts to examine the impact of household factors specifically land rights on deforestation in Lao PDR. We use 6020 sample household data collected by LECS 5 (Lao Expenditure and Consumption Survey 5) in 2012-2013 and use the Logistic regression model for the analysis.

The rest of paper is organized as follows: Section 2 gives an overview of forests and deforestation in Laos. Section 3 reviews the literature. Section 4 describes the model. Section 5 describes the characteristics of the sample households. Section 6 provides the empirical results and discussions. Lastly, the concluding remarks are given in the final section.

**Overview of forests and deforestation in Lao PDR**

Lao PDR is abundant in biodiversity. It is estimated that biological resources contribute over 66 percent to GDP. Moreover, they offer benefits for the rural poor communities as agro-biodiversity is the main source of food, nutrition and income generation. In the area of forestry, some non-timber forestry products (NFTP) such as wild animals, bamboo and rattan shoots, fruits, greens, honey, and others are sold in local markets and some are traded internationally. In addition, non-wood forest products, including edible insects, provide 60 percent of the monetary income of rural villages (FAO, 2019).

Lao PDR is made up three different zones: the northern mountainous region; the central and southern hilly to the mountainous region; and the area around the Mekong River and its tributaries (Somphathilath, 2012). It is a greatly biodiverse country with approximately 172 mammal species, 212 bird species and 8286 higher plant species (IUCN, 2006). Forests in Lao PDR can be clearly classified into the upper mixed deciduous forest, upper dry evergreen forest, and dry dipterocarp forest.

According to the Department of Forestry (DoF), using the national definition of forest of >20 percent tree canopy cover, forest area in 2002 was 9.8 million hectares and 41 percent of the overall land area which declining to 9.5 million hectares and 40 percent of the total land area in 2010 (DOF, 2011). According to the Global Forest Resources Assessment by the United Nations Food and Agriculture Organization (FAO), applying the FAO forest definition of >10 percent tree canopy cover, forest area in 2002 was around 16.4 million hectares and covered 69 percent of the whole land area, and almost 15.8 million hectares and 67 percent of the total land area in 2010. Albeit these figures indicate relatively modest changes between 2002 and 2010 with a loss of 35,000 hectares annually, forest cover is reported to have decreased rapidly in the 10 years prior, between 1992 and 2002, at a rate of 134,000 hectares per year. Additionally, forest quality has worsened and degraded in the last couple of decades, with dense forest falling from 29 percent in 1992 to only 8.2 percent in 2002 and open forest growing from 16 percent to 24.5 percent (FAO, 2010). Deforestation and forest degradation in Lao PDR contributed about 51 million tons to annual CO2 emissions (DOF, 2010).

Lao comprises of 49 ethnic groups and a large number of sub-groups whose livelihoods range from hunting and gathering to various forms of shifting cultivation in the uplands and wet-rice farming in the plains (King and van de Walle, 2010). In recent years, the economy has grown rapidly, with the average annual GDP growth of more than 7 per cents and reaching 8.4 per cents growth in 2010. The agriculture-forestry sector has contributed crucially in boosting the economy, which accounted for 30.4 per cents of the GDP in 2010 and is the largest contributor to national GHG emission.

Despite a small population, forests in Laos are facing numerous issues driven mainly by slash-and-burn agricultural farming, uncontrolled fires, commercial and illegal logging, and fuelwood collection for cooking, which heavily resulted in the loss of 6.8 per cents of the country's forests between 1990 and 2005. The deforestation rate has increased moderately since the 1990s. Also, forest loss in Lao PDR has driven by development activities such as agricultural expansion, forestry plantations, mining, hydropower, and infrastructure development (Mekong Maps, 2010). These pressures are likely to increase given the country's target for accelerating economic growths.

**Literature Review**

Dolisca et al. (2007) conducted a study, based on Tobit regression analysis, to examine effects of deforestation, land tenure, and population pressure at Foreˆ t des Pins Reserve in Haiti, by using the annual average area of cleared forest per household as the dependent variable. Using farm-household data collected from 243 households in 15 villages located in and around the reserve, the study found that household size, education level of household head, land tenure regime and farm labor are important factors for land clearing.

By using Tobit model in the analysis, Etongo et al. (2015) examined the impacts of land tenure and asset heterogeneity on deforestation in Southern Burkina Faso. The study analyzed the drivers of deforestation in Ziro province of Southern Burkina Faso by using the area of forest cleared annually as the dependent variable, whereas household characteristics and local institutions (tenure and property rights) were considered as the independent variables. Data were collected through focus group discussions, participant observation, interviews with key informants and from 200 farm households. Tobit regression results confirmed that land tenure insecurity and low agricultural production expressed in the sizes (areas) and ages of farms led to increased deforestation. The significance of tenure insecurity, as a driver of deforestation, indicated that migrants do contribute more to deforestation than the indigenous groups. Greater rights and improved legal status might reduce the rights to limited use granted to migrants.

In a study of Honduras, Godoy et al. (1998) examined the effects of schooling on the clearance of old-growth rain forest through a survey of 101 Tawahka Amerindian households in the Honduran rain forest. The results of tobit, ols, probit, and median regressions found

that each additional year of education lowered the probability of cutting old-growth rain forest by about 4% and decreased the area cut by 0.06 ha/family each year. However, the effect of education on deforestation was non-linear because, with up to 2 years of schooling, forest clearance declined; with between 2 and 4 years of schooling, clearance increased, but beyond 4 years of education, once again, seemed to curb deforestation. Thus, education curbed forest clearance because it is easier for individuals to gain information about new farm technologies from outsiders in order to intensify term production by river banks.

Kubitza et al. (2018) assessed the impact of land property rights and agricultural intensification on deforestation in Indonesia. The data were collected from a panel survey of farm households in Sumatra and survey data were combined with satellite imageries to account for spatial patterns, such as historical forest locations. Results indicated that plots for which farmers hold formal land titles are cultivated more intensively and are more productive than untitled plots. Nevertheless, due to land policy restrictions, farmers located at the historic forest margins often do not hold formal titles. Without land titles, these farmers are less able to intensify and more likely to expand into the surrounding forest land to increase agricultural output. In addition, results showed that forest closeness and past deforestation activities by households were found to be positively associated with current farm size.

Legesse et al. (2018) studied the impacts of land tenure and property rights on reforestation intervention in Ethiopia and the study examined determinants of farmers' decisions to invest in reforestation interventions through focusing on land tenure and property rights. The study found that land security is one of the most significant factors that affect farmers' decision to practice reforestation intervention. In addition, farmers' level of education, family size and training have statistically positive impact on reforestation intervention.

**Method**

To examine the impact of land rights on deforestation in Lao PDR, we use the cross-sectional and secondary data collected by LECS 5 (Laos Expenditure and Consumption Survey 5) from Lao Statistics Bureau and use samples of 6,020 households to represent Laos for the analysis. The survey was carried out in the years of 2012 to 2013. We use Logistic regression model for estimating the analysis constructed by Greene (1997).

The simple Logistic model is shown as below:

$$\text{Prob (event)} = \frac{e^{(\beta_0+\beta_1 x)}}{1+e^{-(\beta_0+\beta_1 x)}}, \text{ or Prob (event)} = \frac{1}{1+e^{-(\beta_0+\beta_1 x)}}$$

- $\beta_0$ and $\beta_1$: are the coefficients derived from the variable
- X: is the explanatory variable
- e: is the error terms.

In case there are many variables (p variables), we can write the equation as below:

$$\text{Prob (event)} = \frac{1}{1+e^{-z}}$$

$$Z = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_p x_p$$

In this study, we use cutting timbers (yes = 1; 0 = no) as the dependent variable and there are 9 explanatory variables so the logistic regression model is shown in the equation below:

$$P(Timber_{i=1}) = \beta_0 + \beta_1 LR_i + \beta_2 LT_i + \beta_3 Area_i + \beta_4 HS_i + \beta_5 Educ_i + \beta_6 Gender_i + \beta_7 Age_i + \beta_8 Ethnic_i + \beta_9 Region_i + \mu_i$$

Where, $\beta_0$ is the constant coefficient and $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$ are the coefficients of the explanatory variables of land rights, land type, land area, household size, education of household head, gender of household head, age of household head, ethnic of household head and the region that households live respectively; $\mu_i$ is the error term. The details of the variables for the Logistic regression are in Table 2.

## Results and Discussions

Table 1 presents the socio-economic variables of the households involved in the study sample. A total of 6,020 sample household data were used.

**Table 1. Socio-economic characteristics of the households**

| Household characteristics | Number (household) | Percent |
|---|---|---|
| *Land rights of household* | | |
| Owned | 3,941 | 65.47% |
| Free-using | 1,846 | 30.66% |
| Leased | 233 | 3.87% |
| *Land type of household* | | |
| Arable land for temporary crops | 5,255 | 87.29% |
| Fallow land | 133 | 2.21% |
| Land for permanent crops | 385 | 6.38% |
| Grazing land | 50 | 0.83% |
| Forest land | 197 | 3.29% |
| *Agricultural Area of household (hectare)* | | |
| <1 | 3,339 | 55.47% |
| 1-4 | 2,600 | 43.19% |
| >4 | 81 | 1.39% |
| *Household size* | | |
| 1-3 | 1,036 | 17.21% |
| 4-6 | 1,445 | 24.00% |
| 7-9 | 1,228 | 20.40% |
| ≥10 | 311 | 5.17% |
| *Education level of household head* | | |
| Illiterate | 3,057 | 50.78% |

| | | |
|---|---|---|
| Primary school | 1,232 | 20.47% |
| Secondary school | 417 | 6.93% |
| Upper secondary school | 238 | 3.95% |
| Technical training | 699 | 11.61% |
| Bachelor's degree | 358 | 5.95% |
| Higher than bachelor's degree | 19 | 0.32% |
| *Gender of household head* | | |
| Male | 5,682 | 94.39% |
| Female | 338 | 5.61% |
| *Age of household head* | | |
| 21-30 | 692 | 11.50% |
| 31-40 | 1,600 | 26.58% |
| 41-50 | 1,767 | 29.35% |
| 51-60 | 1,345 | 22.34% |
| >60 | 616 | 10.23% |
| *Ethnic of household head* | | |
| Lao | 2,590 | 43.02% |
| Khmu | 1,742 | 28.94% |
| Hmong | 703 | 11.63% |
| Otherwise | 985 | 16.36% |
| *Region in Laos* | | |
| North | 2,432 | 40.40% |
| Central | 2,222 | 36.91% |
| South | 1,366 | 22.69% |

The majority of households are landowners, which accounted for 65.47 percent. However, many households still use and hold the land for free and temporarily rent from others which account for 30.66 and 3.87 percent respectively. About 87.29 percent of the households own arable land for temporary crops and the rest are forest land, grazing land, arable land for growing permanent crops, and fallow land.

For the agricultural land area, less than 1-hectare accounts for 55.47 percent following by 1-4 hectares accounts for 43.19 percent and households who own agricultural land more than 4 hectares is about 1.35 percent. Households are mostly large families with family members around 4-6 people. However, the education level of household heads is very low and approximately 50.78 percent of them have no education at all and with male dominate the gender of the household head. The age of the household head is around 41-58 years old indicating that they are still in active manual workers and have plenty of life experiences. For the ethnicity of the household head, Laos ethnic is made up 43.02 percent following by Khmu, Hmong and other minorities.

To estimate the impact of land rights on deforestation, Logistic regression model is applied. The logistic model might have econometric problem specifically multicollinearity, that can be investigated and removed during the estimation. Multicollinearity is a very severe problem when using Logistics method. If the coefficients of the correlations between the explanatory variables have an absolute value equal to or above 0.80, then the multicollinearity is severe (Gujariti, 1995). The explanatory variables for this study are verified to have no multicollinearity because the highest absolute value is 0.36 which is much less than the criteria value.

**Table 2. The variables for the Logistic regression**

| Variables | Definition | | Expected Sign | Sources of variables |
|---|---|---|---|---|
| *Dependent variable* | | | | |
| Timber | Cutting timbers | 1 = yes; 0 = otherwise | | |
| *Independent variable* | | | | |
| LR | Land rights | 1 = yes; 0 = otherwise | Negative | Etongo et al. (2015) |
| LT | Land type | 1 = arable land for growing temporary crops; 0 = otherwise | Negative | Author |
| Area | Agricultural land area | Hectare | Negative | Author |
| HS | Household size | Person | Positive | Dolisca et al. (2007) |
| Educ | Education of household head | in year | Negative | Godoy et al. (1998) |
| Gender | Gender of household head | 1 = male; 0 = female | Positive | Legesse et al. (2018) |
| Age | Age of household head | in year | Negative | Dolisca et al. (2007) |
| Ethnic | Ethnic of household head | 1 = Laos; 0 = otherwise | Negative | Author |
| Region | Region of Laos | 1 = central; 0 = otherwise | Negative | Author |

Table 3 shows the impact of land rights on household deforestation. The households who own the lands have a negative coefficient with the expected negative sign. This sign shows that there is a negative relationship between land rights (LR) and deforestation (cutting timbers).

If households have land rights, the probability of cutting timbers decreases 11.12 percent compared to the households who have no land rights and the coefficient is statistically significant at 1 percent level. This result is consistent with the results of some studies, which demonstrate that secure land tenure appears critical to reducing annual deforestation compared to unsecured land tenure and households with insecure land titles are more likely to clear forest (Araujo et al., 2009; Damnyag et al., 2012; Dolisca et al., 2007; Etongo et al., 2015; Robinson et al., 2014).

Land type (LT) was expected to be negatively correlated with cutting timbers because if households have arable land for growing temporary crops, they will generate income from selling their agricultural products and less likely to cut timbers for household consumption as they can buy processed woods for household usage instead.

The logistics regression result shows that if households have arable land for growing temporary crops, they will decrease the chance of cutting timbers in the surrounding forests by 6.07 percent compared to other land and the coefficient is statistically significant at 1 percent level.

**Table 3. The impact of land rights on deforestation (cutting timbers)**

| Variables | Definition | Coefficient | t-test |
|---|---|---|---|
| LR | Land rights of the household | -0.1112*** | -12.27 |
| LT | Land type of the household | -0.0607*** | -5.62 |
| Area | Agricultural land area | 0.0092* | 1.84 |
| HS | Household size | 0.0061*** | 2.85 |
| Educ | Education of household head | -0.0144*** | -23.53 |
| Gender | Gender of household head | -0.0090 | -0.50 |
| Age | Age of household head | -0.0014*** | -3.72 |
| Ethnic | Ethnic of household head | -0.0281*** | -2.80 |
| Region | Regional part of Laos | -0.0389*** | -3.67 |
| Constant | | 3.9797*** | 13.88 |
| Number of observations | | 6,020 | |
| F-statistic | | 954.82 | |
| Probability | | 0.000 | |
| $R^2$ | | 0.1646 | |

Agricultural land area (Area) was expected to be negatively correlated with cutting timbers because if households have adequate land area to grow crops then they could be able to generate permanent income from selling their agricultural outputs and then be less likely to engage in cutting timbers in the surrounding forests.

However, the result shows that there is a positive relationship between land area and deforestation. If the area increases by 1 hectare, the chance of cutting timbers will increase by 0.9 percent and the coefficient is statistically significant at 10 percent level. This happens may due to household behaviors. One possible answer is that most of the households in Lao PDR still hugely rely on the forests especially cutting and collecting woods and timbers for cooking and building their houses. Even they have the agricultural land increases they still have to use timbers for household consumption.

Household size (HS) was expected to be positively correlated with cutting timbers because of increased food needs and the greater availability of workers. Table 3 indicates that households with fewer members are more likely to cut fewer timbers. The probability of cutting timber increases by 0.61 percent as the household size increases and this coefficient is statistically significant at 1 percent level. This result is consistent with the results of the studies by Dolisca (2007) and Godoy et al (1998).

As expected, education of the head of household (Educ) has a significant negative effect on deforestation. The result indicates that 1-year increase in education of the household head lowers the chance of cutting timbers by 1.44 percent and the coefficient is statistically significant at 1 percent level. This might be due to the fact that education helps them to acquire information and knowledge regarding appropriate and efficient land use and understand the impact of deforestation. This result is consistent with the studies by Godoy et al. (1998) and Lesgesse et al. (2018).

Gender does not appear to be a significant determinant of deforestation in our study. This may explain by the fact that only 5.61 percent of the female are household heads. Age of

household head has a negative impact on deforestation. The result indicates that the probability of cutting timbers in surrounding forests decreases by 0.14 percent as the age of the household head increases, which could be due to the fact that by getting older, they may not do the heavy tasks specifically cutting timbers as it needs lots of energy to do this work. Empirical studies by Dolisca et al. (2007) and Etongo et al. (2015) showed that the age of the household head had a negative relationship with deforestation. However, the findings were not statistically significant.

As expected, ethnic (Ethnic) has a negative impact on deforestation. The result shows that the probability of cutting timbers in surrounding forests decreases by 2.81 percent if the ethnic of the household head is Lao and it is statistically significant at 1 percent level. This may due to the fact that Lao households live in urban areas and have permanent rice paddy fields compared to other minorities that mostly live in the mountains and heavily rely on shifting cultivation that is the main issue of deforestation.

The result also shows that region has a negative effect with deforestation in our study. If the households settle or live in the central part of Laos, the probability of cutting timbers decreases by 3.89 percent and it is statistically significant at 1 percent level. The result may be explained by the fact that households in the central part tend to live near big cities and they also permanently hold rice field area as the central part mainly is flat and fertile land suitable for agricultural production.

**Conclusion and Recommendations**

The insecure land right is one of the issues causing deforestation. Due to the lack of study, its impact may not be clear. The main purpose of the present study is to examine the impact of land rights on deforestation especially cutting timbers in surrounding forests in Lao PDR.

The study is based on cross-sectional and secondary data collected by LECS 5 (Laos Expenditure and Consumption Survey 5), in period 2012 to 2013, from Lao Statistics Bureau and use samples of 6,020 households in the country. The econometric model of Logistic regression is used for the analysis. The study finds that land rights have a negative impact on deforestation and the impact is statistically significant. Therefore, the author concludes that secured landholding will lower the probability of cutting timbers of the households in the country.

In addition, the important determinants influencing deforestation include land type, agricultural land area, household size, household head’s age, household head’s education, ethnic of household head and the region that household live or settle.

This paper has some limitations. First, the cross-sectional data might only show the short-term effect and might not anticipate the long-term impact, which might have been possible to ascertain by using panel data. Second, the sample size is quite small for national level analysis. Third, we need more advanced econometric methods to examine the impact of land rights on deforestation as the cause of deforestation is multifaceted, and we need more time to investigate the real causes. Fourth, primary data should be used in the study to effectively investigate household’s timber-cutting activities and also face-to-face interview is crucial for the analysis.

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# The Willingness to Pay of Overseas' tourists on Visiting Ecotourism at Phou Khao Khouay National Conservation Area, Vientiane Capital, Laos*

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**Abstract**

This paper is to estimate the Willingness to Pay (WTP) of overseas tourists on visiting Phou Khao Khouay conservation area, Vientiane Capital. The analysis relies on Choice Modeling (CM): Conditional Logit with interaction to seek out to identify the factors that affect the WTP. Both the attribute variables and non-attribute variables are used in the analysis, which are camping, hiking, waterfall activities and culture, and religion visiting. This study examines two types of WTP; the first WTP on general conditional logit model, and the second is the conditional logit with interaction.

According to the sample of 315 respondents, the WTP of tourists from the first model on the waterfall is the highest, which is 74.8 USD, followed by hiking, camping and religion, and culture which are accounted for 65.52 USD, 44.02 USD and 32.85USD, respectively. The second model finds that WTP of tourists on the waterfall is 86.27 USD, followed by hiking, camping, and religion, and culture, accounted for 52.82 USD, 39.94 USD and 30.67USD, respectively. The analysis shows no statistical significance on all the socio-economics characteristics of respondents, which means that the personal characteristics do not have direct effect on WTP. These findings do not only support the provision of good and green services in Phou Khao Khouay conservation area but will also be useful for the whole ecotourism in Laos.

**Keywords:** Phou Khao Khouay; Choice Modeling (CM); Willingness to Pay; Vientiane

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## Introduction

The tourism sector is one of the most important and necessary of globalization movement, impacted directly to economic, which is accounted for 10.4% of the world GDP, and valued more $ 8.5 billion (72,912 billion Kip), making more 313 billion careers or 9.9% of total hiring in 2017 (World Travel & Tourism Council, 2018).

Currently, eastern Asia and Pacific regions have the fastest growing tourism (World Travel & Tourism Council, 2012) and are expected to reach 1.8 thousand billion tourists in 2030 (UNWTO 2011).

Since opening its door to international tourists, in 1989, tourism sector has become one of the main sectors that earns highest foreign currency of state. Thus, the Lao government rationalizes strongly a need to promote the stability and sustainability of the tourism industry, by also actively engaging in the cooperation with international and regional, and non-government organizations.

In 2018, the tourism sector had grown up for 7.63%, there were 111,851 visitors per year and income 2,003,61 billion kips per year, covered 41.68% of GDP/year (Sitphaxay, 2018). The Lao government promotes various tourist attractions and destinations, including accommodation, transportation, service businesses. Lao government has given important consideration in social-economic (tourism) development, for a better life of Lao citizens, and aim to reduce poverty in remote areas.

It is important for the travel and service enterprises in Laos to continue to develop the ability to support tourists by building hotels and guest houses. In 2011, there are more than 2.7 million visitors and 4.1 million visitors, 4.3 million visitors, in 2014, and 2015 respectively. Which support these enterprises incomes in the year 2011, at $400 million, and in 2014, $560 million and more than $ 6700 million in 2015. The various development plans of the nation include the landing route, airport, tourism places, accommodations, restaurants, vehicles of transportation, visitors checking in-out, reasonable service fee, active, clean, security and in keeping Lao resident's traditional (VOA, 2016).

## Literature Review

Hearne and Salinas (2002) conducted a research on the analysis of tourist preferences for ecotourism development by using choice experiments as the tool to analyze the preference of tourists on nature, infrastructure, use of restrictions, and other attributes at Barva Volcano Area, Costa Rica. The survey was conducted of 171 Costa Rican and other 271 foreign tourists who visited the Volcano. The research shows the preferences of tourists as follows: need to improve infrastructure, more information should be provided, and should be lower price of entrance. The marginal willingness to pay (WTP) for greater information was estimated to be USD 1.54 for foreign tourists and USD 1.01 for Costa Rican tourists.

Chaminuka, Groenevel, Selomane, and van Ierland (2012) conducted a research on the tourist preferences for ecotourism in rural communities adjacent to Kruger National Park

in South Africa, by applying the conditional logit model based on income and to promote cultural awareness amongst tourists. The aim of the study is to determine the preferences of tourists, according to origin and income levels, to engage in ecotourism as well as their marginal willingness to pay (MWTP) for three specific ecotourism attributes: village accommodation, village tours and visits to crafts markets. 319 tourists were conducted through the choice experiment and analyzed by conditional probit model. The MWTP for accommodation and income group was negative, but village tours and crafts market were positive and the MWTP among accommodation and income group was higher than the fees that village tours proposed.

Hearne and Santos (2005) study the tourists' and locals' preferences toward ecotourism development in Maya Biosphere reserve, Guatemala, which uses the choice experiments to analyze the preferences toward alternative scenarios of ecotourism of two important stakeholder groups: foreign tourists and educated local residents. The result shows that these two populations have unequal but similar preference orderings, especially toward: improved national park management and the presence of guides for wildlife viewing. These stakeholder groups have different opinions toward paved access roads and the presence of illegal colonists within the protected area.

Iasha, Yacob, Kabir and Radam (2015) estimate the visitors' Willingness to Pay (WTP) for ecotourism in Puncak Lawang Park (PLP), Agam District of West-Sumatera Indonesia by applying Contingent Valuation Method (CVM) on 300 sample visitors comprising both local and international tourists. Their study shows that majority of the visitors are willing to pay for ecotourism at PLP. The outcome from logit regression indicates that bid, income, and males are the most significant factors that influence visitors' WTP. The mean WTP for entrance fee to PLP was Rp9411.35 (RM2.64) per entrance.

In China, Yu et al. (2018) studied the willingness to pay (WTP) for marine conservation, by considering two marine protected areas in Zhejiang Province through Contingent Value Method (CVM), and by combining logit and Tobit models to estimate the WTP for marine conservation between tourism and residents. The study focused on the individuals' willingness to pay and how much they would prefer to pay may be affected separately by different factors. The results showed that most respondents were willing to pay for marine conservation, but they were affected by different factors. The average amounts that the respondents were willing to pay were 216.20 CNY ($34.3) and 172.43 CNY ($27.4) in the Nanji Islands MPA and Putuo Islands MPA, respectively.

In Vangvieng, Laos, Khamsay et al (2015) conducted a research to estimate the tourists' preferences and willingness to pay for ecofriendly services which are related to the natural and environmental conservation of the hotel industry by using choice experiment**.** They used the mixed logit to take into account of preference by allowing coefficients to be normally distributed and assumed to vary among individuals. The result showed that all ecofriendly practices offered in this study were significantly preferred by tourists. Income, age, and education did not have significant effect on the probability of choosing ecologically friendly practices of hotel and attributed to support the ecotourism of the area; the study provided important information that female tourists are more receptive to a new alternative.

Kyophilavong and Bennett (2011) conducted a research estimating the willingness to pay of cleaning up road dust in urban areas in Vientiane, Laos, by using the contingent

valuation method (CVM). The research collected 6590 sample respondents, which showed mean WTP at 7069 kips (USD 0.86) per person per month. The education and income had positive statistically impact on WTP. On the other hand, the number of children in family had negative impact on WTP.

## Method

The questionnaire designed of this study is based on the choice modeling process, which uses the Design Expert program to create the games. The data were collected by the individuals interviewing directly with the overseas tourists in Vientiane Capital, Laos.

Before rolling up the formal survey, two pre-tests were conducted for 30 respondents per each and based on the feedback from the pre-tests, the questionnaire was revised accordingly. The time of the interviews was about 10 minutes on average.

The questionnaire is consisted of three parts: (1) the socio-economic characteristics of the respondents, (2) the Willingness to Pay of the respondents on the activities, and (3) the rating of interests on the activities and the last part is the recommendation or suggestion for the activities.

The willingness to pay (WTP) part of the survey, before asking the open-ended WTP, the packages of the tour for ecotourism, were explained clearly to the interviewees on what is there in the services and explained to them how to mark or select the choices on the questionnaire correctly.

The survey was conducted from May 4th to May 12th, 2019 in Vientiane capital, Laos. The total of respondents is 300 people. The survey was carried by the thesis team and other colleagues in the Faculty of Economics and Business Management at the National University of Laos. The team was trained before starting the survey (Whitington, 2002).

## Results

*Socio-Economic Characteristic of Respondents*

As shown in Table 1, the average age was around 18-25 years. On average, the education level of respondents found 50.79 % of Bachelor degree. About more 30% of the participants are students, and others are organization officers, government and non-government officers. About 35.3 per cents of the respondents came from Europe and around 35.67 % of respondent's income was 501 -2000 (USD/month), which covered the largest number. Respondents about 78 % had never heard about Ecotourism at Phou Khao Khouay Protected Area and about 93.7% never visiting. About 54 % of respondents said that it is a very interesting project and activities.

**Table 1. Social-Economic characteristics of Respondents**

| **Social-Economic Condition** | Percentage |
|---|---|
| Female | 52 |
| Single | 55.24 |
| Age 18-25 | 25.4 |
| Income 501 -2000 (USD/month) | 34.16 |
| Education Level in Bachelor | |
| Non-Education | 0.95 |
| Primary School | 2.54 |
| High School | 18.10 |
| Bachelor Degree | 50.79 |
| Master Degree | 20 |
| Doctoral | 7.62 |
| Main Occupation (%) | |
| Non-govern | 33.97 |
| Government Office | 15.24 |
| Student | 18.41 |
| Retail/Owner of Business | 23.81 |
| Retirement | 8.57 |
| Nationalities (%) | |
| European | 35.24 |
| Asian | 34.60 |
| American | 22.86 |
| Other | 7.30 |
| Never heard | 78 |
| Never visiting | 93.7 |
| Interesting | 54 |
| Very interesting | 18.33 |
| Neutral | 22.66 |
| Less interesting | 3.33 |
| Not interesting | a. |

*The Willingness to Pay*

A total of 315 questionnaires were collected. Of these, 315 questionnaires which include 4725 observations (100 percent of the total sample) are effective information. Out of the total, 3150 observations (33 percent) provided a zero WTP, and 1575 observations that choose by respondents (67 percent) offered positive WTP on our activities. As showed in Table 2, the willingness to pay of 50.00 USD covered 30 percent of the total, followed by the WTP of 100.00 USD which accounted for 18%, 150.00 USD and 200.00USD which are counted for 16% and 6% respectively.

The main reasons that given by respondents for the willingness to pay for those activities are that they fall in love with nature, which is accounted for 26 percent, love to stay with local people and taste local food counted for 32 percent, and love our adventure activities which counted for 42 percent.

On the other hand, the main reason for respondents not to pay or giving zero WTP are that they are concerned about their safety, which is numbered for 35 percent, second is the price is a little bit expensive in some activities which counted for 34 percent. The zero willingness to pay could be classified into two types: true zero WTP and protest bids (Wang et al., 2006). The protest bids, the respondents might be hardly understanding the valuation of the questionnaire. However, it is difficult to separate the zero WTP and protest bids and thus, no protest bids were excluded.

There are many research-works and cases that have been conducted and they estimate the WTP case in Laos, but there is a rare case in Laos of applying the Choice Modeling (CM). Most of the researches in Laos are related to estimating WTP, preferring to apply CVM rather than CM. There are many researches and cases that have been conducted in estimating the WTP in overseas by applying the Choice Modeling (CM), and CVM as well.

In this survey, we focused on an individual's perspective on their payment and focused on overseas tourists only. Like many developed and developing countries, the salaries or income per month of their citizens are pretty high if we compare them to some developing and least developed countries. This CM questionnaire has been criticized (Arrow et al., 1993) for providing the lower price.

**Table 2. Range of WTP of Respondents**

| Willingness to Pay (USD) | Number of Interviewees | Percentage (%) |
|---|---|---|
| 0 | 613 | 39 |
| 50 | 471 | 30 |
| 100 | 252 | 16 |
| 150 | 123 | 8 |
| 200 | 116 | 7 |
| Total | 1575 | 100 |

Table 3 state the reasons to pay and not to pay of the respondents.

**Table 3: Reasons to Pay or Not to Pay**

| **Reasons to pay** | Percentage |
|---|---|
| Interesting Activities | 42 |
| Would like to taste local food and see local's culture | 32 |
| Love Nature | 26 |
| Total | 100 |
| **Reasons not to pay** | |
| The safety during the activities | 55 |
| Expensive Price | 45 |
| Total | 100 |

*Factors Affecting WTP*

In order to evaluate the influence of socioeconomic characteristics on WTP, the multiple regression model was used. The definitions of the variables are given in Table 4. The Conditional Logistic Regression Model had applied on this to estimate the affected factors on the WTP.

**Table 4. Definition of regression Variables.**

| **Variables** | **Definition** | **Unit** | **Mean** | **Std. Dev** | **Min** | **Max** | **Expected sign** |
|---|---|---|---|---|---|---|---|
| **Dependent Variable** | | | | | | | |
| **WTP** | Willingness to Pay | USD | 0.5 | 0.33 | 0 | 1 | NA |
| **Independent Variables** | | | | | | | |
| **Attribute Variables** | | | | | | | |
| **Camping** | Camping | 1= yes, 0= No | 0.5 | 0.47 | 0 | 1 | + |
| **Hiking** | Hiking | 1= yes, 0= No | 0.5 | 0.46 | 0 | 1 | + |
| **Religion** | Religion and culture | 1= yes, 0= No | 0.5 | 0.47 | 0 | 1 | + |
| **Waterfall** | Waterfall Activities | 1= yes, 0= No | 0.5 | 0.46 | 0 | 1 | + |
| **Price** | Price for activities | USD | 100 | 78.59 | 0 | | - |
| **Non-attribute Variables** | | | | | | | |
| **Gend** | Gender | 1= Male, 0 = | 0.5 | 0.5 | 0 | 1 | + |
| **Age** | Age of | female | 35.1 | 12.23 | 18 | 71 | - |
| **Stat** | respondents | Years | 0.5 | 0.5 | 0 | 1 | + |
| **Income** | Status | 1= Single, 0= | 0.5 | 0.34 | 0 | 1 | + |
| | Income per | Others | | | | | |
| **Occ** | month | 1= (3001- | 0.5 | 0.5 | 0 | 1 | + |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 5000) | | | | | |
| **Cont** | Occupation | 0= other, | 0.5 | 0.48 | 0 | 1 | + |
| | | 1= Company | | | | | |
| **Educ** | Continent | officer, 0= | 0.5 | 0.41 | 0 | 1 | + |
| | | Others | | | | | |
| | Education | 1= Europe, | | | | | |
| | Level | 0= Others | | | | | |
| | | 1= bachelor up, | | | | | |
| | | 0 = below bachelor | | | | | |

According to the choice modeling regression, as shown in Table 5 and as we expected, most of the socioeconomic variables, like gender, marital status, education, continent, occupation, income, and age, have the impact as our assumption; unfortunately, they are not statistically significant, which means that those socioeconomics characteristics have no effect on respondents' decision on WTP.

**Table 5.** Factors affected on WTP by Conditional Logit with interaction regression

| Variables | Definition | Coefficient | T-test |
|---|---|---|---|
| **Attribute Variables** | | | |
| **Price** | Price to pay for activities | -0.0305371*** | -5.86 |
| **Waterfall** | Waterfall activities | 2.634573*** | 4.45 |
| **Religion** | Religion and culture activities | 0.9364389* | 1.84 |
| **Hiking** | Hiking activities | 1.613055*** | 3.10 |
| **Camping** | Camping activities | 1.219755 ** | 2.41 |
| **Non- Attribute Variables** | | | |
| **Gcamping** | Gender interact with camping | 0.0952016 ns | 0.46 |
| **Ghiking** | Gender interact with Hiking | -0.0210058 ns | -0.10 |
| **Greligion** | Gender interact with religion and culture | -0.2345818 ns | -1.13 |
| **Gwaterfall** | Gender interact with waterfall | -0.2187546 ns | -0.90 |
| **Statcamping** | Status interact with camping | 0.4085608 ns | 1.18 |
| **Stathiking** | Status interact with Hiking | 0.092854 | 0.26 |
| **Statreligion** | Status interact with religion and culture | 0.273346 ns | 0.78 |
| **Statwaterfall** | Status interact with waterfall | -0.0900519 ns | -0.22 |
| **Agecamping** | Age interact with camping | -0.0011305 ns | -0.12 |
| **Agehiking** | Age interact with Hiking | 0.0037364 ns | 0.38 |
| **Agereligion** | Age interact with religion and culture | 0.0009894 ns | 0.10 |
| **Agewaterfall** | Age interact with waterfall | 0.0002581 ns | 0.02 |
| **Contcamping** | Continent interact with camping | -0.0835631 ns | -0.54 |
| **Conthiking** | Continent interact with Hiking | 0.0047364 ns | 0.03 |
| **Contreligion** | Continent interact with religion and culture | -0.1163772 ns | -0.72 |
| **Contwaterfall** | Continent interact with waterfall | -0.0845205 ns | -0.47 |
| **Educamping** | Education interact with camping | -0.216109 ns | -0.80 |
| **Eduhiking** | Education interact with Hiking | 0.0898724 ns | 0.32 |
| **Edureligion** | Education interact with religion and culture | -0.1312744 ns | -0.49 |
| **Eduwaterfall** | Education interact with waterfall | -0.4657758 ns | -1.45 |

| | | | |
|---|---|---|---|
| **Occcamping** | Occupation interact with camping | -0.028133 ns | -0.13 |
| **Occhiking** | Occupation interact with Hiking | -0.1836968 ns | -0.83 |
| **Occreligion** | Occupation interact with religion and culture | 0.0599698 ns | 0.28 |
| **Occwaterfall** | Occupation interact with waterfall | 0.0269924 ns | 0.11 |
| **Incocamping** | Income interact with camping | -0.0740617 ns | -0.23 |
| **Incohiking** | Income interact with Hiking | -0.1634372 ns | -0.53 |
| **Incoreligion** | Income interact with religion and culture | 0.4317246 ns | 1.38 |
| **Incowaterfall** | Income interact with waterfall | -0.3766291 ns | -1.06 |
| **Number of observations** | | 4725 | |
| **F-Statistic** | | 1481.21 | |
| **Probability** | | 0.000 | |
| **$R^2$** | | 0.428 | |

However, we find that the WTP on every activity, based on the general conditional logit regression and the conditional logit with interaction, are different as evidenced in Table 5 and Table 6. After it interferes by the socioeconomic characteristics, we determine some coefficients are greater and some are less than before interference.

**Table 6. Factors of effect by Conditional Logit with interaction regression.**

| Variables | Definition | Coefficient | T-test |
|---|---|---|---|
| **Pgender** | **Gender interact with Price** | 0.0027307 ns | 1.29 |
| **Pstatus** | **Status interact with Price** | -0.0046239 ns | -1.3 |
| **PAge** | **Age interact with Price** | 0.0000347 ns | 0.35 |
| **PCont** | **Continent interact with Price** | 0.0012919 ns | 0.8 |
| **Pedu** | **Education interact with Price** | 0.0030743 ns | 1.08 |
| **Pocc** | **Occupation interact with Price** | 0.0001924 ns | 0.09 |
| **Pincome** | **Income interact with Price** | -0.0007634 ns | -0.24 |
| **Number of observations** | | 4725 | |
| **F-Statistic** | | 1481.21 | |
| **Probability** | | 0.000 | |
| **$R^2$** | | 0.428 | |
| **Attribute Variables** | Price to pay for activities | -0.026275 | -25.2 |
| **Price** | | | |
| **Waterfall** | Waterfall activities | 1.966357 | 16.6 |
| **Religion** | Religion and culture activities | 0.8631826 | 8.53 |
| **Hiking** | Hiking activities | 1.721588 | 16.26 |
| **Camping** | Camping activities | 1.156623 | 14.45 |
| **Number of observations** | | 4725 | |
| **F-Statistic** | | 1457.53 | |
| **Probability** | | 0.000 | |
| **$R^2$** | | 0.4212 | |

*** 1% significant, ** 5% significant, * 10* Significant. ns: not significant.

Moreover, we can completely visualize the differentiation from Table 7, which compared how much the WTP change after taking interference by the socioeconomic characteristics of the respondents.

**Table 7. Comparison between general WTP and interaction WTP of respondents.**

| | WTP | WTP interaction | Difference | Percentage Change |
|---|---|---|---|---|
| **Hiking** | $ 65.52 | $ 52.82 | 12.70 | -19% |
| **Religion** | $ 32.85 | $ 30.67 | 2.19 | -7% |
| **Waterfall** | $ 74.8 | $ 86.27 | 11.44 | 15% |
| **Camping** | $ 44.02 | $ 39.94 | 4.08 | -9% |

## Conclusion

The main of this paper was to estimate the overseas tourists' Willingness to Pay (WTP) for visiting ecotourism at Phou Khao Khouay protected area of Vientiane, Lao PDR. The Choice Modeling (CM) was use and the factors affecting WTP were identified using Conditional Logit with interaction model analysis.

The WTP for visiting ecotourism at Phou Khao Khouay protected area of Vientiane was 0-50 USD per person per time. The main reason for WTP was for activities during their visiting as camping, hiking, waterfall, religion and culture. The respondents who have income 450 USD and Bachelor degree education show higher WTP. The result indicates that Phou Khao Khouay protected area of Vientiane will benefit from the visits of overseas tourists. This is useful information for the government agencies or other projects to consider. It will help them to understand the benefits by providing more activities and choices to foreign tourists to visit.

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# Factors Determinant Bushmeat Consumption Pattern in 4 Provinces in Lao PDR*

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**Abstract**

The purpose of this study is to examine the factors influencing bushmeat consumption in Lao PDR. Logistic regression model analysis is used, which employed sample size of 654 households from four provinces in Lao PDR: Vientiane capital, Vientiane province, Luangprabang province, and Xiengkhuangprovince in 2018.

The study finds that gender, household expenditure, belief and law awareness, have the positive impact on bushmeat consumption. Wild-life policy-makers should be made more aware that conservation law has positively impact on bushmeat consumption, and thus, the government should put more effort in making the wildlife conservation law strictly followed. This finding might have significant impacts in reducing wild meat consumption in Lao PDR.

**Keyword**: Bushmeat; Consumption; Wildlife; Logistic Model

## Introduction

Wildlife plays the major important role in balancing the environment, which helps to maintain the stability of nature and plant propagation (Kapoor, 2011). Wildlife is also the primary source of meat and income of people in many developing countries around the world (Milner-Gulland and Bennett, 2003). People depend on species a lot since before and, the need of using animal parts to make traditional medicine can also contribute to species decline, for example in china, Rhino horn was used as the medicine to relieve fevers and lower blood pressure. In 1990s, China detached the animal from its list of ingredients approved for manufacturing medicines; however, a few years ago, after the rumor that began flowing in Vietnam that rhino horn had cured a VIP of terminal liver cancer, the animals are, once again, being threatened (Joseph and Zielinski, 2011).

In an era driven by the globalized economy, one of the leading threats to an endangered wildlife is the consumer demand that is thousand miles away in terms of trade

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(Mason, 2017). The unsustainability of the bushmeat trade can be exacerbated by higher road density, as transportations open up the access to remote forested areas and to rural and urban markets; thereby dropping the opportunity cost of the bushmeat trade (Wikie et al., 2000). Wild animal trafficking global is estimated to be valuing more than US$8 billion a year globally, following only to the trade in illegal drugs, with profit margins more attractive than illegal arms dealing (Sain-Ley-Berry, 2000).

Laos is also one of the countries where wildlife encroachment and illegal wildlife trade market have caused serious declines in endangered species population (WWF, 2018). The major threats for wildlife in Laos are habitat loss and harvesting for food and Lao PDR, which has experienced unparalleled development over the past decades, driving, for instance, the construction of major highways and dams (J&C, 2013).

Rural communities in Laos earn nearly half of their incomes from harvesting and selling non-timber forest products, which means that expansion into forests and unplanned development would pose a considerable threat to Laos people and also the wildlife (J&C, 2013). In order to protect the wildlife, Laos' Prime minister's order No.5 was issued on May 8$^{th}$, 2018, which aims to take strict actions on wildlife law enforcement, by means of national laws on the management and inspection on wildlife trade, and commitments to international law (WWF, 2018).

Despite the decline of wildlife in Laos, very few empirical studies examine the factors in influencing wildlife consumption. The study about wildlife trade and human health in Laos was conducted by Greatorex et al. (2016), which assessed the Zoonotic disease risk in markets.

As for this research study, we attempt to study a consumption pattern among people who live in the urban areas in Vientiane Capital, Vientiane Province, Luangprabang Province and Xiengkhuang Province, by using the Logistic Regression model.

## Overview of the Wildlife in Laos

The Lao PDR still obscures a rich fauna, with many species' populations and their habits. 274 mammal species are reported in Laos, of which over classified as "large mammals", and the outstanding among them the Asian elephant, tiger and Saola, for example (WCS, 2019).

In recent years, Laos has caused the international attention, after the discovery of incredible variety of species that are new to sciences. In addition to mammals, Laos supports over 165 species of amphibians and reptiles, including such as the Rock and Burmese Pythons, king Cobras and the large and the noisy Takay Gecko (Gekko gecko), a portentous resident of many Lao houses.

However, Laos is becoming a nucleus for the trade in endangered species with foreign tourists, particularly from neighboring China, in stirring the demand for illegal products. It is said that tiger meat and bear paw are served on menu for the Chinese tourists in Northwest Laos (J&C, 2015), which makes some wild animals in Laos risk becoming endangered.

## Literature Review

Van Song (2008) conducted a study about the illegal trade in wildlife in Vietnam, which analyzed the causes for the rapid growth in the trade and the crucial failures in the country's effort to control it. The study says that the government should strengthen the capability of the organizations responsible for fighting the trade and increase their budget. The study also highlights the need to use education to encourage people to stop consuming illegal wild life products.

Zhang et al. (2008) examined the wildlife trade, consumption and conservation awareness in Southwest China by gathering the data form trading hubs at ports, boundary markets, city market and stores. The result shows that around 60 percent of the respondents had consumed wild meat in the last two years, and, the main consumers are male and young people with high education levels and good incomes. The research indicated that law and regulation on wildlife trade control is insufficient.

Based on a structured survey and semi-structured interview, Drury (2011) studied the urban consumers demand for wild animal products in Hanoi, Vietnam, and investigated the social perceptions of wildmeat consumption. The study found that wildmeat is most generally consumed by successful, high-income, high status males of all ages and educational levels. The research found that the consumption was used as a standard to communicate prestige and obtain social influence.

Suwanarong et al. (2015) studied the hunting, food preparation, and consumption of rodents in Lao PDR, with 584 households in 29 villages, Khamkerd district, Bolikhamxay province, by applying Logistic model. The study found that gender, age, ethnic, and occupation have the impact on rodent consumption.

Kroos (2016) examined the risk factors that influence bushmeat consumption of Ebola hosts in an area peripheral to a high Ebola infection zone. The study found that educated persons were significantly more likely to consume bushmeat than persons who had never attended school, possibly due to enlarged income, and persons who keenly practice the religion animism had a decreased possibility of bushmeat due to religious leaders in discouraging bushmeat consumption during the epidemic. Moreover, the study shows that respondents who consumed domestic meat more than one time per month and lived more than ten kilometers from the bushmeat market were significantly less probable to consume bushmeat.

Bakkegaard et al (2017) studied the household determinants of bushmeat and eru (Gnetum africanum) harvesting for cash in The Democratic Republic of Congo, by using the Heckman selection model. The research shows that being local, higher household labor availability and higher asset endowment were positively related to selection into wild meat hunting, reflecting higher risk-carrying capacities, ease of access to equipment and resources and having more labors in the household lower the bushmeat consumption.

## Method

To examine the factors influencing bushmeat consumption in Laos, four provinces were chosen to be the representative of our study. We collected through household surveys by randomly choosing people who consume and not consume wildmeat in the urban area of each one. The data was collected in August 2018.

The questionnaires have five sections: respondent's general information, house-headed information, household information, the reason of consuming and not consuming wildmeat.

The survey used face-to-face interviews with the respondent of each household, and in total, 654 households were randomly selected using a Yamane sampling formula (Yamane, 1967).

In this study, the dependent variable is to consume or not consume so, dummy dependent variable is used (1, 0), and Binary Logistic Regression Analysis is applied, which conducted by Greene, w (1997).

$$Prob\ (event) = \frac{e^{\beta_0+\beta_1 x}}{1+e^{-(\beta_0+\beta_1 x}} \text{ or } Prob\ (event) = \frac{e^{\beta_0+\beta_1 x}}{1+e^{-(\beta_0+\beta_1 x)}}$$

- $\beta_0$ and $\beta_1$ : are the coefficients derived from the variable
- X: is the explanatory variable
- e: is the error term.

In case, there are many variables (p variable) we can write the equation as below:

$$Prob(event) = \frac{1}{1+e^{-z}} \quad Z = \beta 0 + \beta 1x1 + \beta 2x2 + \cdots + \beta pxp$$

$$Z = \beta_0+\beta_1 x_1+\beta_2 x_2+\ldots\ldots+\beta_p x_p$$

In this study, we use consume bushmeat or not consume bushmeat (yes = 1; 0 = no) as the dependent variable, and there are 11 explanatory variables, so the logistic regression model is shown in the equation below:

$$P(consume_{t=1}) = \beta_0 + \beta_1 gender + \beta_2 age + \beta_3 Ethnic + \beta_4 educ + \beta_5 occu + \\ +\beta_6 status + \beta_7 HHS + \beta_8 lnexpend + \beta_9 GTP + \beta_{10} Beliefe + \beta_{11} law + u_i$$

Where $\beta_0$ is the constant coefficient; $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}$ are the coefficients of the explanatory variables of gender, age, ethnic group, education, occupation, status, household size, household's expenditure, go to other province, belief that bushmeat is good for health and awareness of wildlife conservation law, respectively; $u_i$ is the error term. The details of the variables for the Logistic regression are given in Table 1.

**Table 1. The variables for regression**

| Variables | Definition | | Expected sign | Sources of variable |
|---|---|---|---|---|
| **Dependent variable** | | | | |
| **Consume** | **Bushmeat consumption** | **1 = consume**<br>**0 = not consume** | | |
| Explanatory variables | | | | |
| Gender | Gender of respondent | 1 = male<br>0 = female | + | Drury, R., 2011 |
| Age | | | + | Drury, R., 2011 |
| Ethnic | Ethnic group of respondent | 1 = Lao<br>0 = others | + | Suwannarong et al, 2015 |
| Educ | Education levels | | - | Drury, R., 2011 |
| Occu | occupation | 1 = government officer<br>0 = others | + | Suwannarong et al, 2015 |
| Status | Marital status | 1 = married<br>0 = single | + | Suwannarong et al, 2015 |
| HHS | Household size | | - | Godoy, R et al, 2010 |
| Expend | Household expenditure | Kib/Month | - | Fue, L, 2018 |
| GTP | Go to other province | 1 = yes<br>0 = never | + | Fue, L 2018 |
| Belief | Belief that bushmeat is good for heath | | + | Kotler, P, 1996 |
| Law | Awareness of wildlife conservation law | 1 = Yes<br>0 = No | + | Zhang, L et al ,2008 |

## Results

The socio-economic characteristics of the respondents are shown in Table 2.

**Table 2. The socio-economic characteristic of the respondents**

| Respondents characteristic | Frequency | Percent |
|---|---|---|
| Male | 355 | 54.28 |
| Female | 299 | 45.72 |
| Age | | |
| Age < 21 | 65 | 9.94 |
| 21 – 30 | 200 | 30.58 |
| 31 – 40 | 186 | 28.44 |
| 41 – 50 | 120 | 18.34 |
| < 50 | 83 | 12.7 |
| Other ethnic group | 165 | 25.23 |
| Lao ethic group | 489 | 74.77 |
| Single | 274 | 41.9 |
| Married | 380 | 58.1 |
| Household size | | |
| < 4 | 82 | 12.54 |
| 4 – 5 | 318 | 48.62 |
| 6 – 7 | 176 | 26.91 |
| 8 – 9 | 53 | 8.1 |
| > 9 | 25 | 38.22 |
| expenditure | | |
| Minimum expenditure | 150,000 Kib/Month | |
| Maximum expenditure | 4,500,000 Kib/Month | |
| Never been to other provinces | 267 | 40.83 |
| Been to other provinces | 387 | 59.17 |
| Not believe that bush meat is good for health | 249 | 38.07 |
| Believe that bushmeat is good for health | 405 | 61.93 |
| Don't know conservation law | 174 | 26.61 |
| Know conservation law | 480 | 73.39 |

Source: STATA 13, 2019

To estimate the factors determinant bushmeat consumption, Logistic regression model is applied. The logistic model might have econometric problem specifically multicollinearity, which can be investigated and removed during the estimation. Multicollinearity is a very severe problem when using Logistics method. If the coefficients of the correlations between the explanatory variables have an absolute value equal to or above 0.80, then the multicollinearity is severe (Gujariti, 1995). The explanatory variables for this study are verified to have no multicollinearity because the highest absolute value is 0.44, which is much less than the criteria value.

Table 3 show the marginal effect of factors influence bushmeat consumption.

**Table 3. Factors determinant bushmeat consumption**

| Variables | Definition | dy/dx | P>z |
|---|---|---|---|
| Gender | Gender of respondent | .2173284 | 0.000*** |
| Age | Age of respondent | .0026665 | 0.205$^{ns}$ |
| Ethnic | Ethic group of respondent | -.0800587 | 0.16$^{ns}$ |
| Status | Marital Status of respondent | .009621 | 0.848$^{ns}$ |
| Edu | Education level of respondent | .0010061 | 0.889$^{ns}$ |
| Occ | Occupation of respondent | .0287087 | 0.625$^{ns}$ |
| HHS | Household size of respondents | .0205786 | 0.112$^{ns}$ |
| Lnexp | Household expenditure of respondent | -.0784059 | 0.022** |
| Tgp | Ever gone to other province of respondent | .2557306 | 0.000*** |
| Belief | Belief that bushmeat is good for health | .2243452 | 0.000*** |
| Law | Aware of wildlife conservation law | .5106997 | 0.000*** |

Number of obs = 654
LR chi2(11) = 218.63
Prob > chi2 = 0.0000
Pseudo R2 = 0.2443

**Note:** * 10% significant ** 5% significant *** 1% significant
ns has no significant
dy/dx marginal effect

Source: STATA 13, 2019

**Gender**, as expected, the male gender has positively correlated with bushmeat consumption, because men trend to love adventure activities like hunting bird hunting, for instance. If the respondent is a male, the probability of consuming bushmeat is 21.73 % higher compare to female with 1 % statistically significant.

**Expenditure (household expenditure),** the result shows that the expenditure has negatively correlated with bushmeat consumption, because the household that has high expenditure in the house trend to has meal at the restaurant more than cook at home, and they may have other payment that more important than buying illegal bushmeat. Thus, if the household expenditure increases 1 %, the probability of bushmeat consumption decrease -0.00078 % with 5 % statistically significant.

**GTP (go to other provinces),** was expected to be positively correlated with bushmeat consumption, because in Laos, wild meat is sold beside the street and in local market in the rural area. Thus, a person who ever been to other province, the probability of consuming bushmeat is higher than a person who never been to others province 25.57% with 1 % statistically significant.

**Belief (believe that bushmeat is good for health),** the result is as expected, the belief has positively correlated with bushmeat consumption because many Lao people belief that some wild animals are good for health and can cure disease like eating turtle can make you have a long lifespan. So, it is shown that a person who has a belief, the probability of bushmeat consumption is higher than a person who not believe 22.43 % with 1 % statistically significant.

**Law (aware of wildlife conservation law),** the result is quite surprisingly because the awareness of conservation law has positively correlated with bushmeat consumption. The probability of a person who know the conservation law is higher than a person who don't know the law 51.10% with 1% statistically significant. This means even if people know the conservation law, they don't care and continue eating wild meat, moreover, this can mean that the conservation law is insufficient.

As for age, status, education, occupation and household size factors, they are positively correlated with bushmeat consumption, but ethnic has the negative correlation. However, all of them is not statistically significant, which mean they have no impact on bushmeat consumption.

## Conclusion and Recommendation

There are many influences that affect bushmeat consumption. The main purpose of the present study is to examine factors determining bushmeat consumption in Lao PDR. The study is based on cross-sectional data, which were collected from four provinces: Vientiane Capital, Vientiane province, Luangprabang province and Xiengkhuang province, with 654 samples, in 2018. The Logistic Regression Model was applied in this study.

The study found that gender, been to other provinces, belief and law, have positively affected the bushmeat consumption, while the expenditure has negatively affected the bushmeat consumption in the study areas. In addition, in order to protect the wild life, the collaboration at all scales, involving local people, government and scientists are needed, and educate people with the negative effect of wild meat, because from the survey, most of the respondents said that bushmeat is delicious that is why they consume bushmeat.

This paper has some limitations. First, the cross-sectional data might only show the short-term effect and might not anticipate the long-term impact, which might have been possible to ascertain by using panel data. Second, the sample size is quite small for the 4 provinces with 654 sample. Third, we need more advanced econometric methods to examine the factors determinant bushmeat consumption, and we need more time to investigate the real causes.

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# Renewable Energy Policy Development in Thailand

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**Abstract**

This paper is attempting to explore renewable energy policy development in Thailand. Renewable energy is mostly derived from natural resources and hence considered clean and environmentally friendly. However, there exist some hindrances to the development of renewable energy and the costs of harnessing renewable energy resources are still high compared with the costs of using commercial energy, particularly, the development of solar and wind energy which require the use of high-cost technology. Renewable energy that has high potential to be used in place of fossil energy includes, for example, hydropower, biogas and biomass energy, solar energy and geothermal energy. Studies and development on these energy sources have continuously been undertaken by several agencies, both at the local level initiated by local intellect and at the government level. At present, the development of renewable/alternative energy has become a focus of interest and wider utilization has been promoted to replace conventional energy consumption in parallel with the efforts to stimulate people to use energy efficiently and economically.

**Keywords:** Thailand's Renewable Energy; Thailand's Alternative Energy Development Plan; Energy Policy in Thailand.

## Introduction

Thailand's demand for energy has been rising from past. The energy usage is switched to renewable energy sources. Thailand is still dependent on import of fuel. However, there is a huge potential for solar and wind power in Thailand but until recently a lack of funding and technology prevented them from becoming commercially viable. Both of these options are now being invested in to meet government targets. There are several solar photovoltaic (PV) projects operating successfully, even though they typically incur large start-up costs. Small scale hydro-power systems have proved promising but high costs of materials, equipment and expertise are limiting their construction. Biomass offers one of the most promising sources of potential energy. Sources of biomass in Thailand include fuel wood, rice husks, bagasse, coconuts, corn cobs and distillery slop. Biogas can also be derived from animal dung and cassava.

With the advent of economic recovery after the 1997 economic crisis, Thailand's energy consumption has remarkably increased. The GDP growth rate has continuously increased, reflected by the increasing growth rate of the industrial output index. The industrial sectors which have a high growth rate include the construction material sector and

the automobile and transportation equipment sector. Particularly, automobile and motorcycle manufacturing for commercial purpose has continuously increased since early 2002.

Thailand's commercial energy demand in 2002 totaled 1,283 thousand barrels per day of crude oil equivalent, an increase of 6.6% from the demand in 2001. The demand increased for all energy types, especially for natural gas and coal/lignite. The shares of commercial energy demand were the following: petroleum products, 46%; natural gas, 37%; coal/lignite, 14%; and electricity/import electricity, 3%.

Thailand's expenditure on petroleum imports dropped from 15.4 percent of the gross domestic product (GDP) in 2004 to 10 percent in 2008. This figure shows the potential of government renewable energy policy to support alternative energy usage. Thailand's annual growth in primary energy consumption from 1999 to 2004 was more than double the world average of 2.9 percent. In 2007, Thailand's energy consumption was 47 percent from oil, 33 percent from natural gas, 14 percent from coal, 2 percent from hydropower and 4 percent was from other sources. In the end of 2014 Thai Royal Government had issued Thailand Power Development Plan 2015-2036 (PDP2015) which also includes developing renewable energy. (Energy Policy and Planning Office, Ministry of Energy, Thailand, 2015).

This paper focuses on legal framework relevant to renewable energy in Thailand, energy policy in Thailand, impacts on climate change and Thailand's renewable energy policy, the Alternative Energy Development Plan (AEDP) as well as trade agreements within the framework of energy between Thailand and neighboring countries.

## Relevant Legal Framework to Renewable Energy Development in Thailand

### Institutional set-up of the Energy Sector

The energy sector in Thailand is administered by the Ministry of Energy which was established in 2002 in accordance with the Restructuring of Government Organization Act (2002). The National Energy Policy Council (NEPC) was established under the National Energy Policy Council Act (1992) which is responsible for operating the energy sector in Thailand. This council also has a right to bestow energy operating licenses and issuing energy pricing regulations. Council members with ministers from all relevant sectors as well as from defense, energy, foreign affairs, transport, science and technology, finance, agriculture, commerce, industry and the National Economic and Social Development Board and also government agencies which are working under the Council which are the Energy Conservation Promotion Fund Committee (ECPFC), Energy Policy Committee (EPC) and Energy Policy and Planning Office (EPPO). (Ministry of Energy, 2015).

Renewable energy research is supported by The National Energy Policy Council administers the Energy Conservation Promotion Fund (ECON Fund) which this fund was set up under the Energy Conservation Promotion Act (1992). This fund provides financial support to specified factories and buildings which are involved in energy conservation programs and renewable energy projects. The Energy Conservation Promotion Act determines renewable energy to comprise the energies obtained from biomass, solar power, firewood, geothermal power and so on. (Sitdhiwej, 2005).

### Energy Laws

The legal framework ruling the energy sector is bolstered by the Energy Industry Act of 10 December 2007. This act aims to encourage the use of renewable energy with good quality and with reasonable price. This act also focuses on renewable energy development and domestic energy resources for social, economic and environmental sustainability and to reduce dependency of energy import. The Energy Industry Act (section 51) grants the Energy Regulatory Board the authority to issue licenses for energy industry operation and to define

the criteria, processes and conditions of energy industry action which related to efficiency of energy and resource utilization. (Thailand Law Forum, 2011).

The PDP2015 aims to reduce natural gas power generation, to boost a share of coal power production through clean coal technology, to import electricity from neighboring countries, and to enhance renewable energy. Furthermore, the plan also focuses to develop transmission and distribution system in order to develop renewable energy and ASEAN Economic Community.

The plan also deals with energy conservation measures in the transport division. Regarding to renewable and alternative energy, the purposes of this plan are:

- Maintain the procure of power which generated by renewable energy including very small producers
- Diffuse relevant information concerning to alternative energy to public
- Promote research and development of efficient and compatible alternative energy for society and economics situation
- Push private sector initiatives and public cooperation in energy policymaking and,
- Set up a public institution to implement the support of renewable energy use

A Renewable Portfolio Standard enacting new power plants that must have 5 percent of their generation capacity acquired from renewable energy. The Thai government has also encouraged the purchase of power which is generated by renewable energy together with provision of tax credits and privileges and aids to small power producers from the Energy Conservation Promotion Fund. Moreover, it has also supported special investment in virtue of the Board of Investment. For instance, favorable tax and duty exemption and loans as well as land proprietorship rights for oversea investors.

**Environment and Natural Resource Laws**

Thailand has various aspects of environmental and natural resource laws and regulations regarding to alternative energy. They are Forest Act (1941), Land Code (1954), Factory Act (1969 which revised later in 1992), the Land Reform for Agriculture Act (1975), the Enhancement and Conservation of National Environment Quality Act, Public Health Act and Hazardous Substances Act (1992) and Community Forest Bill (2007). (https://thailand.opendevelopmentmekong.net/topics/environment-and-natural-resources/)

In this section, I will only give the information on the Enhancement and Conservation of National Environment Quality Act. This act institutes general environmental principles which take the position the foundation for all legislation relevant to environment and national programs. The environmental principles in the Act are deemed in Laws and regulations with respect to the industrial, transport and energy sectors. It gives term that help will be furnished for public education in regard to statutory environmental protection requirements and regulations.

The act establishes a National Environment Board to control cooperation between ministries as well as to escort conservation of national environmental quality (section 13). The act holds an environmental impact assessment (EIA) and environmental quality standards.

**International Commitments**

In 1982, Thailand joined the General Agreement on Tariffs and Trade (GATT) and in 1995 Thailand became a member of the World trade Organization (WTO) as well as Thailand is a member of multilateral environmental agreements concerning to bioenergy, the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 and the Convention on Biological Diversity in 2003.

Thailand submitted an Initial National Communication on 13 November 2000 containing: its greenhouse gas inventory as of 1994; greenhouse gas projections and identification of mitigation option; existing assessments on vulnerability and adaptation; and policies, measures and other aspects related to financial resources, technology transfer and capacity building. (Ministry of Science, 2000).

In 2002, the Cabinet authorized the creation of National Commission on Climate Change Policy to be presided by the Prime Minister and be placed under the authority of the Office of Environmental Policy and Planning of the Ministry of Natural Resource and Environment. (Office of Natural Resources and Environmental Policy and Planning, 2020)

**Clean Development Mechanism (CDM)**

Thailand had ratified Kyoto Protocol in August 2002 and the state has issued policies to support energy reservation at national level along with the allocation of US$ 10 million in the current National Economic and Social Development Plan to raise environmental recognition and energy preservation in the primary school curriculum. (Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment, 2020).

By using of renewable energy and CDM project have led Thailand to Sustainable Development. Thailand's CDM project policy is outlined as

- The development of energy by using bioenergy such as biodiesel and factory wastewater and to convert these energies into energy as well as applying renewable energy sources such as solar and wind powers.
- Increasing and improving energy efficiency as well as swapping the types of fuel consumption to produce energy.
- Transformation waste into energy and waste into bio-fertilizer.
- Growing transport efficiency and reduction of greenhouse gas emissions.

It is important capability to apply the CDM to reduce GHG emissions in the energy section in Thailand. Mostly, Thailand's total net GHG emissions are carbon dioxide, which is largely created by energy sector. CDM aims to generate electricity and heat from biogas and to produce liquid from biomass. However, CDM project does not include afforestation and reforestation even though the Ministry of Natural Resources and the Environment is doing the research for potentiality to apply CDM project to afforestation and reforestation. (Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment, 2020)

**Thailand Energy Policy**

Currently the Royal Thai Government carries out its policy in several areas to solve the urgent problems which is leading to the sustainable development of the country. As the Thai Government attempts to enhance the quality of life of Thai people so in energy issue, the government is taking an action which is based on three disciplines which is described as follows:

1. Energy Security: increasing power consumption in the form of various types of fuel in order to lessen the dependency of a specific type of fuel.

2. Economy: remain a proper cost of electricity generation and accomplishing energy efficiency.

3. Ecology: turning down environmental and social impacts by decreasing carbon dioxide intensity of electricity generation.

In addition, the Thai government strongly promotes renewable energy development such as waste, biomass, biogas, wind and solar power production. Competitive investments in

power transmission and distribution system is expected to serve renewable energy and smart-grid development.

Moreover, there is research, development, and establishing standards for electrical instrument and energy preservation building. The Thai government also supports the development of mass public transportation and railway system to boost productive energy use, which will decrease the cost of energy purchase of investment in Thailand. (Energy Policy and Planning Office, Ministry of Energy, 2020).

**Impacts on Climate Change and Thailand's Renewable Energy Policy**

Thailand faced the heightened precipitation during rainy season and Thailand has also experienced with longer dry season period. The rainfall pattern during the last 25 years has been frequently increasing which is leading to either floods or drought. The Thai government has spent up to 13 million Thai Baht (Ministry of Energy, Thailand, 2009, 4-5) to assist people who encounter natural disaster in the last 10 years. As a result, this matter generates the environmental impact such as landslides and river bank erosion as well as generating social impact.

During the last 20 years, Thailand has a big role in energy and environment in the South East Asia region. In the last decades, Thailand had a low level of GHG emissions but now it has been increasing and there is a tendency that GHG emissions will go up in the future because of increasing of population and continuity of economic development [GHG emissions reduction potential: Thailand GHG emissions from the consumption and flaring of fossil accounted for 1% of world's GHG emissions; ranking 22$^{nd}$ in the World's top GHG emitters. Thailand is the second largest contributor to fossil fuel GHG emissions in ASEAN after Indonesia (Ministry of Energy, Thailand, 2009). Consequently, Thailand should alleviate the impact of climate change by decreasing GHG emissions from activities in the country.

In order to cope with the above issues, the Ministry of Energy has set up the program to incline investments, production, and consumption in renewable energy e.g. wind, solar, biomass and so on. One project which is concerning to this issue is 15-Year Renewable energy Development Plan (REDP) 2008-2022 and also the achievement following to the Energy Conservation Program, Phase 3 (2005-2011). This program importantly focuses on energy saving supporting in the transportation and industrial sectors. These instruments will support energy security of the country by decreasing energy imports and increasing energy resources as well as establishing competitive energy market for sustainable economic development and in the long term, this can reduce the GHG emission.

**15-Year Renewable Energy Development Plan (REDP)**

In February 2009, Thailand set up the alternative energy development plan which is the 15-Year Renewable Energy Development Plan (REDP). Currently we are enthusiastic to implement the 15-Year Renewable Energy Development Plan (REDP) with possible explicit action plan. We will promote ethanol and biodiesel to become the energy for Thai people. Apart from that, biodiesel and ethanol are renewable energy from crop so in this case it can increase the price of agricultural products as well as reduce the energy import. Further at the retail price of biofuel is reasonable and using biofuel which is clean energy will lessen the global warming and environmental problems.

The 15-Year Renewable Energy Development Plan will be carried out in three phases. The short term (2008-2011) concentrates on supporting potential technologies for renewable energy such as biofuels and power and heat generation from biogas and also biomass. The second phase is the medium term between 2012 and 2016. This phase emphasizes on

renewable energy technology industry and promoting the development of new prototypes of alternative energy technologies with low cost and supporting new instrument, program, and technologies for biofuel production. The final phase of REDP is from 2017 to 2021. This phase will conduce to the promotion of new technologies for renewable energy which are low cost. For instance, hydrogen energy and expanding the area of Green City. Within this time, it is expected that Thailand will become a regional hub within the Association of South-East Asian Nations (ASEAN) for biofuel and renewable energy technologies. (Ministry of Energy, 2020).

**Trade Agreements within the Framework of Energy**

There are several trade agreements and cooperation between Thailand and neighboring countries within the framework of alternative energy sources along with the promotion of South-South technology transfer for ethanol and biodiesel production and consumption. Due to the rapid growth of bioenergy sector in the Asia-Pacific region, trade and investment in bioenergy and trade cooperation sector between some countries in this region is occurred.

There have been some trade agreements and cooperation which have been operated in Asia-Pacific region.

**1. Association of Southeast Asian Nations**

The ASEAN free trade Area was started in 1992 to get rid of tariffs and integrate regional economics into a single production base and regional market of 550 million people among the ten member countries. Established in 1967, ASEAN consists of Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. An ASEAN Economic Community (AEC) is envisaged in 2015.

Alternative energy issues were talked for the first time at the 26$^{th}$ ASEAN Ministers in Energy Meeting in Bangkok on August 7, 2008.

As regards to expanding external energy collaboration, ministers stated to support sustainable energy development in the region and to increase energy costs in order to fulfill these objectives:

a) To enhance energy efficiency and conservation
b) To promote biofuels for transportation sector and other objectives
c) To increase energy market integration
d) To enhance renewable and alternative energy sources and
e) To improve oil stockpiles

Particularly the increasing significance of bio-fuels was known as an alternative to reduce ASEAN's fossil fuel use. Ministers focused on the demand for better cooperation and experience interchange in promoting biofuel production and consumption together with concerning fiscal inducements, regulatory infrastructure, and supporting facilities.

The Ministerial Statement showed the ASEAN Member States could potentially be the regional hub for biofuel production and trade including intra ASEAN and inter-region. Furthermore bio-fuels has been talked in the context of ASEAN cooperation to react to the impacts of climate change, along with a new initiative on ASEAN Strategy which deals with the impact of climate change on Agriculture, Fisheries and Forestry. (ASEAN, 2008)

**2. Asia – Pacific Economic Cooperation (APEC)**

Since May 2006, APEC Energy Working Group has encouraged members to substitute petroleum in the transportation sector. The APEC Energy working group has set up

standards for ethanol and biodiesel. APEC has also established demonstration projects to encourage second – generation biofuels (APEC, 2008).

The aim of the APEC Energy Working Group is to increase to the highest degree of promoting of the energy sector to the region's economic and well social standard through the operations related to energy demand and supply. Energy and the environment, new and renewable energy technologies, energy efficiency and conservation, and liquid biofuel production and progress (APEC, 2008).

**3. Greater Mekong Sub-region (GMS)**

The GMS members are Thailand, Cambodia, Lao PDR, Vietnam, Myanmar, and China (Yunnan Province and Guangxi Autonomous Region). GMS governments have launched the Roadmap for Expanded Energy Cooperation in the area in order to avoid troubles such as the energy poverty, fluctuating energy prices, geopolitical uncertainties of energy supply, constraint on the environment, interconnectedness of global energy markets. (https://greatermekong.org/about).

**4. Japan-Thailand Economic Partnership Agreement (JTEPA)**

Thailand and Japan concurred on JTEPA to enhance cooperation in trade and investment and to set up a free trade agreement between countries. The Thailand Development Research Institute (TDRI) completed a study on the potential impacts and opportunities of JTEPA for economy in Thailand. The outcomes pointed to the potential for Thailand to gain advantage from energy cooperation. Bio-energy aspect has not been obviously talked under the JTEPA scope. Nevertheless, there is provision in Chapter 13 of JTEPA concerning to the cooperation in the subject of science, technology, energy and environment together with a sub-committee set up for this matter. In this respect, Japan and Thailand have concurred to talk about technology transfer in relation to bioenergy. (Department of Trade Negotiations, 2019).

## Future prospects

Trade and investment in bioenergy in Asia has promoted since regional cooperation has been increased, especially in the Mekong region. However, socio-environmental considerations have been neglected. In this matter, paying attention to the social and environmental sustainability of bioenergy generation should be elaborately considered. Legal clarity should be provided and coherence of system for trade and investment in bioenergy should be stressed regarding to food and fuel competition for agricultural land as well as biodiversity and forest conservation connected with increasing of agro-industrial energy crops.

Policy makers ought to arrange feasible constant plan to enhance the investment in bioenergy progress in the region with keeping the sustainability of social and environmental aspects.

## Conclusion

As Thailand is an agricultural country which produces a large amount of waste residues that can be transformed into the important energy and electricity sources. The Thai government issues energy policies to allow the use of alternative energy sources including efficient technologies for electricity generation, particularly since the Small Power Producer program has been introduced.

The demand of alternative energy in Thailand has been increasing and also the trade and investment in renewable energy business are expanding as well as Thailand has become green energy leader in ASEAN by being the first country of this region to bring in gasohol.

Thailand is promoting biofuel production and consumption in the transport sector and providing tax incentives for biofuel producers and automobile manufacturers and also the Thai government provides low interest loans to palm oil producers. Gasohol has become the main energy source for transportation sector which Gasohol has accounted almost 60 percent of petrol sold in Thailand. However, there is an excess in ethanol supply which interrupts the production in many factories. On the other hand, an energy policy ensures the price of palm oil and oblige the use of biodiesel. The plan aims to raise plantations including in neighboring countries for sustaining adequate supply to meet the national aims. The Thai government has a plan to continue to contribute gasohol and biodiesel by establishing the Oil Fund to assist a competitive price concerning to conventional gasoline.

The Thai government issues national legal and policy plans which are related to the use of bioenergy in a nationwide fashion. Thailand has enthusiastically followed alternative energy sources as well as Thailand has shown up itself as a leader in biofuel development in Southeast Asia. The government cooperates with the private sector to carry out the goal of national roadmaps for biodiesel, biogas and ethanol. Nuclear energy is also a better alternative source to produce power. However, promoting nuclear energy will surely be opposed by the public as several countries have experienced earlier. Therefore, Thailand must go on to work for better policy integration between different ministries and think about domestic and international factors linked to several aspects of bioenergy policies and regulations.

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