

## EXTENDED ABSTRACT

# A STUDY ON CLIMATE ENGINEERING KNOWLEDGE LEVEL OF INTERNATIONALIZED ORGANIC AGRICULTURAL TECH-BASED SMES

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### Abstract

The Climate Engineering knowledge can be specified the knowledge on continuous changes in various climatic forms of a region judges through the changes in the behavior of numerous climate engineering factors which consequential in fluctuations of the entire ecosystem and socio-economic operations. Subsequently those fluctuations open up the doors for ambiguous operations of internationally oriented organic agricultural TSME technopreneurs on their way to sustainability. Present earth is frequent of unpredicted and extreme climatic events such as rainfall, drought, high temperature, high snow, flood, forest fires, volcano eruption, higher sea level etc. which resulted in poor and unpredictable yields from organic agriculture and agriculture allied activities. This study was conducted with the main aims of identifying the key knowledge domains, present levels of climate engineering knowledge, present levels (values) of each climate engineering knowledge domain and to identify the most contributing climate engineering knowledge domain of internationalized organic agricultural Tech-based small and medium enterprises Technopreneurs in Sri Lanka. Out of the total population of 448 internationalized organic agri-TSME technopreneurs, number of 112 internationally oriented organic agri-TSME technopreneurs of tobacco, dragon fruit, mango, cashew and coconut were selected based on Stratified and Simple Random sampling techniques. A self-administered Questionnaire used to collect primary data plus tables, graphs, pie charts along with a multiple regression analysis used as per the qualitative and quantitative data analysis using the SPSS. The research study identified Physical Knowledge, Casual Knowledge, Effect Knowledge and Action Related Knowledge as main knowledge domains for the level of Climate Engineering knowledge of internationalized organic agri-TSME technopreneurs. Tobacco, Dragon Fruit, Coconut, Mango and Cashew internationally oriented organic agri-TSME technopreneurs recorded mean level of Climate Engineering knowledge values as 69.65%, 67.96%, 59.78%, 47.41% and 46.58% respectively. Their individual Climate Engineering Knowledge Domain values are concerned, they possessed an average value of 57% as their physical knowledge, average value of 54.7% for casual knowledge, average level of knowledge on effect 61.85% and average value of 60.36% for action related knowledge where identified the Effect Knowledge is the most contributing knowledge domain. There is an essentiality of implementing up to date knowledge dissemination and technology transfer processes through national and international resources physically and virtually (internet, digital information and communication technologies) to improve internationally oriented organic agri-TSME technopreneurs levels of effect knowledge and action related knowledge as to improve their level of climate engineering knowledge.

**Keywords:** Climate engineering knowledge, internationalized TSMEs, organic agriculture

## 1. Introduction

Climate Engineering knowledge in general is defined as the knowledge of long-term shifts in different climatic patterns of a specific place or a region measured by changes in the behavior of climate factors such as precipitation, rainfall, temperature, and wind patterns which resulting in changes of ecosystem and socio-economic activities. Such changes bring about uncertainties in the sustain ability of agriculture and agro-allied ventures (Urama & Ozor, 2011). It is also known as the knowledge on planet earth’s warm, rainfall patterns shift and extreme events such as drought, flood or forest fires which are more frequent (Zoellick, 2009). This has resulted in poor and unpredictable yields from organic agriculture and agro – allied activities. The climate engineering has implications on food and water supplies, energy production and use, ecosystem and species survival, human health, precipitation patterns, social and political stability. The most serious issue of global warming is a result of poor climate engineering which is one of the most serious global environmental problems in present era. It creates a potential threat to our biosphere with economic, social and environmental consequences. It is also linked to the problem of the inequity between developed and developing countries as the wealthy 20% of the world’s population causes about three quarters of global greenhouse gas emissions.

### 1.1 Research Objectives

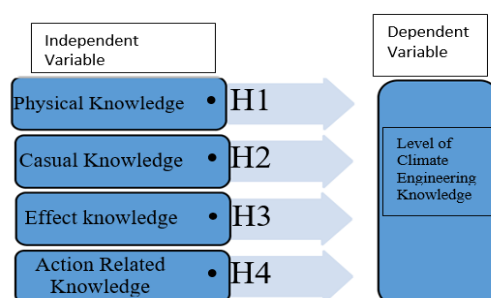
1. Identify the knowledge domains and present levels of climate engineering knowledge of internationalized organic agricultural TSME Technopreneurs in Sri Lanka.
2. Identify the present levels (values) of each climate engineering knowledge domain of various internationally oriented organic agri-TSME Technopreneurs in Sri Lanka.
3. Identify the most contributing climate engineering knowledge domain of internationalized organic agricultural TSME Technopreneurs in Sri Lanka.
4. Provide policy implications on more thorough climate engineering knowledge level of internationalized organic agricultural TSME Technopreneurs in Sri Lanka.

## 2. Methodology

### 2.1 Population and Sample

In Puttalam district of Sri Lanka, it carries 448 internationalized organic agri-TSME (employees 5-24) technopreneurs. Utilized Stratified sampling technique and selected five stratas’ of tobacco, dragon fruit, mango, cashew and coconut. Out of the stratas’, 112 internationally oriented organic agri-TSME technopreneurs were selected based on Simple Random sampling. Both the quantitative and qualitative were used in analyzing process. The SPSS analyzing mode was used to the analyzing.

### 2.2 Conceptual Framework



### 2.3 Hypothesis

#### Hypothesis 01

H1- There is a relationship between physical knowledge domain and level of climate engineering knowledge.

H0 - There is no relationship between physical knowledge domain and level of climate engineering knowledge.

#### Hypothesis 02

H1- There is a relationship between casual knowledge domain and level of climate engineering knowledge.

H0- There is no relationship between casual knowledge domain and level of climate engineering knowledge.

#### Hypothesis 03

H1- There is a relationship between effect knowledge domain and level of climate engineering knowledge.

H0 - There is no relationship between effect knowledge domain and level of climate engineering knowledge.

#### Hypothesis 04

H1 - There is a relationship between action related knowledge domain and level of climate engineering knowledge.

H0 - There is no relationship between action related knowledge domain and level of climate engineering knowledge.

## 3. Findings

### 3.1 Climatic Engineering knowledge levels of organic agri-TSME technopreneurs

Figure 1 shows the mean values gained by different internationally oriented organic agri-TSME technopreneurs. Internationalized organic Tobacco TSME technopreneurs have recorded the highest score of 69.65% and Dragon Fruit technopreneurs marked the second highest score of 67.96% while Coconut technopreneurs recorded 59.78% of marks. Both the internationalized organic Mango and Cashew TSME technopreneurs scored lower marks as 47.41% and 46.58% respectively.

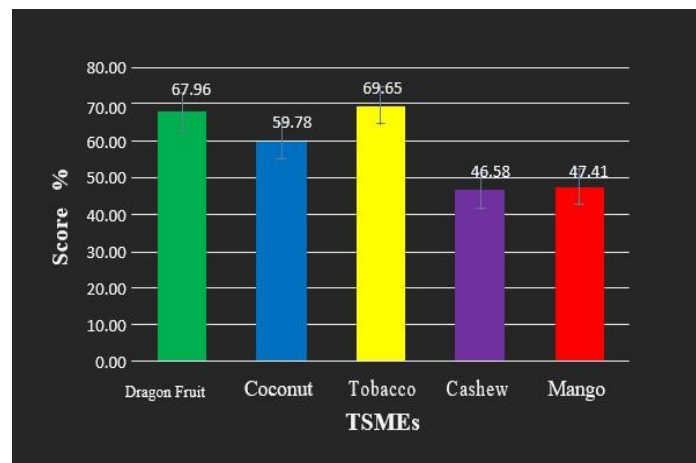
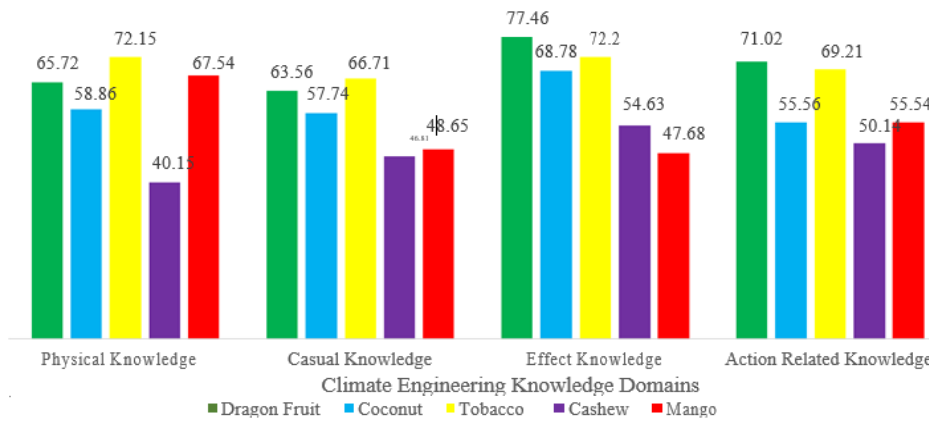


Figure 1. Average Climatic Engineering Knowledge scores of internationalized organic TSMEs Technopreneurs

### 3.2 Levels (average values) of each climate engineering knowledge domain of various internationalized organic agri-TSME technopreneurs



**Figure 2.** Average values of Climate Engineering Knowledge domains of various internationalized organic Agri-TSMEs Technopreneurs

In this study, respondents have recorded an average score of 60.9% as their physical knowledge. It shows that internationally oriented organic agri-TSMEs technopreneurs have a good physical knowledge regarding climate engineering knowledge. Among the technopreneurs, Tobacco technopreneurs carry 72% of highest level of physical knowledge and Mango carries 68% while Cashew technopreneurs recorded 40%, the Cashew technopreneurs carry the lowest value. However, an average value of 56.7% has gained for casual knowledge-based questions. It is a hint to inference that these technopreneurs have a satisfactory knowledge on climate engineering basically the climate change causes. The Tobacco technopreneurs have the highest value of casual knowledge and it is 67%. Dragon Fruit technopreneurs carried 64% and the Cashew technopreneurs are not in the satisfactory level recording only 47% of score.

When analyzing the study’s collected data, all the technopreneurs have an average level of knowledge on effect 64.2%. Dragon Fruit technopreneurs have 77% score recording the highest level of effect knowledge compared to other technopreneurs. Tobacco technopreneurs achieved 72% which is also a very good level, but Mango technopreneurs only 48% which is the lowest. All the respondents have an average value of 60.6% for action related knowledge. Dragon Fruit technopreneurs have 71% score recording the highest level while Tobacco is in the second highest with the score of 69%. Cashew technopreneurs recorded 50%, which is the lowest score.

### 3.3 Multiple Regression Analysis

Table 1. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.880 <sup>a</sup>	0.782	0.781	0.022

a. Predictors: (Constant), Physical Knowledge, Casual Knowledge, Effect Knowledge and Action Related Knowledge

Source: SPSS analysis

As per the analysis, it can be identified that coefficient of determination is 0.782 and demonstrates that 0.781% of the Level of Climate Engineering Knowledge can be determined through this model.

Table 2. Coefficient Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std.Error	Beta		
1	(Constant)	8.980	.000		5.37	.000
	Physical Knowledge	.449	.000	.000	.057	.000
	Casual Knowledge	.608	.000	.226	.066	.012
	Effect Knowledge	.791	.000	.823	.162	.000
	Action Related Knowledge	.678	.000	.000	.003	.000

a. Dependent Variable: Level of Climate Engineering Knowledge of Int. Technopreneur

Source: SPSS analysis

As per the regression analysis, it can be identified that Physical Knowledge, Casual Knowledge, Effect Knowledge and Action Related Knowledge have coefficients of 0.449, 0.608, 0.791 and 0.678 at the significant level of 95%.

### 3.4 The Regression Equation

Level of Climate Engineering Knowledge of organic agri-technopreneurs = 8.980 + 0.449 ( Physical Knowledge) + 0.608 (Casual Knowledge) + 0.791 ( Effect Knowledge) + 0.678 ( Action Related Knowledge)+ E

## 4. Conclusion

The research study recognized Physical Knowledge, Casual Knowledge, Effect Knowledge and Action Related Knowledge as main knowledge domains for the level of Climate Engineering knowledge of internationalized organic agri-TSME technopreneurs in Sri Lanka.

The different internationally oriented organic agri-TSME technopreneurs of Tobacco, Dragon Fruit, Coconut, Mango and Cashew recorded mean level of Climate Engineering knowledge values of 69.65%, 67.96%, 59.78%, 47.41% and 46.58% respectively.

As far as internationally oriented organic agri-TSME technopreneurs Climate Engineering Knowledge Domain values are concerned, they carried an average value of 60.9% as their physical knowledge, average value of 56.7% for casual Knowledge, average level of knowledge on effect 64.2% and average value of 60.3% for action related knowledge.

As per the Multiple Regression analysis, it was identified the Effect Knowledge is the most contributing domain where the Action Related Knowledge recorded the second most contributory domain against the level of Climate Engineering knowledge of internationalized organic agri-TSME technopreneurs in Sri Lanka.

Besides, revealed that independent variables of Physical Knowledge, Casual Knowledge, Effect Knowledge and Action Related Knowledge have strong positive relationships with the level of Climate Engineering knowledge of internationalized organic agri-TSME technopreneurs.

## 5. Policy implications

When it comes to the policy implications, predominantly there must be implemented efficient and effective mechanisms such as frequent awareness programs, up to date knowledge dissemination and technology transfer through national and international resources physically and virtually( internet, digital information and communication technologies) to improve internationally oriented organic

agri-TSME technopreneurs effect knowledge and action related knowledge as main contributory knowledge domains in order to improve their level of climate engineering knowledge.

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