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Local community perception to participate in agro-tourism in *Palugaswewa* Tank Cascade System

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Abstract

Sri Lanka as an agricultural country has many potentials to promote agro-tourism aiming for sustainable rural agricultural development. Nonetheless, the community perception of participation for agro-tourism is not at a satisfactory level. Hence, the study explored the potential and perception of the local community to participate in sustainable agro-tourism activities in *Palugaswewa* Cascaded Tank Village System which was recently nominated as a world heritage. A simple random sampling method was used to select 234 respondents. Collected data through field surveys, focus group discussions and key personnel interviews were analyzed qualitatively and quantitatively. Logistic regression results revealed that gender [Odds Ratio (OR)=2.849], primary occupation (OR=3.284), engaging in tourism activity (OR=6.333), awareness about the agro-tourism activities in *Palugaswewa* (OR=8.106) are significantly (p<0.05) affecting the participation for agro-tourism by the villagers. The factor analysis revealed that social, social welfare, environmental, and land associated factors are significantly (p<0.1) affecting community perception on agro-tourism. According to the thematic analysis, wild animal tours, nearby *Habarana* and *Ritigala* tourism hotspots, traditional agricultural practices, available ancient ruins in the area, and infrastructure

facilities are some potentials and possible ventures for agro-tourism in the area. Hence, the study concluded that there is a potential for introducing a sustainable agro-tourism plan in *the Palugaswewa* cascade in Sri Lanka.

Keywords: *Agro-tourism, Cascaded tank village system, Potentials, Social welfare*

1. Introduction

Tourism comprises the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business, and other purposes (James, 2004). Agro-tourism, farm tourism, or agricultural tourism is the process of attracting visitors and travelers to agricultural areas, mainly for educational and recreational purposes. There are economic difficulties and changes in the farming and livestock industries in many countries in the world. Many farmers especially those who have small-scale, family-owned farms have understood the necessity of supplement their agricultural business model. So, they find new ways of generating income. Agro-tourism can contribute to the overall income, cash flow, and profitability of a farm by providing alternative income via farm products, and farming activities (Malkanthi & Routry, 2011). For example, agro-tourism in Italy showing the agricultural and ecological education events has supported the protected areas from agricultural development. In short, the perception of agro-tourism progression covers the views of tourists' increase of awareness and comprehension on environmental protection and agricultural inhabitants' quality of life improvement particularly in developing countries in which agriculture is yet an important strategy in rural development. Also, China reports providing food for millions of visitors on an annual basis in Shanghai (Awan et al., 2016).

Agro-tourism is significantly different than mass tourism. At present, tourists expect things rather than pleasure from a tour. Some like to get farming experiences, learn about farming, increase their health condition, identify rural culture, as well as pleasure. So nowadays, there is a good demand for agro-tourism in the world. Also, agro-tourism is a good alternative to reduce the agricultural risk of farmers (Maetzold, 2002). Many developing countries have embraced agro-tourism as a strategy for rural development through the intention of accomplishing the well-being of the farming community in these countries. Taiwan and the Philippines are the major agro-tourism destinations in the Asian region. In these countries, agro-tourism activities were developed according to government policies (Rambodagedara et al., 2015).

Moreover, tourism is one of the largest and fastest-growing industries in the world economy. In Sri Lanka, the tourism industry is the fourth highest foreign exchange generator of the

economy. According to the Sri Lanka Tourism Development Authority (SLTDA, tourist arrivals increased 14% in 2016 to a record 2.05m visitors. This was up from 1.798m in 2015.

Furthermore, agro-tourism is a new dimension of alternative tourism development to traditional mass tourism. It will have great potentials with various opportunities to develop the Sri Lankan tourism industry sustainably. Agro-tourism is a part of rural tourism and it relates to tourism on farms, plantations, and home gardens. Agriculture has always been deeply related to the social, cultural, and economic aspects of Sri Lankan history. Looking at the current situation in Sri Lanka, it is not specifically recognized for agro-tourism and is a part of the tours, not the focus. The government promotion of the field is relatively low (Wijewickrama, 2011). In the Sri Lankan context, Agro Technology Parks are established with the objectives of agriculture extension, education, and agro-tourism in Sri Lanka by the Department of Agriculture. The first Agrotechnology Park was formed in *Gannoruwa* in the Kandy district. The second Agrotechnology Park was established in the Hambantota district adjoining *Bataatha* government farm (Department of Agriculture, 2018). In these agricultural farms, agricultural activities ranging from hi-tech agriculture to traditional agriculture. That is demonstrated for the visitors who came to these places. It also strongly focuses on providing information to farmers, school children, and the general public, provide education and training mechanisms, demonstrate the recommended crop varieties and technologies, and edible landscaping consisting of tropical crops (Department of Agriculture, 2018).

According to Malkanthi & Routry (2011), availability of significant number of farmers with private properties, presence of attractive agricultural landscapes including unique features for most of the areas, availability of beautiful natural landscapes with clean and healthy environment, presence of knowledgeable and energetic farming community, availability of significant level of family labor, presence of traditional farming activities including Chena cultivation, organic farming, availability of traditional cultural activities including various livelihoods, Sri Lankan cuisine, availability of preserved environment due to the absence of industrial activities, availability of a number of tourist attractive locations, presence of mutual co-operation of farmers with other organizations in these areas, availability of a large number of unemployed youth that an employee in the agro-tourism sector, initiation of emphasis on sustainable rural tourism development by the government, gradual increase in the demand for agro-tourism by the visitors are some possibilities to introduce agro-tourism for Sri Lanka.

Palugaswewa **Tank Cascade System**

Palugaswewa cascade system contains 78 miner reservoirs and *the Udakadawala* tank is the main and largest one. This cascade system is started 67.5 km far from the *Udakadawala* tank. The establishment of these cascade systems has begun in the 6th century (Piyadasa et al., 2012). There are varying sizes of 11 tanks found within the village. The cascade

consists of two villages that cover an area of nearly 1,300ha namely, *Palugaswewa* and *Udakadawala*. Among them, 156ha are paddy lands, which feed on these tanks. Those paddy lands are cultivated by 244 farmers. There are two tanks renovated recently from their abandoned state. Provision is kept for the development of traditional components such as *Kattakaduwa*, *Gasgommana*, and *Kiulela* (drainage way) in these tanks. The other tanks had been in presence in working condition for a long time. They have been improved in recent times by the government. Some tanks are very small, most probably must have been constructed to trap sediments. The dominant land uses of the site include tanks (including bund, *kattakaduwa*, and *gasgommana*), streams, lowland paddy fields, home gardens, chena, forests, and scrublands.

Palugaswewa cascade system is one of the cascade systems, which is nominated as a world heritage in 2018 by the Food and Agricultural Organization (FOA, 2018). It contains 78 minor reservoirs and the *Udakadawala* tank is one of the largest tanks. In past, this cascade system played a major role in the human lifestyle. Because villagers got water for every purpose from these tanks and their occupations were combined with this cascade system. Not only that, villagers were assigned various responsibilities regarding the tanks. Villagers respected and conserved the tank system. If not, they were punished by the village leader called "*Gamarala*". At present, there are no such rules, regulations, or responsibilities among villagers about the cascade system. Therefore, at present, it has faced a tragic condition (Piyadasa et al., 2012).

However, the continuation of the Cascaded Tank-Village System is threatened by the poor income of farmers in this area as a result of extracting natural resources to fulfill their day-to-day life needs (FOA, 2018). But now it is becoming a problem. Because at the present people over utilizing natural resources in this system. They cut trees in "*wew thawulla*" for economic purposes. So, there are only a few trees to protect the "*ellanga* system". A lot of people in this village were involved in agriculture as their occupation. They have mainly cultivated paddy as a monoculture. There are some natural disasters like droughts and floods. Due to that their crops get damaged. Most of them haven't any other option than agriculture. They face high agricultural risk due to the absence of risk diversification methods. Moreover, the young generation dislikes engaging in agriculture. They migrate to urban areas. This reduces the population of the next generation resides in the village. It can affect badly to protect this world heritage.

It is the responsibility of both villagers and the whole people in our country to protect this cascade system. Creating job opportunities to protect this ecosystem is a major responsibility of authority. As *Palugaswewa* is located close to *Habarana* (area of tourist attraction), there is a possibility to introduce agro-tourism as a solution for the unemployment problem. As well as a measure of conservation of this cascade system. A lot of tourists may come to this area

to visit this world heritage. Villagers can involve in agro-tourism activities to earn income. Then automatically cascade system is conserved. Agro-tourism can create job opportunities especially for youth, and then they will remain within the village. Mass tourism cause to spread of various malpractices and those can affect badly to the village culture. Sometimes drugs and bad habits like smoking can invade villages with tourists. Therefore, most young people in villages might addict to use those things and disrupt their education. As well as some tourists come to villages and extract natural resources and bring them to their countries. That destroys the natural resources of the village. However, there is no such harm through agro-tourism approaches like the niche tourism method. It creates job opportunities for men, women, and youth. It uplifts the livelihood of villagers. Then educational facilities, infrastructures, health services, awareness programs, etc. will improve within the village. Finally, villagers can spend their lives happily without causing any disturbance to the environment. Hence, the study attempts to explore the perception of the local community and the potential to introduce agro-tourism in the *Palugaswewa* tank cascade system.

2. Methodology

Study Areas and Target Population

The study was conducted in the *Palugaswewa* cascade system which is located at Anuradhapura district, North Central province. Longitude is 80° 32' 0" E and Latitude is 7°

Map 1: *Palugaswewa* cascade system
Source: Google earth, 2020

55' 0" N. There are 15582 populations in *Palugaswewa* Divisional Secretariat (DS) division (Census of Population and Housing of Sri Lanka, 2012). There are 16 *Grama Niladhari* (GN) divisions in *Palugaswewa*. Among them, *Palugaswewa* and *Horiwila* GN divisions were selected as target populations (Map 1).

Sample Size and Sample Selection

Table 1 shows the distribution of the sample within the study area. There is 1277 population in the *Horiwila* GN division and a 1070 population in the *Palugaswewa* GN division. Household head lists maintained by the *Grama Niladhari* divisions were the sampling frame. A representative sample for both *Grama Niladhari* divisions was selected which cover 10% of the total population in each GN division. A simple random sampling method was used to select the 234 respondents using a household head list in each GN division.

Table 1: Distribution of sample size

GN Division	Population	Sample Size
Horiwila	1277	127
Palugaswewa	1070	107
Total	2347	234

Source: **Field survey data, 2020**

Data and Data Collection

Both primary data and secondary data were used in this study. Demographic characteristics of respondents such as age, education, occupation, ethnicity, religion as well as their perception to participate, expected economic, social, cultural, and environmental impacts of agro-tourism plan and factors contributing to an inclination to participate were assessed during the primary data collection. Further, information on available tourism destinations around the area, tourist statistics such as peak seasons of tourism, preferred destinations, nativity of tourist, as well as policies and other regulations, etc. were collected from secondary data.

Mainly, primary data were collected using a pre-tested structured questionnaire, key person interviews, field observations, and focus group discussions. The key personal interviews and focus group discussions were completed with social activators, Grama Niladhari, chief monk of the temple, school principal, youth, government sector servants, private sector servants, and members from NGOs. Data from the tourism department, census and statistics, internet, newspapers, bulletin, and cultural centers were used in obtaining secondary data.

Data Analysis

Data were analyzed using both qualitative and quantitative techniques. Data obtained from the questionnaires were grouped based on the research questions and were analyzed using

descriptive statistical methods such as mean, percentages, frequencies, standard deviation, etc., and quantitative statistical methods such as factor analysis and logistic regression analysis.

Descriptive statistics were used to identify potentials and possible ventures for the implementation of the agro-tourism development plan. Moreover, Different parameters of economic, socio-cultural, and environmental were considered to uncover the attitudes and perceptions of the local community to involve in agro-tourism. Factor analysis was used to analyze those parameters and the attitudes and perception of the local community to involve in agro-tourism.

Logistic regression was used to analyze the factors contributing to community inclination (Table 2) to participate in agro-tourism.

Equation for logistic regression,

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \ldots\ldots\ldots \beta_n \ln X_n + \text{error}$$

Y = Probability of inclination to participate in agro tourism

β_0 = Intercept

$\beta_1, \beta_2, \beta_n$ = Coefficient of variables

X_1, X_2, X_n = Independent variables

Table 2: Description of social, economic, and ecological variables used in the logistic regression

Variables	Description	Measurement
Social	Age	Years (in number)
	Gender	Male, Female
	Ethnicity	Sinhala, Tamil, Muslim, Other
	Religion	Buddhism, Hindu, Catholic, Islam, Other
	Educational level	Years (in number)
	Housing condition	Permanent, Semi-permanent, Improvised
	Health status of the family	Presence of non-communicable diseases among family members
	Organizational membership	Yes, No
	Access to public infrastructure	Nearest distance from the house to DS office (Km)
	Size of the household	In number

Economic	Occupation	None, Farming, Government Sector, Private Sector, Self-employment
	Average income	In number
	Unemployment of the household	In number
	Land size	Number of acres
	Secondary occupation	Yes, No
	Capability of handcrafting	Yes, No
Ecological	Concern about environmental protection	Yes, No
	Engaging agricultural activity	Yes, No
	Harvesting resources from the forest	Yes, No

Source: **Field survey data, 2020**

Further, the thematic analysis was used to identify the potentials and possible ventures for implementation of Agro-Tourism in the Palugaswewa Tank Cascade System.

3. Results and Discussion

Demographic Characteristics of Respondents

According to the data analysis, the majority of respondents belonged to the 41-60 years age category. After this, most respondents belonged to 21-40- and 61-80-years categories

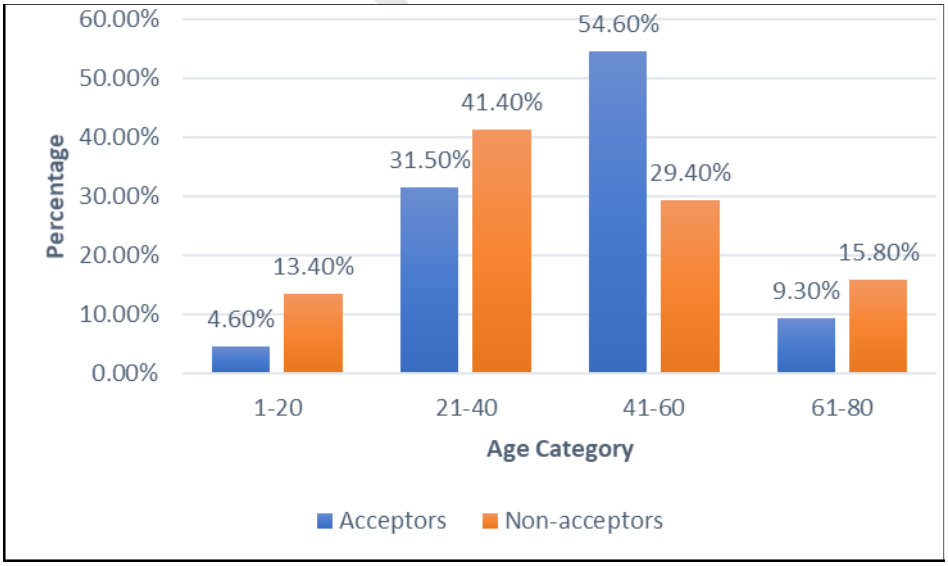

Figure 1: Age categories of respondents
Source: **Field survey data, 2020**

respectively. Less number of respondents represented in 1-20 years age category (Figure 1). Further, the mean age of acceptors and non- accepters were 43 and 39 years respectively. The minimum and maximum age levels of acceptors were 18 years and 74 years. At the same time, the minimum and maximum age levels of non-acceptors were 16 years and 80 years (Table 3). The average age of respondents was 42 years and the minimum and maximum ages of respondents were respectively 16 years and 80 years. Furthermore, many of the respondents (63%) were female in the study area.

Table 3 Age distribution of the respondents

Group	Mean	St. Dev.	Minimum	Maximum
Acceptors	43 years	13.75	18	74
Non-acceptors	39 years	17.30	16	80

Source: **Field survey data, 2020**

According to the results, 186 respondents had obtained education up to the secondary education level. It represented 80% of the total respondents. Further, 11% of respondents had schooled up to primary education and 8% of respondents received tertiary education category. Only 1% of respondents had finished their higher education. Most of the respondents in the study area had received a satisfactory education (Figure 2).

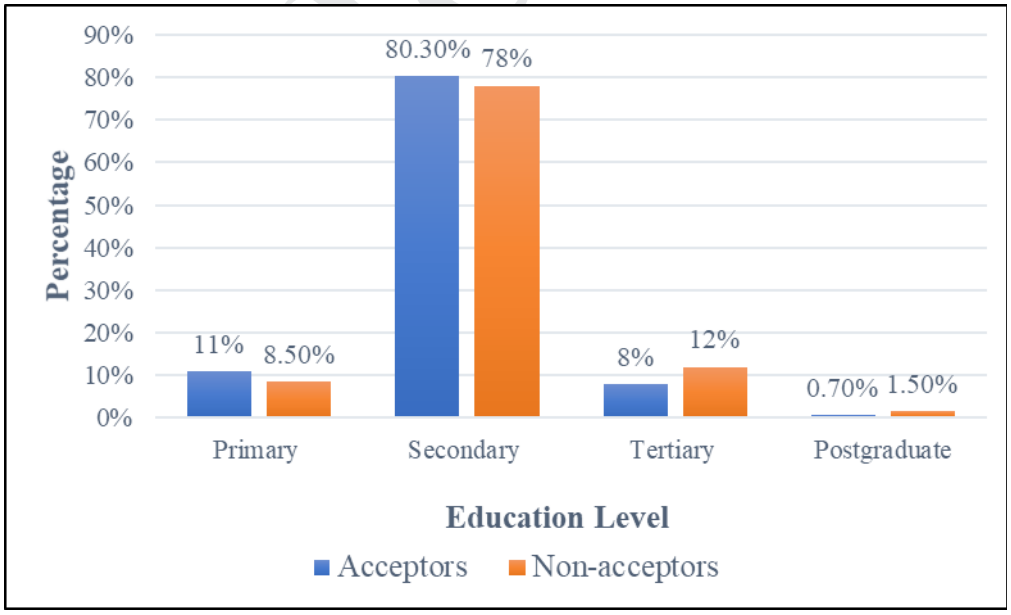

Figure 2:
Education level distributions among respondents
Source: **Field survey data, 2020**

According to the data analysis, the majority of respondents belonged to the married category. After that, most respondents belonged to single and widowed categories respectively. Less number of respondents represented the divorced category (Figure 3).

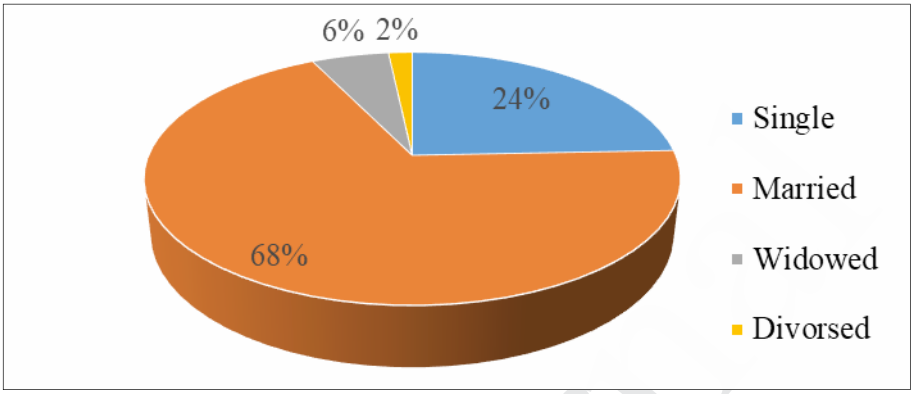

Figure 3: Marital statuses among respondents
Source: **Field survey data, 2020**

According to the results, the highest number of respondents (22%) worked as daily waged employees as their primary occupation. Of all respondents, 19% were involved in business, 17% involving in self-employment, and 14% involving the private sector. The least number of respondents (3%) not involve in any occupation (Figure 4). Moreover, 77% of respondents are not involved in any secondary occupation. At the same time, 8.9% of respondents are involved in farming as a secondary occupation. The least number of respondents (1%) are involved in the government sector, private sector, and business as their secondary occupation. Also, 1% of respondents are involving in studies as their secondary occupation (Figure 5).

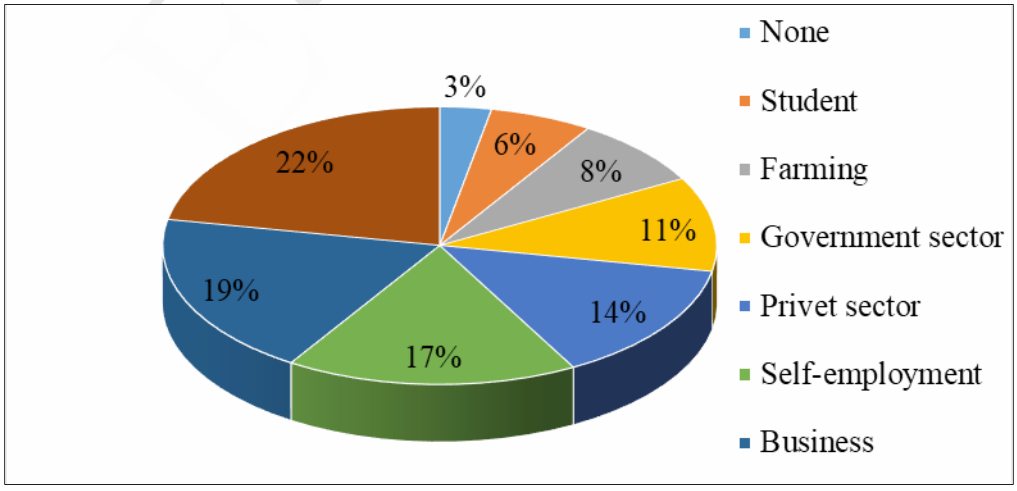

Figure 4: Primary occupations of respondents
Source:**Field survey data, 2020**

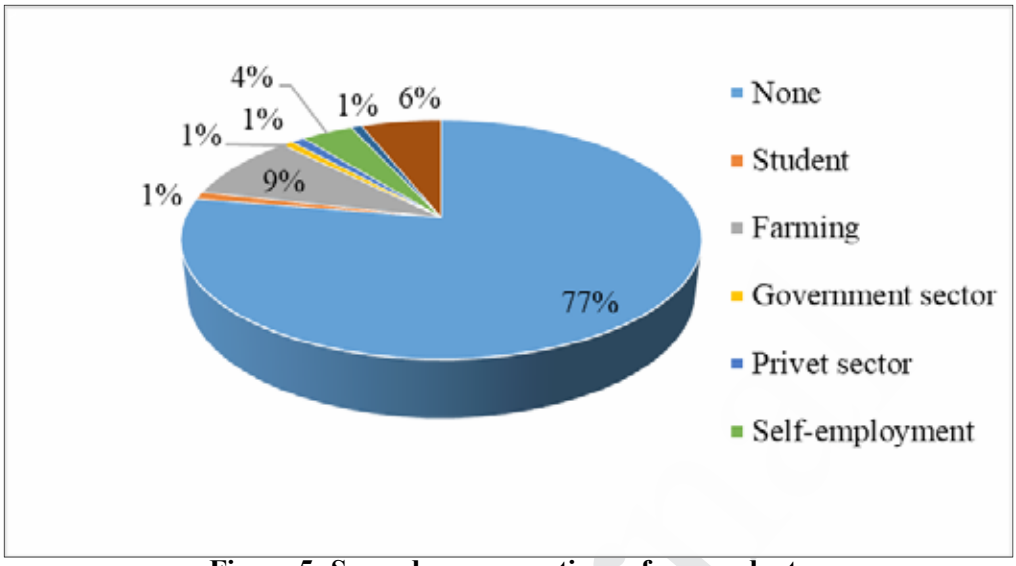

Figure 5: Secondary occupations of respondents
Source: **Field survey data, 2020**

Further, the results of the descriptive analysis revealed that the average household size of the sample was four members. Of all respondents 77.7% were healthy and 22.2% had diseases like kidney failures. The average income level of respondents was Rs. 22768.55. Therefore, they had several economic problems. They can involve in an agro-tourism plan as an alternative income source to cover the immediate household expenditures. Some women can make handicrafts. Then, they can make them and can sell them to tourists who come to the village. It creates extra income for villagers.

Several reasons were provided by respondents for the acceptance of the agro-tourism plan. Conserve tank cascade system, create job opportunities, create extra income source, develop public services and village agriculture, and improve quality of livelihood of villagers are reasons to accept the agro-tourism plan. Deteriorate village culture, disturb a calm environment, waste generation, disturb wild lives, expand drugs in the village and disturb the traditional livelihood of villagers are the reasons for non-acceptance of this plan.

Potentials and Possible Ventures for Implementation of Agro-Tourism in *Palugaswewa* Tank Cascade System

According to the thematic analysis, there are several potentials and possible ventures, which are suited to introduce agro-tourism in the *Palugaswewa* tank cascade system. They can divide into three categories such as environmental, cultural, and economic. The main environmental potential is the tank cascade system in this area. Other than that, *Habarana* and *Ritigala* tourism hotspots are located near *Palugaswewa* and there are various wildlife species on

this site. Ancient ruins in *Galada Purana viharaya*, rural village, traditional agriculture, and medicinal practices are some of the cultural potentials in the *Palugaswewa* area. Economic potentials are available lands, *Palugaswewa* railway station, better road facilities, and the main occupation of villagers is agriculture. They conduct several traditional festivals like *aluth sahal mangallaya, pullayar danaya,* and *gammadu shanthikarma.* Also, some villagers can make handicrafts using natural materials like *pan* (Figure 6).

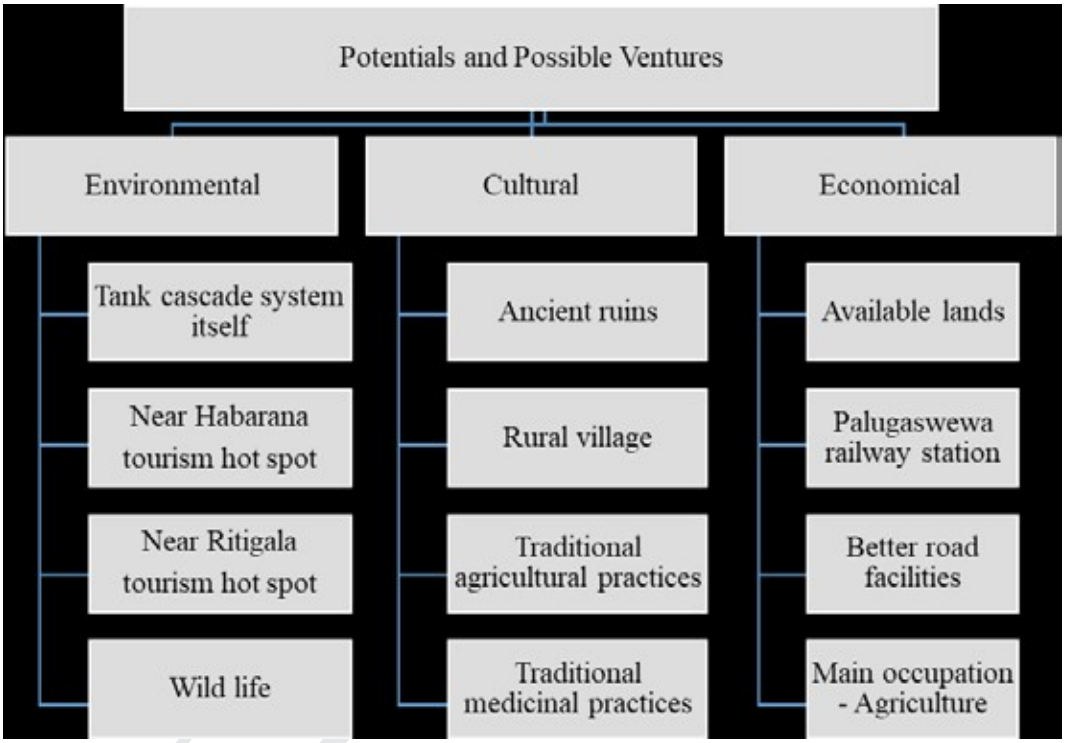

Figure 6: Potentials and possible ventures for implementation of agro-tourism
Source: **Field survey data, 2020**

Attitudes and Perception of the Local Community to Involve in Agro-Tourism in *Palugaswewa* Tank Cascade System

Results reviewed that 65% accepted introducing an agro-tourism plan to the cascade while 35% not accepted introducing an agro-tourism plan. There were different attitudes and perceptions of villagers about introducing agro-tourism to the *Palugaswewa* cascade. Factor analysis was done to identify the attitudes and perceptions that affect to acceptance of the agro-tourism to the cascade Following figure shows (Figure 7) the result of the factor analysis.

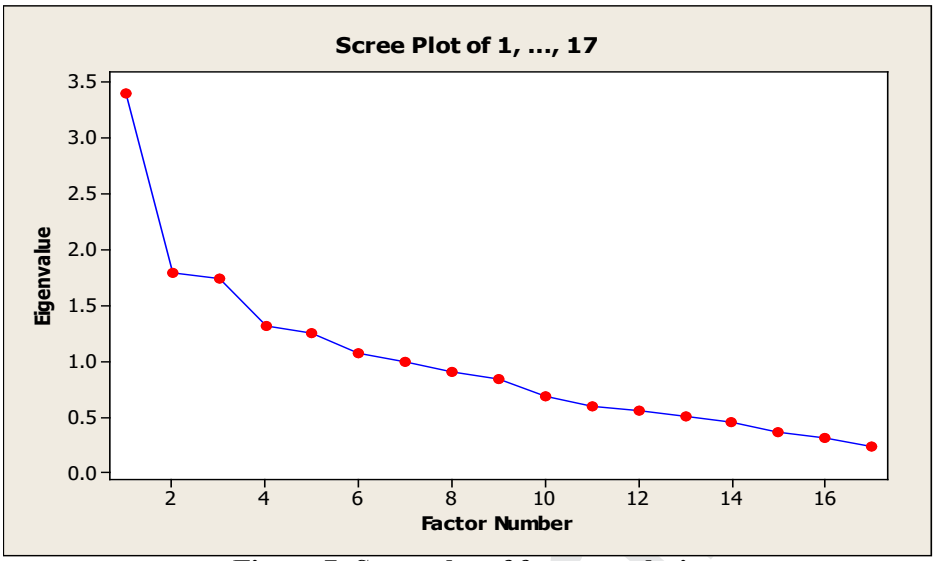

Figure 7: Scree plot of factor analysis
Source: **Field survey data, 2020**

According to the scree plot, 9 variables (Table 4) were significantly affected by the perception of villagers to accept the agro-tourism plan. Improves the quality of public services, improves the quality of village life condition, increases traffic jams, increases crowding, damages village culture interrupts quiet life in the village, improves the image of the village, increases crimes and social problems, increases the land value of village are those variables.

Table 4: Rotated factor loadings and communalities

Variable	F 1	F 2	F 3	F 4
Improve the quality of public services	-0.016	**0.829**	-0.055	-0.036
Improves quality of villages life condition	-0.092	**0.752**	-0.095	0.000
Increases traffic jam	0.226	0.006	**0.792**	-0.103
Increases crowding	0.201	-0.135	**0.797**	-0.033
Damages village culture	**0.720**	-0.117	0.170	-0.082
Interrupt quiet life in the village	**0.654**	-0.081	0.079	0.158
Improves the image of the village	0.095	0.509	0.074	**0.113**
Increases crimes and social problems	**0.641**	-0.035	0.030	0.012
Increases the land value of the village	0.271	-0.032	0.220	**0.146**

Source: **Field survey data, 2020**

Based on the factor close correlation of factor loading values, those variables were categorized into four factors namely social factors, social welfare factors, environmental factors, and land associated factors (Table 5).

Table 5: Factor analysis results

Social factors	**Damages village culture** **Interrupts quiet life in the village** **Increases crimes and social problems**
Social welfare factors	Improves the quality of public services Improves the quality of village life condition
Environmental factors	Increases traffic jams Increases crowding
Land associated factors	Improves the image of the village Increases the land value of the village

Source: **Field survey data, 2020**

According to Kunasekaran et al., (2011) in Malaysia found that environmental impacts, accessibility, economic benefit, crowding, entrepreneurial knowledge, awareness, socio-cultural benefits, constraints, and land issues are the factors affecting the perception scale on agro-tourism in Cameron Highlands, Malaysia. Another similar study was done by Eshliki and Kaboudi, 2012 that environmental destruction, social and cultural effects, economic effects, water and coast pollution, life quality improvement are the factors affecting to community perception of tourism impacts and their participation in tourism planning in Ramsar, Iran.

Factors Contributing to Community Inclination to Participate in Agro-Tourism in *Palugaswewa* Tank Cascade System

According to the logistic regression results gender, primary occupation, engagement in tourism activity and awareness of upcoming agro-tourism plan in *Palugaswewa* are the factors contributing to community inclination to participate in agro-tourism (Table 6).

When the community enhances their awareness of the upcoming agro-tourism plan in the *Palugaswewa* area people who reject the proposed project more likely to accept the agro-tourism development plan (OR:8.106). Therefore, conducting effective awareness programs will be advantageous for the stakeholders. Further, results prove that odds of accepting an agro-tourism plan is higher for people who not have primary occupation (1) (OR=3.284), student (2) (OR=0.176), Private sector (5) (OR=0.182), and Self-Employment (6) (OR= 8.275) as the primary occupation. Results revealed that males (OR=2.849) are more likely to accept agro-tourism as an income generation activity. People who are currently engaged in tourism activities are more likely to accept the agro-tourism activities (Table 6). 'Kelulut'

bee agro-tourism farm, preference to the types of agro-tourism products, encouragement to get involved in 'Kelulut' bee farming, economics impacts, educational level, and gender affected to local community's overall perception of 'Kelulut' honey as the agro-tourism product (Kunasekaran et al., 2018).

Table 6: Factors contributing to community inclination to participate in agro-tourism

Type	Odds Ratio	Estimate Value	Pr Value	95% Conf.
Intercept		3.0693	**0.0015***	
Gender	2.849	0.5236	**0.0106***	1.276-6.362
Age	0.977	-0.0235	0.1758	0.944-1.011
Primary occupation			**0.0015***	
None	3.284	0.9693	**0.0415***	0.184-58.759
Student	0.176	-1.9579	**0.0083***	0.007-4.575
Farming	0.999	-0.2205	0.6377	0.060-16.767
Government sector	0.835	-0.4001	0.4489	0.046-15.034
Private sector	0.182	-1.9210	**0.0050***	0.008-4.076
Self-Employment	8.275	1.8934	**0.0582***	0.245-279.398
Business	7.975	1.8566	0.0745	0.231-275.396
Harvesting resources from the forest	1.698	0.2648	0.2338	0.710-4.062
Engage in tourism activity	6.333	0.9229	**0.0103***	1.545-25.962
Awareness about the agro-tourism activities	8.106	1.0463	**<.0001***	3.486-18.847

Source: **Field survey data, 2019** ***Significant at 5% level**

4. Conclusions

There are many potentials to attract visitors to the *Palugaswewa* area. The traditional value and prevailing beauty of the *Palugaswewa* tank cascade systems, potentials for wild animal tours, nearby *Habarana* and *Ritigala* tourism hotspots, preserved traditional agricultural and medicinal practices by the cascade residents, available ancient ruins in the area, and prevailing infrastructure facilities in the cascade are the top most potentials and possible ventures identified by the study in *Palugaswewa* tank cascade systems.

The majority of the villagers have positive attitudes on introducing agro-tourism for the *Palugaswewa* tank cascade systems. Gender, educational level of villagers, primary occupation, engaging in tourism activity, awareness about the agro-tourism in *Palugaswewa* are significantly contributing to community inclination to participate in agro-tourism. The majority of females do not accept agro-tourism to *Palugaswewa* due to social problems like drug addiction and crimes. People who have completed secondary education, villagers who involve in tourism at present do agree to introduce agro-tourism to *Palugaswewa* cascade

systems mainly since they believe that the concept can develop their village. The majority of students do not accept the concept mainly due to a lack of awareness. Also, social, social welfare, environmental, and land associated factors are significantly affecting community perception of Agro-tourism in this area.

A baseline survey should be done before the implementation of the agro-tourism development plan to recognize the present socio-economic and cultural status of the *Palugaswewa* tank cascade system. Impact assessment should be done to access the impacts of the implemented agro-tourism plan. It is better to introduce sustainable agro-tourism plans to other areas in Sri Lanka as in the *Palugaswewa* tank Cascade system to uplift the livelihood of people, protect the environment and traditional culture. Further, it is proposed to conduct awareness programs to the aware community about agro-tourism.

5. Acknowledgment

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