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Behavioral Patterns of Environmental Stewardship A Pathway to Sustainable Livelihood

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Abstract
Environmental pollution and degradation are not new phenomena, but continuing as a global problem that cannot be completely resolved. Hence, the need to preserve the environment will continue as long as life exists on earth and its ultimate responsibility lies in the hands of each individual. The study is a travel through an individual's daily life in search of their environmental consideration by examining their behavioral patterns of environmental stewardship. The study highlights the mediating role of Environmental Stewardship (ES) between the Preceding Behavioral Motivators (PBM) and Sustainable Livelihood (SL) of individuals. Furthermore, the study also reveals the sequential relationship between Environmental Concern (ECN), Environmental Commitment (ECM), and Environmental Actions (EA) as the determinants of ES. All the established relationships were found significant and the findings enriched the lap of contributed theories and revealed the state of ES and SL of individuals in Kerala.

Keywords: Environmental Concern, Environmental Commitment, Environmental Actions, Environmental Stewardship, Sustainable Livelihood

1. INTRODUCTION

"A healthy ecology is the basis for a healthy economy" (Rifkin & Foundation, 1990). Conserving the environment is not a generous or traditional challenge; it is common sense (Reagan, 1984). The environment has a profound impact on health; clean air, water, and green spaces essential for the well-being and quality of life of humankind (World Health Organization , 2024). A healthy environment is the foundation of human life and existence. However, as human activities progress, the environment has undergone detrimental changes that are threatening the natural balance of human life. It is imperative to shift the individuals' concern on converting environmental degradation into environmental stewardship, which will preserve nature (Danilo V Rogayan, 2019).

Stewardship actions can be carried out by individuals and groups (Bennett et al., 2018; Bodin, 2017; Svendsen & Campbell, 2008; Wolf et al., 2013). In the early 1940s, the concept of environmental stewardship was interpreted by Aldo Leopold, as the commitment of persons to the land, nature, and place-based connotations; was one of the foundational discussions of ES (Leopold & Schwartz, 1989).

Then several reforms and movements were forwarded by authorities around the world such as the Environmental Movement (1960-70)), the establishment of World Environmental Day (1974), Sustainable Development (1987), the Rio Earth Summit (1992), Kyoto Protocol (1997), Paris Agreement (2015), etc were the milestones of the global pursuit of environmental protection and sustainability.

India has a rich history of environmental movements including the Bishnoi Movement (1730), the Chipko Movement (1973), the Silent Valley Project (1978), the Appiko Movement (1983), and the latest Right to Breathe Protest (2019), Save Dehing- Patkai (2020), and Save Aarey (2020) are the which were invited public visions on the environment and its conservation.

Even though numerous movements have taken place, individual responsibility for ecological preservation is crucial, where the concept of ES plays a vital role. It encompasses a wide range of activities like establishing communal gardens, planting new trees, preventing harvests, lowering destructive actions or pollution, creating protected zones, bringing back degraded parts, or purchasing more sustainable products (Bennett et al., 2018). For the study context, ES is operationally defined as "an individual's environmental concern continued by commitment and actions to protect and conserve the environment for the present and future generations".

ES is not an instant behavior; have definite influencers (Mcpherson, 1993; Moskell et al., 2011; Platt, 2006; Wolf et al., 2013). The living situation of each individual is different and such distinct living conditions mould their stewardship towards the environment. So, such motivating factors push an individual or community towards favorable or unfavorable environmental behavior like environmental stewardship.

Likewise, ES has several outcomes that lead to health, well-being, and their sustainable living. The lifestyle choices such as the way of living, the food we eat, and the preferred mode of travel etc. create some ecological footprints. The ES is a possible solution to mitigate these impacts and to have sustainable living. A livelihood includes capabilities, assets, and activities that are required for living (Islam & Ryan, 2016). According to (Chambers & Conway, 1992) "A livelihood is sustainable when, it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation". The concept of sustainable livelihood became popular in the 1980s and 1990s when the Bruntland Commission introduced the concept of sustainable development (Keeble, 1988) and the subsequent Rio Summit in 1992. In today's context, the escalating environmental degradation and its consequences compel people to lead a sustainable life.

This study is a conscious effort to unveil the behavioural patterns of ES in the individual's daily life. It examines the individual's PBM and ES and how effectively they contribute to the expected outcome; sustainable livelihood. In this study, the concept of ES covers three areas of environmental behavior; environmental concern, environmental commitment, and environmental actions. Furthermore, researchers make an additional effort to explore the interrelationships between ECN, ECM, and EA.

2. Theoretical Background and Hypothesis

2.1 Individual's Environmental Behavioral Theories and SLF

Individual behavior encompasses a person's reactions to both external and internal influences (Bakhshian & Martinez-Pastor, 2023). The individuals' environmental behavior is referred to as the actions taken by them in their daily lives to protect the environment (Zhong & Shi, 2020). Such behavior is often derived from some specific preceding influencers and has identifiable outputs. Here ES is an environmental behavior taken as the mediating variable, PBMs are the independent variable and sustainable livelihood

is the outcome variable. There are various theories elucidating this relationship. The prevalent contributors of the earlier are the Theory of Environmentally Responsible Behavior (ERB), Reasoned/Responsible Action Theory (RAT), the Theory of Planned Behavior (TPB), Socio-Economic Theory (SET), and the Sustainable Livelihood Framework (SLF) which paved the way to the conceptual model development in this study.

The ERB theory proposed by (Jody M. Hines & Tomera, 1987) presents a model of predictors (knowledge, control center, attitude, personal responsibility, and intention of acting) of an individual's environmental behavior. This theory ensures the presence of some predecessors to the individuals' environmental behavior.

The second theory contributing to the conceptual model of the study is the RAT proposed by (Fishbein & Ajzen, 1975). This theory argues that subjective norms and beliefs of individuals shape their attitudes, which in turn predict their intention of acting and subsequently influence their behavior. The theory also ensures the existence of some factors as predictors of behavior.

The TPB propounded by (Ajzen, 1991), convincing that the individual's attitude, norms, and control significantly shape their intention, which predicts their behavior. This theory also claims that specific predictors influence an individual's environmental behavior.

In light of these theories, researchers affirmed the relevance of the PBM and treated them as the independent variable of this study which supports consequent environmental behavior; and stewardship. These theoretical insights, expectantly provide a framework to test the relationship between the PBM and ES in the context of this study.

The frontiers of SET Theory or Model (Bronfenbrenner, 1979), explain the interconnections of environment and social change (Fischer et al., 2015). The framework mentions that the relationship between the individual and the environment is mutual (Salihu, 2014). Which means, the individual behavior is influenced by the environment and environment also predicts their behavior and livelihood. Through the lens of the theory, the conceptual model becomes significantly enriched and fairly explains the importance of ES in predicting an individual's SL.

Another valuable approach that enriches this study is the Sustainable Livelihood Framework (DFID, 1999), which highlights various factors influencing an individual's livelihood. The same is constructed in the light of sustainable livelihood theory (Chambers & Conway, 1992). The framework employed in this study is to assess the SL of individuals in its recognized dimensions.

2.2 Environmental Stewardship and Behavioral Motivators

The term Stewardship is widely embraced for the moralities and activities to improve the resilience and sustainability of social-ecological systems in different contexts (Barendse et al., 2016). Environmental stewardship is a general wording used for unfolding action in chase of sustainability (West et al., 2018). Research has portrayed ES as actions, activities, motivations, values, and purposes (Wolf et al., 2013). As (Bennett et al., 2018) articulated, "Local environmental stewardship is the activities taken by individuals, or groups collectively, with numerous impetuses and levels of capacity, to protect or responsible use the environment in pursuit of environmental or social outcomes in various social-ecological contexts". So, it is plausible to have variations in the ES according to the demographic characteristics of individuals and researchers therefore proposed the following hypothesis to investigate these effects;

H1: There is a significant difference in the ES according to the individuals' demographic characteristics such as gender, age, marital status, family size, education, employment, and monthly income.

The measurement of ES varies according to the contexts of the study; some have addressed environmental

knowledge (Alauya-Dica et al., 2022; Muffato et al., 2023; Sadik & Sadik, 2014; Zacher & Rudolph, 2023), environmental concern (Chandra, 2015; Cruz & Manata, 2020; Diekmann & Franzen, 2018; FRANSSON & GÄRLING, 1999), environmental attitude (Bøhlerengen & Wiium, 2022; Buttel, 1979; Gifford & Sussman, 2012; Jeena, 2016) , and actions (Addison & Pavey, 2017; Brooker, 1976; Turnbull et al., 2020) . This study considers ECN, ECM, and EA are the determinants of ES.

Environmental concern is defined as "the level of people's knowledge of environmental issues, support for efforts to solve those problems, as well as the level of willingness to contribute to their solutions" (Ribašauskienė et al., 2024). It simply refers to the individual's concern for the environment; which leads to conscious actions for protecting the environment as a whole (Chan, 1996).

The concept of environmental commitment was introduced by (Keogh & Polonsky, 1998) meaning that, a sensible or emotive attachment to the environment and a responsibility to consider the environment in its best interests (Ivanova-Gongne et al., 2022). It is the feeling of obligation toward the environment by an individual (Yu et al., 2019). An environmentally committed individual will incline to suggest creative explanations and encourage participative activities (Wang et al., 2013).

The most wanted part of ES is environmental action. Which refers to how a person's interactions and experiences with the environment influence their developmental processes and outcomes (Bradley, 1994). Previous research demonstrated that environmental concern impacts both ECM (Emily Huddart Kennedy & Krogman, 2015; Gifford & Nilsson, 2014; Nurit Carmi & Orion, 2015; Yu et al., 2019; Zylstra et al., 2014) and EA (Ghosh & Prasad, 2024; Jayaraman et al., 2017). Similarly, ECM leads to successful EA (Ling-Yee, 1997; Sendawula et al., 2021; Yu et al., 2019). Building on these relationships, researchers have formulated the following hypotheses:

H2: There is a significant relationship exists between ECN and ECM of individuals

H3: There is a significant relationship exists between ECM and EA of individuals

H4: There is a significant relationship exists between ECN and EA of individuals

Furthermore, an additional hypothesis has been included to determine the direction of the relationship between the aforesaid constructs;

H5: ECM mediates the relationship between ECN and EA

ES represents an individual choice to participate in an activity based on their intrinsic and extrinsic motivations (Mcpherson, 1993; Moskell et al., 2011; Platt, 2006; Wolf et al., 2013). This means environmental stewardship is influenced by several factors as an individual's behavior. These motivators are defined as the causes or impetus frameworks that force people to do activities to protect the environment (Bennett et al., 2018). For the study purpose, the PBM is categorized as intrinsic and extrinsic (Bennett et al., 2018; Cetas & Yasué, 2017; Ryan & Deci, 2000) and the identified motivators were divided into these groups. Intrinsic motivators include Attitude and knowledge (L. J. McLeod et al., 2024) with the support of Knowledge- Attitude behavior model (Furst, 1981), Values and Belief (Bennett et al., 2018) from the roots of the TPB (Ajzen, 1991), Self-determination (Bennett et al., 2018) substantiated by Self-Determination Theory (Deci & Ryan, 1985), Environmental Identity (L. J. McLeod et al., 2024) by Environmental Identity Theory (Stets & Biga, 2003). Extrinsic motivators include Socio-Cultural Influences (L. J. McLeod et al., 2024) incorporated from Social Norms Theory (Berkowitz & Perkins, 1987), Perceived Direct Cost & Benefits from Nature (Bennett et al., 2018) from the Eco-System Service Theory (Polasky, 2011), External Rewards & Sanctions (Bennett et al., 2018) considered based on Incentive Theory (Skinner, 2019), Policy and Regulations (L. J. McLeod et al., 2024) from the lap of Regulatory Theory (Ayres & Braithwaite, 1995; Regulatory Theory, 2017). The following are the research

hypotheses formulated by considering the visions of the literature for the study purpose:
H6: There is significant relationship exists between the PBM and E

2.3 Environment and Sustainable Livelihood

Livelihood is defined as the systems and means of existence on the earth (Islam & Ryan, 2016). It includes capabilities, assets (material and social resources), and activities for living (Scoones, 2009). It covers the resources like land/property, crops, food, knowledge, finances, and social relationships of an individual (Islam & Ryan, 2016). SL refers to the way of life that provides individuals access to basic needs, opportunity, a sense of identity and belonging, and the means to produce and distribute resources and services, ensuring social status while addressing social problems like unemployment, underemployment, discrimination, and exploitation (Manion, 2015).

According to (Scoones, 2009) the clamors for SL had started in the early 1990s with the advocacies of (Ashley & Carney, 1999; Carney & Development, 1998; Chambers & Conway, 1992; Scoones, 1998). The environmental movements in the 1980s and 1990s and the subsequent publication of the Brundtland Report popularised the term sustainability. The influence of the Book of (Chambers, 1983) and the initiatives of Richard Sandbrook made SL as the theme for the International Institute for Environment and Development in 1987 (Conroy & Litvinoff, 2013; Scoones, 2009). The most popular definition for SL emerged in a working paper of (Chambers & Conway, 1992) for the Institute of Development Studies; states that "A sustainable livelihood can deal with and convalesce from stresses and shocks, uphold or improve its capabilities and assets, while not deflate the natural resource''. According to (UN-ESCAP, 2008), SL is "the ability to cope and recover from unexpected events, while at the same time enhancing current and future capabilities".

The sustainable livelihood assets and outcomes are very clearly represented in the Sustainable Livelihood Framework (SLF) of (DFID, 1999) by considering sustainable livelihood theory. The SLF is summarized by (R. McLeod, 2001) and established natural capital, physical capital, social capital, human capital, and financial capital as livelihood assets. Natural capital includes natural resources like property, water, environment, biodiversity, and environmental resources. Physical capital comprises of some basic amenities such as water, housing, energy, communications, sanitation, and transport. Similarly, human capital consists of health, skills, information, knowledge and the ability to take job, and social capital includes social resources like trust, groups memberships, relationships & networks, and access to institutions. Finally, financial capital is made up of some financial resources like availability, regular remittances or pensions, savings, and supplies of credit (MIKE MAJALE, 2002).

There is a natural bond between the environment and the sustainable living of people (Horton & Horton, 2019; Ives et al., 2018; Kaneko et al., 2015; Mahato, 2022). As well, the ES will lead an individual toward sustainable living (Barrera-Hernández et al., 2020; Ello et al., 2024; Guo et al., 2022; Kaushal, 2023; Lai & Chen, 2020; Turnbull e
t al., 2021). Based on these findings' researchers developed the following hypotheses:
H7: There is significant relationship exists between the ES and SL
H8: There is significant relationship exists between the PBM and SL

Furthermore, researchers put forward the following hypothesis to investigate the relationship between the study constructs;
H9: ES mediates the relationship between PBM and SL

Based on these hypotheses, researchers conceptualized the relationships among constructs in Figure 2.

3. Methods

Following are the methods and measures employed throughout the different stages of the study;

3.1 Systematic Literature Review

A literature review is an evidence-based in-depth investigation of past studies relating to a topic (Winchester & Salji, 2016). Researchers have gone through a systematic literature review (SLR) of a bunch of studies to enhance both the conceptual and methodological clarity of the study. SLR is an intellectual investigation of the evidence on a topic using perilous methods to recognize, describe, and evaluate studies relating to the topic (Temple university libraries , 2022). It includes articles, books published reports, etc. extracted from the most prominent databases like Scopus, Web of Science, Science Direct, Research Gate, Google Scholar, and Semantic Scholar systematically. The data identification, screening, and final inclusion followed the Prisma Protocol in Figure 1 in the appendix.

The study dealt with the SLR of 86 studies with clear criteria of inclusion of subject domains of environmental science, social science, and arts and humanities, publications of articles, reviews, conference papers, and books written only in the English language and by considering its availability included those studies available in open access till 2024. It revealed the nature of the relationship that exists among the constructs which constituted the research gap of the study.

Researchers intended to fill the existing gap in the literature by exploring the relationship between PBM and SL with the mediation of ES. The previous studies focused only on limited aspects of ES and this study addressed three areas of stewardship; ECN, ECM, and EA providing a comprehensive coverage of ES. As well, by exploring the inter-relationship between them, the study also details the way or process an individual becomes an environmental steward.

As the ecological conditions of nations differ, researchers identified a geographical gap to be filled by conducting a study within the boundaries of Kerala; a state renowned for its environmental conservation and sustainability (Government of Kerala, Kerala state planning Board , 2022). The references and citations were managed by the established reference management software, Zotero 6.0.36. The details of SLR are pictured below:

Figure 1 Prisma 2020 Flow Chart for New Systematic Reviews Which Included Databases and Registers Only

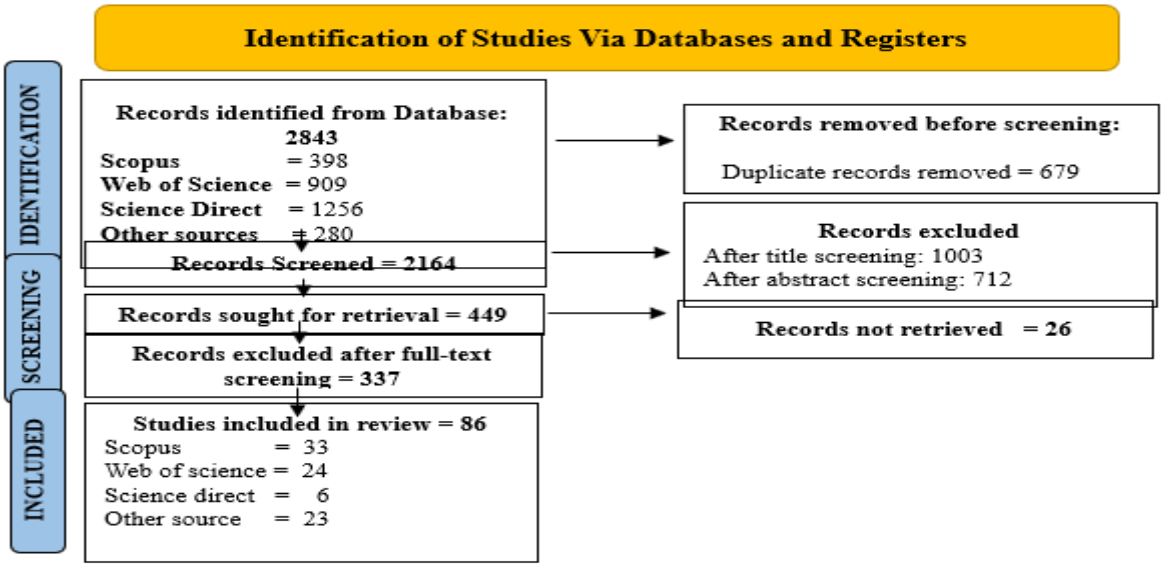

Figure 1. The PRISMA Protocol 2020

3.2 Sample and Procedures

It is an empirical study conducted based on observation and direct experiences by the researcher rather than theories and beliefs (Sim & Hew, 2010). The population includes of all citizens residing in eco-friendly municipalities of Kerala. A total of 87 municipalities are in Kerala (The State of Decentralised Solid Waste Management in Kerala Report , 2021). The Government of Kerala implemented a door-to-door waste collection system known as Material Collection Facility (MCF) as a part of Suchitwa Mission to make a Waste-Free Kerala. According to the (State of Decentralised Solid Waste Management in Kerala Report, 2021, all the municipalities in Kerala are declared as waste-free and eco-friendly municipalities as they implemented the MCF (Table 6). A multi-stage sampling technique was employed to select the sampling unit of study. In the first stage, researchers selected all eco-friendly municipalities in Kerala (87 municipalities) and in the second stage, Kerala was divided into three regions (ministrey of tourism) and selected two districts from each zone based on the highest number of MCFs installed. The selected districts are Kannur and Malappuram from northern Kerala, Thrissur and Ernakulam from central Kerala, and Alappuzha and Thiruvananthapuram from southern Kerala (ministrey of tourism). In the final stage, data was collected from the citizens of municipalities in the selected districts randomly.

The sample size was determined according to the (Krejcie & Morgan, 1970); recommends a minimum sample size of 383 and collected data from 448 individuals using a structured questionnaire. After considering its normality, the responses of 401 individuals were considered for the study. The collected data was analyzed by using IBM SPSS 26 and AMOS. The study used t-test, ANOVA, correlation, and regression along with the descriptive statistics of mean and standard deviation to reach the desired results.

3.3 Measures

A five-point Likert scale is employed for the survey of the study responses (1= Strongly Disagree to 5= Strongly Agree) for measuring the constructs ECN, ENCM, PBM, SL and (0 = Actions Never Taken to 4=Actions Taken Always) for the construct EA. The Likert Scale is a popular response-collecting tool used in research that allows response accuracy and variability (Achi et al., 2022).

The PBM was measured with a self-developed scale in two dimensions; items in each dimension were selected from the findings of (L. J. McLeod et al., 2024) and (Bennett et al., 2018). Intrinsic factors are attitude and knowledge, value and belief, self-determination, and environmental identity and extrinsic factors include socio-cultural influences, perceived direct cost and benefits from nature, external rewards and sanctions, and policy and regulations.

Environmental Concern (ECN) was measured by adapting the established LT Scale (Lounsbury & Tornatzky, 1977) having three dimensions for measuring the ECN of individuals concern for environmental degradation, concern for environmental actions, and concern for the population. However, there are no specific laws and regulations in the Indian Penal Code (IPC) or other legal codes that directly mandate or prohibit population control (Chiinhauching, July 2022). So, to fit the study to the socio-cultural contexts of Kerala, one dimension (concern for population) of the LT scale was excluded.

To measure the Environmental Commitment (ECM), the MWB scale (Maloney et al., 1975) was employed. The scale is one with three dimensions such as verbal commitment, actual commitment, and affect; considered all the dimensions in the study.

The environmental Actions (EA) were measured by using the LESI (Local Environmental Stewardship Indicator) (Turnbull et al., 2020) indicates the level of stewardship actions of a person. The seven actions specified in LESI are sustainable use, education, advocacy, informal enforcement, monitoring, preservation, and restoration. The five-point scale records responses in 0 - action never taken at the site,

1- action taken once, often as an exception to regular behavior, 2 - action taken sometimes, often incidentally to other priorities, 3 = action taken most times the participant was at the site, and 4 - action taken always.

Sustainable Livelihood (SL) was measured by using a self-developed scale supported by the Sustainable Livelihood Framework (DFID, 1999) having five types of assets and the same is considered here as the dimensions of sustainable livelihood. Items under each dimension of SLF were drawn from the inference of the report published (UNDP GCP, july 2017).

3.4 Model

The validated research model is as follows;

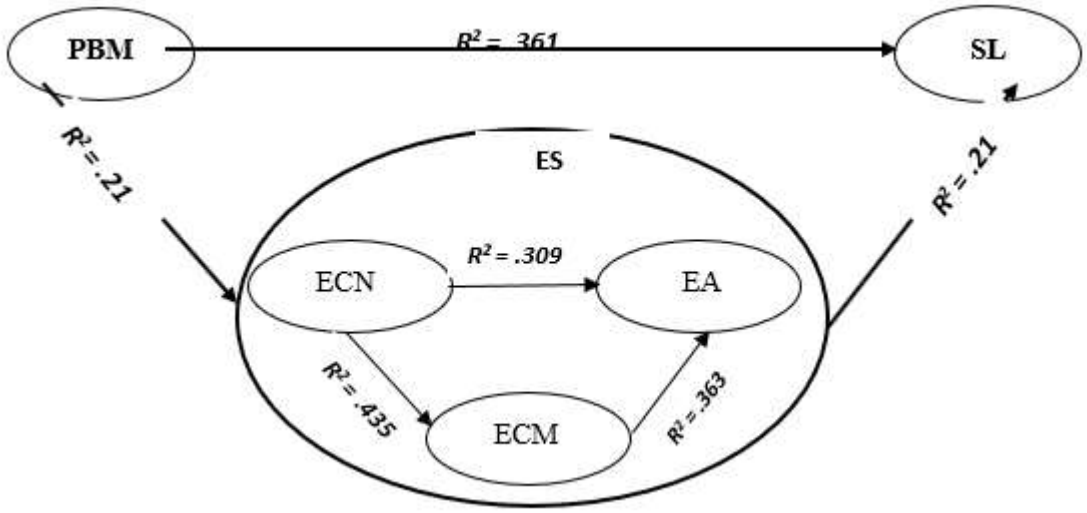

Figure 2: Validated Research Model

3.5 Validity and Reliability

The construct validity was assessed through a CFA analysis to assess the model fit of the study, Composite Reliability (CR), Convergent, and Discriminant validity. The CFA results suggest that the proposed model has an acceptance fit (χ^2 =124.88; df =32; CMIN/DF = 3.903; CFI = 0.961; TLI = 0.946; GFI = 0.961; AGFI = 0.902; RMSEA = 0.85) (Suhr, 2006) with a standardized factor loading for each construct exceeding 0.60 (Table 1). The CR (Fornell & Larcker, 1981) and Cronbach's Alpha (α) (Cronbach, 1951) for each construct exceeded the suggested limit of 0.70. The average variance (AVE) (Fornell & Larcker, 1981) of each construct was above 0.50 but below the CR values (Table 1). These confirm the convergent validity and internal consistency of the study constructs. To confirm the discriminant validity of the constructs, the square root of AVE values for each construct exceeded the inter-correlation coefficients among the constructs (Fornell & Larcker, 1981) (Table 2).

Table 1 Measurement of reliability and validity of constructs

Measurement Items	SFL	a	AVE	CR
Perceived Behavioral Motivators		0.839	0.696	0.820
Intrinsic	.760			
Extrinsic	.903			

Environmental Stewardship ECN	.797	0.762	0.610	0.823
ECM	.828	0.913		
EA	.714	0.964		
Sustainable Livelihood Human capital	.691	0.938	0.628	0.893
Social capital	.808			
Natural capital	.865			
Physical capital	.827			
Financial capital	.760			

Source: Sample Survey

SFL = Standardized Factor Loadings; α = Cronbach's alpha; CR = Composite Reliability; AVE = Average Variance Extracted

4. Results

The results area of the paper shows the tables of descriptives, correlation, regression, and mediation analysis of constructs and items. Which is detailed below:

Table 2 Descriptive Statistics and Inter Construct Correlations

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Gender	1.58	.494													
2	Age	37.31	11.49	.11*												
3	Educational Attainment	3.12	1.273	.1	-.33**											
4	Employment	2.84	1.370	.33**	.07	.05										
5	Marital status	1.20	.398	-.02	-.38**	.15**	.02									
6	Family size	1.69	.463	.08	-.07	.1	.04	.07								
7	Monthly Income	2.19	.901	-.07	.06	.37**	-.10*	.	.14**							
8	Motivators	1.734	.5688	-.07	.06	-.13**	.20**	.07	-.07	-.03						

9	ES	2.204	.3462	.01	-.01	.03	.01	.07	.01	-.02	.14**				
10	SL	2.125	.6119	-.01	.17**	-.19**	.31**	-.01	-.07	-.07	.60**	.14**			
11	EA	2.011	1.237	.07	-.16**	.22**	-.19**	.07	.06	-.03	-.44**	.45**	-.57**		
12	ECN	2.175	.5991	-.04	.11*	-.14**	.22**	-.01	-.03	.03	.53**	.37**	.64**	-.56**	
13	ECM	2.428	.7199	-.07	.17**	-.22**	.15**	-.02	-.05	.01	.53**	.36**	.66**	-.60**	.66**

Source: Sample Survey

Note: N=401; *p<0.05; **p<0.01; SD= Standard Deviation

The above Table 2 shows the mean, standard deviation, and correlation between the constructs in detail. Which shows both positive and negative correlations between the constructs of the study.

Table 3 Environmental Stewardship and Demographic Characteristics

No	Hypothesis			Test used	Test statistic	P value	Inference
1.	Gender	➡	ES	T-test	t = -.195	.845	Not Significant
2.	Marital status	➡	ES	T-test	t = -1.353	.177	Not Significant
3.	Family size	➡	ES	T-test	t = -.286	.775	Not Significant
4.	Employment	➡	ES	One-way ANOVA	f = 2.703	0.030	Significant
5.	Education	➡	ES	One-way ANOVA	f =1.437	0.210	Not significant
6.	Monthly Income	➡	ES	One-way ANOVA	f = 2.942	0.033	Significant
7.	Age	➡	ES	Correlation	r = -.011	0.821	Not Significant

Source: Sample Survey

Table 3 shows the significant difference in the environmental stewardship and various demographic characteristics of individuals. The demographic characteristics considered for the study are gender, marital status, family size, employment type, education, monthly income, and age. Different tests are employed to prove the relationship according to their nature. Hence the p-values are less than 0.05, two hypotheses were found significant at a 5% level of significance (Fisher, 1992); they are the relationship between employment and the monthly income of individuals with ES. So, the results confirm that the ES is different according to their employment status and monthly income, and at the same time, other relationships were found insignificant.

Table 4 Results of Simple Linear Regression Analysis

Hypothesis No:	IV	DV	R^2	Sig.	Inference
H2	Environmental Concern	Environmental Commitment	0.435	0.000	Significant
H3	Environmental Commitment	Environmental Actions	0.363	0.000	Significant
H4	Environmental Concern	Environmental Actions	0.309	0.000	Significant
H6	Behavioral Motivators	Environmental Stewardship	0.21	0.004	Significant
H7	Environmental Stewardship	Sustainable Livelihood	0.21	0.004	Significant
H8	Behavioral Motivators	Sustainable Livelihood	0.361	0.000	Significant

Source: Sample Survey

The above Table 4 shows that, the results of simple linear regression of various study constructs. All established relations are statistically significant as evidenced by the p-values (less than 0.05) (Fisher, 1992) which led to the rejection of null hypotheses at a 5% significance level. In the case of H2, the p-value is significant (0.000) and 43.5% of environmental commitment is explained by environmental concern (Harrell, 2015). Similarly, for H3 the p-value is significant (0.000) and the environmental commitment explains 36.3% of environmental actions. Besides, the relationship between environmental concerns and environmental action is also significant (p-value of 0.000), and 30.9% of environmental action is contributed by environmental concern. Additionally, the preceding behavioral motivators influence environmental stewardship (21%) and environmental stewardship which in turn explains 21% of the sustainable livelihood of individuals with a significant p-value of 0.004. Moreover, these behavioral motivators directly affect sustainable livelihood (36.1%) with a significant p-value of 0.000.

Table 5 Results of Mediation Analysis

No	Hypotheses	Model	R^2	Sig. Value	Inference
H5	The mediating role of ECM between ECN & EA	Model 1 (Without mediation)	.309	.000	Significant
		Model 2 (With mediation)	.408	.000	
H9	The mediating role of ES between PBM & SL	Model 1 (Without mediation)	.361	.000	Significant
		Model 2 (With mediation)	.364	.000	

Source: Sample Survey

The above table 5 presents the results of the mediation analysis conducted using SPSS. The results show two models; Model 1 (without mediation) and Model 2 (with mediation). For H5; the mediating role of ECM between ECN and EA, it is found that the model with mediation is more effective with an R^2 of .408; which means that ECN can predict 30.9 % of EA directly and 40.8% through the mediation of ECM.

Hence, the results confirm the mediation of ECM between the ECN and EA. When talking about the H9; the mediating role of ES between PBM and SL, was also found significant. The PBM can predict the 36.1% SL directly and 36.4% with the mediation of ES. It is understood that mediation contributes only a minor percentage to the outcome variable, yet it can also be considered significant as it improves the R^2 with mediation.

5. Discussion and Conclusions

In this study, the researchers empirically tested the conceptual model linking the PBM to SL with the mediation of ES. By using the data collected from the individuals; who are the citizens of eco-friendly municipalities in Kerala, it is proved that the ES is significantly mediating the relationship between PBM and SL. Furthermore, the researchers also explored the inter-relationship between the dimensions of ES; ECN, ECM, and EA and identified the mediating role of ECM between ECN and EA. This can be considered as the stages of an individual's ES. So, here are the diversified theoretical and practical implications of the study; which are explained below:

5.1 Theoretical Implications

This research is a conscious effort to verify and expand a bunch of theories that constituted the conceptual model of the study. The existing literature often suggests that ES can lead to the SL of individuals and acknowledge the presence of some preceding motivators to individuals' environmental behavior. While verifying the existing theories, this study also focused on a less-explored relationship; the mediating role of ES between PBM and SL. This study verifies the extracts of the ERB theory, RAT, and TPB and ensures the influence of PBM on the environmentally responsible behavior of individuals. Likewise, the study also verified the SET Theory by identifying the significant relationship between ES and SL and enlarged the lap of SET theory by confirming it. The study's findings exposed how behavior like ES can achieve a state of sustainable living for individuals by substantiating the SL theory. Likewise, this study integrated some established theories and proposed a new model to illustrate the relationship between the underlying variables. It will inspire the prospected researchers and can conduct further explorations in future.

5.2 Practical Implications

Along with the significant theoretical implications, the study also offers some valuable insights for policymakers, government authorities, educational institutions, and individuals for the sustainable future of humankind. It proposes an ideal model for the sustainable living of individuals by substantiating the importance of ES in daily life. So, policymakers should create and implement policies that prevent environmental degradation and improve individuals' environmental concerns and stewardship. Besides, the government authorities should concentrate on ES for a sustainable living for their citizen and it is desirable to conduct training programs and public awareness campaigns to enhance the environmental education and awareness of individuals, encourage various local initiatives, and ensure the sustainable allocation of resources for a sustainable future. The study also insists various educational institutions at different levels in the country integrate both theoretical and practical aspects of environmental education into school and college curricula, to ensure the environmental stewardship of future generations. Furthermore, Individuals can voluntarily practice environmentally responsible behavior for their safe and sustainable living in the world. All these initiatives are expected to prevent environmental degradation and calamities to an extent and ensure the secure and comfortable living of this generation and the upcoming generations.

5.3 Limitations and Future Scope of the Study

As far as this study is concerned, we suffered from some constraints that may affect the reliability and accuracy of reached findings. As the content of the survey directly questions the environmental behavior of the respondents, there is a high chance of response biases because respondents might provide socially desirable answers regarding the environment even if it is against the truth. Another dilemma regarding the study is that the concept of environmental stewardship might be defined differently among individuals, so the adequacy of results depends on the selected respondents' perceptions. So, there may also be chances for sampling and reporting bias. Moreover, the generalizability of the study is limited to Kerala only, because the environmental situations and living patterns may differ in other regions and communities.

It is desirable to conduct future research by covering these limitations and to capture further theoretical and practical aspects of this study. By recognizing this study as an exemplary one that revealed the relationship between environmental behaviors and their impact on human life, many explorations are possible. Future researchers can extend the geographical scope of the study by conducting the same study in other regions and states, non-environmentally friendly municipalities, and make comparison studies if possible. And it is meaningful to conduct longitudinal studies to know the long-term impacts of environmentally responsible behaviors of individuals. Exploratory studies can be conducted to explore additional behavioral motivators of environmental stewardship. Besides, it is possible to conduct studies that can find the moderators in this relationship, and the same can be conducted with other independent variables like technology adoption, and government and policy interventions in the future.

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