

## The Role of People's Self-Interests of the Arctic Zone of Russia in Their Pro-environmental Behavior Choices

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**Abstract.** As environmental behavior is still uncommon in developing countries and needs to be popularized, research on the factors for engaging in certain green practices is of high relevance. The aim of this study is to determine how self-interests of individuals of the Arctic zone of Russia influence the pro-environmental behaviors they choose to fulfill. The main hypothesis of the study is that worse-off individuals are more orientated towards the green practices that meet their economic self-interests; individuals with a higher standard of living are more concerned with reinforcement of self-esteem and acknowledgment from society. Methodologically, the study relied on Maslow's needs theory and the Campbell paradigm. The dataset was gathered by surveying 1,102 residents of the Arctic zone of the Republic of Karelia on 14 green practices they may use. The data were analyzed by expert assessment, descriptive statistics methods, analysis of variance, correlation and cluster analyses. The study showed that the level of environmental concern of individuals does not depend on their standards of living, but as this involves financial costs; worse-off individuals adhere to fewer green practices and are more likely to choose the less costly ones (with no correlation between the income and the positive economic effect from the practice). At the same time, the green practices of environmentally passive and environmentally active individuals are less suited to their economic interests than the practices of individuals with a medium level of environmental activity. Scientifically, the value of this study is that it specifies and complements Maslow's needs theory and the Campbell paradigm. The findings are of interest for authorities and non-governmental organizations in their efforts to alter the institutional arrangements for unpopular practices.

**Key words:** Arctic zone of Karelia; green practices; economic interests; environmental interests; pro-environmental actions.

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### 1. Introduction

In the situation where transition to circular economy is a necessity for sustainable development of territories it is essential that pro-environmental behavior (PEB) is adopted by both economic entities and individuals. The level of individual environmental culture in many developing countries is still low, and green practices have not become common [1–3]. Hence, PEBs need to be popularized, which is

impossible without knowing the factors that influence them.

According to Maslow's theory of basic needs [4], the needs an individual fulfills and, hence, his/her actions depend on their living standard. Thus, knowing the living standard and the motivation to fulfill certain needs, we can predict individual behaviors, including environmental behavior. However, previous studies regarding certain green practices (such as buying green products in a developing

country [5]) have demonstrated that even where a PEB cannot satisfy an individual's basic needs as well as an alternative practice, the person may still opt for the PEB. In both poor and rich countries there are environmentally concerned people [6]. A plausible assumption, therefore, is that the best predictor of an individual's pro-environmental actions is the interests perceived as needs expressed in value characteristics rather than personal needs [7].

The study builds upon Maslow's theory, and one section here investigates the applicability of the Campbell paradigm. Questionnaire feedback from 1102 residents of the Arctic zone of Karelia regarding their 14 green practices were analyzed using expert assessment, descriptive statistics methods, analysis of variance, correlation and cluster analyses.

Previously published articles contain some contradictory conclusions about the effect of certain factors on PEBs of individuals (both the influence of non-monetary incentives [8] and a lack thereof [9] have been reported). Furthermore, although the studies provided in-depth analysis, they considered narrow lists of green practices (e. g., five [10] or six [11]) or, within the Maslow's pyramid, their specific types (such as purchasing electric vehicles [12]). Considering the above and the fact that the PEBs of people in the Arctic zone of Karelia are systemically understudied, this research seems relevant.

The study can be regarded novel as it investigates a diverse listing of green practices and previously unstudied PEBs of people in the Arctic zone of Karelia. Its scientific value consists in the new methodology designed for identifying the factors that influence engagement in a certain green practice and its prevalence, and in the new knowledge obtained about

correlations between specific PEBs. Also, the study refines and complements Maslow's needs theory and the Campbell paradigm.

The study is of practical value as it identifies the reasons for the low prevalence of PEB in general and specific green practices, thus helping NGOs and government bodies promote them more efficiently. This knowledge can also be used to transform the institutional settings for adherence to the practices and for aligning them with self-interests of individuals.

The *aim* of this study is to determine how self-interests of individuals of the Arctic zone of Russia influence the pro-environmental behaviors they choose to fulfill.

The *object* of the study was the green practices in use among residents of the Arctic zone of Karelia, Russia. The subject was the role of self-interests of individuals in their choice of PEBs.

The following *hypotheses* are suggested to be tested:

**H<sub>1</sub>:** Individuals with a higher standard of living of the family practice a greater number of PEBs.

**H<sub>2</sub>:** Worse-off individuals are more orientated towards the green practices that meet their economic self-interests than better-off individuals; individuals with a higher standard of living are more concerned with reinforcement of self-esteem and acknowledgment from the society than individuals with a lower living standard.

**H<sub>3</sub>:** Individuals who engage in fewer PEBs more often choose the actions that better meet their economic self-interests; individuals who engage in a greater number of PEBs are more engaged in the behaviors that fulfill their need for reinforcement of self-esteem and acknowledgment from the society than individuals who engage in fewer green practices.

## 2. Literature review

Civil engagement in PEBs varies. Accordingly, individuals have been divided into groups based on their environmental sentiments [13], interest in protecting the environment [14], frequency of participation in environmental events and activities [15], types of consumer activity (according to the degree of financial and social concern [16], interest in fashion [17], etc.), including towards foods (coffee [18], fish [19], organic products in general [20]), wasterecycling patterns [21], and sensitivity to corporate social responsibility [23] based on the model of stages of behavior change [23].

South Koreans were clustered into seven groups based on their environmental perception, environmental awareness and attitudes, practices for environmental protection, environmental policy demand, and quality of life and sustainability [24].

We must remark here that individuals demonstrate different levels of PEB towards different objects [25]. E.g., 88 % Canadian households engage in green consumer behavior, and only 45 % recycle electronics [10]. Clustering of Greek citizens who were the least, moderately, and the most engaged in PEBs showed the highest commitment to post-purchase care and maintenance for extending the service life of goods to be coupled with medium rather than with the highest levels of other pro-environmental practices [11]. Among senior students of US universities, willingness to pay through taxes arises only when having beliefs about consequences for self, in contrast e. g., to willingness to take political action [26].

Commitment to PEB in general or to its specific forms is determined by the individual's values and identity [27], environmental self-efficacy [28], and cynicism [29].

As factors for the PEB of individuals are multiple, they were approached through various theories:

- the theory of reasoned action: individuals make rational choices governed by their intention which, in turn, is determined by attitude and subjective norms [30] (e. g., TRA was applied to demonstrate that the intention to buy a green smartphone is significantly influenced by brand equity [31]);

- the theory of planned behavior: an off-shoot of TRA, additionally incorporating perceived behavioral control to predict intention [32] (e. g., there is evidence that this theory is applicable during the COVID-19 pandemic and that better awareness of the interrelationship between COVID-19 and climate change has a positive effect on pro-environmental intentions and actions [33]);

- the value-belief-norm theory: the values of individuals shape their beliefs which, in turn, influence the norms that govern the behavior [34] (e. g., studies show that a positive effect on environmental worldviews is produced by biospheric, altruistic, and egoistic values [35], whereas hedonic values negative correlate with environmental beliefs and norms [36]);

- the attitudes – behavior – context theory: behavior is governed by both personal attitudes and contextual factors [34] (e. g., the intention to behave pro-environmentally on holiday was found to correlate positively with the corresponding behavior at home, but not to predict it [37]);

- the metaeconomic theory: the behavior of individuals has dual motives: they not only have the tendency to pursue self-interest (egoistic-hedonic tendency) but to also condition that pursuit with the sentiments (empathetic–altruistic tendency) [38] (the terminology in [39] is Ego for self-interests, and Empathy for sentiments). The economic goal thus shifts to maximizing peace of mind both within and among individuals rather than maximizing one of the interests [38] (the

inseparability and interconnectedness of altruistic interests and egoistic interests arising in the presence of financial incentives was proved for engagement in recycling [40]; while a comparison between the effects of altruistic (aspiration to protect the environment), normative (the expectations of household members and of friends and neighbors), and egoistic (recycling is inconvenient and costly) factors showed the greatest impact of altruistic factors and the least of egoistic factors [41];

– Campbell paradigm: whether an individual will or will not perform a pro-environmental action depends on two factors: the person's commitment to protecting the environment and the costs that come with a specific behavior (this includes both financial and metaphoric costs [42]) (it is demonstrated that since the performance of energy- and resource-saving actions varies across European countries, the willingness of individuals to perform these actions also varies [43]; estimates of the costs of pro-environmental behavior reflect the actual behavioral costs [44]);

– Maslow's hierarchy.

Since the methodology of this study primarily builds upon this last theory on the list, it will be described in more detail.

Abraham Maslow, who proposed the theory of basic needs [4], associated PEB with satisfying the supreme need – for self-actualization, more specifically, with its top tier – transcendence (actualization of the holistic society, the nature) [45]. Hence, Maslow's theory implies that PEB is possible only after the more basic needs are satisfied.

Some researchers (Len Doyal and Ian Gough in the theory of human needs [46], Manfred Max-Neef in the conception of human scale development [47], Jeremy Pincus [48] and others) have criticized Maslow's theory: they disagreed that

human needs were hierarchical. To wit, individuals often place personal enhancement above wealth [48]. It would be wrong to attribute PEB to higher needs alone, since even physiological needs include the needs for air, water, and health, which depend on the quality of the environment [49]. Furthermore, pro-environmental actions (such as purchasing eco-friendly instead of traditional products) have positive implications both for the individual customer and for the society at large [50] and can be performed without the aim of environmental protection [16]. According to Hamilton [51], there can be no definitive checklist of needs as they tend to be altered by changes in institutional settings.

In support of Maslow's theory, a study has demonstrated that individuals in less developed countries mostly tend to satisfy their lower-level needs (physiological and safety needs), whereas people in better developed countries shift towards higher needs (for love, esteem, self-actualization) [52]. Speaking of PEB, Maslow's theory is corroborated by surveys of the behaviors of Hong Kong residents, which demonstrated that in Hong Kong as well as in other developed countries upper class members were more inclined to support environmental concerns and actions for environmental protection than members of the lower class [53]. Contrary to Maslow's theory, it is remarked that although the population of poorer countries does not prioritize environmental problems for their country, people in both poor and wealthy countries do believe in the seriousness of environmental problems [6]. The case of legal and illegal firewood purchasing in Guatemala reveals that even in a developing country people may surrender a small material gain in order to buy a green product [5].

The above facts suggest that the PEB of individuals is regulated more by their

interests (needs as expressed in value characteristics) than by their needs.

The effects of certain needs and interests of individuals on different PEBs have been analyzed. One specific finding was that people in Canada, Norway, the USA, and Sweden were not equally willing to make financial sacrifices for the environment [54].

Data collected in China show that financial benefits from purchasing new energy vehicles and a stronger perception that NEVs meet esteem needs have a positive impact on the intention to buy them [8]. On the other hand, another study based on a questionnaire survey of Beijing residents detected a significant effect of monetary incentives, but found no effects from non-monetary measures [9]. A conclusion from yet another study is that self-esteem was a less significant predictor of purchase motivation than price consciousness, while the most significant predictor was environmental concern [12].

The need for self-affirmation is a stronger determinant of giving preference to a green hotel for socially included than for socially excluded consumers [55]. The negative effect on the intention to purchase eco-friendly reusable cloth diapers is produced by the negative implications for the customer. At the same time, no significant effect of environmental implications was revealed [56].

How much the interests of individuals matter can vary depending on external conditions: the moral outrage due to corporate social responsibility [57], the influence of society [58] and the presence of public accountability [50]. Also, people demonstrate an increased desire for green products when shopping in public (but not private) and when green products cost more than non-green products [59].

Thus, previous studies have shown that pro-environmental interests can arise both in low-income and in high-income

cases, and that, according to Maslow's hierarchy, the needs (subsistence and non-subsistence) satisfied in the first place are different for people with different levels of affluence. At the same time, it has not been systematically studied to what extent the personal interests of individuals influence their choice of observed environmental practices. The practical part of this study will be devoted to this issue.

### 3. Data Source and Methodology

The study or, more specifically, the proposed hierarchy of interests of individuals engaging in various green practices is based on the value assessment of needs in Maslow's hierarchy [45]. The proposition regarding the impact of factors as a whole (both total costs and the environmental effect from practicing a PEB) proceeded from the Campbell paradigm [42].

Data on the green practices in use among the population were gathered through a questionnaire survey carried out in 2020 among 1 102 residents of six Republic of Karelia municipalities included in the Russian Arctic zone. The respondents were aged 18 to 72 years. The sample set was representative in terms of the sex, age, district, and housing (private house or apartment building) structure. The sample error was within 3 %.

Fourteen green practices were selected for the analysis (See Table no. 1).

Five characteristics of the selected green practices were examined (See Table no. 2).

These characteristics were scored from one (minimum) to five (maximum) by 15 independent experts based in the region, who differed in their sex, age, occupation, place of residence, and major environmental activities. The criteria for selecting experts were their overall environmental expertise, personal experience of fulfilling green practices,

Table 1. The pro-environmental behaviors investigated

Code	PEB
F1	Membership of environmental organizations
F2	Donating to environmental organizations
F3	Purchasing green products
F4	Recycling household wastes or delivering them to be recycled
F5	Energy saving
F6	Water saving
F7	Reducing the use of disposable items (e. g., plastic cups)
F8	Giving preference to more eco-friendly travel modes (bicycling, walking, etc.)
F9	Participation in subbotniks, cleaning up public spaces, forest and other areas
F10	Initiating subbotniks, clean-up of public spaces and forest
F11	Reporting violations of nature-protection and environmental legislation to the police
F12	Personally prosecuting nature polluters and environment offenders
F13	Initiating environmental actions and appealing to authorities
F14	Participation in environmentalist demonstrations

Source: Author's Computation

Table 2. Characteristics of pro-environmental behaviors

Code	Characteristic of PEBs
Ch1	Monetary costs of practicing
Ch2	Non-monetary costs (time, effort, attention, etc.) of practicing
Ch3	Economic self-benefit from practicing
Ch4	Societal environmental effect from practicing
Ch5	Positive perception of the commitment by the local community

Source: Author's Computation

formal and informal interactions with other environmentally concerned people, and awareness of the environmental situation in the republic. With this number of experts at a confidence probability of 0.95 the maximum permissible relative error of the expert score expressed in fractions of standard deviation is 0.5 [60].

Mean values across all expert scores were calculated for further analysis (See Table no. 3).

The degree to which a green practice met the economic self-interests of individuals was estimated as the difference between the monetary costs that come with this practice and the economic self-benefit from it (Ch3-Ch1), and the degree to which societal environmental interests were met was derived from societal environmental effect of the PEB.

The extent to which commitment to the green practice is positively

Table 3. Mean expert scores of the characteristics of the pro-environmental behaviors

PEB code	Code of the characteristic of the PEB					Ch3-Ch1
	Ch1	Ch2	Ch3	Ch4	Ch5	
F1	1.87	2.80	1.87	3.27	3.80	0.00
F2	3.20	2.07	2.00	3.67	3.60	-1.20
F3	3.47	3.33	2.47	3.53	3.40	-1.00
F4	2.67	4.07	3.07	4.07	3.80	0.40
F5	2.33	2.40	4.07	3.87	3.87	1.74
F6	2.47	2.67	4.07	4.07	3.80	1.60
F7	2.40	3.00	4.00	4.33	3.87	1.60
F8	1.67	3.20	4.00	3.93	3.67	2.33
F9	2.27	4.00	2.20	4.07	4.47	-0.07
F10	2.80	4.07	2.33	4.20	4.40	-0.47
F11	1.20	2.00	1.47	3.13	3.67	0.27
F12	1.60	3.13	1.60	2.87	3.00	0.00
F13	1.73	3.67	2.00	4.00	3.80	0.27
F14	1.53	3.27	2.00	3.53	3.47	0.47

Source: Author's Computation

perceived by the local community was the criterion for judgment on two interests of individuals: firstly, interest in reinforcing acknowledgement from the society, which is a component part of the need for respect; secondly, interest in reinforcing self-esteem, since every individual is part of the local community and, while sharing with some probability the society's average judgments and aspiring self-actualization, he/she gives preference to the more positively perceived actions.

The data were analyzed by the following methods.

1. Descriptive statistics methods.

2. Multiple-factor ANOVA to estimate:

– the relationship between family's standard of living and the average level of environmental concern as well as the number of green practices in use;

– the dependence of the characteristics of the chosen green practices on the living standard and the total number of PEBs practiced by the individual;

– the dependence of the prevalence of certain green practices on their characteristics.

3. Correlation analysis: computing the Spearman rank correlation coefficient to find correlations between the implementation of all possible pairs of PEBs, and the Pearson correlation coefficient to measure the similarity of the scores of PEB characteristics and their co-implementation.

4. K-means clustering to cluster PEBs into groups according to each of their characteristics.

Analysis of variance, correlation and cluster analyses were performed in IBM

SPSS Statistics 27, and the rest of the computations in Excel.

#### 4. Conducting research and results

The results of the survey among residents of the Arctic zone of Karelia show that 58.9% of respondents believe environmental problems to be among those of top concern (Figure no. 1). In fact, this level increased somewhat with a decline in the standard of living: from 53.8% in the fully affluent group to 63.0% among those whose income covers only food and basic necessities. An abrupt reduction of environmental concern to 25.0% was observed only in the worst-off group.

Analysis of variance for the level of environmental concern among groups with different living standards revealed no connection between these variables even at 0.05 significance level (F-test 2.354; sig. 0.052). Hence, environmental problems are perceived as important by

both lower-income and higher-income groups.

People in the sample practiced 3 or 4 PEBs on average, with the smallest number of green practices in the fifth, worst-off group, and the greatest number in the fourth group, whose living standard was only slightly better (See Table no. 4). The maximum possible number of PEBs was demonstrated by two respondents (0.18% of the sample) belonging to two groups with the highest standards of living (See Table no. 5). On the other hand, 147 respondents (13.34%) did not engage in a single green practice.

The relationship between the number of green practices in use and the living standard as measured by the analysis of variance was found to be notable only for statistical significance at 0.05 (F-test 2.541; sig. 0.038). Hypothesis  $H_1$  can thus be considered confirmed: worse-off individuals practice fewer PEBs even though they do find environmental

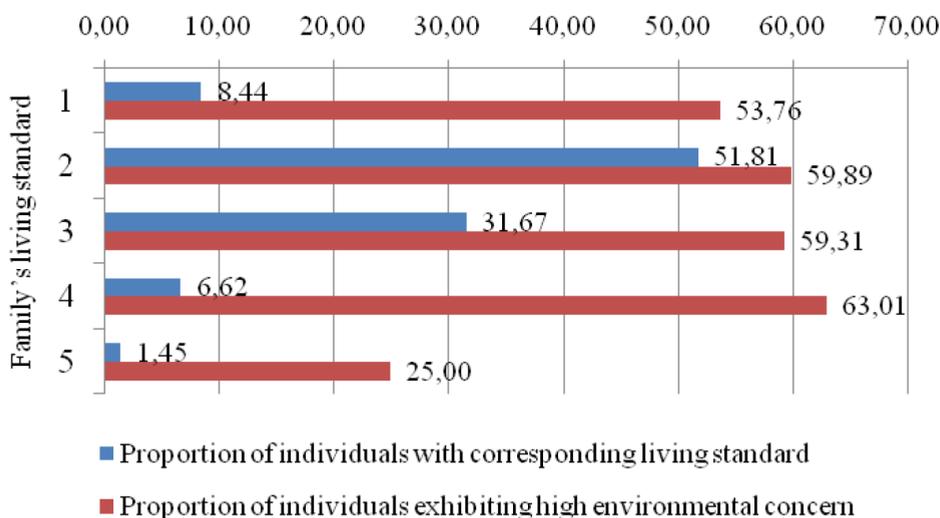


Fig. 1. Distribution of respondents by levels of income and environmental concern, %

Source: Author's Computation

Note. Here and below, family's living standards are scored as followed: 1 – fully affluent; 5 – have to borrow from friends even to buy food. Respondents were asked to choose up to three global problems of top concern from among international tensions, economic problems, environmental problems, health problems, social problems, and personal security.

Table 4. Average number of pro-environmental behaviors in use and characteristics of the chosen behaviors in groups with different living standards

Family's living standard	Mean number of PEBs in use	Average scores of the characteristics of the PEBs in use					Ch3-Ch1
		Ch1	Ch2	Ch3	Ch4	Ch5	
1	3.05	2.64	3.28	2.90	3.82	3.75	0.25
2	3.58	2.55	3.29	2.97	3.86	3.81	0.41
3	3.07	2.52	3.33	3.00	3.88	3.84	0.48
4	3.68	2.45	3.25	3.16	3.91	3.84	0.71
5	2.75	2.15	3.19	3.18	3.90	3.88	1.03
Mean	3.37	2.54	3.30	2.99	3.87	3.82	0.45
Mode	1.00	3.47	3.33	2.47	3.53	3.40	-1.00
Median	3.00	2.47	3.27	3.07	3.90	3.82	0.57
Minimum	0.00	1.20	2.00	1.47	2.87	3.00	-1.00
Maximum	14.00	3.47	4.07	4.07	4.33	4.47	2.33

Source: Author's Computation

Table 5. Mean characteristics of the green practices in use in relation to the total number of pro-environmental behaviors practiced by an individual

No. of PEBs in use	Share of individuals, %	Average scores of the characteristics of the PEBs in use					Ch3-Ch1
		Ch1	Ch2	Ch3	Ch4	Ch5	
0	13.34	0.00	0.00	0.00	0.00	0.00	0
1	16.79	2.77	3.43	2.68	3.78	3.79	-0.09
2	14.34	2.59	3.38	2.85	3.84	3.82	0.26
3	12.25	2.53	3.31	3.05	3.89	3.84	0.52
4	11.16	2.49	3.27	3.09	3.90	3.82	0.60
5	9.98	2.46	3.22	3.23	3.92	3.81	0.77
6	9.17	2.40	3.16	3.23	3.92	3.83	0.82
7	5.63	2.42	3.22	3.12	3.91	3.83	0.71
8	3.54	2.35	3.19	3.07	3.88	3.82	0.72
9	2.00	2.30	3.22	2.96	3.84	3.77	0.66
10	1.09	2.37	3.21	2.88	3.87	3.82	0.52
11	0.45	2.39	3.15	2.77	3.83	3.80	0.38
12	0.09	2.26	3.16	2.62	3.80	3.82	0.36
14	0.18	2.23	3.12	2.65	3.75	3.76	0.42

Source: Author's Computation

problems serious. That said, the number of green practices in use does not depend on the level of environmental concern (F-test 1.197; sig. 0.274).

ANOVA results showed that the living standard influenced only one characteristic of the PEBs – monetary costs coming with the practice (See Table no. 6). The lower

Table 6. **Analysis of variance for the mean scores of pro-environmental behavior characteristics in relation to the living standard and number of green practices in use**

Code of the PEB characteristic	Source of variance	Sum of squares type III	No. of degrees of freedom	Mean square	F-test	Statistical significance
Ch1	LS	1.947	4	0.487	3.865	0.004
	NIP	5.992	12	0.499	3.964	0.000
	LS*NIP	5.798	31	0.187	1.485	0.044
	Error	114.248	907	0.126		
Ch2	LS	0.551	4	0.138	1.408	0.229
	NIP	3.726	12	0.311	3.176	0.000
	LS*NIP	3.425	31	0.110	1.130	0.287
	Error	88.684	907	0.098		
Ch3	LS	2.007	4	0.502	1.993	0.094
	NIP	13.225	12	1.102	4.379	0.000
	LS*NIP	4.624	31	0.149	0.593	0.963
	Error	228.282	907	0.252		
Ch4	LS	0.105	4	0.026	0.872	0.480
	NIP	1.125	12	0.094	3.113	0.000
	LS*NIP	1.615	31	0.052	1.730	0.008
	Error	27.311	907	0.030		
Ch5	LS	0.128	4	0.032	0.561	0.691
	NIP	0.409	12	0.034	0.595	0.848
	LS*NIP	2.601	31	0.084	1.465	0.050
	Error	51.958	907	0.057		
Ch3-Ch1	LS	7.679	4	1.920	4.410	0.002
	NIP	27.073	12	2.256	5.183	0.000
	LS*NIP	11.540	31	0.372	0.855	0.695
	Error	394.822	907	0.435		

Here and below: NIP is the number of practices in use.

Source: Author's Computation

was the individual's income, the lower were the monetary costs of the green practices he/she chose to engage in. The reason may be that the worse-off groups are financially unable to practice certain PEBs or several behaviors simultaneously because of the monetary costs involved.

Although the self-benefit derived from the PEBs in use increased towards lower living standards, this relationship cannot be called statistically significant. The absence of correlation can be explained by the fact that economic interests are fundamental for all categories of respondents (both worse- and better-off), and the possibility of getting economic benefit is less dependent on income than incurring monetary costs.

Nevertheless, the economic benefit from engaging in green practices, calculated as the difference between the positive effect and the costs, is positively related to the income of individuals. This corroborates the part of the hypothesis  $H_2$  that worse-off groups are more orientated towards the PEBs that meet their economic self-interests than better-off groups.

The part of the hypothesis  $H_2$ , which postulates that better-off individuals are more influenced by the need for acknowledgement from the local community, is disproved. The individual's income does not correlate with the non-monetary costs of a green practice and societal environmental interests. The facts that the living standard of individuals correlates with the monetary characteristics of the PEBs they practice and does not correlate with non-monetary characteristics shows that the Campbell paradigm better models the behaviors of low-income than high-income groups.

The situation with the relationship between the characteristics of practices and the total number of behaviors in use is different: only one of the five characteristics, namely positive perception by the local community, did not correlate

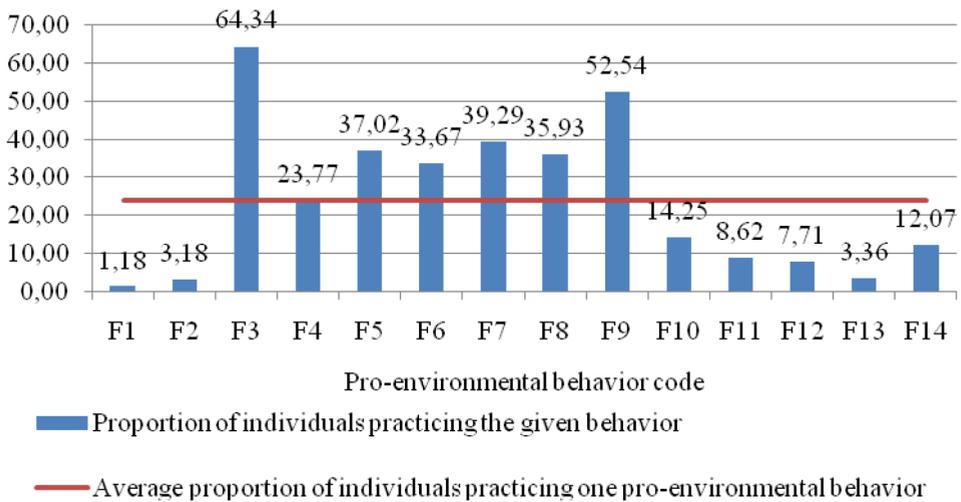
with the number of PEBs practiced. The part of the hypothesis  $H_3$  is thus disproved.

The strongest relationship was found for the economic self-benefit from engaging in a green practice. Curiously, however, this relationship was not linear but inversely U-shaped: the individuals who practiced 5–6 PEBs chose the ones that yielded the highest economic self-effect; for smaller or greater numbers of behaviors practiced their average economic self-effect score decreased. The facts that the monetary costs of the green practices implemented decreased as their total number increased and that the dependence of individual's economic interests on the number of green practices implemented was U-shaped disprove hypothesis  $H_3$  that individuals practicing fewer PEBs were more orientated towards economic self-interests. Considering that hypothesis  $H_1$  was corroborated only for a high level of statistical significance and hypothesis  $H_2$  only for the monetary costs coming with a practice but not for the economic self-effect, this conclusion does not contradict the results described previously.

A combined effect of the living standard and number of PEBs practiced on the characteristics chosen by individuals was observed for monetary costs and perception by the local community, as well as for societal environmental interests.

Purchasing of green products was the most common among all the green practices in the study (Figure no. 2). That said, only 13.1 % of respondents purchased green products often, while a majority (51.3 %) did it occasionally. Another popular practice, involving over a half of all respondents (52.5 %), was participation in subbotniks (voluntary unpaid work for collective benefit on weekends).

The least popular behaviors among residents of the area were membership of environmental organizations (practiced by 1.2 % respondents).



**Fig. 2.** Prevalences of specific PEBs, %

Source: calculated by the authors from the questionnaire survey dataset

According to the analysis of variance, the prevalence of individual green practices did not depend on their characteristics. However, ANOVA repeated after clustering PEBs by each of their characteristics revealed a correlation between the prevalence of green practices and the monetary costs that come with them: the clusters of PEBs that require higher monetary costs were somewhat more prevalent than those involving lower monetary costs (See Table no. 7).

Among all possible pairs of green practices, the strongest association was observed between energy saving (F5) and water saving (F6) (Spearman correlation coefficient – 0.559; distance of the scores of all characteristics – 0.54) (See Table no. 8). On the whole, however, it is worth noting that, as measured by the Spearman correlation coefficient, the relationship of paired implementation of PEBs with the distance between scores of the characteristics of these behaviors

**Table 7. Analysis of variance for the relationship between the prevalence of pro-environmental behaviors and the mean scores of their characteristics**

Source of variance	Sum of squares type III	No. of degrees of freedom	Mean square	F-test	Statistical significance
Ch1	2379.112	1	2379.112	12.543	0.024
Ch2	47.617	1	47.617	0.251	0.643
Ch3	61.682	1	61.682	0.325	0.599
Ch4	0.000	0			
Ch5	27.684	1	27.684	0.146	0.722
Ch3-Ch1	0.000	0			
Error	758.726	4	189.682		

Source: Author's Computation

was moderately negative (Pearson correlation coefficient  $-0.395$ ), and the relationship with the economic benefit from the behaviors was even weakly negative (Pearson correlation coefficient  $-0.168$ ). This confirms once again that when choosing PEBs to practice individuals are guided by multiple factors,

and poorer people may engage in some costly practices.

### 5. Discussion

An interesting finding is the U-shaped relationship between the number of PEBs practiced and the economic benefit from practicing them. Possible

Table 8. Matrix of Spearman correlations between pro-environmental behaviors practiced

PEB code	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
F1	1.000													
F2	0.220 **	1.000												
F3	0.046	0.113 **	1.000											
F4	0.077 *	0.166 **	0.162 **	1.000										
F5	0.090 **	0.172 **	0.284 **	0.300 **	1.000									
F6	0.064 *	0.156 **	0.238 **	0.342 **	0.559 **	1.000								
F7	0.101 **	0.119 **	0.285 **	0.393 **	0.411 **	0.429 **	1.000							
F8	0.076 *	0.037	0.214 **	0.235 **	0.366 **	0.359 **	0.304 **	1.000						
F9	0.020	0.089 **	0.256 **	0.189 **	0.164 **	0.166 **	0.273 **	0.189 **	1.000					
F10	0.124 **	0.207 **	0.173 **	0.193 **	0.161 **	0.160 **	0.188 **	0.122 **	0.325 **	1.000				
F11	0.176 **	0.129 **	0.175 **	0.208 **	0.240 **	0.212 **	0.124 **	0.194 **	0.175 **	0.097 **	1.000			
F12	0.157 **	0.142 **	0.073 *	0.206 **	0.060 *	0.032	0.171 **	0.088 **	0.166 **	0.213 **	0.166 **	1.000		
F13	0.260 **	0.368 **	0.107 **	0.144 **	0.066 *	0.134 **	0.139 **	0.060 *	0.107 **	0.328 **	0.158 **	0.248 **	1.000	
F14	0.114 **	0.282 **	0.142 **	0.120 **	0.189 **	0.196 **	0.170 **	0.082 **	0.090 **	0.160 **	0.124 **	0.039	0.178 **	1.000

\* – correlation deemed significant with 0.05 (two-way).

\*\* – correlation deemed significant with 0.01 (two-way).

Source: Author's Computation

explanations are, on the one hand, the high prevalence of green consumerism among people practicing few PEBs (for 45.4 % of individuals engaging in one PEB this behavior is purchasing of green products) and the high prevalence of donating to environmental organizations among those engaging in many green practices (an average donator engages in eight PEBs). Since these two green practices are associated with the highest monetary costs, they reduce the satisfaction of economic interests for both environmentally active and passive individuals. On the other hand, when proposing explanations for the degree to which economic interests are addressed among individuals who engage in five or six PEBs, one should take into account the frequency with which the group engaging in five practices chooses eco-friendly travel modes (F8), and the group engaging in six practices chooses energy saving, water saving, and reducing the use of disposable items (F5, F6, F7). The listed PEBs are the ones with the highest scores for addressing the economic interests of the individuals practicing them.

The popularity of purchasing green products although they are more expensive than traditional products can be explained by health considerations: organic products are believed to raise one's resistance to disease [61–62]. Thus, simultaneously with satisfying their basic need for other material goods, health-minded individuals exhibit interest in green products. Overall, the popularity of certain green practices largely correlates with the visibility of the environmental effect to the person engaging in them: the environmental effect from purchasing green products, participating in clean-up events is easier to see and evaluate than the effect from appealing to authorities or donating to environmental organizations. This certainly refers to the institutional conditions in this given study.

Quite active participation in subbotniks is partly explained by Soviet legacy, with subbotniks being a common mass event in the USSR. The use of eco-friendly travel modes is possible i. a., due to the relatively small size of the settlements. Since environmental organizations have no units based directly where the respondents live, very few of them are members of such organizations, and the most environmentally responsible citizens implement their own initiatives to protect the environment. The low political activity and passive skepticism towards government bodies and municipal authorities are the reasons for the low prevalence of appealing to authorities in our study.

The factors described above can be regarded as the reason for differences between countries in the prevalences of green practices. To wit, a most common PEB in Canada, similarly to the Arctic zone of Karelia, was the purchase of green products, but in contrast to Karelia, waste composting was more popular there than participation in outdoor activities. An overall comparison of green practice prevalences in Canada and Karelia, however, reveals low engagement of Karelian residents in PEB: 13.34 % did not engage in any of the 14 studied practices (in Canada, only 0.4 % did not engage in any of the five behaviors analyzed [10]).

Our results corroborate previously made conclusions about variation in the engagement of individuals in PEBs [13–15] and variation in the prevalence of their specific applications [10–11; 25; 34].

Despite the findings that people primarily choose to satisfy lower-level needs in less developed countries and higher-level needs in more developed countries [52] we show that the income of people within one country does have an impact on the PEBs chosen by its citizens, but there is

no evidence of impact from the need to heighten self-esteem and be acknowledged by the community in our study.

Conclusions regarding the recognition of environmental problems in poor countries [6] and willingness of people in developing countries to take actions to protect the environment even contrary to their economic self-interests [5] were corroborated for low-income population groups. Similarly, the conclusion that people in developed countries are more inclined to protect the environment [53] was confirmed for better-off population groups.

Our results suggest that the conclusion regarding higher impact of monetary and lower impact of non-monetary factors on the decision to purchase an electric vehicle [9; 12] can be extended to other PEBs. Hence, the statement that altruistic factors have the highest and egoistic factors have the lowest impact on engagement in waste recycling [41] was not corroborated by the analysis of the whole set of PEBs.

One should also keep in mind that the situation regarding implementation of some PEBs varies across the study area. For instance, the infrastructure for waste collection, sorting, and recycling is still rather poor in Karelia, but the situation in cities and towns is somewhat better than in rural areas. On the other hand, villagers have better possibilities to recycle wastes e. g., by composting and to use the compost in their household land lots. Similarly, the range of green products for purchase is wider in urban areas, and the delivery of products purchased online to cities and towns is cheaper, but the availability of local organic produce is higher in the countryside. Having analyzed these differences, we conclude that their impact on the monetary and non-monetary costs of engaging in various PEBs is insignificant.

In the future, it will be useful to investigate the impact of other

characteristics on the actions of individuals (e. g., the green practice being negatively received by the local community).

## 6. Conclusion

The study has confirmed that the level of individual's environmental concern does not depend on their standard of living. Also, people's income was shown to correlate with the monetary costs that come with the behavior, but not with the economic effect or with reinforcement of self-esteem or with acknowledgement by the local community. Furthermore, even if the need for material well-being is high, an individual may sacrifice some material goods when sharing public environmental interests. This suggests that the capacity of Maslow's theory to predict PEBs is limited, and greater accuracy can be achieved by adjusting needs to personal value characteristics.

The practical value of the study consists in the identified reasons for the low prevalence of PEB in general and specific green practices, thus helping NGOs and government bodies promote them more efficiently. People willing to pursue eco-friendly lifestyles are not guided by economic self-interests, needs of self-esteem or acknowledgement by the society. However, they want to know they are contributing to environmental protection and they apparently care for their health. Accordingly, the now uncommon green practices can be made more popular by making the environmental effect of engaging in them greater, more predictable and visible, and by elucidating the correlation between environmental factors and the health status. In particular, the political landscape has to be changed, credibility of authorities should be improved, and their targeted outreach activities should be intensified, civic institutions should be strengthened, etc.

Solutions for infrastructural issues, such as recycling logistics for small communities, will also play a role.

The interests of the local community largely determine the pace, vectors, and characteristics of the territory's development. Our study has demonstrated that in order to achieve environmental and economic sustainability, it is necessary to understand and take into account the

personal and public interests of individuals. Consideration of the interests of the local community and transformation of the institutional conditions for the implementation of green practices will enable individuals to behave pro-environmentally and, ultimately, will ensure a sustainable development and environmental and economic security of territories.

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## Роль личных интересов населения Арктической зоны России в выборе форм экологического поведения

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**Аннотация.** Нераспространенность экологического поведения жителей развивающихся стран и необходимость его популяризации делают актуальным изучение факторов, обуславливающих соблюдение отдельных экопрактик. Цель данной статьи – определение влияния личных интересов индивидов Арктической зоны России на выбор ими реализуемых форм экологического поведения. Главной гипотезой исследования является предположение, что менее обеспеченные индивиды в большей степени ориентируются на экопрактики, удовлетворяющие их личные экономические интересы; индивиды с более высоким уровнем жизни – на укрепляющие самооценку и личную оценку социумом. Методологической основой работы выступили теория потребностей Маслоу и парадигма Кэмпбелла. Требуемые данные собраны благодаря анкетному опросу 1102 жителей Арктической зоны Республики Карелия о 14 соблюдаемых ими экопрактиках. Для анализа данных использованы методы экспертных оценок и описательной статистики, дисперсионный, корреляционный и кластерный анализы. В ходе исследования установлено, что восприятие серьезности экологических проблем не зависит от жизненного уровня индивидов, однако в силу необходимости нести денежные затраты менее обеспеченные индивиды соблюдают несколько меньше экопрактик и имеют большую склонность к выбору менее затратных из них (взаимосвязь дохода и положительного экономического эффекта от соблюдения практики отсутствует). При этом экопрактики экологически пассивных и экологически активных граждан в меньшей степени удовлетворяют их экономические интересы, чем лиц, имеющих среднюю экологическую активность. Научная ценность исследования определяется уточнением и дополнением теории потребностей Маслоу и парадигмы Кэмпбелла. Результаты работы представляют интерес для государственных органов и некоммерческих организаций с целью трансформации институциональных условий непопулярных практик.

**Ключевые слова:** Арктическая зона Республики Карелия; зеленые практики; экономические интересы; экологические интересы; проэкологические действия.

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