



Environmental Attitude of the Inhabitants of Nijandaris in the Conservation of Natural Resources - Peru

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Authors' contributions

This work was carried out in collaboration among all authors. The author MJDLVF raised the research project, drafted the report and drafted the manuscript for review. The RRA, BQR and SCF authors managed the literature searches and methodologies, the same way they managed the analysis of the study and performed the statistical analysis using the software. All authors read and approved the final manuscript.

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ABSTRACT

The environmental attitude is a psychological tendency expressed by the evaluative (perceptions or beliefs) response towards the environment and natural resources flora, fauna, water, soil and air are naturally valuable products for development and continuity towards sustainability; relating both concepts in the Nijandaris population is the main objective of this research. Methodology: a probabilistic sampling was carried out at an age of [30 - 60 years] = 50 people respondents, questionnaire of 20 questions each; validated by the Rensis Likert scale 3 levels each, applying the Karl Pearson relationship coefficient and bilateral t-student. Conclusions: The environmental attitude of the inhabitants of Nijandaris is between bad to regular, likewise their conservative attitude towards natural resources ensures that they always do so. The relationship between environmental attitude and conservation turned out to be positive and significant. Regarding their dimensions, the association between affective attitude and conserving flora and fauna obtained

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r=0.38 positive median t=2.88; the correlation between cognitive attitude and conserving water and soil obtained an r=0.42 positive median t=3.21, and the relationship between conative attitude and conserved air has a considerable positive r=0.62 t=5.47. Therefore, we affirm that there is an environmental attitudinal concern towards the conservation of the natural resources of the adult population [30-60 years] in the Nijandaris Populated Center.

Keywords: Cognitive; affective; conative attitude; conservation of natural resources and Nijandaris.

1. INTRODUCTION

Natural resources are a sustainable measure [1] for present and continuing generations [1–3]. In Peru there is an endowment of natural resources [4,5] especially in the rainforest [4] resources such as water, soil, flora and fauna satisfactorily meet the needs of the population whether in their respective social, political, economic, and environmental sectors [6–9]. In Nijandaris Village Center activities are carried out in the extraction of natural resources, although its population does not exceed 500 inhabitants they manage and consume their natural resources in a way that does not deteriorate their extinction although currently an excessive consumption of it has been seen, therefore, their resources are so important for demographic development [10,11]. If natural resources offer sustainable development to a certain territory [8,12,13], inhabitants should present conservation measures according an environmental attitude of what these resources represent for themselves [14].

People's attitude is manifested by the fact that the natural resources of their environment are in a process of deterioration [7,15–19], that is why attitude is a fundamental part for the management of natural resources [17,20–22]. Thanks to its cognitive, affective and conative perspective analyzes deepens the individual behavior at a personal level [23] of how highly it matters to conserve natural resources [19,21,22,24]. The environmental attitude of each person in conserving natural resources is seen expressed in its three dimensions [17,22,25], a cognitive dimension describes people's information and knowledge towards natural resources [7,15,24,26]; an affective dimension analyzes the perception, beliefs and feelings of inhabitants towards these resources [16,17,24,27]; while the conative dimension analyzes the adaptation, criteria, disposition and involvement of the problems that happens in natural resources [8,19,22,24].

There are national and international research where the importance of natural resources and the environmental attitude of people are analyzed [8,17,19,23,28,29] which is extremely important to observe ideas, emotions, attitudes and behaviors at the personal level [22,24–26] towards the conservation of natural resources such as flora, fauna, air, soil and water [17,19]; until now there is no research in Nijandaris Village Center concerning this content; and through the sources of information we can deepen and analyze how the inhabitants are willing to conservation of natural resources from their environmental attitudinal perspective that will move towards a sustainable future. The following research is to relate the cognitive, affective and conative environmental attitude towards the conservation of natural resources in the adult population of the Nijandaris Village Center.

2. MATERIALS AND METHODS

A. Study area

The research area is located in the village of Nijandaris in the district of Chanchamayo, province of the same name, department of Junín; with geographical location: Latitude: 10°59'46"S, Longitude: 75°19'55"W, about 219.57 km from the capital of Peru.

B. Methodology and Sampling

The research is applied, descriptive - correlational [30] where the adult population of the Nijandaris Population Center between the age of 30 - 60 years is 78 inhabitants, of which, the sampling was probabilistic: confidence level at 95%, margin of error 5%, estimation of proportion 90%, resulting in 50 people to be surveyed.

$$n = \frac{N \cdot Z^2 \cdot p \cdot (1-p)}{(N-1) \cdot e^2 + Z^2 \cdot p \cdot (1-p)} \quad (1)$$

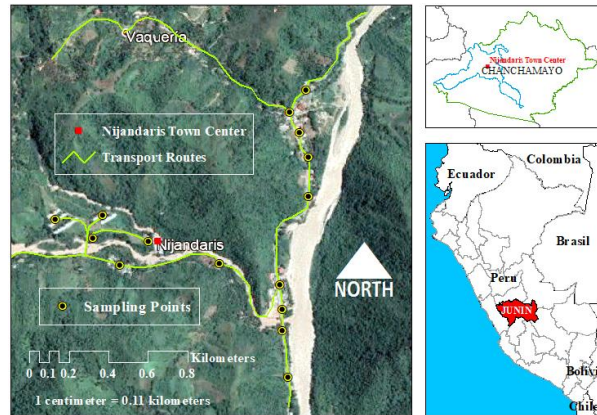


Fig. 1. Location of the inhabitants of the Nijandaris - Chanchamayo Source: author's own elaboration

Table 1. Survey of environmental attitude and affective, cognitive and conative dimensions

N°1. Questions	Answer		
	D	R	G
.01 The concern or interest for the environment is shown as an attitude in the Nijandaris - Chanchamayo Population Center.			
.02 Perceive positive environmental attitudes in the Nijandaris Population Center – Chanchamayo.			
.03 We should plant at least one tree in the Nijandaris Population Center – Chanchamayo.			
.04 Do you consider waste to everything that exists in a landfill.			
.05 Solid waste incineration harms the environment.			
.06 Excessive water pollution and sensitizes the population to value the water resource.			
.07 Only 2% of the water that exists in the earth's crust is used by humans.			
.08 Do you believe that the sources of water catchment are insufficient to guarantee the future availability of the resource.			
.09 The use of natural gas helps to avoid atmospheric pollution.			
.10 Waste pickers are aware of the economic value that garbage currently has.			
.11 The per capita production of solid waste is a function of the number of inhabitants of the city.			
.12 It is important to reforest to avoid soil erosion and to have an economic income.			
.13 I believe that there should be municipal policies on environmental education in the company.			
.14 Conferences on environmental attitudes and solid waste management should be held more frequently at the Nijandaris - Chanchamayo Village Center.			
.15 He welcomes the environmental awareness campaigns in the Nijandaris Town Center - Chanchamayo.			
.16 It will be a sustainable practice to reuse organic and inorganic solid waste in the Nijandaris - Chanchamayo Village Center.			
.17 The population growth rate influences sustainable development in the Nijandaris - Chanchamayo Population Center.			
.18 The entire population lacks real access to basic needs.			
.19 The per capita production of solid waste is a function of the number of inhabitants of the city.			
.20 Today, garbage has a significant economic value.			

Author's Own Source. The questions of [1-6] have an affective concept; [7-9,13-15 and 17] have a cognitive concept and [10-12,16 and 18-20] have a conative concept. Where: D: Deficient; R: Regular and G: Good.

Source own elaboration of the author

Table 2. Survey of natural resources and dimensions, fauna and flora, water and soil, and air

N°2. Questions	Answer		
	N	A	S
.01 Do you think climate change influences water quality?			
.02 Do you think that sustainable water quality can be achieved?			
.03 Do you think you can treat or purify contaminated water?			
.04 The Municipal Authority charges for the consumption of water use in the community.			
.05 Does the community participate in union programs for the environmental protection of water.			
.06 Someone in your household has received training on environmental issues, such as such as: Environmental problems; Soil, water and air pollution.			
.07 The municipality has had lawsuits or complaints from the community for soil contamination.			
.08 The district municipality has motivational and training programs on environmental issues, especially air protection.			
.09 I would like to take an active role in solving problems that cause air pollution.			
.10 I do not want to participate in protest activities against air pollution.			
.11 You are considered at risk from air pollution.			
.12 The municipality manages a system of environmental air management indicators.			
.13 He believes that the sector of the population most affected by air pollution are children between the ages of 6 and 12?			
.14 He believes that measures taken to reduce air pollution have not been successful?			
.15 He believes that the way things are going, within 10 years the flora and fauna will be extinct?			
.16 Do you think that predators such as hawks, crows, foxes, and wolves, which live off farmers' grain crops and poultry, should be eliminated.			
.17 Have you noticed any changes in the plants and animals compared to previous years in the community?			
.18 Do you know if the people in the area use wild plants and animals from the bush?			
.19 In your opinion, is it necessary to protect biodiversity?			
.20 The consumption habits of society, do they influence the loss of biodiversity?			

Source Own Elaboration of the Author. Questions [1-7] have the concept of soil and water; [8-14] present the concept of air; and [15-20] has the idea of the concept flora and fauna. Where: N: Never; A: Sometimes and S: Always. Source own elaboration of the author

Where:

N: population level [age 30 - 60 years] = 57.
 Z: confidence level [95%=1.96].
 e: margin of error [5%=0.05].
 p: estimate of the proportion [90%=09].
 n: probability sampling = 50 persons

C. Survey model

The survey model directly targeted the adult population of Nijandaris. Two survey models were elaborated; the first survey is oriented to evaluate the environmental attitude in its respective dimensions [cognitive=7, affective=6 and conative=7] equal to 20 items and the second survey model is directed to the

conservation of natural resources [flora and fauna=7, water and soil=6 and air=7] equal to 20 items, elaborating a total of 50 replicates.

D. Validity of the instrument, relationship coefficient and significance test.

The Rensis Likert scale [31,32] was used to measure the environmental attitude and the conservation of natural resources in the adult population of Nijandaris between the ages of [30 - 60 years]. For environmental attitude 3 items with different answers [deficient, regular and good] were used and for resource conservation 3 items with different answers [never, sometimes and always] were also used [30–32]. To estimate the relationship coefficient between both

variables the Karl Pearson correlation was used, where its interpretation is classic and known [$r=0$ no relationship/ $r\neq 0$; $r=\pm$ relationship exists], and the confirmation of the relationship between both was used the William Sealy Gosset significance hypothesis test; where if calculated t-student > tabulated t-student, at a significance level of 0.05 bilateral, it confirms the relationship that exists between environmental attitude and natural resources.

3. RESULTS AND DISCUSSION

A. Current status of environmental attitude and conservation of natural resources of the adult population in Nijandaris.

The inhabitants of Nijandaris express their environmental attitude and conservation of natural resources according to their opinion. This opinion is limited by three different answers; deficient, regular and good, as well as by performing it, never, sometimes or always; which is observed in Fig. 2. It has been observed that the inhabitants have more reoccupation of natural resources almost always with 46.7% than almost never with 16.1%, this is reflected in their environmental attitude (Fig. 2B). The 55.1% of the inhabitants have a good environmental attitude, as opposed to a poor attitude with 11.7% (Fig. 2A).

Obtaining data from other investigations can notice in the research of Kaiser [7] presented to have more responsibility to conserve natural

resources with a total of [76% - 94%] and have an environmental attitude of [45% - 50%], these data are higher than the work done in Nijandaris, since not all people share the same idea and also that in different places natural resources are limited; on the other hand Popradit [19] in Thailand claim that the responsibility of conserving resources is more of governmental and political programs, rather than the inhabitants themselves; as their results and responses were much lower than the inhabitants of Nijandaris with 12.3%; and this happened quite the opposite in the work done by Mowo [8] in rural highland residents in East Africa, where they manage natural resources with an environmental behavior and attitude towards the future, and this idea has to reach the inhabitants of Nijandaris.

Research conducted by Byrka [16] in Germany, Booi Chen and Teck Chai [23] in Malaysia and Sonja [33] in Argentina express their idea in different opinions, although reaching the same conclusion, where definitely the attitude, behavior and culture of a person influence the conservation of the environment and natural resources. Also at the local and national level we can also affirm it research conducted by Portal [29] in Jesús María - Lima, where he individualizes the conative attitude with a total of [70% - 44%] when conserving the environment, since this value is extremely higher when presenting a conative attitude of the inhabitants of Nijandaris. Not much difference has been seen in the research conducted by Arteaga [28]

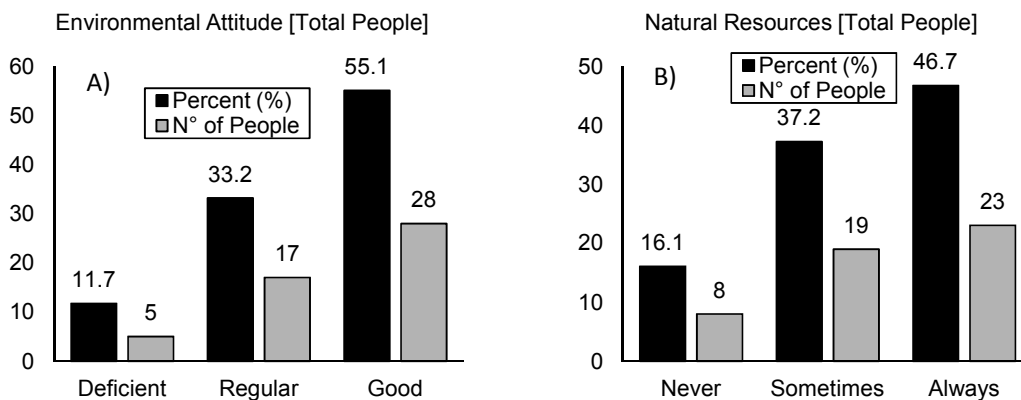


Fig. 2. Statistical bar diagram: environmental attitude and natural resources; total people surveyed and percentage

Note: the figure, a) represents the environmental attitude in its deficient, regular and good states; while figure b) represents the conservation of natural resources in their state never, sometimes and always; of the adult population [30 - 60 years] in the Nijandaris Populated Center.

in Huancayo and Solis [13], where the conative attitude of students is [45.3% - 44%] surveyed in Nijandaris. The inhabitants of Pilcomayo present the same idea with a percentage of [41.08% - 44%], it should be emphasized that this survey is conducted to students of a school and not to older people, although in the district of Pilcomayo of Huancayo we cannot affirm the age that was surveyed, since the survey applied in Nijandaris precisely in age of [30 - 60 years], but even so, both share the same idea of conserving the natural resource not only of the air but of the whole environment to take advantage of them in a sustainable way.

B. Dimensional analysis of environmental attitudes and natural resources

At dimensional level, the inhabitant's express different opinions to conserve the environment from an environmental attitudinal perspective. In Fig. (3a) the dimension of environmental attitude of the inhabitants of Nijandaris is observed, they present a good affective attitude with 66.33%, as they also present a good cognitive attitude with 56.57% and a good conative attitude with 44%; as for a deficient attitude they did not exceed 20% speaking [6% - 14.86%]. In Fig. (3B) it has been observed that there is a similar purpose to conserve resources such as flora, fauna, and air always [50.33% - 49.72%, respectively]; as for conserves soil and water it has been observed that there is a

similarity for always and sometimes conserve with a total [41.42% - 40.57%]; while the inhabitants that never conserve natural resources, the value does not exceed 20%.

While Cobbinah [17] in Ghana, mentioned that country has a better concern to conserve natural resources in order to generate better jobs, income and participation of the inhabitants for a good sustainable management of natural resources and with a positive environmental attitude. Therefore, this idea has to teach Peru and the inhabitants of Nijandaris that having a better concern for the conservation of the natural resource and environmental attitude would help the development of the community and the district of Chanchamayo. Another research at national level that approaches to conserve the soil and water resource is dictated by Cabana [34] where he explains that if we manage environmental services such as water and soil would help to conserve the environment and have a better environmental attitude and behavior. As well as the concept of Condori [20] where he expresses his concern of resources for the conservation of the environment with the participation of the people around him and that this can start from a student education, which we take note of this term since not only should apply in adults if not also to primary and secondary of Nijandaris, in order to educate the new minds of tomorrow.

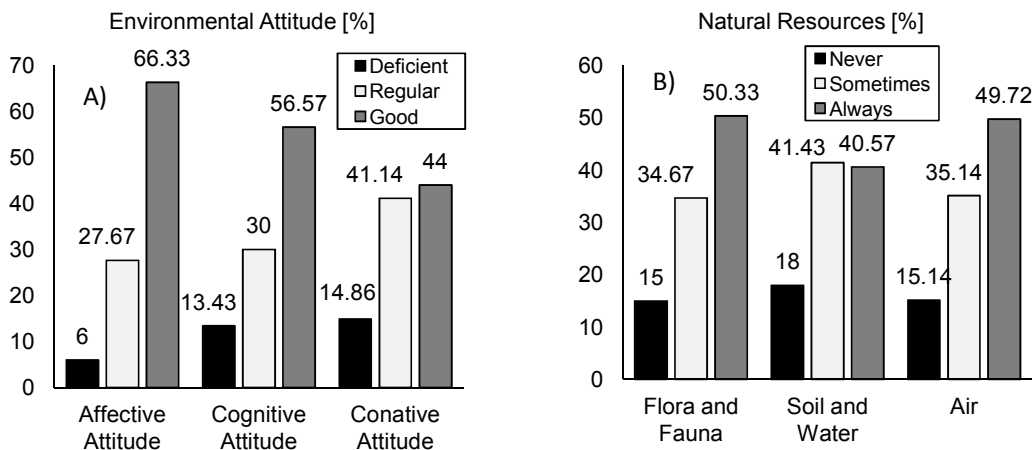


Fig. 3. Statistical bar diagram: affective, cognitive and conative attitude / flora, fauna, water, soil and air resources

Note: the figure, a) represents the environmental attitude in its deficient, regular and good states; while figure b) represents the conservation of natural resources in their state never, sometimes and always; of the adult population [30 - 60 years] in the Nijandaris Populated Center

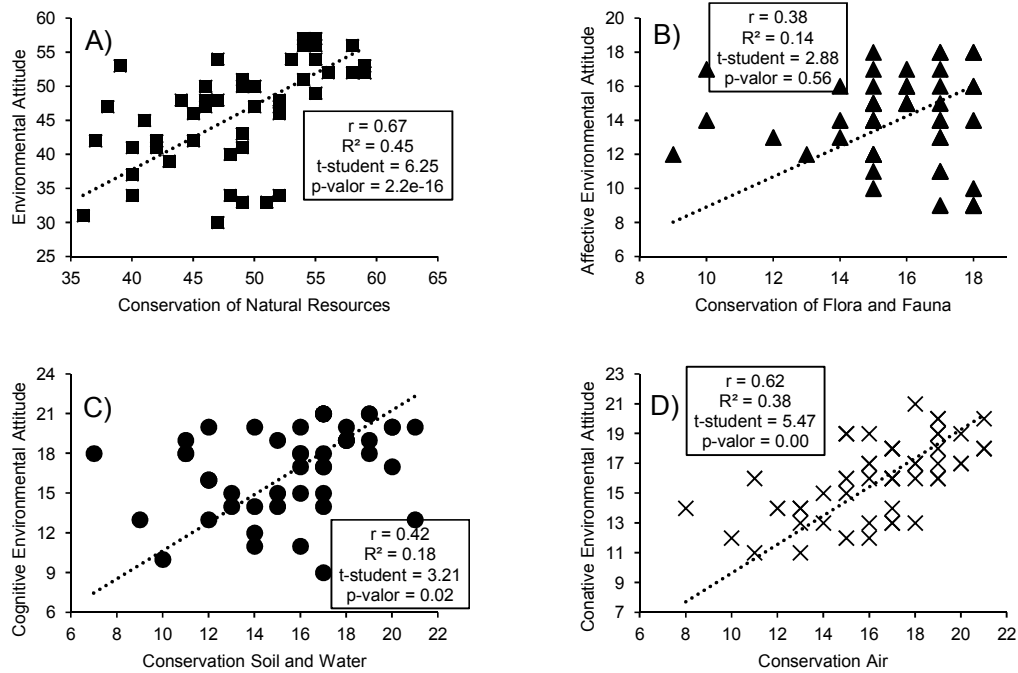


Fig. 4. Data dispersion and normal distribution line: environmental attitude and natural resources

Note: The general relationship between environmental attitude and natural resources a) $r = 0.67$, $t\text{-student} = 6.25$; the relationship between the affective attitude vs conserves the flora and fauna resource b) obtained $r = 0.38$, $t\text{-student} = 2.88$; on the other hand, a cognitive attitude vs conserves the water and soil resource c) presented $r = 0.42$, $t\text{-student} = 3.21$, and, finally, a conative attitude conserves air d) presented $r = 0.62$, $t\text{-student} = 5.47$

C. Relationship analysis and test

It has been observed that in order to conserve natural resources it is very important to know what relationship presents the environmental attitude of the inhabitants of Nijandaris, which through its dimensions can be checked and affirmed the importance of both concepts. An environmental attitude is directly related to the conservation of natural resources and can be demonstrated in Fig. (4a); the relationship that has both means that as the resources are deteriorated or scarce, there will be greater attitudinal importance on the part of the adult population of Nijandaris; while its dimensions can be expressed in the same way.

Research done by Booi Chen and Teck Chai [23] in Malaysian University where obtained a ratio greater [$r=0.71 > r=0.67$] unlike Nijandaris; this may be because they present better environmental issues towards the conservation of resources and have a better attitude; at the national level we found one relationships, where

Condori [20] in the city of Juliaca obtained a relationship coefficient [$r=0.32 < r=0.67$] higher than Nijandaris, this tells us that the city of Juliaca do not present an environmental attitude towards the conservation of natural resources how do they do it the inhabitants of Nijandaris; and finally, we can find another relationship difference made by Solis [13] in the inhabitants of Pilcomayo where their relationship is [$r=0.42 < r=0.67$] in Nijandaris, as also stated by Condori [20].

Unfortunately, it does not exist at international and local level, between the affective environmental attitude and the conservation of the flora and fauna resource; but if we can deduce in the following investigations as mentioned by Berroa and Roth [15] where to affirm that the relationship between the attitude has no importance relatively speaking towards the conservation of the environment is to be negative; which we do not share this statement since when mentioning the environment or environmental is encompassing the resources

that integrate the environmental and social economic development of every inhabitant of the place where he lives; Byrka [16] where he mentions that the environmental attitudinal ecological behavior is extremely important for the conservation of resources and that this should be applied from the environmental psychological restoration; which we rescue this concept spoken by Byrka [16], since if this starts from the environmental psychological perspective, it would help not only the adult population to conserve natural resources but also the young people living in the Nijandaris Village Center; Lopez [18] also shares this opinion since Texas students present more concern towards natural resources and not their attitude, since if it starts from cultururation, it would no longer be necessary to have an attitude to conserve flora and fauna but the entire environment; on the other hand; as also stated by Popradit [19], Booi Chen and Teck Chai [23] where they express more concern towards the conservation of forests in Thailand and Malaysia, this is definitely an announcement for the inhabitants of Chanchamayo not only for the Nijandaris Village Center. At the national level we only found comments on the conservation of the minimum natural resource, not very in depth as mentioned by Portal [29] in Lima, Arteaga [28] Huancayo, Cabana [34] in Cercado de Lima and Condori [20] in Juliaca; where to affirm that if there is at least a concern for natural resources in relation to the environmental attitude of the inhabitants and this can be a start not only for the inhabitants of Nijandaris but also for the whole of Peru.

4. CONCLUSION

The adult population of [30 - 60 years] in Nijandaris Population Center has an environmental attitude of 11.7% poor, 3.2% regular and 55.1% good; in the conservation of natural resources, 16.1% never do it, 37.2% sometimes and 46.7% always. The coefficient of relationship between environmental attitude and natural resources is $r=0.67$ positive considerable and t -student = 6.25 calculated > t -student 1.98 tabulated; for its part in its dimensions: between the cognitive attitude vs conserving water and soil obtained $r=0.42$ positive median and t -student = 3.21 calculated; in the affective attitude vs conserving flora and fauna obtained a $r=0.38$ positive medians with t -student = 2.88; and, finally, the relationship between the conative attitude vs conserving the air obtained a considerable positive $r=0.42$ with t -student = 5.47; therefore, all confirmed that there is a

relationship between the environmental attitude and conserving natural resources in the Nijandaris Village Center. It is recommended to educate and deepen more on the topics of cognitive, affective and conative environmental attitudes and that these terms influence the conservation of natural resources and other environmental areas in particular; representing very important for the economic and demographic development towards sustainable development in the inhabitants of the Nijandaris Village Center. Encourage more people of Nijandaris to conserve the natural resources that present their locality as flora, wildlife, water, soil and air, since there are national companies that extract these resources without any benefit for them, as this can cause deterioration and / or extinction, causing ecological and economic damage in the future; conduct research improving and comparing the same study according to age and sex, as there may be significant differences according to these two characteristics in environmental attitudes to conserve natural resources.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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