

New Ecological Paradigm: Item Validity and Its Refinement Based on Local Indigenous of Manggaraian Culture

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Abstract: *New Ecological Paradigm (NEP) is an instrument developed by Dunlap and Van Liere to measure attitudes, beliefs, values and worldviews that people have in relation to the environment. Although it has been widely used, criticism to the use of NEP is unavoidable. One of the most important criticisms is "can NEP be used outside the context of western culture? This study aims to validate the use of NEP in the Manggarai indigenous people and revise the NEP by incorporating elements of the local wisdom of the Manggarai indigenous people. This research uses quantitative and qualitative approaches. Forum Group Discussion and interviews with traditional leaders were used to obtain qualitative data, while Confirmatory Factor Analysis (CFA) was used to analyze each item of NEP items. The samples in this study were 120 Manggarai people with different ages and education backgrounds. The results showed that the environmental views of manggaraian were present, which were affected by culture, but unfortunately they were not strong as indicated by the size alpha which is only 0.658. Nonetheless, the results of this study also has shown that even though NEP has been translated into a variety of language, it is still can be used as a means for analyzing of people's environmental views.*

Keywords: NEP, item analysis, reproducibility of NEP, Local Indigenous

1. Introduction

Since the end of the 20th century, some values, attitudes, and beliefs that have developed in society are believed and widely accepted as sources of ecological problems. This happens as a result of the development of science and technology that makes it easier for humans to use and process natural products to fulfill their daily needs. Psychological, sociological, economic, and technological factors forming the pattern of consumption behavior and lifestyle of every person [1] believed to be the reason for the lack of attention and human concern for the environmental degradation predicament.

The first celebration of Earth Day in 1970 became the pioneer of the birth of modern understanding about the importance of the environment to guarantee human existence. Experts such as Rachel Carson who paid more attention to the dangers of excessive use of pesticides, overpopulation, nuclear experiments, and smoke pollution produced by factories in urban vicinities encouraged governments and NGOs to reconsider the impact of each activity carried out on the environment [2].

Treating the environment as a social construct of every action taken by the society, results in a shift of perspective that influences human-nature relations from the Dominant Social Paradigm (DSP) which is anthropocentric towards a paradigm of relations that is more ecocentric or in harmony with nature. Actually, both anthropocentric and ecocentric aimed at ensuring human welfare. However, the DSP's orientation in improving the quality of life and human welfare is done by exploiting natural products to the greatest extent. While the ecocentric paradigm on the contrary argues that the welfare and quality of human life will increase if

humans are able to guarantee the sustainability of supporting the environment or in other words human life on earth is also influenced by the conditions of the biotic environment [3].

In this context of greater environmental awareness, Dunlap and Van Liere (1978) developed the New Ecological Paradigm scale (NEP) which assesses attitudes, beliefs, values and worldviews that people have in relation to the environment by paying attention to the carrying capacity of the environment which is based on awareness of growth's limitations, anti-anthropocentrism, rejection of human freedom in exploiting nature, fragility to the balance of nature and the possibility of an ecological crisis [4].

At first, the dimensions of NEP proposed by Dunlap and Van Liere in measuring one's paradigm of nature were limited to three dimensions, namely: limit to growth, anti-anthropocentrism, and fragility of the balance of nature. The philosophy is to take into account the possibility of growing in numbers or not, taking into account the limited resources in the world. The second is based on credence of people about their place in the world, their rights, their qualities and their relationships with other species. Finally, the last includes ideas about the capacity to resist and regenerate modifications and abuses of human beings. Later, in order to accurate the validity of problems, researchers added two dimensions: rejection of exceptionalism, which involves the belief that human beings are exempt from the nature of laws and knowledge can change any environmental situation; and the ecocrisis, which focuses on the idea that environmental disasters are caused by human intervention [5].

For more than three decades NEP has become the most widely used quantifying devices by experts for quantitative measurement in predicting one's environmental concerns in the context of formal education [6]. NEP is also used to

compare environmental perspectives between students in developed countries and students in developing countries [7]. Testing of the reliability of each NEP dimension was also carried out by Erdogan, et al. [8] Thus the revision of NEP by adjusting to its users as done by Manoli, et al. [9] who revised NEP for elementary school students or conducted by Kopnina (2011) who revised NEP with a qualitative approach to determine children's environmental knowledge at elementary school and kindergarten [10].

Although the use of NEP has been carried out extensively throughout the world and testing of its reliability has been carried out globally, nonetheless the use of NEP is inseparable from criticism. The most fundamental criticism of NEP is whether NEP can be used to find out the environmental paradigm of someone in another area other than America which is the place for developing the scale of measurement by Dunlap and Van Liere? [11]. In addition, another question is whether NEP can be used to measure the paradigm of indigenous people's environments, whose daily lives and actions are influenced by the cultural values inherent in them?

These criticisms are in line with those delivered by Nordlund and Garvill who explained that the environmental values adopted by an individual, in this case both anthropocentric and ecocentric, are also influenced by the culture that forms the individual [12]. In the context of culture, indigenous people with their local knowledge have a role in cultivating and managing natural resources. Local knowledge possessed by indigenous people in managing nature is not only a documented knowledge, but local knowledge is integrated with the joints of the life of indigenous people who understand the culture.

Environmental preservation based on local wisdom are very different from environmental conservation based on modern knowledge. In modern science, environmental conservation efforts are always associated with logical things while conservation efforts based on local wisdom are based on hereditary knowledge inherited from ancestors which are sometimes still related to mystical and magical things [13]

The main objective of this research is to validate the use of NEP in measuring the peoples environmental paradigm in a cultural context outside western culture, in this case is the culture of the Manggarai Indigenous People, East Nusa Tenggara, Indonesia. This research focuses on improving NEP by incorporating the values of the local wisdom of the community, especially the Manggarai indigenous people. Through this research an understanding of the way of people's thinking with different cultural backgrounds from western culture towards nature can be understood and as much as possible adopted in any environmental conservation effort.

2. Methods of Data Collection

2.1 Participants

Sample in this study was taken using simple random sampling technique. The number of samples in the study amounted to 120 people aged 19 - 64 years (M = 33.8, SD = 10.57) with different levels of education (42.50% not completing elementary school, 25.83% Primary School graduates, 18,33% of junior high school graduates, and 13.33% of senior high school graduates).

2.2 Instruments

This study uses two instruments, 1) the New Ecological Paradigm instrument developed by Dunlap et al. (2000). The English version has been translated into Bahasa Indonesia by specialist as accurate as possible and then modified according to the level of knowledge of the manggarai indigenous people. 2) NEP instruments that have been modified by incorporating local wisdom values of the manggarai indigenous people. Both of the instruments were scored on 5 point of Likert scales (1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree 5 = strongly agree).

2.3 Data Analysis

The version of the scale is then tested to 120 people. The participants were notified in writing and explained verbally about the purpose of this study. The collected data is then analyzed quantitatively using Confirmatory Factor Analysis (CFA) with the help of SPSS v.16 data processing software to validate and find statements that are irrelevant and must be corrected in measuring the environmental paradigm of the Manggarai indigenous people.

Furthermore, qualitative data was collected by conducting a Focus Group Discussion with indigenous elders and people who understood the Manggarai custom to modify the statements in the NEP instrument by incorporating the values of the local wisdom of the Manggarai indigenous people.

3. Result and Discussion

3.1 Preliminary Analysis of The Case

The Indonesian version of the scale which has been tested, then analyzed descriptively to find the adequacy of the data. Based on the results of the analysis (table 1), it can be seen that the NEP data to be analyzed fulfilled the adequacy of the data marked by the value of skewness and kurtosis all below two.

The same data is then validated using CFA. The calculation results show the value of KMO (Kaiser-Meyer-Olkin) from the data to be validated at 0.560 (table 2) and the number of factors formed with eigenvalues > 1.00 as many as 6 factors with the percentage of total diversity capable of being explained by the factors formed this is 58.793%. (table 3).

Table 1: Descriptive Statistics Of New Ecological Paradigms

	N	Mean	Std. Deviation	Skewness	Kurtosis
1 We are approaching the limit of the number of people the earth can support	120	3.64	1.027	-.508	-.523
2 Humans have the right to modify the natural environment to suit their needs	120	3.34	1.220	-.430	-.736
3 When humans interfere with nature it often produces disastrous consequences	120	2.53	.952	.230	-.682
4 Human ingenuity will insure that we do not make the earth unlivable	120	2.61	1.392	.181	-1.515
5 Humans are severely abusing the environment	120	3.31	1.098	-.408	-.709
6 The earth has plenty of natural resources if we just learn how to develop them	120	2.35	1.179	.570	-.715
7 Plants and animals have as much right as humans to exist	120	4.07	.590	-.263	.895
8 The balance of nature is strong enough to cope with the impacts of modern industrial nations	120	4.06	1.169	-1.367	1.086
9 Despite our special abilities humans are still subject to the laws of nature	120	2.98	1.205	.078	-.993
10 The so-called 'ecological crisis' facing humankind has been greatly exaggerated	120	3.52	1.092	-.577	-.494
11 The earth is like a spaceship with very limited room and resources	120	3.60	1.279	-.557	-.909
12 Humans were meant to rule over the rest of nature	120	3.79	1.099	-.965	.326
13 The balance of nature is very delicate and easily upset	120	3.89	1.389	-1.219	.117
14 Humans will eventually learn enough about how nature works to be able to control it	120	3.43	1.150	-.252	-.909
15 If things continue on their present course, we will soon experience a major ecological catastrophe	120	4.22	.676	-.292	-.809

Table 2: KMO and Bartlett's Test of NEP

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.560
Bartlett's Test of Sphericity	Approx. Chi-Square	167.737
	Df	105
	Sig.	.000

Table 3: Total Variance Explained of NEP

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.053	13.686	13.686	2.053	13.686	13.686	1.792	11.947	11.947
2	1.716	11.441	25.127	1.716	11.441	25.127	1.537	10.245	22.193
3	1.474	9.826	34.953	1.474	9.826	34.953	1.505	10.032	32.224
4	1.316	8.776	43.729	1.316	8.776	43.729	1.44	9.598	41.822
5	1.21	8.069	51.798	1.21	8.069	51.798	1.281	8.537	50.36
6	1.049	6.995	58.793	1.049	6.995	58.793	1.265	8.433	58.793
7	0.982	6.544	65.337						
8	0.881	5.873	71.211						
9	0.806	5.375	76.586						
10	0.699	4.659	81.245						
11	0.68	4.53	85.775						
12	0.623	4.151	89.926						
13	0.55	3.669	93.595						
14	0.494	3.292	96.887						
15	0.467	3.113	100						

Extraction Method: Principal Component Analysis.

The correlation between each variable analyzed in the factors formed (loading factor) after rotation shows that there is 1 item (item 7) that gets a factor loading <0.30 (table 4) and therefore must be omitted [13]. In addition to Item_7 there are three other factors that obtain a factor loading > 0.30 on two components (items 2, 12 and 15) (table 4), all of these three factors must be omitted too and not to be used in measuring peoples NEP.

Based on this result, a re-analysis of NEP data is carried out. After a re-analysis, the final results shows the value of KMO

= 0.580, factors formed amounted to five factors with a total diversity that can be explained by 61.991% and the overall factors formed get a factor loading > 0.30. However, the reliability of the 11 items left after being evaluated using Cronbach Alpha was at a low level of 0.236 and did not meet the acceptable criteria for data reliability threshold of 0.6. Therefore, this instrument cannot be used to measure the NEP of the Manggarai indigenous people and hence needs to be revised.

Table 4: Rotated Component Matrix

	Component					
	1	2	3	4	5	6
Item_1	.004	.027	.211	.771	-.224	-.045
Item_2	.064	.645	.369	.048	-.195	-.121
Item_3	-.260	.526	.260	.126	.103	.417
Item_4	.178	.510	.058	.039	-.047	-.070
Item_5	-.448	.106	-.110	.484	.009	.286
Item_6	-.577	.059	-.088	.393	.197	-.025
Item_7	-.143	.096	.227	-.593	-.326	-.022
Item_8	-.203	.016	.691	.101	.216	.145
Item_9	.708	.193	-.082	.002	.113	.136
Item_10	-.005	.034	.011	.003	.827	-.114
Item_11	.747	.028	-.094	.178	.038	-.058
Item_12	.167	-.174	.418	-.043	.464	.442
Item_13	.040	.139	.645	-.105	-.134	-.146
Item_14	-.058	.686	-.301	-.172	.205	.132
Item_15	-.049	.012	.080	-.014	.121	-.835
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 11 iterations.						

3.2 Development of NEP Instruments Based on Local Wisdom of the Manggarai Indigenous Peoples

Focus Group Discussion (FGD) was conducted by inviting customary elders and people who understood Manggarai customs to be able to revise the NEP instrument by incorporating local wisdom values of Manggarai culture. The revised instrument focused on 11 NEP items that were previously validated. The results of the FGD found that there were several NEP items proposed by Dunlap and Van Liere that were not in accordance with the habits and values

adopted by the indigenous people of Manggarai (items 1 and 11). In addition to the incompatibility of some NEP items, it needs to be revised by including local expressions so that they can be easily understood by the manggarai indigenous people (items 3, 4, 9 and 13).

The following are some descriptions of the results of the FGD relating to the cultural wisdom of the Manggarai indigenous people that will be used to revise the NEP:

Table 5: Cultural Items That Will Be Used to Develop NEP Based on Manggarai Local Wisdom

Item NEP	The Concept of Manggaraian Local Wisdom
Item 1 dan 11	This item is not in accordance with the concept of the manggarai indigenous people about obtaining offspring which are manifested in the following traditional expressions: 1. <i>Eme wakaks betong asa, manga waken nipu tae, eme muntung pu'u gurung, manga wungkutn te ludung</i> (if the old bamboo dies and the young bamboo will take place). 2. <i>Ra'ok lobo sapo, renek lobo kecep. Borek cala bocel, ta'i cala wa'i</i> (Sit together and line up around the fire stove like a pot cover. Defecate about the calves and feet).
Item 3, 4, 9 and 13	This item needs to be revised by including local phrases for easier understanding. The phrase is: 1. <i>...neka pokas puar agu neka tapa satar, boto toe do'ongs poco agu toe kukut's lus agu gak's tana</i> (don't deforest the forest and don't burn the land too, so there are no landslides and split lands). 2. <i>...neka pokas po'ong rantang toe mboas wae woang, toe kembus wae teku...</i> (do not shave the forest so the springs do not stop flowing).
Item 5, 6 dan 10	This item needs to be revised by incorporating elements of local wisdom that are manifest in <i>nunduk</i> (traditional tales) as follows: 1. <i>Nunduk Watu Paung</i> (a story that teaches not to be greedy in using water and its contents so as not to get bad luck or be cursed into stone). 2. <i>Kisah Melombong</i> (a story that teaches the importance of respecting others as god's creature) 3. <i>Rudak (ngelong)</i> (sickness or disease caused by injuring nature and spirit)
Item 8 dan 14	This item needs to be revised by incorporating elements of local wisdom that are manifested in <i>nunduk</i> (traditional tales) <i>Ninik riti run hi empo</i> (a story that tells people's origin)

Based on the description of the local wisdom of the manggarai indigenous people, the author together with the traditional elders then revised the NEP instrument by reformulating the statements on some items that were

difficult to understand by including the expressions of the Manggarai local culture. The results of the revision of the NEP instrument developed by the author together with the traditional elders (table 6) were re-piloted to the Manggarai

community. Results show that the mean value of the revised NEP instrument (table 7) is higher compared to the items in table 1. Likewise with the reliability coefficient, after being

evaluated with Alpha Cronbach, the internal consistency of the revised NEP instrument reached 0.658 and met the threshold.

Table 6: Revised NEP With Local Wisdom of Manggaraian Culture

1	Our <i>lingko</i> is getting smaller because we are approaching the limit of the number of people the earth can support
3	When humans interfere with nature like the story of <i>Melombong</i> it often produces disastrous consequences
4	The story of <i>nunduk watu pa'ung</i> tells us that what we do, will insure make the earth unlivable
5	Humans are severely abusing the environment like the greedy of <i>Melombong</i>
6	The earth has plenty of natural resources if we just learn how to develop them
8	We don't have to do <i>ritong</i> , because nature is strong enough to cope with the impacts of modern industrial nations
9	The ceremony of <i>rudak</i> signifies that despite our special abilities humans are still subject to the laws of nature
10	The so-called 'ecological crisis' facing humankind has been greatly exaggerated
11	What is delivered in <i>neka pokas po'ong rantang toe mboas wae woang, toe kembus wae teku</i> indicates that the earth has very limited room and resources
13	The balance of nature is very delicate and easily upset like what it said in <i>neka pokas puar agu neka tapa satar, boto toe do'ongs poco agu toe kukut's lus agu gak's tana</i>
14	Humans will eventually learn enough about how nature works to be able to control it

Table 7: Descriptive Statistics of Revised NEP With Local Wisdom of Manggaraian Culture

		N	Mean	Std. Deviation	Skewness	Curtosis
1	Our <i>lingko</i> is getting smaller because we are approaching the limit of the number of people the earth can support	120	4.39	.725	-1.159	1.320
3	When humans interfere with nature like the story of <i>Melombong</i> it often produces disastrous consequences	120	4.38	.611	-.442	-.638
4	The story of <i>nunduk watu pa'ung</i> tells us that what we do, will insure make the earth unlivable	120	4.49	.622	-.822	-.313
5	Humans are severely abusing the environment like the greedy of <i>Melombong</i>	120	3.20	.975	-.303	.175
6	The earth has plenty of natural resources if we just learn how to develop them	120	4.47	.607	-.672	-.485
8	We don't have to do <i>ritong</i> , because nature is strong enough to cope with the impacts of modern industrial nations	120	4.52	.579	-.758	-.402
9	The ceremony of <i>rudak</i> signifies that despite our special abilities humans are still subject to the laws of nature	120	4.68	.534	-1.453	1.210
10	The so-called 'ecological crisis' facing humankind has been greatly exaggerated	120	4.70	.528	-1.559	1.561
11	What is delivered in <i>neka pokas po'ong rantang toe mboas wae woang, toe kembus wae teku</i> indicates that the earth has very limited room and resources	120	4.54	.533	-.507	-1.034
13	The balance of nature is very delicate and easily upset like what it said in <i>neka pokas puar agu neka tapa satar, boto toe do'ongs poco agu toe kukut's lus agu gak's tana</i>	120	4.43	.514	.084	-1.559
14	Humans will eventually learn enough about how nature works to be able to control it	120	4.51	.550	-.496	-.874

4. Conclusions

Based on the description of the results, it can be concluded that the criticism of the NEP as stated by Anderson proved to be true. Although the NEP instruments developed by Dunlap and Van Liere still can be used to measure the paradigm and knowledge of one's environment including the indigenous people of manggarai, but by incorporating elements of local culture, the instrument can measure more accurately the environmental paradigm of the community, especially the manggarai indigenous people.

This study found that the environmental views of the manggarai were present, which is more likely affected by its culture, but unfortunately they were not strong and this has predicted by Denis & Pereira (2014), they mentioned that outside the United States, the applying of NEP scale should be used carefully since alpha levels are rather low [14].

Even though the results of this study show that scale can still be used to assess peoples attitudes, beliefs, values and

worldviews in relation to the environment and this is in accordance with what Cordano, et.al (2010) stated that NEP can be used as a durable tool for analysis even when it is translated into new languages than English. Author realizes that the results of this study still have deficiencies and errors, because of that constructive suggestions and criticisms for the improvement and refinement of further research is expected.

5. Acknowledgement

Sincerelly thanks to The Ministry of Research, Technology and Higher Education of The Republic of Indonesia which has funded this research under contract number 0635/K8/KM/2018, 3 January 2018.

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