



Application of the Plithogenic IADOV Approach to Evaluate Satisfaction with the Implementation of Indigenous Rights

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Abstract. The present study addresses a crucial challenge in the evaluation of complex systems: the need to incorporate a holistic view that contemplates not only defined elements but also those that are intrinsically ambiguous or uncertain. The research focuses on the application of the Plithogenic IADOV approach, a model based on neutrosophic logic, to overcome the limitations of traditional methodologies that often fall short when addressing phenomena containing contradictory or unknown dimensions. In the existing literature, despite the wealth of approaches used for the evaluation of systems, there is a perceived lack of methodologies that effectively manage the indeterminacy inherent in many evaluation processes. This study seeks to fill that gap, proposing a method that expands the boundaries of analysis by integrating aspects of uncertainty that have commonly been ignored. The methodology employed is based on the implementation of the Plithogenic IADOV model, which merges neutrosophic analysis techniques with dynamic evaluation tools, allowing for more complete and accurate results in highly complex contexts. Through this application, the results obtained not only provide a clearer view of the elements evaluated but also allow identifying areas for improvement that other approaches would not have detected. The contribution of this study is twofold: first, it offers a new tool for the evaluation of complex systems, capable of effectively handling ambiguity; and second, it provides practical applications that can be implemented in various fields, from business management to public policy. Thus, this approach not only offers a richer theoretical view but also provides tangible solutions for making informed decisions in uncertain scenarios.

Keywords: IADOV Plithogenic, neutrosophic logic, evaluation, complex systems, indeterminacy, ambiguity, uncertainty, traditional models, neutrosophic analysis, methodology, dynamic evaluation.

1. Introduction

Ecuador is distinguished by its rich cultural and ethnic diversity, where Indigenous peoples play an essential role in its history, society, traditions and ancestral knowledge [1]. The indigenous legal worldview, which delves into its connection with the land and nature, contrasts with the Western perspective. Thus, it offers a unique vision of justice and law based on its understanding of the cosmos and life.

Historically, Ecuadorian indigenous peoples have maintained their legal systems in the face of injustices caused by the usurpation of their lands and resources [3]. Despite this, they have fought for the recognition of their customary law and legal practices [4,16], which vary among different ethnic groups, reflecting the cultural plurality of the country. This struggle has led to important constitutional reforms and international recognition of their rights [5], evidencing progress towards justice and equity in multicultural societies.

The 2008 Constitution marked a milestone by promoting plurinationality and Buen Vivir, principles that seek to harmonize the relationship between human beings and nature [6,17]. This approach has made it possible to strengthen indigenous collective rights, ensuring their participation in the

management of natural resources and the exercise of their legal traditions within a framework of respect and collaboration with the state judicial system.

However, there are challenges in the implementation of these rights [7], especially concerning the exercise of the executive, legislative, and jurisdictional powers of indigenous communities [8]. These tensions between constitutional theory and everyday practice motivate the present study, which seeks to evaluate the satisfaction of the Indigenous communities of Ambato regarding the exercise of their executive, legislative and jurisdictional powers through a plithogenic analysis. Among the specific objectives to be developed:

- Analyze the challenges in the effective implementation of legally recognized indigenous rights based on the IADOV Plithogenic analysis.
- To examine the perceptions of Indigenous communities regarding the exercise of their executive, legislative and jurisdictional powers.
- Evaluate the participation, consultation and representation of Indigenous communities in decision-making processes at the legislative and executive levels, through the plithogenic integration of the coherences and inconsistencies of said processes.
- Propose solutions based on plithogenic analysis to improve the implementation of Indigenous rights in Ecuador.

2. Related work.

2.1. Plithogenic environment

The study uses the IADOV Plithogenic method to analyze the diversity and complexity of perceptions of indigenous communities in Ambato, Ecuador, regarding their rights and legal practices. This innovative approach highlights how the interaction between ancestral worldviews and the current legal system influences community satisfaction and underlines the need for inclusive approaches that harmonize cultural plurality with indigenous justice.

Mathematical modeling through neutrosophic logic to plithogenic logic is a methodology that focuses on including indeterminacy and contradiction in the evaluation of sets and systems. Plithogenic logic has the following characteristics:

1. Neutrosophic sets: These sets allow quantifying indeterminacy (I) through a third parameter, in addition to true membership (T) and false membership (F) [9]. The values of T, I and F are independent, and their total sum is between 0 and 3 [10,18].
2. Membership functions: Within a universe of discourse U , a Neutrosophic Set (NS) is defined by three functions: $u_A(x), r_A(x), v_A(x) : X \rightarrow]0-, 1 + [$ which satisfy the condition $0 \leq -\inf u_A(x) + \inf r_A(x) + \inf v_A(x) \leq \sup u_A(x) + \sup r_A(x) + \sup v_A(x) \leq 3$ +for all $x \in X$. $u_A(x), r_A(x), v_A(x)$ are the truth, indeterminacy and falsity membership functions of x in A , respectively, and their images are standard or nonstandard subsets of $]0-, 1 + [$.
3. Plithogeny: Represents the creation and evolution of entities from dynamics and fusions of previous entities that may be contradictory, neutral or non-contradictory [11, 12]. It seeks the unification and connection of theories and ideas in different scientific fields.
4. plithogenic: an extension of the classical, fuzzy, intuitionistic fuzzy and neutrosophic sets. A plithogenic set (P, a, V, d, c) :
 - a) Where "P" is a set, "a" is an attribute (usually multidimensional), "V" is the range of attribute values, "d" is the membership degree of the attribute value of each element x to the set P for some given criteria ($x \in P$), and "d" represents " d_F ", or " d_{IF} ", or " d_N ", when it is a

fuzzy membership degree, an intuitionistic fuzzy membership, or a neutrosophic membership degree, respectively, of an element x to the plithogenic set P ;

- b) "c" means " c_F ", or " c_{IF} ", or " c_N ", when it is a fuzzy attribute value contradiction degree function, an intuitionistic fuzzy attribute value contradiction function, or a neutrosophic attribute value contradiction function, respectively.
 - c) The functions are defined according to the applications that the experts need to solve. $d(\cdot, \cdot)$ and $c(\cdot, \cdot)$ Then, the following notation is used: $x(d(x, V))$ where $d(x, V) = \{d(x, v), \text{ for all } v \in V\}, \forall x \in P$. The attribute value contradiction function is computed between each attribute value for the dominant attribute value (denoted by v_D) in particular, and also for other attribute values v_D .
1. Plithogenic - These include union (OR), intersection (AND), and other aggregation operators that combine attribute values based on t_{norm} and t_{conorm} . Both linear and nonlinear aggregation operations can be created.
 2. Contradiction and aggregation calculation: The contradiction function c evaluates the contradiction between attribute values. Therefore, they influence how t_{norm} and t_{conorm} are applied to create aggregation operators.
 3. If t_{norm} is applied on the value of the dominant attribute denoted by v_D , and the contradiction between v_D and v_2 is $c(v_D, v_2)$, then it is applied on the value of the attribute v_2 as follows:

$$[1 - c(v_D, v_2)] \cdot t_{norm}(v_D, v_2) + c(v_D, v_2) \cdot t_{conorm}(v_D, v_2), \quad (1)$$

4. Or according to the following symbology:

$$[1 - c(v_D, v_2)] \cdot (v_D \wedge_F v_2) + c(v_D, v_2) \cdot (v_D \vee_F v_2), \quad (2)$$

5. Similarly, if t_{conorm} applied to the value of the dominant attribute denoted by v_D , and the contradiction between v_D and v_2 is $c(v_D, v_2)$, then it is applied to the value of the attribute v_2 :

$$[1 - c(v_D, v_2)] \cdot t_{conorm}(v_D, v_2) + c(v_D, v_2) \cdot t_{norm}(v_D, v_2), \quad (3)$$

6. Or, according to the following symbology:

$$[1 - c(v_D, v_2)] \cdot (v_D \vee_F v_2) + c(v_D, v_2) \cdot (v_D \wedge_F v_2), \quad (4)$$

7. neutrosophic intersection and union : They are defined in such a way that one criterion is applied for membership and its opposite for non-membership, while for indeterminacy the average is taken.
8. plithogenic is defined as:

$$(a_1, a_2, a_3) \wedge_P (b_1, b_2, b_3) = \left(a_1 \wedge_F b_1, \frac{1}{2} [(a_2 \wedge_F b_2) + (a_2 \vee_F b_2)], a_3 \vee_F b_3 \right) \quad (5)$$

9. plithogenic is defined as:

$$(a_1, a_2, a_3) \vee_P (b_1, b_2, b_3) = \left(a_1 \vee_F b_1, \frac{1}{2} [(a_2 \wedge_F b_2) + (a_2 \vee_F b_2)], a_3 \wedge_F b_3 \right), \quad (6)$$

10. Resolution and decision matrix: Formulas are used to calculate the median of the plithogenic numbers, allowing a single decision matrix to be constructed for all specialists.

$$\text{median}_{i=1}^m \{PN_i\} = (\text{median}_{i=1}^m \{T(PN_i)\}, \text{median}_{i=1}^m \{I(PN_i)\}, \text{median}_{i=1}^m \{F(PN_i)\}), \quad (7)$$

Where the elements analyzed consist of plithogenic numbers , showing the components of truth, indeterminacy and falsity. In other words, it means that the median of a set of plithogenic numbers is defined as the plithogenic number of the medians of its components $PN_i, T(PN_i), I(PN_i),$ and $F(PN_i)$

To compare relationships between quadrants, the following formula is used to blur a neutrosophic number:

$$S([T, I, F]) = \frac{2 + T - I - F}{3} \tag{8}$$

- For each row of the pairwise comparison matrix, calculate a weighted sum based on the sum of the product of each cell by the priority of each corresponding alternative or criterion (see Table 1).

Table 1: Linguistic expression to determine the level of importance of the factor on the variable

Linguistic expression	Scale	plithogenic (T, I, F)	S
Poor significance (PS)	0	(0,0,9,1)	0.03
Least significant (LS)	1	(0,2,0,8,0,8)	0.20
Low significance (LS)	2	(0.4,0.7,0.6)	0.37
Moderately significant (MS)	3	(0.5,0.5,0.5)	0.50
Significant (S)	4	(0,6,0,3,0,4)	0.63
Most significant (MS)	5	(0.8,0.2,0.2)	0.80
Very significant (VS)	6	(0.9,0,0.5)	0.95

3. Plithogenic IADOV method

The IADOV plithogenic technique is an assessment method that uses five questions, three multiple choice and two open, to measure respondents' satisfaction [13,19] . The particularity of this method lies in its "IADOV Logical Table", which connects three of the questions in a way that is hidden from the participant to infer satisfaction through their interrelations. By extending this technique to the plithogenic context and using a neutrosophic scale [14] , the ability to measure aspects that are indeterminate or inaccessible with conventional methods is introduced. This makes it possible to address the complexity of respondents' perceptions. It requires an assessment system adapted to the neutrosophic model to accurately capture experts' opinions (see Table 2). This system and its neutrosophic equivalents are defined as the scoring function A of a neutrosophic number according to the proposal of Bassat.

Table 2: Expert evaluation system.

Linguistic term	SVNN	Scale
Clearly satisfied	(1,0,0)	0.50
More satisfied than dissatisfied	(0.75,0.20,0.25)	0.40
Indefinite	Yo	0.25

Linguistic term	SVNN	Scale
More dissatisfied than satisfied	(0.25,0.70,0.75)	0.15
Clearly dissatisfied	(0,0,1)	0.00
Contradictory	(1,0,1)	1.00

The term I in Neutrosófica is interpreted as a unit of indeterminacy. Another component of the method is the IADOV Logic Table, which assigns numerical values to three closed questions applied to experts (according to the references consulted [15,20]). If necessary, open questions can also be applied to surveys. Among the questions used in this study are:

1. Do you think that indigenous rights in Ecuador are adequately implemented in the community?
2. What areas do you think require urgent attention to strengthen the rights of indigenous communities?
3. What are the most significant advances you have observed in the implementation of indigenous rights in your community?
4. Can you describe a specific experience where you felt that indigenous rights were well defended or promoted?
5. Are indigenous rights implemented in the community?

To calculate the Neutrosophic Plithogenic Global Satisfaction Index (NPGSI) of the respondents, H_N^P the aggregation operator was used, considering the evaluations of each element X to the plithogenic set P ; $x \in Pd_F d_{IF} d_N$. Thus, the NPGSI is obtained as the sum of the elements analyzed within the plithogenic subset (S_i^P) evaluated[21, 22].

$$H_N^P (S_1^P, S_2^P, \dots, S_n^P) = \sum_{i=1}^n [w_j, S_i^P] \tag{11}$$

4. Results and discussion.

The research reveals the composition and distribution of Indigenous nationalities in Ecuador, their relationship with the land and nature, and their perceptions of community justice contrasted with Western legal visions. It highlights the holistic connection with the environment, the value of community justice focused on restoration and reconciliation, and the importance of ancestral wisdom in conflict resolution, differing notably from the individualism and punitive approach of the Western legal system. For the modeling of the Plithogenic IADOV method, a sample of 35 representatives of the Pilahuines , Chibuleos , Tomabelas and Salasacas ethnic groups was taken . Among them, they act as authorities to administer justice in their community for family, civil or administrative conflicts.

The effective implementation of indigenous rights in Ecuador, despite significant legal and constitutional advances, faces multiple challenges. By using a plithogenic approach with neutrosophic numbers, the disparity between legislation and practice can be assessed from a perspective that recognizes complexity and indeterminacy. Key challenges are identified below and quantified using the IADOV plithogenic method to assess satisfaction with the effective implementation of Indigenous rights (see Figure 1).

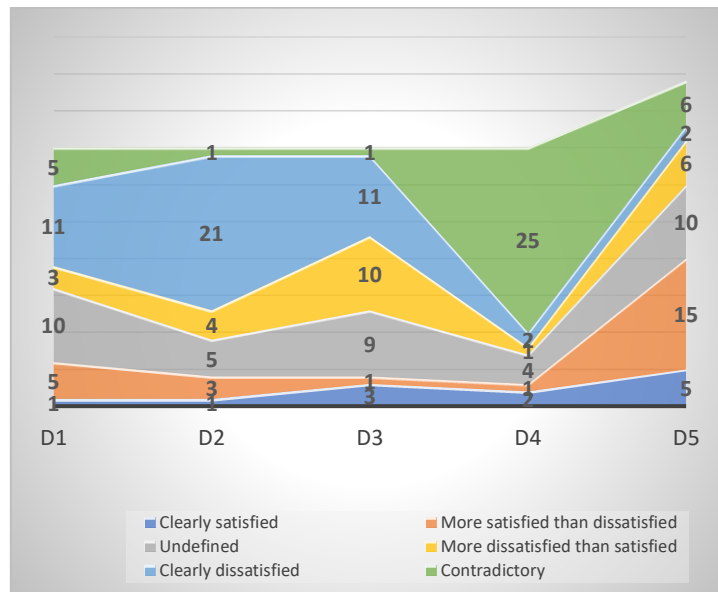


Figure 1: Plithogenic areas of satisfaction with the implementation of indigenous rights.

The satisfaction levels (GS) are observed according to the plithogenic areas related to the implementation of indigenous rights. Based on the challenges and criteria presented by the respondents, the following information was obtained:

1. Access to land and natural resources (D1) $H_{D1}^p = 0.30$ is at a sub-level between I and MSI and CS. Therefore, respondents tend to feel *more satisfied than dissatisfied* with the demarcation of their lands and the concession of these to third parties.
 - GS-(0.75, 0.20, 0.25) : Although legislation recognizes indigenous rights over their ancestral lands and resources, the practice is often hampered by economic and extractive interests.
 - S-(I): There is a high level of uncertainty regarding the demarcation of indigenous territories and the granting of rights over natural resources, affected by government policies and pressure from extractive companies.
 - GS-(1, 0, 1) : The contradiction between recognized rights and their implementation reflects important challenges in the real protection of these rights.
2. Participation in decision-making (D2): $H_{D2}^p = 0.13$ Located between the MSI and the CI, the respondents tend to feel *even more dissatisfied than satisfied* with the exercise of executive, legislative and jurisdictional powers in Ecuador.
 - GS-(1, 0, 0) : Mechanisms for indigenous participation in political and legislative matters have been established.
 - GS-(I): The effectiveness of this participation is variable, with cases of symbolic participation or limited real influence on important decisions.
 - GS-(1, 0, 1) : The discrepancy between inclusion intention and operational practice shows limitations in allowing genuine and meaningful participation.

3. Intercultural Bilingual Education (D3): $H_{D3}^P = 0.19$ Located between the MSI and I areas, respondents show a tendency towards dissatisfaction and indetermination regarding the implementation of intercultural bilingual education. This is due to the variation in its implementation, resulting in a classification of *less dissatisfied and indefinitely satisfied*.
 - GS-(1, 0, 0) : Bilingual intercultural education is legally recognized and promoted as a right.
 - GS-(I): Implementation varies significantly across regions and is affected by resource availability, teacher training, and appropriate content.
 - GS-(0.25, 0.70, 0.75) : There are gaps between educational policies and their practical implementation, which reflects challenges in the universalization of quality education that respects cultural diversity.
4. Indigenous justice and legal pluralism (D4): $H_{D4}^P = 0.79$ This index is located in the areas of CS C. The trend is towards contradictions in legal systems, so, although it is recognized, it is not applied correctly.
 - GS-(1, 0, 0) : The constitutional recognition of indigenous justice represents a step towards legal pluralism.
 - GS-(I): Coordination between ordinary jurisdiction and indigenous justice presents uncertainties, especially in the definition of competencies and mutual respect for decisions.
 - GS-(1, 0, 1) : Conflicts and misunderstandings between legal systems highlight the difficulties in the harmonious implementation of legal pluralism.
5. Conservation of heritage and traditional knowledge (D5): $H_{D5}^P = 0.20$ It can be classified as a classification of *least dissatisfied and not defined satisfied*.
 - GS-(1, 0, 0) : There are legislative efforts to protect indigenous cultural heritage and traditional knowledge.
 - GS-(I): The effectiveness of these measures is uncertain, facing challenges of unauthorized appropriation and commercialization.
 - GS-(1, 0, 1) : The discrepancy between normative protection and violations in practice underscores the need to strengthen conservation mechanisms.

This Plithogenic IADOV analysis highlights that while there is progress in the recognition of indigenous rights, effective implementation faces a complex interplay. The Plithogenic areas used illustrate the disparity between legislation and practice, emphasizing the need to address indeterminacy to improve the protection of indigenous rights in Ecuador. Furthermore, the method introduces new scales to understand the results and respondents' feelings regarding the effectiveness of indigenous rights in Ecuador.

Another critical point to highlight is the perception of indigenous communities regarding the exercise of their executive, legislative and jurisdictional powers in Ecuador, revealing a complex panorama characterized by variations in satisfaction and internal contradictions. Through the use of plithogenic areas, these perceptions can be quantified and analyzed, reflecting the diverse realities and challenges that these communities face within the framework of their recognized rights. The results visualized in the plithogenic areas allow a more nuanced and in-depth evaluation of the degrees of satisfaction (see Table 3).

Table 3: Perception of indigenous communities regarding the exercise of their executive, legislative and jurisdictional powers.

Observation of respondents	Perceptions on the exercise of executive powers	Perceptions on the exercise of legislative powers	Perceptions on the exercise of jurisdictional powers
(1,0,0)	There is moderate recognition of progress in autonomy and the exercise of executive powers at the local level, especially in the management of natural resources and community projects.	-	There is a high degree of satisfaction and appreciation of the ability to exercise community justice based on traditional systems and norms, considering it crucial for the preservation of culture and social cohesion.
(0.75,0.20,0.25)	-	Participation in legislative spaces is valued but is limited by structural barriers and the lack of effective representation in key decisions.	-
I	There is uncertainty about the consistency and continuity of these executive powers, especially in relation to political changes and the variability of institutional support.	There is great uncertainty about the real influence of indigenous participation in the creation of laws and policies that directly affect their communities.	Uncertainties persist regarding the interaction and recognition of indigenous justice within the national legal system, especially in cases of conflict between jurisdictions.
(1,0,1)	There is a perceived contradiction between the formal recognition of these powers and the practical limitations on their effective exercise, due to resource and capacity restrictions.	Expectations about the ability to influence the legislative process often clash with the reality of a political system that does not always adequately reflect or integrate indigenous perspectives and needs.	Tensions and contradictions arise when the application of community justice faces legal challenges or external perceptions of incompatibility with universal human rights.

This analysis of the Plithogenic IADOV highlights the complexity of indigenous perceptions regarding the exercise of their recognized powers. While there are positive aspects, especially at the jurisdictional level, significant challenges persist in the executive and legislative spheres, reflected in

degrees of uncertainty and contradiction. The neutrosophic evaluations used illustrate not only levels of satisfaction but also areas of conflict, emphasizing the need for a more inclusive and equitable approach to the implementation of indigenous rights and powers.

Furthermore, the complexity of indigenous participation, consultation and representation in Ecuador is evident, showing both significant progress and challenges. While efforts to include Indigenous communities in decision-making processes are acknowledged, uncertainties and contradictions in their implementation indicate the need to strengthen these mechanisms to ensure effective and respectful participation that truly reflects the needs and aspirations of indigenous peoples.

Plithogenic integration for the implementation of indigenous rights in Ecuador.

Based on plithogenic analysis in a neutrosophic setting, solutions can be proposed to improve the implementation of indigenous rights in Ecuador. These solutions should focus on addressing areas of high uncertainty and contradiction, while reinforcing what has proven to be effective. The following sequence of plithogenic integration is presented:

1. Design the structure of the plithogenic set and its characteristics (see Table 4),
2. Propose strategies to mitigate challenges within each plithogenic subset.
3. Evaluate interactions to determine those that are close or of greater importance, which will be integrated into the proposed solutions.

Table 4: Structure of the plithogenic set for the implementation of indigenous rights in Ecuador.

Plithogenic set	Subset	Attributes	Variables	Factors
Implementation of indigenous rights	V ₁ :Prevention of violations.	a. Prevention policies. b. Awareness programs.	1. Number of programs executed. 2. Level of community participation.	A. Existing legal framework. B. Assigned resources.
	V ₂ :Rights education.	c. Curriculum contents. d. Teacher training.	3. Coverage of intercultural education. 4. Comprehension assessments.	C. Educational policy. D. Investment in education.
	V ₃ :Political participation.	e. Access to political spaces f. Effective representation.	5. Number of indigenous representatives. 6. Impact of legislative initiatives.	E. Electoral legislation. F. Political culture.
	V ₄ :Territorial management.	g. Community management systems. h. Protection of the earth.	7. Land conflicts resolved. 8. Formally recognized territories.	G. Land claims. H. Development policies.
	V ₅ :Justice and legality.	i. Recognition of indigenous justice. j. Access to legal services	9. Cases handled by indigenous justice. 10. Rulings in favor of indigenous rights.	I. Indigenous legal framework. J. Judicial infrastructure.

The structure of the neutrosophic plithogenic set allows for a neutral analysis of the situation of indigenous rights in Ecuador. This helps to identify where and how policies and programs can be improved to achieve a more effective implementation of indigenous rights. To establish the structure d_N and values of the attributes within the set, neutrosophic values are assigned to each attribute based on the responses of the representative sample of respondents (see Table 5). The structure of the plithogenic set for the analysis is as follows:

Plithogenic set: Implementation of indigenous rights in Ecuador

1. Subset (V_1): Violation prevention.
 - Attributes: Prevention policies and awareness programs.
 - Attribute Value: Neutrosophic values are assigned based on the perceived effectiveness of these programs.
2. Subset (V_2): Rights education.
 - Attributes: Curricular content, teacher training.
 - Attribute Value: Evaluated in terms of the coverage and quality of intercultural education.
3. Subset (V_3): Political participation.
 - Attributes: Access to political spaces, effective representation.
 - Attribute value: Measured by the number and impact of indigenous representatives.
4. Subset (V_4): Territorial management.
 - Attributes: Community management systems, land protection.
 - Attribute value: It is reflected in conflict resolution and recognition of the territory.
5. Subset (V_5): Justice and legality.
 - Attributes: Recognition of indigenous justice and access to legal services.
 - Attribute value: Based on the frequency and outcome of cases handled by indigenous justice.

Table 5: Values of the attributes d_N in the plithogenic set.

No.	Subset	Attribute	Attribute valued d_N
1	Prevention of violations	Prevention policies	(0.8,0.2,0.2)
		Awareness programs	(0.6,0.3,0.4)
2	Education on rights	Curricular contents	(0.9,0,0.5)
		Teacher training	(0.8,0.2,0.2)
3	Political participation	Access to political spaces	(0.5,0.5,0.5)
		Effective representation	(0.4,0.7,0.6)
4	Territorial management	Community management systems	(0.6,0.3,0.4)
		Protection of the earth	(0.5,0.5,0.5)
5	Justice and legality	Recognition of indigenous justice	(0.6,0.3,0.4)
		Access to legal services	(0.5,0.5,0.5)

It can be observed that the multi-attribute neutrosophic plithogenic set with dimension 5 and cardinality $2 \times 2 \times 2 \times 2 \times 2 = 32$ presents dominant values in the attributes $v_a, v_c, v_e, v_g,$ and v_i for each subset. Additionally, the evaluation of the measurement scale of the plithogenic set establishes the neutrosophic values assigned to each attribute in relation to the effectiveness of policies related to indigenous rights in Ecuador. The purpose of this structure is to provide a tool for decision-making based on the analysis of the complexity and contradictions inherent to the subject. Based on each subset, the following priority strategies and actions are proposed:

- A. Strengthen prior consultation: Implement effective and binding mechanisms for prior consultation with indigenous communities on projects that affect them.
Action: Develop and implement a clearer and more rigorous regulatory framework for prior consultations to ensure that they are binding, systematic and culturally appropriate. Training of indigenous officials and leaders in negotiation and intercultural dialogue.
Time: Short term.
- B. Promote intercultural education: Ensure the inclusion of intercultural and bilingual education programs throughout the education system.
Action: Increase investment in the training of bilingual educators and in the development of teaching materials that reflect Ecuador's cultural and linguistic diversity. Ensure the effective implementation of intercultural bilingual education in all regions.
Time: Medium term.
- C. Enhance political and legislative participation: Facilitate platforms for effective political representation of indigenous peoples in the legislative sphere.
Action: Create permanent spaces for dialogue between indigenous representatives and legislators to ensure that indigenous proposals and concerns are effectively considered in the creation of laws. Implement a platform to monitor legislative initiatives proposed or supported by indigenous representatives.
Time: Short to medium term.
- D. Recognize and implement indigenous justice: Strengthen recognition and coordination between indigenous justice and the national judicial system.
Action: Promote the development of coordination protocols between indigenous justice and the national legal system, recognizing and respecting the powers and decisions of each. To this end, training in human rights and intercultural justice is promoted for operators of both systems.
Time: Medium term.
- E. Legally protect lands and resources: Implement and enforce laws that protect the lands and natural resources of indigenous communities.
Action: Establish a robust legal framework for the demarcation and titling of ancestral lands that prioritizes indigenous rights over natural resources, complemented by surveillance and monitoring programs to prevent unauthorized exploitation.
Time: Long term.

This reformulated framework directly addresses the context of indigenous rights in Ecuador by addressing key areas such as consultation and participation, education and representation, and justice and legality. Prioritised strategies and actions aim to address existing challenges and promote the effective and equitable implementation of indigenous rights.

These solutions, prioritized through a plithogenic approach and quantified with neutrosophic numbers, seek to comprehensively and effectively address the challenges identified in the implementation of indigenous rights in Ecuador. This approach allows efforts to be concentrated in the areas of greatest need, promoting a more coherent and fair implementation of indigenous rights.

Implementation of the plithogenic intersection.

Neutrosophic plithogenic intersection involves the combination of two or more subsets and their attributes, where each aspect is common between them. The study identifies intersections where there is an overlap of efforts, objectives or results. Among them, three are classified for development:

- a. Curricular content and access to political spaces.
- b. Protection of lands and recognition of indigenous justice.
- c. Prevention policies and access to legal services.

The degrees of contradiction between the values of each attribute within the intersection presented in the subsets are defined (see Table 6). The results show that:

- Subset $V_2; V_3: c_N(v_c, v_e) = 0.45$
- Subset $V_5; V_4: c_N(v_i, v_h) = 0.20$
- Subset $V_1; V_5: c_N(v_a, v_j) = 0.30$

Table 6: Plithogenic neutrosophic intersection between subsets according to equation (5). Source: own elaboration.

Intersection attributes	$(a1, a2, a3) \wedge p(b1, b2, b3)$	S_N	Assessment
Curricular content and access to political spaces	(0.68,0.25,0.5)	0.64	It is located in a sublevel closer to I than to MSI.
Protection of lands and recognition of indigenous justice	(0.52,0.27,0.48)	0.59	It is located in a sublevel closer to I than to MDI.
Policies on prevention and access to legal services	(0.59,0.35,0.41)	0.61	It is located in a sublevel closer to I than to MSI.

The results obtained define the three intersections close to an important classification for plithogenic integration in terms of the implementation of indigenous rights in Ecuador. Therefore, the characteristics of the three intersections within the subsets are determined (see Table 7).

Table 7: Plithogenic intersections in the implementation of indigenous rights in Ecuador.

Subsets	Intersection on attributes	Plithogenic intersection	Cause of intersection	Advantages	Cons	Benefits
Education in Rights and Political Participation	Curricular content and access to political spaces	(0.68,0.25,0.5)	Education is essential for informed political	Strengthens the foundations for active civic	It can be challenging if education is not practically applied in	Improve the quality of democracy and

Subsets	Intersection on attributes	Plithogenic intersection	Cause of intersection	Advantages	Cons	Benefits
			participation.	participation.	the political context.	empower citizens.
Territorial Management and Justice and Legality	Protection of lands and recognition of indigenous justice	(0.52,0.27,0.48)	Effective territorial management and justice are essential for sovereignty and autonomy.	It ensures coherent management of the territory and its resources.	Lack of integration can lead to duplication or legal conflicts.	It contributes to stability and respect for territorial rights.
Prevention of Violations and Justice and Legality	Policies on prevention and access to legal services	(0.59,0.35,0.41)	Prevention and a strong legal response are essential to protecting rights.	Create a comprehensive framework for prevention and justice.	If not well coordinated, preventive measures may not have legal backing.	Reduces the incidence of rights violations and improves legal response.

The intersection between education and political participation indicates that a solid foundation in rights education can significantly improve the quality of political participation. However, if education is not translated into effective political practices, the full potential cannot be achieved.

Regarding land management and justice, the intersection suggests that effective land management that respects indigenous justice can lead to greater sovereignty and autonomy. However, it is critical that laws and justice systems support land management rather than contradict it.

Finally, the intersection between crime prevention and legal justice suggests that for preventive policies to be effective, they must be supported by robust access to legal services. Lack of legal support can undermine preventive policies.

Each intersection seeks to harness the benefits of cooperation between different subsets to improve the implementation of indigenous rights in Ecuador. It is vital to ensure that these intersections not only exist in theory but also translate into coordinated and coherent actions in practice.

6. Conclusion

The analysis carried out using the Plithogenic IADOV method allows us to understand the perceptions of the indigenous peoples of Ambato regarding their rights. The results suggest legislative progress that has not yet been fully translated into practice. Although a positive trend in satisfaction with the jurisdiction is observed, the executive and legislative spheres show a lower degree of

satisfaction. This situation reflects a scenario of uncertainty regarding the effective exercise of rights, which shows the difficulty of homogenizing experiences within the framework of indigenous cultural diversity.

The study also reveals significant concerns about the participation and representation of indigenous peoples in legislative and executive decisions. It highlights the need to improve indigenous participation and strengthen their ancestral justice systems. It proposes intensifying the participation of these communities in political, legal and economic life by promoting an environment of mutual respect. This will contribute to an Ecuador that adequately values cultural diversity and promotes a more just social and legal balance.

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