Indicadores del Desarrollo Humano Sostenible Diferenciado en los municipios que integran el Valle de Tulancingo

Indicators of Differentiated Sustainable Human Development in the municipalities that make up the Tulancingo Valley

Indicadores de Desenvolvimento Humano Sustentável Diferenciado nos municípios que compõem o Vale de Tulancingo

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Resumen

Este trabajo tiene como objetivo identificar las diferencias existentes en los indicadores de desarrollo humano, pobreza y marginación, su interrelación dinámica y su probable relación con las capacidades funcionales municipales con que se opera el desarrollo sostenible y la igualdad de oportunidades en los municipios que integran la región del Valle de Tulancingo. El estudio se enfoca en presentar los indicadores que diferencian los avances logrados por cada municipio en los temas señalados. Para ello se han consultado referencias teóricas e informes del desarrollo sostenible de los municipios del estado de Hidalgo. Metodológicamente, se ubica dentro de una investigación mixta longitudinal de alcance exploratorio, utilizando una técnica de estudio causal comparativo y análisis documental. Los hallazgos identifican las brechas existentes entre las diferentes demarcaciones políticas consideradas y reconocen los efectos diferenciados. Finalmente se observa una interrelación

entre el desarrollo humano, la pobreza y la marginación y se plantea una propuesta orientada a fortalecer las áreas de oportunidad detectadas en el Índice de Capacidades Funcionales Municipales.

El Índice de Capacidades Funcionales Municipales, definido como una herramienta para medir la operatividad de los municipios en el desarrollo sostenible, juega un papel clave en la identificación de áreas de oportunidad.

Palabras Claves: Índice de Capacidades Funcionales Municipales, Índice de Desarrollo Humano, marginación, pobreza.

Abstract

This work aims to identify the existing differences in the indicators of human development, poverty and marginalization, their dynamic interrelation and their probable relationship with the municipal functional capacities with which sustainable development and equal opportunities are operated in the municipalities that make up the Tulancingo Valley region. The study focuses on presenting the indicators that differentiate the progress made by each municipality on the indicated topics. For this purpose, theoretical references and reports on the sustainable development of the municipalities of the state of Hidalgo have been consulted. Methodologically, it is located within longitudinal mixed research of exploratory scope, using a causal comparative study technique and documentary analysis. Findings identify existing gaps between the different political demarcations considered and recognize the differentiated effects. Finally, an interrelationship is observed between human development, poverty and marginalization and a proposal is proposed that seeks that the actions to be developed in the municipalities focus on strengthening the areas of opportunity detected in Municipal Functional Capacities Index.

The Municipal Functional Capacities Index, defined as a tool to measure the operability of municipalities in sustainable development, plays a key role in identifying areas of opportunity.

Keywords: Municipal Functional Capabilities Index, Human Development Index, marginalization, poverty.

Resumo

Este trabalho tem como objetivo identificar as diferenças existentes nos indicadores de desenvolvimento humano, pobreza e marginalização, sua inter-relação dinâmica e sua provável relação com as capacidades funcionais municipais com as quais o desenvolvimento sustentável e a igualdade de oportunidades são operados nos municípios que compõem a região do Vale de Tulancingo. . O estudo se concentra em apresentar os indicadores que diferenciam os avanços alcançados por cada município nos temas mencionados. Para tanto, foram consultados referenciais teóricos e relatórios sobre desenvolvimento sustentável em municípios do estado de Hidalgo. Metodologicamente, situa-se em uma pesquisa longitudinal mista de escopo exploratório, utilizando técnica de estudo causal comparativo e análise documental. Os resultados identificam as lacunas existentes entre as diferentes demarcações políticas consideradas e reconhecem os efeitos diferenciados. Por fim, observa-se uma inter-relação entre desenvolvimento humano, pobreza e marginalização e apresenta-se uma proposta que visa fortalecer as áreas de oportunidade detectadas no Índice de Capacidades Funcionais Municipais.

O Índice de Capacidades Funcionais Municipais, definido como uma ferramenta para medir a operabilidade dos municípios no desenvolvimento sustentável, desempenha um papel fundamental na identificação de áreas de oportunidade.

Palavras-chave: Índice de Capacidades Funcionais Municipais, Índice de Desenvolvimento Humano, marginalização, pobreza.

Introduction

The Tulancingo Valley (VT) due to its geographic-spatial delimitation has its origin in the high plains of the Sierra de Tenango and ends in the Apan plains in the state of Hidalgo, Mexico. Being a geographic depression between two mountain ranges, the seven municipalities that comprise it have similar geopolitical and social characteristics. According to the National Water Commission [Conagua] (2013), the seven municipalities also belong to the aquifer 1317 called "Tulancingo Valley". The Secretariat of the Environment and Natural Resources of Hidalgo [Semarnat – H] (2016), indicates that five municipalities of the VT make up the Tulancingo atmospheric basin and the Autonomous University of the State of Hidalgo and the Congress of the Free and Sovereign State of Hidalgo [(Uaeh and Celsh]

(2021) include four of them in the Metropolitan Zone of Tulancingo and it is considered that the other three may be included in the near future because they meet most of the requirements to be integrated as part of the metropolitan area.

The decree published by the Executive Branch of the Government Administration of the State of Hidalgo [Peageh] (April 4, 2023), presents the regionalization for the state of Hidalgo, based on a geographic - spatial delimitation defined from the correlation of similar social and economic variables, where specific actions and policies are intended to be carried out, classifies the municipalities of the state of Hidalgo into 25 micro regions. Micro region three contains the municipalities of: Acatlán, Metepec, Santiago Tulantepec de Lugo Guerrero and Tulancingo de Bravo and the fourth the municipalities of Acaxochitlán, Cuautepec de Hinojosa and Singuilucan.

The union of these two micro regions integrates the municipalities of the Tulancingo Valley, and as can be seen in Figure 1, the municipality of Tulancingo de Bravo is the central municipality, which drives and polarizes the other six that surround it.

In order to contribute to municipal and regional development, this study aims to identify the differences in human development, poverty and marginalization indicators, as well as their dynamic interrelation and their probable relationship with municipal functional capacities [CFM] with which sustainable development and equal opportunities are operated in the municipalities of VT.

Figure 1. Municipalities of the Tulancingo Valley.
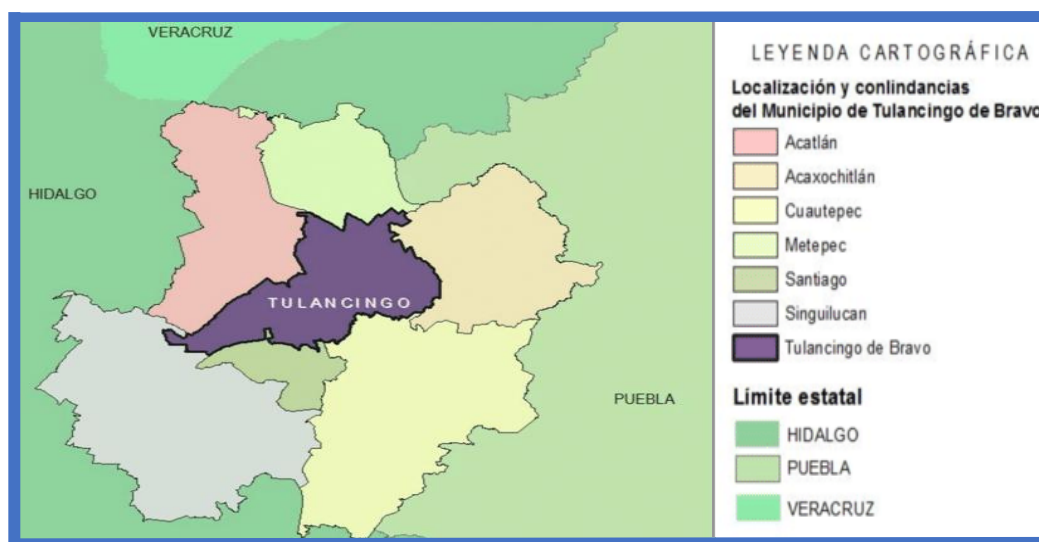
Note: Obtained from Noyola, A. (2016) *Location and boundaries of the municipality of Tulancingo de Bravo* [Cartography]. ResearchGate. Mexico.

The relationship with the CFM is studied under the provisions of Cabrero and Arellano (2011) mentioned by Huerta and Vanegas, who mention:

Two of the basic problems within municipal administrations are: First: The few years of study of the governing bodies and their teams and Second: the lack of continuity in the municipal administration teams, because on average they last in their function less than three years. This situation makes evident the lack of competences of municipal public servants and a very costly learning curve for public finances every three years. (2020, p.107)

The relationships between human development, poverty and marginalization are considered dynamic and feedback loops. Lack of human development can perpetuate poverty and marginalization, while reducing poverty and marginalization can facilitate human development. Effective policies must address these interrelationships to promote inclusive and sustainable development.

In 1965, the United Nations Development Programme [UNDP] was created as the international organization dedicated to the topic of human development. At the global level, the UNDP published the first Human Development Report in 1990, which established the bases for defining, measuring and analyzing human development in member countries and within them.

This is where global strategies emerge for the first time to support public policy processes to activate Human Development and the methodologies to identify, analyze, monitor and evaluate Human Development through indices (HDI) and its Subindices (health, education and income) and thereby provide information that allows for a better quality of life and opportunities for people.

UNDP defines Human Development as "the process of expanding people's capabilities that broaden their options and opportunities." (Duran, Parra and Marcéles, 2015, p.203)

According to Bush and Tuirán (2001), Human Development is a continuous process of expanding people's capabilities and options so that they can carry out their life project linked to the level of development of a population. The HDI is made up of:

- Health Subindex, measures life expectancy at birth and is considered as the ability to enjoy a long and healthy life. Considering a minimum age of 20 years and a maximum of 85.

- Education Subindex, comprehensively measures the literacy level of students and the level of school attendance of children, adolescents and young people in the age groups of six to 24 years. It is defined as the capacity of people to acquire knowledge.

- Income subindex, measures the ability to have the resources that allow for a decent and dignified standard of living, through the Gross Domestic Product per capita.

From the reports published by the UNDP and the National Council for the Evaluation of Social Development Policy (CONEVAL), it has been observed, in their comparison, at the local level (municipalities), the existence of municipalities that lag behind in the application of policies that close the existing gaps in social inequalities and especially in their HDI, in marginalization and in the degree of poverty, others show a regression and therefore gaps in development between municipalities prevail.

The United Nations Development Program [UNDP] in its Municipal Human Development Report 2010 – 2020, mentions:

> It is true that development is not the sole task of governments, but in the context presented by this report, it is essential to know and analyze the capacities of municipal governments to generate actions in favor of the well-being of people, and that can be translated into the effective exercise of their rights, in access to goods and services that satisfy their needs, and in the full development of their capacities. To the extent that municipal governments manage to positively impact the human development of citizens who live in a certain geographical context, it can be said that they will simultaneously favor the achievement of the objectives of the 2030 Agenda." (2022, p. 133)

Other factors for the study of social inequality are marginalization and poverty. According to De la Vega Estrada, Vázquez and Ramírez, (2012, p. 11), marginalization is conceived as a structural problem of society, where certain opportunities for development are not present, nor the capacities to acquire them. Its measurement considers the percentages of: People aged 15 or older who are illiterate (ANAL), People aged 15 or older without basic education (SBASC), inhabitants in homes without drainage or toilets (OVSDE), inhabitants in homes without electricity (OVSEE), inhabitants in homes without piped water (OVSAE), occupants in homes with dirt floors (OVPT), overcrowded homes (VHAC), population in localities with

less than 5 thousand inhabitants (PL.5000) and employed population with incomes less than 2 minimum wages (PO2SM). Marginalization in a few words affects the localities and is not necessarily associated with the people who live in them. Its main use is to focus social programs of the three levels of government.

For its part, the National Council for the Evaluation of Social Development Policy [CONEVAL] (sf) defines poverty as:

> Situation in which a person finds himself/herself when the exercise of at least one of his/her rights for social development is not guaranteed, and if his/her income is insufficient to acquire the goods and services he/she requires to satisfy his/her minimum needs.

The poverty index indicates the percentage of people who have at least one deficiency in access to social sector programs (health services, quality and spaces, educational lag, access to social security, access to food and access to basic services in housing) and their income level is insufficient to meet their needs through the acquisition of goods and services [Deficiencies in economic and social well-being (social deprivation index)].

In addition to the above, in September 2015, international leaders agreed on a series of global goals to combat the most urgent global challenges: poverty, inequality, preserving the environment and promoting the well-being of all. These goals have specific deadlines that must be met by 2030. The name given to the agreement is Agenda 2030 and was signed by the 193 member countries of the United Nations (UN).

The 2030 agenda considers 17 sustainable development goals [SDG], which are graphically represented in Figure 2.

Figure 2. *Sustainable Development Goals for 2030 by type of development*

Note: Prepared by the authors, adapted from Echave (2020) Link between substantive municipal powers and the 17 SDGs. [Table 1a. and 1b.] Gov. Mex. Mexico. https://www.gob.mx/agenda2030/documentos/guia-para-la-elaboracion-de-planes-municipales-de-desarrollo-con-el-enfoque-de-la-agenda-2030

The 17 goals cover 169 social, economic, environmental and equality targets, and 232 indicators for their monitoring and evaluation.

In Mexico, municipalities, in accordance with their substantive municipal powers dictated by Article 115 of the Constitution, have the capacity to influence 59 of the 169 goals and 129 of the 232 indicators that assess the progress of the SDG goals. Tables 1 and 2 present the relationship of Section III, paragraphs a, b, c, d, e, f, g, hei, and Section V, paragraphs a, b, d, e, f, g, hei with the goals of the 17 SDGs.

Table 1. Transversal Link of Municipal Substantive Powers to the Goals of the 17 SDGs

Substantive Municipal Powers	Development Social	Economic development	Environmental Development	Equality
Fraction V				
1. Paragraph b (…) of its territorial reserves	6.6 16.b	8.4 12.2 12.4	11.3, 13.1, 14.1, 15.1 11.6, 13.2, 14.2, 15.2 11.7, 14.5, 15.4 11.b 14.c,	17.14 17.17
2. Paragraph d Monitor, control and authorize the use of land (…)	1.5 6.6 16.b	8.4 12.2 12.4	11.3, 11.a, 13.1, 15.1 11.4, 11.b, 13.2, 15.2 11.5, 15.4 11.6, 15.9	17.14 17.17
3. Section e Intervention in the regularization of ownership (…)	1.4 6.6 16.b	8.4 12.2	11.3 15.1	5.1, 10.2, 17.14 5.a 17,17
4. Paragraph f Granting licenses (…)	1.5 6.6 16.b	8.4 9.1 12.2	11.3, 11.6, 14.2, 15.1 11.4, 11.a, 14.5, 15.4 11.5, 11.b	17.14 17.17
5. Paragraph g Participation in the creation and administration of ecological reserve areas (…) .	6.6 16.b	8.4 12.2 12.4	11.3, 13.1, 14.1, 15.1 11.4, 13.2, 14.2, 15.2 11.6, 14.5, 15.4 11.7, 14.c, 15.9 11.a 11.b	17.14 17.17
6. Paragraph h Formulate and implement public transport programs (…)	3.6 3.9 16.b	9.1 9.4 9.a	11.2, 13.1 11.6, 13.2 11.b,	17.14 17.17
7. Paragraph i Establish agreements for the administration (…)	6.6 16.b	8.4 12.2 12.4	11.3, 13.1, 14.1, 15.1 11.4, 13.2, 14.2, 15.2	17.14 17.17

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			11.6, 11.b, 14.5, 15.4 11.7, 14.c, 15.9	
8. Paragraph a (…) zoning and municipal urban development plans*	SDG 1, 2, 3, 6 and 16	SDG 4, 8, 9 and 12	SDG 7, 11,13,14 and 15	SDG 5, 10 and 17
9. Section c Formulate regional development plans (…) *	SDG 1, 2, 3, 6 and 16	SDG 4, 8, 9 and 12	SDG 7, 11,13,14 and 15	SDG 5, 10 and 17
Section III				
1. Paragraph a Drinking water (…)	1.4, 3.3, 6.1, 16.b 6.2 6.3	8.4, 9.1, 12.2 9.4, 12.4 9.a, 12.5	11.3, 13.2, 14.1, 15.1 11.6, 15.2 11.b, 15.4	10.2 17.14 17.17
2. Paragraph b Lighting (…)	1.4 16.b	9.1 9.4 9.a	7.1, 11.1, 13.2 7.2, 11.b, 7.3 7.b	10.2 17.14 17.17

Note: Obtained from Echave (2020). Link of substantive municipal powers to the 17 SDGs.

[Table 1a. and 1b.] Gov. Mex. Mexico. https://www.gob.mx/agenda2030/documentos/guia-

para-la-elaboracion-de-planes-municipales-de-desarrollo-con-el-enfoque-de-la-agenda-

2030

* Direct link to one or more SDG targets

Table 2. Transversal Link of Substantive Municipal Powers to the goals of the 17 SDGs

Substantive Municipal Powers	Development Social	Economic development	Environmental Development	Equality
Section III				
3. Section c Cleaning, collection, (…) of waste	1.4, 3.9, 6.3, 16.b	8.4, 9.1, 12.4 9.4, 12.5 9.a	11.1, 13.2, 14.1 11.6 11.b	10.2 17.14 17,17
4. Paragraph d Markets (…)	1.4 2.c 16.b	8.3, 9.1, 12.3 8.8, 9.3, 12.5 8.9, 9.4, 12.6 8.10, 9.a	11.1 14.b	10.1 10.2 17.14 17.17
5. Section e Pantheons	1.4 16.b		11.1	10.2, 17.14 17.17
6. Paragraph f Trace	1.4 2.4 16.b	8.3, 9.4, 12.3 8.8, 9.a, 12.4 12.5	11.1	10.2, 17.14 17.17
7. Paragraph g Streets, parks and (…)	1.4 16.b	9.1 12.2	7.1, 11.1 7.2, 11.7	10.2, 17.14 17.17
8. Paragraph h Public safety (Article 21 of the CPEUM).	1.4, 16.1 16.3 16.10	8.8	11.1 11.2	5.2, 10.2, 17.14 17.17
9. Paragraph i Other than local legislatures (…)	16.b			17.14 17.17

Note: Obtained from Echave (2020). Link of substantive municipal powers to the 17 SDGs. [Table 1a. and 1b.] Gov. Mex. Mexico. https://www.gob.mx/agenda2030/documentos/guia-para-la-elaboracion-de-planes-municipales-de-desarrollo-con-el-enfoque-de-la-agenda-2030

The UNDP (2019) in its report "Municipal Human Development 2010 – 2015", establishes that municipal performance does not depend solely on the fulfillment of its attributions and powers, but also on its capacities to influence the human development of its fellow citizens. Under this premise and considering the intrinsic and contextual factors surrounding municipal governance, incorporates the municipal functional capacities indicator [ICFM]:

In order to measure municipal capacities that impact the SDGs and complement the analysis of progress in municipal development. The purpose of the index is to measure the performance of municipal governments and identify the areas in municipal

management, and in terms of public policy processes, of priority attention to increase the capacity of local governments. (UNDP, 2022, p. 134)

In this way, UNDP provides a tool to measure the impact of municipal functional capacities on achieving the SDGs, which allows assessing progress and identifying the organizational, political-administrative and economic factors that have
slowed down their progress.

The ICFM is made up of five sub-indexes, as presented in Table 3.

Table 3. *Sub-indexes of municipal functional capacities*

Capabilities for	Measure
Involving relevant actors (10 indicators)	The ability to convene and enable the participation of sector leaders and relevant people, process management and establishment of collaboration mechanisms.
Diagnose (20 indicators)	The ability to capture, classify, disaggregate, study and synthesize data and information, and whether municipalities are able to transfer the information to a forward-looking vision and/or a higher provision.
Formulate policies and strategies (six indicators)	The ability to not overlook and analyse the different alternative solutions to each public problem, establish objectives, formulate sectoral and transversal policies, and manage methodologies and processes to establish priorities.
Budget, manage and implement (10 indicators)	It measures three elements: 1. Whether the municipality has the qualifications to formulate, plan, manage and implement programs and projects, including the draft budget. 2. It assesses the capacity to manage human resources. 3. It takes into account the existence of indicators for monitoring and following up on the progress achieved.
Assess (10 indicators)	The ability to assess achievements, capture feedback for policy redesign, catalogue lessons learned, foster learning and ensure accountability of all stakeholders.

Note: Prepared by the authors, adapted from UNDP (2022). ICFM indicators for each of the 5 thematic areas [Table 4.1]. UNDP Mexico. Mexico.

https://www.undp.org/es/mexico/publicaciones/informe-de-desarrollo-humano-municipal-2010-2020-una-decada-de-transformaciones-locales-en-mexico-0

In this global context of sustainable development, it is essential to analyze how municipal functional capacities influence the advancement of human development, the reduction of poverty and marginalization in regions such as the VT and two research questions arise:

First: What are the differences in human development, poverty and marginalization indices between the municipalities of the Tulancingo Valley?

Second: Is there any direct relationship between the Municipal Functional Capacities Index and progress in addressing human development, poverty and marginalization in the municipalities of the Tulancingo Valley?

Methods and Materials

The research design is a mixed longitudinal approach with an exploratory scope, using a comparative causal study technique, seven focus groups and documentary analysis.

The longitudinal mixed approach of exploratory scope was selected to combine qualitative and quantitative analysis that would allow identifying trends over time and understanding the factors that influence human development in the municipalities of the Tulancingo Valley.

Each focus group was held online, with an average participation of 20 people per Group. " *The question that triggered the analysis was:* " *What are the factors that hinder social development in the municipality ?* "

Focus group participants were selected through convenience sampling, taking into account their knowledge of social development in their municipalities. The sessions were conducted online using the Group Map platform and lasted an average of two hours.

Documentary data were obtained from official sources: the Human Development Index (HDI) came from the State Population Council of Hidalgo [Coespo - H]; the Marginalization Index, also from Coespo - H; the poverty index from the National Council for the Evaluation of Social Development Policy [CONEVAL]; the Index of Municipal Functional Capacities [ICFM] from the United Nations Development Program [UNDP]; and the Sustainable Development Goals [SDG] from the United Nations Organization [UN].

Results

First, the values of the human development, marginalization and poverty indices of the municipalities of the Tulancingo Valley are presented.

Human Development Indices (HDI), marginalization and poverty in the Tulancingo Valley

In Mexico, social inequality is mainly analyzed through the Human Development Index (HDI), the Marginalization Index (MI) and the poverty index.

According to the United Nations Development Programme [UNDP] (2022), the HDI is classified into four levels on a scale from zero to one: very high (greater than 0.80), high (between 0.70 and 0.80), medium (between 0.55 and 0.70), and low (less than 0.55). This can be seen in Table 4.

Table 4. Classification of the Human Development Index in the municipalities of the Tulancingo Valley

Municipality	Population	CPI $	YEAH	APE	HE	H.H	HDI
Acatlan	22 268	2741.33	0.711	6.4	0.526	0.849	0.682 average
Acaxochitlan	46 065	1782.03	0.646	5.4	0.469	0.817	0.628 average
Cuautepec de Hinojosa	60 421	2311.58	0.685	7.2	0.577	0.883	0.704 high
Metepec	13 078	2639.76	0.705	7.68	0.604	0.871	0.719 high
Santiago Tulantepec	39 561	3495.12	0.747	9.11	0.655	0.867	0.751 high
Singuilucan	15 142	2683.81	0.708	7.40	0.579	0.873	0.710 high
Tulancingo de Bravo	168 369	3580.32	0.751	9.20	6.83	0.893	0.771 high

Note: CPI = Per Capita Income, APE = Average Years of Education, SI, SE and SS = Income, Education and Health Subindexes respectively.

Smallest value in orange, Largest value in green

Prepared by the authors with data from UNDP (2022). Annex – Municipal Idh. UNDP Mexico. https://www.undp.org/es/mexico/publicaciones/informe-de-desarrollo-humano-municipal-2010-2020-una-decada-de-transformaciones-locales-en-mexico-0

Analyzing the data in Table 4, it can be seen that the Tulancingo Valley has two municipalities classified in the low level and five in the medium level of the Education Subindex. As a first priority, public policies must be strengthened throughout the region to encourage an increase in the average number of years of schooling or education of people aged 25 years or older and the values in the enrollment rate in the age groups from six to 24 years.

The Marginalization Index (MI), like the HDI, is a synthetic indicator of the living conditions of the population, but its difference is that it has been calculated using the principal component analysis (PC) method. Arechavala (2008) explains that the PC analysis only

allows for ordering cases, it is an ordinal measure and does not allow for inter-spatial and inter-temporal comparisons except for ordinal comparisons (p. 170). For this reason, there are no levels of marginalization. Table 5 presents the results of the measurement of marginalization by the National Population Council [CONAPO] (nd) and the place occupied by each municipality at the national level.

Table 5. Marginalization rates in the municipalities of the Tulancingo Valley

Municipality	Population	Marginalization index	Degree of marginalization	Place it occupies in the national context
Acatlan	22 268	0.84	Half	1108
Acaxochitlan	46 065	0.79	High	423
Cuautepec de Hinojosa	60 421	0.86	Low	1382
Metepec 1366	13 078	0.86	Low	1366
Santiago Tulantepec	39 561	0.90	Very Low	2059
Singuilucan	15 142	0.86	Low	1318
Tulancingo de Bravo	168 369	0.91	Very Low	2170
Total	364 904			

Note: Prepared by the authors with data from CONAPO (n.d.). Database by municipality 2020. gob.mx. Mexico. https://www.gob.mx/conapo/documentos/indices-de-marginacion-2020-284372

Green color represents the municipality with the least marginalization, orange color represents the municipality with the greatest marginalization

In the CONAPO database (nd), there are records of the 2,469 municipalities existing in Mexico, with the Benito Juárez municipality of Mexico City occupying the place with very low marginalization. And occupying the place with maximum marginalization or number one, is the municipality of Batopilas in the state of Chihuahua. In the state of Hidalgo, the municipality with very low marginalization is the municipality of Pachuca de Soto, occupying the 2,408th place. And the one with the highest marginalization is the municipality of San Bartolo Tutotepec, which occupies the 195th place.

Table 6 below presents the values of the intensity of deprivation suffered by the population through nine forms of exclusion in four dimensions: Education, housing, population distribution and monetary income.

Table 6. Values of the exclusions considered by the marginalization index in the municipalities of the VT

Municipality	ANAL	SBAS	OVSDE	OVSEE	OVSAE	OVPT	VHAC	PL.5000	PO2SM
Acatlan	11.14	46.01	7.25	0.71	3.17	1.44	23.85	100.00	82.09
Acaxochitlan	16.30	54.39	4.58	1.39	14.20	11.56	40.13	88.90	88.80
Cuautepec de H.	8.18	41.23	5.26	0.61	2.87	2.45	25.26	66.02	85.16
Metepec	7.16	38.44	3.10	0.83	1.88	2.47	26.72	100	83.42
Santiago Tulantepec	4.57	28.39	0.56	0.21	3.85	1.39	18.12	42.99	75.20
Singuilucan	8.0	40.62	3.35	0.79	6.46	1.30	22.91	100.00	80.08
Tulancingo of B.	4.61	29.61	0.34	0.31	2.78	1.70	17.87	19.86	72.56

Note: Prepared by the authors with data from Conapo (n.d.). Database by municipality 2020. gob.mx. Mexico. https://www.gob.mx/conapo/documentos/indices-de-marginacion-2020-284372

ANAL = Percentage of people aged 15 years or older who are illiterate, SBASC = Percentage of people aged 15 years or older without basic education, OVSDE = Percentage of inhabitants in homes without drainage or toilets, OVSEE = Percentage of inhabitants in homes without electricity, OVSAE = Percentage of inhabitants in homes without piped water, OVPT = Percentage of occupants in homes with dirt floors, VHAC = Percentage of homes with overcrowding, PL.5000 = Percentage of population in localities with less than 5 thousand inhabitants and PO2SM = Percentage of employed population with income less than 2 minimum wages.

The analysis of Table 6 leads us to: in the case of marginalization in the VT, it is necessary as a priority: First, to execute impact actions, in order to address public literacy policies and completion of basic education in the population over 15 years of age and second, to strengthen public policies regarding housing overcrowding and social programs that contribute to improving family income.

The poverty index according to CONEVAL (2019) is multidimensional, however, the various dimensions can be classified into two criteria:

First. Proportion of the population whose income is not sufficient to acquire goods and services that satisfy their needs or lack of "economic well-being"

Second. Proportion of the population that has at least one of the six social deficiencies associated with education, health, social security, nutritious and quality food, housing and its services called "social deprivation index"

When the proportion of the population has three or more deficiencies out of six possible, within the index of social deprivation and is also below the minimum well-being line, it is classified as extreme poverty. People in this condition do not have sufficient income to acquire the nutrients to live in a healthy way, even if they were to spend it entirely on buying food. Table 7 presents the results of the measurement of poverty by CONEVAL (nd).

Table 7. Poverty rates in the municipalities of the Tulancingo Valley

Municipality	Population	Poverty Rate %	Poverty Extreme %	Population in Poverty
Acatlan	22 268	39.3	4.9	8751
Acaxochitlan	46 065	80.1	28.5	36 898
Cuautepec de Hinojosa	60 421	67.3	9.0	40 663
Metepec	13 078	42.8	4.3	5597
Santiago Tulantepec	39 561	39.2	3.0	15 508
Singuilucan	15 142	48.9	5.3	7404
Tulancingo de Bravo	168 369	44.5	4.4	74 924
Total	364 904	52	8.1	189 745

Note: Prepared by the author with information from the National Institute of Statistics and Geography National Institute of Statistics and Geography [INEGI] (sf) *Tell me….*

Information by entity . Inegi. Mexico

https://cuentame.inegi.org.mx/monografias/informacion/hgo/territorio/div_municipal.aspx?tema=me&e=13 and CONEVAL (sf) *Exhibit statistician 2010 - 2020.* CONEVAL. Mexico. https://www.coneval.org.mx/Medicion/Paginas/Pobreza-municipio-2010-2020.aspx

The orange color represents the highest value, the green color represents the lowest value.

Of the 364,904 inhabitants of the Tulancingo Valley, 189,745 (52%) live in poverty, of which 29,515 (8%) suffer from extreme poverty.

Table 8 below presents the values of the six social deprivations of economic well-being and the social deprivation index.

Table 8. Values of economic and social deficiencies of the poverty index in the municipalities of the VT

Municipality	PERCENTAGES									
	RE	CASS	CASSO	CCEV	CASBV	CAA	PMUCS	PM3CS	PIILP	PIILPE
Acatlan	27.8	37.5	87.7	5.0	25.1	32.8	96.6	35.0	39.8	9.8
Acaxochitlan	33.2	20.7	88.8	4.8	50.2	45.9	97.4	52.8	81.0	44.2
Cuautepec de H.	20.0	30.8	83.0	8.6	12.1	26.2	91.6	21.4	70.8	28.2
Metepec	17.9	40.1	84	7.0	21.8	18.4	92.8	24.7	44.1	12.3
Santiago Tulantepec	15.6	38.7	67.0	5.0	5.2	10.8	75.8	13.8	45.4	11.3
Singuilucan	21	47.4	79.4	4.8	14.0	28.5	91.2	29.1	51.5	14.1
Tulancingo de Bravo	15.4	39.7	71.1	5.7	6.6	16.5	79.2	17.6	50.5	14

Note: Prepared by the authors with information from CONEVAL (nd) *Exhibit statistical 2010 - 2020.* Coneval. Mexico. https://www.coneval.org.mx/Medicion/Paginas/Pobreza-municipio-2010-2020.aspx

RE= Educational Lag, CASS= Lack of access to health services, CASSO= Lack of access to social security, CCEV= Lack of quality and spaces in housing, CASBV= Lack of access to basic services in housing, CAA= Lack of access to food, PMUCS= Population with at least one social deficiency, PM3CS= Population with 3 or more social deficiencies, PIILP= Population with income below the poverty line by income and PIILPE= Population with income below the extreme poverty line by income.

When analyzing the data in Table 8, it can be observed that the two main social deficiencies suffered by the municipalities of the VT are: First, the lack of access to social security and second, the lack of access to health services.

CONEVAL (2018) conceptualizes social security as the set of mechanisms designed to guarantee the livelihood of individuals and their families in the event of eventualities, such as accidents or illnesses, or in the event of socially recognized circumstances, such as old age and pregnancy (p. 51). Therefore, lacking social security means lacking access to:

1. The salaried population does not have the provisions of Article 2 of the Social Security Law or its equivalents in the legislation linked to section B of Article 123 of the Constitution.

2. When the non-salaried population lacks access to the provision or voluntary contracting of medical services and also does not have Afore.

3. For the general population, there is no access to it if they do not have a retirement pension or do not have a family member who provides social security.

4. For people aged 65 or over who do not receive any adult pension.

CONEVAL (sf) defines the lack of access to health services as: A person is deprived if he or she does not have the right to receive medical services from a public institution that provides them (Mexican Social Security Institute, Social Security Institute for the Service of State Workers, Petróleos Mexicanos, Army, Navy or IMSS – Bienestar) or private medical services.

Therefore, the municipalities of the VT have the priority challenge of contributing to the reduction of poverty by managing, with the support of public policies, new federal, state and municipal programs that strengthen access to social security and access to health services.

The Municipal Functional Capacities Indicator

As mentioned above, the United Nations Development Programme [UNDP], in its 2022 report, incorporates the assessment of the functional capacities of municipal governments through the Municipal Functional Capabilities Indicator (ICFM). This is a composite indicator that measures the degree of development of five key competencies that impact the achievement of the Sustainable Development Goals (SDGs) in municipal public administrations. In addition, it seeks to promote actions in favor of people's well-being and reduce sustainable development gaps between municipal districts . Each of these elements defines a sub-index with values ranging between zero and one, where higher values represent better skills .

To avoid measurement biases associated with the population size of the districts, the UNDP classifies municipalities into four groups: those with less than 15,000 inhabitants, those with between 15,000 and 500,000 inhabitants, those with more than 500,000 inhabitants, and those located in metropolitan areas. Each group is assigned a measurement average. Municipalities whose values are below the group average are classified as having lower capacities, while those that exceed the average are considered to have greater capacities . This measurement presented by the UNDP can be observed in Table 9.

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Table 9. Classification of municipalities according to municipal functional capacities

Municipality	Population	SCD	SCE	SCF	SCG	SCI	ICFM
Acatlan	22 268	0.15	0.20	0.983	0.699	0.10	0.412 higher
Acaxochitlan	46 065	0.10	0.20	0.925	0.571	0.60	0.44 higher
Cuautepec de Hinojosa	60 421	0.20	0.20	0.983	0.733	0	0.415 higher
Metepec	13 078	0.10	0.20	0.275	0.311	0.10	0.196 less
Singuilucan	15 142	0.10	0.20	0.292	0.444	0.20	0.239 less
Santiago Tulantepec	39 561	0.10	0.20	0.225	0.444	0.50	0.272 less
Tulancingo de Bravo	168 369	0.40	0.60	0.825	0.556	0.40	0.554 higher
Tulancingo Valley	364 904	0.164	0.257	0.644	0.536	0.271	0.360 higher
State	3 082 841	0.183	0.240	0.591	0.510	0.118	0.324 less

Note: Prepared by the authors with data from UNDP (2022) Annexes – Icfm. UNDP Mexico. https://www.undp.org/es/mexico/publicaciones/informe-de-desarrollo-humano-municipal-2010-2020-una-decada-de-transformaciones-locales-en-mexico-0 .

SCD= Subindex of the capacity to diagnose, SCE= Subindex of the capacity to evaluate, SCF= Subindex of the capacity to formulate policies and strategies, SCG= Subindex of the capacity to budget, manage and implement, SCI= Subindex of the capacity to involve relevant actors and ICFM= Index of municipal functional capacities.

The lowest values are represented in orange, the highest in green.

As can be seen in Table 6, the capabilities with the most areas of opportunity are: The ability to diagnose, the ability to evaluate and the ability to involve relevant actors.

The challenge at the municipal level is to promote and consolidate diagnostic, evaluation and governance actions that allow the participation of relevant actors in joint decision-making.

The five ICFM sub-indexes (UNDP, 2022) consider the topics listed in Table 10.

Table 10. Topics evaluated in the ICFM sub-indexes

Capabilities for	Theme
1. Involve relevant actors	• Relevant actors identified and mobilized • Establish the processes. • Establish collaboration mechanisms.
2. Diagnose	• Capture, integrate and dissociate data and information. • Analysis and synthesis of data and information. • Transform information into a vision of the future.
3. Formulate policies and strategies	• Reflect and analyze alternative solutions to each public administration problem. • Specify objectives and formulate sectoral and transversal policies. • Establish methodologies to establish priorities .
4. Budget, manage and implement	• Develop, plan, manage and implement programs and projects • Manage human capital. • Establish monitoring indicators and monitoring progress made.
5. Assess	• Assess results and adjust policies. • Classify what has been learned and encourage learning. • Ensure accountability to all participants

Note: Prepared by the authors, adapted from UNDP (2022). *The five functional capacities in the UNDP capacity assessment framework* [Figure 4.1]. UNDP Mexico. Mexico.

The importance of the ICFM lies in measuring the capacities of municipalities to involve key actors in local development, achieving commitments and consensus between public servants and civil society. It seeks to measure capacities to convert these diagnoses into public policies and strategies that allow for the management, implementation and generation of useful information from the local level to increase the competencies of municipal governments in the human development of their inhabitants, assess the results that allow for the adjustment of public policies and ensure transparency and accountability to all citizens.

Factors that Impact Municipal Priority Policies

The Municipal Development Plans (2021) of the seven municipalities of the VT consider eight priority policies; of which three have a very close relationship to the issues of municipal functional capacities. These are: Governance and Accountability, Social Policy with emphasis on poverty and social cohesion , and Sectoral Planning and Evaluation.

The municipal focus groups described the factors that impact each of these priority policies. The contributions of these focus groups were processed through a word cloud, obtaining the following results.

Regarding the factors that impact the priority policy Governance and Accountability, the municipalities identified 103 factors distributed as follows: Acatlán, 12; Acaxochitlán, 16; Cuautepec de Hinojosa, 7; Metepec, 14; Santiago Tulantepec de Lugo Guerrero, 16; Singuilucan, 21; and Tulancingo de Bravo, 17.

Figure 3 represents the main frequencies of the major challenges that the VT municipalities have in this policy and that mainly influence the municipal capacity to involve relevant actors .

Figure 3. Word cloud of the main factors that impact the Governance and Accountability policy

Note: Prepared by the authors based on the Municipal Development Plans 2020 – 2024 of the seven municipalities of the VT.

From this word cloud, the main obstacles to governance and accountability are identified: the lack of clear accountability procedures, transparency and planning, as well as poor training, information systems, citizen participation, human and financial resources, and the presence of corruption. Other factors include deficiencies in administrative processes, inclusion and monitoring of public policies and municipal programs, among others . Municipalities The regions that present the greatest challenges in this policy are Acaxochitlán,

Santiago Tulantepec and Singuilucan, since they are home to nearly 80 percent of the main obstacles described,

In the case of the factors that impact the priority policy called **Social** , the municipalities identified 126 factors, distributed as follows: Acatlán 25, Acaxochitlán 14, Cuautepec de Hinojosa 17, Metepec 10, Santiago Tulantepec de Lugo Guerrero 17, Singuilucan 25 and Tulancingo de Bravo 18.

Figure 4 shows the main frequencies of the challenges identified in the Social priority policy, which mainly impact the municipal capacity to formulate policies and strategies.

Figure 4. Word cloud of the main factors that impact social policy

Note: Prepared by the authors based on the Municipal Development Plans 2020 – 2024 of the seven municipalities of the VT.

From this word cloud we can infer that the main factors that impede social development are: the lack of social development programs and policies mainly aimed at children, adolescents and women, social cohesion, contexts of violence and vulnerability, opportunities, poverty and marginalization, among others.

The municipalities The regions that present the greatest challenges in this policy are Cuautepec de Hinojosa, Singuilucan and Tulancingo de Bravo. In all three, 5 of the 7 factors identified as main are identified.

Regarding the priority policy Sectoral Planning and Evaluation, the municipalities identified a total of 84 factors distributed as follows: Acatlán, 10; Acaxochitlán, 7; Cuautepec de Hinojosa, 10; Metepec, 12; Santiago Tulantepec de Lugo Guerrero, 9; Singuilucan, 20; and Tulancingo de Bravo, 16.

Figure 5 shows the frequencies of the major challenges that the municipalities of the VT have in the priority policy of Sectoral Planning and Evaluation and that mainly influence the municipal capacities to Diagnose, Evaluate and Budget, manage and implement.

Figure 5. Word cloud of the main factors that impact the Planning and Evaluation policy

Note: Prepared by the authors based on the Municipal Development Plans 2020 – 2024 of the seven municipalities of the VT.

From this word cloud it can be inferred that the main factors that impede Sectoral Planning and Evaluation are: The lack of municipal programs and policies on the topics of planning and evaluation, performance and monitoring indicators, monitoring of development plans, trained human resources, financial resources and the participation of interest groups , among others. The municipalities The municipalities that present the greatest challenges in this policy are Acatlán, Santiago Tulantepec, Singuilucan and Tulancingo de Bravo. In Tulancingo de Bravo, these seven factors are identified and in the other three municipalities, 6 of the 7 identified as main factors are identified.

The common factor that prevents the development of these three policies is the lack of training, unconsolidated planning processes and lack of resources that affect two of the policies.

Discussion

The municipalities of the VT have similar geopolitical and social characteristics, which has led to their classification within micro regions three and four of the state of Hidalgo. In addition, they are part of the Tulancingo Valley aquifer, while five municipalities make up the atmospheric basin of the region. Currently, four municipalities belong to the metropolitan area of Tulancingo, and it is expected that the other three will be included soon upon meeting most of the necessary requirements . For this reason, it is important to know what are the differences in the human development, poverty and marginalization indices between the municipalities of the VT?

The study of the differences in the various indices highlights the importance of creating a regional or metropolitan administration, coordinating efforts and promoting the participation of all social and political sectors of the Tulancingo Valley for the development of policies and combinations of social programs that determine growth with social justice in this geographic area. These differences are presented below in Table 11.

Table 11. Differences between human development, marginalization and poverty indices

Municipality	Population	Budget 2021 (thousands)	HDI	Marginalization		Poverty		ICFM
				Degree	Place at the National level	Total %	Extreme %	
Acatlan	22 268	70 421	0.682 average	Half	1108	39.3	4.9	0.412 higher
Acaxochitlan	46 065	149 900	0.628 average	High	423	80.1	28.5	0.44 higher
Cuautepec de H	60 421	153 548	0.704 high	Low	1382	67.3	9	0.415 higher
Metepec	13 078	50 553	0.719 high	Low	1366	42.8	4.3	0.196 less
Santiago Tulantepec	39 561	82 870	0.751 high	Very Low	2059	39.2	3	0.239 less
Singuilucan	15 142	62 986	0.710 high	Low	1318	48.9	5.3	0.272 less
Tulancingo de Bravo	168 369	295 842	0.771 high	Very Low	2170	44.5	4.4	0.554 higher

Note: Prepared by the authors with information from tables 3, 4, 5, 6 and 7 of this document

The first difference lies in the population of each municipality. Table 11 shows a classification into four levels: one municipality with less than 15 thousand inhabitants, four municipalities between 15 thousand and 50 thousand, one with approximately 60 thousand inhabitants and another with more than 100 thousand. The number of inhabitants represents the level of budgetary income from the payment of taxes and local rights of citizens.

Regarding the HDI, in general four municipalities have a high life expectancy, an education level between first and third grade of secondary education, two municipalities have per capita income equivalent to two basic food baskets, the per capita income of another four is equivalent to between one and two basic baskets and only one municipality (Acaxochitlán) has income similar to the cost of a basic basket.

Another significant difference between the municipalities of the VT is the degree of marginalization. Acatlán and Acaxochitlán present a high intensity in the lack of social opportunities, in the absence of capacities to generate them and in limited access to fundamental goods and services.

According to CONAPO (2011) " Marginalization is caused by the economic production model expressed in the unequal distribution of progress, in the productive structure and in the exclusion of various social groups", therefore

" State intervention is essential to regulate the mode of production, promote economic activities, ensure the well-being of the population and localities, and incorporate into development those sectors of the population that, due to their conditions and deficiencies, do not participate in the benefits of economic dynamics or in their well-being" (p. 11)

These interventions are complicated by the distribution of population density. In two municipalities (Acatlán and Metepec), the population is entirely rural; in three others, between 51% and 68% of the inhabitants live in rural areas. One municipality has a rural population of 34%, while in another this percentage is less than 15%. Remembering that Inegi establishes that a population is rural if it contains less than 2,500 inhabitants. In the VT, almost five out of 10 people live in a rural context.

In short, marginalization affects localities and is not necessarily associated with the population or people who live there.

Regarding poverty, there are also large differences between the municipalities of the VT. In four of them, four out of 10 people lack the means to achieve the desired quality of life, in another five, seven out of 10, and the most critical, eight out of 10. As for extreme

poverty, in six municipalities it is less than one person out of 10 and in only one is it three people out of 10.

Regarding the degree of development of functional competencies, which influence the achievement of the SDGs, there are also differences in municipal public administrations generating actions in favor of people's well-being. Even though 4 municipalities are above the average set by the UNDP in its report, the reality is that only one municipality is halfway through the development of the desired skills, three municipalities are between 41% and 45% of capacity development, another two are between 24% and 27% and one is less than 20%.

It is worth noting that the Municipality of Acaxochitlán, with a rural population of 57%, has the lowest HDI, the highest marginalization and the highest percentage of poverty of the seven municipalities. However, it has the second best rating in the ICFM, which reflects a greater commitment of the authorities to reduce the social gaps in this municipality.

The importance of identifying the differences that exist in these indexes and indicators will allow decision-makers to establish focal combos of attention to the different problems that the analysis of these municipal results reveals.

As mentioned by UNDP (2022), municipal performance depends not only on the regulatory framework, but also on the ability to influence human development. However, in the VT, deficiencies in municipal functional capacities, especially in planning and evaluation, significantly limit the achievement of development objectives . It is clear that there is no direct relationship between human development indices, the creation of opportunities for development and access to human rights with the acquisition of greater municipal functional capacities.

The importance, therefore, of municipal functional capacities is to provide municipal administrations with factors or functional capacities so that development plans become a reality and solve the problems of the population and localities in order to improve their quality of life.

Finally, the opinions of the focus groups regarding the factors that impede the adequate development of municipal governance and accountability policies, the establishment of a social policy with an emphasis on poverty and social cohesion, and the sectoral planning and evaluation processes, reveal that there are concepts that are repeated in at least two of the three development policies considered: lack of training, insufficient citizen participation in decision-making, lack of municipal programs in the three policies, and lack of monitoring, follow-up and evaluation processes for municipal actions.

In conclusion, the differences in human development, marginalization and poverty indices in the municipalities of the VT demonstrate the need for a focused and coordinated intervention. Policies must prioritize the strengthening of municipal functional capacities, the reduction of the most critical social deficiencies and the promotion of strategic planning, especially in rural and marginalized municipalities.

The main limitation of this comparative study is the temporality of the information analyzed. The data on the HDI, MI and poverty correspond to the year 2020, while the ICFM information dates back to 2018.

Conclusion

There are factors beyond the control of regulatory frameworks in the administration and management of the social and human development of municipalities and their inhabitants. One of the critical factors is the educational level and experience of municipal presidents and their governing bodies, who lead the public administration during their three-year term. This situation highlights the lack of skills and capabilities of public servants to address the problems of municipal and regional development, as reflected in the results of the ICFM .

Another important factor, despite the similarity in social and economic variables between the municipalities of the VT, is the social structures. In this region, 50% of the population lives in localities with fewer than 2,500 inhabitants, which limits access to resources and opportunities, as well as their participation in decisions that affect their lives under the traditional scheme of municipal governance.

A comparison of human development, poverty and marginalization indicators reveals a clear interrelationship between them . Low human development can prevent the reduction of poverty and marginalization. Conversely, a decrease in the level of poverty and marginalization will allow human development.

These three indicators are interrelated: improvement in one can drive progress in the others, while a deterioration in one can aggravate problems in the others .

In conclusion, it is essential to have a regional administration in the VT that unify efforts, promote citizen participation in social development programs and establish a comprehensive plan for training and capacity building of public servants in strategic issues for municipal development and regional.

This regional administration could implement coordinated governance mechanisms and diagnostic strategies that prioritize the areas with the greatest lag, specifically paying attention to rural areas.

The implementation of these actions will not only reduce inequality gaps in the Tulancingo Valley, but will also lay the foundations for sustainable human development that guarantees greater opportunities and well-being for all its inhabitants.

Future Lines of Research

The analysis of the indicators of sustainable human development in the municipalities of the Tulancingo Valley reveals the need for a regional administration that unifies efforts, promotes citizen participation in social development programs and implements a program of training and capacity building for public servants in strategic issues.

Therefore, it is necessary to continue researching to answer the following questions: What methodology can contribute to understanding the development processes of the municipalities of the Tulancingo Valley? And what model of management of managerial skills will allow promoting governance in this region, in compliance with the Sustainable Development Goals?

These questions are relevant for the design of effective public policies in the region. Future research could focus on the 'Analysis of sustainable social structures in the municipalities of the Tulancingo Valley' to identify priority areas, as well as on the 'Management of managerial competencies' in order to strengthen governance and compliance with the Sustainable Development Goals.

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