

Estrategia de innovación y sostenibilidad para el desarrollo de Pluma Hidalgo, Oaxaca

*Innovation and sustainability strategy for the development of Pluma Hidalgo,
Oaxaca*

*Estratégia de inovação e sustentabilidade para o desenvolvimento de Pluma
Hidalgo, Oaxaca*

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Resumen

Según los indicadores de marginalidad del Consejo Nacional de Evaluación, el municipio de Pluma Hidalgo, Oaxaca, es uno de los más pobres de México, de ahí que sea indispensable impulsar iniciativas que permitan atender sus necesidades en materia de empleo y alimentación. Para esto, sin embargo, se deben superar algunas limitantes de índole científica que permitan crear o mejorar los mecanismos de transformación, adaptación y comercialización. El objetivo de este trabajo, por tanto, es presentar una estrategia sustentada en los enfoques teóricos de la competitividad sistémica, la innovación y la sostenibilidad para el aprovechamiento de los recursos disponibles en la mencionada localidad. Para ello, se realizó un diagnóstico a través del cual se determinó que en esta comunidad los niveles de marginación son muy altos, los cuales se caracterizan por lo siguiente: 1) disponen de recursos

con posibilidades de ser explotados, aunque no cuentan con mano de obra activa; 2) la zona se encuentra ubicada en una localización estratégica, pero carecen de vías de comunicación, servicios telefónicos alámbricos e inalámbricos, y 3) requieren capacitación para transformar los recursos que podrían ser intercambiados con las demás comunidades. Los resultados demuestran que el desarrollo económico de la población debe considerar los siguientes cuatro elementos: 1) la competitividad sistémica, donde todos los agentes en los niveles micro, meso, macro y meta participen en la competitividad de una región; 2) la microinnovación, donde los pobladores con capacidades de análisis para el bienestar de la comunidad reconozcan áreas de oportunidad para generar bienes, los cuales al ser intercambiados generen la riqueza que conduzca al desarrollo económico; 3) la sostenibilidad, de manera que la riqueza pueda generarse sin subvalorar las capacidades productivas del futuro, y 4) la educación integral para consolidar la permanencia de las anteriores.

Palabras clave: competitividad sistémica, desarrollo, educación, microinnovación, sostenibilidad.

Abstract

According to the indicators of marginality of the National Evaluation Council, the municipality of Pluma Hidalgo, Oaxaca, is one of the poorest in Mexico, which is why it is essential to promote initiatives that address their employment and nutrition needs. For this, however, some limitations of a scientific nature must be overcome to create or improve the mechanisms of transformation, adaptation and commercialization. The objective of this work, therefore, is to present a strategy based on the theoretical approaches of systemic competitiveness, innovation and sustainability for the use of the resources available in the aforementioned location. For this, a diagnosis was made to determine that in this community the levels of marginalization are very high, which are characterized by the following points: 1) although they do not have active workforce, they have resources with possibilities of being exploited, 2) the area is located in a strategic location, but lacks communication routes, both wired and wireless telephone services, and 3) they require training to transform the resources that can be exchanged with the other communities. The results show that the economic development of the population must consider the following four elements: 1) systemic competitiveness, in which all agents at the micro, meso, macro and meta levels participate in

the competitiveness of a region, 2) microinnovation, in which villagers with analytical skills for the well-being of the community recognize areas of opportunity to generate goods, which, when exchanged, generate the wealth that leads to economic development, 3) sustainability, so that wealth can be generated without undervaluing the productive capacities of the future, and 4) integral education to consolidate the permanence of the previous ones.

Keywords: systemic competitiveness, development, education, microinnovation, sustainability.

Resumo

De acordo com os indicadores de marginalidade do Conselho Nacional de Avaliação, o município de Pluma Hidalgo, Oaxaca, é um dos mais pobres do México, por isso é essencial promover iniciativas que atendam às suas necessidades de emprego e nutrição. Para isso, no entanto, algumas limitações de natureza científica devem ser superadas, permitindo criar ou aperfeiçoar os mecanismos de transformação, adaptação e comercialização. O objetivo deste trabalho, portanto, é apresentar uma estratégia baseada nas abordagens teóricas de competitividade sistêmica, inovação e sustentabilidade para o uso dos recursos disponíveis no local supracitado. Para isso, foi feito um diagnóstico através do qual se determinou que nesta comunidade os níveis de marginalização são muito elevados, os quais se caracterizam pelo seguinte: 1) eles têm recursos com possibilidades de serem explorados, embora não tenham o trabalho ativo; 2) a área está localizada em uma localização estratégica, mas carece de rotas de comunicação, serviços telefônicos fixos e sem fio, e 3) requer treinamento para transformar os recursos que poderiam ser trocados com as outras comunidades. Os resultados mostram que o desenvolvimento econômico da população deve considerar os seguintes quatro elementos: 1) competitividade sistêmica, onde todos os agentes nos níveis micro, meso, macro e meta participam da competitividade de uma região; 2) microinovação, onde os moradores com habilidades analíticas para o bem-estar da comunidade reconhecem áreas de oportunidade para gerar bens, que, quando trocados, geram a riqueza que leva ao desenvolvimento econômico; 3) sustentabilidade, para que a riqueza possa ser gerada sem subvalorizar as capacidades produtivas do futuro, e 4) a educação integral para consolidar a permanência das anteriores.

Palavras-chave: competitividade sistêmica, desenvolvimento, educação, microinovação, sustentabilidade.

Introduction

According to the indicators of marginality of the National Evaluation Council (De la Vega, 2014), the municipality of Pluma Hidalgo, Oaxaca, is one of the poorest in Mexico, which is why it is essential to promote initiatives that meet its needs in terms of employment and food. This can be achieved if we take into account not only that in this community there are spaces such as public markets where people go to get goods and services, but also that in many opportunities the "adversities" of a certain area can be used to promote its economic development.

This is evident, for example, when it is observed that the communities located in clay soils use the raw material of their surroundings to make tiles or bricks, or when it is appreciated that people who live in places with humid climate rely on that climatic variable to plant and harvest food that only occurs under these environmental conditions.

However, although it is true that communities can develop many of these advances by their own means, it is also true that in some cases these processes -mainly those related to the transformation, adaptation and commercialization of products- could be accelerated or improve with the help of institutions, such as universities and research centers.

In this regard, authors such as Rockström et al. (2017) consider that global environmental changes in anthropocene should be defined at all scales, so that efforts can be joined to eradicate poverty and hunger. Based on the foregoing, the purpose of this paper is to try to explain an innovation and sustainability strategy as a framework for the use of resources available in the municipality of Pluma Hidalgo, Oaxaca, so that the growth of their wealth and sustainability as a limit to the exploitation of natural resources.

Background

The sustenance of this work is in a previous investigation (carried out in 2016 by two of the authors of this article) that resulted in an academic text of the XXI Summer of Scientific and Technological Research in area V in the Inter-institutional Program for the Strengthening of the Research and the post-graduate course of the Pacific Dolphin, with professors of different universities and faculties of the country, like the Faculty of Accounting and Administration, the Autonomous Benito Juárez University of Oaxaca, the Autonomous University of Guerrero, the Autonomous University of Huatusco (Veracruz) , the Pedagogical University of the State of Sinaloa, the Higher Institute of Pátzcuaro Michoacán, the University of Colima, and the Interdisciplinary Professional Unit of Engineering and Social and Administrative Sciences of the National Polytechnic Institute, in the Poverty, Marginalization and Inequality project in the municipality of Pluma Hidalgo, Oaxaca.

Derived from this project, the work called Diagnosis for the development of Pluma Hidalgo, Oaxaca (Gómez and Rojas, 2017), emerged, which constitutes the first part of the three that integrate it, namely: 1) diagnosis, 2) strategy for development and sustainability, 3) instrumentation or application of economic policy.

The results of this first stage are based on the systemic competitiveness approach and the theory of growth. The systemic competitiveness, formulated by the German Institute of Development (IAD), indicates that in an economic system all the elements are interrelated under the effect of synergy. This means that each generates impulses and impacts others creating non-linear results, where the result of the total of the elements is different from the sum of them taken individually. In other words, an education for sustainability and human rights are key factors for the necessary transition towards sustainable societies (Gil and Vilches, 2017; Olmos, 2017). This concept, applied to the municipality of Pluma Hidalgo, serves to indicate that this locality needs to grow internally in the economic sphere to promote other activities.

Method

In this work we have tried to study the economic situation of the municipality of Pluma Hidalgo, Oaxaca, whose distinguishing characteristics are the following:

- a. It is one of the localities in Mexico with the highest poverty rates, generated by the disasters caused by hurricane Paulina, which ended almost all coffee production and, consequently, with employment for its 3 500 inhabitants.
- b. The population is located on the top of the hill of Pluma Hidalgo, and resides, mainly, in dwellings built on the slopes of the isthmus, which makes it difficult to plant grain in sufficient quantities to trade.
- c. There is no road system that adequately communicates this population with the main road that connects the capital Oaxaca with Huatulco. This diminishes their possibilities of education, housing, health, as well as the two central themes of this research: employment and nutrition.

The qualitative method was used, and semi-structured interviews were used to gather the comments of the population (see table 1). In order to know the main elements of the economic and social system of Pluma Hidalgo, interviews were applied to experts, which were selected by the municipal councilor in charge of the coordination of the visit, who pointed out that the most knowledgeable of the History and the conditions of the community would be the municipal ex-presidents, as well as a high school teacher who has a recognized prestige in the community, as well as other prominent people according to his opinion. The names of these people and their address were provided by this official and so we proceeded to search, walking the only street in this place. The people interviewed were: Mrs. Rosalba Franco Bohórquez; Mr. Panadero Alberto Franco; Mr. Felipe Lujan; Mrs. Socorro Romero Rojas; Mr. Professor Ignacio Cristóbal López; Mr. Genaro Martínez

To make the interviews it was decided to start by the expert whose domicile was the farthest, and go closer to the center of the town, where the municipal building is located. The first home that is the furthest, is less than five hundred meters away. Gómez J. y Rojas E. (2017).

Tabla 1. Concentrado de respuestas. Investigación para el diagnóstico socioeconómico de Pluma Hidalgo, Oaxaca

PREGUNTA/ ENTREVISTADO	SRA. ROSALBA FRANCO BOHORQUEZ	SR. PANADERO ALBERTO FRANCO	SR. FELIPE LUJAN	SRA. SOCORRO ROMERO ROJAS	SR. PROFESOR IGNACIO CRISTOBAL LÓPEZ	SR. GENARO MARTÍNEZ
1.- ¿Cuáles actividades económicas son las más importantes en esta comunidad?	TURISMO	COMERCIO PANADERÍAS PRODUCCIÓN DE CERDO	PLATANO RESTAURAN- TERA	HORTALIZAS PLATANO GUANABANA LIMÓN	PLATANO GUANABANA	CAFÉ
2.- ¿Cuál es el nivel de educación de este municipio?	SECUNDARIA MÁXIMO	MUY BAJO HACE FALTA UNIVERSI- DAD	HAY BACHILLERATO	NO HAY ESCUELAS	FALTA DE EMPLEO, SOLO HACEN LA PRIMARIA	SECUNDARIA
3.- ¿Cuáles nuevas empresas se han establecido en los últimos años?	NINGUNA	NO HAN LLEGADO	NO	NINGUNA	NINGUNA	NINGUNA
4.- ¿Cuál es el efecto de la emigración de jóvenes?	TODO EL QUE SALE A TRABAJAR YA NO REGRESA	SE VAN A OAXACA, MÉXICO, E.U.	AQUÍ NO TIENEN OPORTUNIDA- DES	REQUIEREN PREPARATORIA Y UNIVERSIDAD PARA QUE NO SE VAYAN A OTRO LADO A ESTUDIAR	NO HAY EMPLEO	FALTA DE ESCUELAS
5.- ¿Cuál es el comportamiento del Turismo?	NO LLEGA	NO HAY	NO HAY	NO HAY INFRAestruc- TURA PARA RECIBIR AL TURISMO	SE REQUIERE PASO HACIA LAS BAHÍAS DE HUATULCO	NO HAY
6.- Qué tipo de infraestructura adicional haría falta?	NUEVA CARRETERA PARA SUBIR HACIA EL PUEBLO	FUENTES DE TRABAJO TURISMO EDUCACIÓN	PREPARAR AL PUEBLO PARA RECIBIR AL TURISMO	TURISMO CRÍA DE CERDO FARMACIA	SE REQUIEREN INDUSTRIAS PARA GENERAR EMPLEO	COMBATIR LA POBREZA

Fuente: Gómez, J. y Rojas, E. (2017) p.49

The results of the interviews were analyzed taking into account three theoretical approaches: the first was that of systemic competitiveness (Esser, Hillebrand, Messner and Meyer-Stamer, 1996), promoted from the general theory of systems. It recognizes the intercommunication and recursion of all elements of the community from different levels: at the micro level, family units and their capacities for survival are considered. At the meso level, the municipal government is located, entity in charge of promoting activities related to education, commerce and employment. The macro level, made up of public policies at the state and federal levels, and the target level, constituted by the experience of the community elders, as well as by people who provide resources from other states or countries.

As a second approach, innovation has been used from the business perspective, which in this research is defined as microinnovation (Gómez, 2014). This analyzes the necessary stages for a new product to arrive, spread and generate wealth in the markets.

Finally, the third theoretical element was that of sustainability, which maintains the principles of economic and social development with a view to preserving resources, since they have been evolving in a new framework called the evaluation of life cycle sustainability. Its practical application requires the integration of several methods, tools and disciplines (Onat, Kucukvar, Halog and Cloutier, 2017).

Proposal

In order to recover the economic and social life of the municipality of Pluma Hidalgo, problems related to food and employment must be urgently addressed, since according to official data from 2015 (see annex), 78.9% of the population is in a situation of poverty, which has caused that a considerable number of young people have chosen to leave this locality.

In this sense, and as a recovery proposal, it can be pointed out the need to build a swine farm not only to guarantee the community the production of meat in a relatively short period of time (less than a year), but also to generate greater sources of employment. For this, however, it is necessary to implement an educational program that, in an integral way, trains the population of all ages in the use of the resources that must be managed to materialize said proposal, because according to Wenche et al. (2017), a sustainable project assumes, first, the perspective of community organization.

This type of actions, based on micro-innovation and sustainability, can serve to create other initiatives that promote viable economic development that meets "the needs of present generations without compromising the ability of future generations to meet their own needs" (Luffiego and Rabadán, 2000, p.474). In this way, options can be offered to establish bases that allow improving the socioeconomic conditions not only of this municipality, but also of the marginal areas of the country located in the south and in the southeast.

It should be noted, however, that this type of social development refers "to the concrete result of the combination of a range of actions (public and private) and institutional (political) interventions aimed at creating conditions and opportunities for individuals to perform their ability to live "(Rodríguez and Gutiérrez, 2010, p.13). This means that the viability of the relationship to be achieved between the socioeconomic system and its ecosystem (Naredo, 1994) must be exploited in order to achieve solid sustainability.

In effect, when applying the principles of microinnovation, it should be considered that the processes followed can not be carried out by a single individual or a company, but that certain stages are required, attended by specialists sequentially, which can be synthesized from the following way: 1) search for market opportunities, 2) invention, 3) prototype development, 4) investment project design, 5) business plan, 6) industrial construction and 7) market penetration. These phases, of course, must be fulfilled in a friendly social environment where educational programs prevail for the entire population (primary, middle and high), so that the development of the community can be promoted in an integral sense.

Added to this, and as already mentioned, any strategy raised from the systemic competitiveness approach must consider the different levels of execution. At the micro level, for example, it should be foreseen that the productive agents have shortcomings in relation to productive, technological, institutional and capital units, so that workers require basic and technological training in the short and medium term, respectively. Regarding consumers, it should be noted that these are made up of a population that is unemployed, so that their income is below the welfare line.

At the meso level, links should be established with the state and federal government, as well as with universities to promote educational programs that raise social awareness of the situation of this community, supported by history, traditions and the effort to continue . This training process is a long-term issue that can only be addressed through public education.

At the macro level, it is necessary to establish links, in the medium term, with the various productive sectors of the country for national trade -export (where appropriate) and supply-.

Finally, at the target level, the economic and social culture of the population in general must be strengthened (Esser et al., 1996) as cultural and ideological elements that strengthen the ideology and culture of the population of this municipality.

It should be noted, on the other hand, that in this proposal the role of the farmers and coffee growers has not been considered because their economic level has remained despite the fall in coffee production. In addition, there are various attempts to support this activity, through projects such as the coffee route, public financing programs managed at the federal level and various plant health strategies.

Likewise, some evident and hidden capacities were detected to achieve the development of this community, as the conviction of its inhabitants to overcome the state of precariousness caused mainly by Hurricane Paulina, which left them without work and without food. That attitude of the plumenses is the greatest virtue for recovery.

Another virtue of this population has to do with the dominance of women and the absence of alcoholism, which allows us to suppose that a promotion policy will find the fertile path for its promotion.

It is important to mention, finally, some limitations found in this research, such as difficult access to the community, transportation, lack of information, weather, etc. Even so, it is necessary to promote other studies to address areas unknown to the academic community, because that way new lines of research can be created.

Conclusion

Currently, Mexico has tried to eradicate poverty through monetary allocations that have proven to be only palliatives that do not eradicate the root problem because they do not promote the human strengths needed to build local progress. In this sense, we must change to a model in which marginalized communities produce products not only for consumption, but also to be exported to nearby communities.

To do this, the available labor force must be activated and trained, work on the improvement of the different communication channels (roads, telephone, etc.) and promote a public policy based on the theory of systemic competitiveness to support the generation of companies. In this way, strategies can be promoted that serve as a pivot for the construction of a regional program to combat poverty through the generation of employment in a sustainable manner.

In other words, it is suggested that the following elements be taken into account for the economic development of all populations: 1) systemic competitiveness, where all agents participate in the competitiveness of a region; 2) microinnovation, where people with analytical capacities for the welfare of the population recognize areas of opportunity to generate goods, which, when exchanged, are placed in the context of innovation; 3) sustainability, so that wealth can be generated without undervaluing the productive capacities of the future, and 4) an integral educational scheme that accompanies all stages in the life of individuals.

Lastly, the pending lines to be addressed include industrial development, in particular the introduction and use of new communication technologies, as well as the accompaniment of universities and research and development institutions. This analysis can be completed when starting the construction of the final project and covering at least the first two stages taught in table 2.

Tabla 2. Las dos primeras etapas de la investigación en Pluma Hidalgo, Oaxaca

Competitividad sistémica	Actividad	Microinnovación	Sostenibilidad
Micro	Producción de alimentos de rápida maduración y fácil comercialización.	Búsqueda de oportunidades en los mercados. Organización de pequeños productores.	Identificación del capital natural sustentable de la comunidad.
Meso	Cooperativas vinculadas con el municipio.	Invento. Elaboración de prototipo. Diseño de proyecto de inversión. Plan de negocio.	Acompañamiento municipal en la cultura de la sostenibilidad.
Macro	Establecer contactos comerciales con comunidades cercanas.	Construcción industrial.	Vinculación de las políticas de sostenibilidad municipales con las estatales y federales.
Meta	Campañas mercadológicas a nivel nacional e internacional.	Penetración en los mercados	Campañas de difusión para fortalecer la cultura de sostenibilidad.

Fuente: Elaboración propia

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Anexo. Indicadores de pobreza del municipio de Pluma Hidalgo, Oaxaca (2010-2015)

		Porcentaje de población		Número de personas		Carencias promedio	
		2010	2015	2010	2015	2010	2015
Pobreza	En situación de pobreza	84.6	78.9	2580	2580	3.5	3.5
	En situación de pobreza moderada	40.3	48.4	1228	1228	2.9	2.9
	En situación de pobreza extrema	44.3	30.5	1352	1352	4.1	4.1
	Por vulnerable por carencias sociales	14.8	20.2	451	451	2.6	3
	Por vulnerable por ingresos	0.2	0.4	6	6		2.5
	No pobre y no vulnerable	0.4	0.5	13	13		3.7
Privación social	Con al menos una carencia social	99.4	99.1	3031	3031	3.4	2.4
	Con al menos tres carencias sociales	74	62.6	2257	2257	4	
Carencias sociales	Con carencia por rezago educativo	41.5	38.8	1265	1265	4.1	
	Con carencia por acceso a los servicios de salud	35.3	9.2	1077	1077	4.2	2.9
	Con carencia por acceso a la seguridad social	88.9	89.2	2710	2710	3.5	3.6
	Con carencia por calidad y espacios de la vivienda	64	57.3	1951	1951	4	3.5
	Con carencia por acceso a los servicios básicos en la vivienda	77.8	78.6	2374	2374	3.7	4.2
	Con carencia por acceso a la alimentación	28.9	12.3	883	2580	4.6	2.9
Bienestar	Con ingreso inferior a la línea de bienestar	84.8	79.3	2586	2586	3.5	3.5
	Con ingreso inferior a la línea de bienestar mínimo	54	41.9	1646	1646	3.7	3.2

Fuente: Elaboración propia adaptado de estimaciones del Coneval, con base en el MCS-ENIGH 2010.

La muestra del censo de población y vivienda 2010. El modelo estadístico 2015 para la continuidad del MCS-ENIGH y la encuesta intercensal 2015 para el Municipio de Pluma Hidalgo, Oaxaca.

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