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Presentation of the Content

In the first article we present, *360-degree and leadership assessment in a service company in northern Mexico applying multivariate techniques* by ESPINOZA-PRIETO, José Roberto, ORTEGA-MONTES, Fabiola Iveth, RUBIO-ARIAS, Héctor Osbaldo and DIAZ-PLASCENCIA, Daniel, with adscription in the, Universidad Autónoma de Chihuahua, as following article we present, *Geographical synthesis of the landscape in Vista Hermosa, Acapulco* by NIÑO-GUTIÉRREZ, Naú Silverio, with adscription in the, Universidad Autónoma de Guerrero, as following article we present, *Financial Sustainability in MSMEs of civil and electrical engineering in Coatzacoalcos* by MENDOZA-GONZÁLEZ, Felipe, CÓRDOVA-ESCOBEDO, Jesús Fausto, RUEDA-MARTINEZ, Fernando and GARCÍA-MUÑOZ APARICIO, Cecilia, with adscription in the, Universidad Veracruzana, as following article we present, *Growth and development of Greek basil variety Medinette in greenhouses and shade netting* by JUÁREZ-ROSETE, Cecilia Rocío, BUGARÍN-MONTOYA, Rubén, ÁVILA-VILLARREAL, Gabriela María and AGUILAR-CASTILLO, Juan Apolinar, with adscription in the, Universidad Autónoma de Nayarit.

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360-degree and leadership assessment in a service company in northern Mexico applying multivariate techniques

Evaluación de 360 grados y de liderazgo en una empresa de servicios en el norte de México aplicando técnicas multivariadas

ESPINOZA-PRIETO, José Roberto†, ORTEGA-MONTES, Fabiola Iveth*, RUBIO-ARIAS, Héctor Osbaldo and DIAZ-PLASCENCIA, Daniel

Universidad Autónoma de Chihuahua, Facultad de Ciencias Agrícolas y Forestales

ID 1st Author: *José Roberto, Espinoza-Prieto* / ORC ID: 0000-0003-0697-0852, CVU CONACYT ID: 426794

ID 1st Co-author: *Fabiola Iveth, Ortega-Montes* / ORC ID: 0000-0002-2071-7901, CVU CONACYT ID: 343986

ID 2nd Co-author: *Héctor Osbaldo, Rubio-Arias* / ORC ID: 0000-0002-0363-3407, CVU CONACYT ID: 120252

ID 3rd Co-author: *Daniel, Díaz-Plascencia* / ORC ID: 0000-0002-8309-8597, CVU CONACYT ID: 164545

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Abstract

The aim was to formulate a 360-degree and leadership evaluation of a service company in northern Mexico to determine its strengths and areas of opportunity. Technical, professional and personal skills were evaluated through an instrument of 44 questions operating interviews with the main collaborators. The instrument was properly validated with the Cronbach's alpha parameter. The information was analyzed with a principal component analysis (PCA) and, in addition, conceptual maps were made using multidimensional scaling. The PCA results showed that six components explain 85% of the information and the scores of communalities with a range of 0.750 to 0.943. Visualized strengths highlight paying attention to customer needs, such as conversations and communication skills. As areas of opportunity were noted the definition of objectives, the measurement of performance in the short term and long-term, such as the need to motivate the work team (discriminant values: 0.715 to 0.739). It is concluded that the implementations of multivariate techniques allow visualizing the way in which the collaborators are perceived in their performance in the company and values can be assigned to variables that allow improving the work environment and productivity.

360-degree, Evaluation, Leadership

Resumen

El objetivo fue elaborar una evaluación de 360 grados y de liderazgo de una empresa de servicio en el norte de México para determinar sus fortalezas y áreas de oportunidad. Se evaluaron competencias técnicas, profesionales y personales mediante un instrumento de 44 preguntas mediante entrevista a los principales colaboradores. El instrumento se validó con el parámetro de alfa de Cronbach. La información se analizó con un análisis de componentes principales (ACP) y se realizaron mapas conceptuales mediante escalamiento multidimensional. Los resultados del ACP mostraron que seis componentes explican el 85% de la información y las puntuaciones de las communalidades con un rango de 0.750 a 0.943. Las fortalezas visualizadas destacan prestar atención a las necesidades de los clientes, como a las conversaciones y habilidades de comunicación. Como áreas de oportunidad se observaron la definición de objetivos, la medición del desempeño en el corto y largo plazo, como la necesidad de motivar al equipo de trabajo (valores discriminantes: 0.715 a 0.739). Se concluye que las implementaciones de técnicas multivariadas permiten visualizar la manera en que los colaboradores son percibidos en su actuación en la empresa y se puede asignar valores a variables que permitan mejorar el clima laboral y la productividad.

Multivaridas, Evaluación, Liderazgo

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* Correspondence to Author (e-mail: fortega@uach.mx)

† Researcher contributing first author.

Introduction

A 360-degree appraisal is a tool or process to obtain confidential and anonymous information about workers in a given company. This type of assessment is implemented to improve the functioning of the company or even to motivate work and activities in order to increase workers' performance and productivity (SafetyCulture, 2022). The German military participating in the Second World War were the first to implement this evaluation tool in order to evaluate the participation of their officers (Appraisal 360, 2022). Peiperl (2001) conducted 360-degree appraisals in 17 companies of different sizes in the number of employees and came up with four interesting paradoxes: the role paradox, which states that you cannot be judge and jury; the group performance paradox, which states that by focusing on one person you can lose coherence in the group; the size paradox, which explains that there are things that are easy to obtain but difficult to apply; and the reward paradox, which states that a person's reward is beneficial but helps very little.

Typically a 360-degree assessment weights personal competencies on the one hand and technical competencies on the other (Madge, 2019). Among the main personal competencies that are assessed are: leadership, emotional intelligence, teamwork, communication, creativity, organisation and organisational values. Among the technical competencies that are assessed are: technical knowledge, product or service mastery, customer support and sales skills. The objective of this case study was to determine through a 360-degree assessment the strengths and areas of opportunity of managers and executives to improve the working environment of the company. It is hoped that these results will lead to better customer service and serve as a basis for other similar companies in Mexico and other areas.

Methodology

This case study was based on a 360-degree and leadership assessment in a company located in the city of Chihuahua, Chihuahua State in Mexico. The company serves an average of more than 250 clients per day. Six of the company's main employees were selected, considering their position of authority and responsibility.

Eleven technical and personal competencies were assessed with a total of 44 questions as ordinal variables with the following five possible answers: poor (1), fair (2), good (3), very good (4) and excellent (5). In addition, a total of four open-ended questions were considered. The evaluation instrument was carried out by means of a formal, personalised interview with all participants. Anonymously, each participant evaluated his or her peers.

The five stages that were implemented for the 360-degree and leadership assessment were as follows: Stage 1. Clear and specific definition of the objective of the process. Stage 2. Selection of participants. Stage 3. Selection of competency areas. Step 4. Define criteria, methodologies and networks to evaluate the project. Step 5. Defining the confidentiality of the evaluations. The main competencies for evaluation were selected jointly with the company and represent: 1) Communication, 2) Leadership, 3) Motivation, 4) Teamwork, 5) Problem solving, 6) Continuous improvement, 7) Organisation and time management, 8) Customer focus, 9) Strategic thinking, 10) Focus on results, and 11) Personal capacity.

Previously, the instrument was validated with Cronbach's alpha parameter, making a statistical and explorative analysis of the data. A principal component analysis (PCA) was used as well as a multidimensional scaling analysis (ALSCAL) and tests of statistical independence. The SPSS version 20 statistical software was used for data analysis.

Results

250 data on technical, professional and vocational competencies were obtained, assessed and visualised using descriptive statistics. The Cronbach's alpha parameter of 0.702 was considered good and consistent. Table 1 shows the means of the technical, professional and personal competences.

Descriptive statistics	Media	Deviation	N	of analysis
Attentive in conversations.	3.78	0.91	32	
Understands the customer's needs and seeks to exceed their expectations.	3.78	0.91	32	
Is perceived by the customer as a reliable person who represents the company.	3.66	0.90	32	
You express your ideas with clarity and respect for the other person.	3.63	1.04	32	
Acts as an active member of the team.	3.56	1.01	32	
Looks for ways to provide added value to customers.	3.56	0.91	32	
Efficiently uses assigned resources to carry out his/her activities.	3.53	0.98	32	
Establishes and maintains long-term relationships with customers by gaining their trust.	3.53	0.84	32	
Recognises and seizes opportunities.	3.53	0.92	32	
Demonstrates interest in the achievement of individual and organisational goals with commitment.	3.53	1.08	32	
Seeks to strengthen skills and work on areas of opportunity.	3.50	1.16	32	
Demonstrates technical knowledge to carry out their work.	3.50	1.02	32	
How to rate their performance towards the achievement of organisational goals.	3.50	1.08	32	
Maintains high levels of performance standards.	3.50	1.11	32	
Shares information effectively and assertively.	3.47	1.08	32	

Table 1 Competences with the highest averages in case
Source: Own Elaboration

Higher means can be considered as strengths. When implementing PCA, it is noticeable that the first principal components describe most of the variance of the data. The lower order components sometimes contain the most important factor in the database and the others may be relegated.

There are different techniques for estimating the number of principal components that are relevant; the most appropriate technique will depend on the structure of correlations in the original data. In other words, the communality is the proportion of variability of each variable that is explained by the factors. The closer the communality is to 1, the better the factors of a given variable are explained as can be seen in Table 2.

Communalities	Inicial	Extraction
Shares information effectively and assertively.	1	0.811
Listens actively and is receptive to the opinions of others.	1	0.854
Listens attentively in conversations.	1	0.868
Communicates clearly in writing.	1	0.819
Expresses ideas clearly and with respect for the other person.	1	0.841
Encourages open and direct dialogue.	1	0.849
Acts as an active member of the team.	1	0.862
Inspires, motivates and guides the team to achieve goals.	1	0.943
Shares knowledge, skills and experience.	1	0.766
Shares recognition of achievements with the rest of the team.	1	0.750
Gathers information from different sources to make a decision.	1	0.830
Focuses on key issues to solve problems.	1	0.816
Has flexibility and willingness to deal with situations.	1	0.785
Considers implications before taking action.	1	0.865
Remains calm in difficult situations.	1	0.886
Adapts to working with new processes and tasks.	1	0.912
Does not show resistance to other people's ideas.	1	0.915
Actively seeks new ways of doing things.	1	0.908
Strives to innovate and contribute ideas.	1	0.855
Seeks to strengthen their skills and work on their areas of opportunity.	1	0.804
Is able to prioritise work tasks.	1	0.858
Effectively completes assigned projects in a timely manner.	1	0.850
Efficiently uses assigned resources to carry out his/her activities.	1	0.892
Establishes and maintains long-term relationships with clients by gaining their trust.	1	0.908
Determines objectives and sets priorities to achieve them.	1	0.895
Seeks ways to provide added value to clients.	1	0.889
Understands customer needs and seeks to exceed customer expectations.	1	0.860
Is perceived by the customer as a reliable person who represents the company.	1	0.912
Has demonstrated outstanding and exceptional knowledge, skills and experience.	1	0.823
Demonstrates technical knowledge to carry out their work.	1	0.756
Demonstrates exceptional attitude and results in reducing costs and increasing productivity.	1	0.781
Has the knowledge to train and coach employees.	1	0.812
Has the responsibility and authority to lead the company.	1	0.885
Is able to motivate the whole team.	1	0.924
How to rate their performance in order to achieve the organisation's objectives.	1	0.898
Understands the short and long term implications of their decisions for the business.	1	0.836
Determines objectives and sets priorities to achieve them.	1	0.896
Has a long-term vision and looks for opportunities to lead the organisation to growth.	1	0.901
Bases strategic decisions and actions on the organisation's vision, mission and values.	1	0.865
Recognises and seizes opportunities.	1	0.852
Maintains high levels of performance standards.	1	0.887
Demonstrates interest in the achievement of individual and organisational goals with commitment.	1	0.828
Cluster case number.	1	0.782
Distance of the case from the cluster centre of its ranking.	1	0.865
Extraction method: Principal component analysis.		

Table 2 Results of the communalities by the Principal Components method
Source: Own Elaboration

From the implemented analysis it can be observed that the following four variables presented the values closest to 1.0: 1) Ability to motivate the entire work team; 2) does not show resistance to the ideas of other people; 3) adapts to working with new processes and tasks and; 4) is perceived by the client as a reliable person who represents the company.

The variables that could be considered as areas of opportunity since they presented values between 0.70 and 0.80 of communality are: 1) shares recognition of achievements to the rest of the team; 2) denotes technical knowledge to carry out his work; 3) shares his knowledge, skills and experience and 4) demonstrates exceptional attitude and results in reducing costs and increasing productivity.

It is important to mention that values of communalities below 0.50 are considered moderate to low; however, in the six evaluated collaborators, they did not show values below 0.70.

It is important to note that the variables used in this study were perfectly adapted to the PCA, as the dimensions were reduced by more than 70%. In other words, only six components are explaining 85.44% of the total of the 44 variables used. This result can be seen in Table 3 and its graphical representation in Figure 1.

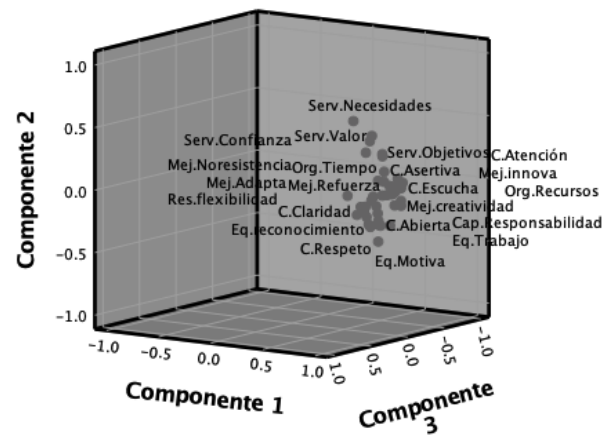


Figure 1 Main components of the model

To validate the effectiveness of the PCA method, the Kaise, Meyer-Olkin parameter is used. This analysis contrasts whether the correlations between the variables studied are minimal and a Kmo value of 0.730 was determined, which is considered moderate (P=0.012).

It is well known that the ALSICAL statistical tool starts from a matrix of distances (similarities) and results in a representation on an ordinary Euclidean scale. In other words, the distances on this scale should be as close as possible to the starting distances. In other words, it is a matter of constructing a few variables (two is the most common, as they are representable on paper) and giving scores to individuals, so that the distances between scores represent the distances given in the problem statement.

In the literature, these scores are often referred to as principal coordinates, and for this reason, multidimensional scaling is also known as principal coordinate analysis. Sometimes the information available is a measure of distance or a measure of discrepancy or difference between individuals, while at other times a measure of similarity between individuals is available.

A common solution will be provided whether the starting data are distances or similarities, as it will in fact be possible to transform a measure of similarity into a measure of distance. This implies that maps or diagrams can be produced to illustrate the stimuli perceived by the individuals under study. Using this criterion, personal, technical and professional competences were plotted and are exemplified in Figure 2.

Component	Total variance explained					
	Initial eigenvalues	Sum of the squared saturations of the extraction				
Total	% of variance	% accumulated	Total	% of the variance	% accumulated	Total
1	30.457	69.220	69.220	30.457	69.220	69.220
2	2.221	5.047	74.267	2.221	5.047	74.267
3	1.560	3.545	77.812	1.560	3.545	77.812
4	1.253	2.847	80.59	1.253	2.847	80.659
5	1.097	2.494	83.153	1.097	2.494	83.153
6	1.009	2.293	85.446	1.009	2.293	85.446
7	.0873	1.984	87.430			
8	0.725	1648	89.079			
9	0.653	1.484	90.563			
10	0.532	1.210	91.773			
11	0.471	1.070	92.842			
12	0.414	0.941	93.783			
13	0.375	0.852	94.635			
14	0.350	0.797	95.431			

Table 3 Explained variance of principal components
Source: Own Elaboration

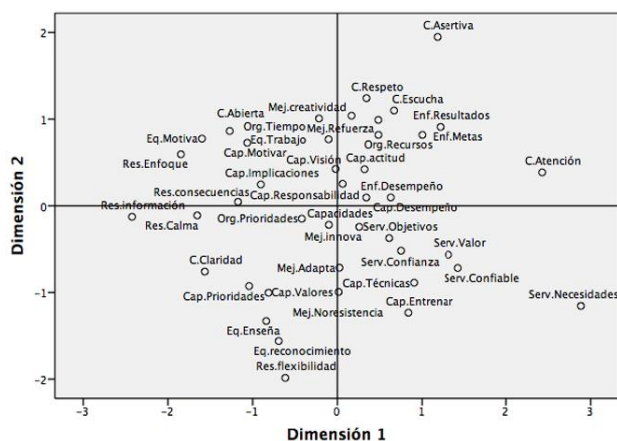


Figure 2 Perception of competencies by all employees

For this methodology the parameters used are the Stress level, which the closer to 0 the better, and the RSQ value, which is a coefficient of determination, being in this case a value closer to 1.0. The values obtained in the present study were a stress value of 0.27962 and an RSQ of 0.62205, which indicates that this map elaborated by multidimensional scaling can be considered as moderate.

This multivariate technique allows concept maps to be produced for each of the variables considered in this case study. For example, Figure 3 shows the employee in the sales management position.

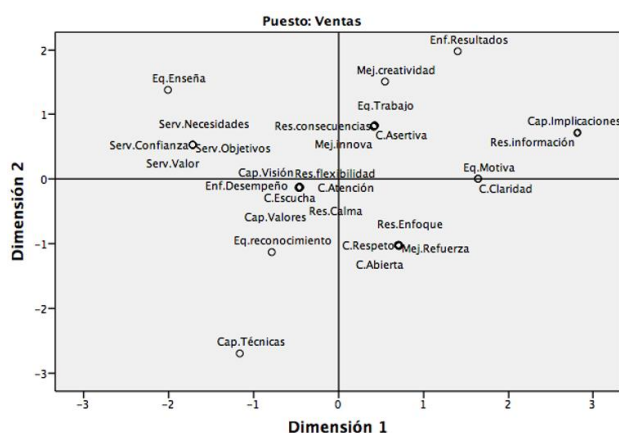


Figure 3 Sales Manager's Perception by Multidimensional Scaling

Another example is the concept map of a customer service employee (Figure 4).

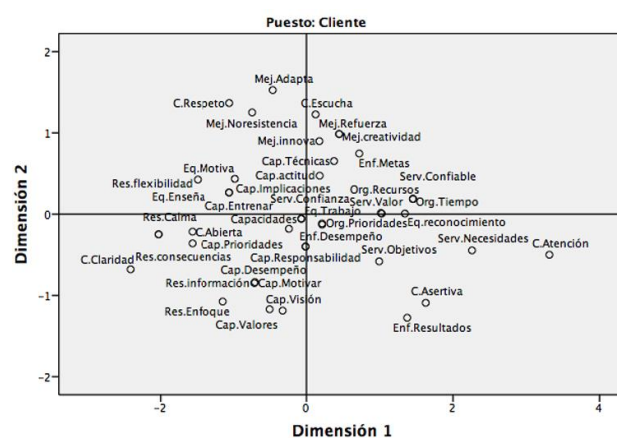


Figure 4 Customer Service Manager Perception by Multidimensional Scaling

The difference between the employee in the managerial position and the customer service position can be analysed. For these cases, a Stress value of 0.08329 and an RSQ of 0.98394 were obtained. It can be seen that the competencies of focusing on results, paying attention to conversations, sharing information effectively and assertively, among others, are more highly perceived by the other five employees in the case of the customer service manager.

Finally, a discriminant analysis and statistical independence tests were carried out in this study. The objective of the discriminant analysis is to maximise the variance between groups and minimise the inter-group variance through linear combinations. In this way, cases can be grouped with a certain probability that their value can be known and the competencies of the most observed employees or, failing that, discriminated against by the other employees can be determined.

In this case, the variable with the highest score comprises the implications of their decisions for the business in the short and long term (0.739), followed by having the responsibility and authority to manage the company (0.733), being able to motivate their entire work team (0.723) and so on, as can be seen in Figure 5.

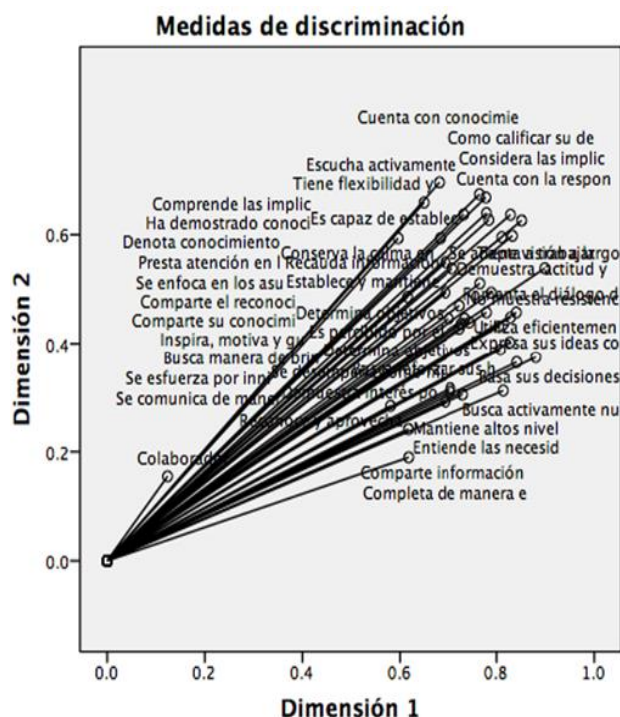


Figure 5 Main discriminated variables of the 360o evaluation

With respect to the statistical independence tests, between each of the items or variables with respect to each of the employees, values were obtained that present a P value of less than 0.05, which means that there is statistical dependence or a relationship between the variable in question and the employee. At this point, none of the technical, professional and personal competencies were statistically significant or were associated in particular with a single employee.

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Conclusions

It can be concluded that the competences assessed include the ability to evaluate the performance of the organisation's objectives, the ability to motivate their work teams and the ability to have the authority and responsibility to manage the company. In addition, the ability to pay attention to conversations between employees and customers, the ability to understand the needs of customers and the perceived trust of employees are strengths. The best evaluated was the person who is in charge of management and customer service within the company. As an important recommendation, the results of this case study were presented to the company in question, and on the basis of collaborative work, a training programme, staff empowerment and improvement of the working environment are being developed.

References

- Appraisal 360, 2022. What is 360 degree feedback. <https://www.appraisal360.co.uk/about/what-is-360-degree-feedback/>. Consultado en noviembre de 2022.
- Mage, B. 2019. 360 evaluations: everything you need to know. <https://www.predictiveindex.com/blog/360-evaluations-everything-you-need-to-know/> Consultado en diciembre de 2022.
- Peiperl, M. 2001. Getting 360-degree feedback right. Harvard Business Review. <https://hbr.org/2001/01/getting-360-degree-feedback-right>. Consultado en diciembre de 2022.
- SafetyCulture, 2022. A quick guide to 360 degree evaluation. <https://safetyculture.com/topics/how-to-conduct-an-effective-performance-appraisal/360-degree-evaluation/>. Consultado en noviembre de 2022.

Geographical synthesis of the landscape in Vista Hermosa, Acapulco

Síntesis geográfica del paisaje en Vista Hermosa, Acapulco

NIÑO-GUTIÉRREZ, Naú Silverio†*

Universidad Autónoma de Guerrero, Facultad de Turismo

ID 1st Author: *Naú Silverio, Niño-Gutiérrez* / ORC ID: 0000-0001-9250-0798, CVU CONACYT ID: 121259

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Abstract

Worldwide, human activity is becoming more frequent and intense, which brings with it changes in the vegetation cover and land use. Hence, the objective of the essay was to contribute to the existing literature on Vista Hermosa, Acapulco. Through, exposing the current characteristics of the elements of nature and their interrelation with land uses promoted by local residents. The methodology used was: consultation, review and selection of documentary, statistical-cartographic materials, both printed and digital, on the area under study and the method used was the integrated analysis of the landscape. Results: location map of the area and 2) a geographic-ecological diagnosis of the landscape. The conclusions obtained were: i) the site that shows a wide sustainable tourism potential and ii) high probability of local development based on its natural attributes to meet the expectations of economic progress *in situ*.

Geography, Land use planning, Landscape, Sustainability

Resumen

A nivel mundial, la actividad humana es cada vez más frecuente e intensa lo que trae consigo modificaciones en la cubierta vegetal y usos del suelo. De ahí que, el objetivo del ensayo fue contribuir a la literatura existente sobre Vista Hermosa, Acapulco. A través de, exponer las características actuales de los elementos de la naturaleza y su interrelación con usos del suelo que fomentan los pobladores locales. La metodología empleada fue: consulta, revisión y selección de materiales documentales, estadístico-cartográficos tanto impresos como digitales sobre el área en estudio y el método empleado fue el análisis integrado del paisaje. Resultados: 1) mapa de localización del área y 2) un diagnóstico geográfico-ecológico del paisaje. Las conclusiones obtenidas fueron: i) el sitio que ostenta amplio potencial turístico sustentable y ii) elevada probabilidad en el desarrollo local cuyo fundamento son sus atributos naturales para satisfacer las expectativas de progreso económico *in situ*.

Geografía, Ordenación territorial, Paisaje, Sustentabilidad

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* Correspondence to Author (e-mail: nsninog@uagro.edu.mx)

† Researcher contributing first Author.

Introduction

Worldwide, human activity is increasingly frequent and intense, which brings with it changes in vegetation cover and land use (Barrientos *et al.*, 2022), which, in 2022, has a global catastrophic dimension that occupies various groups of the planetary citizenship to achieve sustainable development, linked to the elements of nature that has undergone transformations over thousands of years (Cuétara *et al.*, 2022). For this reason, the United Nations Global Compact was signed in 2000 with the aim of aligning business strategies with principles of human rights, favourable labour indicators and care for the environment that promote the achievement of sustainable development objectives (Global Compact 2022, p. 1).

In Mexico, this problem is current in all sectors of the academic and non-governmental population, the three levels of government and business in order to solve, as far as possible, various environmental problems including environmental pollution, the decline of flora and the extinction of wildlife and even the deforestation of the jungle to make way for the expansion of the urban sprawl of many modern cities. Since 2015, these cities have sought to achieve goal 11 of the Sustainable Development Goals "Sustainable cities and communities" (United Nations 2022, p.1).

Research on these issues in Guerrero is incipient, which is exacerbated in the topics of firewood and charcoal extraction, which is constantly growing. In addition, scientific research on the elements of nature is outdated, so studies are conducted at the local level to provide more detailed geographic, economic and population information and from this, generate more reliable data for decision making at the municipal level with the goal of sustainable development (Reyes *et al.*, 2022).

The community of Vista Hermosa in Acapulco, paradoxically, gained momentum after the declaration of El Veladero National Park in 1980 (DOF, 1980). This motivated some people to demarcate plots of land of various extensions with the aim of owning a house, and in this way they began to populate the nearby slopes and hillsides by implementing the slash-and-burn logging of the protected area in the eastern portion of El Veladero National Park.

It is known that 85% of the energy used by the current inhabitants corresponds to hydrocarbons (crude oil, diesel, and gas), 10% to in situ biomass, which includes firewood from logging and slash, while the remaining 5% corresponds to other types of electrical and solar energy.

Hence, the purpose of this contribution is to contribute to the existing literature on Vista Hermosa, Acapulco. Therefore, another purpose is to expose the current characteristics of the elements of nature and their interrelation with the land uses promoted by the inhabitants of this geographical enclave. Hence, it is hoped to contribute to the updating of information on the natural environment, socio-economic characteristics and current population of the site under study.

The problem to which this essay contributes information is the deforestation currently practised by the local population. Given that, it is known that the inaccessibility of the resident and/or migrant peasant population of the economic regions of the state: Central, North, Mountain, Sierra, Tierra Caliente, Costa Grande, Costa Chica and rural area of Acapulco that lack credit for the acquisition of decent housing by the Institute of the National Housing Fund for Workers (Infonavit) (CNBV, 2022).

Methodology

In accordance with the above, a review of the relevant literature was carried out, together with desk research. This essay was conducted from a qualitative, descriptive and cross-sectional approach with an emphasis on Vista Hermosa, Acapulco. This included analysis of statistical databases from the National Institute of Statistics, Geography and Informatics (INEGI), the Ministry of Environment and Natural Resources (Semarnat) and the National Commission of Natural Protected Areas (Conanp). Complemented with field work through three rounds carried out in the months of October-December of this year 2022. Information gathering techniques were applied by means of field logs, photographs and participant observation.

The working method is related to the fundamentals of Landscape Geography in order to achieve sustainability. Landscape is fundamental because: a) it reflects the physical potential of the land, b) it is a biological response on which man acts, c) it allows characterising the territory, d) the fundamental data to classify the geographical enclave is the landscape and e) it is the backbone of any study that allows achieving a deep knowledge of the territorial system. The Integrated Landscape Analysis method is supported by qualitative techniques such as participant observation and in a quantitative way with the cartographic technique. The resulting synergy is useful because it allows correlating the elements of nature with the existing environmental problems in Vista Hermosa, Acapulco.

Results

Vista Hermosa, Acapulco is located in the eastern part of El Veladero National Park and has an area of 8 785 584.39m² (DOF, 2000). It is located between the geographical coordinates 99° 50' 20" west longitude with respect to Greenwich and 16° 51' 35" north latitude with an altitude of 299 metres above sea level (m.a.s.l.) (Figure 1).

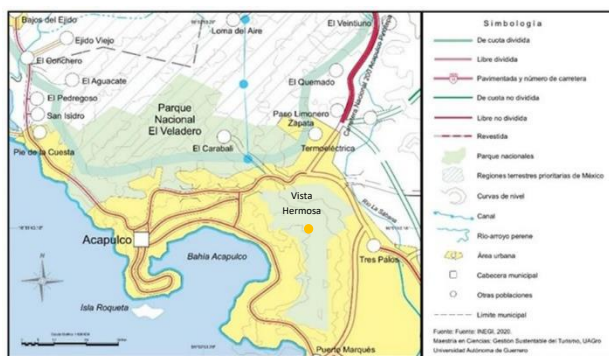


Figure 1 Geographical location of Vista Hermosa, Acapulco

Source: INEGI, 2022

The population analysis shows that Vista Hermosa has a population of 532 people according to INEGI (2022). This settlement has an ejidal police station, a primary school, a grocery shop where they buy basic processed products. There is also a taxi site, which connects the inhabitants with another site near the Acapulco Naval Base (INEGI, 2020a).

Economic analysis, the resident population that receives an economic income for their labour force is 312, which means that 60% of the population is responsible for sustaining the economy of the settlement under study. The number of people who do not receive any income is 220, i.e. 40% of the total resident population, including housewives and children under 12 years of age. There are 100 people employed in primary economic activities, who practice rain-fed agriculture on steep slopes (INEGI, 2021).

Shearing is also practised since the villagers cut specimens of low deciduous forest such as the Amate (*Ficus insipida*) and the Ceiba (*Ceiba pentandra*), among others, to obtain firewood to be able to cook their own food. The average household consumption of these fuels is higher in this forest as a result of the variety of existing plant species, including mesquite (*Prosopis juliflora*), huizache (*Vachellia farnesiana*), guásimo or cuaulote (*Guazuma ulmifolia*) and mangrove (*Rhizophora mangle*), which are frequently found next to roads and unguarded and unfenced properties.

Housewives raise backyard livestock, mainly goats and poultry. Men poach raccoons (*Procyon lotor*), rabbits (*Sylvilagus cunicularius*), green iguanas (*Iguana iguana*) and black iguanas (*Ctenosaura pectinata*) and extract stone materials for self-construction. 212 people work in the centre of Acapulco as cleaners, waitresses, labourers, and public transport workers, among other jobs (INEGI, 2021).

155 dwellings are established, of which 35 are not permanently inhabited, but only for long weekends, summer and end of year holidays. Ninety per cent of the houses are self-built and only 10 per cent have architecture that allows good ventilation, lighting and spatial distribution to accommodate more than four family members.

Infrastructure and equipment is reduced to 25% of streets with asphalt surfacing and the remaining 75% are paved streets or rustic soil. Piped water is delivered to homes through hoses connected to springs or directly through artesian wells, and in the dry season water is supplied by public and private water pipes.

The population affiliated to the federal health services provided by the Mexican Institute of Social Security (IMSS) amounts to 200 which represents almost 40% of the total population. The literate population in the 8-14 age range is 82; the illiterate population aged 8-14 is 4; the population aged 15 and over who can read and write is 329 and the population aged 15 and over who cannot read or write is 35 (INEGI, 2022).

The average level of schooling in Vista Hermosa is as follows: population aged 15 years and over with incomplete basic education 136; population aged 15 years and over with complete basic education 107; population aged 15 years and over with post basic education 94; population aged 18 years and over with at least one degree approved in higher secondary education 26 and population aged 25 years and over with at least one degree approved in higher education 17 (INEGI, 2020b).

Environmental analysis, the presence of Selva Baja Caducifolia stands out due to the fact that it is found in elevated, steeply sloping sites and therefore plays a fundamental role in the infiltration of water into the phreatic mantle that supplies the local springs. The vegetation also has the function of protecting the soil from water erosion, as well as being part of the eastern lung of the city of Acapulco, which from the hillside represents an element of scenic beauty (Masiero and Hrankai, 2022) with visual amplitude from Vista Hermosa towards the bay of Acapulco to the north, Puerto Marqu ez to the west (Figure 2), Barra Vieja to the south and Ciudad Colosio to the east.



Figure 2 Panoramic overlooking Puerto Marqu ez
Source: Own Take

The local relief is made up of homogeneous slopes from the points of view of their origin, formative processes and landforms. The stony materials geologically belong to the Mesozoic era and are therefore ancient, although nowadays they are found as boulders, gravel, sand and silt here the land use is wildlife.

In addition, the high presence of vegetation on the terrain serves as protection against runoffs that are activated in the wet season of the year between July and November when the number of landslides, mudslides and landslides also increases. The dominant climate is Tropical with summer rainfall (Aw) with a mean annual temperature of 27.8  C; where the mean annual precipitation is 1 411.1 mm (Ibidem, 2020b).

The fluvial network in the area of influence of Vista Hermosa, Acapulco is made up of permanent and intermittent streams that are activated during the rainy season and in the highest part of El Veladero National Park there are springs. The elevated sector of the rocky and sandy soil stimulates water infiltration that feeds the aquifer of La Sabana, which benefits the town of the same name, Llano Largo, El Coloso, Cayacos, Tunzingo, Tres Palos, El Salto and San Isidro Gallinero.

From the elevated part of Vista Hermosa down the slopes, the presence of vegetation is less closed, although the existence of more evolved soil favours the formation of several intermittent runoffs fed by the infiltrated water flows from the elevated portion; thus, further down, these flows emerge in the form of permanent streams (Z arate and Ni o-Castillo, 2021).

The soil units are composed of Feozem haplic soil cover, followed by Regosol and Litosol. The former refers to soils of advanced development, showing fluvial erosive processes on stony soils where there are large granitic rocks of igneous origin. The Regosol and Litosol units cover contiguous slopes in the surrounding area.

The Regosol is characterised as an incipient soil of scarcely consolidated, coarse-grained material, with shallow layers of coarse-grained rock. The Litosol soil, on the other hand, is a rocky substrate, which can be seen with the naked eye on the slopes of the neighbouring hills. The incidence of erosion processes is evident in gullies, areas with altered natural vegetation, main roads and erosion in rainfed agricultural land and on the roads that allow access to the village under study.

Diagnosis, deforestation in Vista Hermosa, Acapulco grows year by year at a minimum rate, however, it is necessary to know that the presence of population increases with the passage of time and that with its primary activities can lead to a constant exploitation of the vegetal resource when in 2022 the jungle cover suffers minimal deforestation, an attribute that stimulates high edaphic development and reduces water and wind erosion.

The geo-ecological diagnosis of the landscape shows that the rugged relief conditions the slow evolution of the soil, reflected in thin soil layers, minimal depth and low agrological capacity, making it suitable only for sustaining the wildlife of the low deciduous forest. Because, it is their natural vocation.

However, the presence of the human being constitutes a harmful agent that for diverse causes depredates the timber resources and alters the ecosystem in such a way that, in the medium term of 10 years it can be transformed into a jungle landscape on the verge of extinction to give way to a consolidated urban human settlement, in addition to the coexistence with cultivation plots and pastoral areas, which implies a serious deterioration of the scenic-landscape attribute, still prevailing.

In this order of ideas, it is necessary to consider other energy options such as, for example, the use of agricultural residues such as dry grass, straw, animal excrement and dry sticks as options to substitute firewood as a local fuel. To this end, it is necessary to remember that the conservation of the Selva Baja Caducifolia translates into eight benefits: a) it provides wood for the production of local crafts that are offered to tourists (Rojas *et al.*, 2020); b) it restores soil fertility; c) it stops desertification; d) it prevents water erosion; e) it reduces flooding; f) it is a thermal regulator; g) it is useful for promoting regional environmental education and h) it increases economic benefits through tourism (Comisión Nacional de Áreas Naturales Protegidas, 2018).

Therefore, recommendations include: i) to organise the management of existing natural resources; ii) to develop a local land use plan; iii) to carry out an inventory of natural resources as has been done in other places such as Oaxaca (Velázquez-Sánchez *et al.*, 2018); iv) link the resident population with academics from various local public and private institutions; and v) envision a tourism development in Vista Hermosa, Acapulco, since nature tourism constitutes an invaluable opportunity for economic diversification and dynamisation (Cuétara, Sablón, Márquez and Cartay, 2022).

In this sense, the municipal tourism and ecological authorities, together with the population of Vista Hermosa, can undertake actions for the conservation and protection of the still existing jungle landscape in the eastern polygon of El Veladero National Park (Zárate and Niño-Castillo, 2022; Figure 3): 1) construction of terraces to prevent the constant loss of soil; 2) patrols to prevent fires, especially during the dry season (March-June); 3) workshops with community members to recycle municipal solid waste and thus reduce the number of open dumps; and 4) open forums for participation with the academic, business and government sectors in person or virtually to reach a consensus on the sustainable use of the site.



Figure 3 Scenic beauty from Vista Hermosa
Source: Own Take

Conclusions

The geographic methodology of the integrated landscape analysis translates into a geographic-ecological synthesis model that outlines practical-applicable actions that aim to re-establish the jungle ecosystem of Vista Hermosa, Acapulco, an action that brings with it the sustainable use of natural resources, as well as contributing to improve the economy of the local population.

This motivation, although it seems utopian, is feasible, since the geo-ecological state of the Selva Baja Caducifolia can still be balanced, without preventing the sustainable use of the forest through the diversification of profitable economic activities such as nature tourism, and at the same time compatible with the regeneration of the ecosystem.

The necessary elements exist to carry out a geographic-ecological study that allows for the elaboration of a territorial planning in Vista Hermosa, Acapulco. Based on the multifunctionality of the site, which has a broad sustainable tourism potential given that, in its various facets, it allows a broad and effective use of local development based on its natural attributes to satisfy the expectations of economic progress in situ, without detriment to the productive activities to be implemented to promote regenerative processes of the Low Caducifolia Forest ecosystem and to recover its scenic beauty.

References

- Barrientos, F. W., Reyes, V. M., Puestas, C. M., Sequera, M. D., y Rojas, L. V. (2022). Imaginarios sociales sobre el impacto de la ruta turística binacional Ecuador-Perú. *Revista de Investigación y Cultura* 11(1): 95-102. <https://goo.su/B7nuAv>
- CNBV (2022). *Instituto del Fondo Nacional de la Vivienda para los Trabajadores (INFONAVIT)*. <https://goo.su/JuWzNE>
- Comisión Nacional de Áreas Naturales Protegidas (2018). *Marco Estratégico de Turismo Sustentable en Áreas Protegidas de México*. México: Secretaría de Medio Ambiente y Recursos Naturales. <https://www.conanp.gob.mx/acciones/advc/MarcoEstrategico.pdf>
- Cuéntara, S. L., Sablón, C. N., Márquez, O. L., y Cartay, A. R. (2022). Producto turístico de naturaleza para el desarrollo de comunidades rurales en Manabí, Ecuador. *Revista de Ciencias Sociales* 18(2): 286-297. <https://goo.su/zcZyII>
- Diario Oficial de la Federación (DOF) (1980, 22 de julio). *Decreto por el que se declara Parque Nacional, con nombre de El Veladero, el área que corresponde a los terrenos que constituyen el Anfiteatro de la Bahía de Acapulco, Guerrero*. <https://goo.su/pLiXNS>
- INEGI (2022). *Actualización del Marco Censal Agropecuario 2016*. <https://goo.su/qrMxpX>
- INEGI (2021). *Censos económicos 2019*. <https://goo.su/7iZPmO>
- INEGI (2020a). *Censo de Población y Vivienda 2020*. <https://goo.su/7eydz>
- INEGI (2020b). *Panorama sociodemográfico de México 2020*. <https://goo.su/50Is6>
- Masiero, L. y Hrankai, R. (2022). Modeling tourist accessibility to peripheral attractions. *Annals of Tourism Research*. 92(1): 1-9. <https://goo.su/72Vku>
- Organización de Naciones Unidas (2022). *Objetivos de Desarrollo Sostenible*. <https://goo.su/4TOUaj>
- Pacto global (2022). *Pacto global Red México*. <https://goo.su/UEGNGI6>
- Reyes Macedo, S. M.; Reyes Santiago, M. R., y Méndez García, E. C. (2022). Reproducir la vida en un entorno dinámico: construcción de capacidades turísticas en San Andrés Ixtlahuaca, Oaxaca, México. *Pasos. Revista de Turismo y Patrimonio Cultural* 20(3): 715-728. <https://goo.su/Sty8>
- Rojas Copa, A., Niño-Gutiérrez, N. S., Niño-Castillo, I. N. y Niño-Castillo, J. E. (2020). Tourist focus of handmade souvenirs: two markets case of Acapulco. *ECORFAN Journal-México*. <https://goo.su/Hwrg>
- Velázquez-Sánchez, Rosa; Niño-Gutiérrez, Naú; Gómez-Velázquez, Jesús y Valencia-Gutiérrez, Marvel. (2018). La comunalidad como factor que impulsa al ecoturismo indígena en Oaxaca. *Revista de Negocios & PyMES*. 4(12): 22-28. <https://goo.su/FzH47w>

Zárate Añorve, S. y Niño-Castillo, I. N. (2021). Rurality and multifunctionality in the “El Veladero” National Park, Acapulco, Mexico. In Niño-Gutiérrez, N. S.; Valencia Gutiérrez, M. y García Ramírez, M de J. (coords). *Handbook T-III Productive System, Territory and Sustainability*. México: ECORFAN. www.ecorfan.org

Zárate Añorve, S. y Niño-Castillo, I. N. (2022). Rurality and multifunctionality in the “El Veladero” National Park, Acapulco, Mexico. In Niño-Gutiérrez, N. S.; Valencia Gutiérrez, M. y García Ramírez, M de J. (coords). *Handbook T-IV Sustainability. Rurality and Society*. México: ECORFAN.

https://www.ecorfan.org/handbooks/Sustainability_Rurality_and_Society/Handbooks_Sustainability_Rurality_and_Society_TIV_5.pdf

Financial Sustainability in MSMEs of civil and electrical engineering in Coatzacoalcos

Sustentabilidad Financiera en MIPYMES de ingeniería civil y eléctrica de Coatzacoalcos

MENDOZA-GONZÁLEZ, Felipe†*, CÓRDOVA-ESCOBEDO, Jesús Fausto, RUEDA-MARTINEZ, Fernando and GARCÍA-MUÑOZ APARICIO, Cecilia

Universidad Veracruzana, Faculty of Engineering región Coatzacoalcos - Minatitlán, México

ID 1st Author: *Felipe, Mendoza-González* / ORC ID: 0000-0003-1172-6782, Researcher ID Thomson: S-6747-2018, CVU CONACYT ID: 947336

ID 1st Co-author: *Jesús Fausto, Córdoba-Escobedo* / ORC ID: 0000-0002-7456-6897, Researcher ID Thomson: S-6737-2018, CVU CONACYT ID: 511561

ID 2^{do} Co-author: *Fernando, Rueda-Martínez* / ORC ID: 0000-0002-6144-0996, CVU CONACYT ID: 167238

ID 3rd Co-author: *Cecilia, García-Muñoz Aparicio* / ORC ID: 0000-0001-5316-8630, Researcher ID: S-5564-2018, CVU CONACYT ID: 544736

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Abstract

The factors that put financial stability at risk, and the successes in the financial management of MSMEs related to civil and electrical engineering in Coatzacoalcos were obtained. And the importance of financial planning and the Weighted Average Cost of Capital (CCPP or WACC) was shown, in addition to the Profitability of the company, which can be Economic or Financial, of the financial administration, the financial ratios of liquidity, of indebtedness, , profitability and coverage, economic risks globalization with the arrival of foreign companies, resulting in increased competition, and financial risk with the same globalization, the world economy is decisive for countries like the US and China for example In the methodological aspect, the survey was applied in which the MSMEs were also questioned about the financial risks, and the successes in their financial management. The survey was applied to 5 companies, of which 4 are from the branch of civil engineering, and 1 company dedicated to electrical engineering, company 1 that is medium presents a better financial management.

Management, Financial, Sustainability

Resumen

Se obtuvieron los factores que ponen en riesgo la estabilidad financiera, y los aciertos en la Gestión financiera de las MIPYMES relacionadas a la ingeniería civil y eléctrica en Coatzacoalcos. Y se mostró la importancia de la Planeación financiera y del Costo de Capital Promedio Ponderado (CCPP o WACC), además de la Rentabilidad de la empresa, la cual puede ser Económica o Financiera, de la administración financiera las Razones financieras de liquidez, de endeudamiento, rentabilidad y de cobertura, de los riesgos económicos la globalización con la llegada de empresas extranjeras, dando como resultado un incremento de la competencia, y del riesgo financiero con la misma globalización, la economía mundial es determinante por países como EUA y China por ejemplo, en el aspecto metodológico se aplicó la encuesta en la que también se interrogo a las MIPYMES los riesgos financieros, y los aciertos en su gestión financiera. La encuesta se aplicó a 5 empresas, de las cuales 4 son de la rama de ingeniería civil, y 1 empresa dedicada a la ingeniería eléctrica, la empresa 1 que es mediana presenta una mejor gestión financiera.

Gestión, Financiera, Sustentabilidad

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* Correspondence to Author (e-mail: femendoza@uv.mx)

† Researcher contributing first Author.

Introduction

According to Zamora (2018, para. 5):

Small and medium-sized enterprises (PYMES) contribute 52% of the Gross Domestic Product (PIB) and generate 72% of employment in the country, so it is necessary that we be empathetic and very responsible to give impetus to their businesses, since suffered havoc in the sale of their products caused by the pandemic.

Contrary to what one might think, large companies are not the basis of the country's economy and PYMES are, for this reason it is concluded that these companies must have good financial management, to achieve stability and sustained growth or in a few words that are profitable or financially sustainable.

Unfortunately, statistics say that 90% of PYMES do not exceed two years of existence, and their mortality is very high. As indicated by Sordo (s/f, para. 19): According to the study presented by INEGI, between 2020 and 2021 more than 1.2 million PYMES were born in the country. On the contrary, more than 1.6 million businesses of this type closed their doors permanently.

But there are also more and more companies that are adapting to the great challenges demanded today by the globalized world in which we live.

The general objective will be to analyze the financially sustainable competitiveness strategies of micro, small and medium-sized companies dedicated to civil and electrical engineering in Coatzacoalcos, based on the results, PYMES will have Sustainable Financial Management references to be responsible, especially with a good economic stability, and can face future problems and develop.

The investigation to analyze the financial sustainability, was carried out with the statistics of the survey to the MIPYMES of Civil and Electrical Engineering of Coatzacoalcos, in addition to establishing the risks and successes that they have had.

1. Financial management

1.1. Planning and Weighted Average Cost of Capital

The importance of Financial Planning is very high, because it is a complement to Strategic Planning, this means that it can also help decision-making regarding the alternatives that are in Planning, it serves to determine in the different periods (years) the financing needs of the company, also considering the economic resources and income that the organization has. It is used to project into the future to meet the proposed objectives.

If we are talking about short deadlines, then it refers to Financial Budget, its advantages being the best distribution of resources, which generates a lot of information, serves as motivation and communication in the company, etc. And its greatest importance lies in achieving the objectives of the company.

It is relevant to know the Weighted Average Cost of Capital (CCPP or WACC) because in this way it will be possible to determine if the financing sources they are choosing are adequate for the profitability of a company project, since it could be financing with a result of CCPP that is greater than the yield of the project.

For Fernández (2011):

The WACC is neither a cost nor a required return, but a weighted average between a cost and a required return. Calling the WACC "cost of capital" or "cost of resources" produces many errors, because it is not a cost (p. 2).

In short, adequate financing must be analyzed and calculated to ensure that:

Performance (%) > CCPP (%).

1.2. Company profitability

The literature indicates that there are many definitions for the concept of Profitability, as Sánchez (2002) says "the term profitability is used in a very varied way and there are many doctrinal approaches that affect one or another facet of it" (p. 2), but basically profitability is the profit obtained in a period for an investment made.

This investment can be made with the company's capital or with economic resources outside the organization and which is known as financing, in the end it is It is important that the income is greater than the output.

The profitability of the company can be divided into Economic Profitability and Financial Profitability, the first according to Sánchez (2002) "a concept of known or expected result is related, before interest, with all the economic capital used in obtaining it, without take into account the financing or origin of the same" (p. 4), this profitability represents the return on the investment of the company. Financial Profitability for Sánchez (2002) "faces a concept of known or expected result, after interest, with the company's own funds, and that represents the performance that corresponds to them." (p. 4).

Three internal factors in a small and medium-sized company that can determine its profitability are, Economic Exploitation Profitability, Sánchez (2002) "This indicator is usually called economic exploitation profitability, and constitutes the most important core of the company's profitability, since that is calculating the profitability of the company's typical activity" (p. 7).

The following is that of Financial Profitability considering the net result, and that for Sánchez (2002) "As a concept of result, the most used expression is net result, considering as such the result of the year" (p. 11).

And finally the Self-generated Profitability, in which Lizcano (2004) indicates that:

Self-generated profitability tries to show the company's ability to generate internal financial resources. As a result of the activities of the period, the company will have obtained, on the one hand, a result, and on the other, it will have been able to allocate depreciation in relation to tangible and/or intangible assets (p. 16).

1.3. Financial administration

"More than ever, finance needs to play a vital strategic role in corporations. Financial managers are now directly involved in the overall efforts of companies to create value" (Van Horne, Wachowicz, 2002, p. 2).

The financial ratios (accountable amount / accounting amount) are important because they indicate how the finances are in the company or how the financial situation is. Many times you may think that the number alone can provide enough information, but in reality it is not, using the financial ratios you can determine if the company is indeed on the right track or if you have to use other alternatives or establish other policies economic, with the financial ratios you can make comparisons between different periods, or with other companies of the same line of business, for example, the financial ratios are indicators and that is why it is very important to use them.

Mentioning which are the most important is complex because this will depend on the organization, its size, line of business, etc., but in general the financial ratios are divided into: Liquidity ratios, Debt ratios, Profitability ratios, and Debt ratios. coverage.

As an example, we have the following Financial Ratios, Acid Test, Debt Ratio, and Return on Investment.

1.4. Economic and financial risks

The main economic risks in the current global scenario are the following: Due to the arrival of foreign companies, resulting in new and more competitors. Globalization brings with it the establishment of foreign companies in the country, increasing competition in the supply of products and services.

Technological innovation, by national and foreign companies. The strong technological development in relatively short times, pressures companies to be at the technological forefront.

For the country's own economy. A healthy economy in the nation will encourage market growth, giving stability to companies, on the contrary, a slowdown or economic recession or, in a few words, an economic crisis will harm the economy of companies, due to the low demand for their products and services.

According to Mascareñas (2008): Financial risk refers to the uncertainty associated with the return on investment due to the possibility that the company may not be able to meet its financial obligations (mainly, interest payments and debt amortization) (p. 6).

Regarding the main financial risks in the current global panorama, the world economy is very important, due to the economic crises that could occur in countries such as the United States and China, for example, which can affect interest rates in the national banks. , making debts unpayable for companies, having high rates.

Methodology

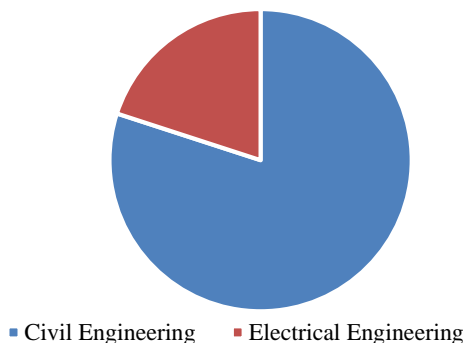
The survey was answered by 5 MIPYMES, of which 4 are from the branch of civil engineering and 1 from electrical engineering. Those that we will call Company 1, Company 2, Company 3, Company 4 and Company 5, to keep their financial management secret.

Inquiry of MIPYMES in Coatzacoalcos.

Civil Engineering	4	80%
Electrical Engineering	1	20%

Table 1 What is the engineering branch of the company?

Source: Own Elaboration (2022)



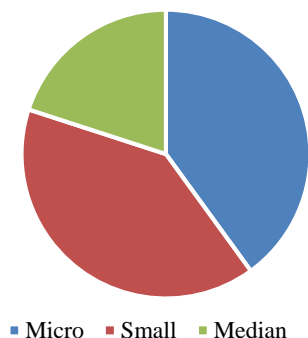
Graphic 1 What is the engineering branch of the company?

Source: Own Elaboration (2022)

Micro	2	40%
Small	2	40%
Median	1	20%

Table 2 Size of the company

Source: Own Elaboration (2022)



Graphic 2 Size of the company

Source: Own Elaboration (2022)

Company 1	Managing Director, Civil Engineering
Company 2	Accountant, accounting
Company 3	Sole Administrator, Master of Business Administration
Company 4	No
Company 5	No

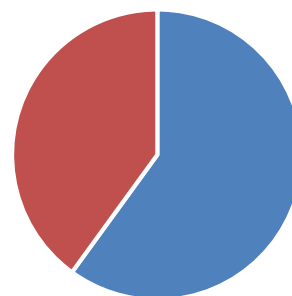
Table 3 Position and academic preparation of the person in charge of Financial Management

Source: Own Elaboration (2022)

The company has faced any deficit in the Financial Budget	3	60%
The company has not faced any deficit in the Financial Budget	2	40%

Table 4 The company has had to face some deficit in the Financial Budget

Source: Own Elaboration (2022)



- The company has faced any deficit in the Financial Budget
- The company has not faced any deficit in the Financial Budget

Graphic 3 The company has had to face some deficit in the Financial Budget

Source: Own Elaboration (2022)

Company 1	No
Company 2	No
Company 3	Personal loans
Company 4	Bank loan
Company 5	Bank revolving credit

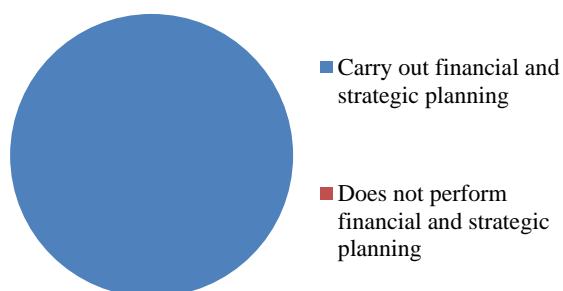
Table 5 What kind of financing did you use?

Source: Own Elaboration (2022)

Company 1	Yes
Company 2	Yes
Company 3	Yes
Company 4	Yes
Company 5	Yes

Table 6 Perform Financial and Strategic Planning

Source: Own Elaboration (2022)



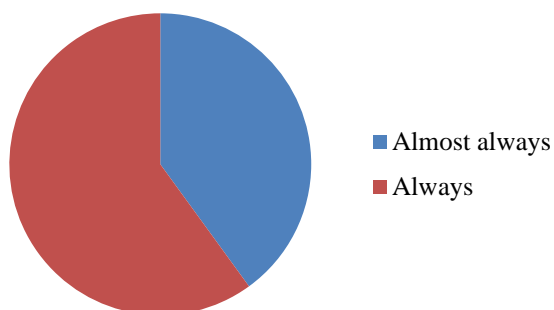
Graphic 3 Perform Financial and Strategic Planning

Source: Own Elaboration (2022)

Company 1	Almost always
Company 2	Almost always
Company 3	Always
Company 4	Always
Company 5	Always

Table 7 Relates its Financial Planning with the Strategic Planning of the Company

Source: Own Elaboration (2022)



Graphic 4 It relates its Financial Planning with the Strategic Planning of the Company

Source: Own Elaboration (2022)

Company 1	Almost always
Company 2	Almost always
Company 3	Sometimes
Company 4	Almost always
Company 5	Always

Table 8 Financial Planning has helped you meet the proposed Strategic Objectives

Source: Own Elaboration (2022)

Company 1	Almost always
Company 2	Sometimes
Company 3	Sometimes
Company 4	Almost always
Company 5	Never

Table 9 The company determines the Weighted Average Cost of Capital (CCPP or WACC)

Source: Own Elaboration (2022)

Company 1	Economic profitability of exploitation, Financial Profitability
Company 2	Financial Profitability, Quality-time
Company 3	Self-generated Profitability, Income-Expense Graphs, break-even point in each project
Company 4	Financial Profitability, Accounting Control
Company 5	Self-generated Profitability, Profit after tax (UDI), % of UDI variation

Table 10 To determine the profitability of the company, what indicators does it use?

Source: Own Elaboration (2022)

Company 1	Current Ratio, Return on Investment
Company 2	Indebtedness Ratio, Working Capital Ratio
Company 3	Investment Return
Company 4	Investment Return
Company 5	Acid test

Table 11 For the Financial Administration of the Company, which Financial Ratios does it use?

Source: Own Elaboration (2022)

Company 1	No
Company 2	No
Company 3	current assets/current liabilities
Company 4	No
Company 5	Liquidity ratio

Table 12 Indicate what other liquidity ratios you use

Source: Own Elaboration (2022)

Company 1	No
Company 2	No
Company 3	Only personal loans
Company 4	Partner loans
Company 5	We have no debt

Table 13 Indicate what other debt ratios you use

Source: Own Elaboration (2022)

Company 1	No
Company 2	No
Company 3	Net profit / sales
Company 4	Accounting
Company 5	Net profit margin

Table 14 Indicate what other Profitability Ratios you use

Source: Own Elaboration (2022)

Company 1	No
Company 2	No
Company 3	Solvency reasons
Company 4	Partner loan
Company 5	Liquidity ratio

Table 15 Please indicate what other Coverage Reasons you use

Source: Own Elaboration (2022)

Company 1	Almost always
Company 2	Always
Company 3	Rarely
Company 4	Almost always
Company 5	Sometimes

Table 16 Make Comparisons of Financial Ratios between different periods

Source: Own Elaboration (2022)

Company 1	Almost always
Company 2	Sometimes
Company 3	Rarely
Company 4	Rarely
Company 5	Rarely

Table 17 Make Comparisons of Financial Ratios with other company(s) of the same line of business

Source: Own Elaboration (2022)

Company 1	Almost always
Company 2	Sometimes
Company 3	Rarely
Company 4	Sometimes
Company 5	Sometimes

Table 18 Due to the results of the Financial Reasons, it has had to make use of other alternatives or establish other economic policie

Source: Own Elaboration (2022)

Company 1	Short periods
Company 2	Mostly short periods
Company 3	Short periods
Company 4	Both periods
Company 5	Mostly short periods

Table 19 For financial risk, the company chooses which type of period to pay its debt

Source: Own Elaboration (2022)

Company 1	Almost always
Company 2	Rarely
Company 3	Rarely
Company 4	Never
Company 5	Sometimes

Table 20 The company uses the Risk Matrix

Source: Own Elaboration (2022)

Company 1	Almost always
Company 2	Rarely
Company 3	Almost always
Company 4	Never
Company 5	Sometimes

Table 21 The responses to the risks in the Matrix have helped you resolve the risks

Source: Own Elaboration (2022)

Company 1	The number of works offered
Company 2	Change of climate, delay of works and therefore delay of payment
Company 3	Late payments
Company 4	Non-payment of customers
Company 5	Client investment policies

Table 22 What factors put the financial stability of the company at risk

Source: Own Elaboration (2022)

Company 1	Correct planning and financial responsibility throughout its history
Company 2	Unanswered
Company 3	consider indirect costs above the ordinary, exclusivity with captive customers
Company 4	income and expenses are tracked by area of the company
Company 5	Have no debt and generate profits

Table 23 Write what you consider to be the financial successes that the company has had

Source: Own Elaboration (2022)

Results

From the survey applied to companies, we have the following responses.

With question 1 it is determined that of the 5 companies that responded to the survey, 4 are from the branch of civil engineering and 1 from electrical engineering.

From question 2, 40% of the companies are Micro, 40% Small and 20% Medium.

In question 3, the general director is responsible for the Financial Management of the company, the accountant in another and the sole administrator in the third company, in the other two companies they do not have someone with that task.

With question 4, it was found that 3 companies have faced a deficit in the financial Budget, and 2 have not.

In question 5, two fifths of the companies (2) did not resort to any type of financing, one company applied to personal loans, another company to a bank loan and the third company to bank revolving credit.

For question 6, 100% of the companies carry out Financial and Strategic Planning.

Two companies almost always relate financial planning to strategic planning, and 3 companies always relate them, answer to question 7.

Financial planning has always helped a company meet strategic objectives, almost always 3 companies, and sometimes a company, question 8.

For question 9 on whether the company determines the Weighted Average Cost of Capital, two companies almost always calculate it, two companies sometimes, and one company never.

In question 10 the companies indicate which indicators they use to determine the profitability of the company.

The 5 companies present what financial ratios they use, in question 11.

Regarding question 12, 60% of the companies answered that they do not use other liquidity ratios, and 40% do indicate them.

In response to question 13, 40% do not use other debt reasons, another 40% do, and 20% declare that they have no debt.

In the response to question 14, 2 companies do not use other profitability ratios, and the remaining 3 companies do.

Two companies do not use other coverage reasons, answer to question 15, and three companies do.

In question 16, a company always compares the financial ratios between different periods, two companies almost always, one company sometimes and another company almost never.

Three companies almost never make financial ratio comparisons with other companies, one company sometimes and another company almost always, question 17.

For question 18, a company almost always, due to the results of the Financial Reasons, has had to make use of other economic policies, three companies sometimes and one company almost never.

In question 19, due to financial risk, two companies choose to pay their debt in short periods, another two companies mostly in short periods, and one company in both periods.

The risk matrix is almost always used by one company, sometimes by another company, two companies almost never and one company never, question 20.

Almost the same results in question 21, except for company 3, where the answers to the risks in the Matrix have almost always helped them to resolve the risks.

Question 22 is important, because companies answer what factors put financial stability at risk.

Just as relevant, that in question 23 the companies report what they consider to be the financial successes they have had.

Gratitude

A special thanks to the Coatzacoalcos companies that responded to the survey.

Conclusions

Based on the responses of the companies, the following conclusions are reached, with respect to their financial management, so that it is sustainable:

- 3 Companies (60%) have a person responsible for Financial Management. To achieve sustainability, companies must have a person in charge of Financial Management.
- The 5 companies (100%) relate Financial Planning to Strategic Planning, and 4 companies (80%) meet their strategic objectives. This being the purpose of relating both plans.
- 40% determines the Weighted Average Cost of Capital. The calculation is important to be able to correctly finance a specific project.

- 60% of the companies calculate the Financial Profitability, and 40% the Self-generated Profitability. Companies must know the Profitability, either economic and/or financial.
- 40% use working capital ratio, another 40% return on investment. Financial Reasons are important for proper financial management of the company.
- 60% make comparisons of Financial Ratios between different periods.
- Company 1, being of medium size, presents a better Financial Management, since it also makes comparisons of the Financial Ratios with other companies of the same line of business, due to the results of the Financial Ratios, it has had to make use of other alternatives or establish other economic policies, use the Risk Matrix and it helps you resolve them.
- For financial risk, 80% (4 companies), including company 1, opt for short periods to pay their debts.

Regarding the factors that put financial stability at risk, the companies indicate the following: The number of works offered; change of climate, delay of works and therefore delay of payment; late payments; non-payment of clients; investment policies of clients.

And finally, of great relevance to achieve Sustainable Financial Management, companies expose their successes: Correct planning and financial responsibility throughout its history; consider indirect costs above the ordinary, exclusivity with captive customers; income and expenses are tracked by area of the company; have no debt and generate profits.

References

Fernández, P. (2011). WACC: Definición, interpretaciones equivocadas y errores. Barcelona, España. IESE Business School Universidad de Navarra.

Lizcano, J. (2004). Rentabilidad Empresarial. Propuesta Practica de Análisis y Evaluación. Recuperado de https://www.camara.es/sites/default/files/publicaciones/rentab_emp.pdf de fecha 10 de diciembre del 2022.

Mascareñas, J. (2008). Riesgos económico y financiero. Universidad Complutense de Madrid, España.

Sánchez, J.P. (2002). Análisis de Rentabilidad de la empresa. Recuperado de <http://www.5campus.com/leccion/anarenta> de fecha 10 de diciembre del 2022.

Sordo, A. I. (s/f). Recuperado el 10 de diciembre del 2022, de <https://blog.hubspot.es/marketing/la-importancia-de-las-pymes-en-mexico>

Van Horne, J. y Wachowicz, J. (2002). Fundamentos de administración financiera. Pearson educación, México.

Zamora, I. (11 de Abril de 2022). Recuperado el 7 de diciembre del 2022, de <https://www.forbes.com.mx/red-forbes-fortalecer-a-las-pymes-el-impulso-para-la-reactivacion-economica/>

Growth and development of Greek basil variety Medinette in greenhouses and shade netting

Crecimiento y desarrollo de albahaca tipo griega variedad Medinette en invernadero y malla sombra

JUÁREZ-ROSETE, Cecilia Rocío*†, BUGARÍN-MONTOYA, Rubén, ÁVILA-VILLARREAL, Gabriela María and AGUILAR-CASTILLO, Juan Apolinar

Universidad Autónoma de Nayarit, Unidad Académica de Agricultura

ID 1st Author: Cecilia Rocío, Juárez-Rosete / ORC ID: 0000-0001-6186-3940

ID 1st Co-author: Rubén, Bugarín-Montoya / ORC ID: 0000-0002-2652-0368

ID 2nd Co-author: Gabriela María, Ávila-Villarreal / ORC ID: 0000-0001-5241-5732

ID 3rd Co-author: Juan Apolinar, Aguilar-Castillo / ORC ID: 0000-0002-5224-1477

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Abstract

Growth parameters were evaluated in plants of *Ocimum basilicum* L. variety Medinette, in two indoor production environments: a greenhouse and a shade net. Plant height, number of branches and leaves per plant, and leaf area were measured. Growth parameters such as leaf area index (LAI), relative growth rate (RGR) and net assimilation rate (NAR) were estimated up to 45 days after transplanting (ddt). The plant and its organs showed sigmoidal growth in the two protected environments. Growth kinetics, height, number of leaves and branches produced per protected environment showed significant differences ($P \leq 0.05$), these parameters being higher for plants grown in shade netting. The physiological efficiency parameters showed an IAF of 0.53 and 1.28 for plants grown in greenhouse and shade net, respectively. The CRT presented the maximum value ($0.14 \text{ mg mg}^{-1} \text{ day}^{-1}$) at 35 ddt for plants grown in shade net. The TAN was $0.078 \text{ mg cm}^2 \text{ day}^{-1}$ for plants in the shade net. Temperature and relative humidity conditions in the greenhouse caused a reduction in growth and physiological efficiency indices in basil.

Ocimum basilicum L., Leaf area, Photosynthetic efficiency

Resumen

Se evaluaron parámetros de crecimiento en plantas de *Ocimum basilicum* L. variedad Medinette, en dos ambientes de producción bajo cubierta: un invernadero y una malla sombra. Se midió la altura de planta, el número de ramas y hojas por planta, así como el área foliar. Se estimaron parámetros de crecimiento como el índice de área foliar (IAF), la tasa relativa de crecimiento (TRC) y la tasa de asimilación neta (TAN) hasta los 45 días después del trasplante (ddt). La planta y sus órganos mostraron un crecimiento sigmoidal en los dos ambientes protegidos. La cinética de crecimiento, la altura, número de hojas y ramas producidas por ambiente protegido mostraron diferencias significativas ($P \leq 0.05$), siendo estos parámetros superiores para las plantas cultivadas en malla sombra. Los parámetros de eficiencia fisiológica mostraron un IAF de 0.53 y 1.28 para las plantas cultivadas en invernadero y malla sombra, respectivamente. La TRC presentó el máximo valor ($0.14 \text{ mg mg}^{-1} \text{ día}^{-1}$) a los 35 ddt para las plantas en malla sombra. La TAN fue de $0.078 \text{ mg cm}^2 \text{ día}^{-1}$ para las plantas de la malla sombra. Las condiciones de temperatura y humedad relativa en el invernadero ocasionaron una reducción en el crecimiento y los índices de eficiencia fisiológica en albahaca.

Ocimum basilicum L., Área foliar, Eficiencia fotosintética

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* Correspondence to Author (e-mail: cecilia.juarez@uan.edu.mx)

† Researcher contributing first Author.

Introduction

The genus *Ocimum* consists of more than 60 species of medicinal and aromatic herbs of the Lamiaceae family in which basil stands out with a great variety of unique aromas, shapes, sizes and colours (Gonda *et al.*, 2020), and its main active agent is the essential oil, which accumulates during the flowering period in 0.5 to 1.5 % based on cineol, metaclavicol, linalool, estragole, among others (Moncayo *et al.*, 2015). *Ocimum* species also have a wide variety of antioxidant and phenolic compounds (Gonda *et al.*, 2020).

Mexico has areas of high potential for the production of fine herbs, with basil being one of the species that stands out most for the area dedicated to its cultivation (389 ha) (SIAP, 2021) in which conventional and organic production is identified (Juárez *et al.*, 2013). The main producing states are: Baja California, Baja California Sur, Guerrero, Morelos, Nayarit and Puebla (SIAP, 2021). Aromatic species are promising crops with high economic potential that are attracting more and more producers due to their commercialisation in international markets; however, their management during the production process can face different types of technological limitations (Combat *et al.*, 2020). On the other hand, growth analysis techniques can be used in multiple situations and their use in intensive crops presents particular aspects that need to be taken into account (Di Benedetto and Tognetti, 2016) and the available information on aromatic herbs is scarce and scattered.

Despite the growing importance of fine herbs in Mexico and in the state of Nayarit, basic and applied information related to the performance of basil varieties in greenhouses and shade nets is incomplete. Hence, it is important to investigate the environmental effects of a protected site on the growth and development of basil plants to understand the nature of plant-environment interaction.

Theoretical framework

The current market for aromatic and medicinal plants has prompted the study of factors affecting their yield and quality in order to improve the productivity of production systems.

It is desirable that the intensive cultivation of plants under a protected environment favours their rapid production and that the plants are healthy and vigorous. In this sense, the yield of a crop is determined by the capacity to accumulate dry matter in the organs intended for harvesting (Morales *et al.*, 2015).

Growth is defined as an irreversible increase in the dimensions of a plant, which can be determined by measuring changes in volume. However, taking these measurements can generate practical difficulties, which is why it is determined with related variables such as weight accumulation, variations in height or diameter and changes in leaf area (Di Benedetto and Tognetti, 2016). The analysis of plant growth can be analysed through the calculation of efficiency indices that allow for the accurate estimation of fundamental processes of productivity. In this context, efficiency indices can be determined with dry weight (Sedano *et al.*, 2005) and leaf area as a function of time (Morales *et al.*, 2015), and their use and interpretation provides elementary information about crop performance in specific production environments (Di Benedetto and Tognetti, 2016).

Leaf Area Index (LAI) is a growth component that represents the leaf surface per unit area occupied by the plant; it increases with crop growth until it reaches a maximum value at which the maximum capacity to intercept solar energy is obtained (Carranza *et al.*, 2009). This information is useful for agronomic and commercial management, as it allows growers to know how the crop behaves with climate and crop management under different production conditions (Colorado *et al.*, 2013). Since it is impossible to take data from the same plant at different times (as the tests are destructive) these parameters are estimated from sampling different plants throughout the experimental period (Di Benedetto and Tognetti, 2016).

Relative growth rate (RGR) is defined as the increase in dry matter per unit dry matter present per unit time and its value is affected by the production environment (López *et al.*, 2018). Net assimilation rate (NAR) is a parameter that indicates the efficiency of a plant's foliage as a source of photoassimilates in dry matter production (Morales *et al.*, 2015).

Method and tolos

The research was conducted at the Academic Unit of Agriculture of the Autonomous University of Nayarit, located in Xalisco, Nayarit (21° 25' LN and 104° 53' LO). The experiment was set up in two protected production environments, one in a modified tunnel type greenhouse with passive lateral and zenithal ventilation, with a milky plastic cover with 30 % shade with high light diffusion and the other in conditions of shade netting made of monofilament of 3.5 x 4.5 threads per cm² with 35 % shading and the other in a greenhouse with a shading net of 3.5 x 4.5 threads per cm² with 35 % shading and the other in a greenhouse of 3.5 x 4.5 threads per cm² with 35 % shading. Temperature was recorded with a HOBO® data logger. The standard nutrient solution (Steiner, 1984) was used at 75 % concentration in all its ions and the Medinette variety of Greek basil (*O. basilicum* var *minimum*) which were obtained from seeds and transplanted in the experimental sites when they were 5 cm high was evaluated.

Black flexible plastic containers of 20 X 20 cm were used. The substrate used was red tezontle with a grain size of 0.3-0.7 mm. A completely randomised design was used in two protected environments: greenhouse and shade netting. Sampling was carried out at 15, 25, 35, 45 and 55 days after transplanting (ddt). Periodic sampling of five plants per experimental unit was used to determine the height (with a flexometer graduated in cm), the number of green leaves and branches per plant, and the leaf area was determined by measuring the surface area of the leaf laminae in cm² with a CI-202 CID Bio Science Inc. model integrator.

A digital balance with a sensitivity of 0.01 g was used to quantify the dry biomass accumulated in the leaf lamina and stem. These parameters were evaluated after the material was placed in a drying oven at 80 °C until it reached a constant weight (g) without including the root system, with these data the leaf area index (LAI) was determined (Morales *et al.*, 2015) using the following equation:

$$IAF = \left(\frac{\text{leaf area per plant} \times \text{population density}}{\text{Surface unit}} \right) \quad (1)$$

With the values of dry biomass and leaf area per plant, the relative growth rate (RGR) was calculated in accordance with the formulas indicated by Morales *et al.*

$$TRC = \frac{\log PS_2 - \log PS_1}{t_2 - t_1}$$

The net assimilation rate (NAR) was determined according to the methodology reported by Morales *et al.* (2015), using the following relationship:

$$TAN = \left(\frac{PS_2 - PS_1}{AF_2 - AF_1} \right) \left(\frac{\log AF_2 - \log AF_1}{t_2 - t_1} \right)$$

Where: PS2 and PS1 are dry weight, AF2 and AF1 are leaf area, log is the natural logarithm of leaf area and t² and t¹ are time, CRT is expressed in mg.mg⁻¹.day⁻¹ and TAN is expressed in mg.cm².day⁻¹.

From the information obtained, a factorial analysis with repeated measurements was carried out and the mean values were compared with Tukey's test ($p \leq 0.05$) using the SAS statistical programme, version 9.0 (2002). Growth curves were made in a MS Excel® spreadsheet.

Results

During the period evaluated, the mean temperature was 25.34 °C in the shade net and 32.2 °C in the greenhouse. The mean relative humidity was 77.98 % for the shade net and 61.62 % in the greenhouse. The dynamics of biomass accumulation in basil variety Medinette was sigmoidal. Growth kinetics, height, number of leaves, branches and leaf area per protected environment were different (Table 1). This can be explained by the fact that plants produced in shade netting had a rapid growth after transplanting and presented the highest leaf area due to the temperature and photosynthetic irradiation conditions that allowed them to intercept a high percentage of radiation and increase the efficiency in the use of this resource.

Treatment	Plant height (cm)	Number of branches (plant ⁻¹)	Number of leaves (plant ⁻¹)	Leaf area (cm ²)
Shade house	48.16 a	72.95 a	935.33 a	910.02 a
Greenhouse	40.0 b	44.77 b	483 b	547.55 b

Means with the same letter between columns are equal (Tukey $P \leq 0.05$).

Table 1 Effect of shade netting on growth parameters of Greek basil variety Medinette

The IAF presented its maximum range of 1.28 at 45 ddt in shade netting, decreasing by 24.5 % at 55 ddt. In the greenhouse its maximum yield was 0.53 (Figure 1). These results are affected by the sampling dates.

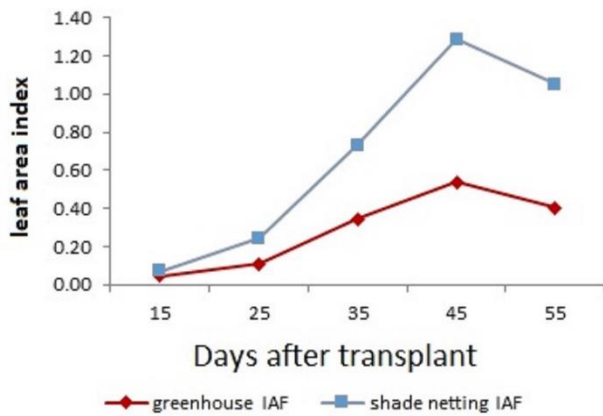


Figure 1 Leaf area index (LAI) of Greek basil plants Medinette variety in greenhouse and shaded netting

The CRR under greenhouse conditions remained constant and under shade net conditions showed a positive trend until 35 ddt when it reached 0.14 mg.mg⁻¹.day⁻¹, which contributes to a higher yield expression of the evaluated plants and decreased throughout the evaluation period until it reached 0.02 mg.mg⁻¹.day⁻¹ at 55 ddt, which is considered a normal process during the development of the crop (Figure 2). The TAN was 0.078 mg.cm².day⁻¹ at 35 ddt in shaded conditions, which is related to the number of leaves and leaf area per plant (Figure 3), which depend on the age of the plant.

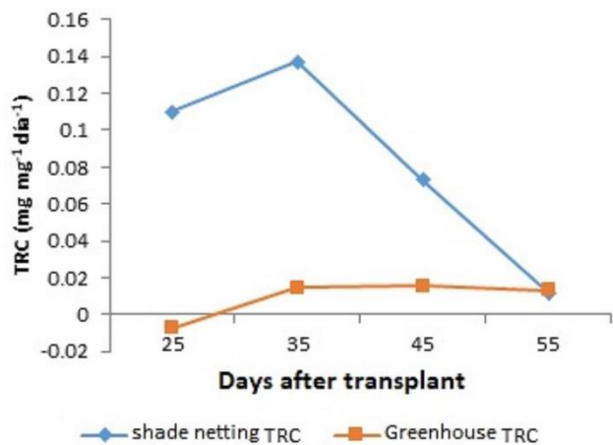


Figure 2 Relative growth rate (GRR) of Greek basil plants Medinette variety in greenhouse and shade net

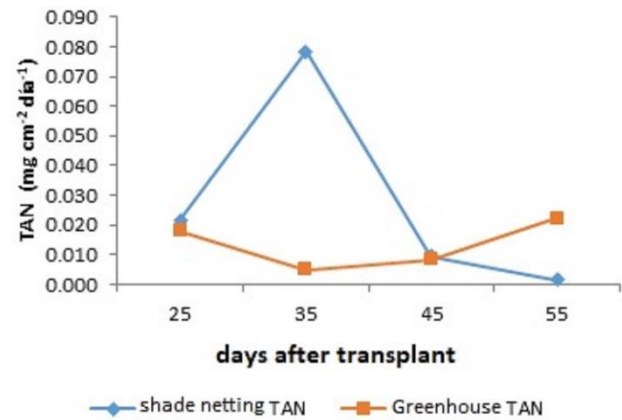


Figure 3 Net assimilation rate (NAR) of Greek basil plants of the Medinette variety under greenhouse and shade netting

Discussion

Factors such as temperature and relative humidity in production environments promote plant growth and development. In this sense, Ruiz *et al.* (2008) showed that there is a relationship between temperature and relative humidity with yield, being at 32 °C and a RH of 58 % when higher productivity is obtained in basil plants. However, these results are affected by the variety of basil grown.

Plant height is variable according to the cultivar produced. In this regard, Chiquito *et al.* (2018) reported plant heights of basil var. Nufar, between 32 and 41 cm, in this study an average height of 48 cm was observed. In this sense, it was determined that the growth dynamics was similar to that obtained in epazote (*Chenopodium ambrosioides* L) by Aguilar *et al.* (2021). With respect to the leaf area of the cultivated plants, the results obtained coincide with those reported by (Chiquito *et al.*, 2018) who indicate that this parameter, together with the accumulation of fresh and dry biomass, are important characteristics for obtaining quality plants for sale on the international market.

On the other hand, a larger leaf area increases the production of photoassimilates, which are exported to the organs of economic interest (Escalante and Kohashi, 2015). In this regard (Di Benedetto and Tognetti, 2016) indicate that the expansion of leaf area is a critical variable for crop productivity and the curve consists of an exponential stage, a linear stage and a stage of decreasing increments.

However, it is important to note that in the commercial management of basil, several cuts are made during its growing cycle, so its growth and development will be variable. The relative growth rate is the central concept of plant growth analysis, during the first days of growth it usually has an exponential biomass accumulation dynamics (Di Benedetto and Tognetti, 2016), in this study the data obtained coincide with that reported by Colorado *et al.* (2013) who reported that the maximum CRR occurs at five days ddt (0.1082 g g⁻¹d⁻¹) and that it decreases as the plant grows and reaches 61 ddt (0.022 g g⁻¹d⁻¹) (Figure 1). This effect has also been reported in other species such as *Physalis* in which CRT has its maximum value at the beginning of the cycle, subsequently becoming constant and decreasing with plant age (López *et al.*, 2018).

With regard to TAN, Colorado *et al.* (2013) indicate that this parameter in basil has a decreasing behaviour due to the development of the crop during the production cycle. This is related to the number of leaves and leaf area per plant, since basil has little leaf senescence compared to other species such as beans, squash and sunflower (Sedano *et al.*, 2005; Morales *et al.*, 2015). Derived from these statements it can be said that a higher production of basil variety Medinette can be achieved with a higher photosynthetic efficiency.

Conclusions

Growth, biomass production and its physiological components are affected by the conditions of the production environment.

Shade netting conditions allowed the highest expression of the parameters IAF, TRC and TAN which resulted in higher plant yields.

References

- Aguilar, C. C., González, M. S. V., Juárez, L. P., Alía, T. I., Palemón, A. F., Arenas, J. & R., Escalante, E. A. S. (2021). Análisis de crecimiento de epazote (*Chenopodium ambrosioides* L.) cultivado en invernadero. *Revista Biotecnia*, 23(2), 113-119. <https://doi.org/10.18633/biotecnia.v23i2.1394>
- Carranza, C., Lanchero, O., Miranda, D. & Chaves, B. (2009). Análisis del crecimiento de lechuga (*Lactuca sativa* L.) Batavia cultivada en un suelo salino de la Sabana de Bogotá. *Agronomía Colombiana*, 27(1), 41-48.
- Chiquito, C. R. G., Solís, P. R., Reyes, P. J. J., Murillo, A. B., Alejandre, R. J., & Hernández, M. L. G. (2018). Promoción del crecimiento de plantas de albahaca utilizando hongos micorrizicos arbusculares y una bacteria marina. *Acta Universitaria*, 28(6), 68-76. <https://doi.org/10.15174/au.201802086>
- Colorado, F., Montañez, I., Bolaños, C. & Rey, J. (2013). Crecimiento y desarrollo de albahaca (*Ocimum basilicum* L.) bajo cubierta en la sabana de Bogotá. *Revista U. D. C. A. Actualidad & Divulgación Científica*, 16(1), 121-129. <https://doi.org/10.31910/rudca.v16.n1.2013.866>
- Combatt, C. E., Pérez, P. D., Villalba, A. J., Mercado, L. J. & Jarma, O. A. (2020). Macronutrientes en el tejido foliar de albahaca *Ocimum basilicum* L. en respuesta a la aplicación de nitrógeno y potasio. *Revista U. D. C. A.: Actualidad y Divulgación Científica*, 23(2), 1-10. <https://doi.org/10.31910/rudca.v23.n2.2020.1325>
- Di Benedetto, A. & Tognetti J. (2016). Técnicas de análisis de crecimiento de plantas: su aplicación a cultivos intensivos. *Revista de Investigaciones Agropecuarias*, 42(3), 258-282
- Escalante-Estrada, A.S. & Kohashi-Shibata, J. (2015). *El rendimiento y crecimiento del frijol. Manual para la toma de datos*. Colegio de Postgraduados, Montecillo, México.
- Gonda, I., Faigenboim, A., Adler, C., Milavski, R., Karp, M. J., Schachter, A., Ronen, G. G., Baruch, K., Chaimovitch, D. & Dudai, N. (2020). The genome sequence of tetraploid sweet basil, *Ocimum basilicum* L., provides tools for advanced genome editing and molecular breeding. *DNA Research*, 27(5), 1-10. <https://doi.org/10.1093/dnares/dsaa027>
- Juárez, R. C. R., Aguilar, C. J. A., Juárez, R. M. E., Bugarín, M. R., Juárez, L. P. & Cruz, C. E. (2013). Hierbas aromáticas y medicinales en México: tradición e innovación. *Revista Bio ciencias*, 2(3), 119-129.

López, S. J. A., Morales, R. E.J., Vibrans, H. & Morales, M. E. J. (2018). Tasa de asimilación neta y rendimiento de *Physalis* bajo cultivo en dos localidades. *Revista Fitotecnia Mexicana*, 41(2),187-197.

<https://doi.org/10.35196/rfm.2018.2.187-197>

Morales, M. E. J., Morales, R. E. J., Díaz, L. E., Cruz, L. A. J., Medina, A. N. & Guerrero, C. M. (2015). Tasa de asimilación neta y rendimiento de girasol en función de urea y urea de liberación lenta. *Agrociencia*, 49(2),163-176.

Moncayo, M. D. R., Álvarez, V. D. P., González, G., Salas, L. & Chávez, J. A. (2015). Producción orgánica de albahaca en invernadero en Comarca Lagunera. *Terra Latinoamericana*, 33(1), 69-77.

Ruiz, E. F. H., Marreno, L. P., Cruz, P. O., Murillo, A. B. & García, H. J. L. 2008. Influencia de los factores agroclimáticos en la productividad de albahaca (*Ocimum basilicum*) en una zona árida de Baja California Sur, México. *Revista Ciencias Técnicas Agropecuarias*, 17(1), 44-47.

Sedano, C. G., González, H. V., Engleman E. M. & Villanueva, V. C. (2005). Dinámica del crecimiento y eficiencia fisiológica de la planta de calabacita. *Revista Chapingo Serie Horticultura*, 11(2), 291-297.

SIAP (18 de septiembre 2021). *Servicio de información Agroalimentaria y Pesquera*. <http://www.siap.gob.mx/>

Steiner, A. A. (1984). The universal nutrient solution. Proceeding Sixth International Congress on Soilless Culture. Wageningen. The Netherlands.

Statistical Analysis System (SAS) (2002) SAS Institute Inc. Release 9.0 Edition. Cary NC. U.S.A.

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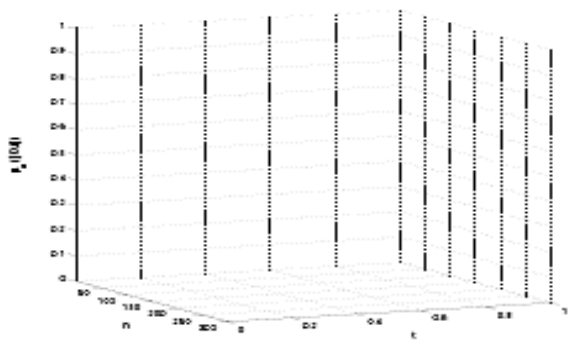
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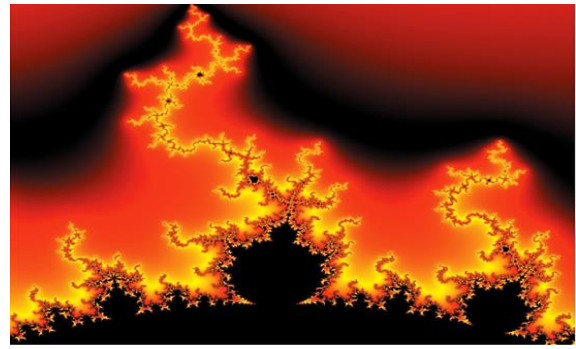


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