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# DIAGNOSIS OF COMPLIANCE WITH THE ISO 14001:2015 STANDARD IN THE SECONDARY AVOCADO SECTOR

# DIAGNOSIS OF COMPLIANCE WITH THE ISO 14001:2015 STANDARD IN THE SECONDARY AVOCADO SECTOR

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***Abstract*** -- The study contains a methodology to evaluate compliance with the requirements of ISO 14001:2015 in an avocado packing company[1] located in Michoacán, Mexico, which is the largest avocado exporter in the world and it is imperative to comply with international standards, among others, those of environmental aspects in order to export its products. This is a descriptive study based on qualitative data; an evaluation instrument was developed based on categories of compliance with the standard. A level of implementation of the standard's requirements of 60% for the "Organizational Context" chapter, 63% for "Leadership", 91% for "Planning", 48% for "Support", 53% for "Operation", 26% for "Performance Evaluation" and 10% for "Improvement" was identified. It is concluded that it is necessary to undertake corrective and preventive actions focused on performance evaluation and continuous improvement of the System to raise the degree of implementation of the Environmental Management System based on ISO 14001:2015.

***Key words:*** Assessment, ISO 14001, environmental management systems, agribusiness.

***Abstract*** -- The study contains a methodology to evaluate compliance with the requirements of the ISO 14001:2015 standard in an avocado packaging company located in Michoacán, Mexico, whose entity is the largest exporter of avocado worldwide and compliance with international standards is essential. among others, those of environmental aspect to be able to export their products. This is a descriptive study based on qualitative data, an evaluation instrument was developed based on categories of regulatory compliance, it was possible to identify a level of implementation of the requirements of the standard of 60% for the chapter "Context of the Organization", 63% for "leadership", 91% for "Planning", 48% for "Support", 53% for "Operation", 26% for "Performance Evaluation" and 10% for "Improvement". It is concluded that it is necessary to undertake corrective and preventive actions focused on the evaluation of the performance and continuous improvement of the System to raise the degree of implementation of the Environmental Management System based on the ISO 14001:2015 standard.

***Key words -*** Evaluation, ISO 14001, management systems, agribusiness.

## INTRODUCTION

The management systems in companies are an instrument that allows them to maintain order in their processes. help a establish mechanisms for the management of activities for the prevention adverse environmental impacts through measures such as compliance with applicable environmental legal regulations, programs of monitoring programs, environmental policies and development of improvement actions, in this sense, one of the alternatives to implement an Environmental Management System (EMS) is to apply the requirements of ISO 14001:2015, which follows a continuous improvement model that drives organizations to be up to date in the business context. Several authors have contributed their experiences regarding the implementation of an EMS based on ISO 14001, as is the case of Ortiz, Martinez and Cuervo [3], who identified that for the implementation of environmental management systems it is necessary an adequate financial performance, the sustainable development of the company and other systems (integrated), as is the case of ISO 9001:2015 which deals with quality management systems. Vidal and Azuaga [2], for their part, consider sustainable economy as a fundamental issue , according to their study, it seeks to harmonize economic profitability, social welfare and care for the , which is the basis of sustainable economy.

[1] The name of company is reserved agreement of confidentiality

which can be achieved with a sustainable approach. Other authors such as Aguilar, Huerta, Melena, Torres, Vargas and Cuautle [4], started from a bibliometric analysis in which they identified four pillars of sustainability: the environmental, economic, social and institutional aspects; this last institutional aspect is considered important in the implementation of management systems for the clarity of roles and functions of personnel and also contributes to the standardization of processes. Lozano and Trujillo [7], for their part, classified environmental impacts in the form of a matrix that interrelates the stages of the production process with the environmental components and factors, subclassifying the latter into physical factors, biotic factors and socioeconomic factors, It should be noted that the magnitude of these environmental impacts is related to the area of influence where the work center is located, which is why the international standards of the ISO norms contain in one of their chapters the requirement to analyze the context of the organization as a mandatory requirement. Vera [8] points out that if SMEs do not have resources for an EMS, there will be no way for their sector to contribute to the Sustainable Development Goals (SDGs), since it is necessary to cover the costs of certification audits, However, establishing a management system in a company following the requirements of an international standard does not necessarily mean that the company has to be certified, as it may be operating its EMS without certification and only as a good practice. Other studies such as that of Arevalo and Canales [9] revealed that the relationship between the implementation of environmental management systems and the reduction of environmental effects is directly proportional, so that the more an EMS is implemented, the more pollutant emissions, water consumption and the reduction of chemical compounds are reduced, also revealing some methodological, personal and practical factors as an obstacle to its implementation. In the case of companies in the agroindustrial sector in Mexico, specifically for avocado exports, there are a series of requirements to be met, both from Mexican environmental regulations such as the General Law of Ecological Equilibrium and Environmental Protection [14], which in the exercise of its powers, In addition, avocado exporters must also comply with the schemes or "standardizers", as De Castro, Gadea and Sánchez [10] call them, and the Ministry of the Environment and Natural Resources (SEMARNAT) is responsible for monitoring compliance with the national legal framework, referring to standards such as the SMETA Audit requested by the importing countries, where SMETA
[11] contains its item on compliance with environmental requirements in its criterion 10b2 Environment 2-Pillars. On the other hand, given the competitive environment that companies face today, it is necessary to establish strategic alliances to share good practices and also to adopt a philosophy of efficiency in the consumption of resources, that is, to create value in their processes and services through "Lean Thinking" as a basis for innovation in the agroindustrial sector [12], In turn, other case such as that of Candiotti, Hurtado and Lituay [13] have opted to focus efforts also on the supply chain, which they call "Green Logistics", which allows incorporating good environmental practices into the supply chain and the supply of goods and services.

In Mexico during 2018, about 58 Environmental Excellence recognitions were delivered throughout the country according to data from the Ministry of Environment and Natural Resources [6], meanwhile, in the international context, studies of consulting companies indicate that the total number of companies that maintain an environmental management system certificate add up to about 312,580, which represents that environmental management is the second most implemented standard around the world according to De León [2]. Although the aforementioned works consider key aspects to implement, maintain and improve an environmental management system (EMS), it is identified that it is not clearly mentioned how to start in order to implement an EMS. The present study is carried out in a company of the secondary sector of the avocado agroindustry (fruit of major production and marketing of Michoacán, Mexico to the world), in which a methodology is applied to assess the level of compliance with the requirements of ISO 14001:2015 [5] to, from this, generate actions necessary for regulatory compliance and contribute to the care of the environment.

## DEVELOPMENT

### Methodology

This is an applied research with a descriptive approach, in which an evaluation system was carried out based on the methodology: "ASES of Nissan Motor Company" as well as on the criteria of the ISO 14001:2015 Standard, which establishes compliance requirements for companies based on the "must" contained in its different clauses of the chapters. The methodology for conducting the research consisted of five phases: The first in getting to know each stage of the process in order to identify the associated environmental aspects, the second stage comprised the design of the checklist, third phase evaluated the level of compliance of the

In the fourth phase, an action plan of activities was established to achieve compliance with the standard's criteria; in the fifth phase, mechanisms for improvement were established (this article only contains the first three phases). The company to which the checklist was applied is an agroindustrial company located in Michoacán, Mexico.

**Development**

*Avocado production chain*

The avocado production chain consists of five stages: Avocado producers (cultivation), fruit collection, packing which may also include processing, export and marketing, and the import process. The study focuses on stage 3. Packing, processing and shipping, which corresponds to the secondary sector of the avocado agribusiness (see Figure 1).


Avocado production chain. Image Gallery Aztecavo S. A. de C. V. At: http://web.aztecavo.com.mx:8082/Index.php and Image Gallery Avocados Alejandrina S. A. de C. V. At: http://aguacate.com.mx/?page_id=573

For the shipping, processing and packaging process, a series of stages are followed, ranging from fruit reception, machine feeding, manual selection, de-stemming, brushing, dust extraction, selection by size, labeling, boxing, transport, weighing, palletizing, pallet strapping, lot identification, storage and/or shipping (see Figure 2).


Avocado packing process. Source: Own elaboration.

*Evaluation criteria*

The evaluation of the environmental management system included the design of a checklist containing the requirements established by the ISO 14001:2015 standard starting with chapter four. The first three chapters do not contain auditable requirements for compliance with the standard. The criteria used to verify compliance with the requirement was on a scale of 0 to 5, where:

0 = The requirement is not met and there is evidence of progress towards meeting the requirement.
1= Not operating, but there is some record that it has ever operated
2.- Partially complied with but no records of the operation are generated.
3.-Partially complied with, there are records and documentary evidence in standardized formats.
4.- The requirement is fully complied with, records and documentary evidence are generated in standardized formats.

*Evaluation of ISO 14001:2015 criteria*

The evaluation instrument was applied for each clause of the ISO standard that mentions that the organization "must", through field verification, in this case going to each process owner in the organizational structure of the company. See table 1.

**Table 1**.
ISO 14001:2015 requirements compliance checklist

| EMPRESA: SECTOR SECUNDARIO AGROINDUSTRIA | | | | | | |
|---|---|---|---|---|---|---|
| Requisitos ISO 14001-2015 Sistemas de Gestión Ambiental | Diagnóstico de Cumplimiento | | | | | |
| **4.CONTEXTO DE LA ORGANIZACIÓN** | **0** | **1** | **2** | **3** | **4** | |
| **4.1 COMPRENSIÓN DE LA ORGANIZACIÓN Y DE SU CONTEXTO** | | | | | | |
| **La organización debe determinar:** | | | | | | |
| Las cuestiones externas e internas que son pertinentes para su propósito y que afectan a su capacidad para lograr los resultados previstos de su sistema de gestión ambiental. Estas cuestiones incluyen las condiciones ambientales capaces de afectar o de verse afectadas por la organización. | | | X | | | |
| **4.2 COMPRENSIÓN DE LAS NECESIDADES Y EXPECTATIVAS DE LAS PARTES INTERESADAS** | | | | | | |
| **La organización debe determinar:** | | | | | | |
| a. Las partes interesadas que son pertinentes al sistema de gestión ambiental; | | | X | | | |
| b. Las necesidades y expectativas pertinentes (es decir, requisitos) de estas partes interesadas; | | | X | | | |
| c. cuáles de estas necesidades y expectativas se convierten en requisitos legales y otros requisitos. | | | X | | | |
| **4.3 DETERMINACIÓN DEL ALCANCE DEL SISTEMA DE GESTIÓN AMBIENTAL** | | | | | | |
| La organización debe determinar los límites y aplicabilidad del sistema de gestión ambiental. Cuando se determina este alcance, la organización debe considerar: | | | | | | |
| a. las cuestiones externas e internas a que se hace referencia en el apartado 4.1; | | | X | | | |
| b. los requisitos legales y otros requisitos a que se hace referencia en el apartado 4.2; | | | X | | | |
| c. las unidades, funciones y límites físicos de la organización; | | | | | | X |
| d. sus actividades, productos y servicios; | | | | | | X |
| e. su autoridad y capacidad para ejercer control e influencia. | | | X | | | |
| Incluir en el sistema de gestión ambiental todas las actividades, productos y servicios de la organización que estén dentro de este alcance. | | | | X | | |
| Mantener este alcance como información documentada y disponible para las partes interesadas. | | | X | | | |
| **4.4 SISTEMA DE GESTIÓN AMBIENTAL** | | | | | | |
| La organización debe establecer, implementar, mantener y mejorar continuamente un sistema de gestión ambiental, que incluya los procesos necesarios y sus interacciones, de acuerdo con los requisitos de esta Norma Internacional. | | | X | | | |
| La organización debe considerar el conocimiento obtenido en los apartados 4.1 y 4.2. | | | X | | | |

Note: The table contains only a portion of the chapter 4 section of the checklist as an example. Source: Adapted from Nissan Motor Corporation' ASES[2] system audit guide.

[2] Automotive Supplier Evaluation Standards

## DISCUSSION AND ANALYSIS OF RESULTS

Results by chapter of the ISO 14001 standard

Once the diagnosis was carried out for each clause of the chapters of the standard, a level of 60% was obtained for chapter 4 "Context", 63% for "Leadership", 91% for "Leadership" and 91% for "Leadership".

"Planning", 48% "Support", 53% "Operation", 26% "Performance Evaluation" and 10% for "Improvement". (See Illustration 3). On the other hand, regarding operation of activities, according to the results of the Economic Censuses applied during 2019 in Mexico [15] large economic units (those who report investment or expenses for environmental protection) in the manufacturing sector, the main items in which they invest : Investment in electrical energy for a certain process, Management and final disposal of waste with household characteristics and environmental awareness , meanwhile, in what they report less investment is in what concerns emissions of pollutants into the atmosphere, reforestation and environmental restoration projects and the hiring of environmental consulting, leaving the above for reflection for future research [16].

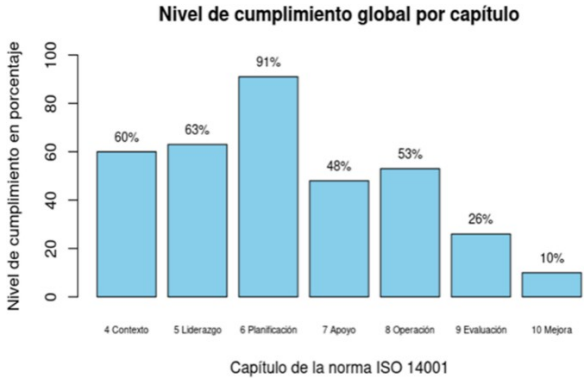


**Illustration 3**. Level of compliance by chapter of the ISO 14001:2015 standard. Source: Own elaboration.

## CONCLUSIONS

It is concluded that the avocado packing company has a compliance of less than 70% for six of seven chapters of mandatory compliance by the ISO 14001:2015 standard, so it is necessary to focus efforts on improving in two axes of the continuous improvement model on which the standard is based: "Verify and Act", that is, to follow up for the evaluation of the performance of productive activities related to the environment as well as the establishment of methodologies for continuous improvement. The future work included in the study is the application of a plan of actions derived from the areas of opportunity detected. Another line of future research includes measuring the effectiveness of the Environmental Management System, that is, verifying if the EMS really contributes to minimize the environmental impact of the company's activities. significant environmental impacts, and a third line of action is the development of a compliance matrix incorporating ISO 14001:2015 requirements, SMETA audit requirements (criterion 10b2. Environment 2-Pillars) and other "standardizing" schemes as requested by the importing country.

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