






Sustainability and Environmental Care: Social Responsibility




Sustentabilidad y Cuidado Ambiental: Responsabilidad Social

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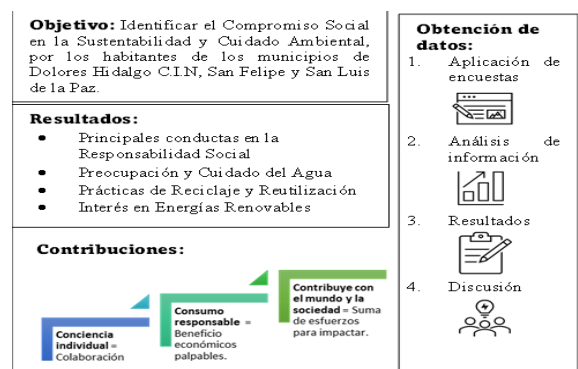
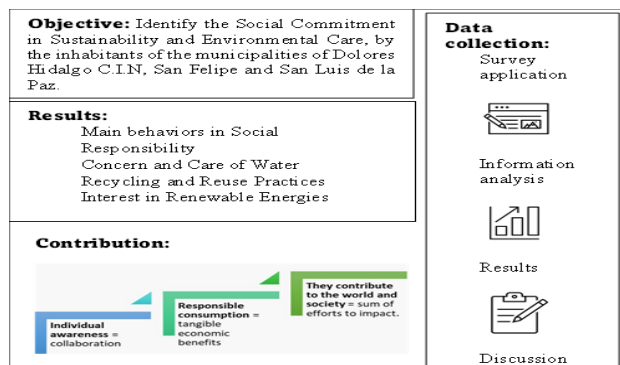
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Abstract

The climate crisis is worsening as greenhouse gas emissions continue to increase; the availability of drinking water for the population; "Day 0" makes it more present; you practice it in agriculture and other economic activities; As the growth of the national population increases in urban areas where water conditions are overexploited, all of this compromises the availability of natural resources for future generations. The challenge we face to transform environmental conditions with individual activities is not impossible, political leaders and public institutions should unite all stakeholders to focus on the SDGs to strengthen collaboration, while building trust and accountability. In search of actions that make course, government institutions at state and federal level has the Legislative Strategy for the 2030 Agenda, the awareness of citizens in the state of Guanajuato and in the municipalities was given the installation and implementation of the Bodies for Monitoring and Implementation of the 2030 Agenda (OSI), clear actions, now is not the time for analysis and diagnosis, we must be aware respectful with us and with future generations.

La crisis climática está empeorando a medida que las emisiones de gases efecto invernadero continúan en incremento; la disponibilidad de agua potable para la población; el "Día 0" hace más presente, la practicas en agricultura y otras actividades económicas; así como el crecimiento de la población nacional se incrementa en zonas urbanas donde las condiciones hídricas están sobreexplotadas, todo ello compromete la disponibilidad de los recursos naturales para las generaciones futuras. El reto que tenemos por transformar las condiciones del medio ambiente con actividades individuales no es imposible, los líderes políticos y las instituciones públicas deberán unir a todas las partes interesadas para enfocarse en los ODS fortalecer la colaboración, al tiempo que generan confianza y responsabilidad. En busca de acciones que hagan rumbo, las instituciones gubernamentales a nivel estatal y federal cuenta con la Estrategia Legislativa para la Agenda 2030, la conciencia de ciudadanos en el estado de Guanajuato y en los municipios se dio la instalación y puesta en marcha de los Órganos de Seguimiento e Implementación de la Agenda 2030 (OSI), acciones claras, ahora no es momento de análisis y diagnóstico, debemos ser conscientes respetuosos con nosotros y con las generaciones futuras.



Environmental Care, Sustainability, Social responsibility

Cuidado Ambiental, Sustentabilidad, Responsabilidad

Resumen

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Introduction

Mexico is committed to developing various activities to meet the 2030 Agenda and thus the sustainability goals (SDGs) in the National Development Programme, 2019-2024 (NDP).

As a member of the MIKTA group (Mexico, Indonesia, Korea, Turkey and Australia), it is committed to promoting sustainable development worldwide and has submitted its Voluntary National Reports on at least one occasion.

The need to protect our environment, the urgency to change habits in society that allow a rational use of vital resources for the subsistence of human beings and to comply with the 2030 Agenda are increasingly visible.

For this reason, this article presents the results of the research conducted in the municipalities of Dolores Hidalgo Cuna de la Independencia Nacional, San Felipe and San Luis de la Paz, in the state of Guanajuato, on the social awareness of the inhabitants in relation to environmental care and sustainability.

Understanding that environmental care is presented through the actions that are generated to protect what nature offers us for subsistence and that as a society there is a commitment to make it last for future life.

The individual commitment to environmental care is analysed; considering this as a central axis in achieving results with a global impact with which a sustainable society can be achieved, as there is a strong interrelation between the actions that are carried out in the present to be able to make use of the resources in the future.

The main water, air and soil pollutants are investigated, as well as the actions that generate them; however, the actions carried out by the population to reduce them are also highlighted.

The strategies carried out with respect to recycling, reuse, waste separation and the degree of use of support granted by the government are presented, with them it is possible to conjecture the level of commitment that society has towards the preservation of the environment. Finally, the conclusions reached as a result of the study of this topic are presented.

Background

In the Convention on Biological Diversity, the United Nations defines biodiversity as: the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. It mentions that it encompasses cultural and economic issues, recreational and spiritual activities. Biodiversity is therefore important for the survival, well-being and development of the human species.

In the National Development Programme (PND) 2019-204 in the point of social policy, there is a specific section on Sustainable Development, which shows the commitment to promote it as an indispensable factor for well-being, with ethical, social, environmental and economic mandates that must be applied to guarantee a habitable and harmonious future, as a result of which policies and programmes are created in the social fabric, in ecology and in political and economic horizons.

The Political Constitution of the United Mexican States, in Article 3, establishes that every person has the right to education, based on respect for the dignity of persons, human rights, to develop in a harmonious way the faculties of the human being and to promote love for the homeland, respect for rights, freedom, peace and international solidarity conscience, to promote honesty and values, etc. As well as contributing to human coexistence and respect for nature, etc.

The Ministry of Education (SEP) at the national level recognises the complexity of the 2030 Agenda, which will allow for the transformation of habits by establishing clear goals to move towards a sustainable development model, which is why the National Development Plan 2019-2024, the Sectoral Education Programme 2020-2024 and Budgetary Programmes were aligned with the principles of the 2030 Agenda and its goals, with an emphasis on SDG 4 (PSE, 2024). For its part, the Environmental Report of the State of Guanajuato 2020, published on 24 March 2021, by the Ministry of Environment and Territorial Planning [SMAOT], mentions that, from an international perspective, Mexico has a mega-diverse biodiversity.

This means that it has been recognised as a country with a large number and diversity of plants and animals. It also indicates that the state of Guanajuato has optimal conditions, due to its location, relief, soils and climates, as well as mineral and water resources, for the development of biodiversity; however, the way in which humans have caused changes in the ecosystem, modes of production and the effects of climate change, cause the loss and degradation of biodiversity. In this report, the main causes of deforestation and its current situation are described below:

Deforestation due to changes in land use.

According to the SMAOT (2021), Land use determines the extent of deforestation, the degree of transformation and the time of exploitation, being the main cause of biodiversity loss in the State. According to the comparative analysis of the 2009-2018 satellite images, the dynamics of changes in the coverage of the various ecosystems present in our State can be detected. Thus, variations may be due to the loss of vegetation cover to make way for rainfed agricultural activities, as occurs in the municipalities of León and Manuel Doblado, where natural pastureland is eliminated for this activity.

Another modality is when the natural cover is eliminated and gives way to induced pasture, such as what happened in the municipality of Ocampo (elimination of natural pasture) or in **San Felipe** (oak forest with secondary vegetation was eliminated), or **San Luis de la Paz** (elimination of natural pasture), Tierra Blanca (xerophytic scrub) or Valle de Santiago (tropical deciduous forest).

Pests and diseases

In terms of pests and diseases through inter-institutional coordination between the National Forestry Commission [CONAFOR], the Ministry of Agri-Food and Rural Development [SDAyR], and the SMAOT (2021), indicate that, The municipalities where these diagnoses were carried out were Acámbaro, Atarjea, **Dolores Hidalgo Cuna de la Independencia Nacional**, Guanajuato, San Diego de la Unión, **San Felipe**, **San Luis de la Paz**, San Miguel de Allende, Tierra Blanca, Victoria, and Xichú, and they referred to diagnoses of parasitic plants (mistletoe), epiphytes (paxtle), defoliating worms and bark strippers.

Forest fires

The municipality of San Felipe stands out in this area, as it has the highest number of hectares affected, as mentioned by the SMAOT (2021).

In this period from 2018 to 2020, the municipalities that have suffered the greatest affectation by forest fires are: **San Felipe** (14 thousand 586.35 hectares), Cuerámara (1 thousand 829 hectares), Pénjamo (1 thousand 787 hectares) and Celaya (1 thousand 107 hectares), which cover more than 81 percent of the affectations .

State Context

Although actions have been taken that have allowed the state of Guanajuato to adapt to climate change, its effects continue to impact the economic-productive, social and environmental sectors; as indicated by the SMAOT (2021), it was determined that the average annual temperature in the state of Guanajuato increased between 1.07 °C and 1.11 °C, from 1901 to 2019. Recent warming has been most intense in the south and southeast regions of the state, and less so in the northeast. In relation to precipitation, total annual precipitation increased in the state between 52.0 mm and 71.9 mm over the last 20 years, mostly in the southeast and to a lesser extent in the northwest of the state.

At the same time, due to the reduction of precipitation in some months, they have intensified since the middle of the 20th century, with an extreme meteorological drought occurring in 2011 in most of the state, and in the first half of 2018 and 2019, a moderate to intense drought.

Temperatures in the state of Guanajuato, although varying by region, tend to be increasingly hotter, which affects the annual rainfall cycles, concentrating a greater amount of rain in a few days, thus causing floods that cause social and economic impacts. At the same time, the concentration of a greater volume of less frequent rainfall prolongs the periods of dry days, which increases the occurrence of droughts whose consequences are the advance of desertification, aggravation of the water crisis, increased vulnerability of the population, effects on rainfed agriculture, scarce water availability, as well as reduced vegetation due to the lack of climatic conditions for its development.

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Pollution and environmental deterioration

When talking about environmental impact, solid waste pollution must be considered, according to the SMAOT (2021),

In the area of integrated solid waste management we monitor the percentage of special handling waste valorised since 2018, where 14.9 percent of valorised tons were registered, for 2019 they increased to 23.2 percent¹, which is equivalent to 1 million 649 thousand 741 tons .

Among the actions carried out by the municipalities, the programmes they have created stand out, as well as the planning for the integrated management of solid waste, according to the SMAOT (2021),

To date, the municipalities with Municipal Programmes for the Prevention and Integral Management of Urban Solid Waste published in the Official State Government Gazette are Huanímaro, León and Villagrán; the municipalities that have their planning instrument in process or without publication in the Official State Government Gazette are: Cortázar, Dr. Mora, **Dolores Hidalgo Cuna de la Independencia**, Irapuato, Ramita, Salamanca, San Diego de la Unión, **San Felipe**, **San Luis de la Paz**, San Miguel de Allende, Santa Cruz de Juventino Rosas, Yuriria and Tarimoro .

Air Quality

The Air Quality Monitoring System of the State of Guanajuato, does not indicate the municipalities of Dolores Hidalgo Cuna de la Independencia Nacional, San Felipe and San Luis de la Paz, as those that have exceeded the limit values of concentration in ambient air of atmospheric pollutants, but nevertheless the alteration to the atmospheric composition in the State affects living organisms and climatic conditions, the SMAOT (2021), mentions that, Air pollution has effects at local, regional and global levels. In addition to the local effects associated with poor air quality on the health of living beings and the reduction in agricultural production, at the regional level, as it affects forests and aquatic ecosystems due to acid rain, and finally at the global level, as climate change and the reduction of the thickness of the stratospheric ozone layer, which can have disastrous repercussions on health problems, material and economic losses.

Therefore, knowing what has caused a change in our ecosystems should lead to awareness-raising, thus enabling the population to take environmental responsibility.

Objective

To identify the Social Commitment to Sustainability and Environmental Care, by the inhabitants of the municipalities of Dolores Hidalgo Cuna de la Independencia Nacional, San Felipe and San Luis de la Paz, phenomenological on the actions that they individually carry out for the preservation of water, air and soil, with clear actions developed in their own contexts.

Justification

The Mexican Ministry of Public Education in its sectoral programme establishes quality education as one of the 17 goals of the 2030 Agenda for Sustainable Development, with the fulfilment of Sustainable Development Goal 4 (SDG 4) Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Curricula include current needs and challenges to achieve comprehensive education at the primary level, specifically in subjects such as the Formative Field, Ethics, Nature and Society, which involve values for the environment and biodiversity, from early childhood to higher education.

The Intergovernmental Panel on Climate Change (IPCC) in a survey conducted by popular vote among UN member countries concluded that four out of five people want their country to take stronger climate action and say they are willing to take steps to change their habits progressively.

It is a challenge that governments cannot meet unless they are joined by leaders, business leaders and their citizens.

The intention arises to know the personal performance in the investigated municipalities in the full exercise of their right as Mexicans, in terms of the preservation of biodiversity.

Theoretical framework

As time goes by and generations pass one after the other, the damage to the environment, which provides us with the necessary conditions for the survival of human beings, becomes more and more noticeable, the definition of the environment is:

It is a system formed by natural and cultural elements that interrelate with each other and are modified by human action. The environment is the surroundings that condition our way of life, however, our way of life also conditions and adapts it.

Therefore, man's intervention in the conditions in which the environment is currently found is based on his social conscience, understanding that any action carried out by human beings will have consequences and repercussions that can be positive or fatal for their subsistence in the future.

Social awareness can be defined as 'the knowledge that a person has about the state of others in his or her community. The socially conscious individual is rightly aware of how the environment can help or hinder people's development'.

A great commitment and social awareness is required to carry out actions that together ensure the sustainability of the resources provided by the environment, thinking that future generations will be able to take advantage of and enjoy them, also considering that evolutionary development will continue and surely the needs and demands will be different.

Environmental sustainability 'refers to the preservation of the environment so that society finds a balance between the supply of its needs and the rational use of natural resources, without damaging nature'.

The issue of sustainability carries with it a high degree of responsibility and participation that requires the whole population as a whole to achieve tangible results, since resources are limited in quantity and quality, so that the actions taken in the present play a fundamental role in their preservation.

On the other hand, the concept of sustainability in the Brundtland report (1987) is presented for the first time as the satisfaction of present needs without compromising the ability to satisfy the needs of future generations.

The member states of the United Nations (UN) created a plan of action for people and planet called Agenda 2030 with 17 sustainable development goals.

The 2030 development agenda is a plan of action for people, planet and prosperity, where one of the goals is to strengthen universal peace in larger freedom.

It was implemented by all countries and stakeholders through a collaborative partnership. It sets out 17 Goals with 169 integrated and indivisible targets covering the economic, social and environmental spheres, which are integrated and indivisible and combine the three dimensions of sustainable development: economic, social and environmental.

The environmental dimension is oriented towards ecologically sustainable development, emphasising the ecological conditions necessary to sustain human life in the future. The social dimension refers to the implications for the social fabric of the lack of some natural resources, the unequal use and social distribution of natural resources, and finally, the economic dimension is described as the generation of employment and the equitable distribution of the benefits of this economic outcome, often based on the natural and cultural resources of a community. Not forgetting the need to conserve resources in order to continue to make use of them, which leads to solidarity with future generations so that they can enjoy and take advantage of these options for their well-being in a future reality.

Basic dimensions for measuring impact:

- People, which involves ending poverty and hunger, guiding people to exploit their potential with equal dignity and a healthy environment.
- Planet, which involves protecting degradation through responsible consumption of natural resources and taking action on climate change.

- Prosperity refers to all human beings enjoying a full life, economic and technological progress in harmony with nature.
- Peace to achieve calm, just and inclusive societies, free from violence and freedom.
- Collective participation refers to partnerships of all stakeholders to implement and develop the 2030 Agenda in a supportive and responsive manner.

Five dimensions that are necessary to measure and understand impact.

The Intergovernmental Panel on Climate Change (IPCC) provides comprehensive assessments of the state of scientific, technical and socio-economic knowledge on climate change, potential impacts and response strategies. In its reports, the IPCC reports on the disastrous impacts we will face, such as more frequent and extreme events, loss of biodiversity, exacerbated health crises, and worsening conflicts over increasingly limited resources.

The latest IPCC publication sets out practical solutions to develop such as investment in renewable energy, responsible production and consumption, promotion of biodiversity and healthy ecosystems.

Methodology

In order to carry out the research, 282 surveys were applied in the municipalities of Dolores Hidalgo Cuna de la Independencia Nacional, San Felipe and San Luis de la Paz, belonging to the state of Guanajuato. An estimation error of 2.54% was used, which allowed us to estimate the number of surveys carried out. Likewise, the type of sampling carried out was a probability conglomerate sample.

Results

1. General data

67% of the respondents were between 18 and 23 years old, 21% between 24 and 28 years old and 12% between 29 and 34. Of the total number of respondents, 52% identify themselves as female, 47% as male and 1% preferred not to respond.

In terms of occupation, 46% are students, 16% entrepreneurs, 12% housewives, 8% labourers, 7% government employees, 6% day labourers and 5% entrepreneurs.

In terms of their place of residence, 53% live in rural areas and 47% in urban areas. 45% come from the city of Dolores Hidalgo Cuna de la Independencia Nacional, 30% from San Felipe and 25% from San Luis de la Paz.

a) Water

94% of respondents are concerned about water care, while 6% do not consider it an important issue. Among the activities that pollute water in the household, 38% mention stirring cooking oil when washing dishes, 30% the use of detergents such as fabric softeners, soap powders and bleach, 20% the use of hair products, and 12% cleaning products.

To take care of water, 44% reuse water for watering plants, 29% control the time of their showers, 23% measure their use in household chores and 4% carry out other activities. Regarding the work of government institutions in charge of drinking water, 58% rate it as good, 22% as excellent and 20% as bad.

Respondents consider that treated water is mainly used to irrigate green areas (38%), although 34% do not know its purpose. Industrial uses (16%) and for cleaning public roads (12%) are also mentioned. Regarding the benefits of treated water, 40% see it as a replacement for drinking water, 22% are not sure, 22% associate it with environmental care and 16% with the generation of energy and nutrients.

b) Air

In relation to transport, 39% use their own vehicle, 24% use a city truck, 18% use motorbikes, 11% use bicycles, 5% use other means of transport and 3% use tractors. Forty-six per cent use transport one to five times a week, 33% six to ten times a week, and 21% more than ten times a week.

The activities that increase air pollution in their municipality, according to the respondents, are mainly rubbish burning (41%), excessive use of polluting means of transport (28%), fires (17%), tobacco smoke (7%), and the use of fireplaces and cookers (6%).

To reduce air pollution, 45% avoid burning rubbish, 28% opt for cycling or walking, 16% do not smoke, 8% avoid pyrotechnics and 3% do other activities.

c) Soil

With regard to soil pollution, 47% consider littering in the streets to be the main problem, followed by the use of chemicals such as pesticides (26%), the dumping of cooking or vehicle oil (17%), and the disposal of contaminated water (8%).

To help reduce this pollution, 39% recycle waste, 26% use biodegradable products, 16% prefer reusable products, 14% avoid dumping contaminated water, and 5% do other activities.

d) Recycling

85% of respondents recycle used items, while 8% do not and 7% are not sure. The most recycled materials in the household are plastic (51%), paper and cardboard (24%), magazines, books and newspapers (14%), aluminium cans (8%), and others (3%). In terms of predominant waste, 28% mention plastic bottles and bags, 25% food waste, and other minor waste.

e) Waste separation

55% of respondents indicate that they separate inorganic waste, while 31% separate organic waste and 14% do not separate at all.

f) Re-use

80% reuse items in their household, 11% do not and 9% are not sure. The most commonly reused items are plastics (43%), paper and cardboard (26%), and magazines and newspapers (20%). Motivations for reusing include pollution reduction (46%), waste reduction (23%), and the well-being of future generations (16%).

g) Government support

54% of respondents indicate that there is support from their municipality to access renewable energy, 28% do not know and 18% say there is no support. The most mentioned supports include solar heaters (54%) and solar panels (17%).

h) Use of Solar Energy

86% have considered using solar energy and 55% have received support for this. 44% state that there are renewable energy parks in their municipality, although 33% do not know about them. 83% indicate that there are one to two parks. Regarding the impact of these parks, 40% mention reduced electricity costs, 26% less pollution, and other minor effects.

i) Promotion of Renewable Energy Use

54% believe that their municipality promotes the use of renewable energy, while 30% are not sure. The actions they take include the use of energy efficient light bulbs (25%) and switching off unused devices (37%). The benefits of adopting energy alternatives include a reduction in expenses (65%) and encouraging the use of natural light (17%).

2. Top Behaviours in Social Responsibility

Water Care and Concern

- **Behaviour:** A remarkable 94% of respondents are concerned about the responsible use of water. The main actions they take to care for water include reusing it for watering plants (44%) and controlling the timing of showers (29%).
- **Impact:** This concern reflects a widespread awareness of water scarcity and the need to preserve it, although practices that contribute to water pollution, such as the use of detergents and the dumping of oil, still persist.

Recycling and reuse practices

- **Behaviour:** 85% recycle objects and 80% reuse materials in their homes, with plastic being the most commonly recycled material (51%).
- **Impact:** These practices indicate a significant commitment to waste reduction, although separation of organic waste (31%) could still be improved. The main motivation for these actions is pollution reduction (46%).

Interest in Renewable Energy

- **Behaviour:** 86% of respondents have considered using solar energy, and 54% believe that their municipality promotes the use of renewable energy. Government support, such as solar heaters, is also well received (54%).
- **Impact:** This trend towards renewable energy adoption reflects a desire to lower electricity costs and contribute to a cleaner environment. However, there is a significant percentage (28%) who are unaware of the support available.

Discussion

Awareness of environmental care represents the conviction of a person, group or society as a whole to take care of natural resources, by protecting and using rationally what nature gives us, actions that benefit the present and future generations. According to the results obtained in the research, it is possible to observe the attitude of the citizen and the level of awareness, in front of the sustainability of environmental care and with it their participation in:

Reuse water for sanitary plants, measure shower time and water use at home, avoid throwing contaminated water into the public drainage.

Avoid burning rubbish, leaving waste on public roads.

Recycle, separate and reuse waste, mainly plastics, use biodegradable products.

Reduce waste generated at home by actions such as using paper or cloth bags, containers for shopping.

Minimise the use of fossil fuels by converting to solar heating and using bicycles or walking as a means of transport.

Use energy efficient lighting, switch off electronic devices and appliances when not in use.

Be motivated to contribute to reducing activities that reduce environmental pollution.

Educate family members about the effects of these actions.

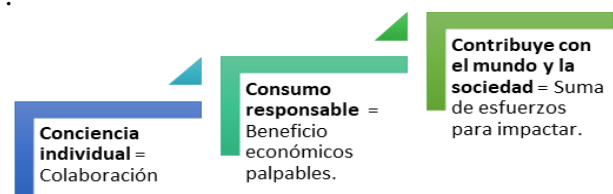
Identify government support for renewable energy, such as the purchase of solar water heaters.

State and Federal Government entities. Promote and disseminate public and social policies for the care of biodiversity and education.

Promote investment in the generation of green energies such as wind and solar parks.

Promote education plans from the earliest schooling.

We identify the impact that personal effort has when added to the efforts of the social fabric and government, to result in a massive impact on the needs of our planet, the calls that is indicating us through the different abrupt environmental phenomena, on the urgency of maintaining a balance between nature and the use of resources, with responsible consumption.



However, more timely promotion by the relevant authorities and institutions is needed in order to encourage citizen practice, bringing more forceful and massive actions that promote the sum of more universal efforts.

Conclusions

In Mexico until the year 2020 we are 126,014,024 inhabitants, in the state of Guanajuato there are 6,166,934 people, the sixth place in population in Mexico, each of these citizens have needs for nutritious food, housing, footwear and clothing, school facilities that have economic, social and environmental impacts.

The rapid pace at which society advances in search of growth and development has led to an excessive use of resources, and as a consequence, it is not the same with which alternatives are sought to protect and preserve the resources that will ensure the sustainability of life in the future.

These alternatives should consider modifying certain harmful habits and adopting actions in favour of the environment, such as the use of clean energy, recycling and reuse of materials, among others.

It is of vital importance the actions that are carried out at an individual level, the impact they can have when they are added to the collective, as this represents an example and the guidelines to follow for new generations that should have environmental care in their culture.

Declarations

Conflict of interest

The authors declare that they have no conflict of interest. They have no known financial interests or personal relationships that could have influenced the article reported in this paper.

Authors' contribution:

Lira-Mejía, María Carmen: I contributed in the idea, the development of the research, the definition of the methodology, the elaboration of the analysis, development of the discussion and elaboration of the conclusion. I also contributed to the revision and editing of the document.

Landeros-Guerra, Martha Soledad: I contributed to the development of the analysis of the information, summary, justification, discussion, conclusions, revision and editing of the document.

Villegas-Torres, María del Sagrario: I contributed to the development of the introduction, theoretical framework and conclusions.

Ortiz-Rayas, Ana María: I contributed to the development of the background and conclusions.

Availability of data and materials

Data sets used or analysed during this study are available upon reasonable request from the corresponding author.

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Abbreviations

ODS	Sustainable Development Goals
PND	National Development Programme
OSI	Monitoring and Implementation Bodies
SEP	Secretary of Public Education
PSE	Education Sector Programme
MIKTA	Mexico, Indonesia, Korea, Turkey and Australia
ONU	United Nations
SMAOT	Secretariat for the Environment and Land Management
CANAFOR	National Forestry Commission
SDAy R	Secretariat for Agri-Food and Rural Development
IPCC	Intergovernmental Panel on Climate Change
INEGI	National Institute of Statistics, Geography and Informatics (Instituto Nacional de Estadística, Geografía e Informática)

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