

# Towards the Implementation of Sustainable Development Goals at the University of Guadalajara, Mexico

Marco Berger Garcia<sup>1,\*</sup>, Carla Aceves Avila<sup>2</sup>

<sup>1</sup>University Center of Los Altos, University of Guadalajara, México

<sup>2</sup>Sustainable University Program Director, University of Guadalajara, Mexico

Copyright©2018 by authors, all rights reserved. Authors agree that this article remains permanently open access under the terms of the Creative Commons Attribution License 4.0 International License

**Abstract** The focus of this article is to examine how higher education institutions in Mexico are preparing for implementation of the Sustainable Development Goals (SDG) agenda. Specifically, we have developed a case study of the University of Guadalajara (UdG), the second largest higher education institution in Mexico, by identifying its institutional sustainability programs as preconditions toward the achievement of SDGs. For this purpose, we first analyze the evolution of UdG's sustainability programs and their preliminary results, including participation in nationwide higher education sustainable development partnerships and consortiums. We then explore how these institutional programs might harmonize with the sustainable development goals and targets. Finally, and based on the main environmental issues faced by each region of the state of Jalisco, we propose a statewide SDG preliminary agenda that links UdG's outreach and research programs with sustainable development policies of local governments.

**Keywords** Sustainable Development Goals, Environmental Education, Living Laboratories

## 1. Introduction

As catalyzers, public universities are key stakeholders. Public universities mobilize human, technological and research-based resources at the national and regional levels. In the past 20 years, Mexican higher education institutions have made some initial efforts to build up regional and national networks in order to coordinate policies towards sustainable development. The balance of these actions is difficult to define due to fragmentation and incomplete information. Overall, results have been modest regarding full implementation of harmonized and systematized green actions within university campuses. Another venue for coordinating sustainable development goals in the higher education context in Mexico is through the social responsibility framework. Recently, the Mexican Social

Responsibility University Organization (OMERSU) has combined the social responsibility paradigm with sustainability guidelines through a workable platform for national universities. However, the integration of Corporate Social Responsibility (CSR) within the sustainable development paradigm could be potentially problematic. Blowfield & Frynas [1]; Behringer & Szegedi [2].

Prior to 2015, Mexican public universities were at an impasse with respect to the implementation of sustainable development policies on campus. This deadlock is now starting to break in the context of the sustainable development goals initiative. So the question is, how well prepared are public universities in Mexico to transition to embrace the Sustainable Development Goals and, accordingly, to put in place a robust monitoring and evaluation framework.

Public Universities are complex organizations characterized by unclear technology, problematic preferences and fluid participation. Cohen et al. [3]. Within this context, external initiatives such as the implementation of SDGs in the public university realm bring difficulties and challenges, among these: to set out a consensus-based, inclusive and comprehensive framework arena where stakeholders (researchers, university officials, students and teachers) embrace the sustainable development goals initiative. Nonetheless, high-caliber external and global initiatives such as SDG's are frequently welcomed by the governing structures of public universities and are implemented on a top-down basis.

The National Association for Universities and Higher Education Institutions (ANUIES) recently launched a national-scale survey that gathers data from research bodies within universities to find out whether their research line directly contributes to a specific SDG and target. It is a first step towards reporting what Mexican Higher education institutions are doing in terms of SDGs. However, it lacks two fundamental issues that should be taken into account in order to develop better evaluation frameworks that lead to the empowerment of universities

and higher education institutions as real means of implementation. First, it assumes that the research community is familiarized with the SDGs before evaluating the SDG literacy among the research community, which is a crucial predictor of SDG success at the implementation level Higher Education Sustainability Initiative [4]. Secondly, it lacks an additionality component. In other words, the survey fails to raise two important questions: how, when and how much are professors at Mexican Higher Education institutions adapting or reframing their research lines and topics due to the Sustainable Development Goals, and whether their studies contribute to the Sustainable Development Goals anyway.

## 2. Background

### The Latin American Context of Education for Sustainable Development and the Measurement of Sustainability Efforts

According to Bravo [5], institutional environmental planning began to occur among Higher Education Institutions (HEIs) starting in 1991 with the creation of the University Environmental Program of the National Autonomous University (UNAM is its acronym in Spanish). For the Mexican context the Center for Education and Training on Sustainable Development (CECADESU in Spanish) of the Environmental Secretary (SEMARNAP then, currently SEMARNAT) held the First National Meeting of Higher Education Institutions with Extracurricular Environmental Initiatives in 1998. This meeting took place at the University of Colima and in 1999 at the Autonomous University of San Luis Potosí. In the year 2000 CECADESU held the third meeting at the University of Guanajuato [6]. In March of 2000 the Joint Committee of the National Association of Universities and Higher Education Institutions of México (ANUIES) and SEMARNAP consisted of the chairs and representatives of the Autonomous University of Coahuila, of the state of México, of the state of Morelos, Nuevo León, San Luis Potosí, Zacatecas, University of Guadalajara, University of Guanajuato, and University of Veracruz (*Veracruzana*) as well as representatives of SEMARNAP, CECADESU, and the Secretary General of ANUIES (*Asociación Nacional de Universidades e Instituciones de Educación Superior*) [7]. This Committee created the Inter-institutional Strategic Action Plan for Achieving Sustainable Development in Higher Education Institutions, in which the University of Guadalajara also took part. In the same year 2000, the University of Guadalajara was one of the HEI founders of the Mexican Consortium of University Environmental Programs for Sustainable Development known as “COMPLEXUS”. The mission of this organization is to “promote the improvement and quality of academic processes regarding environment and sustainable development through the concurrence and collaboration of

the environmental programs or entities of HEIs...” Universidad Autónoma de Coahuila 2013 [8]. Clearly, the vision was very general and overall it was meant to promote sustainable development. At that time, the seventh millennium development goal focused on environmental sustainability, but the vision of Mexican HEIs for the most part translated into new programs, or on introducing content into the curriculum.

In 2001, 2002, 2005 and 2006, the University of Guadalajara hosted COMPLEXUS meetings for the development of indicators to measure the contributions to sustainable development by Mexican HEIs. From these meetings, COMPLEXUS published a book on indicators designed to measure the contribution of education to sustainability. Clearly most of the HEIs involved in COMPLEXUS considered the mainstreaming of sustainability course contents to be relevant. There was little or no debate of the contribution of the performance of HEIs and facilities management as part of the sustainable development strategy. However, much debate occurred over the pertinence of sustainable development as a development paradigm. Mexico proposed its own approach based on environmental education for sustainable development based on the strength it had developed for decades in this area. In March of 2005 strategic sectors, including Mexico's Secretary of Education signed onto México the National Commitment for the Decade of Education for Sustainable Development. Even though all of these efforts have given visibility and importance to the mainstreaming of sustainable development in education, with every change of federal or state administration, it is necessary to refresh and retrain the new authorities in order to be able to continue.

The University of Guadalajara was one of the HEI pioneers in Mexico making an effort to introduce sustainability into its curriculum and its social responsibility. The University's ability to collaborate with other institutions and the achievement of relevant social impacts has long been recognized.

### University of Guadalajara's Experience as Pioneer on Sustainable Development Higher Education Initiatives

It has been recognized that HEIs play a critical role in humanity's progression towards sustainability. There is a great road to travel ahead in the definition of which fields or strategies should be used in order to holistically and systematically orient and assess HEIs guaranteeing that all students become sustainability literates as well as facilitators. So far, several comprehensive attempts have been performed in order to assess a “cross cutting” or “whole school approach” [9] for achieving sustainability. Nevertheless, even though there is substantial literature, clearly there is a great difficulty in the assessment of a whole school approach applied to the University of Guadalajara given its magnitude, spread locations in Jalisco, and the great variety of programs that it offers. So

far, no tool has been consistently and systematically applied to public universities in Latin America in order to evidence any given approach to sustainability. The debate of what to observe and what to do still remains to be done in Latin America, particularly in Mexico since many stakeholders are still unaware of the role that education for sustainable development plays towards sustainability. The University of Guadalajara has followed in the last five years a “whole school approach” regarding its facilities and operations, also there has been a great history of local sustainability oriented research as well as intense exploration of sustainability in its programs, but no systematic approach nor assessment had yet taken place over neither until.

Curiel Ballesteros, cited by Bravo [9] identifies at least five prior stages of institutional environmental experience at the University of Guadalajara. The first stage according to Curiel occurred between 1989 and 1990 when within the context of a profound academic reform in 1990 the Committee of Ecology and Environmental Education was created. Several members of the academic community collaborated through research, environmental education and the first proposal of an institutional environmental policy for promoting sustainable development and environmental culture. This Committee was the first at a national level with these characteristics and objectives. Since 1990, significant evidence of the University's success, with the creation of transdisciplinary programs for the advancement on the knowledge and application of sustainability solutions in Jalisco, includes, for example:

- The creation of the Masters in Environmental Health and the second Environmental Education Master's program in Mexico,
- The establishment of the first Environmental Management and Economy program in Mexico,
- The creation of an intermunicipal management committee model based on basins known as JIMA (*Junta Intermunicipal de Medio Ambiente*), originally created for the Intermunicipal Management Committee of the Ayuquila River lower basin (known as “JIRA” in Spanish) now used in all of Jalisco for intermunicipal environmental management,
- Scientific studies and proposals focused on several natural protected areas, now declared in Jalisco (Sierra de Manantlán, *Bosque La Primavera* and *Piedras Bola*), among others),
- For two decades the University has led a turtle conservation program (Tortugario “La Gloria”) at Tomatlán, Jalisco and a crocodile conservation program (Reptilario “Cipactli”) at Puerto Vallarta, Jalisco, with the involvement of researchers and students,
- For decades the University has attended to poor urban areas, indigenous communities and slums to provide medical and legal orientation services with the attention of professionals and researchers as well as

early involvement of students in research opportunities,

- As of 2015 the University provides intercultural education for indigenous populations in five university centers (north, south coast, Jalisco wetland, coast, and south centers), including tutoring for admission exams, academic tutoring, and intercultural training for professors,
- -As of 2015 the University provides inclusive education through grants for students with disabilities (deaf, mobility, or visual disabilities), grants for indigenous students,
- -In 2013 the University became one of the very few in Mexico to promote day care centers for students who are parents (applies to female or male students who are parents).

In short, the University of Guadalajara has been an innovative and constant contributor for decades toward the solution of sustainability problems in Jalisco with meaningful research, critical opinions and clear actions.

### **Decentralization and the Fulfillment of the Sustainable Development Goals**

Due to a major administrative reformation of the University of Guadalajara in 1994, the education centers of the city of Guadalajara were grouped into disciplinary areas while the education centers located outside of the city continued to be multidisciplinary in nature. These university centers, as well as the university high schools, have evolved in different degrees of depth and sophistication in sustainability mainstreaming and the pursuit of sustainability goals. The fact that the university operates in different locations scattered through Jalisco, at three different levels of higher education (ranging from high school to graduate school), poses a tremendous challenge for the harmonization of institutional sustainability efforts. Many actions have not survived through time or have transferred into other facilities because the effort tended to be voluntary and therefore disarticulate. As a result of a lack of an articulated and mandatory sustainability policy for the whole institution in the past, a university center could develop a unique approach to its particular sustainability problems.

In reality, in the past there was not an integrated strategy for the fulfillment of specific institutional sustainability goals at the University of Guadalajara, but rather scattered efforts instead. From its beginning in 2015 the Sustainable University Program was intended to document and articulate the abundant and diverse sustainability practices within the 15 university centers and 67 high schools located throughout all the state of Jalisco. Clearly, these activities evidenced that in addition to the underlying objective of providing higher education of a greater quality, there was a clear interest on the part of the university community in the achievement of sustainability goals.

Social responsibility has also become a clear issue in the latter years considering the great pressure upon HEIs to promote progress and quality of life. The alignment of education goals with social goals and aspirations has always been a clear priority for the university. Nonetheless, social responsibility has also made it evident that the planning and management strategy also reflects the university's compliance and fulfillment of its own mission. Given the size of our university, the impact of our operations and the degree of penetration that the university's actions have in the population of Jalisco, planning, management, and administration, are truly transcendental for the fulfillment of both institutional and planetary sustainability goals, given that they are an extension of our education goals. Informal education through institutional practice evidences our social responsibility and is an undeniable tool for massive sustainability education, even outside campus. Nonetheless, it has been proved that even though it is part of education's social mission, international university rankings fail to measure the HEIs success in developing third mission activities, thus being scarcely significant for being a formal part of the organizational structure or the academic environment [13].

### 3. Findings

#### **Evolution and Institutionalization of the Sustainable University Program and Institutional Sustainability Strategy**

As of 2015 the Sustainable University Program of the University of Guadalajara has prioritized "collecting" and documenting these efforts, evidencing a rich array of sustainability practices. Of these, some are oriented to a cross-cut approach to sustainability in the curricula of the participating programs, and others are oriented toward a more efficient management of facilities, observing that many of these also enhanced a higher quality education with a sustainability approach. The program also introduced several other institutional exercises as a means of diagnosing the state of sustainability practices in the institution. From 2015 to 2016 this program made a thorough study of the introduction of sustainability literacy into the curriculum, as well as the state of management practices as related to sustainable practices. As a result of the exercise, the University of Guadalajara developed several instruments which allow not only a great array of management practices, but also the more accurate accountability of institutional sustainability indicators. Among others, these instruments were developed and are currently being institutionally piloted:

- A tree inventory of all adult trees on university land,
- A greenhouse gas inventory for all the university centers in Guadalajara in order to plan responsible carbon reduction goals,

- An oversight of the environmental compliance of management practices,
- A training course on Sustainable Procurement for all the personnel involved in procurement in order to develop both a policy and an inventory of sustainable providers in every region,
- Piloting of an introductory course of Education for Sustainable Development approach as applied to Mexico and Latin America for professors,
- Development of the pilot application of a sustainable management system in two of our largest university centers (based on environmental impact and population),
- Experimental application of a water footprint measurement model in two university centers which are located in an area of high climate change vulnerability.

Additionally, in 2016 the University of Guadalajara also initiated the University Integral Program of Energy Transition (PUITE in Spanish), which is the greatest and most powerful energy strategy for the adaptation to climate change. This program has several dimensions. The most significant ones for the effects of this paper:

- Transition to clean energy through solar farms, two of which are already being built in Jalisco,
- Transition from fuel based to electric or hybrid vehicles throughout the institution,
- Verification of energy efficiency through constant monitoring of electricity consumption in university facilities.

Also in 2016, the Inclusive University Program was created in an effort to articulate diverse social actions such as intercultural programs in communities with a high indigenous student population, actions for the integration of students with disabilities, and day care centers for promoting the greater integration of young parents who study at the university. These actions together with the long-established programs of social intervention through medical and legal services, evidence a profound commitment to the fulfillment of social needs.

#### **Strategic Partnerships with Public, Private and Social Sectors for the Fulfillment of SDGs**

As mentioned above, the actions currently being developed through the Sustainable, Inclusive and Energy Transition University programs evidence the integral approach of the University of Guadalajara to contributing to the sustainable development goals. Currently the university is clearly focused on the approach of the following SDGs:

- SDG4, quality education, particularly goal 7, through the introduction of education toward a sustainable development approach through professor training and in the production of electronic materials which introduce content and practice for students,

- SDG5, particularly 5.4, mainstreaming gender equality through the day care centers program,
- SDG6, water access and sanitation, particularly 6.3 and 6.4, with policies directed to the reduction of the water footprint, and establishment of drinking water stations in all education centers,
- SDG7, clean energy, particularly 7.1 and 7.2, through all the actions of the energy transition program,
- SDG12, sustainable consumption and production, through the actions of the sustainable university program, training of administrative personnel for the life cycle and sustainable procurement approach, preventive verification of compliance of environmental norms for adequate disposal of solid waste and water discharges, and the promotion of a sustainable lifestyle through bicycle safety, as well as a non-smoking campus strategy,
- SDG13, climate action, particularly 13.1 and 13.3, both through the sustainable university program and energy transition strategy, through the introduction of measures of adaptation, also through upgrades of equipment such as vehicles and lighting fixtures, and through the consideration of specific actions of adaptation in education centers of high vulnerability (centers most vulnerable to water shortages are developing rainwater catchment as well as reuse of treated water),
- SDG14, marine life in several of its specific goals is thoroughly attended through research on species, coastal life, and consciousness over the effects of human activities. Also the sustainable university program collaborates with sustainable infrastructure for the turtle and the reptiles programs,
- SDG15, land ecosystems, the sustainable university program is contributing to this objective through its tree inventory. The actions for classifying and mapping the more than 15000 adult trees in university property promote consciousness and evidences action. Our inventory also evidenced the need to introduce more and native species for the renovation of our vegetation, contributing to the strengthening of local biodiversity and its corridors,
- SDG16, peace, justice and solid institutions is an important commitment for our institution. Sustainability, inclusiveness and energy strategy are committed to transparency, the rule of law, and the protection of human rights.

#### 4. Discussion

Currently, one of the main challenges with respect to the implementation of Sustainable Development Goals at the University of Guadalajara is not the lack of initiatives and actions towards sustainability, but rather the issue of how to trickle down the SDGs from the macro to the lower levels of the organization, so that students, teachers, researchers and administrative workers alike embrace the

SDGs and the translation to specific sustainability actions on a daily basis. Moreover, given the thematic scale and regional scope of the University of Guadalajara, the issue at hand is how to identify and construct sustainability indicators at the level of the regional campuses. In doing so, we propose a dual strategic planning approach, first by running the Living Laboratory framework as a tool for introducing the sustainable development goals into the public university system, particularly at the University of Guadalajara. The Living Laboratory framework implies the “development of new products, systems, services, and processes, employing working methods to integrate people into the entire development process as users and co-creators, to explore, examine, experiment, test, and evaluate new ideas, scenarios, processes, systems, concepts and creative solutions in complex and real contexts” Evans et al. [10]. All of this relates to context-based sustainable development solutions.

The second strategic intervention to accelerate SDG implementation processes is to harness the University of Guadalajara as a partnership-builder at the local level. Given UdG’s geographically decentralized model, the second interaction arena of University of Guadalajara in order to achieve the Sustainable Development Goals is through intervention in local and state-level sustainable development issues. In order to propel the SDG initiative into the outreach off-campus level, it is necessary to align applied research and outreach activities with local environmental sustainability agendas based on local sustainable development issues.

In this regard, we also propose a two-fold differentiated and complementary strategy that first addresses Guadalajara’s Metropolitan Area environmental quality issues that have degraded in recent years: for example, air quality, land use, biodiversity and natural protected areas, and then to align them accordingly with the corresponding SDG. On the other hand, the eight regional campuses of the University of Guadalajara provide a unique and diverse platform to address local sustainability issues through applied research, outreach and capacity-building. With a view toward effectiveness, we propose then that, in principle, each regional campus should adopt the most suitable SDG bundle, including targets and indicators, either already existing or constructed, that addresses the most significant sustainable development issues at the regional level.

Table 1 depicts the main environmental issues at Guadalajara Metropolitan Area and the Metropolitan University Center, those that can be relied on to lead in a specific SDG, target and set of indicators, according to the nature of the issue and the available expertise for each campus. Due to the complexity that each goal implies, it is necessary to take an interdisciplinary approach that can apply across the specific campuses. That being said, it is important that each campus takes the lead and responsibility for at least one Sustainable Development Goal. In a complementary way, Table 2 depicts the main

environmental issues at the regional level of the western state of Jalisco, Mexico thereby suggesting which target and set of indicators should be taken at the regional campus level, seen as a node or cluster.

**Table 1.** University of Guadalajara's Metropolitan Thematic Campuses and Local Environmental Issues

University of Guadalajara Metropolitan-Thematic Campus	Environmental Issues of Guadalajara Metro Area	SDG	Target	Indicator
Arts, Architecture and Design University Center (CUAAD)	Land Use and urban sprawl.	11. Make Cities and Human settlements inclusive, safe, resilient and sustainable.	11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing.
			11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety.	11.2.1. Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities
	11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries		11.3.1 Ratio of land consumption rate to population growth rate. 11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically	
	11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities		11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities.	
Science, Technology, Engineering and Mathematics University Center (CUCEI)	Air Quality  Waste Management	11. Make Cities and Human settlements inclusive, safe, resilient and sustainable	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.	11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities. 11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities
Tonalá University Center (CUTONALÁ)	Energy inefficient consumption Water Supply and Sanitation	7. Affordable and Clean Energy	7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.	7.1.2 Proportion of population with primary reliance on clean fuels and technology.
Social Sciences and Humanities University Center (CUCSH)	Rule of Law, Enforcement, Transparency and Accountability	Peace, Justice and Strong Institutions	16.5 Substantially reduce corruption and bribery in all their forms	16.5.1 Proportion of persons who had at least one contact with a public official and who paid a bribe to a public official, or were asked for a bribe by those public officials, during the previous 12 months
Health Sciences (CUCS)	Environmental Quality and Human Health.	3. Good Health and Well Being	3.4 Reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.	3.4.1 Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease. 3.4.2 Suicide mortality rate
Economics and Management University Campus (CUCEA)	Production and Consumption Negative Externalities.	11. Responsible Consumption and Production	11.A Support positive economic, social and environmental links between urban, per-urban and rural areas by strengthening national and regional development planning	11.A.1 Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city
Biological and Life Sciences University Campus (CUCBA)	Overfishing and overharvesting	14. Life below water	14.4 Effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	14.4.1 Proportion of fish stocks within biologically sustainable levels.

Source. Own adaptation from UdG's Institutional Development Plans, State of Jalisco and Municipal Development Plans

**Table 2.** University of Guadalajara’s Regional University Network and Local Environmental Issues

University of Guadalajara Regional Campus/ Location	Main Environmental Issues	Sustainable Development Goal	Target	Indicator
Los Valles University Center. Ameca, Jalisco	Greenhouse Gas Emissions due to sugar cane and agave exploitation.	7. Affordable and clean energy	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption
Coast of Jalisco University Center. Puerto Vallarta, Jalisco (CUCOSTA)	Urban Sprawl, Deforestation and Water Use for the Tourism Sector	15. Protect, Restore and Promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and biodiversity loss	15.4 Ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development	15.4.1 Coverage by protected areas of important sites for mountain biodiversity
Southern Coast of Jalisco University Center. Autlán, Jalisco (CUCSUR)	Watershed Pollution from agriculture and livestock. High level of emissions due to deforestation and degradation.		15.2 Promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	15.2.1 Progress towards sustainable forest management
Southern Region University Center. Zapotlán Jalisco (CUSUR)	Wetlands management Deforestation and natural protected areas management		15.1 Ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type
University of Guadalajara Regional Campus/ Location	Main Environmental Issues	Sustainable Development Goal	Target	Indicator
La Ciénega University Center. Ocotlán, Jalisco (CUCIENEGA)	Water Supply at the Chapala Lake Reservoir	6. Ensure availability and sustainable management of water and sanitation for all.	6.3 Improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	6.3.2 Proportion of bodies of water with good ambient water quality
Northern Region University Center. Colotlán, Jalisco (CUNORTE)	Desertification, Water Supply	2. Zero Hunger	2.4 Ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.	2.4.1 Proportion of agricultural area under productive and sustainable agriculture
Los Altos University Center. Tepatitlán, Jalisco. (CUALTOS)	Water Supply, Livestock and Agricultural Discharges		6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	6.3.1 Proportion of wastewater safely treated 6.3.2 Proportion of bodies of water with good ambient water quality
Los Lagos University Center. Lagos de Moreno, Jalisco (CULAGOS)	Dam Construction and Environmental Conflict.	6. Ensure availability and sustainable management of water and sanitation for all.	6.5 Implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.	6.5.2 Proportion of transboundary basin area with an operational arrangement for water cooperation

Source. Own adaptation from UdG’s Institutional Development Plans, State of Jalisco and Municipal Development Plans

Even though possibilities are clear, the greatest challenge in this aspect is being able to support local research agendas which contribute to global solutions. Stakeholders both within and outside the university are not always keen, much less aware of the potential in local efforts. Capacity-building both within the university as well as with stakeholders and grass-root organizations is still a challenge to be faced by University of Guadalajara. A strategic approach is vital for the road ahead.

Universities represent means of transformation in this global effort. As catalyzers, public universities generate, transfer and mobilize human and technological resources to speed up sustainable development goals achievement. Moreover, at a micro level, universities play a role at how they are doing in achieving the Sustainable Development Goals themselves. Therefore, in this section we assess through SDG indicators framework so far what are the gaps and achievements of UdG towards the implementation of Sustainable Development Goals (SDG's). Tables 1 & 2 summarized the 8 Goals which directly involve UdG performance due to its nature, mission and strategic planning. But how well does UdG performs in each one of them? Currently, the Sustainable Campus Program hosted at UdG is working to define preliminary baselines,

thresholds and indicators towards the implementation and achievements of Sustainable Development Goals on campus.

In this regard, SDG 13, Climate Action is the one goal with enough data to establish appropriate baselines and feasible goals towards 2030, and even an estimate of monetary investments throughout this period. Carbon sequestration and Co2 emission reductions are fundamental mainstream indicators to achieve effectiveness for climate change mitigation. In this sense, given current and projected student enrollment populations at UdG, it is possible to estimate expected and net CO<sup>2</sup> emissions scenarios for 2030 (Table 3). Furthermore, as shown in Table 4, setting carbon neutrality as a campus-level Sustainable Development Goal implies significant shifts towards green budgeting and green project investments. According to several surveys carried out at diverse UdG campuses, there are significant opportunity areas to abate greenhouse gas emissions within the university network: student population projections rates clearly outpace carbon sequestration rates. Therefore, cost-effective interventions are needed, alongside carbon sequestration certificates since net emissions will remain positive for 2030 scenarios along UdG.

**Table 3.** Student Population and Greenhouse Gas Emissions: Current and Projected: Selected University Centers.

University Center	Student Population (Baseline 2009)	Student Population 2015	Projected student population 2030 (additional students)	Growth Rate	Expected Emissions 2030	Carbon sequestration rate Tasa de captura	Net Emissions 2030
CUALTOS	2,832	3,776	4,781	79%	528	9.2	519
CUCOSTA	4,643	5,720	6,840	84%	1,826	13.5	1,813
CUNORTE	1,363	3,527	6,340	56%	1,311	39.8	1,271
CUSUR	4,724	6,525	11,332	58%	1,790	24.6	1,766
CUVALLES	2,902	4,281	7,020	61%	1,813	7.4	1,806

Source: Balderas, Arturo. "Diagnosis to achieve carbon neutrality certification". Sustainable University Program-UdG

**Table 4.** Carbon Mitigation and Neutrality Goals, selected Campus. University of Guadalajara, Mexico 2015-2030

UNIVERSITY CENTER	Emission Abatement Investment (Estimated) Million USD	Emission Abatement Investment (Estimated) Million USD (Annual)	Carbon Certificate Purchase Requirements (Total USD)
CUALTOS	305,714.29	20,571.43	65,714 (19,770 – 131,420)
CUCOSTA	1,057,142.86	70,857.14	236,000 (68,570-468,500)
CUNORTE	948,571.43	63,428.57	120,000 (37,100- 245,700)
CUSUR	1,297,142.86	86,285.71	171,429 (52,000 – 346,800)
CUVALLES	1,182,857.14	78,857.14	188,572 (56,800- 377,100 )

Source: Balderas, Arturo. "Diagnosis to achieve carbon neutrality certification". Sustainable University Program-UdG



## 5. Conclusions

This quick review makes it evident that University of Guadalajara is taking action towards the implementation of Sustainable Development Goals. Nevertheless, there are enormous challenges ahead. Internally, the institutionalization of the strategy through a formal policy is necessary as a guarantee of a permanent budget and permanent capacity building in these three areas. Also, it is necessary for education authorities at state and federal levels to observe and consider sustainability actions on HEI as part of the evaluation strategies. The challenge of systematic documentation and approach by the University still lies ahead as well as a capacity building strategy which will enable every campus to act consistently.

A great challenge lies ahead with respect to our interaction with education authorities at state and federal levels. In the past, sustainability actions have been considered voluntary, and even though all HEIs should be committed to promoting either environmental education, education for sustainability or climate change education, it is a fact that there is no indicator in any state or federal education instrument that verifies compliance with the general commitment. Such enforcement is necessary for HEIs to consider sustainability actions seriously, allocate adequate budgets, and assign adequate personnel. Also, based on our university's experience, disarticulation and improvisation also cause great frustration in the community because successful practices and innovative ideas cannot be documented, replicated or continued and the knowledge acquired may be lost. On the other hand, the formal observation and consideration of sustainability actions on HEIs should be part of the evaluation strategies given that these actions provide informal education through life experiences for students, professors and administrative staff multiplying exponentially the effect of education on making societies conscious and resilient. Thus, indirect capacity building within education authorities remains a great challenge ahead in order to create the appropriate conditions to enable sustainability practice beyond a voluntary approach. There is no certification instrument or approach to sustainability learning in the Mexican education system. Also, certification instruments for programs do not assertively assess sustainability issues nor sustainability competences. If education authorities remain ignorant and passive of the necessity of a hands-on approach on sustainability, the road ahead will be even more challenging. The role of the University of Guadalajara as the second largest public university in Mexico poses a great responsibility for documenting, evidencing and enabling this change.

Another opportunity also lies with the environmental authorities (mainly state and federal). Sustainability actions from HEIs should receive more specific and greater support from environmental authorities. Given that large numbers of the population are exposed to good (or bad)

sustainability practices and habits, these tend to be replicated elsewhere. Sustainability performance in HEIs is currently certified through policy instruments meant for production facilities which are not appropriate for the needs and operation of educational facilities. If one specific HEI has an exceptionally strong sustainability performance, it will be assertively contributing to SDGs as well as promoting a greater quality of life to all its members. Specific public policy and instruments should be created as incentive and in order to enhance sustainability practices at HEIs and the rewards are obvious, considering the educational effects these good practices have on the population.

There is an extraordinary opportunity for public HEIs such as the University of Guadalajara to make a substantial and integral contribution to society if government agencies could finance the study of real life sustainability problems in order to promote the involvement of researchers and academics applying knowledge in the solution of real life problems. Multidisciplinary research as well as early involvement of students in real-world contexts could give rise to long-sought-after sustainability abilities and competencies. A hands-on approach to real-life sustainability issues in harmony with the living laboratory framework, with government support, could induce a more effective focus on the SDG goal fulfillment, and it could make a powerful contribution to applied education for sustainable development. University of Guadalajara has a great challenge ahead in the cross cutting institutionalization of its sustainability exercise through a whole school approach as well as proposing its own sustainability goals which contribute in turn to regional and planetary challenges. Finally, given the scale and scope of the University of Guadalajara decentralized network, it lends itself to fostering differentiated interventions for SDG achievement alongside local and state governments and civil society partnerships, to establish from-the-ground-up regional sustainable development indicators.

---

## REFERENCES

- [1] Asociación Nacional de Universidades e Instituciones de Educación Superior (ANUIES). Plan de Acción para el Desarrollo Sustentable en las instituciones de Educación Superior. Ciudad de México: ANUIES-SEMARNAT-CECADESU, 2001.
- [2] Balderas, Arturo. *Diagnóstico para alcanzar la certificación en neutralidad en carbono*. Guadalajara, Jalisco: Programa Universidad Sustentable. Universidad de Guadalajara. 2017.
- [3] Behringer, Karoly, y Krisztina Szegedi. «The role of CSR in achieving sustainable development-Theoretical Approach.» *European Scientific Journal*, 2016: 10-25.

- [4] Bravo, Maria Teresa. *Los planes ambientales institucionales en la educación superior en México. Construyendo sentidos de sustentabilidad (2002-2007)*. Ciudad de México. . Ciudad de México: SEMARNAT/INE/ANUIES/UNAM, 2012.
- [5] Cohen, Michael D, James, G March, y Johan P. Olsen. «A Garbage Can Model of Organizational Choice.» *Administrative Science Quarterly*, 1972: 1-25.
- [6] Evans, James, Ross Jones, Andrew Karvonen, Lucy Millard, y Jana Wendler. «Living labs and co-production: university campuses as platforms for sustainability science.» *Current Opinion on Environmental Sustainability*, 2015: 1-6.
- [7] Garriga, Elisabet, y Doménech Melé. «Corporate Social Responsibility Theories: Mapping the Territory.» *Journal of Business Ethics*, 2004: 51-71.
- [8] Higher Education Sustainability Initiative. *Mapping Awareness of the Global Goals*. New York: High-Level Political Forum on Sustainable Development, 2017.
- [9] McMillin, J. y Dyball, R. *Developing a Whole-of-University Approach to Educating for Sustainability. Linking Curriculum, Research and Sustainable Campus Operations*. Journal of Education for Sustainable Development. Vol. 3, no. 1, pp. 55-64. 2009.
- [10] United Nations General Assembly. *Transforming our world: the 2030 Agenda for Sustainable Development*. New York: United Nations, 2015.
- [11] Universidad Autónoma de Coahuila. *Declaración de las instituciones del COMPLEXUS*. Saltillo, Coahuila. México: Universidad Autónoma de Coahuila, 2013.
- [12] Universidad de Guanajuato. *Indicadores para medir la Contribución de las Instituciones de Educación Superior a la Sustentabilidad*. Guanajuato, México: Universidad de Guanajuato, 2013.
- [13] Urdari, Claudia; Teodora Viorica Farcas, Adriana Tiron-Tudor, (2017). *Assessing the legitimacy of HEIs' contributions to society: The perspective of international rankings*. Sustainability Accounting, Management and Policy Journal, Vol. 8 Issue: 2, pp.191-215. 2017.