

Chapter 30

Challenges and Potential Sustainable Solutions of Environmental Threats and Climate Change in Guatemala

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Introduction: The Need to Cope with Environmental and Climate Change Threats

The recent approval of the Sustainable Development Goals (SDGs), at the end of the year 2015 in the General Assembly of the United Nations, culminates a process of understanding the goals sought throughout the world, regarding economic growth, quality of life and the environment, including climate change. These three axes, in a joint and balanced way as well as the approach towards future generations, are the dimensions that precisely define the United Nations World Commission on Environment and Development in the Brundtland Report (1987). These SDGs replaced the Millennium Development Goals (MDG) changing the horizon for achievements from the year 2015–2030. However, over time, since the United Nations called these global efforts the “First Decade of Development” in 1960, its approaches and integration of its various components has not been an easy task.

Towards a New Consensus at the World Level

This consensus is equivalent to the acceptance of a new paradigm that included more than 190 countries. They are practically the territories that make up planet Earth itself. These agreements reached consensus by September 2015, and almost immediately, a similar event took place in the meeting of the Conference of the Parties, COP 21 in Paris at the end of December 2015. The willingness of atten-

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dance was significant despite possible cancellation of the event, due to terrorist attacks that blighted Paris, a few days before that date.

These same dimensions fought each other for their integration and supremacy in over the past 50 years. At the beginning, the economic aspect was privileged, while the social, environmental and climate change aspects remained less relevant in the approaches, policies and realities (Amaro 2012). It was not until the late 80s that talk about the “human face of development” began and this concern arose in the 90s. Finally, the United Nations Framework Convention on Climate Change (UNFCCC) was accepted in 1992 and finally approved definitely in March 1994. After this meeting, 20 more encounters had to take place in order to reach the consensus achieved during the COP21 in Paris in 2015. In the final declaration, a petition was made to the Adaptation Committee and Least Developed Countries (LDC) Expert Group, under section (b) of “Adaptation”, where the following recommendation may be read: “Study methodologies to evaluate the needs of adaptation in order to provide assistance to developing countries without placing undue burdens on them” (Naciones Unidas 2015).

This paragraph aims to an openness of minds. Continuous discussions took place for over those 20 years before, on the responsibility of mitigating climate change and the cost to be borne by each party. By the time the COP21 Agreements were reached, the argument for placing said burden on developed countries was often the axis where the consensus faltered. At the COP21, the discussions on funding became concentrated mainly on developed countries. At present, and in the declarations issued because of the COP22, the following year, a preponderant participation of developed countries is recognized. The target for all activities reaches a minimum investment of US\$100 billion (Naciones Unidas 2015, Agreement 54). These sums will be contributions to the Green Climate Fund (GCF) and the Global Environment Facility (GEF), which are responsible for the financial functioning of the Convention. These instruments will be the guiding principle for these contributions, along with the support of the Least Developed Countries Fund (LDCF), Special Climate Change Fund (SCCF) and the Adaptation Fund (AF) (Naciones Unidas 2015, Agreements 59 and 60). Future meetings will have to rule the contributions, access to and distribution of these funds. The recent US Government withdrawal of these agreements reached in Paris and Morocco will surely intensify these discussions. Nevertheless, it may also strengthen more the participation and determination of other developed as well as developing countries’ actors.

This evolution towards greater consensus points to the gradual awareness of the ecological dimension of development, which has resulted in numerous conferences, international meetings, accords and framework agreements in recent times. At first, social aspects were largely considered as a consumption and budget expenditure, not as a requirement for development, while the environment and its advocates appeared as lovers of nature and wildlife. Both approaches were marginal and often contradictory to the transformations and economic goals put as main objectives in the past (Amaro 2012).

Although important consensuses have been reached in achieving the compatibility of these objectives, still the necessary awareness of the need to make a reality

of these dimensions, was far from becoming a basic premise for the activities carried out by universities, the market, the government and civil society. Lack of consensus affects the promotion of investment, policies and preventions. It is necessary to reflect on which challenges deserve special attention that could lead to methodologies that make needs visible, considering the set of vulnerabilities, threats and priorities, as outlined in the COP21 Agreements.

The present elaboration highlights three challenges, which should constitute central concerns if progress is a goal in these dimensions. The first one is about poverty and food security, demonstrating that the latter is the most direct relation of the possible impacts of climate change that affects populations. At least such is the case for Guatemalans. The second challenge relates to the inadequate coordination of key actors and decision-makers when addressing the aforementioned problems. The last and third challenge focuses on the need to channel these efforts towards regional and local levels, creating links between sustainable development, care of the environment and climate change in the most remote places where there are often major contradictions and deficiencies in economic growth, quality of life and environmental impacts.

Sustainable development is the prevailing paradigm in the world today and it is therefore necessary to face social conflicts that paralyze investment, influence economic growth and contribute to perpetuate and increase poverty and environmental pollution. The concept of paradigm, as Kuhn (1962) argues, may perhaps be synthesized simply as a “puzzle”, which is shared by a community of scientists, after being found that other approaches that guide research and its applications, have limits to the advancement of knowledge.

Then, each one contributes to constructing knowledge from each perspective around the premises accepted in the paradigm, which equally has consequences for researchers as well as for decision-makers in these areas. The consensus reached at the United Nations General Assembly in New York in September 2015 and then in December 2015 at the COP21 in Paris, amounts to the acceptance of a paradigm, even though there were some stakeholders that may not yet share some of the premises of these contents. This is evidenced by the mentioned uncertainty created after the elections held in the United States of America in November 2016, despite previous ratifications of these agreements.

This elaboration wants to highlight which challenges are the most urgent to face at present in Guatemala. In doing so, it will establish the link between these priorities to be formulated and the needed measures to cope with threats coming from the lack of economic growth, its impact on poverty, the extension of this absence in food security and the way this weakness should be face through coordination and decentralization at the local level.

The Context of Sustainable Development, Poverty, Food Security and Climate Change to Highlight Challenges and Priorities in Guatemala

Modality 1 contains the 17 paradigmatic goals that substitute the Millennium Development Goals (MDGs), by the consensus reached. These same goals give an account of the environmental and climate change issues that are in the MDGs. On the other hand, recent studies give an account of the impact of climate change in Latin America, the Caribbean and Guatemala and the legislation efforts made to address these threats. A study by specialists of the United Nations Environment Program (UNEP) and the Latin American Parliament (2015) states:

Virtually the entire land area of LAC (Latin America and the Caribbean) will be subject to caloric events that now occur every 700 years; the Amazon basin and many densely populated areas are expected to experience extreme drought; the Andean glaciers will have disappeared by the end of this century. Glacial melting will initially increase the risk of flooding, to later end in a drought that will affect the communities that depend on it; category 4 or 5 hurricanes could be more frequent and powerful. This, along with a one-meter increase of the current sea level, will have devastating effects, especially in the Caribbean. Events such as the gigantic Amazon droughts of 2005 and 2010, the increase in frequency of hurricanes in the Atlantic, and the loss of 90% of tropical glaciers are clear evidence of this. (p. 13, translation made by the author)

This situation has a closer impact on Guatemala whose coasts are bathed by the Caribbean, the dangers of which have been pointed out as well as the increased presence of cyclones. In addition, the United Nations University in Tokyo (2013) recognized these shortcomings. Researchers elaborated a World Risk Index here that ranked 173 countries according to their degree of vulnerability regarding natural hazards and institutional capacity to face these threats. Guatemala ranked fourth, only behind Vanuatu, Tonga and Philippines. This situation has also been noted by other authors, who have demonstrated the recurrence of disasters due to floods and storms, highlighting its frequency mainly from 1998 with Hurricane Mitch and repeated at great costs to the country in 2005, 2010 and 2011 (Amaro et al. 2014).

The first goal depicted in Graphic 30.1 focuses precisely on the eradication of poverty and the second, which has the same title, was one of the main programs called “Zero Hunger Pact”. The Food Security and Nutrition Secretariat (SESAN by its initials in Spanish) implemented this program in Guatemala since 2011 in alliance with other government branches and different municipalities of the country. This program aimed to reduce by 10% the undernourished population under 3 years old and diminish child mortality in children under 5 years in 166 municipalities prioritized according to their poverty conditions, in 4 years culminating in 2015 (SEGEPLAN, Circa 2012).

This program was launched with great publicity during the previous administration presided by General Otto Pérez Molina (2012–2015), who is now facing corruption charges and preventive detention in Guatemala since his final year in



Graphic 30.1 Source UN News Centre (2015), Sustainable development goals kick off with start of new year. <http://www.un.org/sustainabledevelopment/blog/2015/12/sustainable-development-goals-kick-off-with-start-of-new-year/>. Accessed 28 Jan 2017

office (2015) which he was unable to conclude due to the aforementioned reasons. The press recently voiced concerns in the dissemination of the results obtained during this program according to evaluations held during the period 2012–2015. It is necessary to take into consideration that, although there is a decrease in Guatemalan poverty levels from 59.9% in 2012 to 58.2% in 2013, chronic malnutrition rises to 60.6% in the year 2014 when evaluating children under 5 years of age. However, the current leader of the SESAN recognizes that the program reached only 30% of the residents of the prioritized municipalities (Muñoz Palala 2016). These actions are an example of the implementation difficulties following international agreements.

What Can Be Done? Sustainable Development, Mitigation and Adaptation as Responses

The subject of natural resources and disasters is crucial in the sustainable development and climate change issues. The plea of the COP21 Agreements aims to the formulation of methodologies capable of detecting the needs, legal backgrounds (PNUMA/PARLATINO 2015) and economic, environmental and social implications in order to resolve its consequences. Altamonte and Sánchez (2016) advance an elaboration close to the study presented here. These authors state:

In other words, governance may be seen as the collection of processes of both decision-making as well as the implementation of resulting decisions, in which institution act through mechanisms, procedures and rules formally or informally established. An adequate governance must be capable of managing the multiple fiscal, regulatory, macroeconomic, social, environmental and long-term public investment (among other) challenges that are implicit in the path of natural resource-based development that in fact represents absolute development. (pp. 16 and 17. Translation made by the author.).

Faced with this situation, the possible answers should concentrate on focusing the dimensions that might attenuate the mentioned factors. This call should consider the goals enunciated by the consensus around the SDGs that make an appeal to the eradication of poverty and hunger in conjunction with the environment and climate change threats that are largely responsible for this situation. An improvement in these dimensions will necessarily have an impact on the effects of the detected vulnerabilities. Simultaneously, to reduce the emission of greenhouse gases (GHG) and the adverse conditions of climate change, efforts must be made. Guatemala has promised during the Conference of the Parties in Paris that it will reduce 11.2% of GHG emissions by its own means and with external aid, that amount can be doubled in order to achieve a 22.6% reduction by 2030 (MARN 2015, Sect. 3.2). This leads us to face in short, medium and long term, essential elements in the process of adaptation and for this, three challenges that must be faced in this field are highlighted next.

At present only Mexico and Guatemala have specific legislation on climate change enacted in Latin America (PNUMA y Parlamento Latinoamericano y Caribe 2015). As a result, the Guatemalan Government is engaged in a series of plans, following the approval by Congress of the Climate Change Law (2013). These operational plans cover 4 instruments: the National Action Plan for Climate Change Adaptation and Mitigation, that calls for the coordination of all related government bodies, the private sectors, civil society and universities. These bodies sit in the Climate Change Council headed by the President of the Republic. The Law specifies that this body should meet each 2 months. The goal is to implement the articles specified in the Law completely. The second operational plan refers to energy for production and consumption; the third, elaborates on a program for the reduction of Greenhouse Gases; and the fourth, aims to cope with the environmental problems created by private and public transportation (MARN 2016). There is no doubt that the government with regard to climate change is in a design stage, although it has a legislation in place that still is missing in most of the rest of Latin America.

Therefore, there are still possibilities for further actions in the climate change area. A general diagnostics on climate change in Guatemala (Castellanos and Guerra 2009) concludes with a call to intensify the activities related to woods and reforestation; the integrated management of basins; increase the provision of food; the need for an adequate handling of garbage; and a greater emphasis on the prevention of disasters. Complaints also abound regarding the lack of general awareness and government coordination with regard to climate change threats and dangers.

According with other studies made, the most dramatic situation of the impact of environmental factors and climate change on poor populations, are the so-called “Dry Corridors” that are defined as “a region characterized by semiarid soils and risk of droughts” (MAGA 2010). A last study on the subject says that “Climate change and the advance of the agricultural frontier will impinge upon the forest coverage, the increment of soil erosion and the reduction of water volumes...where the provision and supply of water represents 86% of the damages” (PNUD and PNUMA 2013). This situation affects crops, subsistence food and malnutrition, particularly on poor children with less than 5 years. This paper will concentrate on this interrelation, looking for further coordination to cope with this situation and suggesting measures to improve the quality of life of the poorest population in these territories.

Main Sustainable Development, Environment and Climate Change Challenges Faced by Guatemala

First Challenge

Economic, social, environmental and climate change are closely related. Economic growth must be a basic goal in order to achieve a reduction of poverty in the country and thus lessen the effects of climate change. The comparison between the previous global situation of the SDGs that have specific objectives to be met by the year 2030 and the reality of Guatemala, raise the eradication of poverty to a priority in the country. There can be no distribution of wealth without economic growth. Poverty perpetuates despite the comparative advantages of Guatemala as a frontier to the largest global market in the world: USA, Canada and Mexico. This vulnerability makes the effects of climate change more pronounced with regard to hunger and malnutrition. This is reflected in the information that follows.

These news and the following Figure appeared in the journal of greater circulation in Guatemala. Translation by the author in order of appearance from top to down: “Region of 9 thousand 620 km². Majority of population live in the “Dry Corridor”. Below this title, it says:

“The area known as “Dry Corridor” extends from part of the northwestern Departments (provinces), like Huehuetenango and Quiché, to the southeastern end, including Jutiapa and Chiquimula”. Then, the map of Guatemala is seen where the name of main departments or provinces appear. The color means: red light: extremely high; orange: very high; and yellow, high threat. The bigger headings refer to “Majority of the population lives in the Dry Corridor (small letters). “65 thousand families ask for food” (capital letters).

Source: Contreras, G. (9 August 2016). Piden alimentos 65 mil familias. *Prensa libre*, p. 6.

The content of the Graphic 30.2 shows territories of the so-called “Dry Corridors” in Guatemala. This information was selected as an example of how the



Graphic 30.2 Guatemala: a map of “Dry Corridors and Poor families Affected by Food Security”

extent of these phenomena reaches the general public in the country. The most evident alterations of climatic and environmental factors that mainly affect the population living in poverty and have an impact on nutritional levels in these areas are the following:

- Changes in temperature.
- Changes in precipitation.
- Flooding and drought cycles that affect water and hydro biological resources.
- Natural disasters often causing displacement and search for refuge.
- Agricultural crops either affected by droughts or flooding with direct impact in food security for the population living in poverty.
- Deterioration of soil already affected by the use of pesticides.
- Contamination of water, air, and appearance of related diseases.

Table 30.1 examines the economic growth in a short, medium and long term of Guatemala since the year 2001–2016. As can be seen, the modalities vary from 0.5% in 2009, which is the lowest and reaches the highest, 6.3% in 2008. In fact, in 16 years, this indicator only exceeded 4% in 5 years. Only 1 year, the figure reached 5% and another one 6%. In all other periods and years, rates have not exceeded 4% for a total of 9 years below 4%.

Table 30.1 Economic growth rates in percentages, as measured by Guatemala's Gross Domestic Product (GDP), 2001–2016

Year	GDP	
	At prices of 2001	
	Values	Var. %
2001	146,977.8	2.4
2002	152,660.9	3.9
2003	156,524.5	2.5
2004	161,458.2	3.2
2005	166,722.0	3.3
2006	175,691.2	5.4
2007	186,766.9	6.3
2008	192,894.9	3.3
2009	193,909.6	0.5
2010	199,473.8	2.9
2011	207,776.0	4.2
2012	213,946.6	3.0
2013	221,857.5	3.7
2014 ^{p/}	231,118.2	4.2
2015 ^{p/}	240,706.8	4.1
2016 ^{py/(low)}	248,079.6	3.1
2016 ^{py/(low)}	250,005.2	3.9

p/ Preliminary figures, py/ projected figures

Source Banco de Guatemala, Producto Interno Bruto, Base: 2001. <http://www.banguat.gob.gt/inc/main.asp?id=51803&aud=1&lang=1>. Accessed 10 January 2017

These economic growth rates in Guatemala are insufficient to achieve an effective distribution that can significantly lower the poverty rates that prevail in the country. It is enough to make a comparison of that same indicator with China. For example, between 2000 and 2016, China's lowest rate reached 6.7% (2016) and the highest achieved more than 14% (2007). From 2000 to 2016, China achieved a GDP growth of over 10% from 2003 to 2008 and then again in 2010, 9 in a total of 16 years (National Bureau of Statistics of China 2016).

Guatemala, in the past, has suffered violent political conflicts that had their greatest rise between the 50s and 90s. Finally, in 1996, the government and violent opposing forces sign the Peace Accords. These efforts were similar to the ones made in Latin America, now by Colombia. What has remained behind is that in the Peace Accords signed on that date, an economic growth rate goal of 6% is set, a figure that has rarely been achieved in all these years and there is not even any public discussion about it. The international experience represented by China proves that it is impossible to achieve significant accomplishments in this field, if systematic and continuous economic growth is not present. However, observers indicate that this is a "necessary but not sufficient" condition (United Nations Development Program 2015, p. 2). Actions in physical infrastructure, human capital formation and quality of life should also be added as an ingredient. Nevertheless,

there would be agreement that without economic growth, the advances in distribution becomes impossible.

In comparison to the observations made for the case of Guatemala, the quoted report (United Nations Development Program 2015) states:

...China has increased its per capita 5 times between 1990 and 2000, from US\$200 to US\$1000 and from US\$1000 to US\$5000 again in the year 2010, moving into the middle-income countries of the world category. Also during the period 1990–2005, it has eliminated 470 million people from the extreme poverty category, contributing to the 76.09% poverty reduction experienced worldwide during the same time period. (p. 5)

A review of current poverty trends in Guatemala based on the latest surveys (INE 2015) in the country yields the following results (1US\$ = 7.43918, 7 February 2017 according to Banco de Guatemala):

- For the year 2000, the value of the total poverty line was Q4,319 per year. However, for 2014, the cost of food plus goods and services, reached Q10,218 that is equivalent to a 137% increase in the cost of living.
- By 2014, 59.3% of the population was living in poverty, that is, more than half the population had a consumption below Q10,218 per year.
- Between 2000 and 2014, total poverty increased by 2.9%, from 56.4% in 2000 to 59.3% in 2014.

This, in turn, has causes and consequences related to the environment and climate change since it is the population living in poverty that lacks the instruments needed for adaptation. The poor population also largely suffers the vulnerabilities referring to the existing deficits in Guatemala and the necessary instruments to face this situation. Graphic 30.3 displays a dimension of malnutrition that explains largely the existing gaps in Guatemala. This factor tends to make the situation of living in poverty more vulnerable in relation to the natural and climatological factors. The relationship between abundance or scarcity of water with the nutritional levels is evident, as shown clearly in these figures in the case of Guatemala as compared to the rest of Latin America and the Caribbean.

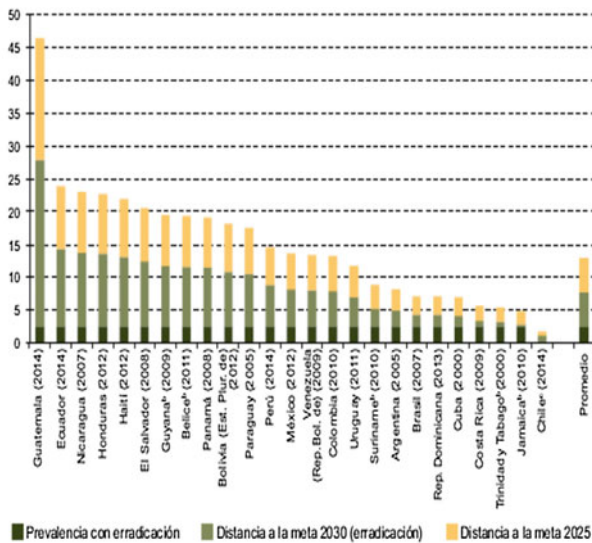
Second Challenge

There are voids and opposing attitudes in the coordination of top decision-makers. It is necessary for universities, the private sector, civil society, the government and a shared and transversal ecological approach, to coordinate and make a difference regarding the effects of the environment and climate change in the context of a sustainable development. Deficits in these alliances are a missing characteristic of networks that have appeared in the current digital era.

These mentioned actors, sectors and dimensions are five protagonists that will be found by adding the mentioned stakeholders with the environmental and climate change approach. However, these concepts first began being three, called “the Triple Helix”, constituted by the academy, private sector and government, this concept has evolved to become later a “Quintuple Helix”.

To explain this challenge, it is necessary to delve into the explanation of the meaning of the so-called “helixes”. This trend emerged in the sixties, during the

América Latina y el Caribe (25 países): prevalencia de desnutrición crónica y distancia a la meta mundial de nutrición 2025 de la OMS y a la meta 2030 (erradicación)^a
(En porcentajes)



Fuente: Comisión Económica para América Latina y el Caribe (CEPAL), sobre la base de informes oficiales de los países e información de la Organización Mundial de la Salud (OMS).

^a Promedio ponderado por la población.

^b Población estimada sobre la base de Naciones Unidas, World Population Prospects: The 2015 Revision.

^c Para Chile no hay meta de erradicación, pues la prevalencia actual es inferior al 2,5%.

Graphic 30.3 Latin America and the Caribbean (25 countries): Prevalence of chronic malnutrition and distance to the WHO world target of nutrition 2025 and the 2030 target (eradication). Translated by the author. It is warned in the notes below the Graphic that all figures for populations were drawn from United Nations sources and that they were used for deriving means affecting the countries shown. In addition, they mention that that for the case of Chile there is not target of eradication because, the target of prevalence is below 2.5%. As it is shown the worst situation prevails in Guatemala by a far distance.

Kennedy administration. His term that also were “Cold War” times, arose a troubling question: if enemies attack us-members of his cabinet asked themselves-with intercontinental rockets, how could we communicate in order to face that threat in a coordinated way? This is where the Defense Advanced Research Project Agency (DARPA) originates. The high military leadership, its headquarters being the Pentagon, soon saw the need to seek collaboration with universities and the private sector to materialize these innovations (González de la Fe 2009). The internet and its derived electronic innovations arises from this endeavor. Since 1997, an international research network on the Triple Helix (TH) model began to make international calls and meetings. They still meet every 2 years and even though they cover mainly developed countries, the “Four Asian Tigers” (Hong Kong, Singapore, South Korea and Taiwan) as well as Brazil have joined. These activities influence the emergence of entrepreneurial universities. There is no doubt that the

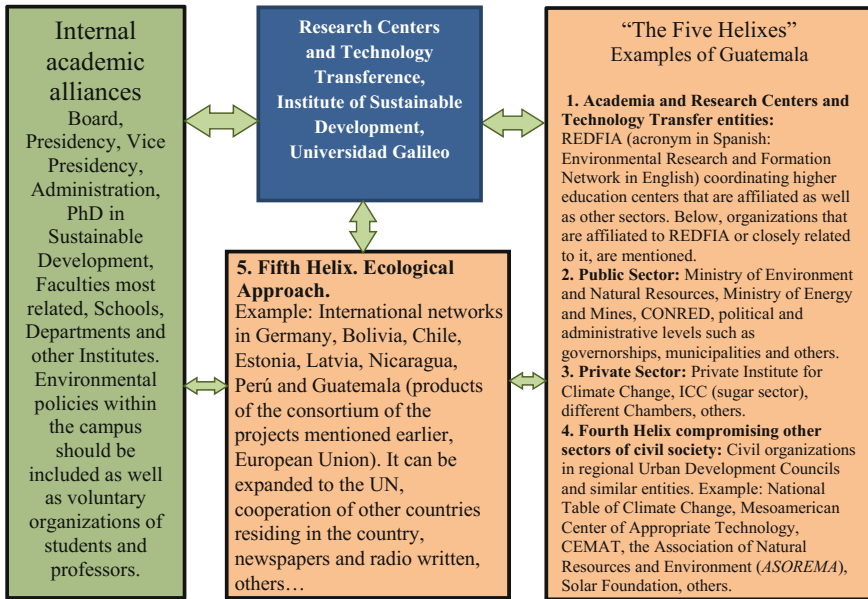
USA has a greater tradition of collaboration between the three sectors of the Triple Helix. The so-called “Silicon Valley”, greatest source of innovation for the industries that make up the emerging “knowledge society”, would not have been possible without TH alliances.

Henry Etzkowitz (2003) describes this movement in ten statements that synthesize this initial proposal of the TH and that then constitute the base for other extensions of it: 1. The source of innovation rests in triad networks, not independent work. 2. The social construction becomes as important as the physical devices. Examples found are business incubators, science and technology parks and their projection. 3. The model is interactive in the transfer of knowledge. Innovation arises when another sphere somehow originates, participates or assists. 4. “The capitalization of knowledge” happens in parallel with the “adoption of knowledge of capital”. The first one invents new measures of research funding. Companies apply this knowledge. 5. The formation of capital is recycled in different ways: financial, social, cultural and intellectual. Who do you know?, and what do you know?, are essential and also interchangeable. Financial capital arises from this. It accumulates and intensifies accordingly to amount of triad collaboration. 6. Functional and territorial globalization contributes. 7. This makes achieving goals easier for sectors and territories that are lagging behind. 8. Reorganizations revolve around new opportunities in new technologies. 9. Universities become a source of horizontal and vertical development and according to this experience are reoriented. 10. Transformations become easy when technology renews and new networks arise.

However, missing in the previous description of the TH is the one using the innovation, who at the same time is the citizen and whose collective is Civil Society. This gives rise to another helix, in addition to the ones of the triad. In fact, having had experiences in national (Guatemala) and international networks, a fourth helix came to the fore for the developing countries case. Originally, it was unknown that there were already made efforts in such direction (CLIQ 2008–2011). Notwithstanding, these contributions were accepted and are an integral part of some efforts in Guatemala.

On the other hand, it is necessary to point out that there has been continuity in this approach within the environmental and sustainable development concerns (Leal et al. 2012; Amaro et al. 2012, 2014; see also <http://www.galileo.edu> in the Research section and in Publications of the Sustainable Development Institute within the same address). This expansion is accentuated with the recent proposal of an ecological helix, whose crosscutting insertion will give meaning to alliances between universities, the private sector, the government and civil society (Carayannis et al. 2012). Thus, this development is complete.

Graphic 30.4 exemplifies a real practice of this approach for the case experiences in Galileo University of Guatemala. The five helixes tend to incline towards the right of this graphic, placing existing related research centers towards the middle, specifically the Sustainable Development Institute that directly delves into the coordinated actions being undertaken. In addition, towards the left, the hierarchical structure of the university has their place, vertically, from its senior managers to the different faculties, administrations, institutes and other dependencies that compose



Graphic 30.4 An specific example of the “Five Helixes” approach at the Galileo University in Guatemala. *Source* Own design of the author

it. This formation must support in its group the approach of the “Quintuple Helix”, which is integrated by other universities, the private sector, government, and civil society (NGOs, lobbies, and trade unions, among others). International aid is also another factor. This outward vision facilitates action within the University itself. In fact, the Board of Directors has already approved an Environmental Policy that directs sustainable development actions towards the campus itself.

The question that arises after describing the alliances comprised by a network containing each component of the “Quintuple Helix” is what could be the main problems that decision-makers can encounter, in order to reach the proposed goals. This approach draws from the nature of each entity belonging to each one of the helixes.

Universities often receive criticism for creating “ivory towers”, to isolate themselves from the surrounding society. These attitudes largely stem from fear of interferences in research and teaching practices at the university of specific interests, whether of ideologies, power organs or external value systems. This may stem from governments jealous of their influence or from certain guilds pursuing immediate interests. In this sense, high education activity portrays a defending attitude towards the freedom of professorship and research, and convenient to step aside from this kind of contradictions and biases in order to have a broader and neutral view of society. It cannot be forgotten that it was in higher education institutions where the words “Faculty cloister”, meaning confinement, originated.

That was the name used to refer to main researchers and professors belonging to a certain area of knowledge.

The theory of the “Helixes” goes a step beyond this dilemma. It calls for the innovation of behaviors. The approach prior to this one sees academia, industry and government as separate entities. There is a lack of sufficient evaluation and feedback of the knowledge created in the academic environment, while the learning needs for solving society’s problems, which no citizen can forgo, are being lost. Therefore, a separation between basic and applied research emerges, and Education Ministries become isolated from the rest of the government and agents of change. This also has an impact in funds that fail to address urgent and problematic needs of the broader society.

The new approach stems from historical crises that separate societies into “developed and developing countries”. Authors like Schumpeter (1966, 1978) call innovation in the industry as a fundamental engine to achieving this goal. The separation between basic and applied research calls for a collaboration between the academy and the industry to close this gap. On the other hand, the relationship between the energetic problem and its crisis since the 70s, create the need to search for new horizons. For this reason, starting in the nineties, the concept of “corporate social responsibility (CSR)” emerges, which was an absent value in the first stages of development.

However, attitudes in the private sector stem from different premises. Here there is also a fear of alterations to the “free supply and demand law” in a market that needs to be seen as free from pressure. The government and other forces alter prices. At the end, there is a conviction that these interventions thwart economic development and welfare of the masses. The important thing is therefore the return on investment and perceived rent, which must be free from any influence that might limit it. Notwithstanding that there are corporations that are oriented to the practice of social responsibility, many others prefer the inherent attitudes of a free market and the search of profit as supreme value. This may hinder alliances and networks in fields sensitive to sustainable development.

Civil society is also not free of thought currents that conspire to approach and consolidate alliances with other sectors. Specific sectors of them defend particular interests that have incidence in lobby practices, as would be the case of certain pressure groups. This situation is so varied that it makes these efforts appear as dispersed and often contradictory and short-term. These actions stem from diverse funding as a response to interests that are often disparate. In the end, many of these investments appear as a cost that does not fulfill the objectives sought. The tensions resulting from hydroelectric investments in Guatemala, mainly because of their water operations, are an example of this. Here national and local governments, private sector and neighborhood associations often assisted by NGOs, are seeking multiple and diverse ends that require a greater coherence. This dispersion is a weakness that is necessary to combat.

The government also suffers from tendencies that could hinder possibilities of alliances and broader networks. The new trends of the digital era and the access to knowledge and new practices induce horizontal relationships while the strength of

alliances depends less on hierarchical and vertical structures. The latter are precisely the characteristics of organized state entities. The officers that comprise these public organisms tend to consider themselves as “rulers” of areas of their concern. Often they behave with citizens as if they are entitled to be obeyed without discussion or dissent. Therefore, the government places itself in a position of command that often drives away possible collaborators. The service attitude that leads to more horizontal relationships and broader alliances is less cultivated. This call does not mean that the state restraint of attending specific benefits addressed to specific territories related to citizen’s common welfare. The state should continue to be responsible for these actions but in a more democratic way and less authoritarian manner. This vertical conduct can thwart any attempt to vertebrate helixes as an effective strategy.

Third Challenge

This dimension entails the need to create a decentralizing strategy to separate service providing functions that will eliminate gaps towards the local population downstream, which can be applied to the necessary adaptation measures to address sustainable development, environmental and climate change threats.

Before delving into the possible alternatives that could achieve a constructive relationship in this field, an opening is necessary to introduce arrangements with all the factors involved in investment decisions in the chosen territories. Here, some of the alternatives needed to make this a reality, based on the legal framework or making use of it respecting its premises. The modalities of Guatemalan reality that can intervene in the eradication of social unrest at local levels related to the extractive industry and other related industries as well, are the following (10) are illustrated below and then Table 30.2 summarizes another nine preceding those 9, for a total of 19 modalities):

(1) *A precondition: The Agreements of alliances within a decentralizing strategy.*

This modality is the first in a series of conditions that should accompany decentralizing efforts depicted above. There should be a greements between all network stakeholders. It is the way to revert the centralist and vertical tendencies. Then the municipality and local institutions become an axis for the immediate expression of the community. The municipal government and universities may lead the organizing role of many of the needed functions and activities. Universities may act as advisors of official public institutions, while private entities and civil society may assume other responsibilities. One such agreement might be the creation of new administrative structures, beyond national, regional, departmental and municipal boundaries such as basins. The territories influenced by basins, whose boundaries and legal limits do not coincide with the existent ones, are those that interact with “Dry Corridors”. They do not have a legal status in the country as a whole. Basins run across many political administrative structures and hierarchies, regardless of the unique climate change threats they represent.

In this manner, certain modalities involving community participation and its rationality can find a clear expression at a municipal or local level. Alternatives to strengthen alliances and networks become operational. Table 30.2 lists

Table 30.2 Separation of the functions of organizing, producing and funding of municipalities and organized neighbors granting access to civil society, private enterprises and universities

Modality	Coordinator	Producer	Payer
(1) Direct sale through improvements contribution	Municipal Government or University or both	Municipal government	Civil Society (consumer) or Private Company. Both focused on target population
(2) Contract	Municipal Government or Universities or both	Civil Society, Private Company or University or all	Municipal Government or Private Company or both
(3) Franchise (exclusive)	Municipal Government or Universities or both	Civil Society or Private Company or both	Consumer Civil Society or Private Company or both
(4) Franchise (multiple)	Municipal Government or Universities or both	Civil Society or Municipal Government or Private Company or all	Consumer Civil Society or Private Company or both
(5) Grant	Municipal Government or Universities or Civil Society or all	Civil Society or Municipal Government or Private Company or Universities or all	Municipal or Central Government through the former, Companies or Civil Society (supplier or consumer) or International cooperation
(6) Bonds or cash or exchange instruments given directly to the population	Municipal Government or Universities or Civil Society or all	Civil Society or Municipal Government or Private Company or Universities or all	Municipal or Central Government, Companies or Civil Society (supplier or consumer)
(7) Market	Civil Society	Civil Society	Civil society (consumer)
(8) Social investment funds	Municipal Government or Universities or both	Civil Society or Central Government or Municipal Government	Central Government or Municipality or international sources or Civil Society
(9) Self-service	Civil Society (NGOs), Universities or both	Civil Society (NGOs) or the affected population	There isn't. They are self-help programs. Ex. Construction of own housing

modalities with which the company that makes investments in any local territory can coordinate actions with the municipality, private enterprises, civil society and if appropriate with universities to implement actions leading to the sustainable development of communities. These agreements include paying attention to environmental and climate change threats. This condition would lead to the following articulations in discernible modalities:

- (2) *The National System of Urban and Rural Development Councils*. The present Constitution of the Republic of Guatemala became legal in 1985 and the law on these mentioned councils got this same status since 1987. The structure covers the national, regional, departmental and municipal levels, and reaches villages and communities, in the recent changes approved in the year 2002. This legislation had approval together with a new Municipal Code and Decentralization Law. More local modalities are available here for actions to bring sustainable development to local territories. In these Councils, by law, the “Quintuple Helix” might be represented at all levels as well as this modality is represented in the Climate Change Council, which is headed by the President of the Republic of Guatemala, thanks to a law approved at the end of 2013.
- (3) *The municipal or local development advisory commissions*. This modality is legislated in many countries on all continents, including Africa and Guatemala. It is about creating platforms where Mayors can share responsibilities with the Corporation and the most decisive forces of the community. For example, article 17 of the Municipal Code grants neighbors the right to integrate a municipal social audit commission (Curruchiche and Linares 2012).¹ Other representations might be incorporated if needed.
- (4) *Open meetings to call the entire community such as Public Hearings and Open Town Hall Meetings*. These encounters are of an advisory nature. They might call “representatives of local organizations”, such as communal groups, civil society organizations, trade unions, ecological lobbies and others. Public Hearings could stimulate a more open presence than the Open Town Hall Meetings. Today, this modality could become a prelude to appeal to the parties regarding problems concerning the environment and climate change, in such a way to ensure a reconciliation, before making use of the courts of justice. Another more modern goal of Public Hearings is to debate and clarify issues or alternatives that require decisions on behalf of the municipal authorities. This way, the Corporation can invite representatives of the “Quintuple Helix” such as central and municipal government authorities, technicians, stakeholders and neighbors, to provide information and points of view for common benefit. The objective of this modality then points towards the implementation of a formal modality in which the Municipality acts as arbiter and manager in the task of said community through the handling of issues of common benefit. Like the Open Town Hall Meetings, this mechanism, must be cautious when the municipality itself is part of the case and there are questions for inaction on this matter. The most modern conception implies identifying subjects, inviting the people most related to important decision-making of the municipality, holding the audiences with the greatest possible amount of publicity and eventually taking a stand on the issue.

¹All specific references to the legislation quoted belongs to the aforementioned document that is listed at the end of the text in the section of “References”.

In almost all Latin America, including Guatemala, there is the modality of Open Town Hall Meetings and has a tradition that had its greatest surge in Latin America during the Wars for Independence at the beginning of the 19th century. Municipal or local corporations responds this way to the requests made by participants about their management system. This modality is The Municipal Code of Guatemala in Article 38 contemplates this modality. The meeting will link municipal authorities and community leaders in the solution of specific problems like garbage management; the creation of joint ventures to manage markets, the consequences on social services due to the presence of free zones or new industries, etc.

The tensions that these meetings face are conducive to the creation of the commissions described previously that provide solutions to potential or actual tensions. The objective in this modality points to the usefulness of the commissions in case of concrete problems that have possible short, medium and long term solutions. Technical assistance often supports the commission with a specialized report that is usually required in the deliberations for decision-making. This technical report should also contribute to the deliberations made in the so-called Public Hearings and Open Town Hall Meetings. This is a role that universities can fill with professors as well as students.

- (5) *Stakeholder consultation.* This action aims to consult the affected population on crucial aspects of their work. This modality aids the Mayor when he is in the dilemma of making decisions that may seem unpopular. Article 38 of the Municipal Code of Guatemala contemplates this possibility. This is particularly helpful in the case of the Mayan population that constitutes a high percentage of Guatemala citizenship, international agreements supports this alternative.
- (6) *Municipal and Governor Elections.* This is a decisive channel for the relationships between the community and municipal authorities. Probably the most decisive. It is a kind of final evaluation of local public management. The possibility of allowing the presentation of independent candidates from local levels, independent of national political parties, is already a reality in Guatemala. There are Civic Committees. However, in Guatemala the election by popular vote of governors is missing. His appointment is an attribution of the Executive Branch (the Presidente of the Republic) but according to a list of candidates submitted by bodies where Civil Society organizations are represented.
- (7) *Local auxiliary authorities in territorial levels smaller than the municipality.* Decentralization does not end in the place where the municipality is located. There are auxiliary Mayors or equivalent modalities in smaller constituencies in Guatemala such as administrative posts, towns, neighborhoods, settlements, villages and hamlets.
- (8) *Traditional forms of civic organization of the community.* In Guatemala, with a high percent of its population being of Mayan descent with pre-Hispanic influences, there is concern over traditional leadership conveyed by the presence of so-called “indigenous Mayors” along with Mayors elected in the same

circumscription without this cultural component. Article 23 of the Law on Urban and Rural Development Councils, establishes an Indigenous Advisory Council that will provide its services to both the Municipal Council of Urban and Rural Development (COMUDE, Consejo Municipal de Desarrollo in Spanish) and the Community Development Council (COCODE, Consejo Comunitario de Desarrollo in Spanish). The forces of modernity have often forgotten these structures and have preferred to establish in the communities new leaderships that compete with traditional leaderships. Lessons learned have favored the incorporation of these forms to the national development goals.

- (9) *An administration for the people: house-to-house visits, government days in the neighborhoods and villages, audiences with the Mayor, direct telephone line, radio audiences, annual management accountability.* Their common denominator is a Mayor or Administrator “facing the people” through different means without a need for meetings. The various modalities are self-evident and require no further explanation. Their goal is to create a transparent government that is held accountable by the citizens and is responsive to their demands.

Specific modalities could be created by decentralizing functions at all levels and sharing responsibilities and benefits among the participating helixes.

Table 30.2, makes a list of these distinctions that cover the activities that might be carried out and distributes them among the members of the helixes in a conjoined manner. The following alternatives that depend on the different situations presented for their implementation are enumerated next. The idea is to strengthen the objectives of sustainable development taking into consideration a “give and take” that leads to a win-win situation for all stakeholders. Local conflictive situations are conducive for the application of these modalities.

- (10) *Integral approaches to people’s participation.* Here the experience of the city of Porto Alegre in Brasil must be emphasized, because it does not fit into any of the modalities formerly described and can only be implemented if there is a high political will and integral outreach to incorporation of neighbors to the municipal management system. This experience is relevant because it has already been implemented for over 20 years and has managed to survive over time overcoming one of the problems of participation that once the external impulse ceases or discouragement begins, activities tend to decrease.

This experience is well documented (Genro and de Souza 1999; Harnecker 2000a; Lenin 1920). To carry out this activity, the municipality has been zoned and the population has organized around Popular Councils that in turn appoint representatives called “delegates” that participate in a Participatory Budget Council. There is a timetable and regulations for the entire annual budget discussion.

This process includes two plenary sessions, intermediary meetings between the neighbors and the administrative structures of the municipality and the selection of topics among which the neighbors will select priorities. For them “service forums” and “delegate forums” are also held. Priorities are decided on four main problems of their region or thematic priorities that are chosen

among eight subjects: basic sanitation, housing policy, paving (asphalt, water and sewage systems), education, social care, health, transportation and circulation, and organization of the city. This is a collective decision. All of the above is collected in written documents for each region and there are indicators used to create the regional budget matrix. This way, a priority in one region may be the last one in another. From a technical standpoint, the Municipality has created a Regional Coordinator of the Participatory Budget (CROP) dedicated to this instrument and the need for a Forum of Community Counselors (FASCOM) that has emerged during the discussion process.

The alliances of the “Quintuple Helix” might be observed in Table 30.2. The organizing function refers to the design, regulation and evaluation of this decentralization. The productive function to those responsible for generating benefits for the population and paying function to those called on to finance this operation. The modalities can be combined and the representations of the networks could vary according to the nature of the good, service or benefit to which it pertains. In this sense, Table 30.2 offers a theoretical example to applicable global aspects such as citizen organization, training and any of the phases of planning and evaluation. Modalities depicted in Table 30.2 are explained in the next sections.

- (11) *The direct municipal sale of a good or service and the contribution modality for improvements.* As the government authorizations and investments of the corporations materialize, the Municipality can take on services or examine those it already manages. A first approach is to examine the demands generated because of these changes. In light of scarce resources and considering new sources of income for the municipality and the generation of employment opportunities among the citizens, a possible approach is to share the costs with the consumers of said services and the community, involving the representations of the “Quintuple Helix” in the formulation, funding and delivery of such services. Regarding its funding, it is necessary to remember that in addition to consumers, private companies can also be held accountable in reducing the impacts of their local investments, under the premise that “whoever pollutes pays”.

This way the local government becomes more solvent. The participation not only implies rights, but also responsibilities. An example of this is the “contribution to improvements”. This seems to work best when the population directly participates as salaried local labor. The participation of universities in this modality appears in their character of advising based on placing specialized support personnel with the authorities in order to regulate and assess the progress of the operations undertaken. Many universities in Guatemala already have such mandate through the Supervised Professional Exercise (EPS), by which professors and students, share responsibilities in activities required to complete their undergraduate studies. These requirements could easily be channeled towards activities that address environmental and climate change threats.

- (12) *Contract*. This modality would preferably be applied to technical assistance and service needs. In fact, for sewer and sewage treatment, municipal private companies could be hired. Construction is also susceptible of being ordered by contract. Operations that do not match those of the Municipality, like maintenance and transport repair, might be hired elsewhere. This could be extended to airport operations, garbage collection, cemetery management, food programs, etc. Labor for the construction of sewers can also be hired with community organizations. In this sense, the modalities above can be combined in order to achieve a better option. The corporation itself can be subject to contract by producing goods that fulfill the needs of neighbors. For example, extending electricity to neighbors who lack it could be one of those benefits.
- (13) *Franchise (exclusive)*. The Municipal Government acts as organizer, granting a monopoly of production of a service to a firm, whether for profit or not. The difference with the contract is that the payer is no longer the government, but the citizen who consume the good or service, or the investing company. If there are agreements to do so, civil society organizations or the investing corporation can make the payment to the hired firm.
The Municipality usually maintains total or partial control over prices, and it can negotiate them even when this function is beyond their sphere of competence. This modality is best applied to public services like water, electricity, slaughterhouses and transport. For example, granting the municipal trail to livestock associations has these characteristics.
- (14) *Multiple franchise*. Table 30.2 shows a similarity between the previous modality and this one. The difference is that in this modality the concessions are given to several producers. This creates a market with certain competition that can benefit consumers. Certain systems can be used to make the public sector compete with the private sector, allowing the consumer to choose. In this modality, the producer can also be the community in any of its forms, but both the organization as well as the payment are made by a private company or the consumer civil society or both.
- (15) *Subsidy*. This modality is self-explanatory. An inherent problem in this arrangement is the creation of dependencies, in cases where there is not an alternative. This is important to bear it in mind. These situations refer to natural disasters, support for disabled people, situations of the population or people who are incapable of fending for themselves, etc.
- (16) *Bonds*. This modality is also used to promote access to certain goods and services. Unlike subsidies, where the support goes to the producer and consumer options are restricted, this modality supports the consuming citizen who is able to see their preferences multiplied at a lower cost to the state. Modalities like this have been tried in Guatemala regarding food security, health and education.
The bond is distributed through regional and local state agencies. With that bond, the beneficiary can go to any business and trade it for food products and services of their preference. The merchant can then exchange said bond for

cash. The result is to expand the net coverage of education and health and to increase business income without the need to create an additional bureaucratic structure.

This modality as described previously can be extended to education and health if desired. This way the citizen will select those services that fulfill their basic needs. The organizer of the bond modality is the consumer, who can freely follow their preferences without any imposition. The producer is the existing private sector, operating within the market, which are available to the consumer. Finally, who pays is the Central or Municipal Government and ultimately the food donor that could even be the investing private company in this territory.

- (17) *Market*. This modality is created to balance the excess of management of the municipality in activities that should be carried out by the private sector or other civil society organizations with the pursuit of service or profit. In this case the consumer orders and pays for the good or service. The civil community, created for profit or not, is in charge of offering the good or service in accordance to the laws of supply and demand.

In many cases this formula allows certain criteria on behalf of the Municipality. For example, the Municipality can be a promotor of certain goods and services that can create job opportunities within their jurisdiction. Neighbors can go to a Bank in order to carry out public works in benefit of a neighborhood, such as the paving of a street. The municipality or local administration can in this case endorse neighbors so they are able to obtain a loan from the banking system at the existing rates. The payment is distributed among the beneficiaries. In this case, the municipality played a facilitating role allowing the market to operate for the benefit of everyone.

- (18) *Social Investment Funds created from the own funds of local levels*. The so-called “Social Investment Funds” have accompanied structural adjustment policies for some time in most of the world. As the economies of these countries are reactivated, there is less justification for the emergency and short-term orientation of this instrument. For this reason, they have transitioned from Social Emergency Funds to Social Investment Funds. They are mainly destined to infrastructure although a percentage has been destined to social programs and loans to small-scale entrepreneurs, depending on priorities.

NGOs and civil society in general, including neighborhood organizations, can play a major role. They can participate in the organization of the type of product or service they wish to deliver to the population. Production can be hired from either lucrative or non-lucrative private sector or with any other formula derived from the community. Finally, the payment is made by the contracting entity that might come from central or municipal government or even from international sources.

- (19) *Self-service*. This is the simplest way to meet local needs for goods and services. The difference from committees is that the contribution is individual. All actions related to prevention, are placed under this area. Some of the individual activities that can contribute to a better municipality are garbage-recycling, precautions taken when disposing cigarettes, vigilance and security regarding crime. Savas (1987, p. 128) states that “Family as a self-service unit, is the original and most efficient department of housing, education, welfare and human assistance, and it provides a wide range of vital services to its members.”

While these modalities can be abstracted in reality, in practice the same service can be provided with a combination of the actors outlined above. The common theme that underlies the presented arrangement is that these activities will not be carried out while the population remains absent from municipal management or with such tensions that it does not allow an orderly participation.

Conclusions and Recommendations

The main purpose of this elaboration has been to draw attention to the different dimensions of sustainable development, which are crucial to combat environmental pollution and the threats caused by climate change. To this end, the following conclusions and recommendations might be drawn from the former discussion:

1. These statements and the paper has its limitations. The statements made reflect a preference of the author with regard to many other alternatives and courses of action that might be taken on the basis of the findings presented. Particularly, one has to realize that the exercise of linking sustainable development with a multidisciplinary perspective and its ecological dimensions is relatively new. There are still gaps that have to be filled. Many years have elapsed since development as such found a niche in research and policies. A multidisciplinary perspective was absent for many years. A sectorial division of knowledge and practice prevailed for a long time. In a way, these discussions about priorities in sustainable development is a starting point and as such as all beginnings is an initial outlook that has limitations and calls for further clarifications. The risk of not doing so, will be the prevalence of former views already superseded.
2. Relations have been established among the different Sustainable Development Goals, approved by more than 190 countries at the United Nations General Assembly at the end of 2015. Global experiences indicate that there would be an intimate relationship between the final goal of eradication of poverty and the populations most affected by climate change whose effects lead to serious nutritional deficiencies.
3. On the other hand, this confrontation also calls for an alliance between different social sectors that could jointly and simultaneously articulate actions in order to achieve the desired goals by the year 2030.

4. The complexities of each country and the effects of these situations lead to the examination of these situations for Guatemala. In order to carry out this verification of the Guatemalan reality, three primary challenges were selected, without which hardly a difference could be made in the future.
5. The actions designed in the past are not truly sufficient to make a difference. Economic growth does not reach levels that actually reduce poverty significantly and it is a known fact that there cannot be distribution of wealth without an outstanding economic growth, which should at least reach the level fixed in the Peace Accords that mention the need to achieve 6% rate of economic growth.
6. Populations living in poverty, exemplified today by those suffering in Guatemala's "Dry corridor", reach hundreds of thousands, displaying nutritional levels that place Guatemala among the most desolate countries in terms of nutrition and hunger levels.
7. Actions carried out by the government alone do not appear to deliver the desired results. Only 30% of the population has been benefited by the program especially designed for this purpose last years.
8. This situation leads us to the realization that the government alone is not enough and that greater alliances are needed, in addition to significant economic growth and an effective distribution. This distribution requires also effective actions, which are decisive in physical infrastructure, human capital formation and quality of life. This leads us to the second challenge that targets the lack of effective coordination of all relevant sectors in this field.
9. These alliances support results achieved in other countries regarding the "Quintuple Helix", around which networks are built and the government establishes systematic and continuous alliances with the private sector, civil society and academia in order to make a difference in the challenges found when facing climate change and hunger, based on effective national partnerships.
10. However, the challenges do not end there. The tendency of action dispersion by each sector received a special attention. Particularly, civil society organizations that revolve around a myriad of objectives should put emphasis in collective priorities to make viable the activities of the networks.
11. This way, universities must turn more towards a broader society. The private sector, for its part, must display greater openness to corporate social responsibility. Civil society, constituted by myriads of public interest including lobby institutions, should avoid dispersion and multiplicity of goals and purposes, in order to make actions more effective. Finally, the government should avoid the tendency to see society in a vertical way and, following the digital era, propose more horizontal cooperation relationships, that emphasize relations based on solidarity rather than those based on authority,
12. To seal a third challenge, it is necessary to bring efforts to local levels including the most remote territories. This effort requires a decentralizing orientation that is innovative as well, because historically centralized decisions tend to dismiss the most vulnerable populations in rural and remote areas. In this sense, this

challenge requires different modalities or approaches in which alliances among the different stakeholders of the “Quintuple Helix” make joint efforts. This elaboration suggests 19 modalities that give rise to different courses of action in order to solve this dilemma.

13. The modalities suggested have a solid basis thanks to citizens’ representations and agreements or conventions, made by municipal and local development councils, advisory commissions, public audiences and/or open councils.
14. Also, there is a need of direct citizen consultations, municipal and governor elections, local auxiliary authorities, openness to traditional organization structures. There is a need of administrations that “face the people” within an integral approach to community involvement, sale of services to citizens, contracts to satisfy population needs, exclusive and multiple franchises capable of generating specific benefits.
15. In addition, other modalities discussed were subsidies when there are no other alternatives, bonds that grant access to specific services, appeals to the market when necessary, social investment funds that are already practiced in Guatemala and many countries, and finally, appeals to the citizens to provide labor free of charge, for their own benefit.
16. All these modalities can combine according to the nature of the selected benefit. What is common is the presence of stakeholders oriented towards public citizen goods. These actions along with an effective representation on behalf of the academia, private sector, civil society and government, accompanied by a battle against poverty stimulated by significant economic growth, will be the courses of action that can make a difference regarding the Sustainable Development, environmental and climate change objectives of the future.

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