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BEYOND GROWTH: A CRITICAL ANALYSIS OF SUSTAINABLE DEVELOPMENT

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EXECUTIVE SUMMARY

This paper analyzes the ideas behind the concept of sustainable development and how such concept is interpreted from different perspectives. Moreover, it tries to uncover the basic logic behind sustainable development and how this holistic idea should be placed into practice in the real world. Afterwards, the paper realizes a brief summary of the recent history of sustainable development. It analyzes how the concept has evolved throughout the most important international summits on sustainability and the future steps that the international community has agreed to pursuit towards sustainable development in the future. Later, the paper studies in depth how we should measure progress towards sustainable development; and proposes two different sets of approaches to realize assessments at national and local levels, paying special attention on the main applications of such methodologies, pros and cons. Finally, the paper uses the analysis made on different approaches to measure sustainable development and applies one of the methodologies studied in a practical case: Agenda 21 in Brussels.

KEY WORDS

Agenda 21

Assessing the Sustainability of Social Initiatives and Proposing Agendas for Change, ASSIPAC

Environmental Performance Index, EPI

Multi-Criteria Analysis, MCA

Natural Capital

Sustainability Assessment Model, SAM

Sustainable Development

Sustainable Development Goals, SDGs

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1. INTRODUCTION

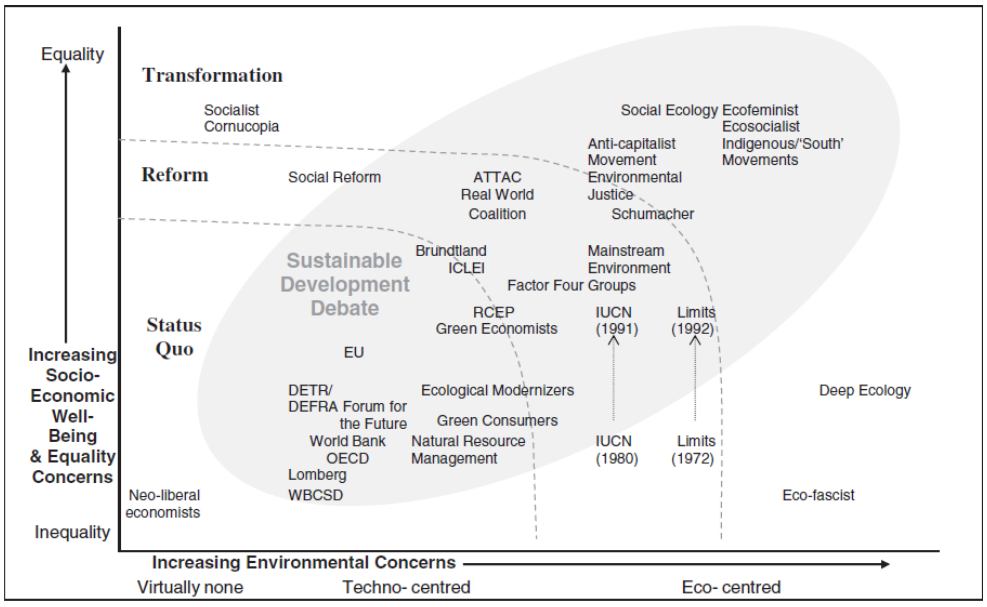
A lot has been written and said about sustainable development since the first warnings about the environmental harm and the rising inequality that have been caused for human economic and technological progress. Nevertheless, at the end of the day of all these literature, discussions, international summits and agreements signed it seems that the core concept of sustainable development is still vague and open to different and misleading interpretations; also the targets and indicators set towards reaching this goal are still far from being reached. In this paper, I try to provide an objective definition of the concept of sustainable development and how such definition should be adapted at community level. In addition, I study the recent evolution of the concept of sustainable development and the briefly expose the upcoming international agenda towards sustainability. Besides studying the idea of sustainable development, it is extremely important to have methodologies and approaches to measure the progress towards sustainable development. Without counting with efficient qualitative and quantitative approaches to measure and compare such progress all the efforts in relation to sustainable development might be vain. For this reason, I consider that it is vital to assess the improvements towards sustainability from two different perspectives: national and local. In this paper, I introduce and explain the main pros and cons of different methodologies to measure sustainable development at both scales. Finally, I put into practice one process oriented criterion explained within this paper to analyze one project based on sustainable development in the city of Brussels: Agenda 21.

2. WHAT IS SUSTAINABLE DEVELOPMENT?

The most worldwide known definition for sustainable development comes from the Bruntland report (World Commission on Environment and Development, 1987) "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs". But what does this definition really mean? What kind of development are we looking for and what are the needs we want to fulfill? This vague concept has allowed the existence of different interpretations depending on the context of the discussion and the audience for the debate. Hopwood, Mellor & O'brien (2005) propose a map of different economic approaches and their relative position towards socio-economic and environmental concerns. We can see their map in graph 1. The socio economic axis measures the importance given to human well-being and social equality whereas the environmental axis analyzes the significance of the environment conditions for each approach. In the shaded area of the graph are the different views within the

sustainable development debate. The views within the range of status quo argue that adjustments towards sustainable development in matters of society and environment should not be fundamental, and that the solution for all these problems is to continue with the promotion of economic growth which ultimately will eradicate world poverty. Reformist accept that change is necessary but still do not believe that the problems the world is facing today are critical. The views under the transformation area urge for a fundamental change in the way in how society interacts with the environment, and see change as completely necessary to avoid a huge crisis or even the collapse of life as we know it today.

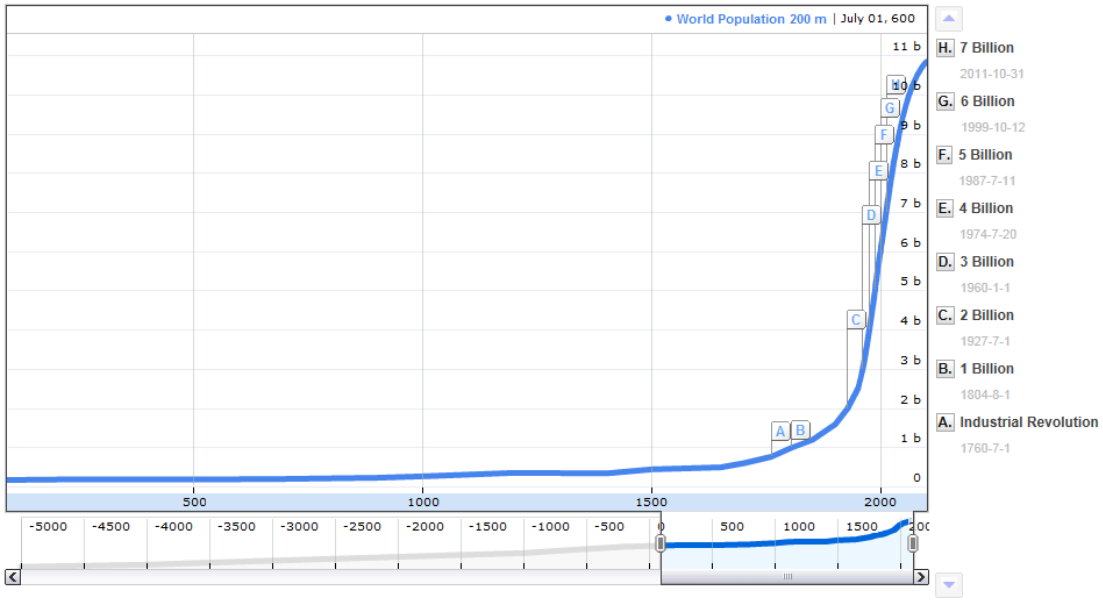
Graph 1. Mapping different approaches of sustainable development



Source: Hopwood et al. (2005)

Sustainable development must be seen from two different perspectives: as a way of understanding the world and as method for solving global problems. We live in an overcrowded world, right now there are around 7.2 billion people on the planet. At the beginning of the industrial revolution we were only 800 million and this amount has grown 9 times in only 250 years, whereas before the industrial revolution human population growth had remained mainly stable across history. Today estimations say that by 2050 we will reach the 9 billion and by 2100 the 11 billion. In graph 2, we can see a picture of the world population evolution since year 0.

Graph 2. World population year 0 to year 2100 (estimated)



Source: worldometers

These billions of people are struggling to find their own means for survival in this congested world; they are looking to have appropriate living conditions: food, health care, safe water, housing, future for their children and prosperity. This is why they are constantly looking for economic improvements in a globalized and interconnected world economy that is constantly growing as well. Nevertheless, our world is one of large imbalances; there is unequal income distribution between and within countries. According to a report released by Oxfam (2014) 1% of the world's population controls almost half of the planet's total wealth, 7 out of 10 people live in countries in which the income inequality has increased in the last 30 years, and at least 1 billion people live in such poverty that their daily struggle is only for mere survival.

Our world economy is not only remarkably unequal, but is also a major threat for the planet itself. We as well as the other living species are dependent from the environment for our own survival. Despite the public awareness about environmental damage made by humans, we continue to worsen this situation across the globe: we are changing the earth's climate, the availability of fresh water, the ocean chemistry and the habitats of other species. Some of these changes are already irreversible, according to a recent study published by the NASA (2014) a part of the Antarctica glacier has reached the point of no return and we also are causing changes in the functioning of key processes –such as the cycle of water, nitrogen and carbon- from which life depends.

And after a brief look on some of the major issues that affect the world today we arrive to the concept of sustainable development. From an intellectual perspective, sustainable development tries to analyze and understand the interactions between three complex systems: the world economy, the earth's environment and the global society. From a normative –or ethical- perspective, sustainable development recommends a set of goals or indicators which the world should seek. In this sense, sustainable development looks after an ideal society in which economic progress continues growing, while at the same time the well-being of the people is increased i.e. social inclusion, less inequality, access to food and health care, elimination of extreme poverty; and reducing environmental risks caused by human activities. This is a holistic framework, in which society tries to reach social, economic and environmental goals at the same time.

In order to achieve this we need to have good governance. Governments must take care to provide core functions to society in order to make them prosper. Functions like health care and education, a good urbanization and infrastructure, the protection of the people from violence, the implementation of regulations to preserve the environment and many other are vital for the achievement of sustainable development. Nevertheless, what we see more often is completely the opposite: corruption at all government levels, unending wars and lack of the proper public services. In the world that we are living in today, not only the governments are the major actors in the process of the development. Multinationals also play an important role over the world economy and their decisions often have major social, economic and environmental impacts in the places where they are present. Their actions affect the development of certain regions directly and how they act will have a positive or negative effects depending on the way in which these organizations follow the law, respect the environment and seek to increase the well-being of societies. Therefore, good governance of multinationals is also a key factor in the pursuit of sustainable development.

In conclusion we can study sustainable development as a science of complex systems that interact and affect each other: a global economy that is constantly increasing in every corner of the world, the well-being of individuals including equality and access to decent living conditions, the changes in the earth's environment, and the behavior of governments and businesses worldwide. As a complex system as it is, the "formula" to achieve this holistic and fair idea of socially inclusive and environmental sustainable economic growth is pretty complex as well. There is no single formula that can be applied to every different scenario; sustainable development must be studied, adapted and put into practice according to the different characteristics of each community in order to be successful and meaningful.

Consequently, we can affirm that sustainable development is in essence a scientific and moral based complex problem solving.

3. SUSTAINABLE DEVELOPMENT CHRONOLOGY

3.1. The Silent Spring, the Earth Day and EPA Creation. 1960's

Around the decade of 1960s people started to worry about environmental issues, mainly due to the increase in the levels of pollution and the use of pesticides with agricultural purposes. The book Silent Spring written by Rachel Carson (1964) showed with her research the sad reality that many farmers and villages were facing at that time in the U.S. caused by the use of pesticides on their land, mainly DDT. She exposed the negative effects of the pesticides, which were not only affecting the land but were also harming the air, the rivers, the animals and the environment in general in a cumulative way. It did not take too long for the chemistry industry to take actions against her findings; nevertheless many scientists safeguarded her position. The government took actions on behalf of the president John F. Kennedy, and one year later the President's Science Advisory Committee released a pesticide report which was in favor of the claims signaled by Carson. Her work served to inspire many ecological and environmental political movements like the first "Earth Day" which took place the 22nd of April 1970. As a result of all this consciousness created among the general public, 20 million people went out to the streets to claim their right to be concerned about the environment and the future of the earth we are living in (Earth Day Network, 2012); this particular event had a great scope on that time because it succeed in assembling people from confronting backgrounds to fight towards the same cause, having support from both Republicans and Democrats. Today, the Earth day is celebrated by over 1 billion people in 192 countries.

Also as a direct consequence of Carson's book impact and the huge success of the Earth Day Nixon's administration saw the necessity to create a "strong and independent agency" to look out for the protection of the environment; this was the beginning of the U.S. Environmental Protection Agency (EPA) (Lewis, 1985). The mission of this organization is to "protect the human health and the environment" (EPA, 2014).

3.2. The Limits to Growth and the United Nations Conference on the Human Environment. 1972

All these developments in the environmental field until that time had presence mainly in the U.S.; fortunately, it did not take too long before the awareness about the environmental

problems originated as a consequence of the human "progress" acquired an international scope:

"The future is no longer… what it might have been if humans had known how to use their brains and their opportunities more effectively. But the future can still become what we reasonably and realistically want." (Meadows, Randers & Meadows D. 2004)

This is how begins the 30-year update of the first report that pointed out publicly the fact that technological developmental and societal increase could not simply continue as they have for the last couple of centuries. The main message of The Limits to Growth (Meadows, Randers & Meadows D. 1972) was to warn society about the limited amount of resources available on earth and the unsustainable path of growth that humanity had been taking till then. An international team of researchers at the Massachusetts Institute of Technology (MIT) elaborated a computer simulation model to investigate five trends of global concern: accelerating industrialization, rapid population growth, widespread malnutrition, depletion of nonrenewable resources, and a deteriorating environment (Meadows et al. 1972). Their idea was to recreate diverse possible future scenarios of humanity using different elements that are interrelated and evolve simultaneously such as population, food production and pollution. The report concluded that exponential growth of humanity cannot continue indefinitely, and that unless we started to take actions for attaining a sustainable economic growth, the limits to growth would be reached in the near future causing a collapse in both population and industrial capacity.

The same year, in Stockholm the first global environmental conference was held: the United Nations Conference on the Human Environment (UNCHE) (United Nations, 1972). This conference reunited representatives of over 100 countries from both public and private spheres, and it settled a foundation for environmental action at international level, the aim of it was to create consciousness about the fact that environmental problems are global problems that are affecting the society and the economy as a whole. They created a common set of principles in order to guide the defense and improvement of the human environment; all of them are aligned to restore and improve the environment quality as well as continue with economic and social development, but always from a sustainable perspective. The UNCHE also urges the different international government bodies to cooperate in creating multilateral or bilateral arrangements in order to improve the existing environmental laws and to compensate the victims of pollution and other environmental damage caused by their own industrial activities. During the UNCHE, it was also created

the United Nations Environment Programme (UNEP), based in Nairobi, Kenya. This organization is the voice of the environment within the United Nations. They work as an advocate of sustainable development at international level, their mission is "to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations." (UNEP, 2014).

3.3. World Conservation Strategy. 1980

After that in 1980, the International Union for the Conservation of Nature and Natural Resources (IUCN) with the advice, cooperation and financial assistance of the UNEP and the World Wide Fund for Nature (WWF) presented the World Conservation Strategy with the aim of achieving three main objectives, from the conservation of living resources: to maintain essential ecological processes and life-support systems, to preserve genetic diversity and to ensure the sustainable utilization of species and ecosystems. The strategy defined development as "the modification of the biosphere and the application of human, financial, living and no living resources to satisfy human needs and improve the quality of human life" and moreover in order to achieve sustainable development it states that is necessary to take into account social, ecological and economic factors (Cultural ecology, 2007). It was a guide directed to three main targeted groups: government policy makers, conservationists and development practitioners. It proposed a set of priorities for both national and international actions to ensure Earth's capacity to sustain development and to support life; it provided as well both an intellectual and practical guidance for the conservation of natural resources.

3.4. Our Common Future. 1987

In 1983, the World Commission on Environment and Development was asked by the General Assembly of the United Nations to formulate a "global agenda for change". This report should propose environmental strategies for achieving sustainable development by 2000, create concern about the importance of co-operation regarding environmental issues among all countries, and help to define a long term agenda for international collaboration during the coming decades. Gro Harlem Brundtland the Prime Minister of Norway was in charge of leading this special independent commission; the report was finished by 1987 under the name Our Common Future, it is also known as the Brundtland Report. One of the most important contributions of this report was the "official" definition they gave to sustainable development:

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987).

The report stated as well that this concept of sustainable development does imply limits imposed by the social organizations on environmental resources, the state of the technology of that time and the ability of the planet to absorb the effects of human activities; moreover if these social organizations and technologies are managed in an appropriate way is it possible to create a new era of economic growth in which poverty is no longer inevitable. It also expressed that attaining sustainable development was not a fixed goal, but certainly an evolving process in which all the variables involved such as exploitation of resources, the direction of investments, the orientation of technological development and institutional organizations are always in constant change and because of this reason they must be constantly adapting themselves to meet both needs: the present and the future ones. Finally they remarked that national and international institutions although they were designed as independent bodies needed to start working together in order to manage the different ecological and economic interdependences (World Commission on Environment and Development, 1987).

3.5. Rio Summit, 1992

Later on, in 1992 the United Nations Conference on Environment and Development (UNCED) took place in Rio de Janeiro, also known informally as the Earth Summit (United Nations, 1997). It was the biggest conference in size till that time, 172 government delegations, 2.400 representatives from NGOs and other interested parties came together for this meeting. Its primary goal was to "come to an understanding of development that would support socio economic development and prevent the continued deterioration of the environment, and to lay a foundation for a global partnership between the developing and the more industrialized countries, based on mutual needs and common interests, that would ensure a healthy future for the planet". At UNCED three major agreements and two legally binding international conventions were signed:

- Agenda 21: An environmental action plan that promotes the development of national strategies, plans, and policies capable of inspiriting sustainable social and economic growth, and at the same time taking care of environmental development. Its primary goal is to warrant that development continues in a sustainable way.

- The Rio Declaration on Environment and Development: A series of principles that assigned to the different signing states the responsibility of adopting of a model of growth based on Sustainable Development which take into consideration the role of women in this process, the elimination of poverty and the reduction of the high differences in income and living standards worldwide.
- The Statement of Forest Principles: A group of principles oriented to realize an appropriate sustainable management of forests worldwide. This was the first global consensus signed on this matter in history.
- The United Nations Framework Convention on Climate Change: Aimed to prevent the disastrous consequences of global climate change, mainly by stabilizing the emissions of greenhouse gas at a level that would allow ecosystems to adapt naturally to these changes.
- The Convention on Biological Diversity: Designed to protect the earth's flora and fauna diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising from the use of them. This convention also included the appropriate use of biotechnology industry and industrial rights.

The Earth Summit will be always remembered as the turning point in history in which governments from all over the world came together to design an agenda for sustainable development.

3.6. Rio +20 and the Sustainable Development Goals, 2012

After this first world summit, two more followed in order to review the commitments and goals achieved since Rio 1992; the first of them was the World Summit in Sustainable Development in 2002 at Johannesburg and the second was the United Nations Conference on Sustainable Development (UNCSD) in 2012 commonly known as Rio+20.

Nevertheless, after more than 50 years of taking actions in pro of attaining sustainable development it seems the achievements accomplished so far are not sufficient enough to attain the goals proposed in the several past summits on this matter. There has been uneven progress within countries especially in terms of poverty eradication; also many developing countries are having many difficulties in the integration of the concept of sustainable development to their own policies, mainly due to the multiple financial, economic, food and energy crises. These actions towards sustainable development are becoming more urgent every day, if we take into consideration the forecast for world

population exceeding the 9 billion by 2050 and the estimation of two thirds living in cities. For all these reasons in Rio+20 it was decided to launch a process to develop a set of Sustainable Development Goals (SDGs) based on Agenda 21, the Johannesburg Plan of Implementation and the Millennium Development Goals (MDGs) (United Nations, 2012). The SDGs are thought to take the lead in the development agenda after 2015 and to address four dimensions of society: economic development, social inclusion, environmental sustainability and good governance. The 23rd of October 2013, the Sustainable Development Solutions Network (2013) identified the following priority challenges that are correlated and each of them contributes to the basic pillars of sustainable development:

- End extreme poverty including hunger
- Achieve development within planetary boundaries
- Ensure effective learning for all children and youth for life and livelihood
- Achieve gender equality, social inclusion and human rights for all
- Achieve health and wellbeing at all ages
- Improve agriculture systems and raise rural prosperity
- Empower inclusive, productive and resilient cities
- Curb human-induced climate change and ensure sustainable energy
- Secure ecosystem services and biodiversity, and ensure good management of water and other natural resources
- Transform governance for sustainable development

These challenges must be pursued at all society levels: global, regional, national and local; and they were thought to act as a foundation for framing the SDGs in the near future. The hope of the SDGs is to convert ideas on feasible and quantitative actions, according to the Rio+20 (United Nations, 2012) agreement they should be "*action-oriented, concise and easy to communicate, limited in number, aspirational, global in nature and universally applicable to all countries while taking into account different national realities, capacities and levels of development and respecting national policies and priorities*". In order to achieve sustainable development the challenges addressed above should be persecuted in conjunction since they are interrelated and complementary to each other. The SDGs will show us in the near future if all the ideas that have been discussed during the last half century are really feasible and attainable and on top of that, they will help us to find a way in which all the efforts realized towards this goals can be measured and quantified for further improvements.

4. HOW DO WE MEASURE SUSTAINABLE DEVELOPMENT?

Sustainable development must be looked on from two different perspectives: one macro to analyze the performance across nations and the other micro, to study the effects that projects based on sustainability have at a local level. For this reason I decided to study two different set of approaches that try to assess sustainability from the two different points of view explained above.

4.1. Assessment of Sustainable Development at National Level

4.1.1. Capital Theory under the view of Sustainable Development

Capital in economic theory is any stock that yields a flow of productive services over time and which is subject to managed control. The simplest interpretation of capital is used to represent already produced durable goods or any non-financial asset that is used in the production of goods and services, this type of capital is known as "Produced Capital"; according to Smith, Simard and Sharpe (2001) since "production is a positive function of produced capital services, and more production is assumed better than less, the greater the size of produced capital stock in the economy, the better, other things being equal". If over time this Produced Capital is not being replaced it will deteriorate, for this reason it is necessary to keep a small quantity aside to replenish the one that has been already consumed, therefore making the economy sustainable. Nevertheless, human beings can derivate benefits from other sources different than this manufactured capital; nowadays society is taking into account other intangible forms of capital such as "Social Capital", a definition that includes many important values that contribute a significant value to firms: intellectual property, brands and reputation. "Human Capital" is also one intangible asset that grants considerable value to companies, the quality of labor and its productivity can in many cases be a decisive variable in the development of different business. This concept can be explained as the different capacities and capabilities of the population either inherent to them or acquired through time. The better the knowledge and the abilities of the human capital the more efficient the use of the other types of capital. Human capital also can decrease over time; people get retired and also become "obsolete" as new technologies are installed if the proper knowledge is not accurately updated hence Human Capital needs a constant investment for being economically sustainable (Smith et al. 2001). Sometimes even a single person can make a difference within a business environment, we have several modern examples of diverse remarkable talented people who were a turning point in the progress of different companies; people like Amancio Ortega (Inditex), Bill

Gates (Microsoft), Carlos Slim (Carso Group), Steve Jobs (Apple) and Richard Branson (Virgin) have built empires in the recent years thanks to a number of precious intangible skills inherent to them and the knowledge they have acquired throughout their life.

We can also think about nature as a form of capital and we can include in this capital all the world's stocks of natural assets which include land, air, water, living organisms and all of the components of the biosphere. All these elements together provide us our ecosystem, goods and services which are absolutely necessary for human existence and are at the same time used as foundation for economic activity (International Institute for Sustainable Development, 2014). There is an important distinction from the Natural Capital from the others kinds of capital; one part of it is renewable – which means that they can be replenished naturally and their quantity is not affected in a large proportion by human activity e.g. sunlight, air, wind - and the other is non-renewable –these resources are either formed due to a long and slow geological process or are not naturally formed in the environment e.g. minerals deposits, fossil fuels – (Annand & Venema, 2008). The renewable natural capital can suffer from qualitative depletion when extraction exceeds its natural growth and non-renewable natural capital can suffer from quantitative depletion, this means a continuous decrease of the available stock of this type of resources.

Unfortunately, the natural stock is not easily valued monetarily since usually there is not an explicit price for it. This has led the Natural Capital aside for many years from being deeply studied in economics, very few economists have highlighted the important role of it in the production process: Alfred Marshall made a distinction between land and capital and considered the use of land as a very important factor for the production of goods and services, John Hicks stated that any factor that contributes to the production process must be accounted even if there is not an appropriate market or price for such factors, (Anand & Venema, 2008). Georgescu-Roegen devised a theory that related economy, society and biophysical constraints and called it "bioeconomics". This term was intended to "make us bear in mind continuously the biological origin of the economic process and thus spotlight the problem of mankind's existence with a limited store of accessible resources, unevenly located and unequally appropriated" (Gowdy & Mesner 1998). These concepts inspired the birth of a new discipline: Ecological Economics which studies the interdependence and co-evolution of human economies and natural ecosystems over time and space (Palgrave, 2014).

By focusing deeply in this idea of natural capital, we arrive to a concept that is being used under different authors and international organizations at the time of analyzing the relation of the natural capital with the economy and sustainable development: The Natural Capital Approach (NCA) identifies the natural capital as the foundation for human, social and manufactured capital; and it is defined as follows "A means for identifying and quantifying the natural environment and associated ecosystem services leading to better decision-making for managing, preserving and restoring natural environments" (Anand & Venema, 2008). This idea was conceived as a connection between sustainable development and environmental management; Annand et al. explain how to implement the NCA within economic and environmental systems.

The difficulty for including the NCA under an economic system framework arises due to subjectivity at the time of assigning an "economical" value to these assets. For many years the only expenditures accrued as *some way* of natural capital were those related with the extraction, conversion and refinement of the natural resources by means of human beings (Anand & Venema, 2008). Nevertheless, from a more suited sustainble point of view: The natural capital should be treated equally to other types of capital, which means that it also suffers from depreciation and it must be protected in order to be conserved over a long period of time. According to this definition, the expenditures of natural capital should also be accounted within the costs of human activities. Moreover, Annand et al. argument that this valuation should be in charge of the public sector, given that the private sector is more concerned about its own profit than the profit of the public and environment in general; to include the NCA under an economic system the following two approaches are proposed (Anand & Venema, 2008):

- To assign an "economic value" to all the components of the natural environment
- The appraisal and handling of the natural capital should rest in the hands of an institution that seeks the best possible outcome for both the nature and the public in general.

In order to implement the NCA within an environmental system context it is necessary to incorporate knowledge of ecosystems as well as understanding on human perspectives, temporal and spatial dynamics. The human being is also a vital part of the environment and the ecosystems, therefore it is important to study the different interactions between humans and the different actors present in the natural systems i.e. all the elements that are part of the biosphere. In order to apply the NCA it is also essential to include the different

human cultures and societies into the equation. This variety makes a requisite for a correct implementation the adaptation of the concept at the different local contexts. The NCA proposes to breakdown ecosystems in such a way that they can be measured and valued -although it leaves the valuation of such ecosystems open for debate-; in this way allowing to include the ecosystems in multiple environmental planning and management schemes.

Different authors and International Organizations have used the concept of Natural Capital to develop different methodologies to measure and to put into practice the concept of Sustainable Development, in the next section we will discuss and analyze a few of them.

4.1.1.1. The Four-Capital Aproach

The Four-Capital method of sustainable development evaluation uses 4 of the types of capital described previously: manufactured capital, natural capital, human capital and social capital. This framework states that in order to keep the total amount of Capital to be sustainable it is necessary to maintain or increase such levels of capital over time (Ekins, Dresner & Dahlstrom, 2008), the problem arises when we question whether it is possible to substitute some kinds of capital for another or if some types of capital are simply not i.e. they cannot be replaced by any other form of capital in terms to contribution to welfare. Talking about natural capital there are really few forms of capital that cannot be substituted nevertheless these types of NC are exceptionally important in contributing to human welfare and economic production like the atmospheric systems from which climate is dependent.

Along history, development has been focused in increasing the amount of manufactured capital without paying too much attention to other types of capital; as a consequence, the increase in manufactured capital has led to the decrease of social, human and natural capital. This framework implements its reasoning into practice by proposing an "ideal" set of indicators for manufactured, environmental, human and social capital to assess the contribution to Sustainable Development made by the EU structural funds (Ekins et al. 2008). Next table 1, taken from the paper, is listing the set indicators proposed under the argumentation of the Four-Capital approach.

Table 1. Proposed set of indicators under the Four-Capital Method

Manufactured Capital	
Indicator	**Topic**
Financial investment in transport infrastructure	Transport
Financial investment in energy infrastructure	Energy

Financial investment in telecommunications infrastructure	Telecommunications
Environmental Capital	
Indicator	**Topic**
Increase in CO_2 emissions and other GG emissions	Climate Change
Concentrations of low-level ozone - increase in emissions of main local air pollutions	Air contamination
Solid waste generation - improvements in solid waste management	Waste contamination
Concentrations of various pollutants in surface waters - % coastal sites complying with Bathing Water Directive - Emissions of heavy metals	Water contamination
Water abstraction as % of availability - water consumption	Water consumption
Forest cover, forest depletion and growth	Forests
% stocks fished above minimum biologically acceptable level - reduction in catches of depleted stocks fished (tons by species)	Fisheries
Greenfield development as % of total new development - area converted from greenfield to developed land	Urbanization
% land area protected - loss, damage, fragmentation of protected areas - wetland loss through drainage - incidence of forest fires	Biodiversity loss
% land area with landscape designation - development along coast - loss of cultural features - loss of areas within which active management of landscape features	Landscape changes
% renewables as share of power generation - energy consumption	Energy
% share of passenger traffic by car - % population exposed to unacceptable noise levels - Change in road passenger (km)	Transport
% agriculture share of land use - change in number of farms - Pesticides per km2 agricultural land - % organic farming in agricultural land use - Nitrates per km2 agricultural land - Agricultural water use	Agriculture
Human Capital	
Indicator	**Topic**
Educational attainment (ISCED levels) broken down by gender and age	Education
Success rate of training (% finding employment on completion)	Training
Number of patents taken out from innovations being developed -net employment created or safeguarded - brain import/export	R&D
Life expectancy - nutritional status of population - immunization against childhood diseases - exposure to air pollution - health and environment related health expenditure - extent of drug/alcohol abuse - infant mortality - suicide rates	Health
Unemployment (male, female, youth etc) - Activity rate (male, female full-time equivalents) - long-term unemployment	Labor market conditions
Absenteeism - worker productivity	Labor productivity
Number of start-up firms - ratio of entrepreneurs/population	Entrepreneurship
Social Capital	
Indicator	**Topic**

Extent of trust (in local associations, hierarchical organizations, government, scientists) - fear of crime	Trust
Population living below poverty line - measures of income inequality - children in poor households - workless households	Equity
Voter turnout - citizen satisfaction with the local community - newspaper readership - access to childcare provision, public transports systems, retirement homes, green spaces, healthcare, internet - time spent commuting - divorce rate	Social integration
Crime rates - benefit dependency (ratio) - retirement age - prisoners per 100.000 people - extent of homelessness	Social exclusion
Networks of social civic engagement - voluntary groups or number of volunteers	Social organizations
Number and type of organizations (i.e. good sectorial representation and diversity) - business clusters - Survival rates of start-ups	Hierarchical organizations
Decentralization of decision making - partnerships - transparency of procedures - participation in planning process - length of political procedures	Political arrangements
Length of civil cases - differential interest rates	Legal, financial arrangements

Source: Ekins et al. 2008

4.1.1.2. Capital Theory and an indicator of "weak" sustainability

Some authors like Pearce and Atkinson (1993) consider that the idea of natural capital does not really capture the relation of the economy with the environment. However, they admit that even though this relation is not properly stated, the idea of natural capital can work as the foundation for the development of a framework that can explain better this linkage between the economy and the environment. This framework proposes an indicator of "weak" sustainability, this indicator is described as a weak one because it assumes a traditional neoclassical view and states that substitution is possible among all the types of capital: human capital, natural capital and man-made capital or manufactured capital. As it has been discussed earlier this assumption is unrealistic, therefore a "strong" indicator will take into account this difference and would require that natural capital must be kept constant or even increasing with time (Pearce and Atkinson 1992). To develop the indicator Pearce and Atkinson (1992) follow the "constant capital" rule which assumes: substitution between the different kinds of capital, in order to keep sustainability the *total* amount of capital must be maintained at least constant, and the amount of consumption that "can be sustained without reducing capital corresponds to the definition of income". This rule becomes:

$$\frac{\partial K}{\partial t} = K = \frac{\partial (K_M + K_H + K_N)}{\partial t} \geq \mathbf{0}$$

Where $K = K_M + K_H + K_N$, and

$K_M = Man - made\ or\ Manufactured\ Capital$

$K_H = Human\ Capital$

$K_N = Natural\ Capital$

We also know that

$$K = S(t) - \delta . K(t)$$

Where $S(t) = Savings$ and $\delta = depreciation\ of\ the\ stock\ of\ Capital$

If we combine both equations and we include the condition for sustainability express above, we have that:

$$S(t) - \delta . K(t) \geq 0$$

$$S(t) - \delta . K_M(t) - \delta . K_H(t) - \delta . K_N(t) \geq 0$$

If we assume human capital cannot depreciate, drop time and divide what is remaining from the equation by Y, then:

$$\left(\frac{S}{Y}\right) - \frac{[\delta . K_M]}{Y} - \frac{[\delta . K_N]}{Y} \geq 0$$

This is the basic condition for sustainability. This condition can be used for an indicator

$$Z = \left(\frac{S}{Y}\right) - \frac{[\delta . K_M]}{Y} - \frac{[\delta . K_N]}{Y}$$

If Z>0 than we can say that the country evaluated with this indicator is on a sustainable development path and if Z<0 the country needs to take extra actions in order to take the state back to a sustainable path relative to its national income (Pearce and Atkinson 1993). We have reliable data from the first two terms of the equation thanks to The United Nations System of National Accounts and the World Bank World Development Reports. The data for the depreciation of natural capital is collected from different national estimates using market prices. This study shows that many countries fail into passing this "weak" sustainability test and that many others only pass it marginally.

4.1.1.3. Genuine Savings Rule

Uwasu and Yabar (2011) outline the fact that many of the indicators that are used widely in academia such as the Human Development Index developed by the United Nations do not establish a link between environmental and socio-economic relations. This paper uses the

genuine savings (GS), originally an idea introduced by Pearce and Atkinson (1998) –"GS is the value of the aggregate change in the portfolio of assets held by an economy"- this concept includes as assets natural capital, produced or manufactured capital and human capital. The World Bank provides estimates for GS also known as Adjusted Net Savings (ANS) for over 100 countries. GS or ANS is calculated in the following way (World Bank 2010):

$$\begin{aligned} &Gross\ National\ Savings\ (GNS) \\ &\quad = Gross\ National\ Income\ (GNI) - private\ consumption \\ &\quad - public\ consumption + net\ current\ transfers \end{aligned}$$

$$Net\ National\ Savings\ (NNS) = GNS - Depreciation\ (fixed\ capital)$$

$$\begin{aligned} &Adjusted\ Net\ Savings\ (ANS)\ or\ Genuine\ Savings\ (GS) \\ &\quad = NNS + Education\ Expenditure(EE) - EnergyDepletion\ (ED) \\ &\quad - Mineral\ Depletion\ (MD) - Net\ Forest\ Depletion\ (NFD) \\ &\quad - CO_2\ Damages\ (CO_2D) - PMDamages\ (PMD) \end{aligned}$$

GS measures the true savings of a country after considering the investments made in human capital, the depletion of natural resources and the damages caused by pollution. A negative value indicates that the total capital of a country is decreasing; therefore the country needs to elaborate correct policies that help to reverse this unsustainable trend. GS is also an indicator of "weak" sustainability; this means that it allows substitutability within the three different kinds of capital. (Uwasu and Yabar, 2011) study the factors that determine the patterns in GS changes; focusing on capital and institutions to analyze the relationship between wealth and sustainable development. This research concludes that the institutions and population growth are the main factors behind the patterns in GS. More stable institutions or better governance are positively correlated with increases in wealth and better capital accumulation over the long run; and population growth affects negatively GS patterns of a given state. This method is useful at the time of evaluation if the development of a country is sustainable or not and also how this condition will evolve along time; moreover it gives insight in which are the factors behind the results obtained and this can be a truly useful tool at the time of designing effective policies that help to improve the overall capital accumulation of a country.

The two latter methods based on the natural capital are mostly suitable for measuring sustainable development at national level, since most of the times there is no disaggregation

of the information needed for the above explained indicators at a local level. Both of them are indicators of weak sustainability, therefore they do not incorporate restraints in the use of capital and they assume perfect substitution between manufactured capital, human capital and natural capital. Furthermore, these indicators do not account the irreversible effects that can be caused for the abuse of natural capital, for instance extinct species cannot be recovered once they disappear from the biosphere.

Moreover, the principal problem is the way in which natural capital is being estimated since there is still no general consensus in how it should be measured. The results obtained can be ambiguous. Therefore all the conclusions extracted from an analysis made with any of these frameworks should be done carefully as the results may be overestimated or underestimated due to the estimations made on natural capital. The Four-Capital method analysis is theoretically more robust nevertheless it needs to be studied carefully in order to be properly adapted to different scenarios and at different scales.

In general, we could say that the methods based in the concept of natural capital even though are used mostly to measure sustainability at a macro level and that the measurement of such natural capital is still open to debate. They can help at the time of analyzing structural problems at national level and to develop policies that take into account these environmental factors in order to achieve sustainable development in a given country.

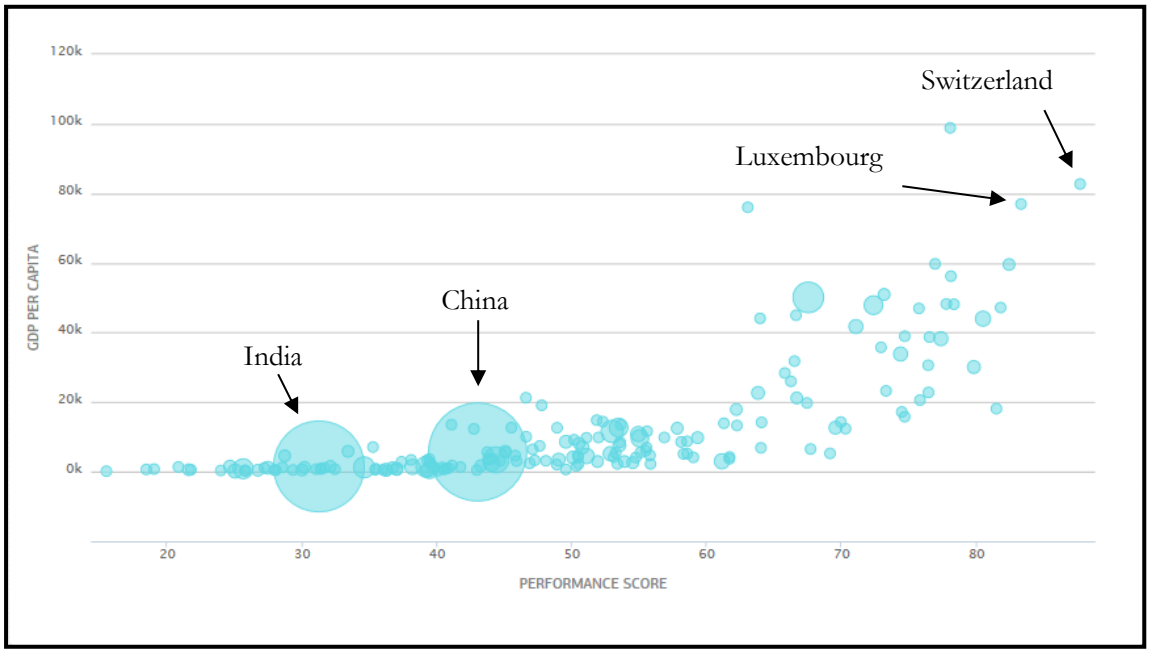
4.1.2. The Environmental Performance Index (EPI)

The EPI is a composite index, developed by Yale Center for Environmental Law and Policy in collaboration with the World Economic Forum; the EPI (EPI 2014) "ranks how well countries perform on high-priority environmental issues in two broad policy areas: protection of human health from environmental harm and protection of ecosystems". The EPI is composed by 20 indicators grouped in 9 issue areas that reflect national-level environmental data and statistics. The 9 areas of study are: health impacts, air quality, water and sanitation, water resources, agriculture, forest, fisheries, biodiversity and habitat, and last but not least climate and energy (EPI 2014). This index uses an outcome oriented criteria to measure how close the evaluated countries are to meet an international established target or, in case there is no target, how are the countries' accomplishments compared to the top performing countries. The EPI is mainly focused on environmental issues, nevertheless its web data explorer allows us to do graphical comparisons with the composite value of the index as well as the 20 indicators disaggregated and the GDP pc,

population, and land area of the 178 countries analyzed in the data set. In graph 3, the performance score of the overall index against the GDP pc is plotted.

The size of the bubbles is proportional to population of the country that is being plotted in the graph. We can see a clear positive correlation between the GDP pc and the performance score, also there is a negative correlation with the number of inhabitants with the EPI; which means that from the group of countries analyzed the ones with higher GDP and small population size in general outperform the rest of the countries in terms of environmental sustainability. It is not a surprise that among this selected group we have countries like Switzerland, Luxembourg, Norway and Australia; on the other hand it should raise important concerns among the International Organizations and policy makers in general the fact that some of the nations with the highest rates of industrialization and economic growth and which also have some of the more elevated number of inhabitants, have a very poor performance in the EPI. China and India are the most worrying countries that fulfilled these characteristics; both are among the worst performers ranking 118 and 155 respectively, and also are the countries with the worst global performance in terms of air pollution.

Graph 3. GDP per capita vs EPI score



Source: EPI, 2014

The EPI, as examined above, is primarily focused on the environmental component of sustainable development leaving aside the other two pillars of the concept: economic prosperity and social inclusion. It is called to be an important reference point in the post-

2015 agenda and the development of effective measuring tools for the SDGs. As explained in an earlier section the Sustainable Development Solutions Network (2013) has identified some priority challenges that will be highly relevant at the time of formulating the SDGs.

Among them we have: improve agriculture systems, raise rural prosperity, curb human-induced climate change, ensure sustainable energy, secure ecosystem services and biodiversity, ensure good management of water and other natural resources; all of these topics are within the range of study of the 20 indicators which compose the EPI. Hence it is very likely that EPI will play an important role as a tool to measure the environmental part of Sustainable Development within countries in the short to medium run.

4.1.3. A system dynamics approach

The first attempt to model sustainable development was made by a group of MIT researchers and published in the well-known Limits to Growth. The objective was to analyze the impact of exponential population growth, pollution and the use of natural resources on the planet. The conclusion of this model was not very optimistic.

It stated that "if the present trends in growth population, industrialization, pollution, food production and resource depletion continue unchanged, the limits to growth will be reached sometime within the next one hundred years…" (Meadows et al. 1972). Although this model had many criticisms in academia it brought an important message for the upcoming models: it is necessary to model globally and locally. Individual nations contribute in different degrees to the deterioration of the environment; usually the wealthier nations consume more and generate more waste at the expense of the poorer nations' natural resources. If we look at the ratio between the Ecological Footprint (demand on nature) and the Biocapacity (ecological supply) at national level of first world countries like Belgium, we realize that if everyone live according to Belgium standards and with this country's production capacity we will need 5.3 planet earths to keep this level of consumption. Whereas, if we look at a global level the estimations say that we will need 1.5 planet earths to maintain the global level of consumption (Borucke et al. 2013). Out of this trivial analysis we can confirm the necessity of looking at sustainability from two different perspectives: global and local.

Moffat and Hanley (2001) propose a system dynamics model that evaluates sustainable development from both perspectives: global and local. The methodology followed by them to build the global model is focused on the environmental effects caused by the use of natural resources and population changes, and afterwards it sets a national model within

this context. The model is divided in 3 main sectors: a demographic group –subdivided in rich 20% and poor 80%-, biosphere and a material sector. This model also accounts for differences in consumption patterns, birth rates, non-renewable resources and renewable resources – food consumption per person is measured in FAO kilocalories converted into tonnes of Net Primary Productivity (NPP) i.e. how much carbon dioxide vegetation takes in during photosynthesis minus how much carbon dioxide the plants release during respiration – (NASA, 2000). The national model takes into account a wider range of variables: migration, employment, natural resources – renewable and non-renewable -, and man-made capital. It also accounts for the changes in world prices and the different land use categories. The results from this simulated model predicts that after the population reaches a top of 14 billion of inhabitants under current consumptions trends the ecological damage would cause a collapse of NNP which means the end of life on the planet. In this sense we could say that this analysis model has a similar conclusion like the limits to growth model, the difference is that the assumptions of this model are more realistic. Further improvements of this approach should include a disaggregation by economic sectors so we can study their contribution to ecological damage separately. In conclusion, this methodology presents to a great extent a simplified representation of reality; nevertheless it can be helpful to analyze the different interactions within countries on the effects of such interrelations at an ecological global level.

4.2. Assessment of Sustainable Development at Project Level

4.2.1. The Bellagio Principles for Sustainable Assessment and the ASSIPAC method

The Bellagio principles were thought to serve as guidelines to realize a suitable assessment of sustainable projects developed by community groups, non-government organizations, corporations, national governments and international organizations. They were developed by the Institute for Sustainable Development and the Rockefeller Foundation and are supposed to be a link between theory and practice; instead of creating a set of indicators, these principles are meant to work as an underlying basis for the whole assessment process including system design and identification of the appropriate indicators for each specific project. Attaining sustainable development is a matter of choice of all the social agents involved including individuals, civil society, governments, etc. And since it is a matter of choice, reaching the goal of sustainability will only be feasible if all the stakeholders are completely committed to this cause. Furthermore, as this is an interrelated process it is compulsory to keep a careful track on the evolution of the projects in order to keep the

concept, the goals and the execution properly aligned. The Bellagio principles state the assessment of progress towards sustainable development should:

- Have a clear vision on sustainable development and objective goals that define such vision
- Have and holistic perspective and include a revision of the system and its parts; recognize the well-being of social, ecological and economical sub-systems and account for all the interactions between these elements; analyze the effects of the human activity –either good or bad- in ecological systems, and account for its cost and benefits, in monetary and non-monetary terms
- Take into consideration the 3 essential elements of sustainable development: social inclusion and the differences within current population and between present and future generations, dealing with important matters such as resource use, over consumption, poverty and human rights; take care of the environmental systems from which societies are dependent; and look after the development of the economy and other variables that influence social well-being.
- Assume a long term perspective considering the fact that all the decisions taken now will have a considerable impact in the future of both humans and ecosystems; determine a space of study large enough to account for the impact of the actions taken today not only on the locals but also on other external agents; study the past and present conditions to predict the future ones.
- Have a clear idea of the number of issues that want to be addressed with the analysis, the goals and the indicators that will measure the progress, try to realize standard measurements in order to allow future comparisons.
- Be an open process in which all the data gathered, assumptions, methodologies and uncertainties are accessible to the public.
- Make use of a clear and effective language that can be easily understood by different agents such as general public, policy makers, etc.
- Count with the participation of representatives of different backgrounds e.g. professionals, social groups, and indigenous people; in order to guarantee the multiplicity of concepts and ideas. The process should include as well the involvement of policy makers to assure the further implementation of the different ideas identified by all the stakeholders involved in the process.

- Have an ongoing assessment in order to keep track of the project evolution; it should also be adaptive and responsive to changes to the changing and evolving environment; customize the project as new information is gathered and finally promote collective learning and feedback to decision-makers.
- Provide efficient institutional capacity for data collection, maintenance and documentation. (Hardi and Zdan 1997)

Devuyst (1999) uses the Bellagio principles to develop a sustainability assessment method named: "assessing the sustainability of societal initiatives and proposing agendas for change" (ASSIPAC). This methodology is composed by two systems: the sustainability check and the sustainability assessment study. Both systems take into consideration several of the environmental, social and economic aspects from the concept of sustainable development. The sustainability check consists in a process oriented revision which makes use of a checklist approach and it is focused on describing the characteristics of the project and the existing alternatives of it related with sustainability. Its purpose is to examine whether the project evaluated has any discrepancies with the vision of sustainable development or not.

The assessment is realized by bringing together the project under study with other initiatives that have proved to be outstanding cases of sustainability and make a thoughtful comparison of them. It is possible to collect information about the project or initiative and at the same time gather data from other existing sustainable development policies, visions or strategies. Once the person or organization in charge of the assessment has made the comparison between the initiatives checking both the pros and the cons, it is time to develop an agenda to improve the project evaluated. The sustainability assessment study follows a more quantitative methodology paying specific attention on the targets that have been set by the project and the other existing options. Moreover, sustainable development is a very vague concept and the only way of establishing feasible and quantifiable goals is by analyzing each geographical area and involving in the formulation process the society in general (Hardi & Zdan, 1997) by which such area is comprised; in this way it is possible to transform the general idea of sustainable development into an explicit vision which will lead to the development of measurable objectives, action plans, and indicators. In case there are no specific alternatives developed for the individual area that is under the scope of the evaluated project, the assessors should elaborate an "ideal" proposal of sustainability against which they can compare the initiative that is been evaluated. From these in depth

study it is possible to develop a forecast of the gradual change of the selected sustainability indicators as a result of the project and propose a plan to improve such predicted results. The ASSIPAC method was designed in first instance to evaluate projects mainly focused in urban planning; nevertheless, it is broadly used in assessing projects with different scopes.

4.2.2. Measuring Sustainable development using Multi-Criteria Analysis

Sustainable Development is a concept that has 3 different dimensions; it integrates different characteristics of social, economic and environmental matters. For this reason, developing a methodology that can capture this multi dimensionality seems to be an appropriate approach to measure sustainability. For doing so, it is necessary to "link economic evaluations with biological, ecological and social valuations" (Boggia & Cortina 2010). This methodology takes the Complex Social Value (CSV), which is focused precisely in a multidimensional assessment, to elaborate a heterogeneous evaluation that uses a set of indicators some of them are monetary and the others non-monetary. Since multi-criteria analysis (MCA) is a way to analyze complex problems that involve monetary and non-monetary variables, it has been widely used by private and public entities to break down the parts of problems to be examined and reassemble the pieces afterwards to provide a thorough view of the matter analyzed to policy makers. Hence MCA is used to evaluate problems and to provide greater insight at the time of solving them (Communities and local governments, 2009). The present model was used to evaluate the territorial planning of region in Italy involving the integration of social, environmental and economic aspects. One set of indicators that reflected sustainability at a local level was selected in advance to construct two indexes: the environmental index (EI) and the socioeconomic index (SE). The final step consists in interpreting both indexes conjunctively (Boggia et al. 2010).

This method sets two matrices composed by the indicators and the different municipalities that will be studied; one matrix is used to examine the environmental indicators and the other one for the social and economic indicators. Afterwards a weight is assigned to each indicator; the weight corresponds to the importance attributed to every single indicator. Since each indicator has its own units of measurement it is necessary to realize a standardization process in order to provide comparable information within the indicators. This approach allows us to analyze different possible outcomes by varying the weights of importance to the different indicators i.e. it is possible to prioritize for certain aspects of sustainability as the problem solver considers to be more appropriate. Finally with the results, a ranking of the municipalities evaluated is established observing collectively the

results from both environmental and socioeconomic index. In table 2, we can find the description of the set of indicators used to develop the EI and the SE.

Table 2. Description of the indicators used to elaborate the Environmental Index and the Socioeconomic Index

Environmental Indicators	**Socioeconomic Indicators**
Total CO2 emissions	Population density of each municipality
Urbanized areas of a municipality in relation to the total area	Unemployment rate
Level of fragmentation of a territory due to infrastructures and urbanization	Women's unemployment rate
Consumption of electricity for domestic use per consumer	Income that families are able to spend after paying taxes (thousands of €)
% of differentiated waste collection	Ratio on injured people to those employed
Amount of water used pc in each municipality	Ratio between the number of active business and the residents
Total potential loads, is a composite index made up of four indicators in relation to the unit of surface area of the municipalities	Ratio of people over 17 with a high school or university diploma over the total population over 17
The ratio between the number of companies with an environmental certification and the other companies	Ratio between the population from 0 to 14 years of age old plus the population over 65 and the population from 15 to 64 years of age
Registered environmental management processes for municipality governments	Ratio of tourists to the total resident population

Source: Boggia et al. (2010)

The authors preferred to keep both indexes separated in order to account for the differences in terms of environmental sustainability against the socioeconomic results of each municipality- By doing so this methodology also becomes a strong sustainability tool because it does not take natural capital as equally exchangeable with social and manufactured capital i.e. it is not possible to replace one type of capital with another. The results are plotted in a graph in which we can observe simultaneously the values of both indexes for each municipality; this gives us an overall picture of the situation of them with respect to the values of sustainability by showing us the relative position of the municipalities in each index. It allows us to make comparisons among the different municipalities and gives us an idea about which areas need to be worked the most in order to approach the concept of a sustainable development.

This approach is highly dynamic, since it can be adapted to measure different indicators, assigned different weights to each indicator, extended in time and used at different geographical levels; this dynamism allows the indexes to be reviewed periodically in order to check the evolution of the territories under study. It is also a strong sustainability

method because it considers no substitutability among the different kinds of capital and searches for the maintenance of the 3 types of capital for future generations, as it was stated in the Bruntland report.

Nevertheless, the dynamism of the model can be viewed as a quality and as a defect at the same time; since this methodology can be completely adaptable to many different scenarios the results will depend on the indicators stated at the beginning of the analysis and the corresponding weights assigned to them. Therefore, if this model is not properly stated since the beginning with relevant indicators and suitable weights the results extracted from it can be meaningless.

4.2.3. The Sustainability Assessment Model (SAM)

The SAM was originally developed by a group of companies belonging to the UK oil and gas industry; its aim was to assess the sustainability of project developments, the SAM can also be used to assess specific design decisions and the performance of organizations. This framework follows a four-step full accounting approach (FCA) to a given project and considers the full life cycle of it, including both positive and negative externalities produced as a consequence of the project and monetizes all the externalities evaluated so they can be measured and compared (Cavangh, Frame & Lennox, 2006). The FCA monetizes externalities that do not have a price in current markets and that are not likely to be monetized in the near future; this approach allows a better understanding of the full effects of an individual project and such information is highly valuable for policy makers at the time of evaluating impacts. Table 3 summarizes the four-step approach followed by the FCA.

Table 3. FCA four-step methodology

Stage 1	Define the cost objective. This may be, for example, a product a production process, waste disposal option, part of an economic entity, an entire entity or an industry.
Stage 2	Specify the scope or limits of analysis. This means what sub-set of all possible externalities are to be identified
Stage 3	Identify and measure external impact. This involves making the link between a cost objective and the externalities arising from the cost objective
Stage 4	Cost external impact. This is the monetization of the externalities or determination of the fuller cost associated with the project, it includes all the costs that are not captured by an ordinary current account for a cost objective

Source: Bebbington, Brown & Frame (2007)

The externalities are first measured physically and then converted into monetary terms. The externalities are divided in 4 categories under this methodology: economic, resource use, environmental and social impact. Later, this information is included in the financial

information of the evaluated project; out of this combination the final accounting results will be either positive or negative and this information will provide us a view of whether the studied project is sustainable or not based on the total amount of externalities that it produces (Cavanagh et al. 2006).

This method provides better results when it is carried directly by the agents involved in the development of the assessed project and not made by independent researchers. SAM's main drawback comes from the theoretical and practical difficulties that arise at the time of monetizing environmental externalities since such valuation is left open for the evaluators of the project. This means that the results obtained from this analysis will be always biased by the methodology implemented by them. Therefore the results of an analysis performed under SAM will always be dependent in the proper involvement and accurate measurements realized by the team in charge of implementing this approach.

4.2.4. A Comparative Framework for measuring Sustainable Development

MOG (2004) elaborates a framework which is based in two major facts that ultimately will determine the success of a project based on the concept of sustainable development:

- Process orientation: Attaining sustainable development is not a fixed goal; it is more like a continuous and evolving process that has to be achieved through the existent means. Consequently, a project that wants to achieve sustainable development must be flexible i.e. the project should learn from the changing conditions and also evolve with them; if it wants to have a long term impact, otherwise the improvements accomplished with the project may only be temporary.
- Participatory processes and community organizing: In order to develop an effective project it is necessary that the community, which will be benefited from such an initiative, participates in the formulation process since the very beginning. The participation of all the stakeholders should be in every single process of the project; since the research, going through goal's setting, implementing the project and finally evaluating the results obtained. If the initiative succeeds in creating institutions managed by the beneficiaries of it, eventually these institutions will carry the concepts of sustainable development within the community even after the project is over; thus prolonging the effects and creating a sense of duty and ownership about sustainability matters.

The methodology proposes 2 kinds of criteria to evaluate initiatives: process-oriented criteria set and outcome-oriented criterion. The first one is designed to analyze the quality of the program's approach and the latter is useful to evaluate the progress made by the project towards its own goals.

The process-oriented criterion states that it is possible to contrast any sustainability project with a set of criteria that analyzes the type of methodology employed to formulate the initiative. Table 4 describes each of the criteria used to elaborate such evaluation.

Table 4. Process-oriented criteria set

Criterion	Description
Character of participation	As explained before the participation of all the stakeholders is vital for the development of an efficient project. Therefore, with this criterion we will analyze the involvement in the participation of the locals in aspects such as the attention given to their ideas and opinions, the degree in which they can participate in all the stages of the initiative and the capacity of them to propose ideas and give feedback to the project.
Success and nature of institutions	If sustainability is a long term goal, the work of keeping this idea along time will eventually be left in the hands of the locals. This means that such programs must "educate" and create social awareness within the locals on the importance of sustainable development by establishing and reinforcing the social institutions like NGOs, universities, government bodies, etc. Consequently, we can evaluate a program by analyzing its capacity to build institutions and the contributions made to them.
Diversity, multiplicity and adaptability of the project ideas	Since the concept of sustainable development includes different dimensions –social, economic and ecologic- it is necessary to develop diverse ideas that can be adaptable and adoptable at local level.
Accounting for heterogeneity, diversity and dynamism	Communities are not homogenous; they are in fact diverse and change over time. Therefore, an effective initiative should account for these differences in order to target the highest possible number of people. If people are analyzed as they had all the same characteristics, the program will only be useful for a limited number of persons who actually fulfil those characteristics.
Understanding and use of local knowledge	At a last stage the work towards sustainable development will be made by the locals, for this reason the program needs to focus in the knowledge, abilities and skills, as well as the limitations, of the beneficiaries; and use this knowledge at the time of developing and implementing the project for having a better performance.
Recognizing the influence of external conditions	The program must consider external conditions that affect the initiative even if they cannot control them. Economic, social, demographic, political, cultural and many other factors should be evaluated as well; since they can affect directly the results.

Source: Mog (2004)

The outcome-oriented criteria should be adapted to the individual program that is going to be studied since the outcomes will vary depending on the objectives and the location of the initiative. This framework analyzes a sustainable rural development program and establishes a list of criteria that will study the outcomes of such a project, and it considers that a program is successful if it "helps to create positive change without (intentionally or

unintentionally) producing countervailing negative change within its realms". Even though this methodology is mainly qualitative, it is based on realistic assumptions that try to capture diverse aspects from reality like the heterogeneity of the people and the importance of their participation. Such characteristics are determinant at the time of designing a project based on sustainable development that will have long lasting impacts into a community.

5. CASE STUDY: PROCESS EVALUATION OF AGENDA 21, BRUSSELS

5.1. Introduction

A sustainable community is one that uses its resources to meet its currents needs while being sure of keeping an adequate amount of resources for to support the needs of future generations. This means to maintain the quality life of its residents while keeping the ability of nature to continue functioning along time by minimizing waste, preventing pollution, promoting efficiency and developing local resources to revitalize the local economy. A sustainable community combines a living system in which human, natural and economics elements are interdependent and work as complements between each other. (Minnesota SEDEPTF, 1995)

For the first time in history, almost half of the world population lives in urban areas and the way in which these communities are organized will determine the success or failure in attaining sustainable development. The basic problem of the communities from developed countries is that they are unsustainable, most of the cities have adequate housing and alimentation, but they consume and cause contamination at rates that the earth cannot support.

The environmental impact of these cities from "northern" economies should be studied more in depth, because their effects in changing ecosystems is much larger than the effects caused by cities from the "southern" economies. Many communities have relied in the availability of cheap and "abundant" sources of energy, like fossil fuels, and have grown in an inefficient way, becoming heavily dependent from lengthy distribution systems and making the automobile a must to keep up with the daily living and thus continually increasing contamination. There is also an apparently unlimited water stock to supply the needs of the northern cities as well as a huge expense on energy.

We know the problem exists; the dilemma is how can we encourage governments to take action and start to plan and re-organize the cities in pro of sustainable development? With all these sustainability concerns in 1994 more than 80 European localities signed the

Aalborg Charter in Denmark. This document was inspired by the Local Agenda 21 plan proposed in the UNCED in Rio de Janeiro two years before and was developed as well to contribute to other sustainability plans of the European Union. This charter was based on the "consensus of individuals, municipalities, NGOs, national and international organizations, and scientific bodies" (Aalborg charter, 1994). Brussels was one the municipalities that were participants of the Aalborg Charter and it committed itself to work towards sustainability by implanting and developing Agenda 21within the city.

5.2. Description Agenda 21, Brussels

In 2005, the city of Brussels starts the development of Agenda 21, a plan thought globally but designed to be developed at local level. On a first stage, the city hired an independent bureau to make an evaluation of existing initiatives towards sustainable development that were already being used within the city by the local administration; and the way in which the administration was working till then, paying special attention in how the financial resources were being used. It was concluded that the participation of the citizens was crucial for the development of Agenda 21, since the higher involvement of the habitants in these initiatives towards sustainable development are most of the times translated into more efficient and better adapted programs. The amelioration of the local management, the information and the sensitization of the citizens, the knowledge of the local context, and the adhesion of habitants of the city to take an active role were thought as the core for the correct implementation of this initiative changing the civic culture and becoming a "democratic school" for the city. Therefore, the local participation was one of the main social objectives within this project. Finally, after analyzing all the available information concerning to the sustainable development of the city and consulting diverse social organizations and the citizens in general, the city of Brussels presented Agenda 21 in 2008.

Since then the project has been evaluated 3 times, such evaluations have led to the current organization of the project. Agenda 21 is now divided in 5 objectives that cover 22 different domains and these objectives are tried to be achieved through 154 actions. The 5 objectives and their correspondent domains can be found in table 5.

Table 5. Objectives and domains of Agenda 21, Brussels

Objective	Domains
A modern and efficient government	Tools for monitoring and evaluation, transparent access to information, participation and sensitization about sustainable developments, quality of services and management of human resources, public finances, procurement, sharing experiences

A responsible management of natural resources	Biodiversity and green spaces, water policies, energy policies, waste reduction, labelling and impact control
An harmonious urban development	Housing and habitat development, mobility, landscape and architectural heritage
A social cohesion and bigger sense of solidarity	Social cohesion, social inclusion and equal opportunities, health and sports, access to culture, international solidarity, living conditions
A dynamic policy of employment and economic development	Sustainable economic development, employment, social economy

Source: Agenda 21 local de la ville et du CPAS de Bruxelles, Plan d'action (2012)

5.3. Methodology

This project comprises many different areas and large number of individual actions I decided to use the methodology proposed by Mog (2004) to analyze the process orientation of the project. This methodology was the best fit to analyze Agenda 21 according to the time and resources available to realize the study; the SAM requires to know all the costs related to the project as well as a measurement of all the positive and negative impacts of the initiative, after doing some interviews with direct agents who work directly with the project I came to the conclusion that I was almost impossible to realize an estimation of the total costs of the project since there is no one single department of the administration in charge of running Agenda 21. There is one office responsible for the organization and the communication of the project within the whole administration but the funds to develop each of the actions come from different departments e.g. economy, mobility, education, culture, etc. And this funds are accounted within the individual budget of each department and not as individual contributions to Agenda 21, these characteristics makes the cost measurement needed to use SAM methodology a non-viable approach to follow in this case. The MCA studied earlier is not suited either since it has been developed to make comparisons between different municipalities and checked how well each of such municipalities is performing in environmental and socio-economic matters. I could indeed construct the EI and SE, but the information provided by both indexes will be meaningless if I do not count with other municipalities similar to Brussels to make a proper comparison. The ASSIPAC methodology based on the Bellagio principles uses a process oriented methodology just like Mog, however as the MCA it needs to have similar initiatives in order to assess the effectiveness of the project.

In conclusion, to assess the quality and the development of Agenda 21 and whether it will be successful or not in the long term I decided to use process oriented criterion developed by Mog. To do so, I realized a semi open survey written in 3 languages: English, French and Dutch; and a series of small meetings to the people working directly with the

administration and agenda 21, political agents, and the public in general. The survey can be found in Annex 1. With this survey and the meetings, I tried to analyze whether the project was consistent with the characteristics described in this framework or not.

5.4. Results

The complete survey was answered for 65 people, among which 62% were from Belgian origin, this means that 1 out of 3 people who answered this survey were from other countries. I consider this survey to be representative of the population of the city since the demographic relation from my survey is consistent with the information provided recently by news and articles which confirm that at least the 33% of the inhabitants of the city come from a foreign origin. 65% of these respondents were male and almost half of the sample did not have any kids. Also the majority had lived in Brussels for more than 4 years, so they were in the city by the time Agenda 21 started to be in practice. Other 24 respondents of the survey only provide partial answers to the survey, mainly about Agenda 21 and the city of Brussels but without providing their demographic information, I will use their answers as well to analyze this initiative. In total we have 89 survey responses, being 24 of them partially answered and 65 completely answered.

- **Character of participation**: According to the survey the 55% of the respondents think that the population in general has none, very little or little participation within the project. The locals as well as other social organizations were taking into account in the process of formulating the initiative, but it seems that after its implementation the administration is the one that is in charge of the whole process and the population in general is only allowed to participate actively in a part of the actions. 63% of the surveyed people have not ever received any information regarding Agenda 21 and how they can contribute to the sustainable development of the city. Although Agenda 21 does have a specific set of actions towards the participation and the sensitization of the citizens and stores about sustainable development and according to their latest evaluation the progress has been quite outstanding in 2012 (Rapport 2012 d'évaluation des actions de développement durable, 2012). Their results are contradictory with the answers from the survey; perhaps a survey with a larger sample could give us better information to contrast these facts.

- **Success and nature of institutions- and capacity-building efforts**: For the results obtained so far we could infer that this project still has a lot of work in matters of consciousness to the population in general. As explained earlier if a project based on sustainable development wants to have long lasting results its beneficiaries must take an open role within such projects and be at least partially involved in the development of the actions. Most of the actions are made directly by the administration; therefore there is no interaction with other important social agents like NGOs and universities. The people surveyed consider that this project can help to improve the already existing initiatives of the city that work towards sustainable development. Agenda 21 needs to start adapting some of their actions to work more closely with such agents, this collaboration will allow creating bigger benefits, positive externalities and spillovers from the actions that are already working within the city.
- **Diversity, multiplicity and adaptability of the ideas promoted by the program**: The program does have a big range of ideas promoted towards sustainable development. It accounts for many different matters like good governance, biodiversity, caring of the green spaces, sustainable consumption of energy and water resources, urbanism, mobility, social integration, and economic development. Among the respondents from the survey all these matters should have substantial importance in the sustainable development of the city. In this criterion, we could say that Agenda 21 does make a good labor in covering a wide range of action areas.
- **Accounting for heterogeneity, diversity and dynamism:** Agenda 21 counts with actions towards social integration, equality, disabled integration. Nevertheless the actions proposed do not make a distinction between the heterogeneity of the Brussels population, as I exposed earlier one third of the population comes from foreign countries and a correct integration of these group will foster the sustainable development of the city. 67% of the respondents of the survey think that the actions promoted by Agenda 21 have none, very little or little integration towards the population in general. Consequently, this project must pay larger attention on this part of the citizens and include their needs in further updates of the project.
- **Understanding and use of local knowledge, skills, initiatives and constraints**: Since most of the work is made from the administration, we could say that Agenda 21 takes very little advantage of the local knowledge, skills, initiatives and

constraints from the city. In fact, the administration does realize a research from them to adapt them into project; however, since most of the activities are carried afterwards by the administration without the collaboration of other social agents and with a limited participation from the citizens many possible spillovers that could result from such collaboration are lost in the way. From the survey, 67% of the respondents do not think that Agenda 21 involves the "locals" within the development and realization of the different actions promoted by the program.

- **Recognizing the influence of external conditions, markets and policies**: The project recognizes the influence from external conditions, like the economy, politics, immigration, labor market characteristics, and environmental changes; for the development of the actions realized by the project.

In summary, Agenda 21 in Brussels is a project that covers a wide range of actions towards the sustainability of the city. The results exposed in their evaluation report exhibit considerable advances nevertheless these outcomes are mainly qualitative and evaluated by the administration itself; therefore, all the results are directly dependent from the approach used by the administration for realizing such evaluation. From the analysis and the data collected, Agenda 21 fails in incorporating a broad participation of the citizens and other social agents like civil organizations, universities, and NGOs. Also the project must take into account the large heterogeneity and multiculturalism of the city inhabitants; and use more from the existent skills and knowledge from the area. If Agenda 21 incorporates all these characteristics explained above the project will have long lasting results and the ideal of sustainable development and green capital of Europe will be a more close and realistic goal.

6. FINAL CONCLUSIONS

Sustainable development must be seen as a science that tries to analyze and understand the interactions between highly complex systems: a continuously expanding global economy, the welfare of society in general, the changes in the earth's environment and ecosystems, and the governance of governments and international organizations such as corporations. Sustainable development should be looked as well as a way for solving todays' complex problems from a normative – or ethical perspective -. Within this holistic idea the objective is to reach social, economic and environmental goals simultaneously. Nevertheless, as a way for solving complex problems, the concept should be adapted to the characteristics of each single community in which the idea is going to be put into practice.

After more than 50 years of literature, international summits and agreements; we are still far from reaching the targets established in such reunions. There has been uneven progress towards sustainable development across nations especially in matters of poverty eradication. The challenges that humanity will face in the upcoming years in matters of urbanization, consumption and social equality will require an important extra effort towards sustainable development by all the stakeholders involved. For these reasons in the Rio +20 summit, it was decided to design a set of Sustainable Development Goals, which will take the lead in the development after 2015. The SDGs are called to face all these upcoming social, economic and environmental challenges; there will also be designed in such a way that we can quantify and measure the progress towards this holistic approach of sustainable development.

The indicators analyzed using the capital approach are more suitable for analyzing sustainable development at national level, since most of the times there is no disaggregate data needed for their utilization. These indicators are most of the times "weak" sustainability indicators because they allow perfect substitution between the different kind of capital and not account for some of the irreversible effects in the environment caused by human activity. The main drawback from these methodologies is the lack of a standard consensus for estimating the value of natural capital. Therefore, the results obtained from an analysis made through the capital approach will depend directly in the way how such natural capital is quantified.

The Environmental Performance Index ranks how well countries protect human health from environmental harm and protection of the ecosystems. This composite index is mainly focused in the environment perspective of sustainable development. Nevertheless, since many of the different indicators that are covered for this index are also part of the challenges that will be addressed by the SDGs the EPI is called to be an important measuring and comparative tool across nations in the development agenda post 2015.

The studied system dynamics approach is simplified representation of reality. However, this methodology can provide meaningful information to analyze the different interactions within countries and the effects of such relations at an environmental global level.

The ASSIPAC methodology proposed by Devuyst (1999) and based on the Bellagio principles for sustainable assessment can be adapted to study different kinds of projects that are guided by the concept of sustainable development. It proposes two different methodologies: one more qualitative oriented – the sustainability check – and other more

quantitative – the sustainability assessment study -. With this method it is possible to compare similar initiatives and develop forecasts of the expected outcomes from the analyzed projects.

Multi-Criteria Analysis have been broadly use in matters of sustainability, since it is a method that allows to study complex interrelated systems from different perspectives. What makes the methodology proposed Boggia et Cortina (2010) outstanding is the division made between socio-economic and environmental issues through two separate indexes: the Environmental Index and Socio Economic Index. Thanks to this disaggregation this approach becomes a "strong" sustainability measure. This methodology is also flexible, adaptable and can be reviewed periodically to assess performance towards sustainability across time. The main drawback from this method is its adaptability, since it can be molded to account for sustainability with different importance weights depending on the interests of the assessor.

The Sustainability Assessment Method allows us to account for all the positive and negative externalities in the economy, society and environment; occasioned by a given project. The best quality from this approach is that you can use it to analyze different kinds of projects – not only projects based on sustainable development -, in the externalities that they trigger in the communities in which such project is present. The main disadvantage from the SAM is similar as the one exposed with the different capital approach: the appraisal of environmental externalities.

The assessment proposed by Mog (2004) proposes 2 different criteria – process and outcome oriented - to evaluate projects that work towards sustainability. The first one tries to evaluate how the process orientation of the project under evaluation is and how well the beneficiary communities of such initiatives are integrated in all the stages of the project; and the latter studies the outcomes adjusted to the initiative that is been going through the evaluation. This methodology addresses practical and qualitative characteristics that have proven to be key factors at the time of implementing a project based on sustainable development and to make the benefits and spillovers of such project long lasting overtime. The main advantages of this approach is that is based on realistic assumptions and it can be adapted to different projects within different scenarios and scopes.

Finally, after doing an in depth review of sustainable development and analyze different methodologies to measure progress towards this objective, I apply the process oriented reasoning behind Mog's (2004) assessment method to analyze the project Agenda 21,

which takes place in Brussels (Belgium) since 2008. According to the results extracted from the surveys and the small meetings with administration representatives, I conclude that Agenda 21 fails in incorporating a broad participation of the citizens and other social agents like civil organizations, universities and NGOs. Also the project should account for the heterogeneity of the Brussels population and make use of the existing skills and knowledge from the area. If the project incorporates these characteristics within its implementation and process evaluation the benefits derived from Agenda 21 will be long lasting and better adapted to the particular characteristics of the city and its citizens.

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8. ANNEX

8.1. Survey on Agenda 21, Brussels

Knowledge about the project - connaissances sur le projet - Kennis over het project

Preg.1.- Do you have any idea about the project Agenda 21 and how it works? - Savez-vous ce qu'est le projet Agenda 21 and comment il fonctionne ? - Heb je enig idee over het project 'Agenda 21' en hoe het werkt?

- ☐ None - Aucun - geen
- ☐ Very little - très peu - zeer weinig
- ☐ Little - peu - weinig
- ☐ Some - certains - sommige
- ☐ Substantial - important - wezenlijk

Description of Agenda 21 - Description de l'Agenda 21 - Beschrijving van Agenda 21

Agenda 21 is a plan organized around 5 goals and spread over 22 areas of interventio in favor of local Sustainable Development of the city of Brussels. Its five main objectives are:-A modern and effective government-A management responsible for natural resources-A harmonious urban development- More social cohesion and a strengthened solidarity-A dynamic policy of employment and economic developmentAgenda 21 est un plan organisé autour de 5 objectifs et divisé en 22 domaines en faveur du développement durable de la ville de Bruxelles. Ces 5 objectifs principaux sont :- Un gouvernement moderne et efficace- Une gestion responsable pour les ressources naturelles- Un développement urbain harmonieux - Une cohésion sociale et des solidarités renforcées- Une politique dynamique pour le développement de l'emploi et de l'économieAgenda 21 is een plan georganiseerd rond 5 doelen. Het specaliseerd zich in 22 interventiedoeleinden ten gunste van de lokale duurzame ontwikkeling in Brussel. De vijf belangrijkste doelstellingen zijn:- Een moderne en effectieve overheid- Een management dat verantwoordelijk is voor de natuurlijke hulpbronnen- Een harmonieuze stedelijke ontwikkeling- Een versterkte sociale cohesie en solidariteit- Een dynamisch beleid voor werkgelegenheid en de economische ontwikkeling

Preg.2.- What is your opinion about the project or general idea about it? - Quel est votre opinion ou votre idée générale à propos du projet? - Welke is uw mening of uw globaal idee betreffende dit project ?

_____

Preg.3.- To which degree the population is agreed to participate in the different initiatives of Agenda 21? - A quel degré la population est-elle autorisée à participer aux différentes initiatives d'Agenda 21 ? - In welke mate mag de bevolking deelnemen aan de verschillende initiatieven van Agenda 21?

	None - aucun - geen	Very little - très peu - zeer weinig	Little - peu - weinig	Some - certains - sommige	Substantial - important - wezenlijk
Degree of participation - degré de participation - De mate van betrokkenheid	☐	☐	☐	☐	☐

Preg.4.- How important do you think is the contribution of Agenda 21 is to the development of Brussels? - Selon vous quel est le degré d'importance de votre contribution à l'Agenda 21 pour le développement de Bruxelles? - Hoe belangrijk is de bijdrage van Agenda 21 aan de ontwikkeling van Brussel volgens jou?

	None - aucun - geen	Very little - très peu - zeer weinig	Little - peu - weinig	Some - certains - sommige	Substantial - important - wezenlijk
Degree of contribution - degré de contribution - Mate waarin zij bijdragen	☐	☐	☐	☐	☐

Preg.5.- Have you ever received any information about the project and how you can contribute to it? - Avez-vous déjà reçu des informationssur le projet et la manière d'y contribuer ? - Heeft u ooit enige informatie over het project, en hoe u kunt bijdragen aan het project, ontvangen?

	None - aucun - geen	Very little - très peu - zeer weinig	Little - peu - weinig	Some - certains - sommige	Substantial - important - wezenlijk
Amount of information received - quantité d'informations reçues - Bedrag van de ontvangen informatie	☐	☐	☐	☐	☐

Preg.6.- If you have received any information, which way did you receive it? - si oui, de quelle manière? - Zo ja, op welke manier?

_____

Preg.7.- How much do you think the government and politicians are related to this project? - Selon vous, a quel degré le gouvernement et les politiciens sont-ils concernes par ce projet? - In welke mate denkt je dat de regering en de politici te maken hebben met dit project?

	None - Aucun - geen	Very little - très peu - zeer weinig	Little - peu - weinig	Some - certains - sommige	Substantial - important - wezenlijk
Degree of relation - Selon vous, a quel degré le gouvernement est relié à ce projet - Mate van relatie	☐	☐	☐	☐	☐

Preg.8.- Have you noticed an increase in the consciousness of people about sustainability, good governance, social integration and economic growth? - Avez-vous remarqué une augmentation de la prise de conscience des gens à propos du développement durable, de la bonne gestion, de l'intégration sociale et du développement économique ? - Is Je een toename in bewustzijn van het volk opgevallen aangaande duurzaamheid, goed bestuur, sociale integratie en economische groei?

	None - aucun - geen	Very little - très peu - zeer weinig	Little - peu - weinig	Some - certains - sommige	Substantial - important - wezenlijk
Increase in consciousness - Augmentation de la conscience - Verhoging van het bewustzijn	☐	☐	☐	☐	☐

Preg.9.- How much importance these matters should have according to you? - Quelle importance ces questions devraient avoir selon vous? - Hoeveel belang zouden deze zaken moeten hebben volgens jou?

	None - aucun - geen	Very little - très peu - zeer weinig	Little - peu - weinig	Some - certains - sommige	Substantial - important - wezenlijk
Sustainability - développement durable - Duurzaamheid	☐	☐	☐	☐	☐
Good governance - bonne gestion - goed bestuur	☐	☐	☐	☐	☐
Social Integration - intégration sociale - sociale integratie	☐	☐	☐	☐	☐
Economic growth - développement économique - economische groei	☐	☐	☐	☐	☐

Preg.10.- Have you ever contributed to any intiative that contributes to sustainable development? - Avez-vous déjà contribué à des initiatives qui contribuent au développement durable? - Heeft je ooit bijgedragen aan een initiatief dat bijdraagt aan duurzame ontwikkeling?

☐ Yes - Oui - Ja
☐ No - Non - Neen

Preg.11.- If yes, in which one? - Si oui, dans la/lesquelles? - Zo ja, welk initiatief was dit?

_____

Preg.12.- If not, would you be willing to collaborate in one of this projects? - Si non, seriez-vous prêt à collaborer à l'un de ces projets? - Indien nee, zou u bereid zijn om mee te werken in een van deze projecten?

(* Marque una sola opción)

☐ Yes - oui - Ja
☐ No - non - Neen

Population involvement - Participation de la population - betrokkenheid van de bevolking

Preg.13.- To which degree do you believe the actions promoted by agenda 21 are oriented towards all the population? -Croyez-vous que les actions faits par Agenda 21 sont orientées vers toute la population? - Bent u van mening dat de acties die Agenda 21 promoot, zijn gericht op de gehele bevolking?

	None - aucun - geen	Very little - très peu - zeer weinig	Little - peu - weinig	Some - certains - sommige	Substantial - important - wezenlijk
Degree of orientation towards all the population - Degré d'orientation vers toute la population - Mate van oriëntatie op de bevolking	☐	☐	☐	☐	☐

Preg.14.- To which degree do you think each neighborhood of Brussles is being benefited by Agenda 21? - A quel degré pensez-vous que toutes les zones de Bruxelles vont bénéficier de l'Agenda 21? - In welke mate denktu dat wijken in Brussel profiteren door Agenda 21?

	None - aucun - geen	Very little - très peu - zeer weinig	Little - peu - weinig	Some - certains - sommige	Substantial - important - wezenlijk
Centre	☐	☐	☐	☐	☐
Laeken	☐	☐	☐	☐	☐
Neder Over Heembeek	☐	☐	☐	☐	☐
Quartier Nord	☐	☐	☐	☐	☐
Marolles	☐	☐	☐	☐	☐
Senne	☐	☐	☐	☐	☐

Preg.15.- Have you observed any changes in the way in which the program acts in Brussels, Has the program improved over the time? - Avez-vous observé des changements dans les zones où le programme est présent ? Le programme s'est-il amélioré dans le temps ou pas? - Heeft u enige veranderingen gezien in de manier waarop het programma werkt in Brussel? Is het programma gedurende de tijd verbeterd of niet?

☐ Yes - oui - Ja
☐ No - non - neen

Preg.16.- How big do you think is the scope of the project in the region of Brussels? - Quelle est selon vous la portée du projet dans la région de Bruxelles? -Hoe groot denkt u dat de omvang van het project is in de regio Brussel?

	None - aucun - geen	Very little - très peu - zeer weinig	Little - peu - weinig	Some - certains - sommig	Substantial - important - wezenlijk
Scope of the project - portée du projet - Scope van het project	☐	☐	☐	☐	☐

Preg.17.- Do you think that agenda 21 is helping to improve the already existing sustainable initiatives? - Pensez-vous que l'Agenda 21 contribue à améliorer les initiatives durables qui existent déjà? - Denkt u dat Agenda 21 helpt om de reeds bestaande duurzame initiatieven te verbeteren?

☐ Yes - oui - Ja
☐ No - non - neen

Preg.18.- Do you think that the "locals" are involved in the development and realization of the different actions? - Croyez-vous que les citoyens sont impliqués dans le développement et la réalisation des différentes actions? - Denkt u dat de plaatselijke bevolking is betrokken bij de ontwikkeling en uitvoering van de verschillende acties?

☐ Yes - oui - Ja
☐ No - non - nein

Preg.19.- To which degree do you think these factors influence the sustainable development of Brussels? - A quel degré pensez-vous que ces facteurs influencent le développement durable de Bruxelles? - In welke mate denkt u dat de volgende factoren invloed hebben op de duurzame ontwikkeling van Brussel?

	None - aucun - geen	Very little - très peu - zeer weinig	Little - peu - weinig	Some - certains - sommige	Substantial - important - wezenlijk
Economy - l'économie - economie	☐	☐	☐	☐	☐
Politics - la politique - politiek	☐	☐	☐	☐	☐
Inmigration - l'immigration - immigratie	☐	☐	☐	☐	☐
Labor market characteristics - les caractéristiques du marché du travail - arbeidsmarkt kenmerken	☐	☐	☐	☐	☐
Environmental changes - les changements environnementaux - veranderingen in het milieu	☐	☐	☐	☐	☐
Urbanization - l'urbanisation - verstedelijking	☐	☐	☐	☐	☐

Preg.20.- Which of the following characteristics do you think that are the most benefited from Agenda 21 in Brussels? - A quel degré les items suivant ont bénéficié de l'Agenda 21 à Bruxelles d'après vous? - Welke van de volgende kenmerken hebben volgens u het meest geprofiteerd van het Agenda 21 project in Brussel?

☐ Economics - économie - economie
☐ Equality - égalité - gelijkheid
☐ Mobility - mobilité - mobiliteit
☐ Green space - espaces vert - groene ruimte
☐ Other (please specify) - Autre (s'il vous plaît préciser) - Andere (gelieve te specificeren)_____

Preg.21.- Do you know any other project that works with the idea of Sustainable Development and that could be successful in Belgium? - Connaissez-vous d'autres projets qui fonctionnent avec l'idée du développement durable et qui pourraient avoir du succès en Belgique? - Kent u andere projecten die werken voor duurzame ontwikkeling en zouden deze succesvol kunnen zijn voor België?

☐ Yes - oui - Ja
☐ No - non - Neen

Preg.22.- If yes, to which project? - Si oui, quel projet ? - Zo ja, welk project?

_____

Demographic information - informations démographiques - demografische informatie

I kindly ask you to answer the following questions for statistical reasons - Je vous demande de bien vouloir répondre aux questions suivantes pour des raisons statistiques - Ik verzoeken u vriendelijk om de volgende vragen te beantwoorden om statistische redenen

Preg.23.- What is your ethnic origin? - Quel est votre origine ethnique? - Wat is wu etniciteit?

☐ Belgium - Belgique - België
☐ Other (please specify) - Autre (s'il vous plaît préciser) - Andere (gelieve te specificeren)_____

Preg.24.- What is your monthly income? - Quel est votre revenu mensuel? - Wat is uw maandelijkse inkomen?

☐ 999€ or less per month - 999€ ou moins par mois - €1000,- of minder per maand
☐ Between 1000€ and 1999€ - entre 1000€ et 1999€ - Tussen €1000,- en €1999,- per maand
☐ Between 2000€ and 2999€ - entre 2000€ et 2999€ - Tussen €2000,- en €2999,- per maand
☐ Between 3000€ and 3999€ - entre 3000€ et 3999€ - Tussen €3000,- en €3999,- per maand
☐ 4000€ or more - 4000€ ou plus - 4000 € of meer per maand

Preg.25.- How long have you lived in Brussels? - Depuis combien de temps vivez-vous à Bruxelles ? - Hoe lang woont u al in Brussel?

☐ 1 year or less - 1 an ou moins - 1 jaar of minder
☐ Between 1 and 2 years - entre 1 et 2 ans - 1-2 jaar
☐ Between 2 and 4 years - entre 2 et 4 ans - 2-4 jaar
☐ More than 4 years - plus de 4 ans - 4 of meer jaren

Preg.26.- Your work is related directly with the administration of the city of Brussels? - Votre travail est relation direct avec l'administration de Bruxelles? - Is u werk direct gerelateerd aan de gemeente Brussel?

☐ Yes - oui - Ja
☐ No - non - Neen

Preg.27.- If yes, do you work directly with the project of Agenda 21 in the administration? - Si oui, travaillez-vous directement avec le projet Agenda 21 dans l'administration? - Zo ja, werkt u direct mee aan het Agenda 21 project?

☐ Yes - oui - ja
☐ No - non - Neen

Preg.28.- Genre - Genre - Geslacht

- ☐ Masculine - Masculin - Man
- ☐ Feminine - Féminin - Vrouw

Preg.29.- How many children do you have? - Combien d'enfants avez-vous? - Hoeveel kinderen heeft u?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4 or more - 4 ou plus - 4 of meer

Preg.30.- What is your age? - Quel est votre âge? - Hoe oud bent u?

- ☐ 19 or less - 19 ou moins - 19 of minder
- ☐ 20-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50 or more - 50 ou plus - 50 of meer

Thank you very much for taking your time for filing this survey! - Merci beaucoup d'avoir pris de votre temps pour le dépôt de cette enquête - Hartelijk dank voor het nemen van uw tijd voor het indienen van deze enquête!