University for Peace

Masters Program: Responsible Management and Sustainable Economic Development

(RMSED)

Curriculum Development: Sustainable Development

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Abstract

This curriculum is entitled "Sustainable Development" and is to be taught as a short course at the Center for Conflict Management (CCM) of the National University of Rwanda (NUR). It is mainly about sustainable development processes for Rwanda, whereby the three main dimensions of sustainable development, environmental, economic and social, are deeply analyzed both in the Rwandan and general contexts. The three dimensions are also contextualized both in the global and country contexts to enable students to gain wider knowledge and skills in the field. It also includes the teaching methodology, evaluation and assessment of the course throughout the process of learning and teaching. It emphasizes the critical pedagogy of transforming students to be change agents in the field of sustainable development in the Rwandan approach to development.

This research report is submitted in partial fulfillment of the requirements for the degree of Master of Arts, Responsible Management and Sustainable Economic Development.

Declaration of Academic Honesty

I hereby declare that this research report is entirely my own work and that it has not been submitted as an exercise for a degree at any other University.

Signed _____

Name Surname

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Place UPeace

Date 30/6/2011

This curriculum has been submitted for examination with my approval, as the GLP programme academic supervisor.

Signed:.....

Victoria FONTAN

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Degree: Master of Arts, Responsible Management and Sustainable Economic Development (RMSED).

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Dedication

To the United Nations mandated University for Peace (UPEACE) and its affiliated Africa Program based in Addis Ababa, Ethiopia.

To Thomas Klompmaker, head of projects at the University for Peace who thought, among others, to design the Great Lakes Program in order to promote capacity cooperation between UPEACE and universities in Great Lakes Region. He deserves much credit, as well as his Dutch Government who funded the program.

To all people who have devoted the rest of their lives to working for sustainable development.

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List of Acronyms and Abbreviations

AIDS	: Acquired Immune Deficiency syndrome
CCM	: Center for Conflict Management
CEOs	: Chief Executive Officer
CEPL	*: Communaute Economique des Pays des Grands Lac*
DRC	: Democratic Republic of Congo
EAC	: East African Community
ECOWAS	: Economic Community of West African States
ETO	: *Ecole Technique Officiel*
FDI	: Foreign Direct Investment
FDLR	: *Forces Democratiques de Liberation du Rwanda*
GATT	: General Agreement on Trade and Taxation
GDI	: Gross Domestic Investments
GDP	: Gross Domestic Product
GE	: Green Economy
GHG	: Green House Gas
GLP	: Great Lakes Program
GNI	: Growth National Income
GRI	: Global Reporting Initiative
HDI	: Human Development Index
HIPC	: Heavily Indebted Poor Countries
HIV	: Human Immune Virus
ICGLR	: International Conference on the Great Lakes Region
ICT	: Information, Communication and Technology

IISD : International Institute for Sustainable Development

IPCC : Intergovernmental Panel on Climate Change

ISAE : Higher Institute of Agriculture and Animal Husbandry

ISAR : *Institut des Science Agronomique du Rwanda*

ITSSD : Institute for Trade, Standards, and Sustainable Development

IUCN : International Union for Conservation of Nature and Natural Resources

KIST : Kigali Institute of Science and Technology

LDCs : Least Developed Countries

LTIF : Long Term Investment Framework Project

MA : Master of Arts

MDGs : Millennium Development Goals

MINALOC : Ministry of Local Government and Social Affairs

MINECOFIN : Ministry of Finance and Economic Planning

MoH : Ministry of Health

MTEF : Medium-Term Expenditure Framework

NGOs : Non-Governmental Organizations

NIS : National Investment Strategy

NUR : National University of Rwanda

NURC : National Unity and Reconciliation Commission

OECD : Organization for Economic Co-operation and Development

PIP : Public Investment Programs

PRS : Poverty Reduction Strategy

PRSP : Poverty Reduction Strategy Paper

PSCT : Peace Studies and Conflict Transformation

REMA : Rwanda Environment Management Authority

RMSED : Responsible Management and Sustainable Economic Development

SD	: Sustainable Development
SEI	: Stockholm Environment Institute
SIDA	: Swedish International Development Agency
SSA	: Sub Saharan Africa
TNS	: The Natural Step
UK	: United Kingdom
UN	: United Nations
UNCED	: United Nations Conference on Environment and Development
UNCTAD	: United Nations Conference on Trade and Development
UNEP	: United Nations Environment Program
UNEP	: United Nations Environment Program
UNSECO	: United Nations Educational, Scientific, and Cultural Organization
UPEACE	: University for Peace
US	: United States
VCT	: Voluntary Counseling and Testing
WCED	: World Commission on Environment and Development
WHO	: World Health Organization
WSSD	: World Summit on Sustainable Development
WTO	: World Trade Organization

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Chapter One: General or Academic Chapter

(Rationale or Framework)

1.1 Introduction

The introductory section details the contextual conditions for the curriculum and how the course relates to the reality of the field on different levels: International, Regional, Country and University levels.

1.2 International Context

"Sustainability has become a "high table" issue in international affairs, and on many regional, national, and local agendas. Though visions of sustainability vary across regions and circumstances, a broad international agreement has emerged that its goals should be to foster a transition toward development paths that meet human needs while preserving the earth's life support systems and alleviating hunger and poverty – i .e . that integrate the three pillars of environmental, social and economic sustainability" (The International Council for Science, 2002).

The World Commission on Environment and Development in their report entitled "*Our Common Future Report*" defined sustainable development as the kind of development that "meets the needs of the present without compromising the ability of future generations to meet their needs" (1987, p .43). According to the Commission, sustainable development covers the economic, social, political and environmental aspects of the people living in the universe, which must be measured in terms of sustainability, not in terms of economic growth. The achievement of sustainable development requires a new and different approach to thinking, especially by policy makers. The development process of all countries must bear transformative progress in the economic, social, cultural, political, environmental and technological sectors in order to meet the needs of the people while ensuring better quality of life. The ecological system is at the epicentre

of the development programs of a society. People need to be conscious about their geo-ecological setting despite whatever political or economic hardships they may incur. This is a collective responsibility of everyone in the society, as well as globally (1987, pp. 43-48).

Sustainable development processes are only sustainable when basic needs are fully met, reflected in the quality of life that people are living. This is achieved by attaining increased productivity and equitable opportunities among people in their economic, ecological, social and cultural systems. While these aspects are related to economic growth, the reality is that the presence of economic growth does not necessarily mean that there is sustainable development. Growth must be considered alongside social development, economic development, socio-cultural and socio-political developments, as well as ecological sustainability.

The development process in any community should be for the people, by the people and of the people in nature of its future sustainability. Sustainable development should be a positive, long-lasting change in the eyes of the people, and they should enjoy more choices in the consumption of goods and services. Such change must take place in the economic, social/cultural and political institutions of any society, also considering the need for ethics, values and rationality for the future within a responsible system if it is to be sustained.

In addition to the definition of the Brundtland Commission, the New Economics Foundation (NEF) emphasizes sustainable development inspired by three main principles: ecological sustainability, social justice and people's welfare (Saamah et al., 2011). The argument behind the mentioned principles is that all over the world, there are four major problems arising that constrain sustainable development: climate change, the battle for natural resources, rising inequality and unemployment. Nevertheless, the fact that all human economic activities depend on natural resources has prompted people to rethink sustainability by focusing more on the ecosystem. The argument focuses on the need for waste management,

reduction of emissions, promotion of renewable energy and redesigning our commerce system. While these are the core elements of sustainability in the developed world, in the context of the developing world, particularly in the Rwandan case, sustainability goes beyond those elements, as will be explaining in upcoming sections of this curriculum.

Initially, the concept of sustainable development was much more about environmental sustainability (World Commission on Environment and Development, 1987). In other world summits that followed, like the United Nations 2002 World Summit held in Johannesburg, South Africa on sustainable development, there was more emphasis on economic development, social development and environmental protection (IISD, 2002; UN, 2002). The agenda identified integration, information and participation as cornerstone elements to attain development in all corners of the world. The agenda again emphasized the importance of public participation in the decision-making process to promote sustainability in all dimensions. It recommended that both public and private firms change their old ways of doing business and start implementing business practices oriented toward environmental protection and social welfare promotion of the people. On the other hand, related summits like Kyoto of 1997 and the Copenhagen Summit of 2009 were much more focused on global warming and climate change.

It is important to point out that while the Brundtland Commission emphasized the inter-linkages between economic development, environmental protection and population pressure, the different United Nations world summits on sustainable development redesigned the concept and emphasized the inter-linkages between environmental protection, economic development and social development. Although there are no big differences in the main components of the term, the fact that it is defined differently by various entities in distinct contexts has led some to consider it as an expansionist model, whereas to others, it is an ecological model. Contrary to the above and due to increasing globalization and capitalism, sustainable development is all about limiting economic development of the developing nations and their rate of population growth so that the world's super powers can manage and control the

world's natural resources

Michael P. Todaro and Stephen C. Smith in their book, "*Economic Development*, identify three core values of the development process: sustenance, self-esteem and freedom (2009). In other words, development goes beyond economic growth, contrary to the definition of the classical economists who defined development in terms of economic growth or Growth National Income (GNI) (Sachs**,** 2005; Collier, 2007; Boyle & Simms, 2009). Notably, the development process requires resources as one of the factors necessary for it to take place, and those resources are always in scarcity.

Thus, development is related to conflicts within the whole process, and these conflicts should be managed in constructive ways so as to sustain progress for future generations. Therefore, in the context of the developing world, currently referred to as the 'South', many countries are facing a diversity of obstacles to achieving sustainable development due to poverty and structural factors related to social, economic and political institutions. Again, such obstacles differ across regions; for example, countries in Africa have problems more or less different from those in Latin America and the Caribbean, which also differ from those in Asia.

The development of these countries largely depends on the vicious cycles of loans and donations from the World Bank, International Monetary Fund, United Nations affiliated programs, and developed countries, especially those in Europe and North America. However, such donations and loans are always attached to negative conditionalities that in most cases act as a stumbling block to achieving sustainable development (Burton, 1996; Moyo, 2009). For example, a country in the North may condition another country in the South to vote in favor of that country in one of the different United Nations sessions so as to get a loan or donation. By consequence if the country in the South disagrees, then the aid may not be given or relations may even be broken.

Particularly, many African countries are facing challenges in democratization, good governance, human rights violations, corruption, ignorance and illiteracy. Some have suffered from the long civil wars and rebellions that have swept across the continent for a long period of time. Their long-standing impact, wherein human capital and infrastructure are totally destroyed and reduced to zero, is characterized by problems of development contributing to a vicious cycle of challenges from one decade to another. In international trade, these countries face a number of problems that prohibit them from reaching the same level as developed nations. These problems include: relying on only one or two primary goods as their main exports; lack of control over the price they receive for these goods; the price they pay for manufactured goods increases frequently; long term planning is impossible as the value of their exports fluctuates so much; and increasing the amount of the primary goods they produce would cause the world price to fall (McNeill, 2010).

The Organization for Economic Cooperation and Development (OECD) (2001, p.1) points out that:

> [S]ince Rio, there has been progress in developing countries in some key areas, including reducing levels of absolute poverty and increasing attention to environmental issues. In other areas there has been significant deterioration, including water, soil, and bio-diversity. Extreme poverty still ravages the lives of a quarter of the population in developing countries. Such levels of poverty and inequality raise serious issues of sustainability - of peace and security, of equity and solidarity, and of the environment - at the national, regional and global levels.

Finally, it is important to note that technology can promote or destroy the process of sustainable development, be it environmentally, economically and/or socially. It can destroy the process when we don't take into account technology's negative impacts on the ecosystem. For example, how do we account for our environment during natural resource exploitation? Do our companies take in mind their greenhouse emissions to the ozone layer? Do we think about our system of manufacturing commodities? On the other hand, technology can promote sustainability through the protection of the

ecosystem. For example, agriculture needs technological application to increase productivity and transform commercial farming. Technology is also crucial in the management of the ecological system, climate change and economic growth.

1.3. Regional Context

The International Conference on the Great Lakes Region (ICGLR), its headquarters based in Bujumbura, the capital of Burundi, explains that the countries of the Great Lakes Region (Angola, Burundi, Central African Republic, Kenya, Republic of Congo, the Democratic Republic of Congo (DRC), Rwanda, the Sudan, Uganda, the United Republic of Tanzania and Zambia), which, "in their majority have fallen prey over the last two decades to the political instability, lengthy wars and recurring conflicts which have resulted in the numerous displacement of the populations and the destruction of social, economic and industrial infrastructure…" (ICGLR, 2006) have been affected in their progress in the development process and the development of the region as whole. Hence, the sustainable development process has a far way to go in countries like DRC and Burundi, to mention but a few.

In addition, the Rwandan genocide of 1994, has also led to increased socio-political upheavals in its neighboring countries. Especially in the Eastern Democratic Republic of Congo and Burundi, the presence of the Rwandan ex-soldiers and the genocide militias has continued to cause insecurity in these countries. The Swedish International Development Agency (SIDA) believes that, "the dynamic of the conflicts in the Great Lakes Region is complex. The conflict in DRC contains both national and regional components. The regional component is connected with the 1994 genocide in Rwanda. A domestic conflict is ongoing in Burundi with ramifications in DRC" (2004, p. 8). Therefore, there are limited chances to concentrate on developmental projects and programs in their countries. Moreover, the large amount of funds that could have been used in development activities is directed to security or to military operations and training.

The genocide militias that took refuge in the eastern part of the Democratic Republic of Congo have continued to cause insecurity by killing people, raping women, violating human rights and destroying infrastructure in the region. Neighbouring Burundi has witnessed a long civil war that continues today, weakening progress in development. Uganda's National Resistance Army also continues to cause insecurity in the northern province of Kivu, blocking all development initiatives in the DRC and in the northern part of Uganda, where they still have some combatants hiding in forests and among collaborators in the villages. To ascertain the above argument, paragraph two of the preamble for Dar-Es-Salaam Declaration on Peace, Security, Democracy and Development in the Great Lakes Region emphasizes that they are:

> deeply concerned about the endemic conflicts and persistent insecurity caused or aggravated by, inter alia, illegal traffic of small arms and light weapons, proliferation of armed groups, organized crime, impunity of war crimes, genocides and other crimes against humanity, massive violations of human rights and other policies of exclusion and marginalization, use of violence for conquering and conserving power, mistrust and suspicion between governments, illegal exploitation of natural resources, economic stagnation and poverty aggravation; recognizing the efforts made at national, regional and international level to resolve these endemic problems (International Conference for Peace, Security, Democracy and Development in the Great Lakes Region, 2004).

The 2590th European Union Council Meeting noted that:

> they strongly believe that the success of the Disarmament, Demobilization, Repatriation, Reintegration, and Resettlement of foreign armed groups, including Rwandan combatants (former FAR, Interahamwe and FDLR) and the Disarmament, Demobilization and

> Reintegration of Congolese soldiers and combatants is closely linked to the political progress in the transition period and that its successful implementation will be an essential element for restoring peace in the whole region (European Union, 2004).

This position demonstrates that the European Union is taking a leadership role in starting to think about the sustainable development of the region.

Despite the fact that the region is still faced with political wrangles in parts of many countries, there are some governments that have begun the process of sustainable development, focusing on social, economic and environmental aspects with relevant policies. These include: Uganda, DRC and Sudan. Again, there are countries like Rwanda, Tanzania, Kenya and Zambia that have laid out solid mechanisms, though distinct from one another in nature and actions that aim to promote the sustainable development of those nations. Among the policies already in place are: environmental protection and conservation policies, waste management measures and mechanisms of waste treatment, and regulating companies that pollute the environment, to mention but a few. On the other hand, the process remains challenged in many ways, including: limited funds, corruption and bad governance, limited human capacity in the field, limited or poor technological capacity to link environmental protection with sustainable development, etc.

1.4 Country Context

On the country level, the 1994 Rwandan War and Tutsi genocide markedly worsened life conditions and poverty, as well as destruction of infrastructure. By then, the country had to start from scratch without water, electricity, good infrastructure, and without human resource capacity, either in the public or private sector. By 1997, the country had somewhat stabilized its security dimension and was deeply focusing on economic recovery, where the government, private sector and NGOs had started

implementing policies aimed at reducing the poverty rate, which started at 65% and was reduced to 56% in 2006 (MINECOFIN, 2008). Although the situation has since improved for half of the population, poverty is still widespread, especially among the rural population. A large number of Rwandans live in rural areas, owning only small portions of land due to land scarcity, and some are even landless.

Households are mostly headed by women because their husbands were targeted and killed during the genocide; in other households, their husbands are still exiled or in prison for having committed genocide and other crimes against humanity in the 1994 genocide. Other households are headed by children, again due to having lost their parents; and for some, their parents are still in exile or in prison. The elderly and disabled also account for a significant percentage, since youth were mostly targeted in the genocide. Many of those who were not killed were seriously maimed for life.

According to SIDA (2004), in Rwanda's "national analysis of poverty, job opportunities, membership of associations and access to microcredit have been identified as the most important factors for reducing poverty". Rwanda Vision 2020 points out that, "although Rwanda has made significant progress from the devastated nation that emerged from the 1994 genocide, it still remains a severely under-developed, agrarian based economy with around 60% of the population living under the poverty line" (Republic of Rwanda, 2000, p. 4). Nevertheless, despite the setbacks of 1994-1997 and economic recovery after that period, the Swedish International Development Agency (SIDA) writes that:

> The Rwandan economy fell to pieces in connection with the 1994 genocide. Great progress has been made since regarding macroeconomic indicators. Between 1995 and 2001 growth was on average 6 per cent. In 2002 the economy grew by 9.4 per cent. At the same time, inflation was held back throughout, for example in 2002 inflation was only 2 per cent…. The economy is heavily dependent on aid. The tax base is narrow but has been broadened. There are at present limited chances of further increasing tax

> revenue. Rwanda's extensive foreign debt and consequent debt service is a heavy expenditure item in spite of the fact that the country receives debt relief within the framework of the Heavily Indebted Poor Countries (HIPC) debt initiative (2004).

From 1994 - 2000, the country was facing an internal budget deficit and external balance of payments deficit, unemployment and underemployment, macroeconomic disequilibria, low rates of savings and investments, plus a low export rate (Republic of Rwanda, 2000). Other problems faced by the country in general include: "diminishing agricultural productivity and arable land distribution; natural barriers to trade; narrow economic base; weak institutional capacity; low level of human resource development; public debt; social and economic consequences of the 1994 war and Tutsi genocide" (MINECOFIN, 2000).

To that end, the Rwanda's Vision 2020 is to fundamentally transform the nation into a middle-income country by the year 2020. This will require achieving an annual per capita income of US$900 by the year 2020, reducing the poverty rate by 30% and an average life expectancy of 55 years (Republic of Rwanda, 2000). In 2000, Rwanda´s per capita income was US $290, the poverty rate was 64% with an average life expectancy of 49 years (MINECOFIN, 2000). The MINECOFIN annual report of 2009 showed that per capita income had increased to US $450 and the poverty rate had been reduced to 57%. This indicates that there are achievements as far as the targets to achieve the Vision 2020 are concerned, as well as achieving the global millennium goals. The following table indicates the main pillars of the vision 2020 that will contribute to achieving the above transformation, leading toward a sustainable development process.

Table 1: Pillars of VISION 2020 and its crosscutting areas

Pillars of Rwanda's Vision 2020	Cross-cutting areas of Vision 2020
1.Good governance and a capable state	1. Gender equality 2. Protection of environment and sustainable natural resource management 3. Science and technology, including ICT
2. Human resource development and a knowledge based economy	
3. A private sector-led economy	
4. Infrastructure development	
5. Productive and Market Oriented Agriculture	
6. Regional and International Economic integration.	

Source: Republic of Rwanda, 2000, p. 11.

The pillars reflect all dimensions of sustainable development in the Rwandan context. There is great progress being made towards achieving these pillars as well as the Millennium Development Goals as stipulated in the United Nations Agenda for Development in reference to the Summit that took place in September 2000, at the UN Headquarters, attended by 192 Heads of State and Governments. The sectors that have achieved progress include: environmental protection, waste management, education, gender promotion, health, science and technology, promoting the private sector, modernizing agriculture and animal husbandry. Poverty reduction has been the major concern, but the rate at which it has been reduced did not meet expectations due to a variety of constraints, such as limited financial means, high literacy rate in rural areas, resistance to change particularly in rural areas, and increasing population growth at 2.82 per annum despite the effort of educating the population about family planning

(MINECOFIN, 2010).

The United Nations Development Report in the document entitled, *"Turning Vision 2020 into Reality: From Recovery to Sustainable Human Development",* adds that "in order to overcome the trap of decreasing agricultural productivity, poverty and population growth, Rwanda will need a "Big Push" of investments across a range of key sectors, so as to ease the bottlenecks to long-term economic development" (United Nations Development Report Rwanda, 2007, p. 1). In the same line of argument, Rwanda has revised all the laws and regulations regarding investment in the country in order to promote a favorable business environment. Among the laws that have been passed and published in 2009 are: Company Law, Labor Law, Secured Transactions in Movable Property and Insolvency Law. In 2010, the country was ranked second in the world for reforming business, a sign that the country is progressing, as far as trade and investment are concerned, in promoting economic development and social welfare of the citizens.

Again, In terms of trade and commerce, the country has made progress in the region despite unfavorable conditions in the international trade system. Within this context, the United Nations Conference on Trade and Development (UNCTAD) and the Ministry of Trade and Industry of Rwanda in their document entitled, "Rwanda's Development-Driven Trade Policy Framework" assert that:

> The Government of Rwanda has emphasized the need to develop a comprehensive trade policy as an integral part of the country's overall development plan and strategy, especially in light of the immense structural weaknesses of Rwanda's trade activities, many of which are a result of deeper constraints in supply and productive capacities. The trade policy would also be oriented to addressing challenges emerging from the global economic crisis combined with the ongoing global food crisis, volatile energy prices and climate change. The trade policy aims to contribute to building a strong, resilient economic base over the normal functions of economic development, centered on the core pillars including economic

> aspects (infrastructure, investment, macroeconomic, microeconomic, enterprise, technology, etc.); development and good governance; social development; environmental and climate change; gender; and private public sector collaboration… (UNCTAD, 2010, p. vii).

Currently, the government of Rwanda is undertaking various policies, measures and projects to reduce poverty and meet the Millennium Development Goals for sustainable development. Agriculture is considered to be a main driver of development for the rural population. Since the majority of the population depends on agriculture and animal husbandry as the most important economic activities, t citizens are being supported to transform this sector. For example, people are being educated to practice commercial instead of subsistence farming, farmers are being provided with fertilizer for free, and there are efforts to encourage land terraces all over the country given its hilly terrain. Farmers are being encouraged to rear cross-breed cows instead of the local breeds, and poor families are being given such cows for free in line with poverty reduction (MINECOFIN, 2008).

As far as fighting poverty in the country, there is a lot that is being done on the policy level, and many projects are in progress. This analysis explains about two main projects that work at the grassroots level to fight poverty in rural areas and among the common population. These two projects are: 'one cow per family' and '*Ubudehe*'. Where local leaders at District, Sector and Cell[1] levels are accountable to the people, these projects have reduced poverty in a quantifiable and visible manner. *Ubudehe* is defined as:

> The traditional Rwandan practice and cultural value of working together to solve problems. The literal origins of the word describe the practice of digging fields before the rains come and the planting season arrives. A group of households join together to dig their fields; acting

[1] A sector is the third administrative level and cell is the second lowest administrative level in Rwandan local administrative levels.

> collectively to share the burden of the work and make sure that everyone is ready in time for the planting season. The concept of ubudehe is very inclusive, covering men and women and all social groups including the Batwa. It can also extend to those who are too poor or incapacitated to take part in the collective action. After the group has completed their fields they move on to the fields of those who have not been able to participate directly. A successful harvest is then celebrated with un'ganura made from collecting together donations from everyone's first harvest (MINALOC, 2004, p. 1).

Like Gacaca, as a traditional way of solving conflicts in the society, the Ubudehe project is an initiative of the Ministry of Local Government and Social Affairs (MINALOC). It was revived as a way to foster collective action at the community level. MINALOC states that:

> It is designed to work with and reinforce the ongoing political and financial decentralization process and to provide a direct infusion of financial capital into the rural economy, aimed at overcoming one of the main obstacles to pro-poor economic growth. The key strength and innovation of this process is the direct link to the planning and budgeting processes of formal government structures (2004, p. 2).

This project is aimed at empowering people to empower themselves as self-agents in the development processes of the communities. It supports them in participating in the identification of their economic, social, political and environmental needs in all planning dimensions. In some cases, they can even manage some funds that are directly intended to improve their welfare. For example, constructing bridges and schools can be done by themselves supported by government engineers. That way, the money is paid to them, instead of circulating to those who already have it. Those with skills are the ones who benefit most from such programs; and those without skills provide labor, which can be very beneficial in some circumstances.

"One cow per family" is a project initiated by the President's Office to help curb poverty among the poorest people. The main objective is to help families with animal husbandry, supporting milk production and providing fertilizers to improve their agricultural activities. The project has a two-sided advantage in the sense that it provides income and improves agricultural production. Since 2004, over 3.000.000 cross- and high-breed cows have been distributed among households all over the country (MINALOC, 2010; MINECOFIN, 2010).

In education, in 2000, enrolment in primary school was 72%; in 2007, it was 80%; in 2009, it was 92%; and in 2010, it was 93% due to free universal primary education (UNDP Rwanda, 2009; NISR, 2010), whereas in secondary school the number of students increased due to nine years' basic education, whereby no child pays tuition fees. Girls' enrolment in primary school is more than boys' enrolment. From secondary education to higher institutions of learning, science and technology have been supported and improved. For example, female students with the highest performance in secondary schools are given prizes by the government as a way of encouraging them to study the sciences. The best performers after secondary school completion are given scholarships to study outside Rwanda, namely in the US, UK, India, and South Africa, to name a few. Even those in Rwandan higher institutions of learning are given better opportunities than those undertaking arts and humanities, as they pay lower tuition fees, for example. This shows the government's commitment to promoting science and technology toward the sustainable development of the country. However, the government is also encouraging inequality in disciplines, as if sciences are the only studies that can lead to the development of the nation.

In a nutshell, there are other many programs at the grassroots level working to fight poverty, in addition to favorable policies and programs at the national level. Problems remain regarding limited land and its terrain, high illiteracy rate, overpopulation and the colonial heritage of ethnicity, which is still reflected

among people both inside and outside the country, and which is a stumbling block to the economic development of the country. It is within this context that this curriculum is designed to help Rwandans improve their knowledge and skills in the field of sustainable development. It will provide more relevant information on the current needs of development vis-à-vis the realities of the world. It will target more specifically the practitioners, who, in their daily activities, work with the middle income earners, and the local population, who, in most cases, find themselves lost in the current world of information, capitalism, today's financial crisis and globalization.

1.5 Local – University Specifics

The National University of Rwanda (NUR) has a variety of faculties, schools and centers that strive to support the government toward promoting a sustainable development process in Rwanda. The sustainable development plan is also reflected in the University's mission: "to generate and disseminate high quality multi-disciplinary knowledge and promote effective research, skills training and community service for national competitiveness and sustainable socio-economic development". Such departments that teach disciplines related to this curriculum include: Faculty of Economics and Management, Department of Development Studies in the Faculty of Arts, Media and Social Sciences and the Center for Sustainable Development and Environmental Protection, to mention but a few. In short, this curriculum fits within the mission of the National University of Rwanda.

The only particularity for this curriculum is that it will be taught as a short course at the Center for Conflict Management (CCM) of the National University of Rwanda (NUR), an exception to the University as a whole, where there are not any short courses being offered; in fact, within the entire country, this will be the first short course intended to target people who work in the field of development.

1.6 Programme Details

Table 2: Programme Details

Programme Title	Short course on Sustainable Development
Exit Awards	Certificate
Modes of Attendance	Full-time
Resource Group	Center for Conflict Management (CCM)
Year of Commencement	2012

1.7 Programme Administration

Table 3: Programme Administration

Programme Organizer/Leader	Prof. Paul Rutayisire
Programme Implementation team	
Name	**Institution**
1. Prof. Paul Rutayisire	CCM/NUR
2. Dr. Sentama Ezkiel	CCM/NUR
3. Elly Musafiri	CCM/NUR
4. Jean Bosco Habyarimana	CCM/NUR

1.8 Course Description

This curriculum is designed to provide a broad understanding of sustainable development in general. The course will analyze the different theories, practices and policies in the setting of attaining sustainable development. This curriculum will discuss various sessions that reflect both national and international development issues: environmental, economic and social. The main contents of the curriculum have

been prepared in the context of national and international settings, and practical examples will be given in relation to what is feasible in the Rwandan context as a country committed to attaining sustainable development in various aspects by 2020, according to Rwanda's Vision 2020.

1.9 Main Goal

The main goal of this curriculum is to provide knowledge and skills in the field of sustainable development. The three main aspects of sustainable development, environmental, economic and social, will be analyzed on both the international and national levels.

1.10 General Objectives

The general objective of this curriculum is to provide students with a wider understanding of the concept of sustainable development. The specific objectives will include:

1. Providing theoretical and practical knowledge in the field of sustainable development;
2. Facilitating students to link such knowledge to the Rwandan realities where applicable in the process of attaining sustainable development;
3. Identifying the challenges of attaining sustainable development within the Rwandan context and its realities.

1.11 Intended Learning Outcomes

After completion of the curriculum, beneficiaries are expected to gain knowledge, skills and values in the field of sustainable development. The table below indicates the output profile of the people who will benefit.

Table 4: Intended learning outcomes

Skills	Values	Knowledge

Understanding the field of sustainable development To critically understand various approaches and models in national and international development policies. Understanding the challenges of development	Gender sensitivity in sustainable development Owning the process of sustainable development	Creativity Open-mindedness in sustainable development Practical knowledge Reinvention of traditional knowledge to achieve sustainable development. For example, Ubudehe project in poverty reduction

1.12 Contents

Session #	Readings
Section One	
Session One and Two: General Course Introduction	**Required Readings** 1. Pieterse, N. J. (2007). *Development Theory: Deconstructions/Reconstructions*. London: Sage Publications. (Chapters One & Two, pp. 1-31). 2. Todaro, P. M., & Smith, C. S. (2003). *Economic Development*. (8th Edition). Boston: Addison Wesley. (pp. 1-32). 3. MINALOC. (2001). *Community Development Policy*. Kigali: Image Media. (pp. 1-20). **Recommended Readings** 1. Krueger, R., & Gibbs, D. (2007). *The Sustainable Development*

	Paradox: Urban Political Economy in the United States and Europe. New York: The Guilford Press. (pp. 1-60).
Section Two: Environmental Dimension	
Session Three: International environmental policies	**Required Readings** **1.** The World Commission on Environment and Development. (1987). *Our Common Future Report***.** Oxford: Oxford University Press. (pp. 1-60). 2. IISD. (2002). *Ten+Ten Sustainable Development Successes and Failures***.** New York: United Nations. (pp. 1-6). 3. UN. (2002). *The Road from Johannesburg: What Was Achieved And the Way Forward.* New York: United Nations. (pp. 1-8).
Session Four: Environment and sustainable development	**Required Readings** 1. Buchholz, A. R. (1993). *Principles of Environmental Management: The Greening of Business.* New Jersey: Prentice Hall. (Chapter One, pp. 1-26). 2. Jacobs, M. (1999). Planning Sustainability. In Kenny, M. & Meadowcroft, J. (Eds). *Sustainability and Markets: on the Neo-classical model of Environmental Economics.* New York: Routledge Publishers. (pp. 78-100). 3. Storm, S. (2009). Capitalism and Climate Change: Can the Invisible Hand Adjust the Natural Thermostat?. In *Development and Change.* Volume 40, No. 6. (pp. 1011 – 1039).

	Recommended Readings 1. Noel, P. (2001). *Understanding Ethics*. Australia: The Federation Press. (pp. 1-40). 2. OECD. (2001). *Strategies for Sustainable Development: Practical Guidance for Development Co-operation*. New York: OECD. (pp. 1-3).
Session Five: Green economy	**Required Readings** **1.** UNEP. (2010). *Green Economy Report: A Preview*. Paris: St-Martin-Bellevue. (pp. 1-24). **2.** United Nations Environment Programme. (2010). *Green Economy: Driving a Green Economy Through Public Finance and Fiscal Policy Reform*. Working paper Version 1.0. (pp. 1-14).
Session Six: Sustainability tools and principles	**Required Readings** 1. Blewitt, J. (2008). *Understanding Sustainable Development*. London: EarthScan. (pp. 41-50 and pp. 173-198). 2. Wakernagel, M., & Rees, W. (1996). *Our Ecological Footprint: Reducing Human Impact on the Earth*. Ontario: New Society Publishers. (pp. 9-12).
Section Three: Economic Dimension	
Session Seven: Trade and sustainable development	**Required Readings** 1. Baumol, J. W. & Blinder, S. A. (1994). *Economics: Principles*

	and Policy. (6th Edition). London: The Dryden Press Harcourt Brace & Company. (Chapters One and Two, pp. 1-40). 2. Meyer, M. (2010). *LDCs' Trade and Investment Challenges: A Report and Action Plan of a Group of NGOs in view of the Istanbul Summit of Least Developed Countries in May/June 2011. International Center for Trade and Sustainable Development*. Geneva: International Center for Trade and Sustainable Development (pp. 1-43).
Session Eight: Private sector and sustainable development	**Required Readings** 1. McDonough, W., & Braungart, M. (2002). *Cradle to Cradle: Remaking the Way we Make Things***.** San Francisco: North Point Press. (pp.130-182). 2. Natrass, B., & Altomare, M. (2001). *The Natural Step for Business***.** Ontario: New Society Publishers (pp.1-29). **Recommended Reading** 1. Blewitt, J. (2008). *Understanding Sustainable Development.* London: EarthScan. (pp. 120-143).
Session Nine: Agricultural transformation for sustainable development	**Required Reading** 1. Wilson, A. (2009). *Agriculture and Sustainable Development: Policy Analysis on the Great Plains*. Manitoba: International

	Institute for Sustainable Development (IISD). (pp. 1-45). 2. Waldron, A. S. (2009). *Modernizing Traditional Agriculture in China through the Development of Higher Value Agrifood Chains: The Case of the Beef Industry*. Thesis Submitted for the Degree of Doctor of Philosophy Conferred by the University of Queensland in 2009. Faculty of Natural Resources, Agriculture and Veterinary Science, The University of Queensland. (pp. 1-30).
10. Science and technological innovation versus sustainable development	**Required Reading** 1. Gilberto, C. G. (2002). *Science and Technology for Sustainable Development*: *A Latin American and Caribbean Perspective*. Santiago: United Nations (pp. 1-33). Beder, S. (1994). *The Role of Technology in Sustainable Development: Technology and Society*. Vol. 13, No. 4. (pp. 14-19).
Section Four: Social Dimension	
Session Eleven: Education and sustainable development	**Required Reading** 1. Szirmai, A. (2005). *The Dynamics of Socio-Economic Development: An introduction*. Cambridge: Cambridge University Press. (pp. 1-33). 2. Huckle, J., & Sterling, S. (1996). *Education for Sustainability*. London: Earthscan Publications Ltd. (pp. 1-50).

Session Twelve: Gender and sustainable development	**Required Reading** 1. Reynolds, F., & Goldsmith, E. J. (1999). *Women and Sustainable Development – From Local to International Issues*. Issue No. 3. UNED-UK. 2. Hemmati, M., & Gardiner, R. (2002). *Gender and Sustainable Development. World Summit Papers of the Heinrich Böll Foundation, No. 10*. Berlin: Heinrich Böll Foundation. (pp. 1-40). **Recommended Reading** 1. United Nations. (1999). *Trade, Sustainable Development and Gender*. Papers prepared in support of the themes discussed at the Pre-UNCTAD X Expert Workshop on Trade, Sustainable Development and Gender (Geneva, 12-13 July 1999). (pp. 1-30).
Session Thirteen: Health and sustainable development	**Required readings** 1. World Health Organization. (1997). *Sustainable Development and Health: Concepts, Principles and Framework for Action for European Cities and Towns*. WHO Regional Office for Europe, Copenhagen: WHO. (pp. 1-40). 2. Ministry of Health. (2009). *Annual Report for 2008*. Kigali: MINISANTE. (pp. 1-50).
Session Fourteen: Field	

trip	
Session Fifteen: Group Presentations	

1.13 Methodology

At least three days prior to the commencement of the course, the materials with a detailed syllabus will be available, containing all information related to the course, including required readings and recommended readings. Before the beginning of the course, students will have the obligation to read carefully the reading materials and attend classes prepared to participate actively during the course. The teacher will promote critical learning and thinking in a systemic way for students to be encouraged to provide practical and relevant examples to the course content so as to better understand the concepts, principles, methods and underlying challenges in sustainable development, especially in the Rwandan and African Great Lakes Region context.

A diversity of learning and teaching methods will be applied to promote student-centered learning and critical pedagogy. The teacher will follow the students closely so as to promote critical thinking and develop critical knowledge within the young generation, who is expected to foster change in the future.
The methods to be applied include: lectures, group discussions and presentations, group seminars in different groups, co-facilitation between students and teachers, learning by posters, video clips accompanied by discussions, and finally, guest speakers will be invited to provide their practical experiences in the process of attaining sustainable development. One of the proposed guest speakers will be Nyirangarama Enterprises, a very famous enterprise in Rwanda and in the East African Economic Community.

Use of PowerPoint presentations by the teacher is one of the methods to be applied. The lecture will be

one-and-a-half hours, and the remaining time will be given to students to share some experiences related to the field and to ask questions or give comments as well as suggestions for improvement in knowledge sharing.

Students will be divided into different working groups, and they will have to discuss the assigned work and make short presentations. Every student in the course will have to contribute to the group presentation either by presenting, commenting or even providing additional input to others. This will be a prerequisite and mandatory for all the students in the course.

Co-facilitation between students and lecturer(s) will be communicated to students in advance so that they first read the work they are supposed to facilitate. Prior to the beginning of the class, students will first meet the lecturer so as to discuss what to facilitate and methods to be applied. It will be an obligation for the lecturer to follow closely the facilitation by the students and they may clarify in detail some issues that students may not fully exhaust over the course of the class.

In order to stimulate students' perceptions, understanding and analysis of issues, films and/or short videos will be used as one of the teaching materials. The Students will have to watch the films and/or video clips that are relevant to the course, and later will be asked to share their analysis or perceptions so as to deepen their level of analysis and understanding of realities on the ground.

Last but not least, a well-detailed schedule will be prepared in advance for students to debrief the previous class proceedings. This will provide a comprehensive and analytical framework for improvements by the teacher to facilitate students to better understand the content, using the following teaching materials:

1. **Readings -** The readings will include:
    - Text books

- Journals
- Relevant articles both published and unpublished

2. Resources

a) Websites

b) Short film

1.14. Evaluation

In accordance to the academic regulations of the National University of Rwanda, both evaluation for the lecturers and the students is a must in the university's pedagogical framework. Student evaluation is important to find out whether they have understood the main elements of the course in general. At the same time, evaluation for the lecturer is there to find out whether he/she meets the requirement to teach that course or if the kind of knowledge and skills given to students is relevant to the realities on the local, national, regional and international levels.

1.14.1 Criteria

Students' evaluation will include: regular verification for attendance, in-course assessment, assignments, presentations, debriefing on the previous sessions, writing reflection papers, participation and analysis in films and short video clips, and writing final papers. See the detailed description for each, below:

1.14.2 Tools of evaluation

The following are the detailed tools of the course evaluation from beginning to end.

a. **In-course assessment -** Every student will be graded based on her/his participation in the different class sessions. They will be given readers in advance so as to prepare themselves before coming to class. The more a student participates and gives relevant or practical examples will accord him or her certain assessment performance.

b. **Class assignments and presentations -** It is obligatory for all students to participate in all sessions and assigned work. After one week following the course commencement, students will be a given an assignment as group work, and at the end of a course, students will be given an individual final paper. Students will be encouraged to participate to a certain extent in the class presentations, since one's participation will accord him/her a certain grading.

c. **Debriefing class proceedings -** Students will be divided into two groups so as to debrief on the previous class proceedings. Each group will be given a certain amount of time to present to others what they have learned from the previous sessions, followed by time to receive criticism, questions and comments on the given information. This gives the teacher a chance to evaluate how students have fully grasped the course content and may provide a way of revising the teaching methodology.

d. **Watching films or short video clips-** Students will be provided some films and/or movies to watch in reference to the realties in sustainable economic development either on national or international setting. After this activity, students will be required to provide their content analysis on what they will have analyzed in the film.

e. **Reflection papers -** Students will be requested to write one reflection paper of 300 words in the middle of the course.

f. **Field visits -** All students will have to participate in the field visit which will take place at the end of the course. Every student will have to write a reflection paper of 250 words about the field

trip and submit the reflection paper in no more than two days from the day when the trip is carried out.

g. **Final paper -** Students will have to write a final essay of 2500-3000 words as a final evaluation. This will have to be a scientific paper, and they will be given topics in due course. It will be evaluated as 50% of the course grade and submitted three days after the course ends.

h. **Evaluation forms** - At the end of the last session of the course, students will be given forms to fill out so as to evaluate the capacity of the teacher. This will examine his/her performance in terms of critical knowledge presented to students, and whether or not it is relevant in reference to the local, national, regional and international levels.

1.15 Assessment pattern

Table 5: Assessment pattern

No.	Component	Weighting (%)
1	Attendance regular verification	5
2	In- course assessment and analysis from the visual session	10
3	Class assignments and presentations	20
4	Debriefing class proceedings	5
5	Reflection papers	10
6	Reflection on field visit	10
7	Final paper	40

	Total	**100%**

1.16 Bibliography

The teaching resources for the course will include the following:

1. Chapters from text books
2. Selected textbooks
3. Handouts
4. Resources from the web
5. Articles from journals
6. Film and/or short videos
7. Relevant and comprehensive unpublished work
8. Magazines

CHAPTER TWO: ADMINISTRATIVE CHAPTER

2.1 Specific course title

The course title is "Sustainable Development."

2.2 Course code

The course code will be determined later.

2.3 Prerequisites (for students).

None

2.4 Course length

Each session will be three hours per day continuous. Every week students will have to cover 15 hours of course sessions. The course will be taught over a period of three weeks.

2.5 Credits

The course is a three-credit course

2.6 Course meeting times and place

The time for the course will be from 5:30pm to 8:30pm in the evening. The course venue will be at the

National Commission for the Fight Against Genocide premises where the Center for Conflict Management (CCM) of the National University of Rwanda (NUR) runs its Masters Programme in Peace Studies and Conflict Transformation. The hall will be communicated to students in advance.

2.7 Intended participants

Participants will be students who are admitted into the programme. They will have a background in any social sciences discipline or with at least three years in the related field of development.

2.8 Where the course fits within the general program of studies

The course fits in the first semester of the academic year in the short course programme as well as in the university's mission and vision.

2.9 Assessment

The assessment of this course will include:

- Regular class attendance
- Student's participation in the class and in group work assignments
- Final paper of 2500 – 3000 words

2.10 Language of instruction

The language of instruction will be English only. Students shall fulfill the requirements of being fluent in the English language. Despite the fact that Rwanda has been a French speaking country, today English is truly becoming an official language of instruction from primary school to the higher institutions of learning. Those who have studied in the French system with little proficiency in the English language will

be given an intensive English training after being admitted to the programme so that they will be able to fulfill the requirements. Notably, such facilitation and support is provided by the National University of Rwanda in the undergraduate and postgraduate programmes in all Faculties, Schools and Centers at zero cost to students.

2.11 Special requirements

The library for the Center for Conflict Management of the National University of Rwanda is already equipped with different text books and journals in the field of Peace and Conflict Studies because it is already running a Masters Programme in Peace Studies and Conflict Transformation (MA PSCT). Given the fact that the MA in Peace Studies and Conflict Transformation is supported by the Gothenburg University in Sweden, the Center has access to the University's online library, which will allow the students in the programme to access the already existing materials. Nevertheless, CCM, as a research and teaching center, has itself published a lot of work related to building sustainable peace, and all of those publications in the field of Peace and Conflict Studies are set in the Rwandan context. As such, these publications will serve as catalysts to providing knowledge of peace building within the Rwandan context.

2.12 Academic writing regulations

Students will be advised to read carefully the plagiarism policy. Plagiarism in any form is completely prohibited and punished by the laws of the National University of Rwanda. Any work of any author either published or unpublished has to be acknowledged and cited, as well as referenced at the end.

2.13 Respect for views of others

Students must respect the views of others even if their views may not be relevant to the class discussion or even carry any meaning in normal life. Academic criticism is encouraged for students to grow intelligently and to comprehensively share knowledge that is beneficial to intellectual development.

2.14 Habitual tardiness

Students must be in class on or before the official start time, unless any unforeseen incident makes them unable to be on time. Habitual late attendance will affect their grade in class participation.

2.15 Late submission of assignments

Students will be advised in advance to submit their assignments to the Administrative Assistant of the Center for Conflict Management based in Kigali, on time or before deadline. Any student who will not submit assignments on time will not be graded, unless they obtain prior permission for late submission from the Center for a valid reason. Without sound reasons, such assignments will not be accepted and the student will have to redo the course at a later date.

2.16 Attendance

Attendance will be mandatory as applied to other teaching programs of the Center. Any student who does not attend at least 20% of the total hours as prescribed in the by-law of the postgraduate programs at the National University of Rwanda will not be permitted to do the final paper, unless the Center and Postgraduate Executive Board decide otherwise for acceptable reasons.

2.17 Instructor's biography

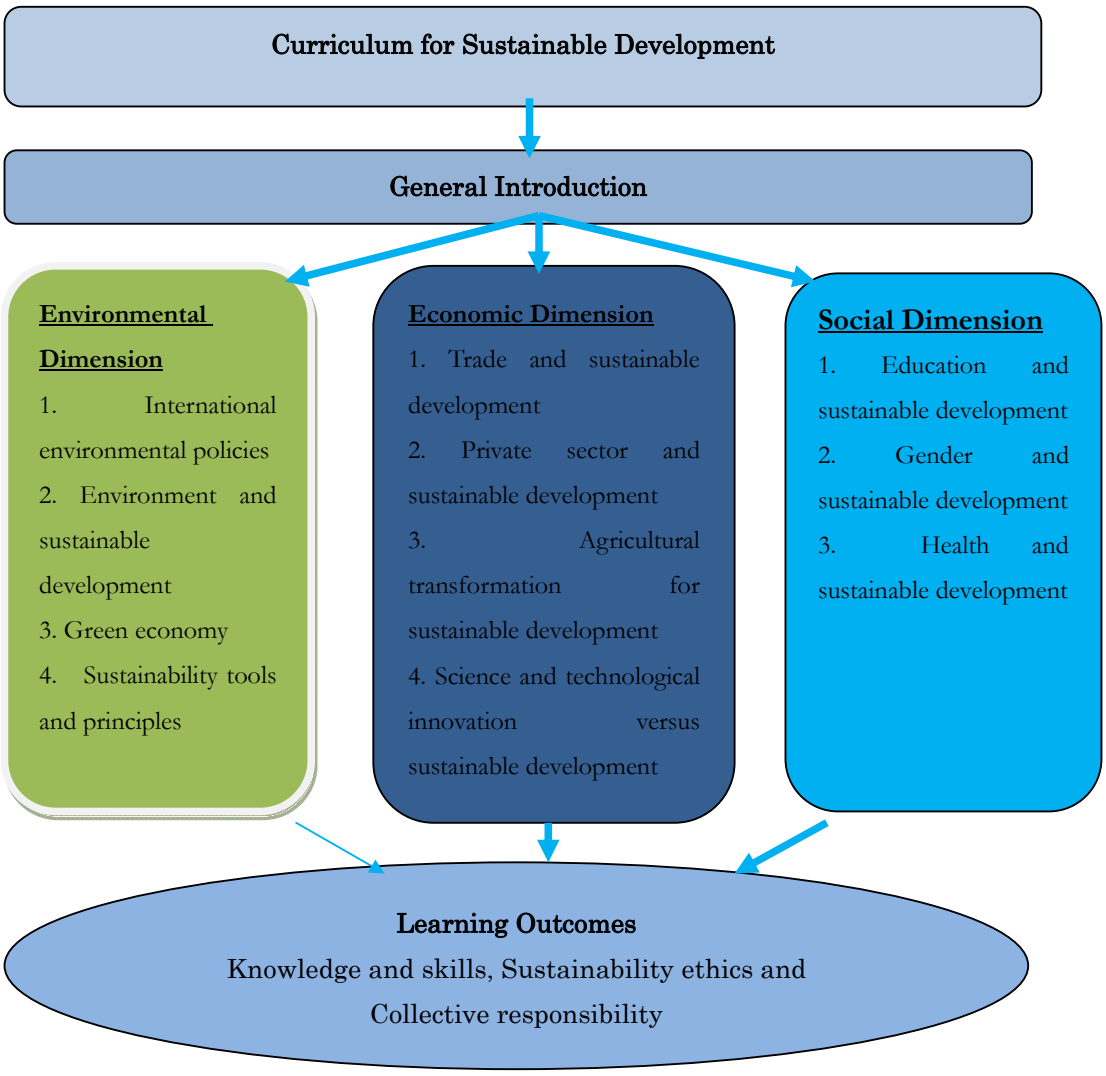
Mr. Elly Musafiri
MA Responsible Management and Sustainable Economic Development
Junior Researcher and Assistant Lecturer, Center for Conflict Management (CCM)

CHAPTER THREE: TEACHER'S MANUAL

Structure of the curriculum

Sustainable development encompasses three main aspects of life: environmental, economic and social. Therefore, this short course curriculum will cover the three aspects with both an international and Rwandan national perspective and within both contexts, as is elaborated in the following sessions. It has four sections: General Introduction; Environmental Dimension; Economic Dimension and; Social Dimension.

Figure 1: Structure of the Curriculum



The curriculum is also made up of the following sessions with reference to the above sections:

Section One: General introduction

Sessions one and two: General Course Introduction

Section Two: Environmental dimension

Session three: International Environmental Policies

Session four: Environment and Sustainable Development

Session five: Green Economy

Session six: Tools and Principles

Section Three: Economic Dimension

Session seven: Trade and Sustainable Development

Session eight: Private Sector and Sustainable Development

Session nine: Agricultural Transformation

Session ten: Technological Innovation and Sustainable Development

Section Four: Social Dimension

Session eleven: Education and Development

Session twelve: Gender and Sustainable Development

Session thirteen: Health and Sustainable Development

Session fourteen: Field Trip

Session fifteen: Group Presentations

SECTION ONE: General Course Introduction

Sessions One and Two: General Course Introduction

3.1.1 Objective

To understand the evolution of development and its current trend of sustainability as well as Rwanda's approach to sustainable development.

3.1.2 Session Contents

The session is composed of the following sections:

- Introduction
- Theory of development
- Evolution of development
- Concept or meaning of sustainable development
- Analysis of different dimensions of development
- Rwanda's approach to sustainable development

3.1.3 Intended learning outcomes

At the end of the session, students will be able to:

- Understand the meaning of development and its evolution into the current trend of sustainable development.

- Understand the meaning of sustainable development in a general context as well as Rwanda's approach to sustainable development.

3.1.4 Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with a brief course introduction and academic discussion on the readings
Discussions based on the readings (30 minutes)	Two students co-facilitate the discussion with the teacher
General discussion (30 minutes)	The teacher moderates the discussion with interactive student participation.
Group discussion and presentations (One hour).	Students will be divided into three groups and will present their notes.

3.1.5 Notes for the teacher

a. Introduction

This session intends to understand the concept of development, its evolution, the concept of sustainable development and its different dimensions, as well as Rwanda's approach to sustainable development. It is a general introduction to the course that specifically aims to analyze the concept of development and its evolution into the current model of sustainable development. The concepts of 'development' and 'sustainable development' must not be viewed differently, but rather as two parts of the process from one trend to another.

b. Theory of development

Development has been defined differently by researchers and politicians since the 18th century. It has been defined based on economic principles and in light of the roles that political science and sociology have played in promoting development. For example, Modernization Theory tried to explain development as a linear process through which every country must pass, citing the example that poor countries should pass through the same process that industrialized nations used. The main principle in this theory is that all developing nations should get aid from the developed nations so as to learn from their experiences of progress.

However, this principle is irrelevant given that not all developed nations used the same processes of development; each country had its own model of development even though strategies were the same. In the 1950s, Dependency Theory emerged to advocate that developing nations break ties with the developed nations to concentrate on their internal growth. On the economic side of it, there have been economic explanations and theories that explain the process of development. Some of theories include: comparative advantage, Rostow's Stages of Development, and the Malthusian Theory about population and development, to mention but a few.

Comparative Advantage is based on the principle of specialization where a country can produce goods that the other does not produce so that they may trade amongst themselves. Rostow's Stages of Development are linear in nature and he proposes five stages that every country must pass through. The stages are: traditional society, preconditions for take-off, take-off, drive to maturity, and high mass consumption. Malthusian Theory is largely based on population growth and economic growth, and he believes that population is growing faster than economic growth. His model was first published as "An

Essay on the Principle of Population", one of the earliest books on population and economic development.

In a traditional way, it meant generating and sustaining an annual increase in the Gross National Income (GNI) at rates of perhaps 5% to 7% or more in a country. During the 1950s and 1960s, developing nations realized that although they were achieving economic growth, a majority of their populations remained in absolute poverty, signifying that the definition of growth was not holding any meaning. Then in the 1970s, development was being defined in terms of poverty reduction, inequality and unemployment within the context of the growing economy (Todaro & Smith, 2003).

During the 1990s, development was about the improvement of human welfare. By then, most people aspired to "higher standards of living, longer lives, and fewer health problems: education for themselves and their children that will increase their earning capacity and leave them more in control of their lives; a measure of stability and tranquility; and the opportunity to do the things that give them pleasure and satisfaction" (Harrison, 1998, pp. 231-232). Todaro & Smith (2003, p. 22) conclude that development "is both a physical reality and a state of mind in which society has, through some combination of social, economic, and institutional processes, secured the means for obtaining a better life." For Todaro and Smith (2003, p. 23), development has three objectives:

- To increase the availability and widen the distribution of basic life-sustaining goods such as food, shelter, health and protection;
- To raise levels of living, including, in addition to higher incomes, the provision of more jobs, better education, and greater attention to cultural and human values, all of which will serve not only to enhance material well-being but also to generate greater individual and national esteem; and

- To expand the range of economic and social choices available to individuals and nations by freeing them from servitude and dependence not only in relation to other people and nation-states but also to the forces of ignorance and human misery.

In their definition and objectives of development stated above it is clear that they emphasize the new paradigm of economics, economic growth and social welfare of the people. At the same time, however, the aspect of environmental protection and its link to development economics and social welfare are totally absent, signifying that they emphasize weak development, or development without sustainability. This analysis is based on the argument that all economic activities and the social welfare of humankind depend on environmental aspects, which is a relevant part of the field of sustainable development.

c. Evolution of development

Development is said to have begun with the industrial revolution in Great Britain during the 18th and 19th Centuries, where agriculture, mining, manufacturing, transportation and technology had a profound impact on the socio-economic and cultural conditions of the people. The concept of development then spread to different parts of Europe and North America. At the same time, the field of development has been motivated by different stakeholders: people, trade unions, firms and industries, NGOs, Western powers, the United Nations, thinkers, etc.; and through different disciplines like sociology, economics and political sciences, to name a few.

Since the beginning of the 18th Century, the development discourse was influenced by the sociology of development and development economics, mainly through great thinkers of the time. Pieterse (2007, pp. 38-39) states that:

> The term 'development theory' suggests a coherence that in fact is hard to find. What we do find is plethora of competing and successive currents, schools, paradigms, models and

> approaches, several of which claim to exclude one another. For start, development theory refers to two terrains which have tended to converge only at certain junctures: development sociology and development economics. Further more or less obvious distinctions run between theory and ideology and practice.

Certainly, as there were great discoveries in different dimensions like technology, transport facilities, manufacturing, etc., academicians also influenced the level and dimensions of development to best suit the people economically, socially and politically. One of the writings of the time that influenced development was *The Wealth of Nations* by Adam Smith, who was interested in the development of capitalism. He was followed by Karl Marx, who was somewhat criticizing capitalism because of the inequality that was being created between the bourgeoisie and the proletariat. Pieterse (2007, p. 97) states that:

> Classical and modern development thinking was fundamentally structuralist: the emphasis was on the large-scale patterning of social realities by structural changes in the economy, state and the social system. This also applies to critical development thinking of the time, which was informed by Marxism, which in its orthodox forms is basically structuralist.

Throughout the 1950s and 1960s, development was seen in terms of fighting poverty, reducing the population growth rate and building strong state institutions. In the following decade, throughout the 1970s, development was still viewed in terms of poverty reduction, reducing income inequality between the rich and poor, as well as reducing unemployment rates that were high across developing nations. This trend of development was guided by the World Bank and Western states that supported these nations (Todaro & Smith, 2003). By then, three models of economic growth were emphasized: the production function, the saving function and the labour supply function (related to population growth).

During the 1970s, development was defined in terms of growth and measured in terms of GNP per

capita. Gradually, the meaning of development changed as people's needs continued changing, such as human needs, health, education, literacy and housing matters. Development grew to be defined in accordance with 'people's choices and human capacitation. Writers like Sen (1985), for example, wrote about the shift from an emphasis on growth to a focus on people's choices and improving the capacities of the people. The Human Development Index became a standard of measurement. This is when people-centered development came into existence (Pieterse, 2007, p. 97). There have been many development theories starting with the beginning of the 19th Century. The following table provides a summary of development theories in relation to global hegemony.

Table 6: Development Theories

Development thinking	Historical context	Hegemony	Explanation
Progress, evolution	19th Century	British empire	Colonial anthropology and Social Darwinism
Critical development	1890-1930s	Colonialism	Classical political economy
Modernization	Post war boom	US hegemony	Growth theory, structural functionalism
Dependency	Decolonization	Third world, nationalism, G77	Neo-marxism
Dependency	Decolonization	Third world, nationalism, G77	Neo-marxism
Neoliberalism	1980s	Globalization, Finance and cooperate capital	Neoclassical economics, monetarism

Source: Pieterse, (2007, p. 7).

Nevertheless, development in developing countries during the 1990s had different development dimensions, as follows:

Table 7: Actors in the field of development during the 1990s

Institutional	State	IFIs	UN system	Civil society
Structure	Governments, ministries, South and North	IMF, World Bank	UN agencies	NGOs
Infrastructure	Bureaucracies, interest groups, parties, factions, citizens	WTO, G7, central, international banks	UN General Assembly, governments, ILO, WHO, etc.	People, social movements, trade unions, firms, churches, etc.
Locations	Capitals, etc.	Washington, DC	New York, Geneva, Paris, Nairobi	Dispersed
Development Thinking	Economics (neoclassical to Keynesian) and human development	Neoclassical economics, monetarism, neoliberalism	Human development	Alternative development (post-development)
Disciplines	Economics, Political Science	Economics	Economics, Political Economy, Political science	Sociology, anthropology, ecology, gender and cultural studies

Source: Adopted from Pieterse (2007, p. 10).

From the mapping of the development field above, several points follow, as noted by the author:

Box 1: Development Mapping

1. It is not really possible to generalize about development – the question is, whose development? Different stakeholders have different takes on the meaning of development and how to achieve it. This is not a minor point but a fundamental circumstance. Development intrinsically is a field of multi-level negotiation and struggle among different stakeholders;

2. Schematic as it is, this outline may enable us to fine-tune thinking about the relationship between power and knowledge in development;

3. The field is in flux. Thus, the World Bank has been shifting position repeatedly in view of policy failures and political pressures and trends;

4. New concerns and priorities that are broadly shared by development stakeholders – such as globalization, poverty alleviation, gender awareness, environmental management – prompt new combinations and partnerships that crosscut 'boxes';

5. Emergencies occur that make for crosscutting alliances and approaches – such as complex emergency, humanitarian, conflict prevention and post-conflict reconstruction. In this light this kind of map is already overtaken on the ground, which serves as a reminder that the map should not be mistaken for the territory.

Source: Adopted from Pieterse (2007, p. 10).

Due to the growth of industries, technology and innovation geared toward development in the 19th and

20th Centuries, such developments had a major impact on the environment due to the high greenhouse emissions into the air and their negative impact on climate. The ozone layer was almost destroyed due to emissions and climate change was a serious discourse by the beginning of the 1990s. The growth of industries and factories, as well as the rise of science and technology affected human development and natural resources, which also affected the economic and social development of people. The development path in which all dimensions of life - environmental, economic, social, health, etc. - were being affected due to economic activities that had no sustainable future in mind, proved unsustainable itself. Consequently, the United Nations General Assembly in 1983 passed a Resolution 88/161 and an independent commission was established: the Brundtland Commission. This World Commission on Environment and Development (WCED) was commonly known by the name of its Chair, Gro Harlem Brundtland. Their report was released in 1987, defining sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their needs" (WCED, 1987, p. 43).

Five years after the release of the Brundtland Report in 1987, the United Nations thought of helping governments rethink economic development and find ways to halt the destruction of natural resources, and to that end, the Earth Summit was held in Rio de Janeiro in 1992. The Summit lasted for two weeks and was the climax of the process that began in December 1989 toward planning, education and negotiation among all UN Member States to come up with the Agenda 21 (Agenda for the 21st Century) in order to achieve sustainable development. Notably, different world summits followed in the different years; for example, Social Development held in Copenhagen in 1995, the Fourth World Conference on Women held in Beijing in 1995, Housing and Settlement held in Istanbul in 1996, Food Security held in Rome in 1997, the Kyoto Protocol of 1997 and the World Summit on Sustainable Development held in Johannesburg in 2002.

d. The meaning of sustainable development

The concept of sustainable development is not as new as people may think. It dates back to the prominent economists of the 19th Century, like Malthus and David Richardo. It was first reflected in the Malthusian theory of population. President Abraham Lincoln of the United States of America who held leadership from March 1861 until in April 1865 – the period he was assassinated, once said that a positive paradigm of sustainable development is a bottom-up, de-centralized (rather than a top-down, centralized) representative democratic approach to economic, political and social governance, emphasizing free markets, the rule of law, and institutional checks and balances.

Different scholars agree with the definition of sustainable development by the Brundtland Commission's Report of 1987 by the United Nations, which states that "making development sustainable so as to meet the needs of the present without compromising the ability of future generations to meet their own needs". Sustainable development encompasses three different dimensions: social, economic and ecological (Susan Baker, 2006, p. 6). In her book, Baker identifies normative principles of sustainable development: common but differentiated responsibilities, inter-generated equity, intra-generational equity, justice, participation and gender equality.

Huckle and Sterling (1996, p. 2), quoting the International Union for Conservation of Nature and Natural Resources (IUCN) and the United Nations Environment Program (UNEP) (1991), defines the following: "Sustainable development means improving the quality of life whilst living within the carrying capacity of the supporting ecosystems". James Meadowcroft (1999, p. 16) quoting Lafferty (1996) clarifies and points out that:

> As sustainable development has passed into the idiom of international political interchange it has come to be associated with a set of normative principles including a

> concern to meet human needs, especially the urgent developmental needs of the poor: the protection of environmental resources and global life-support systems; the integration of economic and environmental considerations in decision making; encouragement of popular participation in environment and development-related processes; and recognition of the common but differentiated needs and responsibilities of the countries of the North and South.

Also, the United Nations Educational, Scientific, and Cultural Organization (UNSECO) adds that sustainable development has been "developed around three key areas: society, environment and economy; with culture as an underlying dimension" (UNESCO, 2009, p. 2). Baker (2006, p. 6) explains how the Brundtland Commission defined sustainable development. It defined sustainable development as "mainstream thinking about the relationship between the environment and development".

However, Meadowcroft criticizes sustainable development by saying that "since sustainable development focuses upon the maintenance of development momentum, it does not necessarily entail the preservation either of existing environmental systems or of prevailing social structures and practices" (1999, p. 16). The Stockholm Environment Institute (SEI) believes that for man to address the increasing contemporary issues of development and environmental concerns in order to attain sustainable or durable development, we urgently need valid scientific knowledge, relevant polices and welfare focus (Forrester, et al., 2009). Huckle and Sterling (1996, p. 2) state that a community that has achieved sustainable development must be characterized by the following, as indicated in the box:

Box 2: Characteristics for sustainable development

(1) Resources are used efficiently and waste is minimized by closing cycles;

(2) Pollution is limited to levels that natural ecosystems can cope with and without damage;

(3) The diversity of nature is valued and protected;

(4) Where possible local needs are met locally;

(5) Everyone has access to good food, water, shelter and fuel at reasonable cost;

(6) Everyone has the opportunity to undertake satisfying work in a diverse economy; the value of unpaid work is recognized, whilst payments for work are fair and fairly distributed;

(7) People's good health is protected by creating safe, clean, pleasant environments and health services that emphasize prevention of illness as well as proper care for the sick;

(8) Access to facilities, services, goods and other people is not achieved at the expense of the environment or limited to those with cars;

(9) People live without fear of personal violence from crime or persecution because of their personal beliefs, race, gender or sexuality;

(10) Everyone has access to the skills, knowledge and information needed to enable them to play a full part in society;

(11) All sections of the community are empowered to participate in decision-making;

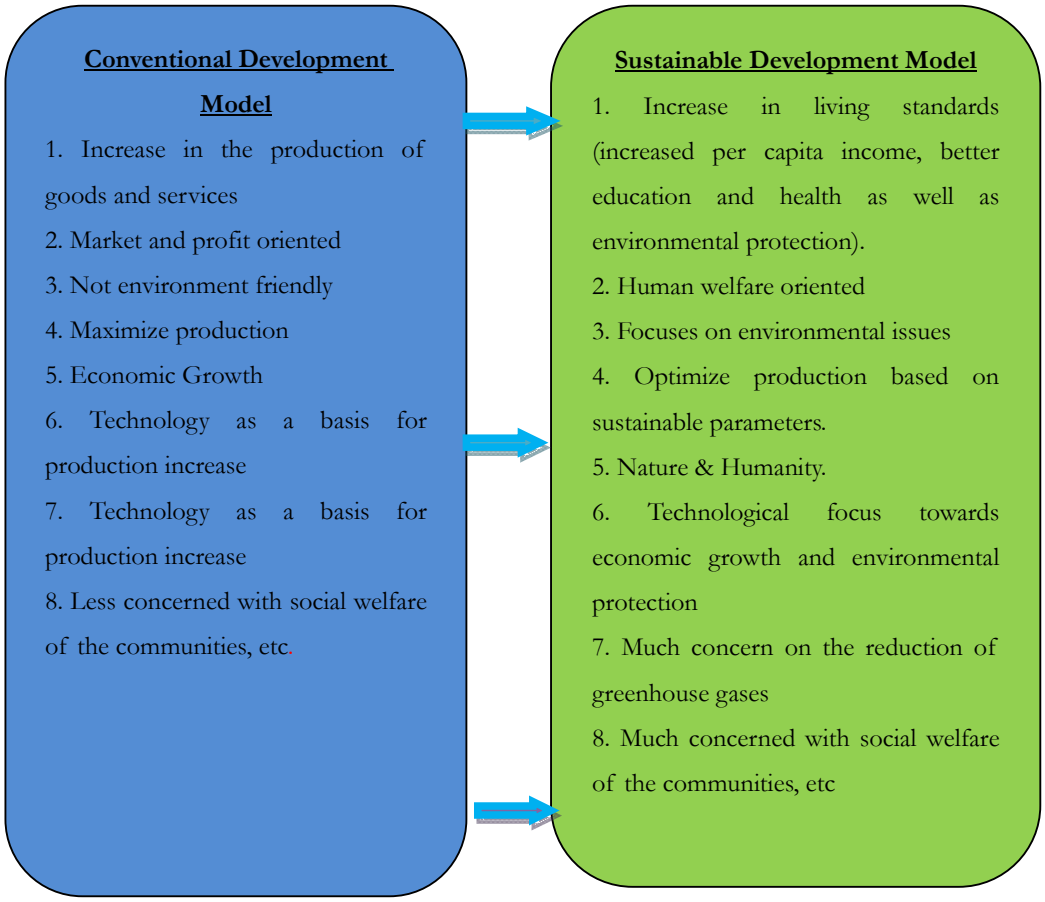
(12) Opportunities for culture, leisure and recreation are readily available to all;

(13) Places, space and objects combine meaning and beauty with utility.

Source: Adopted from Huckle & Sterling (1996, p. 2).

These arguments by Huckle and Sterling are relevant to the Brundtland Commission Report of 1987 and contents of the Rio Declaration on Environment and Development of 1992. Again, they also reflect the Johannesburg Declaration on Sustainable Development or the Earth Summit 2002, which provides measures and policies to be adopted by governments to achieve sustainable development both in policy making and practice. Finally, the following table provides the transition of economic development to sustainable development:

Figure 2: Transition of development to sustainable development



Source: Todaro & Smith, (2003).

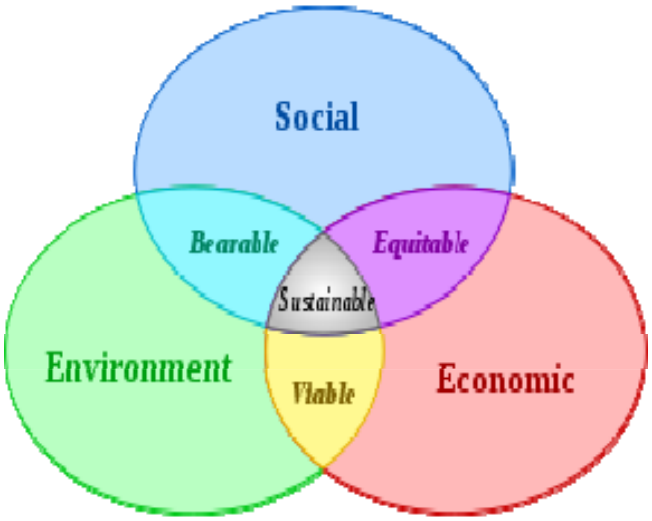
The figure above shows the transition from the conventional model of development to the current model of development, which seeks to focus on the social, economic and environmental dimensions of sustainable development, which are also coupled with the New Economic Foundation's paradigm that focuses on the three dimensions but also advocates for personal and social welfare development.

e. Analysis of different dimension of sustainable development

For sustainable development to take place in any society of the globe, a positive paradigm must be emphasised in light of environmental, economic, social, political and technological dimensions. The positive paradigm must embrace the needs of the future generations and provide greater opportunities for better and equitable welfare of the people. The Institute for Trade, Standards, and Sustainable Development (ITSSD) based in the United States of America, argues that "to achieve this paradigm, we emphasize the importance of economic growth, free markets, the rule of law, strong intellectual property rights, scientific discovery, technological innovation, and the establishment of balanced, science-based and cost-effective national regulatory and standards systems"(ITSSD, n. d).

This positive paradigm is somewhat different from the Brundtland Commission of 1987, which greatly emphasized the relationship between the environment and sustainable development. The process of sustainable development encompasses environmental, economic and social aspects. These aspects should be equitable, bearable and viable (Adams, 2006). This is illustrated in the following diagram:

Figure 3: Dimensions of Sustainable Development



Source: Mirian Vilila. (2010). Sustainable development – Session two: *Envisioning a Sustainable Society*. Lecture Notes, Department of Responsible Management and Sustainable Economic Development, University for Peace.

The figure above shows the different dimensions of sustainable development. With reference to this curriculum, the environmental dimension includes environmental policies, rules and regulations, green economy, water and soil management, waste management, etc. The economic dimension includes: trade, agriculture, public finance, accounting, etc.; whereas the social dimension includes: education, gender, health, etc.

f. Rwanda's approach to sustainable development

a) Introduction

The aftermath of the 1994 genocide and insurgencies that followed during the years 1996-2000, was not conducive for real GDP growth, whereby GDP grew at over 10% per year as the economy recovered from a low base. This was followed by a period of stabilization mainly from 2001-2006 during which real GDP growth was realized. Additionally, Rwanda is committed to the process of sustainable development and has participated in all of the World Summits on Environmental Protection and Sustainable Development whereby the resolutions of the meetings have been incorporated into the government' policies and laws, both on the national and local levels. Consequently, there is a link between such policies with achieving the MDGs by 2015. Therefore, the country's sustainable development approach is highlighted in Rwanda's Vision 2020 and PRSP government documents, as analysed below, both at the national and community levels.

b) National level approach

The country's approach to sustainable development is reflected in the government's documents, like Vision 2020 and PRSP aimed at poverty eradication as well as attaining sustainable development. Rwanda, being a developing country, has a number of challenges to attain sustainable development: Diminishing agricultural productivity and arable land distribution; Natural Barriers to trade; Narrow economic base; Weak institutional capacity; Low level of human resource development and Public debt; and Social and Economic Consequences of the Genocide (Republic of Rwanda, 2002). The Rwanda's Vision 2020 and PRSP (2002) cover the three main aspects of sustainable development, environmental, social and economic dimensions: Protection of environment and sustainable natural resource management; ICT and technological innovation; Fighting poverty and hunger; Productive and Market Oriented Agriculture; Improved health care and combating HIV/AIDS; Regional and International Economic integration; Human resource development and a knowledge based economy; and A private sector-led, environmentally friendly economy.

Rwanda's Long Term Investment Framework Project (LTIF) towards sustainable development is comprised of six main dimensions and 30 programs, all reflected in Vision 2020 and PRSP documents, and partly connected to achieving the (MDGs), which is also reflected in their medium-term strategies for development of 2002 - 2015, as indicated in the Vision 2020 document. Examples include decentralisation programs, poverty reduction from 67% to 50%, promoting health systems and improved medical care, etc. In practice, a lot has been achieved but there still remains a lot to be attained, mainly in economic development and private sector-led development, with environmental protection as the main focus. The following table shows Rwanda's LTIF:

Table 8: Rwanda's Long Term Investment Framework (LTIF)

Intervention areas	Programs
1. Governance	1. Good governance 2. Defence 3. Police and prisons 4. Administrative buildings 5. Administrative and financial management
2. Justice	6. Reinforcement of the justice system 7. Human rights and penal justice
3. Infrastructure	8. Energy 9. Water and sanitation 10. Soil protection, irrigation and water resource management 11. Transport infrastructure 12. Community Development Fund (CDF) infrastructure
4. Production chains	13. Agri-business production chains 14. Non-agricultural production chains 15. Diversification and food security chains
5. Structural transformation	16. Support for the non-agricultural private sector 17. Regional growth poles 18. ICT 19. Vocational training, technical and professional education 20. Engineering, Science and Technology 21. Reinforcement of projects' execution capacities 22. Environment

	23. Entrepreneurship
6. Social sector	24. General education 25. Health 26. Population 27. Urban development, lands management and shelter 28. Community development 29. Gender, family, youth and other social affairs 30. Culture, sports and arts

Source: Adopted from MINECOFIN, (2002).

The above six dimensions are explained in depth in the Vision 2020 and PRSP documents of the Rwandan government. They all reflect Rwanda's long-term development strategy to attain sustainable development. The government has borrowed from "Singapore's Development Model" of private sector development, although the private sector is not so active in the country. Private sector promotion is at the verge of development in the country.

In order to make Rwandan Vision 2020 and Rwandan PRSP a reality and to achieve sustainable development, the country has adopted a new approach of planning which is based on central and local governments in partnership with the local communities. The context is as follows: Vision 2020; National Investment Strategy/Long Term Investment Framework; Poverty Reduction Strategy; Sector[2] strategic plans; District development plans; and Medium Term Expenditure Framework. The context had never existed in Rwanda's planning process as indicated in the historical country planning process:

[2] A sector is the third lowest local administrative level in the new Rwandan administrative levels.

Table 9: Rwandan historical planning process

Period	Process of planning
1966 – 1986	Centralized planning: Interim Emergency Plan, 2nd and 3rd Five -Year Plan for Economic, Social and Cultural Development
1986 – 1994	Participatory communal planning was considered, though never applied due to the lack of qualified personnel and socio-political disturbances
1994 – 2002	Short-term planning instruments (Structural Adjustment Program, Public Investment Program, emergency and rehabilitation programs)
2002 – present	Development of PRSP, Vision 2020, Sector strategies, and District / Province development plans

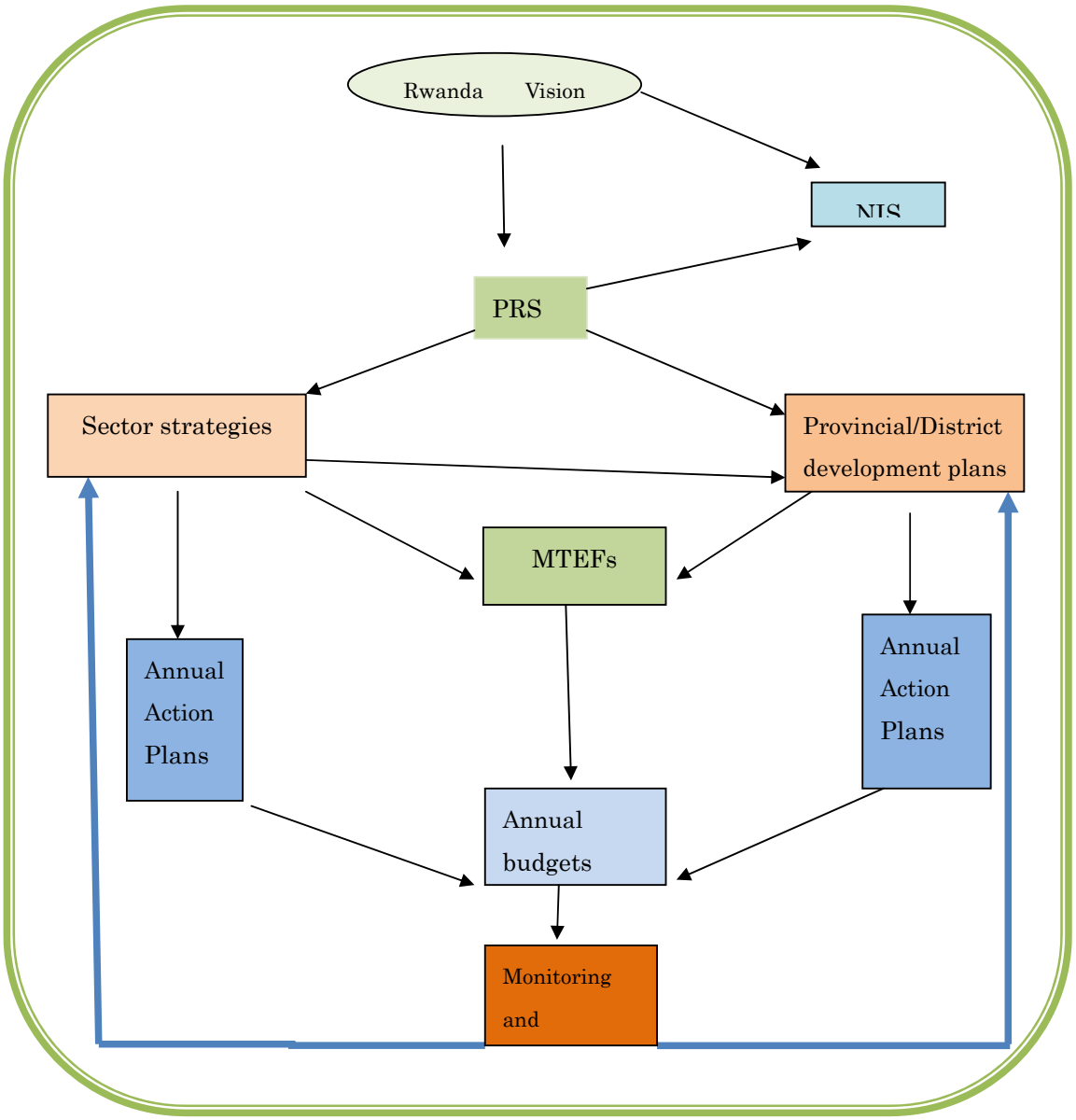
Source: Adopted from MINACOFIN, (2002).

The table indicates the planning process that characterized Rwanda since independence days up to date. From 1966 – 1986, the government's planning was based on the central government, it was not decentralized. They had what they called 2nd and 3rd five-year plan for economic, social and cultural development. The environment was not a concern in their planning. During 1986 – 1994, participation of the community was considered but not implemented on the local level due to a lack of qualified personnel and socio-political and socio-economic disturbances. The civil war and genocide of 1990-1994 also had an effect on the planning process, as well as on the economy. When the genocide of 1994 ended, the new government embarked on a process of short term planning instruments, such as structural adjustments programs, public investment programs (since all public assets were destroyed during the war), as well as rehabilitative programs across the country.

After stabilization of the country and the economy in 2002, the government of National Unity

embarked on medium-term and long-term development programs. The government's Vision 2020 and PRSP of 2002 detail the long-term development plans of the country where central and local governments participate actively in the planning process. The approach is both a top- down and bottom-up process to enable the local community to participate in their own development agendas. Development needs are identified by the local communities at the lowest administrative level.

Fig 4: Converting Vision 2020 into a reality as a development approach



Source: MINICOFIN, 2002

As indicated on the figure above:

> "Long-term aspirations of the Vision will translate into medium-term programs of the National Poverty Reduction Strategy (PRS) as well as the National Investment Strategy (NIS). The PRS is operationalized through medium-term sector strategies that will inform provincial and district development plans. The sector strategies and the decentralized development plans will be implemented through the Medium-Term Expenditure Framework (MTEF); three-year fully integrated budgets that mainstream the Public Investment Programs (PIP) of these agencies and translate into concrete action plans accounted for through annual budgets. The poverty reduction achieved through the MTEF will be monitored and will feed back into the elaboration of sector and provincial plans" (MINECOFIN, 2002, p. 21).

c) Community Empowerment for Sustainable Development: a critique for the local government (at District, Sector and Cellule administrative levels) in Rwanda.

Like in other African countries, Rwandan communities are still facing difficulties in attaining sustainable development despite the high commitment by the central government to help communities empower themselves. The local government has not been fully aware that community participation in needs assessment and problem identification in their development process is of paramount importance. Empowerment is not impossible without their participation, which also affects the sustainable development process. A process of identifying their needs, problems and development objectives provides them the ability to allocate their resources and establish ways to best handle their development agenda.

However, due to the government's commitment to empower local communities socially, economically and environmentally, there are some groups in some communities that have joined hands in identifying issues that affect their wellbeing, as well as finding solutions to those issues. This initiative is through the Ubudehe[3] project where people are becoming responsible for their sustainable development journey. The challenge remains where the government lacks technicians or social workers to work with these communities, who may act as facilitators, enablers, or guides in the process of the community's welfare system and sustainable development. District and Sector employees in most cases are inefficient, corrupt, irresponsible and uncountable in supporting communities in development. Some of them are after their own benefits of survival since their salary is just a drop in a river. They spend much of their time looking for other sources of income, or just surfing the web for those who have internet in their offices. The government should resolve this if Rwanda is to achieve what is contained in Vision 2020.

The process of sustainable development in communities should be one that deals with human needs, taking the environment into consideration. The process must work to prevent or alleviate people's problems and improve the quality of life for all people in a certain setting. Communities should be seen as people who are able, willing and with a vision to work toward their ideas. Some people cannot survive without the existence of these local communities - they are there for their communities and their communities are there for them. People working with these communities should create a reciprocal relationship to make sustainable development happen.

We must view these communities as people who can manage to solve their own problems, but the local government and some practitioners are reluctant to be aware of such important assets in a community's sustainable development. Bradford et al. (1994, p. 95), citing Combs (1969) found out that: "effective helpers tended to view clients as able rather than unable, worthy rather than unworthy, internally

[3] Uhudehe is the traditional Rwandan practice and cultural value of working together to solve problems.

motivated rather than undependable and helpful rather than hindering". The primary task for the local government, as well as development practitioners at the district and sector levels should be one of helping communities to discover these potentialities and make use of them. The task should be based on a planned change that assures familiarity, skills and expertise of the practitioners based on planned intervention.

d) MINALOC's Approach to Sustainable Development on Community level

Sustainable development is not a new phenomenon in Rwanda. It is reflected in the community development policy of May 2001, launched by MINALOC. The policy recognizes community organization as the basis for community development. The Vision 2020 and PRSP (2008 - 20012) recognize this role as vital for Rwanda's development process toward sustainable development, where local communities must play a leading role in reducing poverty (MINALOC, 2001; MINICOFIN, 2002). Therefore, to ascertain the above argument, MINALOC, (2001, p. 5) asserts that:

> "there is a need to involve the community in decision-making because, the community has therefore, never had an opportunity to exercise its powers in decision making in affairs concerning community's own development. This was because of the situation of dependence accentuated by humanitarian intervention during the emergency period, which followed the war and the genocide".

The Ministry's document again clarifies that the government has set out the following strategies to promote community organization for development: Setting up a network for collection and circulation of functionally necessary information, encouraging the emergence of organizational dynamism, ensuring the participation of client communities in community organization and making them responsible for

their development, increasing production through improvement of production of available resources, setting up a community development fund and ensuring rigorous financial management, including profitable population for more transparency.

Working procedures for the local government and development practitioners should have common goals to allow local communities to have access to information, knowledge and to other resources necessary for development. They should also work to stimulate their minds toward innovation and entrepreneurship within grassroots structures (MINALOC, 2001, p. 3). Roberts (2000, p. 65) highlights that: "…engagement of the community members in their welfare organization activities must reflect the community's needs and resources if sustainable development is to be achieved." Finally, community development for sustainable development in the Rwandan context must transform itself in light of the various deep-rooted problems that beset Rwanda as a country since the Rwandan war and 1994 Genocide.

e) A critique for the approach

The government's approach to development, as well as sustainable development is clear and understandable as contained in the Rwanda Vision 2020 and PRSP 2002 documents. All the dimensions of sustainable development are indicated, but the two documents do not explain issues related to waste management and reducing toxic gases produced by the public or private industrial companies. The government has embarked on a process of regulating hygienic and sanitary issues across the country, where no waste can be found on the streets of the cities, for example, and plastic bags have been completely abolished in the country since 2007 for environmental protection and sanitary reasons. The approach does not describe how landfills in Kigali City will be improved and managed. There are no policies directed towards reducing toxic gases produced by companies or industries, illustrating the

weakness of the approach.

3.2.6 Evaluation procedure for sessions one and two

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learned or gained from the class teachings and discussions
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in the critical thinking related to the class
Group discussions and presentation	The extent to which students have gained knowledge, applied their knowledge to issues, critically evaluated the issues and reflected upon the issues.

3.2.7 Required readings

1. Pieterse, N. J. (2007). *Development Theory: Deconstructions/Reconstructions.* London: Sage Publications (Chapter One & Two, pp. 1-31).
2. MINICOFIN. (2002). *Rwanda Poverty Reduction Strategy Paper***.** Kigali: Image Media (pp. 1-40).

Required readings

1. Todaro, P. M., & Smith, C. S. (2003). *Economic Development.* (8th Edition). Boston: Addison Wesley (pp. 1-32)
2. MINALOC. (2001). *Community Development Policy*. Kigali: Image Media (pp. 1-20)

SECTION TWO: ENVIRONMENTAL DIMENSION

Brief note about the dimension

The environmental dimension is one of the key dimensions in the field of sustainable development. This is because in any economic activity, the raw materials are extracted from the environment or depend on it; thus, all human economic activities affect the environment negatively. Consequently, climate change has arisen as the most immediate impact on the environment and people's lives. Since the industrial revolution and through the 1980s, the environment was given less concern, yet all economic activities depended on it. The growth of industries and technological innovation increased gas emissions to the ozone layer and in early 1983, the United Nations had to rethink the development agenda that was creating climate change due to environmental damage. This gave birth to the Brundtland Commission, which was published in 1987 and the World Summit of 1992, held in Rio de Janeiro, Brazil, etc. This section is composed of the following sessions:

1. International Environmental policies
2. Environment and Sustainable Development
3. Green Economy
4. Tools and Principles

Session Three: International Policies for Sustainable Development

3.3.1 Objective

To understand international policies toward sustainable development under the United Nations Conference on Environment and Development held under different world summits.

3.3.2 Contents

The session contents are:

- Introduction
- Summary of the International Policies/Declarations
- The Brundtland Commission (1987)
- UN Conference on Environment and Development (Rio de Janeiro, 1992)
- World Summit on Sustainable Development held in Johannesburg (2002)
- Kyoto Protocol (2005)
- Achievements and Failures

3.3.3. Intended learning outcomes

At the end of the session, students will be able to:

- Understand international policies toward sustainable development and their different dimensions throughout the course of the process.
- Analyze how these international policies have been incorporated into the national policies of Rwanda.

3.3.4. Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with a brief introduction to the session
Discussions based on the readings (30 minutes)	The lecturer facilitates the discussion
General discussions(30 minutes)	The teacher moderates the discussion with

	interactive student participation.
Group discussion and presentations (One hour).	Students will be divided into three groups and will present their notes.

3.3.5. Notes for the teacher

a. Introduction

The year 1992 marked a strong commitment by the United Nations to set up policies for environmental protection and development. This was seen at the United Nations Conference on Environment and Development (UNCED), which took place in Rio de Janeiro, Brazil, from 3-14 June 1992. In the conference, governments committed themselves to adopting national strategies for sustainable development. The Rio conference emphasized social and economic development while protecting world ecosystem to better meet the need of the future generations (IISD, 2002). OECD in their document entitled "*Shaping the 21st Century"* published in the year 1996 called for the formulation and implementation of such strategies in every country by 2005 where development co-operation agencies were argued to support such processes in developing countries (OECD, 2001, p. 7).

Notably, during the 1992 UN Conference on Environment and Development held in Rio, governments made a commitment for the 21st Century to implement what was agreed upon and was named Agenda 21 to "adopt national strategies for sustainable development [which should] build upon and harmonize the various sectoral, economic, social and environmental policies and plans that are operating in the country.[…] Its goals should be to ensure socially responsible economic development for the benefit of future generations" (OECD, 2001, p. 7). In 1997, the Special Session of the UN General Assembly met to review progress made since the Rio de Janeiro Summit. The greatest outcome of the session was that there was continued environmental deterioration, poor patterns of consumption production and

population growth. This assessment led the United Nations to set a target date of 2002 for introducing national sustainable development strategies, which culminated in the conference held in Johannesburg.

The United Nations Environment Program (2010, p. 5) shows that the Organization for Economic Cooperation and Development (OECD), in their recent study conducted in 2010, estimated that

> current and planned policy measures are likely to reduce emissions by only around 12 per cent against 2005 levels by 2010, which is significantly short of the 25-40 per cent cuts below 1990 levels recommended by the Intergovernmental Panel on Climate Change (IPCC, 2007). Water and air quality is also deteriorating rapidly in some cases, particularly in the major cities in the developing world.

The financial global crisis of 2007-2010 has worsened the life conditions across the world despite the fact that the level of impact has been different between the North and South. The environmental protection policies have also been affected due to shortage of funds. However, as the "recovery strengthens, policy-makers are examining potentially new sources of environmentally sustainable growth in the longer term" (United Nations Environment Programme, 2010, p. 5).

b. Summary of the International Policies/Declarations aimed at Sustainable Development

The international policies for sustainable development are diverse and have been designed in reference to meet man's welfare needs and promote people's rights according to various sectors. However, this session will cover the Brundtland Commission Report, The United Nations Conference on Environment and Development held in Rio de Janeiro in 1992, Kyoto Protocol and World Summit on Sustainable Development held in Johannesburg, 2002 since they are the ones that deal with

environmental issues as the basis of sustainable development. The diversity of policies is indicated in the following box:

Box 3: Sustainable Development in policy making

1. Environment and Development-Rio de Janeiro 1992
2. Human Rights-Vienna 1993
3. Population-Cairo 1994
4. Social Development – Copenhagen 1995
5. Women – Beijing
6. Housing and Settlement – Istanbul 1996
7. Food Security – Rome 1997
8. Kyoto Protocol 2005
9. Earth Charter - 2000
10. World Summit on Sustainable Development – Johannesburg 2002
11. Copenhagen world summit - 2009

1. The Brundtland Commission – Basis for 20th Century Thoughts for Sustainable Development

The Brundtland Commission was a World Commission on Environment and Development (WCED) that was set up by the United Nation in 1983. It was named after its Chair, Gro Harlem Brundtland. The commission was set up to analyze and come up with recommendations about the growing concerns of the deterioration of the environment and natural resources and the likely consequences of such deterioration toward socio-economic development. The mindset by the United Nations was that environmental issues were global in nature and it was a common interest of all nations to establish

favorable policies toward a sustainable future and development. The Commission was created by the United Nations General Assembly under Resolution 38/161 in 1983.

The Brundtland Commission produced and published its report in 1987 entitled, "Our Common Future" with three main parts: Common Concerns, Common Challenges and Common Endeavors. This report was the basis for the UN and the entire world to start thinking about the environmental concerns of sustainable development. Thus, the Commission defines sustainable development as follows: "sustainable development is 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, p. 43).

Thus, the Brundtland Commission focused on the needs of the present and future generations. It recommends that this can be done through institutional development, education and economic growth. The report is criticized for not focusing much on the system dynamics of the environment and for emphasizing weak sustainability. The report indicates that the developing world is faced with poverty coupled with increasing inequality, water shortages and health, and that it will be difficult to cope with the ecological problems or other crises that will rise.

2. UN Conference on Environment and Development (Rio de Janeiro, 1992)

The United Nations Conference on Environment and Development, which met at Rio de Janeiro, Brazil from 3 to 14 June 1992, was concerned with three main dimensions: environmental restoration, preservation and social development. Their objectives were to meet the challenges of global warming, pollution, biodiversity and the inter-related social problems of poverty, health and population. The conference participants built upon the UN Declaration on Human Environment of Stockholm, which was adopted on 16 June 1972.

According to preamble of the Rio de Janeiro Conference on Environment and Development, participant countries and civil societies aimed at "establishing a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people" (1992, p. 1). The conference emphasized the nexus between environmental protection and sustainable development. For example, Principle 4 states that: "In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it".

The United Nations Conference on Environment and Development, held at Rio de Janeiro also established Agenda 21 which is commonly known as the Agenda for the 21st Century. Agenda 21 "is a global program that committed 118 countries to environmental restoration, preservation and social development. Their aims are to meet the challenge of global warming, pollution, biodiversity and the inter-related social problems of poverty, health and population," (UN Agenda 21, n. d). Agenda 21 differed from the Brundtland Commission in that Agenda 21 was more comprehensive and offered means of implementation to attain sustainable development.

Students will have to read carefully the four sections of Agenda 21: Social and Economic Dimensions, Conservation and Management of Resources for Development, Strengthening the Role of Major Groups and Means of Implementation. They will have to compare this agenda with the Rwanda Vision 2020 and PRSP documents in terms of sustainable development. They will also identify the loopholes of the Rwandan Vision 2020 and PRSP documents to fully identify and recommend which measures the country should undertake to attain a fully sustainable development ladder.

3 Kyoto Protocol

Both the Rio de Janeiro Conference and Kyoto Protocol were linked to the Brundtland Commission Report recommendations. This protocol was convened in Kyoto, Japan on 11 December 1997. It was an international agreement linked to the United Nations Framework Convention on Climate Change. It

entered into force on 16 February 2007 by the industrialized nations. Given the fact that industrialized countries are more responsible for contributing high levels of emissions in the atmosphere, the protocol places a "heavier burden on developed nations under the principle of common but differentiated responsibilities" (UN, 1998, p. 2**).** Though the member counties for the protocol have reduced the high level of emissions, there still remains much to be done for its proper implementation in order to reduce the immediate impacts of these emissions, such as the damage of the ozone layer, which leads to increased damage of the environment.

4. World Summit on Sustainable Development (WSSD) held in Johannesburg, 2002

This World Summit took place in Johannesburg, South Africa from 26 August to 4 September 2002. It was organized by the United Nations Commission on Sustainable Development. It was organized to evaluate and find best strategies for implementing Agenda 21, which was adopted in Rio de Janeiro in 1992. Since it took place 10 years after the Rio de Janeiro United Nations Conference, less was achieved as the parties committed to implement Agenda 21. Albeit, it was an opportunity for the participants to adopt concrete and measurable polices to better implement Agenda 21.

The World Summit was attended by tens of thousands of participants: Heads of States and Governments, national delegates of NGOs and the business community to focus on the world's difficult challenges, including improving people's lives, improving sanitation and health services, conserving our natural resources, control of population growth, water sanitation, shelter for all, energy, food and economic security. The former Secretary General of the United Nations, Kofi Annan, in his opening remarks, emphasized the need for all actors to work constructively together, including civil society as well as governments and businesses to implement agenda 21 as a way of striving towards sustainable development in all countries.

5. **Copenhagen Summit (2009)**

The Kyoto Protocol signed in 1997 that came into force on 16 February 2007 had set the deadline of 2012 to prevent climate change and global warming. As time was running out, Copenhagen came into existence in 2009 to review and replace the Kyoto protocol. This conference on climate change took place from 6 – 18 December 2009. The conference's aim was to generate awareness toward and find solutions to the global issues of climate change and environmental protection. The aims of the conference were to create awareness to solve problems of climate and global warming; promoting dialogue with governments, business and science to deal with climate change and global warming; and to inspire the role of global business to promote environmental friendly business (Earth Negotiations Bulletin, 2009, pp. 10-30).

The success of the conference was not very different from the Kyoto Protocol of 1997. The United States of America has continued to isolate itself from other developed countries to implement different protocols related to preventing global warming and climate change, yet it is one of the Western countries that contribute a lot of greenhouse gas emissions into the air. The US argued that China and India should bear the same responsibilities and costs of implementing the protocol since they supply almost the same quantity of gas emissions into the air. Though some countries that signed and ratified the Kyoto Protocol have done little in reducing emissions, some believe that the Copenhagen conference will not change anything as far as preventing global warming is concerned.

c. Achievements and Failures

The International Institute for Sustainable Development (IISD) analyses the successes and failures of the above policies since the 1992 Rio Earth Summit. This analysis is entitled, "Ten + Ten: Successes and Failures" and puts all of this recent history listed above into the context: 'What has the world accomplished since 1992?' The summary is listed below in table format:

Table 10: Successes and Failures of Policies Since Rio de Janeiro in 1992 – To Date

Successes	Failures
1. An ozone-friendly future - The ozone layer is beginning to recover. International cooperation to eliminate ozone-depleting chemicals has been successful.	1.The breakdown of the Rio bargain - The 10 years since Rio have been a lost decade, marked by the collapse of leadership and a failure of the rich countries to deliver on their 1992 promises.
2. Small is bountiful - Even though international progress since Rio has been slow, thousands of practical projects at a grassroots level have borne fruit.	2. Pulling up the ladder: the widening wealth gap - Despite rising incomes globally, the number of people living in absolute poverty continues to rise.
3. The rise and rise of civil society- Experts, interest groups and ordinary people have made inroads into the policy-making process.	3. Use it up, throw it out: over-consumption as a way of life **-** Despite increased awareness of the problems, it seems developed countries remain wedded to their pollution-intensive lifestyles.
4. Sustainability, Inc.: the emergence of corporate social responsibility - Business is beginning to recognize its wider responsibility towards people, communities and the environment.	**4.** What price aid? The folly of the Washington Consensus **-** Strings attached to financial aid packages have done substantial harm to developing countries.
5. Levelling the information playing field - Electronic communications are making information more widely available and decision-making more transparent.	5. Costing the Earth: economics still sends the wrong signals **-** Delegates at Rio recognized that economics and the environment needed to be brought into line, but it seems the environment is still being short-changed.
6. Knowledge is power: pushing the boundaries of science and technology - Major advances have been made in the	6. Whatever happened to world peace? **-** High hopes for harmony following the end of the cold war have been dashed by a fresh spate of armed

	way we understand natural systems, and in the development of sustainable technologies.	conflicts.
7.	Keeping track: measuring progress towards sustainability - The development of more accurate indicators and accounting practices gives us a better picture of our progress toward--or our movement away from --sustainability.	7. Sea sickness: oceans and fisheries in peril **-** Marine ecosystems have paid a high price for overfishing, pollution and coastal development.
8.	The Kyoto Protocol: global problem, global solution - Despite a U-turn by the U.S. and some backtracking in Bonn, Kyoto represents a crucial milestone on the road to a stable atmosphere.	8. Pressure mounts around scarce water resources **-** Climate change, coupled with political tensions and competition for increasingly scarce clean water, provides a recipe for conflict.
9.	Permeating the corridors of power - In several countries, the principles of sustainable development have begun to infiltrate the machinery of governance.	9. The human tragedy of AIDS - The AIDS virus has wreaked havoc on developing countries, especially in Africa, and the devastation continues.
10.	Other promising starts: landmark agreements on chemical and biological risks - Environmental agreements like the Biosafety Protocol and the Stockholm Convention on Persistent Organic Pollutants offer new safeguards for communities and the environment, provided that they are matched by strong leadership.	10. Lost forever: species extinctions continue unchecked - Despite the good intentions of the Biodiversity Convention, thousands of species a year are disappearing from the face of the planet.

Source: International Institute for Sustainable Development Website - www.iisd.org

The above table shows the successes and failures of the Rio Declaration by member states. Some states committed themselves to environmental protection and development but some others did not commit due to conflicts of interest. To some countries, lack of funds has been a major constraint to accomplishing what they had agreed to during the World Summit.

3.3.6 Evaluation procedure for session two

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learned or gained from the class teachings and discussions
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in the critical thinking related to the class
Group discussion and presentation	The extent to which students have gained knowledge, applied their knowledge to issues, critically evaluated the issues and reflected upon the issues.

3.3.7. Required Readings

1. The World Commission on Environment and Development. (1987). *Our Common Future Report***.** Oxford: Oxford University Press. (pp. 1-60).
2. IISD. (2002). *Ten+Ten Sustainable Development Successes and Failures***.** Ontario: IISD. (pp. 1-6).
3. UN. (2002). *The Road from Johannesburg: What was Achieved and the Way Forward.* New York: United Nations. (pp. 1-8).

Session Four: Environment and sustainable development

3.4.1 Objective

To analyze the importance and linkages of environmental protection towards sustainable development processes and programs across the globe

3.4.2 Session contents

The session contents are:

- Introduction
- Environmental planning and protection
- The new environmental paradigm for sustainable development
- Climate change
- Environmental ethics
- Environmental sustainability in Rwanda
- Watching a short film entitled, "Greenpeace: Stopping Amazon Deforestation" available at http://www.youtube.com/watch?v=Fo4WXly4QYk&feature=related

3.4.3 Intended learning outcomes

At the end of the session, students will be able to:

- Understand the nexus between environment and development in general, which aims to promote a sustainable future.
- Identify how the environment is the basis for all human economic activities and how the impact on the environment can impact all of our economic activities.

3.4.4 Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with a brief introduction of the course
Discussions based on the readings (30 minutes)	Three students lead the discussion, facilitated by the teacher
General discussions(30 minutes)	The teacher moderates the discussion with interactive student participation.
Watching a short film	Both students and the teacher
Group discussion and presentations (One hour).	Students will be divided into three groups and will present their notes.

3.4.5 Notes for the teacher

a. Introduction

There is a strong nexus between the environment and sustainable development. Without proper policies to protect the environment, human beings can be expected to cause ecological consequences as well as economic ones. This is explained by James Burton (1996, p. 152) in his book, *The Poverty Of Nations,* quoting Chambers (1983) that "the environment exists for man, not man for the environment," meaning that man's survival depends on the environment. Todaro and Smith (2003, p. 463) explains that in the past years, economists are increasingly aware of the importance of protecting the ecosystem. The two authors identify the seven basic issues that define the environment of development: (1) the concept of sustainable development, and linkages between the environment and (2) population and resources, (3) poverty, (4) economic growth, (5) rural development, (6) urbanization, and (7) the global economy (Todaro & Smith, 2003, p. 463).

The new environmentalism movement views environmental issues as global instead of regional or local,

and it has transcended the old ideologies to become something of a new ideology itself, cutting across types of systems (Buchholz, 1993, p. 17). The author states that "the new environmentalism recognizes resource limitations, and questions the wisdom of a continued emphasis on economic growth. Instead of harping about limits to growth, however, the banner of the new environmental movement is sustainable growth or sustainable development" (Buchholz, 1993, p. 17). Ecologists have constantly emphasized the need for environmental protection and management for sustainable development. Below is a table showing the evolution of thought to link environment and sustainable development:

Table 11: Stages of ecological Consciousness

Stage	Principal or focus	Ethic
Conservation	Use resources wisely and do not deplete them needlessly. Emphasize efficient development and use of natural resources.	Instrumental view of nature: Nature has utility only as it serves human purposes
Preservation	Preserve certain areas of the country in their natural state and close them to development	Nature has intrinsic value in its own right apart from the services it provides for human beings
Protection	Focus on pollution control and dangers to human health	Human-centered
Survival	Be concerned with global problems and sustainable growth	Eco-centered

Source: Buchholz (1993, p. 12).

The United Nations Commission on Sustainable Development, framing the Brundtland Commission Report in April 2007 stated that the needed economic growth is one that is forceful and socially and

environmentally sustainable in the long-run (United Nations Commission on Sustainable Development, 2007). This is also reflected in the Rio de Janeiro Declaration that took place from 3 to 14 June 1992 in its Article 4, which leads: "in order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it". In the political and economic dimensions, sustainable development is linked to the protection of the ecosystem, global warming and climate change.

UNESCO identifies sustainability issues that should be incorporated into the sustainable development agenda: water, energy, agriculture, food, health and biodiversity, given that they are also related to the three dimensions of sustainable development as the United Nations' report denotes. Their explanation is that environmental degradation leads to "widespread poverty, inequitable economic development, population growth, the loss of cultural and linguistic diversity and exclusion from educational opportunities"; hence, the focus on environmental issues is crucial (UNESCO, 2008, p. 5).

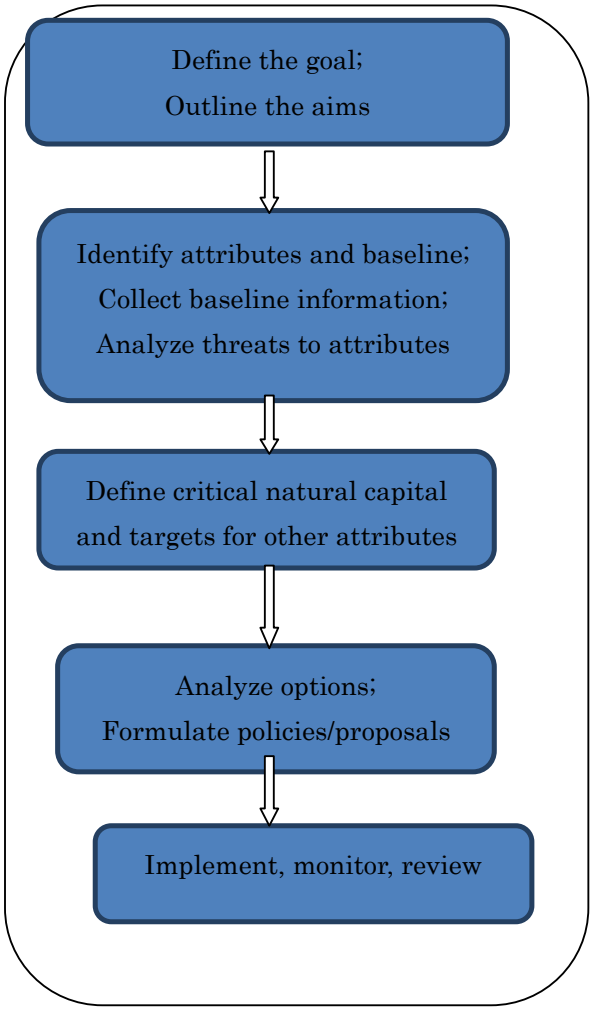
Michael Jacobs recognizes the relationship between sustainability and planning. He explains that there are ecological boundaries within which human societies need to operate. He believes that "living with ecological limits means reducing the negative environmental impacts of human activity and enhancing the resilience of the environment" (1999, p. 66). Jacobs (1999, p. 78) defines environmental sustainability as "a path of economic and social development whose impacts on the natural environment are constrained within ecological limits".

b. Environmental planning

Paul Selman (1999, p. 148) explains that environmental planning is "a diverse activity, comprising multiple approaches, and based on a range of options for direct action and indirect influence". He again states that "environmental planning should be understood as a rational human activity aimed at

taking decisions which optimize welfare both presently and at some time in the future" (1999, p. 148). Selman proposes the following environmental planning process:

Figure 5: Environmental planning process



Source: DTA/CAG (1994) in Selman (1999, p. 150)

c. Problems with Planning for environmental sustainability

Paul Selman (1999, p. 153) says that "the need to plan is often driven by the existence of dilemmas, and so the activity is typically problem-focused. It is also future-oriented, and is thus associated with a

climate of uncertainty. At the same time, it often has a retrospective element whereby we seek to audit past performance to help us learn from experience". Christiana and Maria (2002, p. 206) point out that "the scale of climate change requires global collective action, yet the costs and complexity make many countries hesitant to participate. A functioning climate change regime has thus been difficult to construct". The authors, while reflecting on the complexity in managing the problem of climate change asked themselves the following questions: Who is responsible? Who is affected? Who should act? And what is to be done?

Buchholz (1993, p. 3) identifies two major constraints of the environment: global warming and ozone depletion. He believes that these problems are due to population growth and concentration, especially in urban areas. The increase in population leads to manufacturing of more goods and an increase in services to meet their needs, consequently leading to more waste material to be discharged into environment. He explains that the environment has been largely destroyed due to the changes of people's consciousness on the universe. The table below shows his argument:

Table 12: Changes in Human Consciousness vs. Environmental Problems

Theory	Explanation
Theories About the Universe	The earth is not at the center of the solar system, let alone the universe
Theories of evolution	Human life is the result of an evolutionary process that incorporates the principle of natural selection
Theories of the Unconscious	Human freedom is circumscribed by unconscious wishes and desires
Theories about Nature	Humans are a part of nature and must see themselves as but one part of a vast and interdependent ecosystem

Source: Buchholz (1993, p. 10).

d. The new environmental paradigm

Harris (2007, p. 304) states that:

> the increasingly pressing nature of more and more 'wicked' problems in environmental management, particularly water issues, is leading to a changing paradigm for environment management. This new environmental paradigm involves the recognition of the precariousness of the present state, decentralization, systems thinking, and deliberates processes and ethical considerations of justice, equity and fairness.

Harris (2007) explains that the new environmental paradigm has come to address the issues of knowledge, evidence and uncertainty, which are bound in democracy and technology. This is because our environmental management issues are becoming more complex than before, such that the application of scientific and technological inputs is urgent, as well as are building trust, understanding and increasing capacity at the community level.

e. Climate change

Climate change and global warming are becoming an important global discussion in the process of sustainable development if global equity is to be realized (Baker, 2006; UNESCO, 2008). Figueres and Ivanova (2002) distinguish climate change problems from environmental problems. They assert that "climate change is one of the first truly global environmental challenges" (Figures & Ivanova, 2002, p. 206). According to them, several key features distinguish climate change from other environmental problems:

> the atmosphere is a classic example of a public good; the impact of climate change is not likely to be evenly distributed among regions and countries; developing countries tend to be more vulnerable and, at the same time, less able to respond and to adapt; a multitude of human activities from global to national to individual; and uncertainties as to the timing, scope, and impacts of climate change reinforce reluctance to alter economic behavior (2002, p. 206).

There are various reasons why climate change has become a global concern in the last two decades. This is because global warming is affecting the common people around the globe, coupled with the increasingly poor management of the environment and greenhouse gas emissions into the air. Such arguments are given by both politicians and academics. For example, James Morton (1996) notes that in some parts of Africa, climate has changed due to the 'tragedy of the commons' where herders apply zero grazing on a limited land and where farmers' fallow rotations have been reduced due to limited land and its poor usage. The Malthus Theory can best explain this context because population is increasing year by year, yet the land is not increasing. The fact that land degradation is taking place is not a surprise because there are no well-defined policies to protect the environment or soil so as to benefit from them. This argument is right, because a country like the UK, with over 160 million people has managed to feed its population as well as protect their environment; whereas smaller Uganda with 33 million people has failed due to a lack of coordinated efforts in environmental protection and management.

The United Nations Department of Economic and Social Affairs recognize that "climate change is an inevitable and urgent global challenge with long-term implications for the sustainable development of all countries" (UNDES, n.d.). The Department contends that there is strong link between climate change and sustainable development. It can affect the rich and poor nations, though the poor nations may be affected more than the rich ones. The effects are diverse and may vary depending on what policies may have been implemented in terms of social, economic and natural settings of the countries.

From 6 -18 December 2009, world leaders from 170 countries met in Copenhagen, Denmark to participate in "Copenhagen Climate Change Conference" as well as reviewing the success and failures of Kyoto Protocol - adopted on 11 December 1997 and which entered into force in February 2005. This world conference on climate was essential in preventing global warming and climate change. This followed the United Nations Conference on climate held in 2007 in Bali. The conference was not successful like the Kyoto Protocol. There was an imbalance in sharing responsibility of reducing gas emissions between poor and rich countries as well as the rich countries.

The poor countries refused to share the responsibility of reducing carbon emissions since they produce less compared to the developed countries. The US again refused the responsibility of reducing carbon gases as it had done during the signing of the Kyoto Protocol. The US would not engage if China and India would not take on the same responsibilities as developed countries since their carbon emissions are increasing year by year at a rate of 7%. During the conference:

> The idea is that all countries should put in 'effort' proportional to how much the emit. So the international agreement might be 'each country must put a $30 price on carbon emission.' Of course they would keep the revenues. The carbon price could be the price of allowances under cap and trade or the carbon tax rate, or a 'feebate' that puts a 'fee' on low-mileage cars and gives a rebate to high mileage cars… (Copenhagen Climate Change Summit, 2009).

Since the Kyoto Protocol, the US and Japan still continue to deter themselves from the agreement signed by other industrialized countries as if climate change does not matter to them. The issue behind their refusal is related to the costs therein and a conflict of interest whereby costs differ depending on the country's level of industrialization. The two countries argue that if China and India, which are becoming more industrialized, cannot bear the same costs, then the implementation of the agreement is unfair, since the two countries produce almost the same amount of carbon emissions into the air.

f. Environmental ethics

> *"The choice is ours: form a global partnership to care for Earth and one another or risk the destruction of ourselves and the diversity of life. Fundamental changes are needed in our values, institutions, and ways of living. We must realize that when basic needs have been met, human development is primarily about being more, not having more. We gave the knowledge and technology to provide for all and to reduce our impacts on the environment. The emergence of a global civil society is creating new opportunities to build a democratic and humane world. Our environmental, economic, political, social and spiritual challenges are interconnected, and together we can forge inclusive solutions"*
>
> *--The Earth Charter, 2000*

There is a big gap in efforts being done to protect our environment. The lack of responsibility to protect the future generations of human and non-human life on the planet has been growing since the period of the 1960s through the 1980, and continuing to date. The problem has not gone anywhere; it is still affecting the life systems of people and Earth through man's activities in the world economy. The impact is being, or will be felt by everyone if nothing is done (Noel, 2001, p. 187). The Earth Charter explains that when human needs are met, it does not mean that welfare has been achieved. People need to use their knowledge, ability and willingness to have more equitable lifestyles relevant to supporting and protecting the future lifestyles of future generations. This requires a collective responsibility toward building sustainable ways of living and processes of sustainable socio-economic development. Thus, this session is about collective responsibility and ethics in attaining sustainable development across the globe. Collective responsibility, ethics and principles are very crucial on the global, national and community levels.

This call is much more relevant for the future. This is because, "the quality of our air, soil, and water has diminished to worrying levels in some regions while the rapacious depletion of Earth's rainforests, the nurturing cradle of the planet's biodiversity, may be beyond repair" (Noel, 2001, p. 187). The gas emissions

and other toxic materials we produce from our industrial activities are affecting the ozone layer, such that if no responsible and coordinated measures by governments, industries and the communities are put in place as environmental scientists have recommended, the impacts will be highly negative on people's lives, the economy and the environment. This will create an unsustainable reality for the future economy and lifestyles of future generations.

To achieve a sense of collective responsibility, ethics and awareness toward sustainable development, there should be connected efforts on the international, national and community levels in partnerships with the private sector and international or local NGOs engaged in the process of sustainable development. Nevertheless, Noel (2001, p. 187) puts it that "there has been progress made by governments, companies and communities" toward implementing this collective responsibility, despite the fact that such responses are not concerted, but rather are fragmented in action.

OECD (2001), explaining about the associated hardships, assert that there are tremendous challenges in working towards social, economic and environmental sustainable development. It recommends viable structural changes in the ways societies manage their economic, social and environmental affairs. Noel also puts it that there is a blind political will on environmental protection, as well as "little will to surrender economic growth for environmental conservation" among Western democracies (2001, p. 187). The Kyoto Protocol cited the United States of America and the Government of Japan as the countries that refused to sign the convention on reducing emissions, yet they are among the top countries that send emissions into the air. Such conflicts of interest create a misunderstanding between nations and leading to unequal responsibility.

To some extent, some countries may decide to opt for different solutions with a strong desire to create an approach that will have a positive impact towards the common good. OECD (2001) and Noel (2001) argue that the process of sustainable development is about making and implementing choices in a realistic, effective and lasting way. This requires thinking about the relationship of technology and new

systems that are appropriate in relation to the nature of the Earth.

There is a strong nexus between recent economic developments and the technologies that had been developed by that time. The problem was that scientists did not think about the negative effects of environmental damage that are being caused by the current economy; thus, technologies at the beginning of the 21st Century needed to think more about their impact on future generations regarding environmental protection, which would have led to a protected economy as a means toward sustainable development (OECD, 2001).

Sustainability requires commitments by governments, industries, NGOs, the private sector and communities. Collective action is a prerequisite, not an option. Ethics is a primary driver toward any achievement or success in life. In addition, environmental issues regarding sustainability and protection ethics are crucial. Noel (2001, p. 188) clarifies that "attempts to articulate an environmental ethic necessarily assume that human beings have ethical responsibilities towards the natural world". Here students will be taught three approaches of environmental ethics that center on anthropocentrism, extensionism and biocentrism or eco-centrism.

Anthropocentrism – Determines the right, good or fitting environmental questions in terms of their impact on human beings. Human beings are at the epicenter of all things in the universe. In this approach "the claim that pollution of the environment is to be avoided could be justified by invoking the human right to clean air and water" (Noel, 2001). This approach does not emphasize the collective responsibility towards environmental protection; instead, it only focuses on the species in the environment rather than the environment itself.

Extensionism – Looks at the more responsible global society and institutions that serve the interest of people. It is against globalization, which is creating a very big gap between the poor and the rich, favored

by the rigid policies of the World Bank, IMF, World Economic Forum and World Trade Organization. In support of this statement, Preston Noel explains that global ethics have been developed by the world ethicists, religious leaders and environmentalists and are enshrined in the 2000 Earth Charter, summarized in four categories: Respect and care for the community life; Ecological integrity; Social and economic justice and Democracy, nonviolence and peace (Noel, 2001; Earth Charter, 2000).

Biocentrism or eco-centrism –Believes in reduced reliance on nature in exchange for technological solutions. They are more concerned with the ecosystem in which man lives human activity that damages the environment. It is a more nature-centered than human-centered ethos towards environmental protection.

g. Sustainable Environmental Protection in Rwanda

Given the civil war and genocide of 1990-1994, environmental degradation has been severely exacerbated by the conflict. Whereas many trees were cut down as a way of finding a place to settle refugee returnees from the neighboring countries who were exiled from 1959-1994, even more trees were cleared as way to find energy for cooking. Again, considering the living conditions in the rural areas, all people depend on natural resources for their survival and way of life. For example, farming, energy production and shelter all depend on natural resource exploitation. Given the nature of survival, there is an urgent need for sustainable environmental protection measures across the country, which the country has strongly implemented since 2003.

Sustainable environmental protection is a crosscutting issue highly prioritized in the Rwandan development process. The country's policy objectives for the standardized protection of environmental resources include: reducing the population dependency on agriculture, reduction of dependency on nonrenewable biomass energy and minimizing the rate of diseases related to environmental degradation. These objectives are carried out through different mechanisms: public awareness and trainings across the

country and, notably, through legal precedence where a new organic law to support the conservation of the environment was passed in 2008 (UNDP, 2009; REMA, 2009).

There are public and civil society organisations involved in environmental sustainability. These organisations cooperate in enhancing environmental sustainability toward the future. Civil society organisations are engaged in sensitizing the community towards environmental protection and management, and some carry out research to enhance knowledge, which can be used by students and policymakers in promoting sustainability. For example, public institutions like Rwanda Environment and Management Authority (REMA), *Institut des Science Agronomique du Rwanda* **(**ISAR), Higher Institute of Agriculture and Animal Husbandry (ISAE), etc. are engaged in teaching, research and awareness.

As on the national level, there are a number of projects striving to promote environmental sustainability in order to fight climate change and produce new and sustainable income generating opportunities, including: Clean Development Mechanism, Rwanda Poverty and Environmental Initiative (PEI), Building Capacity for Sustainable Land Use and Management in Rwanda, and Consolidated Waste Management Project in Rwanda. Two of their expected outcomes are to produce: "an enabling policy framework to support an effective system for environment management and ecosystem conservation established, capacity at national, district and community level to restore and protect ecosystem of national and global importance against potential degradation strengthened" (UNDP, n. d). The outputs would be to produce "policies, regulations, guidelines and standards for environment protection developed and implemented at central and decentralized levels and Capacity of communities and local Government for ecosystem and land conservation" (UNDP, n. d). Both public and civil society organizations strive toward one common target of sustainability of the environment since over 90% of the Rwandan population depends on natural resources for their living.

- **Protective measures**

Protectionist environmental measures are mainstreamed in both the Rwandan Vision 2020 and Poverty

Reduction Strategy Paper which enable policymakers within government and civil society to engage in the same field to address the issues of poverty and environmental management and protection. The government has also promoted alternative energy sources to replace the use of biomass energy and the protection of the remaining natural forests by refining resettlement strategies (UNDP Rwanda, 2009).

In alignment with the laws that have been put in place to protect the environment, in practice there are many activities on the local level that have been internalized by the local population as a result of massive awareness campaigns by the government, as well as the influence of the implementation of the law. These practices include: digging land terraces on every hill of the country in both public and individually owned plots of land, environmental protection on every last Saturday of every month throughout the year. Notably, every individual, association, and public or private institution must acquire a license to cut any tree for production. Whether or not the tree is on your own land or compound, you must acquire a license to cut it, and digging terraces must be a constant activity across the nation. Such practices are essential in promoting environmental sustainability and are highly prioritized by the local administration all over the country.

The policy on environmental protection is very rigid and is embedded in almost all development policies of the country. The main components of those policies are: An integrated water resource management; "Setting up information systems to early warning of hydro-agro meteorological system and rapid intervention mechanisms; Promotion of intensive agro pastoral activities; Development of firewood alternative sources of energy; Promotion of non-agricultural income generating activities and Introduction of species resisting to environmental conditions" (Republic of Rwanda, 2009, p. 8).

- **Challenge**

Though there is rapid development in all sectors of the country, polices about environmental sustainability remain unknown to some or the majority of people, mainly in the rural areas. There is need for continuous awareness campaigns, especially for some of these programs mentioned above.

3.4.6 Evaluation procedure for session one

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learned or gained from the class teachings and discussions
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in critical thinking related to the class
Analysis of the film	The extent to which students have grasped the contents of the film in relation to the session and apply the analysis in the Rwandan context
Group discussion and presentation	The extent to which students have gained knowledge, applied their knowledge to issues, critically evaluated the issues and reflected upon the issues

3.4.7 Required Readings

1. Buchholz, A. R. (1993). *Principles of Environmental Management: The Greening of Business*. New Jersey: Prentice Hall. (Chapter One, pp. 1-26).
2. Jacobs, M. (1999). Sustainability and Markets: On the Neo-classical Model of Environmental Economics. In Kenny, M. & Meadowcroft, J. (Eds). *Planning Sustainability*. New York: Routledge Publishers (pp. 78-100).
3. Noel, P. (2001)**.** *Understanding Ethics***.** Sydney: The Federation Press. (pp. 1-40).

Session Five: Green Economy

3.5.1 Objective

To understand the meaning of the green economy and how it contributes to the sustainable development process and to differentiate the concept of green economy from sustainable development.

3.5.2 Session contents

The session is comprised of the following parts:

- The meaning of green economy
- Green Economy: through public finance and fiscal policy reform
- The link between environmental sustainability and the MDGs
- Strategies for a green economy

3.5.3 Intended learning outcomes

At the end of the session, students will be able to:

- Understand the concept of green economy
- Analyze the concept of green economy vis-à-vis sustainable development and the link between the two in promoting a sustainable future.

3.5.4 Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with a brief introduction of the course

Discussions based on the readings (30 minutes)	The teacher facilitates the discussion
General discussions (30 minutes)	The teacher moderates the discussion with interactive student participation
Group discussion and presentations (One hour).	Students will be divided into three groups and will present their notes

3.5.5 Notes for the teacher

a. The meaning of Green Economy

The green economy is now becoming a strong movement towards sustainability in fighting environmental degradation and poverty across nations. The movement is strongly convinced that the increasing environmental degradation in developing nations has constrained the achievement of the Millennium Development Goals as set in 2000 by the United Nations. The United Nations Environmental Program (UNEP) believes that sustainability cannot be achieved without the green economy. The green economy has the same objective as sustainable development, but the two concepts differ. The only difference is that the green economy strives to achieve sustainability through market-oriented policies as well as regulation of the system, while sustainable development looks at sustainability through social, economic, political, environmental and technological development. Thus, UNEP (2010, p. 3) defines green economy (GE) as:

> one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. A GE is characterized by substantially increased investments in economic sectors that build on and enhance the Earth's natural capital or reduce ecological scarcities and environmental risks. These sectors include renewable energy,

> low-carbon transport, energy-efficient buildings, clean technologies, improved waste management, improved freshwater provision, sustainable agriculture and forest management, and sustainable fisheries. These investments are driven or supported by national policy reforms and the development of international policy and market infrastructure.

The United Nations Environment Program identifies the critical role of fiscal policy in moving toward a green economy. First, the means through which tax revenues are generated has a "fundamental effect on the structure of incentives facing business and households, in both consumption and investment decisions" (UNEP, 2010, p. 3). Secondly, how governments spend these "revenues not only on recurrent costs, but also investments in public infrastructure or supporting technology development, plays a critical role in shaping the path of economic development" (UNEP, 2010, p. 3). UNEP explains that for this to be efficient, there should be cooperation across different sectors of the government, citing finance and environment as examples. Building and improving administrative capacity within the agencies of environment and customs, for example, are likely to be important dimensions, specifically for developing countries. In short, fiscal policy and public finance can play a big role in protecting the environment and influencing people's consumption patterns in their environmental surroundings.

In the developing world, economic development should be linked with environmental sustainability since a majority of the population depends on agriculture as the main economic activity and source of revenue. Green economy can play a crucial role in reducing poverty, inequality between the rich and the poor, and improving water and food security through improved environmental and natural resource protection. It can also lead to improved energy use, water quality, waste management, buildings and forests as explained in the above definition. UNEP (2010) argues green economy seeks to enhance economic growth, income opportunities and social inclusion. It focuses on the following as main sectors: waste management, forests, agriculture, water, fisheries, energy, buildings, cities, transport, tourism and manufacturing. Also, financial sustainability is critical for the green economy to be achieved

- banks need to play an equitable role in offering equity financing at the household level.

b. Green Economy: through public finance and fiscal policy reform

There is a strong link between the green economy and how public finance and fiscal policy perform in relation to improved environmental protection policies and measures. The United Nations Environment Program identifies three well designed sets of indicators that can help measure key interactions between the environment and the economy at the macro level while helping guide policy management:

1. "Investment, employment and output in key sectors of the green economy: Key sectors of the green economy include energy, building, transport, manufacturing, tourism, waste management, as well as the critical ecosystem and resource-based sectors of agriculture, forests, fisheries and water. Indicators on investments in greening these sectors and the associated share in production and employment, directly reflect policy actions such as the share of renewables in the energy mix.
2. Decoupling economic growth from impacts on the environment: This includes measures of the intensity of energy, resource and materials use and waste generation for specific sectors and the economy as a whole, such as with energy use per unit GDP, GHG emissions per unit GDP. These capture the outcomes or impacts of policies and investments to green key sectors.
3. Aggregate indicators of economic progress and wellbeing, including poverty alleviation and natural capital depreciation: A range of initiatives are investigating alternatives to traditional economic measures such as GDP as the principal compass for economic policy and assessment. The depreciation of ecosystems and natural capital can be reflected in net savings rates, including for example an accounting of the drawdown of fossil fuel stocks" (2010, p. 7).

c. The link between Environmental Sustainability and the MDGs

The United Nations Environment Program has linked environmental sustainability with the MDGs. Given that most developing nations depend on agriculture as the main economic and productive sector, the two are intertwined. Included in their report entitled, "A Brief for Policymakers on the Green Economy and the Millennium Development Goals*"* the following box explains the linkage:

Box 4: The link between Environmental Sustainability and the MDGs

1. Environmental goods and services are essentials for the global economy
2. Ecological infrastructure undermines the MDGS
3. Decline of coral reefs has affected coastal defenses, tourism revenues and other incomes of the local population
4. Decline of coral reefs has affected fish production, causing increased hunger, MDG 1 affected
5. Deforestation also increases greenhouse gas emissions
6. Clean energy would contribute to mitigating climate change if there were to be a reduction in the burning of fossil fuels

The above box explains the relationship between the environment and the development of nations. Protection of the natural capital, or natural resources, is vital for human survival since we all depend on the environment for food, air, and any economic activities carried out in our surrounding environment.

d. Strategies to achieve sustainable development versus green economy

- ***Integrating and making trade-offs between economic, social and environmental objectives***

OECD (2001, p.14) identifies the strengths of integrating and making trade-offs between economic, social and environmental objectives, and states that:

> Sustainable development is not just about the environment. The pursuit of sustainable development requires policy changes in many sectors and coherence between them. It entails balancing the economic, social and environmental objectives of society - the three pillars of sustainable development - integrating them wherever possible, through mutually supportive policies and practices, and making trade-offs where it is not possible. This includes taking into account the impact of present decisions on the options of future generations. However, sustainable development has often been interpreted narrowly as an environmental issue without implications for more than a small group of society.

Indeed the integration and trade-offs between economic, social and environment development have been focused on by many researchers and different movements towards sustainable development. This link is a strategy of paramount importance in the process of sustainable development despite policies that are still fragmented. The target should be aiming at the needs of the future generations.

- ***Developing approaches that reflect each country's unique circumstances***

OECD (2001, p. 14) underpins the notion that countries should identify their own approaches unique to their realities since economic, social and environmental problems differ depending on context, noting:

> The relative priority given to the three pillars of sustainable development will vary in individual countries, societies, cultures and situations, and over time. Approaches to sustainable development reflect the diversity of the social, economic and environmental challenges faced

by developing countries. Thus, whilst sustainable development is a universal challenge, the practical response can only be defined nationally and locally. This is why there are many interpretations of sustainable development, deriving from different values and interests in different societies. For example, in Thailand, sustainable development is defined as holistic development which involves six dimensions: economic, social, environment, politics, technology and knowledge, and mental and spiritual balance. In Bolivia, there is a particular emphasis on political dimensions (e.g. good governance and participation) and on the cultural and spiritual identity of diverse indigenous peoples.

In Rwanda, sustainable development encompasses social, economic, and environmental dimensions, as well as ICT innovation and development, good governance, cultural and psychological development.

3.5.6 Evaluation procedure for session five

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learned or gained from the class teachings and discussions
Reflection on the short video about STUFF	The extent to which students have understood the content in the video in relation to what they have learned in the class
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in the critical thinking related to the class
Group discussion and presentation	The extent to which students have gained knowledge, applied their knowledge to issues, critically evaluated the issues and reflected upon the issues.

3.5.7 Required Readings

1. UNEP. (2010). *Green Economy Report: A Preview*. St-Martin-Bellevue: UNEP (pp. 1-10)
2. UNEP. (2010). *Green Economy: Driving a Green Economy through Public Finance and Fiscal Policy Reform*. Working paper Version. No. 2 (pp. 1-17).
3. Buchholz, A. R. (1993). *Principles of Environmental Management: The Greening of Business*. New Jersey: Prentice Hall. (Chapter Two, pp. 28-50).

Session Six: Sustainability tools and principles

3.6.1 Objective

To understand tools used to achieve and measure the level of sustainability in the long-term process of sustainable development.

3.6.2 Contents

The session contents are:

- Introduction
- Sustainability tools: Ecological Footprint Analysis; The Natural Step Framework; Building Sustainable Communities; The Global Reporting Initiative, etc.
- Sustainability principles

3.6.3. Intended learning outcomes

At the end of the session, students will be able to:

- Understand a variety of sustainability tools in promoting sustainable development process across the globe.
- Identify which tools they can adapt to the context of Rwanda.
- Understand the four main principles of sustainable development as elaborated in the Earth Charter.

3.6.4. Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with a brief introduction to the course
Discussions based on the readings (30 minutes)	The teacher facilitates the session
General discussions (30 minutes)	The teacher moderates the discussion with interactive student participation
Group discussion and presentations (One hour)	Students will be divided into three groups and will present their notes

3.6.5. Notes for the teacher

a. Introduction

Sustainable development needs systems thinking to effect change. There is a need for new scientific understanding of living systems and a new science of sustainable living. Blewitt (2008, p. 41) states that "complex adaptive systems identify problems and possibilities that are simultaneously multidimensional, dynamic and evolving". Blewitt continues:

> "A systems approach involves examining the connections and relationships between objects and events as much as the objects and events themselves. Changes in one component of the system will lead to changes in another, which in turn may lead to changes elsewhere. Interactions occur between system components that may cause both themselves and the system itself to change. Systems theorists write of negative and positive feedback loops, emergent properties, dynamic equilibrium, hierarchy, communication, evolution, system adaptation, and system breakdown. In general, the more complex a system and the more interlocking its feedback loop, the more robust and better able they are to resist change" (2008, p. 41).

Dennis (2004) identifies tools for the transition to sustainability as visioning, learning, networking, truth-telling, and loving. Without such tools, sustainability can be complicated to attain and people may find it difficult to maintain the economy and its environmental surroundings. Sustainability needs a value that can be measured by specific indicators. Blewitt (2008, p. 41) believes that the challenges arise in identifying "reasonable and manageable" indicators that effectively serve to determine whether these systems are providing relevant information and showing interconnection among the variables of the change.

b. Sustainability tools

1. Ecological Footprint Analysis

Why should people apply the ecological footprint for sustainability?

Box 5: Why the ecological footprint for sustainability

1. High level of natural resource consumption
2. Carrying capacity of nature exceeded already
3. Consumption distributed unequally: increasing poverty problems and increasing social problems around the world

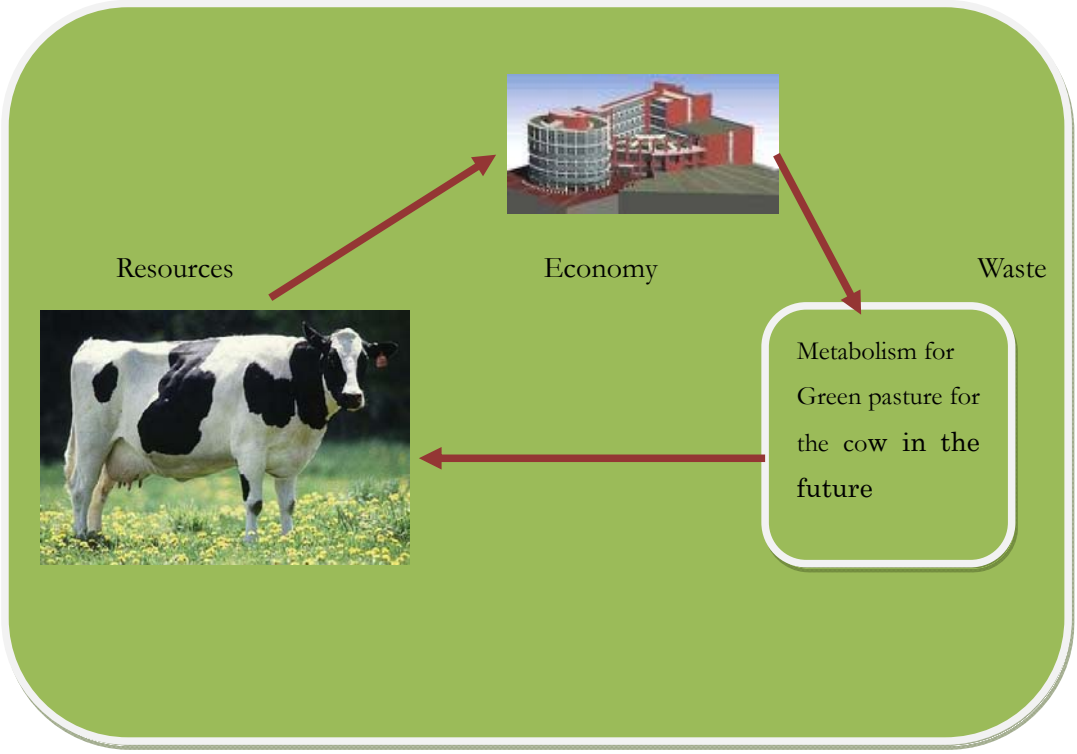
Blewitt (2008, p. 176) defines ecological footprint as the "total area of productive land and water required continuously to produce all the resources consumed by a region (or city) and to assimilate all the wastes produced by a particular population, wherever on Earth that land is located". It is a tool that enables us to estimate our resource consumption and waste assimilation requirements in a defined human population or economy in terms of a corresponding productive land area

(Wakernagel & Rees, 1996, p. 9). Blewitt (2008, p. 175) emphasizes that the ecological footprint analysis is a:

> …land-based substitute measure of the population's demands on natural capital. It assumes that it is possible to accurately measure a given population's resource consumption and waste production and these flows can be converted to a biotically productive area" and that "the footprint aggregates ecological flows associated with consumption and production, translating them into an appropriate land area serving as the key indicator and ready comparitor between demand for ecological space and its finite supply.

The demand from our natural economy should match the supply of our life basics. Blewitt (2008, p. 176) states that "the ecological footprint of any population can be used to measure its current consumption and projected requirements against available ecological supply and point out likely shortfalls". The ecological footprint enables people to attain more by using less material and energy which lead to improved welfare with less environmental damage. Additionally, it helps people make use of the waste generated from our natural economy to produce another productive economy; thus, it should help societies make choices about their demands versus supply on the future of the environment.

Figure 6: Example of an ecological footprint



Ecological footprint is like an "industrial metabolism." Consider the example above where a cow feeds on the grass as resources that eventually become waste and the waste is then used to fertilize the land, which later produces the green pasture for the cow once more.

2. The Natural Step Framework

The Natural Step is a non-profit organization founded in Sweden in 1989 by scientist Karl Henrik Robert. The Natural Step is both a nonprofit organization and a philosophy for sustainable development. In our context, we shall be focusing on its philosophy of sustainable development. Blewitt (2008, p. 176), quoting The Natural Step (2000) explains that The Natural Step framework is a methodology that has been designed to support organizations as well as communities to plan their activities in a more sustainable manner. He thinks that "the Natural Step focuses on the initial causes of problems, rather than the

environmental effects" and it "supports proactive rather than active environmental planning with investments and measures selected specifically to foster a sustainable trajectory offering long-term flexibility and short-term profitability" (2008, 176). The following table shows conditions and five levels of the Natural Step:

Table 13: Conditions and levels of the Natural Step

Conditions	Levels
Concentrations of substances extracted from the Earth's crust	Principles of ecosphere (social and ecological constitution): Historically, resource availability, productive ecosystems, purity, trust and equity in society decline while simultaneously population, resource demand and competitiveness increase
Concentrations of substances produced by society	System conditions (Principles of sustainability): This may be considered the success or achievement level.
Degradation by physical means	Strategy (Principles of sustainable development): Particularly back-casting from principles
Human needs are met worldwide	Activities (concrete actions): This includes phasing out fossil fuel use, switching capacity to renewable energy, or substituting metals that are naturally abundant in the biosphere or benign for ones that are scarce or potentially harmful.
	Tools (management): Such as environmental management systems, IS0 14001, life-cycle assessment, Factor 10, zero emission

Source: Blewitt (2008, p. 181).

Thus, the main purpose of The Natural Step (TNS) is to "develop and share a common framework comprised of easily understood, scientifically-based principles that can serve as a compass to guide a society toward a just and sustainable future" which emphasizes upstream principles rather than details, a shared framework and common language plus non-negotiable system conditions (Blewitt, 2008, p. 181).

2. Building sustainable communities

Sustainable development cannot be achieved without community participation, awareness and involvement. The community needs to be educated and given information about the policies for sustainable development in all dimensions. Communities should participate in identifying what is good, what is bad and what can be done to improve these policies (Blewitt, 2008, p. 186). He also argues that "for many sustainability practitioners, it is important to emphasize that everyone can make a difference – individuals, groups, governments, NGOs, large corporations – and encourage them to do so" (2008, p. 186).

For communities to develop and attain economic development, they need to be involved in all activities including problem identification, analysis, project implementation and evaluation and monitoring. Additionally, they can take the lead in environmental protection and management in their respective areas of residence, signifying that they are social engineers in the process of sustainable development.

3. The Global Reporting Initiative

The Global Reporting Initiative is a collaborating center of the United Nations Environment Programme that has produced a widely used sustainability reporting framework setting out principles and indicators which organizations may use to measure and communicate their economic, environmental and social performance (GRI, 2005; Blewitt, 2008). The Global Reporting Initiative (2009) states that:

> Sustainability reports based on the GRI framework can be used to benchmark organizational performance with respect to laws, norms, codes, performance standards and voluntary initiatives; demonstrate organizational commitment to sustainable

development; and compare organizational performance over time. GRI promotes and develops this standardized approach to reporting to stimulate demand for sustainability information – which will benefit reporting organizations and those who use report information alike.

Blewitt (2008, p. 185) asserts that it is also becoming increasingly necessary to "communicate development practices internally to employees and stockholders and externally to the general public. For some business, maintaining or improving market share may depend on how green the company is and appears to be".

c. Sustainability principles

The dominant patterns of production and consumption are causing environmental devastation, the depletion of resources, and a massive extinction of species. Communities are being undermined. The benefits of development are not shared equitably and the gap between rich and poor is widening. Injustice, poverty, ignorance, and violent conflict are widespread and the cause of great suffering. An unprecedented rise in human population has overburdened ecological and social systems. The foundations of global security are threatened. These trends are perilous – but not inevitable.

The Earth Charter, 2000

The Earth Charter (2000) has identified four main principles for sustainable development. It recognizes global partnership to realize universal responsibility towards environmental protection for sustainable development. The four principles are: Respect and care for the community life; Ecological integrity; Social and economic justice; and Democracy, nonviolence and peace.

3.6.6. Evaluation procedure for session six

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learned or gained from the class teachings and discussions
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in the critical thinking related to the class
Group discussion and presentation	The extent to which students have gained knowledge, applied their knowledge to issues, critically evaluated the issues and reflected upon the issues.

3.6.7. Required Readings

1. Blewitt, J. (2008). *Understanding Sustainable Development*. London: EarthScan. (pp. 41-50) and (pp. 173-198)
2. Wakernagel, M., & Rees, W. (1996**).** *Our Ecological Footprint: Reducing Human Impact on the Earth.* Ontario: New Society Publishers (pp. 9-12).
3. Buchholz, A. R. (1993). *Principles of Environmental Management: The Greening of Business*. New Jersey: Prentice Hall. (Chapter Two, pp. 60-70).
4. Earth Charter. (2000). *The Earth Charter: Vision, Ethics and Action*. San Jose: Earth Charter International Secretariat (pp. 1-4).

SECTION THREE: ECONOMIC DIMENSION

A brief note about the section

This section on economic development will mostly reflect what can support people to engage their economic activities to improve welfare. It is less about classical economics and much more about development economics that can help Rwandans to improve their economic abilities toward greater social welfare. Michael (2004, p. 4) supports this argument in stating that "economists are interested in new directions in their discipline because there is something for practitioners to learn, even from their rudimentary phase".

Economic development is broad and covers a variety of dimensions; thus, in this session four dimensions will be covered: Rwanda's approach to sustainable development in the dimension of sustainable economics; trade and sustainable development; private sector and sustainable development; agricultural transformation, science and technological innovation. These dimensions were selected on the basis that they are the ones that contribute to sustainable economic growth, supporting the welfare of middle class Rwandans. These dimensions are in reference to the stage of the country's development, its geo-physical location and nature and the current relevance and role that technology plays in the development process worldwide.

The framework for economic development

The concept of economic development is broad. In this economic dimension of sustainable development, I have narrowed it to developmental activities that contribute to the socio-economic welfare of the people:

- In ordinary terms, economic development is any activity, task, project or program that provides additional jobs and income, which in return improve the residents' quality of life.

- Technically, economic development refers to the expansion of the economic base through efficient allocation and use of available resources.
- In its broad sense, economic development suggests an improved way of living for which the people have indicated preference (Todaro & Smith, 2003).

In a wider context, green economy is one of the newest branches of economics with one primary goal: to help people improve their social and economic situations. The underlying philosophy, based economic development, is to always help people act upon their situations instead of simply reacting to them. This new thought within economic development represents a new way of thinking about community growth and stability (Todaro & Smith, 2003). Albeit, some emphasis should be placed on endogenous development using local human and physical resources to create new employment opportunities and stimulate new locally based economic activities.

As the new age of information contributes to the new economic paradigm; as Stiglitz (2005, p. 27) puts it, "information economics has already had a profound effect on how we think about economic policy, and is likely to have an even greater influence in the future". While classical economists had ignored the importance of environmental management in development, the new economics considers it essential if sustainable development is to be attained. Edwards (2005, p. 49) argues that "sustainable business practices are becoming recognized as essential not only for corporate survival but also for the long-term health of the planet". He continues: "the unbelievable success of the business sector in exploiting the Earth's minerals, forests, oceans and species has yielded a consumption-based world economy" that has affected the environment and people's welfare in some countries all over the world (Edwards, 2005, p. 27).

Adam Szirmai (2005, p. 1) explains that "economic development cannot be explained by economic factors only, and the concept of development includes more than mere changes in economic indicators".

The author defines economic development as growth in production and employment to which he calls it a change in structure of a country (2005, p. 5). MINALOC (2002, pp. 1-2) also indicates that "economic growth, alone, is not sufficient to bring about the necessary rise in the standard of living of the population. To vanquish hunger and poverty, growth must be Pro-Poor, giving all Rwandan's the chance to gain from the new economic opportunities".

Finally, the New Economic Foundation argues that economic development should reflect three important aspects of people's welfare: ecological sustainability, social justice and people's wellbeing. These three aspects are important in people's lives, and in the 21st Century they are highly recommended in the new development path, as they are indicated in the Agenda 21, as well as in the Earth Charter, mainly in the four major principles for sustainable development. The New Economic Foundation promotes personal and societal wellbeing by promoting the social, economic and environmental aspects of human beings, as stipulated mainly in world summits on sustainable development, like the Rio Summit of 1992 and Johannesburg Summit of 2002.

Session Seven: Trade and sustainable development

3.7.1 Objective

To understand the role of trade, particularly international trade as a factor in the sustainable development processes of a certain nation, especially developing nations.

3.7.2. Contents

The session contents are:

- Introduction
- Trade and Sustainable Development
- International trade for sustainable trade in Least Developed Countries (LDCs).

- International versus intra-national trade
- Trading system and developing countries
- Regional Integration and sustainable development
- Regional economic blocks and sustainable development

3.7.3 Intended learning objectives

The intended learning outcomes of the session are to**:**

- Understand the link between trade and sustainable development, particularly in the developing world and on focusing on Sub Saharan Africa as a case study;
- Recognize the role of regional trade blocs in promoting sustainable trade and development.

3.7.4 Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with a brief introduction to the course
Discussions based on the readings (30 minutes)	The teacher facilitating the session together with the students
General discussions (30 minutes)	The teacher moderates the discussion with interactive student participation
Group discussion and presentations (One hour)	Students will be divided into three groups and will present their notes

3.7.5 Notes for the teacher

a. Introduction

Regional and international trade plays a big role in the economic development of nations and becomes vital when environmental concerns are included in the trading system. Such a link leads to sustainable

development. The protection of the environment by the trading system benefits community welfare since all of the communities depend on the environment for their survival and health. The following session looks at the role of trade in promoting the welfare of the people by taking into account the nature of our ecology as one of the factors of promoting sustainability.

b. Trade and Sustainable Development

Trade is one of the most influential factors contributing to the development of societies within the different regions of Africa and in other regions of the developing world. For example, in Africa, regional economic blocs like ECOWAS[4], CEPGL[5], EAC[6], SADC[7], etc. have contributed to the welfare of citizens in the member countries. Albeit, the State has become more reluctant to respond to the needs of the people in Africa due to inefficiency and corruption by the governments, which have characterized the African states in the post-independence period. There is a lack of a favorable system to support trade and other developmental programs. However, some countries, like India, China and Singapore somehow have a trading system with Rwanda that helps GDP grow despite the fact that it does not work to promote the welfare of the poor.

As Meyer (2010, p. 4) explains in his review of the LDCs' track record in the past decade and their reaction to the crises of the past: "many LDCs are in a good position today to move towards a sustainable high-growth path and reduce absolute poverty through employment, following the example of more advanced developing countries". Murray (1997) clarifies that there has been an increasing

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[4] Stands for the Economic Community Of West African States

[5] A French acronym meaning *Communaute Economique des Pays des Grands* Lacs and in English it stands for the Economic Community of the Great Lakes Countries

[6] Stands for the East African Community

[7] Stands for South African Development Community

awareness about the link between economic development and environmental protection, which will be accelerated through free trade among nations. He notes that at the Earth Summit of the United Nations Commission for Sustainable Development held in 1992, the links between trade and environment were discussed, constraints were identified therein, and solutions were also drafted (Murray, 1997).

In the 21st Century, new models have been designed by some countries to protect their domestic trade or to cope with the imposition of trade barriers imposed on to them due to various reasons, like failure to institutionalize democracy, disputed relations, the global financial crisis and refusal to join regional trade blocs. Some of the major protectionist policies adopted by some countries include competitive production costs, a skilled workforce and nimble entrepreneurs across the state economy. For example, Romania and Bulgaria in Eastern Europe, who were denied access to join the EU in 2008-2009, adopted such policies and measures. In the period of financial crisis, the countries that adopted such polices, according to the World Bank Report 2010, include Latvia, Romania and Poland.

Additionally, the United Nation's Department of Economic and Social Affairs, Division for Sustainable Development recommends that:

> trade liberalization and globalization can have both positive and negative effects on sustainable development. There is a continued need to support efforts by developing countries to integrate themselves into and derive benefits from the multilateral trading system. At the same time, attention also must be given to enhancing the contribution of the multilateral trading system to sustainable development (United Nation's Department of Economic and Social Affairs, n. d).

c. International trade for sustainable trade in Least Developed Countries (LDCs).

Baumol and Blinder (1994, p. 872) state that "International trade is vital to the health of any nation" and

therefore necessary to achieve sustainable development. Baumol and Blinder (1994, p. 873) continue: "the earth's resources are not equally distributed across the planet". They explain that international trade is essential for the prosperity of the trading nations because:

> every country lacks some vital resources that it can get only by trading with others; each country's climate, labor force, and other endowments make it a relatively efficient producer of other goods; and specialization permits larger outputs and can therefore offer economies of large-scale production.

The United Nations Commission on Sustainable Development (UNCSD) also explains the importance of international trade in achieving sustainable development in the developing countries, stating that:

> the international economy should provide a supportive international climate for achieving environment and development goals by: promoting sustainable development through trade liberalization; making trade and environment mutually supportive; providing adequate financial resources to developing countries and dealing with international debt; and encouraging macroeconomic policies conducive to environment and development (Earth Summit Agenda, 2002, p. 1).

Michael P. Todaro and Stephen C. Smith (2003, p. 515) argue that "international trade has often played a crucial though not necessarily benign role in the historical experience of the developing world". Meyer proposes the best trade and investment policies of the international community regarding sustainable trade in developing countries. These best practices include:

- Concluding new-style trade agreements which maximize the positive effects on regional integration and market access of LDCs. These agreements should be enabling, comprehensive and practical.
- Industrialized and emerging market countries should put an end to the stalemate of the Doha Round and agree to conclude the negotiations which, with all their limitations, are to the benefit of LDCs.
- A new type of developed and developing countries investment agreement should replace the thousands of old style investment agreements which have proved to be of little use (2010, p. 6).

d. International versus intra-national trade

Different states/provinces/districts/regions within a country may be totally different in terms of their geographical ecosystems, availability of goods and services and food commodities. That is why intra-trade is so necessary for people and the nation to develop. If a country's policies promote this system of trade together with international trade, sustainable economic development can be achieved in conjunction with other sectors in progress. Baumol and Blinder (1994, p. 875) explains why this is important: "the logic of international trade is essentially no different from that underlying trade among different states; the basic reasons for trade are equally applicable within a country or among countries".

- **The law of comparative advantage**

This law is attributed to David Ricardo in his book entitled, "*Principle of Political economy and Taxation"*, from the year 1817 where he wrote about trade among countries where a country can have absolute advantage or comparative advantage over another country in the production of goods and services for exportation. These advantages allows countries to specialize in goods and services that they can produce efficiently for export and import other specialized goods from other countries, promoting trade for sustainable development and the welfare of the people.

Baumol and Blinder (1994, p. 876) states that "the gains from international specialization and trade are clear when one country is better at producing one item while its trading partner is better at producing another". For example, Rwanda produces the highest quality of coffee in Africa, but it is also liked by many people in the east African region. At the same time, Rwanda produces little sugar or cement. In comparative advantage terms, Rwanda can trade coffee in the region and also import sugar or cement from the neighboring countries. Notably, the neighboring countries also produce coffee despite the fact that the Rwandan coffee is of high quality. These countries can live without Rwandan coffee; thus, for Rwanda it is an absolute advantage since it can import what it does not produce in large quantities with fewer costs in terms of product costs and transportation costs, to mention a few.

Notably, in the Rwandan context, the country does not emphasize mono production as a one-sided policy, but rather it has to do with the nature of land terrain and fertility. For example, Rwanda emphasizes the practice of specialization in some food or cash crops all over the country from province to province and from district to district, which helps the local population improve their earning capacity. This is because the land fertility and terrain differs from place to place and cannot allow farmers to produce all necessary food or cash crops in the same region. Farmers grow all the food and cash crops available in the country but they must specialize in one commodity that is economically productive to them. Thus, the government has adopted the policy of specialization depending on the soil type and characteristics in a particular place. This policy has increased food production in recent years. Regions that used to be characterized by hunger are no longer victims of hunger. It has also led to intra-trade among districts or provinces and among regional neighbors like Uganda, Tanzania, Burundi and DRC.

Nowadays, every district has food reserves that are bought by the government to support farmers on relative prices, these reserves are controlled by the government for emergencies that may arise like droughts or natural disasters, and they can be supplied to the needy people if the need arises. Again, the

price given to these farmers is much better than the prices given by private traders who are always interested in abnormal profits.

In the historical experience of the African countries, international trade has played a crucial role in their development stages. During the 1980s, a lot of trade and development issues focused on understanding the spectacular export success (Kang, 2007). Although the principle of comparative advantage states, "country should, and under competitive conditions will, specialize in the export of the products that it can produce at the lowest relative cost", in most cases it has been a failure due to poor trade agreements and policies among countries, blocking sustainable development in terms of trade.

e. Trading system and the developing countries

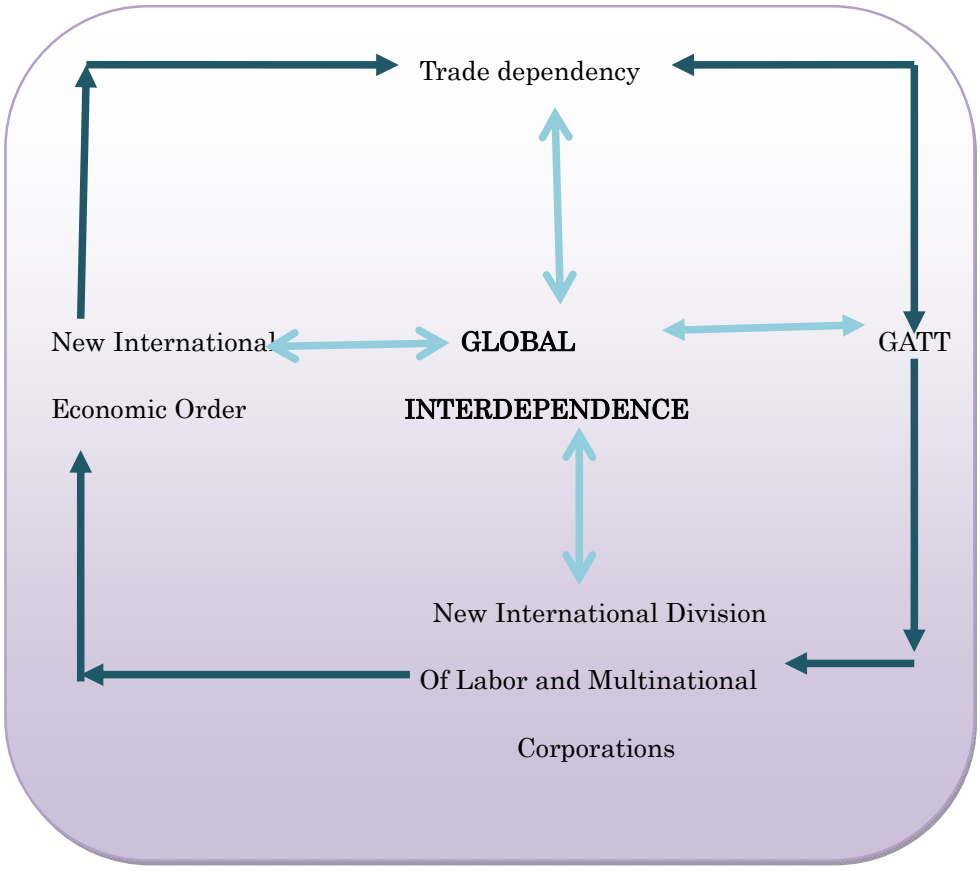
There are arguments that the international trading system is not conducive to facilitating development in developing countries. This is reflected in many government and civil society workshops, conferences and seminars, as well as in some books. Since the Uruguay Round of the World Trade Organization (WTO) meetings, developing countries have faced the implementation of WTO agreements, and market payoffs have been quite disappointing, since (Hoekman, Mattoo & English, 2002, p. 483). The criticism has been that the multilateral rules do not support the developing nations, making their comparative advantage with the Western world even more difficult.

Tussif and Lengyel (2002, p. 485) also argue that "since the coming of WTO into force, developing countries face new challenges and priorities related to their participation in multilateral negotiations. There is a broad consensus that market access has not improved as much as expected". Hoekman et al. (2002, p. 483) add that "many developing countries have inadequate (or no) representation in Geneva, which impedes their active engagement in negotiations and in the day-to-day functioning of the WTO". Some researchers explain that this underrepresentation is due to lack of expertise by the people in the

developing nations, which is not the case. Skilled people are available but the system seems to be discriminatory in nature.

Thus, the claim by Cho (1995) that there is trade dependency among all nations seems to be wrong, because the international system does not favor the developing nations. Below is the summary of this trade dependency, which, if there was a good trading system, could have been valid:

Figure 7: Trade dependency



Source: George Cho (1995, p. 15).

In the trade dependence system, the author believes that there is global interdependence, which is dependent on the new international economic order, new international division of labour, multinational corporations and the General Agreement on Trade and Taxation (GATT). This claim may be true only

among the developed nations, but not between the South and North, due to irregularities in the system, as explained above.

a. Regional Integration and sustainable development

- **What is regional integration?**

Regional integration is a process by which states within a particular region promote their level of interaction with regard to economic, security, political, and also social and cultural issues (Ginkel, 2004). Basically, regional integration is one of the recent trajectories in international relations. Both industrialized and developing countries in the world are members of regional integration agreements, and many belong to more than one body. The structure of regional agreements varies, but all have one thing in common: the objective of reducing barriers to trade between member countries.

According to OECD (2001), regional integration results into two main effects. These are: competition and scale effect, and trade and location effect:

> Competition and scale effects arise as separate national markets become more integrated in a single unified market. The larger market permits economies of scale to be achieved and brings producers in member countries into closer contact—and competition—with each other. Entrenched monopoly positions are eroded, promoting efficiency gains within firms. Suppliers from nonmember countries will also experience the change in market size and competition, inducing changes in the pricing of their imports and in their attitude to foreign direct investment (FDI). In contrast, trade and location effects arise when the regional agreement changes the pattern of trade and the location of production. The direction of trade changes as imports from partner countries become cheaper, encouraging consumers to substitute these for local

> production and for imports from the rest of the world—phenomena known as trade creation and trade diversion. These effects create real income changes for consumers and producers, as well as changing government tariff revenues.

This also creates dependency on imported goods and increases the vulnerability of a country as its local production has been eroded by cheaper imports. Lolette Kritzinger-van Niekerk (2005) highlights the two main preconditions for successful regional integration as: political, which encompasses domestic peace/security in countries, and political and civic commitment and mutual trust among countries. The related economic conditions related to stabilization are: minimum threshold of macro-economic and financial management in countries (price stability, realistic real exchange rates, etc.), and sufficiently broad national reforms to open markets.

- **Regional economic blocks and sustainable development**

Meyer (2010, p. 17), stressing the role of regional economic blocs in sustainable development argues that:

> as most LDCs have small and shallow markets, a division of labor in productive investment with neighboring countries will in many cases allow for a scale of production which make output and exports internationally competitive and enhance regional trade. Therefore, stronger regional economic communities as well as regional investment in economic infrastructure are essential conditions for a successful diversification strategy.

The Rwanda's Vision 2020 document states that regional economic integration is one of the crucial elements of achieving Vision 2020. To that end

> it is necessary to pursue an open, liberal trade regime, minimizing barriers to trade as well as implementing policies to encourage foreign direct investment. Furthermore, the need to adopt policies to promote competitive enterprises, exports and entrepreneurship rather than protecting failing industries cannot be over emphasized. Economic zones for Information Communication and Technology (ICT) based population will be crucial for enhancing competiveness of Rwandan firms (MINECOFIN, 2002, p. 19).

The government considers ICT a paramount factor in promoting trade in Rwanda, the East African region and Africa in general as it is being implemented in other developed countries. In 2010, an internet broadband cable was installed across the whole country so as to enable all people but especially the middle class Rwandans to trace business opportunities, help educated people to find jobs, and farmers to get better prices for their crops through e-market system. This internet broadband cable will provide access to information for all categories of people, especially the traders to buy and sell their goods without much time being spent travelling and being able to know prices without moving from one place to another, which will definitely be less costly compared to the traditional way of doing business (for detailed analysis, see session 10).

3.7.6. Evaluation procedure for session seven

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learned or gained from the class teachings and discussions
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in the critical thinking related to the class
Group discussion and presentation	The extent to which students have gained knowledge, applied their knowledge to issues, critically evaluated the issues and reflected upon the issues

3.7.7 Required Readings

1. Baumol, J. W., & Blinder, S. A. (1994). *Economics: Principles and Policy.* (6th Edition). London: The Dryden Press (pp. 870-910).
2. Meyer, M. (2010). *LDCs' Trade and Investment Challenges: A Report and Action Plan of a Group of NGOs in View of the Istanbul Summit of Least Developed Countries in May/June 2011.* Geneva: International Center for Trade and Sustainable Development (pp. 1-43).

Session Eight: Private sector and sustainable development

3.8.1. Objective

To understand how the private sector contributes to environmental degradation and its contribution to sustainable development.

3.8.2. Contents

The session contents are**:**

- Introduction
- Industries and sustainability
- Responsibility towards to every one's advantage
- Reducing emissions and toxic gases
- A short film entitled "*The Story of STUFF Project*".
- Corporate social responsibility (CSR) versus sustainable development

3.8.3. Intended learning objectives

The intended learning outcomes of the session are to**:**

- Understand the role of the private sector in promoting sustainable development and how industries contribute to greenhouse gas emissions in developed and developing countries
- Understand how CSR can contribute to sustainable development

3.8.4. Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with a brief introduction to the course
Discussions based on the readings (30 minutes)	The teacher facilitates the session together with three students
General discussions (30 minutes)	The teacher moderates the discussion with interactive student participation
Watching a film entitled *The Story of STUFF Project*	Students and teacher watch the film together

3.8.5. Notes for the teacher

a. Introduction

Willard (2002, p. 139) quoting Forest Reinhardt (1999), highlights the nexus between the private sector and sustainable development:

> Environmental problems are best analyzed as business problems. Whether companies are attempting to differentiate their products, tie their competitors' hands, reduce internal costs, manage risk, or even reinvent their industry, the basic tasks do not change when the word "environment" is included in the preposition…Companies aren't in business to solve the world's problems, nor should they be. After all, they have shareholders who want to see a return on their investments. That's why managers need to bring the environment back into the fold of business problems and determine when it really pays to be green…Imaginative and capable managers who look at the environment as a business issue will find that the universe of possibilities is greater that they are ever realized.

Big and small private companies in the North and South are contributing to environmental damage and

degradation. They also contribute to increased quantity of waste, emissions and energy consumption that eventually affect the environment and climate change. The outcome of such a way of doing business is not only felt by the clients, but also by the companies. What, in the new era of sustainable development, then, can these companies do to reduce or stop such negative impacts pollution? Natrass and Altomare (2001, p. 3), quoting Theo Colborn et al. in their book, "*Our Stolen Future"* explain that:

> the journey to a different future must begin by defining the problem differently than we have done now…The task is not to find substitutes for chemicals that disrupt hormones, attack the ozone layer, or cause still undiscovered problems, though it may be necessary to use replacements as a temporary measure. The task that confronts us over the next half century is one of redesign.

In other words, companies and industries should start to redesign the way they produce consumption goods and services since they are contributing greatly to increased emissions and environmental damage. It is clear that private sector involvement in the socio-economic development of communities is increasing since the 20th Century and contributing to the GDP of nations. But the main issues that are becoming questionable are: how is the production system sustainable? Is it addressing the question of climate change and environmental degradation?

The answer to this question is that companies should start thinking about the way they design products. They should think about how to produce products in the same way that they should think about how raw materials exist, so as to enable recycling. If this system is adopted, much can be attained towards sustainability. Such advantages may include producing less waste and ease in terms of management, using less energy and reducing emissions. On the side of the companies, they can also save money through sustainable approaches by reducing the cost of production.

In the environmental perspective, consider a company that uses minerals to manufacture products that we consume. These minerals are mined underground, and in the process, environmental damages are not accounted for; hence, the necessity to rethink our design system in producing commodities that we need in our daily lives in order to adopt a recycling policy. The argument by Natrass and Altomare (2001, p. 3) supports this claim, as McDonough and Braungart (2002) also stated below:

> the natural world is becoming more and more impaired everywhere on the planet in its capacity to continue to provide us with the vital services we need to exist and to thrive with dignity and pleasure. The reality is that in many parts of the world, and for vast growing numbers of people, life no longer provides much dignity or pleasure. Evidence is mounting that living systems throughout the world are in increasing jeopardy" and that "today, more and more people throughout the world are becoming concerned that the basic design of our entire industrial society is both faulty and inadequate for the long-term voyage that is the dream of humanity. The precious cargo of our family and friends, the multitude of other life forms, and all that we hold dear is in danger while we maintain our present course.

The recognition that the natural world is not different from the human economy, as Natrass and Altomare (2001, p. 3) have put it, requires awareness as well as political, economic and social reforms in systems and our communities. The current competitiveness in the market in the capitalist world should be rethought regarding ways of utilizing resources for eco-efficiency by applying appropriate technologies and relevant environmental protectoral policies. The partnership of the public and private sectors would be a great catalyst in achieving the above concerns, with collective social responsibility towards community welfare.

b. Industries and sustainability

The protection of the environment by the industries is not a new phenomenon, as many researchers have been blaming companies for being irresponsible. What should be blamed, according to academia today, is the system of design which is contrary to the current environmental demands. This is where redesigning the system is relevant in order to facilitate recycling processes to reduce environmental damage and emissions. It has been in existence since the industrial revolution in the 18th Century, except that the negative impact of pollution by the industries on the ozone layer was not taken into account then. McDonough and Braungart (2002, p. 45) explain that:

> The drive to make industry less destructive goes back to the earliest stages of the Industrial Revolution, when factories were so destructive and polluting that they had to be controlled in order to prevent immediate sickness and death. Since then the typical response to industrial destruction has been to find a less bad approach. This approach has its own vocabulary, with which most of us are familiar: reduce, avoid, minimize, sustain, limit, halt. These terms have long been central to environmental agendas, and they have become central to most of the environmental agendas taken up by industry today.

Thus, one can assert that there is a strong nexus between industries and environmental sustainability due to the bad gases generated by these industries that affect the climate and damage the environment. The analysis made by Natrass and Altomare (2001, p. 4) about the environment and industries is highlighted as follows:

1. Industrial structure is based on a faulty design: Ours is take-make-waste society that violates the conditions for sustainable human life on Earth. To understand the problem,

we need to take a natural systems view of our society and its relationship to the environment.

2. The issue is a complex one in their many dimensions and that the issues therein are easy to understand in the framework developed by The Natural Step.
3. Not so late for the industrial society to take actions towards the environment. Blame cannot be attributed to them, what is necessary is to necessary solutions so as to change our present so as to have a better future.
4. There is a responsible humanity. Some companies have started taking strong steps towards the environmental protection though there are some countries that still ignore the industrial impact on the environment, like the US and Japan. The two countries refused to sign the Kyoto Protocol towards reducing emissions that damage the ozone layer.
5. We can learn from the above companies and innovative people who managed to take serious measures towards the sustainability of our industries vis-a-vis the environmental protection.

For effective sustainable development, governments should ensure regulatory frameworks for industrial activities. Such frameworks should be measurable with performance standards and there should be access to information to verify compliance. Willard (2002, p. 152) proposes the five steps: "Stop subsiding the wrong things, and shift taxes from labor and profits to resource use and pollution; Pass tough regulations to support the right things; Ensure there are enough inspectors to catch violators; Prosecute the polluters; and Publicize which is best and who is worst".

c. Responsibility to every one's advantage

To protect the environment is a responsibility for the government, private sector and citizens. Small and bigger companies have the same responsibility despite different capacities towards protecting the natural world. Willard (2002, p. 151) ascertains that "even the best companies will only be sustainable if the

institutions and markets surrounding them have reshaped to support and promote sustainability", an argument that encompasses the concept of collective responsibility between small and big companies. Companies need to start understanding that they also have a role to play in protecting the environment in partnership with other stakeholders in the open market of production.

Nevertheless, nowadays companies are trying to look at the environmental point of view as they produce products and analyze consumption behaviour, specifically since the Kyoto Protocol came into force in 2005 by the most industrialized countries and the European Union member states. This is again explained by Natrass and Altomare (2001, p. 15), who clarify that "companies are moving beyond pollution prevention that focus on reducing environmentally harmful outputs, to eco-efficiency which looks at 'industrial metabolism'". Frankel proposes a new vision for better environmental protection and an eco-efficiency system that companies need to keep in mind:

- Progress toward zero waste: rather than seeking to reduce waste, companies will come as close as possible to eliminating it altogether;
- Whole systems thinking: addressing problems at the level of the entire system, rather than the parts, using a design approach that allows strategies to convince something completely new rather than simply to extrapolate the future from the present;
- Looking beyond internal operational sustainability and making the world's problems the company's problems; and
- Moving beyond the focus on environmental issues to a focus on sustainable development

d. Reducing emissions and toxic gases

Growing industries and factories over the last centuries have done more good in accelerating economic growth in different countries due to development and inventory of technologies. On the other hand,

these technologies have contributed to environmental damage, especially among manufacturing companies, the leaders in polluting the natural economy. Thus, it is the responsibility of both public and private companies to reduce emissions and toxic gases that damage the environment. McDonough and Braungart (2002, p. 54) assert that "reducing the amounts of dangerous toxins and emissions released by industry is an important eco-efficient goal. It sounds unassailable, but current studies show that over time even tiny amounts of dangerous emissions can have disastrous effects on biological systems". The authors (2002, p. 62) propose a system of industry to reduce toxins and emissions, which is only possible when the policy of recycling is adopted:

> …release fewer pounds of toxic wastes into the air, soil, and water every year, measure prosperity by less activity, meet the stipulations of thousands of complex regulations to keep people and natural systems from being poisoned too quickly, produce fewer materials that are so dangerous that they will require future generations to maintain constant vigilance while living in terror, result in smaller amounts of useless waste and put smaller amounts of valuable materials in holes all the planet, where they can never be retrieved.

On the international level, policies have been put in place to reduce emissions and toxic gases by some Western countries. The Kyoto Protocol was adopted in Kyoto, Japan on December 11, 1997 and entered into force on February 16, 2005. It was an international agreement linked to the United Nations Framework Convention on Climate Change, and the major feature of the Kyoto Protocol was to set binding targets for 37 industrialized countries and the European community for reducing emissions. There has been progress in implementing this protocol but the challenge remains that little has been done, and some countries like US and Japan have refused to sign the protocol. Aside from the fact that it is expensive to implement, conflict of interest also remains a major obstacle in the industrialized countries.

e. Corporate social responsibility

Blewitt (2008, p. 138), quoting Holme and Watts (2000) defined corporate social responsibility as a "continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large". However, Basu and Palazzo (2008) define corporate social responsibility as a where companies integrate social and environmental concerns in their business operations as well as involving their stakeholders. According to the two definitions, the commonality is that companies or corporations should work within the context of promoting social, economic and environmental concerns for the indigenous structure of the locations where they operate, promoting local capacities and skills while respecting the local culture and addressing the broad sustainability challenges and natural diversity.

Corporate social responsibility needs to accommodate a diversity of stakeholders such as business corporations, local populations, local leaders, the church and youth. This is only achievable when CEOs of the companies are assisted by their employees to make it happen. The Need for common goals and vision is very essential to achieve the goals of corporate social responsibility (Blewitt, 2008, p. 150). He asserts that "all businesses should have a social, ecological and moral purpose, should seek to create shared value, recognizing that there will be some issues best left to NGOs and governments" (2008, 150). The emphasis here is on cooperation between governments and NGOs to improve the welfare of the people in order to address their needs. In the context of sustainable development, responsive business owners must operate as social entrepreneurs in order to maximize the output of their business strategies, taking into consideration the natural economy, climate change and the positive impact of both parties.

3.8.6. Evaluation procedure for session eight

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learned or gained from the class teachings and discussions
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in the critical thinking related to the class
Discussion on the film entitled *The Story of STUFF Project*.	The extent to which students have analyzed the film in relation to the session contents, mainly on redesigning our commerce

3.8.7. Readings

1. McDonough, W., & Braungart, M. (2002). *Cradle to Cradle: Remaking the Way we Make Things***.** Sydney*:* North Point Press (pp.130-182).
2. Natrass, B., & Altomare, M. (2001). *The Natural Step for Business***.** Ontario: New Society Publishers (pp.1-29).
3. Blewitt, J. (2008). *Understanding Sustainable Development*. London: EarthScan (pp. 120-143).

Session Nine: Agricultural transformation

3.9.1 Objective

To better understand the relevance of agricultural transformation in the process of sustainable development. This sector is important in the development of Rwanda because over 90% of the population depends on agriculture (MINECOFIN, 2002).

3.9.2 Contents

The session contents are:

- Introduction
- Rwandan need for agricultural transformation
- Rwandan context of implementing transformative agriculture

3.9.3 Intended learning objectives

The intended learning outcome of the session is to understand the concept of agricultural transformation and its application in the Rwandan context.

3.9.4 Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with brief a introduction to the course
Discussions based on the readings (30 minutes)	Three students read the discussion
General discussions (30 minutes)	The teacher moderates the discussion with interactive student participation

Group discussion and presentations (One hour)	Students will be divided into three groups and will present their notes

3.9.5 Notes for the teacher

a. Introduction

In Rwanda, like in other countries in Sub Saharan Africa, large portions of populations depend on agriculture as the main economic activity, and it is largely subsistence farming. Such agriculture lacks application of technological innovation to increase production. Though many countries in Africa, including Rwanda, have started adopting policies and measures towards transforming agriculture, there is still much to be done. Constraints like citizens' resistance to change due to their illiteracy and lack of funds to invest in the sector still remain as challenges in the process.

b. Rwandan need for agricultural transformation

There are various reasons that explain why Rwandan local farmers should adopt the culture of agricultural transformation in the fastest ways possible over other farmers in the East African Community Member States or in the Central African region. Despite the fact that the highest percentage of citizens in the region depend on agriculture as the main economic activity, Rwanda has particular reasons that if not solved, many Rwandans will die of hunger or suffer from chronic poverty in future decades.

Firstly, it is a very small country with 26,338 square kilometers only and with over 11 million people with a high growth rate of 3% per annum, leading to an increasing number of people without land or with limited land for agriculture (UNDP, 2009). According to the Rwandan Ministry of Agriculture and Animal Resources, Rwanda is the most densely populated country in Africa with 300 people per square kilometer (and up to 600 people per square kilometer of arable land). How limited land is shows how effective, modernized agriculture is paramount. Moreover, 60% of all households have plots of land of

less than 0.5 hectares. The national average is about 0.75 hectares (MINECOFIN, 2002b). Meanwhile, FAO (as cited in MINITERE, 2004b) estimates that a 0.9 hectare plot is economically viable for an ordinary family (Gasarasi & Musahara, 2004).

Secondly, the Rwandan topography is mostly hilly or mountainous in nature, making land cultivation by machines quite difficult. Thirdly, 90% of the total population depends on subsistence agriculture as the main economic activity and 95% of them are illiterate (Gasarasi & Musahara, 2004). Therefore, all of the above mentioned issues make it necessary for Rwanda to speed up or improve the already existing policies to transform agriculture and improve productivity toward transforming the economy.

Todaro and Smith (2003, p. 419), analyzing the importance of agriculture in the national economic development of developing countries, identifies three basic complementary elements, necessary for improving socio-economic welfare:

> Include: (1) accelerated output growth through technological, institutional, and price incentive changes designed to raise the productivity of small farmers; (2) rising domestic demand for agricultural output derived from an employment-oriented urban development strategy; and (3) diversified, nonagricultural, labour-intensive rural development activities that directly and indirectly support and are supported by the farming community.

Scott Anthony Waldron (2009, pp. 25-27) explains how traditional agriculture modernized and how it contributed to the economic development of countries from 1950s-1960s; from 1970s-1980s; and from 1990s-2000s, especially in the West and in some Asian countries. For developing countries, including Rwanda, to attain sustainable advancements in improved output, yield or production, there should be a shift from subsistence to modern agriculture and cattle rearing by applying new technologies and innovations (Todaro & Smith, 2003, p.450). The following table indicates the necessary conditions for agricultural transformation, rural development and sustainable agriculture in developing countries:

Table 14: Conditions for agricultural transformation

Sources of small-scale agricultural progress	**Conditions for general rural advancement**	**Objectives of sustainable agriculture**
1.Technological change and innovation 2.Appropriate government economic policies 3.Supportive social institutions	1.Modernizing farm structures to meet rising food demands 2.Creating an effective support system 3.Changing the rural environment to improve levels of living	1. To conserve and enhance the natural resources that agriculture uses and shares. 2. To be compatible with other environmental resources that are affected by agriculture. 3. To be proactive in protecting the agri-food sector from the environmental impacts caused by other sectors and factors external to agriculture.

Source: Todaro & Smith (2003, p. 450); Art Wilson (1995, pp. 19).

The authors explain that the above components are all interrelated and go hand in hand. The absence of one of the factors can affect the progress of the other. The above dimensions are essential for sustainable development in the developing countries and can only be achieved through governments' commitment and responsibility toward their citizens.

c. Rwandan context of implementing transformative agriculture

According to Rwanda's Vision 2020, 90% of the total population depends on agriculture as the main economic activity, whereas only 10% of all agriculturalists practice commercial agriculture. Rwanda being a hilly country makes land degradation a major problem in agricultural production, and the use of machines in most cases is not possible due to undulated topography with thousands of hills and marsh lands. Soil erosion affects farmers in many parts of the country, except the eastern province which is less affected compared to other provinces due to its being naturally flatter.

Consequently, environmental sustainability has been promoted by the government to fight soil erosion as a means to support agriculture throughout the country. Though a majority of the farmers still use traditional mechanisms of farming, the government has taken considerable measures to improve and adopt modern ways of farming. In the Rwandan context, sustainable agriculture means: increased agricultural production, crop rotation, application of organic methods of farming, soil conservation, irrigation efficiency, protection of water and subsidies for sustainable agriculture.

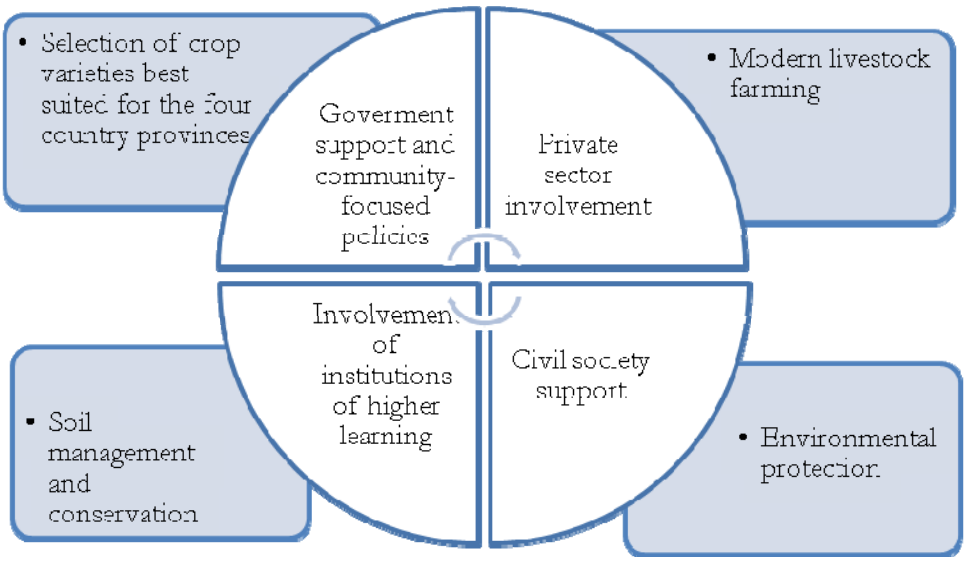
- **Growing selective cash or food crops**

Taking into account the land topography of the country and soil fertility that differs from province to province, the government has taken a strategy of sensitizing rural populations to grow selective cash and food crops, taking into consideration land fertility and soil characteristics, climate and crops commerciality. For example, each province and district grows food and cash crops that are compatible with the soil characteristics and land topography of the place. The adoption of better methods of farming aims to improve agricultural production to improve their life standards. Construction of terraces and adopting irrigation practices are among best practices that may be practiced by every citizen as a way of improving agricultural protection, especially in hilly districts of the western, northern and southern provinces.

- **Soil management and environmental protection**

The country being mountainous in nature causes it to be affected by soil erosion, especially during rainy seasons, thereby making land conservation a priority across the whole country. To combat soil erosion, the government has emphasized and sensitized the population to dig land terraces on their lands, and it has become a custom for all Rwandans. To maximize soil sustainability, farmers apply organic farming methods, crop rotation and irrigation efficiency to maintain soil sustainability. Regarding environmental protection, the government has taken measures to combat deforestation across the whole country. Charcoal burning has been banned and it is now required that it be done through being granted permission by concerned authorities in both public and privately owned forests. Afforestation and reforestation have been encouraged to promote agroforestry, protecting wetlands and combating soil erosion in all parts of the country as a way of environmental management and protection.

Figure 8: Framework for Rwanda's sustainable agriculture



The diagram indicates the Rwandan approach to sustainable agriculture, where government's role leads the process, supported by the private sector, civil society and institutions of higher learning or agricultural research institutions in the country. They mainly focus on soil conservation and management, environmental protection, promoting modern livestock farming and selective crops that best suit certain

regions of the country.

3.9.6. Evaluation procedure for session nine

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learned or gained from the class teachings and discussions
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in the critical thinking related to the class
Group discussion and presentation	The extent to which students have gained knowledge, applied their knowledge to issues, critically evaluated the issues and reflected upon the issues

3.9.7 Required Readings

1. Wilson, A. (2009). *Agriculture and Sustainable Development: Policy Analysis on the Great Plains*. New York: International Institute for Sustainable Development (pp. 1-45)
2. Waldron, A. S. (2009). *Modernizing Traditional Agriculture in China through the Development of Higher Value Agrifood Chains: The Case of the Beef Industry*. Thesis Submitted for the Degree of Doctor of Philosophy Conferred by the University of Queensland in 2009. Faculty of Natural Resources, Agriculture and Veterinary Science. The University of Queensland (pp. 1-30).

Session Ten: Technological Innovation and Sustainable Development

3.10.1 Objective

To clarify the importance of science, technology and ICT in the three aspects of sustainable development: social, economic and environmental, but particularly in the economic dimension.

3.10.2 Contents

The session contents are:

- Introduction
- Science and Technology Innovation versus Sustainable Development
- Science, Technology and ICT in Rwandan Development Process

3.10.3 Intended learning objective

The intended learning outcome is to understand the role of science, technology and ICT in promoting sustainable development.

3.10.4 Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with a brief introduction to the course
Discussions based on the readings (30 minutes)	The teacher facilities the session
General discussions (30 minutes)	The teacher moderates the discussion with interactive student participation

Group discussion and presentations (One hour)	Students will be divided into three groups and will present their notes

3.10.5 Notes for the teacher

a. Introduction

Science, technology and ICT are important in any development process of a country. For example, technology and ICT are becoming cross-cutting dimensions in all sectors ranging from education, health, economy, business, production, and trade, to mention but a few. The students must be able to understand this new trend of technology, and ICT may help them to better plan for the future of the people they work in the different developmental activities.

b. Science and Technology Innovation versus Sustainable Development

Science and technology play a big role in the development of a country, as well as in the sustainability of the economy. The developed nations climbed to the top of the economic ladder where they are today as a result of the application of science, technology and innovations in agricultural and industrial activities. Buchholz (1993, p. 9) states that "changes in technology have expanded the variety of products available for consumption, increased their quantity through increases in productivity, made products and packaging more complex, and raised the rate of obsolescence through rapid innovation". The International Council for Science and Technology for Sustainable Development argues that Science and technology are "increasingly recognized to be central to both the origins of sustainability challenges and to the prospects for successfully dealing with them" (2002, p. 6) and that science and technology are not equitably accessible to many in terms of the sustainable development of different societies.

Therefore, this session will be aimed at analyzing how science and technology are relevant to the

development of societies in developing countries, including Rwanda, and what can be done in terms of policies and the involvement of both the public and private sectors.

In the Rwandan context, for poverty eradication and development in general, the government of Rwanda considers Science, Technology and Innovation Capacity as crucial contributing factors in the process (Republic of Rwanda, 2002, p. 20; MINECOFIN, 2007, p. 71). The government has embarked on promoting science disciplines in secondary schools and higher institutions of learning as well as promoting the use of technology in all socio-economic activities in all dimensions where possible.

The application of science and technology in the sustainable development of societies should focus on the nature of a society and its socio-ecological system as the unit of analysis. Certainly, this unit of analysis should not only focus on the biogeochemical, climate, ecological and speciation processes, but also on politics, social institutions, human behaviour, technological innovation, markets and the political economy (International Council for Science, 2002, p. 20).

Governments should not respond to the current technological fixes to achieve sustainable development; instead, they should put much emphasis on the more radical technological innovations. However, much emphasis should focus on economic, political, environmental and social factors which are paramount in shaping technological innovations for the future. This requires a long-term planning process and a "preparedness to bear short-term economic costs while industry readjusts" (Beder, 1994, p. 14).

c. Science, Technology and ICT in Rwandan Development Process

Science, Technology and ICT can play a big role in the development of any country in the same way that it can affect the development of the country when strong measures are not taken into account. For example, technology can have a negative impact on the environment or cause pollution which affect people's health and welfare, as well as the environment that people depend on. Therefore, this part analyses the role of science, technological innovation and ICT in the development process of Rwanda.

- **Science and technology in sustainable development of Rwanda**

Rwanda, as a developing nation at the heart of Central Africa, has implemented sound policies to develop the discipline of sciences and technology. For proper implementation of the decision to promote sciences and technology, the government of Rwanda created a new Ministry for Science, Technology and Scientific Research, which was separated from the Ministry of Education in 2005. This ministry is under the President's office for proper control and promotion in order to accelerate the development of the country. Within this framework, some educational institutions have been created to boost human capacity in the field and to help promote improved services in both the public and private sectors. In addition to the National University of Rwanda, which has had the Faculty of Sciences since 1970, another institution of higher learning that was started by the government after the genocide is the Kigali Institute of Science and Technology (KIST), created in 1997, and other colleges like ETO Muhima, ETO Gitarama, etc.

Both in secondary schools and higher institutions of learning, sciences and technology are being promoted by the government where students studying the sciences are supported more than others studying humanities and arts. Despite this initiative to promote sciences and technology in the country, there are challenges that remain: limited resources, such as teachers, equipment, laboratories and limited infrastructure. Again, with the application of technology in some activities like agriculture and business,

there are no clear policies to regulate the negative effects, like pollution and the waste that is generated. Coupled with poor waste management all over the country, such impediments affect the environment, constraining the sustainable development processes. In the school curricula, there is no relationship between science, technology and environmental protection, or even the linkage with public awareness. Also, there is no policy or law that promotes the sciences and technology or focuses on its outcome on the social, economic and environmental aspects. This reality promotes weak development leading to unsustainable development. Such a crucial idea of promoting science and technology while focusing on their negative effects is highly recommended. The following table indicates the strengths and weaknesses for sciences and technology in Rwanda:

Table 15: Strengths and weaknesses for sciences and technology in Rwanda

Strengths	**Weakness**
Political will in the central government	Limited awareness at the local level
Limited infrastructure	Lack of enough funds
No link with sustainability, only focus on economic development	Low linkage with environmental protection and social improvement
Promoted in schools	No clear or defined linkage with SD

The table below indicates the strengths and weaknesses of science and technology versus sustainable development in Rwanda. This section intends to bring awareness to having such strong links with sustainable development in the country.

- **ICT and development**

Rahul Tongia, Eswaran Subrahmanian and Arunachalam (2005, p. 4), in their book entitled *Information and Communications Technology for Sustainable Development: Defining a Global Research Agenda* explain that "**t**he rapid

diffusion of internet and new communications technologies such as mobile telephony suggest that innovations from ICT for SD can also be faster than the progression shown by earlier technologies". How is it taken into account by Rwanda? Is ICT making any progress on the development of the country? Information, Communication and Technology (ICT) has been promoted and supported by the government to improve development and promote public and private services, as well as trade. ICT is a cross cutting dimension in all developmental activities in the country. Within such initiatives, there are activities underway in need of improvement:

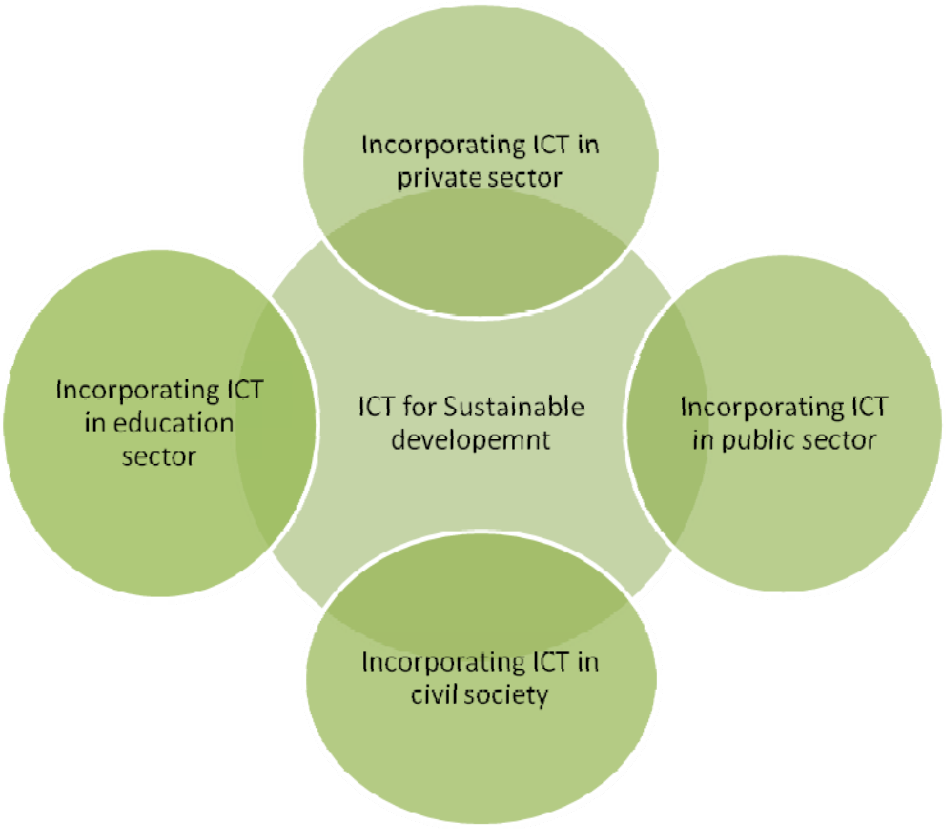
- An internet broadband cable has been installed over the country to facilitate all people to access internet at lower cost. It will again facilitate traders to search and sell their goods through the internet, help farmers to find prices for their production easily without moving from their areas of residence, as well as promote services in all sectors and help people to search for employment.
- Telecenters, which have been established in every district in the country have promoted internet access but still remain insufficient to help people make use of ICT in the development process. Many of the computers in those telecenters have been broken down and lack maintenance. Words and policies should match actions if development is to become a reality and not only a very far-off vision, as it has been in most of Sub-Saharan Africa.
- "One laptop per child" policy – the government has designed policies to promote science and ICT in all schools – from primary to secondary schools and mostly in higher institutions of learning. This policy was designed in 2007 and was delayed in its implementation due to inefficiency and corruption in the Ministry of Education. Corruption is strongly punished by law in Rwanda and culprits have paid for it in that Ministry. This delayed policy was implemented in August 2010, whereby over 300 primary schools have been given laptops to promote the use of computers at an earlier stage.
- The Majority of public and private institutions can access internet in the whole country at a cheaper cost. This was facilitated by the increase of companies that supply internet from one to

five companies. Internet can be supplied through two major channels: broadband and internet modems. Business people can easily access internet by the use of modems provided they have their personal computers or mobile phones.

- ICT speeds service delivery. For example, the Department of Migration and Immigration in the Ministry of Internal Affairs has ranked Rwanda as the top country in delivering visa application services online, and the applicants get a response within only 24 hours. Other public offices, as well as private sector services, should adopt such a policy to deliver quick services to the citizens or customers.

ICT can play a crucial role in the sustainable development process of Rwanda, particularly regarding awareness of sustainability principles, ethics and values. This has not yet been done, and yet it can help the government to educate the population about sustainability. It needs a framework that can be applied to the various dimensions of life and to the system in which it operates to serve the interests of citizens in the process of sustainable development. In this curriculum, I propose the following framework to achieve sustainable development and the green economy:

Figure 9: Proposed ICT incorporation in SD



It is necessary for the government of Rwanda to adopt ICT for sustainable development in order to avoid gaps that may be created by the new errors of science and technology that developed countries are facing today. This is because "nowadays, it is apparent that most developing countries are facing the challenge of the "Digital Divide" either internally, regionally or with the developed countries. With no doubt, science and technology is the core element for development, and "we can never solve the problem of environmental pollution without addressing the core issue of development. This development shall be different in approach from conventional ones, and shall focus on the advancement of science and technology" (Qiming, 2008, p. 1). Rwanda should develop improved ICT infrastructures to promote ICT for sustainable development by targeting the public and private sectors, and implementing it in schools by incorporating the relevance of science, technology and ICT in school

curricula and in civil society. This will help improve awareness across all sectors in the country, which will also solve the problem of information sharing with the rest of the world, in issues related to ICT for sustainable development.

3.10.6 Evaluation procedure for session ten

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learned or gained from the class teachings and discussions
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in the critical thinking related to the class
Group discussion and presentation	The extent to which students have gained knowledge, applied their knowledge to issues, critically evaluated the issues and reflected upon the issues

3.10.7 Required Readings

1. Gilberto, C. G. (2002). *Science and Technology for Sustainable Development: A Latin American and Caribbean Perspective*. Santiago: United Nations (pp. 1-40)
2. Beder, S. (1994). *The Role of Technology in Sustainable Development*: *Technology and Society*, Vol. 13, No. 4. Winter. (pp. 1-19).

SECTION THREE: SOCIAL DIMENSION

A brief note about the section

As already mentioned in other dimensions of sustainable development, the social dimension is one that conventional economics did not address. Promoting the social welfare of the people is essential in sustainable development because without it, people cannot be motivated to engage in the sustainability processes. The sessions in this section include:

- Education and Sustainable Development
- Gender and Sustainable Development
- Health and Sustainable Development

Session Eleven: Education and Sustainable Development

3.11.1 Objective

To better understand the role of education in sustainable development processes. Education is a crucial factor in promoting awareness towards sustainability policies, measures, ethics and principles.

3.11.2 Contents

The session contents are:

- Introduction
- Education and sustainable development

3.11.3 Intended learning outcome

The intended outcome is to understand the importance of education in promoting sustainable

development.

3.11.4 Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with a brief introduction to the course
Discussions based on the readings (30 minutes)	Three students read the discussion supported by the teacher
General discussions (30 minutes)	The teacher moderates the discussion with interactive student participation
Group discussion and presentations (One hour)	Students will be divided into three groups and will present their notes

3.11.5 Notes for the teacher

a. Introduction

Education plays a big role towards sustainable development through awareness and educational institutions. Sustainable development will be possible if it is enshrined in the curricula of schools from primary to higher institutions of learning.

a. Education and sustainable development

The UNESCO (2008, p. 5) Mid-Term Strategy 2008-2013, emphasizes that:

> "Development and economic prosperity depend on the ability of countries to educate all members of their societies and offer them lifelong learning. An innovative society prepares its people not only to embrace and adapt to change but also to manage and influence it. Education enriches cultures, creates mutual understanding and underpins peaceful societies".

Education improves cognitive capacity and individual skills, which also increase productivity in a work environment (Birdsall & Sabot, 1998, p. 424). Szirmai (2005, p. 222) states that "education is [a] necessary, but not sufficient condition for development", but that perhaps it is an important factor or driving force. Is education an important factor in Rwanda? Perhaps, yes. This is because the Rwandan government believes that its population is the resource of the country given a lack of natural resources.

Education can be a driving force in Rwanda simply because when many people are educated, they can easily get access to employment within or outside the country. The illiteracy rate in Rwanda is high, as MINECOFIN (2002) indicates that 48% of Rwandans are unable to read and write. Use of technology in agriculture and other sectors is limited due to lack of adequately trained people in animal husbandry, retarding modernization of the sector as well as other sectors like business, technology application in development programs, community development, and socio-political institutions, to mention but a few (MINALOC, 2008).

Huckle and Sterling (1996, p. 2), quoting the United Nations Conference on the Environment and Development (1992) argue that "education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues… it is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behavior consistent with sustainable development". The Brundtland Commission of 1987 and the Earth Charter also consider education to be a primary driver in promoting awareness, values and attitudes, as well as in acquiring relevant knowledge to promote sustainability at the international, national and local levels. Though institutional development and technological innovation can take place without the education sector in some instances, education plays a crucial role in accelerating the process as well as promoting awareness in the public. This is mostly significant in the developing countries, especially in the African countries where illiteracy is too rampant and resistant to change.

The Earth Charter, under the fourth principle of 'democracy, nonviolence and peace', Section Fourteen states that governments should "integrate into formal education and life-long learning the knowledge, values and skills needed for a sustainable way of life". The arguments behind the principle are to:

- Provide all, especially children and youth, with educational opportunities that empower them to contribute actively to sustainable development.
- Promote the contribution of the arts and humanities as well as sciences in sustainable development
- Enhance the role of the mass media in raising awareness of ecological and social challenges, and
- Recognize the importance of moral and spiritual education for sustainable living (Earth Charter, 2000).

The principles above are very relevant in promoting sustainable development, especially in a country like Rwanda where such principles are not included in the school curricula in public or private schools across the country. To this end, education can play a big role in promoting the science of sustainable development particularly among the young generation. Nevertheless, the principle also promotes treatment of all living beings with respect and consideration, which can also be promoted through education. Section Fifteen of the Charter under the same principle identifies the reasons. It helps:

- To prevent cruelty to animals kept in human societies and protect them from suffering.
- Protect wild animals from methods of hunting, trapping, and fishing that cause extreme, prolonged, or avoidable suffering.
- Avoid or eliminate to the full extent possible the taking or destruction of non-targeted species (Earth Charter, 2000).

All of these can be taught to the young or old generations through formal or informal education to promote respect of all living beings with due respect and consideration; thereby, environmental protection has a diversity of means and strategies. An inclusion of such principles in the sector still

remains a challenge, whereby it limits people's minds and understanding toward adopting changes geared towards the economic and social needs of the community. Clear strategies need to be formulated to articulate the need for change in Rwandan society. Again, UNESCO's (2008, p. 5) Mid-Term Strategy 2008-2013 notes that "as a specialized agency of the United Nations, UNESCO contributes to the building of peace, the eradication of poverty, sustainable development and intercultural dialogue through education, the sciences, culture, communication and information".

The quotation highlights an important point regarding lack of access to information by different groups of people to promote sustainable development. That is why informal and formal education is so important in promoting sustainable development, especially in countries with a high rate of illiteracy. Having education in any field is not about attending schools; it may be done through a variety of methods and programs. It can be done in schools, workshops, conferences or seminars and awareness programs using media like radios, TVs, newspapers, etc.

This goes with the UNESCO publication by its International Commission on Education for the Twenty-first Century, which emphasizes the four "pillars of learning" (learning to know, learning to do, learning to live together and learning to be), which, even to date, focus on the development of cognitive skills and the assimilation of knowledge (UNESCO, 2008). Education for sustainable development must emphasize the four pillars highlighted by UNESCO if we are to adopt change that is compatible with our social, economic and environmental needs. Therefore, recognizing that education is an important tool in achieving sustainable development, Rwanda needs a strategic plan of awareness about the main principles of sustainable development as set out by the Rio de Janeiro conference. The following box shows the 18 principles of the conference:

Box 6: Principles of sustainable development according to the Rio Conference of 1992

- People are entitled to a healthy and productive life in harmony with nature.
- Development today must not undermine the development and environment needs of present and future generations.
- Nations have the sovereign right to exploit their own resources, but without causing environmental damage beyond their borders.
- Nations shall develop international laws to provide compensation for damage that activities under their control cause to areas beyond their borders.
- Nations shall use the precautionary approach to protect the environment. Where there are threats of serious or irreversible damage, scientific uncertainty shall not be used to postpone cost-effective measures to prevent environmental degradation.
- In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process, and cannot be considered in isolation from it. Eradicating poverty and reducing disparities in living standards in different parts of the world are essential to achieve sustainable development and meet the needs of the majority of people.
- Nations shall cooperate to conserve, protect and restore the health and integrity of the Earth's ecosystem. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.
- Nations should reduce and eliminate unsustainable patterns of production and consumption, and promote appropriate demographic policies.
- Environmental issues are best handled with the participation of all concerned citizens. Nations shall facilitate and encourage public awareness and participation by making environmental information widely available.
- Nations shall enact effective environmental laws, and develop national law regarding liability

for the victims of pollution and other environmental damage. Where they have authority, nations shall assess the environmental impact of proposed activities that are likely to have a significant adverse impact.

- Nations should cooperate to promote an open international economic system that will lead to economic growth and sustainable development in all countries. Environmental policies should not be used as an unjustifiable means of restricting international trade.
- The polluter should, in principle, bear the cost of pollution.
- Nations shall warn one another of natural disasters or activities that may have harmful transboundary impacts.
- Sustainable development requires better scientific understanding of the problems. Nations should share knowledge and innovative technologies to achieve the goal of sustainability.
- The full participation of women is essential to achieve sustainable development. The creativity, ideals and courage of youth and the knowledge of indigenous people are needed too. Nations should recognize and support the identity, culture and interests of indigenous people.
- Warfare is inherently destructive of sustainable development, and Nations shall respect international laws protecting the environment in times of armed conflict, and shall cooperate in their further establishment.
- Peace, development and environmental protection are interdependent and indivisible.

Source: United Nations, 1992

The box indicates the principles of the Rio Conference which promote sustainable development in all countries. Education systems of all countries should incorporate such principles into their curricula in order to make a difference in our lifetimes so that our present needs should meet the needs of our future generations. Notably, these principles provide a clear understanding of the meaning of sustainable development in a short summary.

3.11.6 Evaluation procedure for session eleven

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learned or gained from the class teachings and discussions
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in the critical thinking related to the class
Group discussion and presentation	The extent to which students have gained knowledge, applied their knowledge to issues, critically evaluated the issues and reflected upon the issues

3.11.7 Required Readings

1. Szirmai, A. (2005). *The Dynamics of Socio-Economic Development: An Introduction.* Cambridge: Cambridge University Press (pp. 1-33).
2. Huckle, J., & Sterling, S. (1996). *Education for Sustainability.* London: Earthscan Publications Ltd. (pp. 1-50).

Session Twelve: Gender and sustainable development

3.12.1 Objective

To better understand the importance and crucial nature of gender in the sustainable development process. Sustainable development is both a concern and responsibility for both men and women.

3.12.2 Contents

The session contents are:

- Introduction
- Gender and sustainable development in Africa
- Gender and environment

3.12.3 Intended learning outcome

The intended outcome of the session is to understand the importance of gender in promoting sustainable development.

3.12.4 Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with a brief introduction to the course
Discussions based on the readings (30 minutes)	The teacher facilitates the session
General discussions (30 minutes)	The teacher moderates the discussion with interactive student participation
Group discussion and presentations	Students will be divided into three groups and

(One hour)	will present their notes

3.12.5 Notes for the teacher

a. Introduction

Gender is becoming a cross-cutting dimension in social, political, economic and environmental protection. Women are also becoming strong agents in the sustainable development process and awareness all over the world. This session will be aimed at analyzing the role of gender in the African context, as well as in Rwanda. This is because women are the majority of those engaged in environment-related activities like agriculture and collecting firewood for energy and water for cooking. All of these activities depend on our environment, which we largely depend on for survival and for other economic activities that promote our welfare.

b. Gender and sustainable development – African Perspective

In this 21st Century, gender is becoming a crosscutting issue in all dimensions of life: political, economic and social. Can it be left out in the environmental issues? The answer is definitely no, especially in the developing countries where the consequences of environmental degradations are borne more by women. Of course, in the developed world, gender is no longer an issue in social, economic, political and environmental issues, with the exception of domestic violence, although on a lesser scale. Processes to sustainable development must be a concern of both men and women. This argument makes a lot of "sense" in the developing world particularly in Sub-Saharan Africa (SSA).

Why? Perhaps there are a number of explanations in social, political and economic perspectives, but I embark on the everyday realities that are truly environmental, and economic perspectives that affect socio-economic welfare. First, though there are no exact statistics about each country's main economic

sector in SSA, without any doubt, the majority of populations, depend on agricultural activities that are subsistent in nature, including Rwanda, where 90% depends on agriculture (MINECOFIN, 2002). Notably, due to cultural constraints, women are the ones that contribute a lot to this sector despite the fact that men are regarded as household care takers. Women contribute a lot yet have less control over production. Secondly, energy is a big problem in Africa, and a majority of the population, particularly in rural areas, depends on firewood energy for cooking. Collection of the firewood is a social and moral family responsibility for women and their young children. Thirdly, water management in the region is still a big problem, where getting clean drinking water is still a dream to many in the different parts of Africa. Women and children are also responsible for fetching water for domestic use and sometimes they need to walk long distances.

All of these issues are environmentally related and contain a socio-economic dimension. Thus, given the fact that those women are more involved, their participation in environmental protection towards sustainability, as well as their socio-economic development is essential and rational.. For example, given the reality that a majority depends on agricultural activities, women need to be engaged in fighting soil erosion and promoting soil conservation. Concerning energy, forest conservation ethics and science are essential to their living and survival; hence the continuous political need to foster gender in all dimensions of human welfare. UNESCO also argues that this must be based on three strategic principles:

- **Universality** - promotion and respect for universal freedoms and rights, especially the right to education, freedom of expression and freedom from poverty ;
- **Diversity** - ensuring the respect for cultural diversity and pluralism, in particular in education, the cultural sphere and the media ;
- **Participation** - ensuring the full participation of women in the emerging knowledge societies and their involvement in policy dialogue and implementation (UNESCO, n.d).

The three strategic principles highlighted by UNESCO reflect the realities mentioned above in the Sub-Saharan Africa perspective. In Rwanda, these principles have been designed and put in place, and are acting as a driving force towards economic development and sustainability. The big challenge remains: changing people's mentality towards understanding what is meant by gender equity, especially among the illiterate population.

Different researchers have linked gender and sustainable development for a variety of reasons. For example, Baker (2006), links gender with the three pillars of sustainable development, as follows:

1. "Environmental protection: requires understanding of the gender –specific impacts of environmental degradation and misuse; requires recognition of women's relationship to environmental resources and their roles in resource planning and management; and that requires incorporation of women's knowledge of environmental matters into policy and planning.
2. Economic well-being: requires gender-sensitive strategies: 70 per cent of the world's estimated 1.3 billion people living in absolute poverty are women; requires recognition that the economic well-being of any society cannot be achieved if one group is massively underprivileged compared with the other; and requires realization that an economy cannot be called healthy without utilizing the contributions and skills of all members of society.
3. Social equity: requires making the link between gender equity and social equity, and that requires acceptance that no society can survive in the long run, or allow its members to live in dignity, if there is prejudice and discrimination against any social groups" (pp. 171-172).

c. Gender and environment

Both men and women can play an equal or different role in environmental degradation or in environmental protection depending on a certain situation, knowingly or unknowingly. My concern in this section is the role that gender plays in environmental protection and management. Women have

been playing a role in management of natural resources like soil, water and forests. In Rwanda, women lead in the management of natural resources given their traditional knowledge in managing resources. The fact that women are the sole controllers of the households, are involved in land cultivators and in charge of fetching water and collecting firewood together with their children, they have the same responsibility to protect these natural resources. If they do not take on this responsibility, they become the victims along with their children in managing home affairs since a majority in rural areas depends on natural resources like land, forests and water.

Despite these cultural practices of women in Rwanda as far as environmental management and protection are concerned, the government's policy of gender mainstreaming refers to a policy of including gender in all policies or programs, where both men and women take on the same responsibilities. In this way, the protection of the natural resources is not an affair of women alone; it is a responsibility of both men and women, mainly due to two factors in the Rwandan context:

- Both men and women depend on the natural resources; thus, environmental use, knowledge and assessment is for all
- Given that the environment is part of the surroundings of both men and women, they are both accountable for its management and protection.

The United Nations Conference on Environment and Development held in Rio de Janeiro 3-14 June 1992 was the first to affirm the importance of gender in sustainability. For example, Principle 20 states that "women have a vital role in environmental management and development" (UNCED, 1992). Their full participation is therefore essential to achieve sustainable development. The Agenda 21 also promotes the role of gender in protecting the environment at all costs.

The two factors mentioned above go hand-in-hand with the United Nations Environment Program's principles, which note that gender mediates human/environment interactions and all environmental use, knowledge, and assessment; and that gender roles, responsibilities, expectations, norms and the division of

labor shape all forms of human relationships with the environment. The inter-linkage is explained by United Nations Environment Program:

- Gender differences are evident in the use and management of natural resources, and unequal relationships in the family, community, etc. mediate women's access to resources;
- Gender differences are evident in livelihood strategies that are rooted in particular uses of the environment;
- Gender differences are evident in knowledge of the environment, knowledge of specific resources, and of environmental problems;
- Gender differences are evident in responsibilities for managing, owning, or stewarding resources, and in rights to resources;
- Gender differences are evident in encounters with the environment, in perceptions of the environment and in perceptions of the nature and severity of environmental problems;
- All of the above contribute to the gender differences that are evident in accountability, stewardship, and action for the environment.

Source: UNEP, (n. d).

Once gender is neglected in environmental issues, the resulting impacts affect all, according to the United Nations Environment Program. The following box indicates the negative impacts on gender:

Box 7: Gender impacts resulting from environmental risks

- Men might be exposed to toxic chemicals used in mining, women will be exposed to pesticides used in export flower-industry)
- Women's and men's income-generating activities may require specific resources (fuel, water)

that produce particular wastes

- Environmental contamination produces different health hazards for men and women - women may be particularly vulnerable to home-based hazards such as indoor pollution
- Women's workload to provide resources for the household (water, fuel, food) increases when resources become scarce
- If environmental hazards produce illness, men and women have different responsibilities for caring for ill family members
- Responses to environmental change vary with age, class, family hierarchy, and gender
- Biases in educational and training systems may mean that women are less equipped than their male counterparts to understand, cope with, and anticipate environmental change or resource conditions.

Source: UNEP, (n.d.).

In conclusion, gender is crucial in promoting environmental management and protection in all parts of the world. Gender mainstreaming is essential to promote the role of men and women in all development processes.

3.12.6 Evaluation procedure for session twelve

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learned or gained from the class teachings and discussions
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in the critical thinking related to the class
Group discussion and presentation	The extent to which students have gained knowledge, applied their knowledge to issues, critically evaluated the issues and reflected upon the issues

3.12.7 Required Readings

1. Reynolds, F., & Goldsmith, E. J. (2002*). Women and Sustainable Development – From Local to International Issues*. Issue No. 3, London: UNED-UK (pp. 1-20).
2. Cons, R. (2006). *Education for Sustainability*. London: Free Press (pp. 30-70).

Recommended readings

1. Hemmati, M., & Gardiner, R. (2002). *Gender and Sustainable Development.* World Summit Papers of the Heinrich Böll Foundation, No. 10. Berlin: Heinrich Böll Foundation (pp. 1-40).

Session Thirteen: Health and Sustainable Development

3.13.1 Objective

To analyze the nexus between the Rwandan health system and the sustainable development process related to the social dimension of sustainable development.

3.13.2 Contents

The session contents are:

- Introduction
- Health in the Sub-Saharan African (SSA) Region
- Rwandan health system
- Prevention and fighting against pandemic and endemic diseases
- Waste management versus health protection

3.13.3 Intended learning outcome

The intended outcome of the session is to understand the importance of health in promoting sustainable development.

3.13.4 Methodology and Responsible Persons

Introduction to the course (30 minutes)	The teacher will start with a brief introduction to the course
Discussions based on the readings (30 minutes)	The teacher facilitates the session
General discussions (30 minutes)	The teacher moderates the discussion with interactive student participation.

Group discussion and presentations (One hour)	Students will be divided into three groups and will present their notes.

3.13.5 Notes for the teacher

a. Introduction

When people's health is in danger, sustainable development can never be achieved. Health welfare development is also among the sustainable development indicators of any country. Environmental protection is related to health development, especially in the African tropical countries where malaria is a prevalent disease that kills many people. The Agenda 21 of the United Nations Department on Environmental Protection and Sustainable Development considers health as a sustainable development factor; thus, the relationship of health alongside environmental and economic factors in sustainable development is undeniable. Poor environmental protection, poor waste management, water management and the ways in which companies manufacture medicines can also affect human health in different ways and with a diversity of consequences on human life and economic activities. The World Health Organization Regional Office for Europe (1997, p. 1) explains that "human health and sustainable development are inextricably interlinked".

b. Health in Sub-Saharan African (SSA) Region

In some parts of SSA, rampant wars and political upheavals have swept across some nations, putting health issues at risk, or even forgotten in a country's development agenda due to conflict escalation and de-escalation processes. In some countries, about 30% or more of the national budget goes to the Ministry of Defense or the Ministry of Internal Affairs for security purposes, as well for sovereignty protection. It is understandable that sovereignty of a nation must be protected; but countries without war or those that have not faced war, have continued to spend a lot of money on military rather than

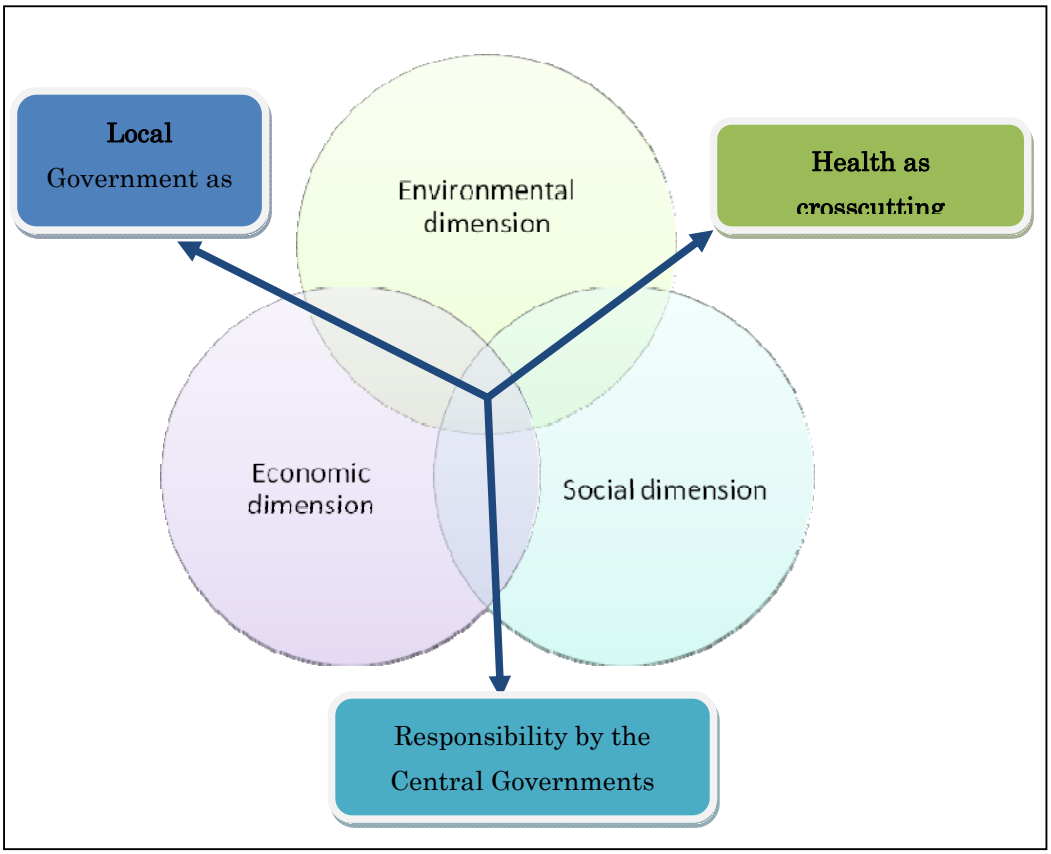
developmental and welfare projects of the citizens, year after year and decade after decade. Mortality rates have increased in conflict zones due to conflict escalation, to the extent that even injured people cannot easily access medical treatments (African Development Bank, 2008). Examples of these countries are: DRC, Ivory Coast, Somalia, Madagascar, Angola, Central African Republic, Guinea Bissau, Guinea Conakry, etc. Even in countries without war, medical access is still a dream to many.

On the policy level, there is poor environmental protection, waste management and water management policies despite limited means in terms of funds and technical knowhow to improve health management. Environmental surroundings around many households in rural areas in the region are engulfed with bushes and overgrown plants anopheles mosquitoes, which carry the malaria virus. Secondly, in both major and small cities, there are no well-managed landfills and waste is sometimes found in inhabited areas. Alongside the road when it is rainy season, this waste produces a bad smell, affecting the lives of those living nearby or passing through. Also, there is a lack of well-constructed rainwater sewage systems in most cities, which also cause negative impacts on people's health and welfare. Sometimes such stagnant waste during rainy seasons leads to the outbreak of epidemic diseases like cholera or diarrhea.

A majority of the population lacks clean drinking and cooking water, despite being one of the regions in the world with many of water sources. The problem is a result of poor public funds management coupled with poor post-independence governance models and corruption. In some governments, public funds, instead of being used to promote people's welfare, go into the pockets of the few who are in power and characterized by nepotism and favoritism based on regionalism and ethnicity. With these models of government, water has remained a big challenge in most parts of Sub-Saharan Africa, affecting peoples' health and welfare (HDI, 2008). Another neglected dimension is the promotion of health in some school's curricula so that the young generation in schools can help their illiterate parents to improve their health welfare, especially by fighting malaria.

Limited action on the local level to actively engage in the sustainable development process and local administrative personnel who have limited capacity in catalyzing change have retarded the process of attaining healthy populations (WHO, 1997, pp.1-4). Governments should promote the participation of local communities in improving their health conditions, and the local leadership should be motivated to be the social engine to promote health welfare conditions, which would act as the driving force for the sustainable development process. Although some governments are aware that the local government is a driving force towards sustainable development, or any change for that matter, the challenge remains that decentralization has not yet been put in place or implemented to make change happen or empower the local communities. Power remains in the central government as well as in the hands of a few people who, in some cases, are less concerned with the empowerment of the local communities. Below is a proposed integrated conceptual model for sustainable development in SSA:

Figure 8: Proposed integrated conceptual health model for sustainable development



The integrated approach to sustainable development is for the countries in SSA. The dimensions indicated above are prescribed by Agenda 21 as stipulated by the United Nations Department for Environmental Protection and Sustainable Development. The difference is that health should be a crosscutting dimension among the three dimensions of economic, social and environmental. The local government should participate in and have a sense of ownership of community development projects, and the central government should take on this responsibility. This is because, in most cases, central governments do not involve the local government or communities in their development projects.

c. Rwandan health system

The government of Rwanda considers its health sector an important engine for human development. Health is linked to environmental protection in the whole country. This argument is linked to the fighting of malaria and other epidemic diseases like cholera, TB, HIV/AIDS, diarrhea, etc., in the local communities, which claim people's lives particularly in the rural areas throughout the whole country. Malaria cases decreased to 60% in 2008 and mortality rates to 11% in 2008, as well (MoH, 2008, p. 8). The Rwandan Ministry of Health states that:

> To respond to the Rwandan Government's ambitious plan for the country's sustainable development as detailed in its 2020 Vision, we strongly believe that quality of care must continuously be a national priority. For this to happen, we need to focus on human resources development, building and sustaining 'Mutuelles de Santé' and reinforcing decentralization within the health sector (Ministry of Health, 2008).

The death toll of such diseases has been reduced to 95% due to health measures taken by the local government. People have been educated to clear bushes and remove stagnant water around their homes

to fight mosquitoes that cause malaria (Ministry of Health, 2008). All hospitals and health centers in the country provide family planning facilities to the citizens.

The Government of Rwanda through the Ministry of Health is committed to "improving the Rwandan population's health situation by strengthening the quality of service delivered and providing access to treatment through universal health insurance coverage (Mutuelles de Santé)" (Ministry of Health, 2008, p. 8). Health Insurances have become a universal tradition in all institutions, public, private and civil society, as well as in the local communities. Around 94% of the Rwandan population has medical insurance to ensure that no one can become a victim of diseases. Each person in a family contributes 1000 Rwandan Francs (equivalent to $2 US) at the beginning of every year and gets medical treatment throughout the year. This policy has assisted the rural population greatly, especially women giving girth and children. Child mortality rates were reduced drastically as a result of this medical insurance. The following table indicates the number of Rwandans with medical insurance in different companies as of 2008:

Table 15: Beneficiaries of medical insurance companies, 2010

Insurance Company	% of beneficiaries	Number of population
RAMA	2.5	210,000
MMI	0.7	53,851
Mituelle de santé	90	-
Others	3.8	-
Total	95	

Source: Ministry of Health, 2010

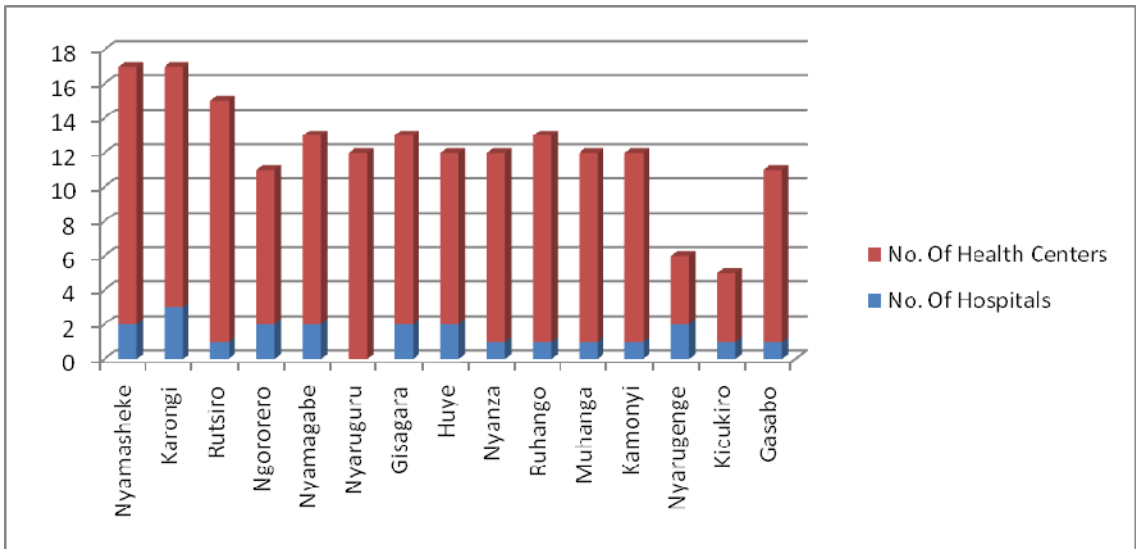
It should be noticed that the medical insurance for the local population, commonly known as Mutuelle

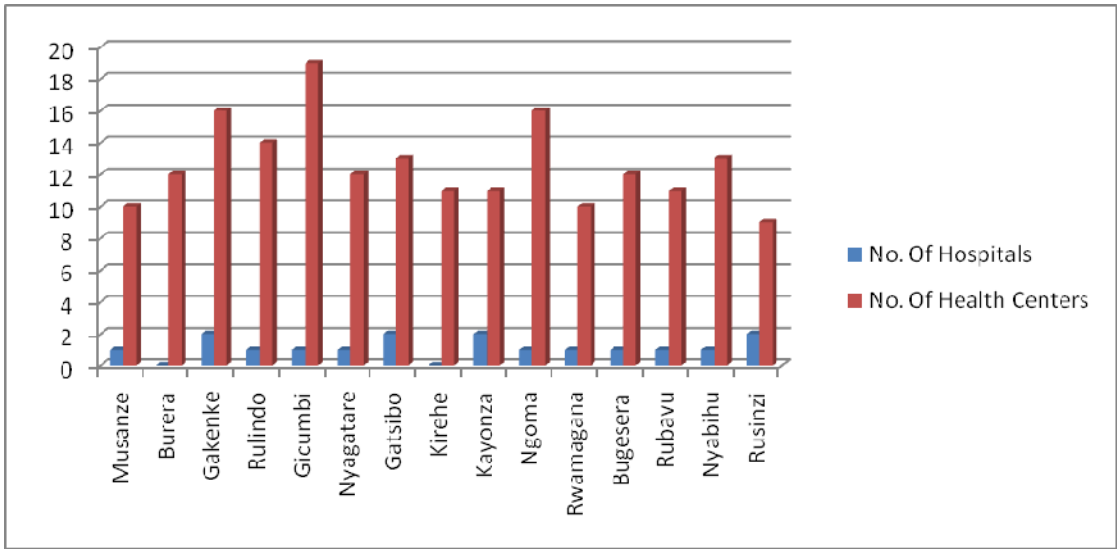
de santé, began in 1996 and was received negatively by the citizens within the pilot districts in the country. In 2004, it was expanded to all districts in the whole country, and by 2007 it had over 73% of beneficiaries. Notably, the health sector policy in Rwanda is based on Vision 2020 and PRSP 2002, as well as on the decentralization policy. Since the government is committed to achieving the MDGs, health policy reflects the goals of the MDGs goals (Ministry of Health, 2008).

d. Rwandan Hospital facilities

The 30 districts that make up the whole country have referral hospitals and more than 380 health centers across the country. The following charts show referral hospitals and health centers across the country by province:

Chart 1: Referral hospitals and Health centers in the whole country





Source: Ministry of Health, 2010

The above charts indicate referral hospitals and health centers in the all 30 districts of the country. In the Eastern Province, Nyagatare, Ngoma, Rwamagana and Bugesera districts all have one referral hospital each; Gastibo and Kayoza districts have two hospitals each, and Kirehe district has none. Additionally, they all have over ten health centers per district. In the Northern Province, Musanze, Rulindo and Gicumbi districts haveone referral hospital each, Gakenke district has two referral hospitals, and Burera district has none. Each district has between 10 and 19 health centers. In the Western Province, Rubavu, Nyabihu, and Rutsiro districts have one referral hospital each; Ngororero and Rusizi districtshave two referral hospitals each and Karongi district has three referral hospitals. In the Western Province, each district has between 9 and 14 health centers. In the Southern Province, Kamonyi, Muhanga, Ruhango and Nyanza have one referral hospital each; Huye, Gisagara and Nyamagabe have two referral districts, and Nyaruguru district has none. Each district has at least 10-12 health centers. Finally, Kigali City, Kicuciro and Gasabo districts each have one referral hospital and Nyarugenge has two referral hospitals. Notably, Nyarugenge and Kicuciro districts each have four health centers, and Gasabo district has 10 health centers (MoH, 2010).

- **Prevention and fighting against pandemic and endemic diseases**

There has been a considerable reduction in fatal diseases and indicators, including malaria, HIV/AIDS, TB and child mortality. For example, in 2001, the TB mortality rate was 4%, and in 2005, it was reduced to 3**%;** and the mortality rate decreased from 135/1000 in 2001 to 66/1000 in 2006. Malaria deaths dropped from 8.515 in 2001 to 950 in 2005 (Ministry of Health, 2008). Such improvement was due to an increase in hospitals and health centers, health facilities and equipment coupled with the increase of human resource - both doctors and nurses - across the country. The health system has been improved in such a way that about 98% of the total population is covered by different health insurance companies, both public and private.

This progress has been achieved through the formation of the Treatment and Research AIDS Centre (TRAC), which was later transformed into TRAC Plus, founded in 2007, established by the LAW N° 28/2007 OF 27/06/2007, to serve as a national centre for infectious disease control and prevention in Rwanda. It was created as a merger of the former TRAC, the National Malaria Control Program (PNILP) and the National Tuberculosis and Leprosy Control Program (PNILT). The creation of TRAC Plus aimed to unify all efforts in the fight against infectious diseases, especially HIV, AIDS and STIs, Malaria, Tuberculosis, and other epidemic infectious diseases.

Box 8: Mission and Overall Goal of TRAC Plus in fighting epidemic diseases

Vision

TRAC Plus will be a Centre of Excellence for disease prevention, control and research in Rwanda and beyond.

Overall Goal

To promote and facilitate measures and actions taken in respect to the prevention, care, treatment, and research in the fields of HIV and AIDS, Malaria, Tuberculosis and other Epidemics Infectious diseases.

Mission Statement

1. *Contribute to the improvement of the health status of the population (reduce morbidity and mortality)*
2. *Strengthen the health and public health system (with the help of partners [government and NGO] and stakeholders)*
3. *Define national needs, priorities, and approaches, and establish policies/guidelines in line with government development framework such as Vision 2020 and EDPRS and international developments goals such as Millennium Development Goals.*
4. *Conduct independent applied research and disseminate findings for use of those concerned (political level, partners, communities, care providers, individuals …).*
5. *Contribute to improving quality of health services.*
6. *Enable and facilitate participation of population through information and guidance.*

Source: TRAC Plus, 2009

Across the country, there are awareness campaigns for the fight against HIV/AIDS and programs that aim at improving people understands on how HIV/AIDS, Malaria and TB are transmitted. The above mission statement explains the activities of the national centre in preventing the spread of the above epidemic diseases. The table below indicates the basic statistics of people living with AIDS who are under ARV medical support and developmental programs supported by the government and partner donors.

Table 16: Basics statistics (Absolute numbers and percentage)

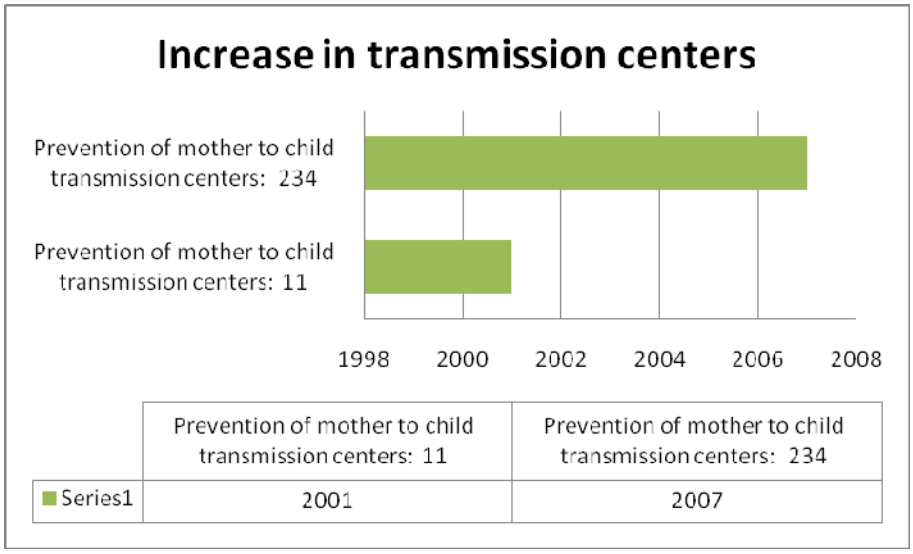
Province	Clients on ARVs		Newly enrolled		Children on ARV		Adult on ARV	
East	12811	17.0%	283	17.2%	1122	17.1%	11689	17.0%
Kigali	23229	30.9%	316	19.3%	1558	23.8%	21671	31.6%
North	9505	12.6%	333	20.3%	908	13.8%	8597	12.5%
South	13015	17.3%	303	18.5%	1167	17.8%	11848	17.3%
West	16657	22.1%	406	24.7%	1803	27.5%	14854	21.6%
Rwanda	75217		1641		6558		68659	

Table Continuation

Province	ARV>12 months		2nd line		Lost to follow-up (%)		Died (%)	
East	9492	16.7%	132	9.5%	14	8.4%	22	20.0%
Kigali	19242	33.8%	925	66.8%	93	55.7%	33	30.0%
North	7102	12.5%	100	7.2%	22	13.2%	16	14.5%
South	9155	16.1%	67	4.8%	14	8.4%	13	11.8%
West	11907	20.9%	161	11.6%	24	14.4%	26	23.6%
Rwanda	56898		1385		167		110	

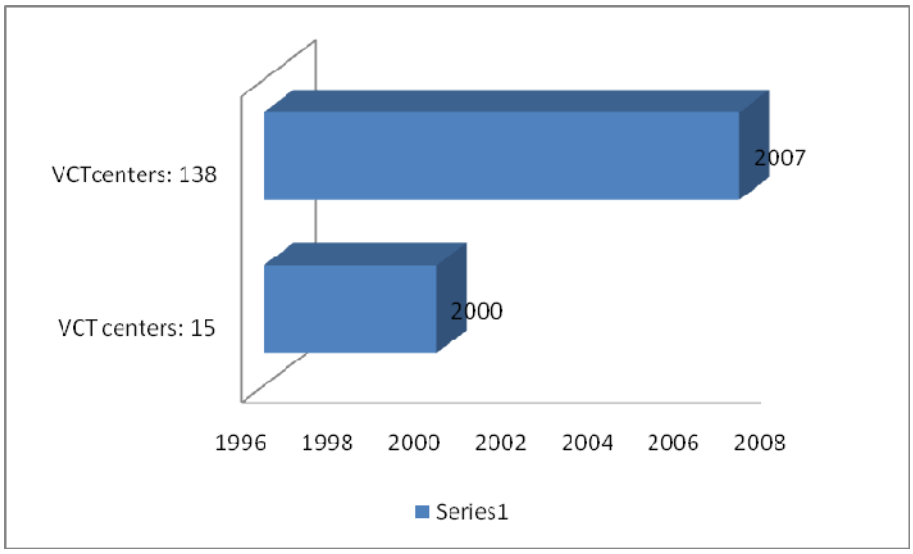
Source: TRAC Plus, 2009

Due to improved awareness about HIV/AIDS and medical facilities in all main hospitals, pregnant women must be tested before giving birth to make sure that their children are born free from the virus. Such facilities have been extended to different hospitals and health centers year by year. For example, the following chart indicates the increase of health facilities reducing HIV infection from mother to child during birth in 2001-2007:



Source: Rwandan Ministry of Health, 2010

Again the following chart also shows the increase of Voluntary Counseling and Treatment (VCT) centers from 2000-2007. In 2000, there were only 15 VCT centers, and by 2007, there were 138 centers. This number continues to increase, despite the fact that the author of this curriculum did not manage to get updated statistics as of 2010.



Source: Rwandan Ministry of Health, 2010

The above charts show that there has been improved responsibility by the government to increase VCT

and an increase in transmission centers across the country from 1998 up to 2007. Notably, from 2008 up to date, such facilities have been increased and medical services improved.

e. Waste management versus health protection

Waste collection in Rwanda has somewhat improved compared to other countries in the East African Region. In all five provinces of the country there are companies in charge of collecting waste from all households and dumping it in the different landfills across the country. Certainly, waste management in the Nyanza landfill in the capital city of Kigali and in other landfills across the country remains a challenge to people's health, specifically those living near the landfills. Supporting this argument, the United Nations Development Programme notes:

> Every day, more than 100 ton of waste is brought to the landfill site in Kigali, located in Nyanza. At present, it is the only facility in Kigali that is dealing with collected solid waste. However, due to lack of proper facility and treatment skills, the gathered waste is just discarded to the site and the accumulation is creating new hills of waste. As a result, there are issues such as bad odour and methane gas explosions, and risks of garbage landslides, groundwater pollution, etc. Additionally, the current population of one million in Kigali City is expected to expand to three million in the near future, and the present facility does not have enough capacity to deal with the tripled amount of waste (UNDP Rwanda, n. d.).

The accumulation of waste in Nyanza landfill in Kigali city is affecting the health of those living nearby, as well as in other parts of the country where waste management is also a problem. Therefore, the Kigali City Council, supported by UNDP Rwanda, is trying to improve the landfill facility and its maintenance techniques. Notably, the city is applying the Fukuoka Method of semi-aerobic solid waste treatment at the landfill site at Nyanza landfill in Kigali. The Fukuoka method is applied in Japan's landfill sites. "Fukuoka

Method is strongly effective when the waste contains organic waste. In this point, the case in Kigali has a great potential to let Fukuoka Method function well as 85% of collected waste consists of organic waste at present (UNDP Rwanda, n. d.).

If the project is well implemented with better treatment skills, people will be protected from methane gas explosions and bad odor or smell thereby protecting people's health. Finally, as far as waste management and health are concerned, there are well-constructed sewage systems in many parts of the major cities so that when it rains, water is well directed to where it is supposed to go. The fact that plastic bags were abolished in the country facilitated the protection of sewage systems and the environment. Before this abolishment, people could just throw these plastic bags anywhere, getting stuck in the sewage systems, which also created health problems in the affected areas. These policies promote sustainability of sanitation and the health of the people.

3.13.6 Evaluation procedure for session thirteen

Methods	Aspects
Debriefing from the class proceedings by students	The extent to which students have learnt or gained from the class teachings and discussions
Discussions led by the lecturer	The extent to which they have understood the content and how they have engaged in the critical thinking related to the class
Group discussion and presentation	The extent to which students have gained knowledge, applied their knowledge to issues, critically evaluated the issues and reflected upon the issues

3.13.7 Readings

1. Ministry of Health. (2008). *Annual Report for 2008*. Kigali: Rwanda Ministry of Health (pp. 1-50)
2. WHO. (1997). *Sustainable development and health: Concepts, Principles and Framework for Action for European Cities and Towns.* Copenhagen: WHO Regional Office for Europe. (pp. 1-40).

General conclusion

The process of development is gradual. It requires social, economic, political, environmental and technological innovation and change at all levels: micro, mezzo and macro. It involves a variety of strategies and mechanisms in the process. It also requires intervention of different stakeholders, including governments, international nongovernmental and local organizations, and private sector and charity organizations, particularly in the developing world. As we all inhabit this ever-changing universe due to social, economic, political and technological change and innovation, we understand that the information used in this curriculum will vary from year to year and period to period. The information used is current as of February 2011, and it will again be updated hereafter.

Throughout the teaching periods of this curriculum, information in this curriculum will always be updated or changed into contexts that reflect the international, regional and national levels. This is because students will need to be updated and equipped with relevant information to enable them to plan for a sustainable future. Therefore, this curriculum is built on dynamic processes of knowledge, not on linear knowledge. Transformational education on both the individual and societal levels in the field of sustainable development will always have to reflect on the future needs of our future generations; thus, the learning outcomes of this course will once again reflect this sustainability paradigm.

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