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STATE OF SOUTH-SOUTH AND TRIANGULAR COOPERATION

IN THE PRODUCTION, USE AND TRADE OF SUSTAINABLE BIOFUELS

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State of South-South and Triangular Cooperation in the Production, Use and Trade of Sustainable Biofuels

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Abbreviations

ABC	Brazilian Cooperation Agency
ACE	Asean Centre for Energy
AGOA	African Growth and Opportunity Act
APNPP	Association of Non-Oil Producing Countries
APEC	Asia-Pacific Economic Cooperation
ASA	Africa-South America Summit
ASEAN	Association of Southeast Asian Nations
ASPA	Summit of South American-Arab Countries
AU	African Union
BIMSTEC	Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation
BNDES	Brazilian National Development Bank
BRIC	Brazil-Russia-India-China Forum
CARICOM	Caribbean Community
CBI	Caribbean Basin Initiative
CBOT	Chicago Board of Trade
CELAC	Community of Latin America and Caribbean States
CPLP	Community of Portuguese Speaking Countries
CSD	United Nations Commission on Sustainable Development
D8	Developing 8 (group formed by Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan and Turkey)
DFID	UK Department for International Development
EAC	East Asia Community
EAS	East Asia Summit
EBA	Everything But Arms
EEA	European Environment Agency
ERIA	Economic Research Institute for ASEAN and East Asia

EU	European Union
EUBIA	European Biomass Industry Association
ECOWAS	Economic Community of West African States
ECOSOC	United Nations Economic and Social Council
EMBRAPA	Brazilian Corporation for Agriculture and Livestock Research
FAO	Food and Agriculture Organization
FEALAC	Forum for East Asia-Latin America Cooperation
FFV	Flex Fuels Vehicles
GCF	Green Climate Fund
G8	Group of Eight (United States, France, Japan, United Kingdom, Germany, Italy, Canada and Russia
G20	Group of Twenty Finance Ministers and Central Bank Governors (In 2008 was transformed into Summit level)
GBEP	Global Bio-energy Partnership
GDP	Gross Domestic Product
JICA	Japan international Cooperation Agency
IADB	Inter-American Development Bank
IBF	International Biofuels Forum
IBSA	India Brazil South Africa Dialogue Forum
IEA	International Energy Agency
IFAD	International Fund for Agriculture Development
IMF	International Monetary Fund
IPoA	Istanbul Programme of Action for Least Developed Countries 2011-2020
LDCs	Least Developed Countries
MDGs	Millennium Development Goals
MERCOSUR	Southern Common Market
NAASP	New Asia-Africa Strategic Partnership
NAPCC	Indian National Action Plan on Climate Change

OECD	Organization for Economic Cooperation and Development
OPEC	Organization of the Petroleum Exporting Countries
PALOP	Portuguese-speaking African Countries
SADC	Southern Africa Development Community
SSC	South-South Cooperation
TC	Triangular Cooperation
UN	United Nations
UNASUR	Union of South American Nations
UNCSD	United Nations Conference on Sustainable Development (Rio+20)
UN IV LDCs	United Nations IV Conference on LDCs Countries
UNCTAD	United Nations Conference on Trade and Development
UN DESA	United Nations Department for Economic and Social Affairs
UN ECLAC	UN Economic Commission for Latin America and Caribbean Region
UN ECA	United Nations Economic Commission for Africa
UN ESCAP	United Nations Economic Commission for Asia and Pacific
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFID	United Nations Fund for International Partnership
UNIDO	United Nations Industrial Development Organization
ZAE	Sugarcane Agro-ecological Zoning
WB	World Bank
WTO	World Trade Organization
WCRE	World Council for Renewable Energy
WBCSD	World Business Council on Sustainable Development

EXECUTIVE SUMMARY

An inclusive and dynamic biofuels sector should take into consideration both the opportunities and the risks of this renewable energy source. For many countries, this sector presents significant potential to reduce long-held industrial and technological constraints in countries with comparative advantages for biofuels production. There are policies to safeguard against pressure on food security, biodiversity, as well as land and water systems. This paper explores the state of the biofuels development cooperation agenda with a particular focus on South-South and Triangular Cooperation initiatives, the opportunities for and challenges in achieving a sustainable biofuels industry.

The introduction of this report draws attention to the relationships between energy and development, taking into account the current multiple crises that, more than ever, require strong cooperation to enable structural reforms and ensure continued progress. With particular consideration to the energy matrix of today, which is still highly dependent on fossil fuels, the introduction section also addresses the need for the democratization of technology in the biofuels sector, which together with other forms of renewable energy sources, can contribute to the dual goals: prepare the world for the great emerging challenges of climate change and generate more income and employment opportunities specially in rural areas.

The second section of this report explores the potential for renewable energy in addressing the combined challenges of rising global temperatures and massive energy insecurity in some areas of the developing world. Sustainably produced biofuels can help support an energy transition, in order to reduce reliance on fossil fuels by increasing the share of renewable sources of energy particularly in the most vulnerable countries. International cooperation should play a key role in boosting what UN DESA calls the « Great Green Technology Transformation ». This section argues that biofuels are by no means a panacea or golden solution for the energy, economic development and climate crises. However, it can contribute ,if proper policies are implemented, to reducing technology and industrial gaps in a number of developing countries.

The third part explores the inter-linkages between agriculture and energy and the impacts of biofuels on food security. It elaborates on the potential and challenges of this technology in contributing to the achievement of the Millennium Development Goals (MDGs). The revenues from developing countries' sustainably produced biofuels could strengthen the social agenda by delivering economic growth and food security boosting rural and national development. Developing countries could benefit not only from potential local demand for biofuels but also the international market and particularly in countries with preferential market access in the developed world generating export revenues and reducing the high burden of energy imports.

Subsequently, this study analyses the major initiatives established by developing and developed countries in the biofuels sector. These initiatives aim to cover various aspects of biofuels, particularly in the fields of sustainability, food security, land use, investments, and the transfer of technology for the production and trade of sustainable biofuels. A mapping of the various initiatives undertaken on South-South, Triangular, Inter-regional and Multilateral Cooperation is also provided in the sections referred above. A final section is dedicated to the UNCTAD Biofuels Initiative with an update of its most recent initiatives.

1. INTRODUCTION

Modern patterns of production and consumption are heavily dependent on fossil fuels and unsustainable, thus requiring a mind-set change towards what UN-DESA calls the "Great Green Technological Transformation" to be cleaner and inclusive[1]. Addressing the opportunities and the challenges of a greener economy requires thinking on new development paths which take into consideration the longstanding challenges of poverty reduction and hunger and from the nature side, over-exploitation of natural resources, environmental degradation, pollution and climate change, one of the greatest emerging threats to humankind. The upcoming United Nations Conference on Sustainable Development (Rio+20)[2] envisages finding a solution for these issues including in its agenda item, the implementation of the concept of sustainable development in a context of poverty reduction.

The increasing scarcity of fossil fuels and the increasing volatility in energy prices poses a serious threat to the economic development of many countries, particularly the least developed countries (LDCs), most of which are heavily, if not fully, dependent on imported energy. These countries are facing simultaneous challenges of energy poverty and security without increasing their use of carbon-intensive fuels, in order to mitigate further damage to the climate. It is in this context that policy makers in many developing countries have been focusing their attention on developing renewable energy sources.

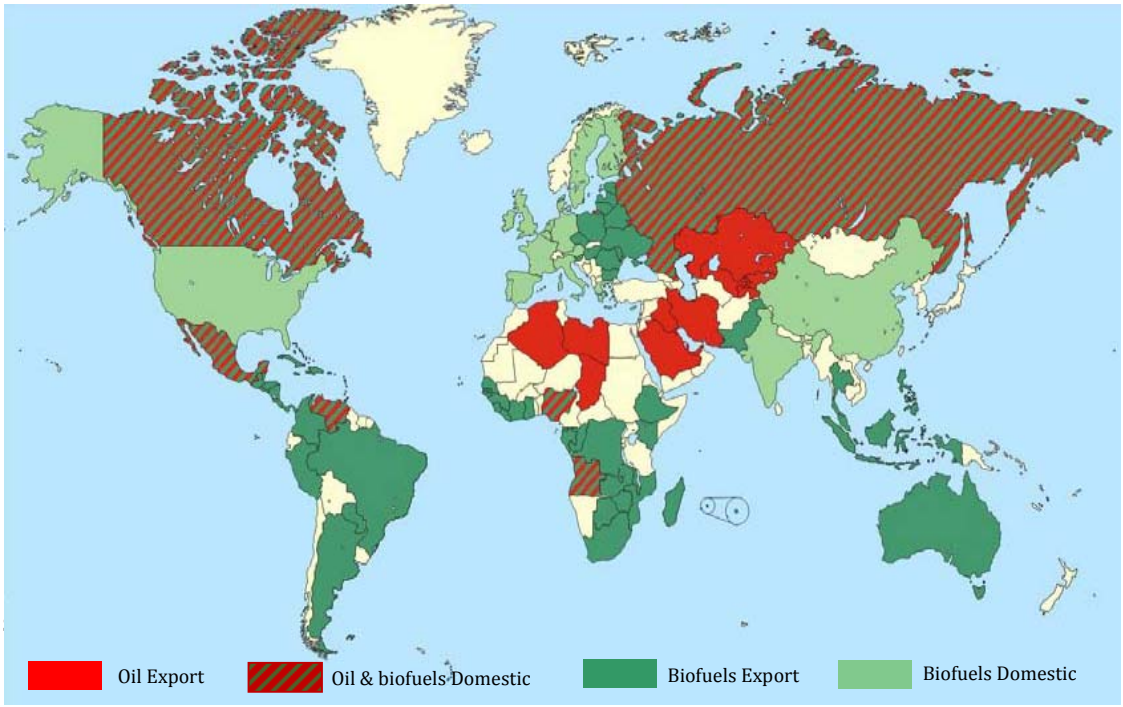
Biofuels have therefore become an important potential energy source, particularly for the transportation sector. However, if the expansion of biofuels production takes place in a hasty and non-sequenced manner, there is a risk of adversely impacting food supplies and prices, if crops have been diverted to their production. Although biofuels account for only 1.5 per cent of the global supply of liquid fuels, they accounted for nearly half the increase in the consumption of major food crops in 2006–2007, mostly as a result of corn-based ethanol produced in the United States. Biofuels demand has also propelled the process for other grains and dairy through cost-push and demand substitution effects.[3]

However, in a number of net oil-importing developing countries, agricultural conditions are conducive to developing biofuels from non-food crops. The use of sugarcane and non-food oilseeds (such as Jatropha and castor) could be expanded without threatening the food security of the countries concerned. If production and growth is well managed, biofuels could provide new economic opportunities in these countries, and new sources of foreign exchange, as well as offering a viable alternative to fossil fuels.

With this report, the United Nations Conference on Trade and Development (UNCTAD), taking into consideration its mandate on trade and development, as well as its role as the Secretariat of the Commission for Science and Technology for Development, adds its voice to other United Nations agencies such as the United Nations Industrial Development Organization (UNIDO) in supporting the potential of countries to explore the development agenda of sustainably produced biofuels. This agenda must take into account concerns surrounding food security, environmental risks, land rights and the need for creating new and renewable sources of energy that can become a mechanism for mitigating climate change at the same time as promoting development.

[1] World Economic and Social Survey 2011: The Great Green Technology Transformation, Department of Economic and Social Affairs, DESA.
[2] United Conference on Sustainable Development (Rio+20) available at http://www.uncsd2012.org/rio20
[3] IMF, World Economic Outlook 2008.

Figure 1: The Possible Global Biofuels Market in 2030



Source: IEA 2009

2. THE POTENTIAL FOR RENEWABLE ENERGY

Addressing the combined challenges of rising global temperatures and massive energy insecurity in the developing world requires large and interconnected investments with long gestation periods across several sectors. The principal aim should be an energy transition, in order to reduce reliance on fossil fuels (especially coal and oil) by increasing the share of renewable sources of energy (including wind, solar and advanced/non-food biofuels). However, this transition must also support, and not hinder, meeting longstanding development goals.

The development and the use of renewable energy can: a) weaken the current strong dependence on fossil fuels, particularly in the transport and electricity sector; b) reduce greenhouse gas emissions; and c) promote rural and national socio-economic development in both developed and developing countries. New technologies in this sector create opportunities for overcoming longstanding challenges related to the energy matrix as well as emerging challenges such as climate change. In this context, biofuels provide opportunities for diversifying energy sources and promoting industrial and technological development while providing socio-economic development in countries with comparative advantages for developing the sector.

Biofuels are by no means a panacea or golden solution for the energy, economic development and climate crises. However, if appropriate measures are taken, particularly concerning food security and environmental risks, biofuels may become an integral part of the sustainable development agenda in a number of countries, many of which are currently classified as being least developed countries. The implementation of a proper biofuels policy in these countries, with the support of developing and developed countries through public and private investment (and the reduction of widespread subsidized biofuels and trade barriers in the developed world) is necessary in order to capitalize on the potential benefits. The countries that succeeded in implementing appropriate policies on renewable energy sources following the first oil shock, which took place in the 1970s now serve as examples to the world.

Box 1: The role of alternative fuels

Changing the fuel mix within the transport sector can play an important role in aligning energy policies with carbon budgets. The CO_2 emissions profile of an average car journey can be transformed by using less petroleum and more plant-based ethanol. Many governments now see biofuels as a technology that kills two birds with one stone, helping to fight global warming whilst reducing dependence on oil imports. Developing countries have demonstrated what can be achieved through a judicious mix of incentives and regulation in the transport sector. One of the most impressive examples comes from Brazil: over the past three decades, the country has used a mix of regulation and direct government investment to develop a highly efficient industry. Subsidies for alcohol-based fuel, regulatory standards requiring automobile manufacturers to produce hybrid vehicles, preferential duties and government support for a biofuels delivery infrastructure have all played a role. Today, biofuels account for around one third of Brazil's total transport fuel, creating wide-ranging environmental benefits, with positive spillovers on the economy and technology chains, while at the same time reducing dependence on imported oil.

Source: Human Development Report 2008, United Nations Development Programme.

2.1 The challenges of energy security and climate change

Developing countries, particularly the least developed countries, are extremely vulnerable to the consequences of the financial, food and economic crises. These can seriously undermine their efforts to achieve significant socio-economic growth. Climate change, a man-made problem, already affects all countries and if faced with inaction will most likely have devastating consequences for millions in the developing world. Additional unresolved challenges, such as poverty and hunger and widespread economic, technological and industrial underdevelopment further impede the level of development required for them to achieve the Millennium Development Goals (MDGs). These combined crises also endanger much of the progress that has in fact been made.

However, a number of developing countries are managing to mitigate the effects of the global financial crisis. Endowed with abundant natural resources, these countries are fortunate enough to possess large domestic markets and are in a position to implement macroeconomic policies that focus on their national development interests. They are emerging as new global players and, in some cases, are supporting the development of other developing countries. Nonetheless, the current crises and the predicted effects of climate change call for immediate action towards a drastic change in human lifestyles. This is especially urgent with regards to patterns of consumption and production, now overly dependent on fossil fuels and their vast greenhouse gas emissions. There is a need to create the necessary conditions for modifying energy production and consumption in such a way that more environmentally friendly sources can replace the current emission-intensive energy matrix.

Several countries have either succeeded or are moving in this direction by implementing policies promoting the production, trade and use of new energy sources as partial substitutes for oil and coal. Moving towards a less carbon-intensive and more sustainable economy also requires taking appropriate measures to reduce the pressure on already over-exploited and over-threatened land and natural resources, and to safeguard the environment whilst promoting the development of new energy sources. Governments play a key role in safeguarding the so-called "public goods" such as biodiversity, environmental protection and land rights, while exploring alternative energy sources to promote the socio-economic development of their citizens.

Overcoming these challenges while maintaining a development path with minimum or no socio-economic and environmental loss, as well as mitigating the adverse effects of climate change, will dominate the agenda of the international community in the coming years. All actors will be involved across regional, national and local levels. This is one of the greatest challenges today, on a planet with nearly 7 billion people, of whom over 1 billion live in poverty, and with a projected population of 9 billion in 2050. A global crisis is not a mere hypothetical idea any longer, and measures to deal with its consequences need to be taken on a firm and inclusive cooperation platform.

Developed nations, particularly those that have contributed most to the current climate crisis, are now being asked to assume a greater level of responsibility, and to support countries that have least contributed to the crisis, but are likely to suffer the most as a result of it. Africa, for instance, is the continent that has contributed least to the world's carbon dioxide emissions from energy and industrial sources (no more than 2-3 per cent), with annual per capita emissions of 0.8 metric tons of carbon dioxide per person, compared to the 4.5 tons per person global average and the 20.6 t/p ratio in the US.[4] Africa is becoming a victim of the adverse effects of climate change such as floods, the scarcity of rain and the instability of rain seasons, increasing drought and the growing spread of tropical plant and human diseases. These factors contribute to a socio-economic disaster, exacerbating poverty and hunger and causing increasing migration flows and political instability.

Currently, from a list of the 47 poorest countries in the world (per-capita incomes of less than $2 per day), 38 are net oil importers and 25 are completely dependent on oil imports to meet their energy needs.[5] Many of these countries possess the agricultural conditions needed to develop biofuels from non-food crop raw materials such as sugarcane and non-food oilseeds, such as Jatropha and castor seeds, that could be produced without putting pressure on the country's food security. Biofuels could not only boost technological and socio-economic development in these countries, but also generate opportunities to overcome the (so-called) technological and industrial gap. If managed well, biofuels could provide a valid alternative to fossil fuels, alongside other clean energy sources still being developed, many of them in developing countries such as China, India and Brazil.

2.2 Investing in local resources for reducing technology and industrial gaps in the south

The use of biofuels can also contribute to realising the dormant potential for developing industrial capacity, which is crucial for many developing countries, in view of their long-held desires and efforts to achieve economic and industrial development. Brazil is the most visible example. The implementation of the National Ethanol Programme Proálcool in 1975 boosted government and private investments towards the development of a sugar cane based ethanol industry and a diversified technological package covering all the phases of the ethanol production and consumption chains starting from the farm gate in the agriculture production complex (fertilizers, biopesticides, machinery) to the ethanol mill and by-products (equipment, bioelectricity) to consumption (alternative and renewable energy for transportation, flex fuel vehicles) and most recently to the new products and new uses of ethanol's high-tech by-product (bioplastic). A new technological *momentum* is taking place with the development of second generation biofuels. Brazil accounts today for three-fifths of South America's industrial production.[6] The agro-industry and particularly the biofuels industry have contributed considerably to such a development. Lessons from Brazil are serving many developing and developed countries.

3. ACHIEVING THE MILLENNIUM DEVELOPMENT GOALS: THE POTENTIAL ROLE OF AGRICULTURAL AND ENERGY COOPERATION

The Millennium Development Goals (MDGs)[7], particularly goals 1 (eradicate extreme poverty and hunger), 7 (ensure environmental sustainability) and 8 (develop a global partnership for development), call for international cooperation to seek improvements in livelihoods, especially in developing and least developed countries. Furthermore, the Istanbul Programme of Action for the LDCs (IPoA)[8] for the Decade 2011-2020 adopted at the Fourth United Nations LDCs' Conference in May 2011 reaffirmed

[4] United Nations Fact Sheet on Climate Change Africa is particularly vulnerable to the expected impacts of global warming. United Nations Fact Sheet on Climate Change and Human Development Report 2007/2008: Fighting climate change: Human solidarity in a divided world.
[5] ENERGY FOR DEVELOPMENT: The Potential Role of Renewable Energy in Meeting the Millennium Development Goals. Paper prepared for the REN21 Network by The Worldwatch Institute. Lead Authors: Christopher Flavin and Molly Hull Aeck. Paper available at http://www.worldwatch.org/system/files/ren21-1.pdf

[6] Brazil. China Daily, 12 June 2009. Available at http://www.chinadaily.com.cn/china/2009sco/2009-06/12/content_8276679.htm
[7] Millennium Development Goals available at http://www.un.org/millenniumgoals
[8] Fourth United Nations Conference on the LDCs, Programme of Action for the Least Developed Countries for the Decade 2011-2020.

the commitments of the international community in key areas: development of productive capacities, south-south cooperation and agriculture and rural development. This study shows that a potential uptake of sustainable biofuels industries in developing countries and also in LDC countries , where more favourable conditions exist could offer additional possibilities for more inclusive development if food security and socio and environmental concerns are properly addressed,

3.1 The challenge of feeding 1 billion hungry people

One billion people – a sixth of the global population – live in poverty and hunger. The majority of them live in the poorest rural areas and rely (directly or indirectly) on agriculture as their main source of income.[9] FAO figures indicate that the hunger rate exceeds 35 per cent in sixteen African countries, and that external assistance is needed routinely by 30 countries – 20 in Africa and 10 in Asia – in order to overcome food insecurity. The food crisis of 2007/2008 brought the deep-rooted underdevelopment of the agricultural sector and the issue of widespread poverty to the top of the development agenda. Additional contributing factors include the economic, financial and climate change crises and political instability. Hunger poses a tremendous challenge to the fulfilment of the 2015 deadline for achieving the MDGs, in particular with respect to the MDG 1 (eradicating extreme poverty and hunger by halving the proportion of people who suffer from hunger).[10]

Rather than postponing the MDGs from 2015 to a decade or more later, the international community continues to attempt to reduce the numbers of those who live in hunger and extreme poverty in order to achieve the MDGs. The mechanisms for improving cooperation in agriculture and energy are important instruments for reducing the technological gap, and for providing countries in the South with much-needed resources for development. Such cooperation is crucial to global efforts in dealing with the climate change challenge. Agriculture and energy cooperation can provide energy security whilst simultaneously contributing to more inclusive development, particularly in the case of the poorest countries. Biofuels are not a panacea or a golden solution. However, biofuels could facilitate reaching a level of progress necessary for industrial, socio-economic and environmental development. For that to happen, substantial efforts are required from both cooperation partners and local governments.

The sustainable production of biofuels from biomass can contribute to mitigate climate change, generate income, not least in the agricultural sector.[11] In the presence of strong regulatory frameworks, revenues from developing countries' biofuels sectors could be used for boosting social programmes as a component of economic growth and rural and national development. Developing countries are themselves potential markets for biofuels, particularly in the case of emerging economies such as China and India. Both countries are currently highly dependent on fossil fuel imports. India, for instance, is forecast to be 90 per cent dependent on fossil fuel imports by 2030. Replacing fossil fuels for these countries has become a priority, and biofuels will increasingly play a central role in the attempt to reduce reliance on traditional energy sources.

From an industrial trade and development perspective, the potential for developing biofuels as an instrument for economic growth is unquestioned. This potential is most pronounced in those countries that have a comparative advantage for developing a biofuels sector, particularly from non-food crops – the case for over 100 sugarcane producing countries. A significant number of these countries could easily become biofuels producers and exporters over the coming decades, once appropriate government policies and investment are available. The sustainability issues of the sector should be properly addressed, avoiding the application of misguided policies such as the use of food crops for biofuels production in countries facing food insecurity. The case of ethanol in Brazil has proved to be a model example, with important efforts being taken towards the establishment of appropriate environmental and labour standards such as the elimination of sugarcane straw burning for harvesting and the initiatives aiming at a phased transition in towards mechanical harvesting, since manual harvesting can

[9] FAO Newsroom, 19 June 2009: "1.02 billion people hungry: one sixth of humanity undernourished — more than ever before".
[10] Report of the Secretary General: Agriculture development and food security (A/64/221).
[11] World Economic and Social Survey 2009 Promoting Development, Saving the Planet, UN DESA 2009.

be one of the most physically demanding agricultural activities but nevertheless constitutes an important source of jobs for the sugar-cane regions.

Box 2: Labour and Environmental initiatives taken by the Ethanol industry in Brazil

Progresses in harvesting methodology: Sugarcane harvesting in Brazil has traditionally been done manually, generating 300,000 jobs, especially in São Paulo State, where 60 per cent of Brazil's sugarcane is produced. A large percentage of these workers are temporary migrants coming from the poorest states in Northeast Brazil. It has traditionally been common practice to burn the fields prior to the harvest. Doing so eliminates much of the straw and leaves, and clears the fields of dangerous animals such as scorpions and snakes. However, the practice has detrimental consequences for human health and for the environment. Fuligem, or "black rain" – a black ash produced during the burn of sugarcane crops with the intent to reduce foliage prior to harvesting –, has been correlated with respiratory problems in local populations during the harvest season. Burning also negatively affects biodiversity, as it kills wild animals present in the sugarcane fields.

Agroecological Zoning: A Sugarcane Agroecological Zoning (ZAE Cana) bill was adopted by the Brazilian congress in 2009 aiming to provide guidance for future biofuels production plants in the country. The law prohibits the expansion of sugar cane cultivation and installation of new processing sugar and ethanol units in the Amazon and Pantanal biomes, and in the Upper Paraguay River. The initiative is a positive step in the protection of the environment, preservation of biodiversity and sustainable use of the natural resources. If well implemented, it could be a model for many other countries where biofuels could have negative impact on the fight against deforestation.

Source: Timossi 2008 and Itamaraty 2011[12]

3.2 The impact of biofuels on food security

Bioethanol production is predominant in the Americas, with the United States and Brazil being the biggest producers, together representing nearly 90 per cent of global production with nearly 55 billion litres. Central American and Caribbean countries are also becoming important players in bioethanol production and trade, despite producing smaller quantities. In South America, two important players in bioethanol production are Colombia and Paraguay, producing 350 million litres between them. Other important players are the EU (with 4 per cent), China (with 3 per cent), Thailand, Colombia, India, Australia and Paraguay. Biodiesel is mostly produced in the EU (with 54 per cent of the global production). Germany holds a major share, accounting for over 50 per cent of the 8.7 billion litres produced in 2008 in the EU, followed by France, Italy, Belgium, Poland, Portugal, Austria and Spain and others. The United States is the second world player in biodiesel with 16 per cent of global production.

A range of different raw materials are being used for biofuels production, using locally produced feedstock or imports and semi-finished products for processing or re-processing to meet local and export demand. Bioethanol can be produced from sugarcane, as the case of Brazil shows, but also from cereals such as corn in the United States, and from wheat and sugar beet in the EU. Biodiesel is mainly produced from vegetable oils, particularly from oilseeds such as palm oil, rapeseed, soybean and sunflower. Some of these crops have contributed to concerns over food security issues with the media exposure of the food crisis in 2007/2008. This is still an unresolved issue and has laid bare the agricultural crisis that the sector faces as a result of decades of neglect at local and international levels.

The 2008 food crisis focused attention on the problem of 1 billion people living in hunger. As a result, a number of countries have started a process of reviewing their biofuels policies, taking into account concerns on food security. Several have eliminated biofuels from their development policy agenda. The

[12] Timossi 2008, Sustainable agriculture in developing countries: The case of Brazil. Paper prepared for the Swiss Development Cooperation Agency, 2008. For Agroecological Zoning, Ministry of Foreign Affairs of Brazil (Itamaraty) 2011 at www.itamaraty.gov.br

food crisis was caused by a number of factors that originate in long-term problems such as the patterns of agricultural production, poor income distribution and trade issues.[13] Inappropriate biofuels policies may have led to excessive competition with food crops and to environmental side effects, thereby exacerbating the crisis[14]. However, some biofuels (depending on the feedstock used), have in fact served to mitigate the effects of the food crisis, by generating income in rural and urban areas in countries where the sector was developed in a sustainable manner.

The connection with, and the impact of, the so-called first generation of biofuels on the food crisis remains a polemic issue, with many pros and cons being cited depending on which constituency is consulted.[15] Such was the case with food-based feedstocks such as corn in the United States (25-30 per cent of total production) and oilseeds in the EU (over 80 per cent of total production), which have contributed more to food crop price increases over the last two years than has sugarcane feedstock. [16]

Prices of sugar in the international market have remained stable, even experiencing some falls whilst food crops were reaching historical levels at the Chicago Board of Trade (CBOT). On the other hand, land use change in Brazil did not occur at levels that could pose a risk to food security, as many staple foods (such as rice and beans) are produced in areas far away from areas of sugarcane production.[17] Caution is nevertheless desired in this topic and major markets have included an analysis of the impact of biofuels into food security. The EU is expected to deliver an initial report of the impacts of biofuels on food prices by 2012.[18]

The use of second generation biofuels, based on cellulosic raw materials, is under way. Several projects are being implemented mainly as a response to the criticisms on the use of the first generation feedstocks, as well as to expand the potential resource base from which biofuels can be produced. However, large-scale availability will be limited in the middle term. Brazil, the United States and several EU member states are taking the lead in developing and establishing partnerships for developing second-generation biofuel technologies.

[13] The 2008 World Food Crisis" by Jomo Kwame Sundaram Lecture for 2008 annual Advanced Graduate Workshop on Poverty, Development and Globalization, organized jointly by Columbia University's Initiative for Policy Dialogue (IPD) and University of Manchester' s Brooks World Poverty Institute (BWPI). Available at http://policydialogue.org/files/events/Jomo_KS_2008_food_crisis.pdf
[14] FAO's views on Bioenergy. Available at http://www.fao.org/bioenergy/47280/en
[15] See: UNCTAD (2008) Biofuel production technologies: status, prospects and implications for trade and development.
[16] Author calculations based on US and EU official figures for 2008.
[17] Timossi 2008.
[18] Directive 2009/28/EC p. 38

Box 3: The Food Crisis and the Exposure of the Long-Standing Agricultural Crisis

The global system of agriculture, food production and natural resource management suffers from a number of problems:

- The challenge of making enough food available to provide everyone in the world with a balanced and healthy diet – food production has grown steadily over the past half-century, and yet hunger and malnutrition are more widespread than ever.[19]
- Food security has been consistently at risk from price volatility, especially – but not exclusively – with respect to food grains. The global community recognized this problem as long ago as 1962, with the international development strategy calling for commodity price stabilization as a key plank of development.
- The widening gap between the increasingly rapid growth in the demand for more resource-intensive food commodities and the slower growth in the yields of food production.
- The growing demand for alternative uses of land and water, not only for the rehabilitation of ecosystem services (including expanding the forest cover and protecting soils), and also for non-food production (including the growing demand for bioenergy products).
- Climate change is projected to have widespread and (on balance) adverse impacts on global agriculture.
- There is a tremendous amount of experience and knowledge about best practices in the areas of the sustainable and equitable management of soils, water, biodiversity, participatory practices and rural development. A major policy goal is to create the conditions under which these practices are used on a universal scale.
- For ecological and institutional reasons, Africa did not experience the green revolution, and yields remain far below those of other regions.
- The green revolution that took place in other regions is based on unsustainable methods that overuse fossil energy resources as well as chemicals and water. There is a need to move into a more sustainable phase of the green revolution. In this context, South-South and Triangular Cooperation can provide a valuable platform, not only for exchanging successful experiences and sharing knowledge as well as difficulties and failures, but also for providing the investment necessary to enhance agricultural development in the South and the North, as both need to deal with climate change, among other challenges.

Source: Report of the United Nations Secretary General: Agriculture development and food security, 2009.

4. SOUTH-SOUTH AND TRIANGULAR COOPERATION FOR PRODUCTION, USE AND TRADE OF SUSTAINABLE BIOFUELS

Cooperation among developing countries is a relatively long-standing issue in international relations within the South. A primary event was the first Asia-Africa Conference of developing and newly independent countries in 1955, also known as Bandung Conference referring to the Indonesian city. The United Nations Conference on Technical Cooperation among Developing Countries in 1978 in Buenos Aires was later another important boost for broader framework cooperation. The so-called Buenos Aires Plan of Action adopted at the conference became the mantra for boosting developing countries cooperation. For several years this cooperation was limited to low skilled or low level technology considering the conditions of these countries with very few exemptions. The situation is now changing with the emergence of many developing countries as global political and economical powers.

The establishment of the G20 group of major economies replacing the G8 group of highly industrialized countries is a clear example of the period of rebalancing of power the world is living today. Despite the large gap still present, major developing economies have developed certain technological packages that in some cases are even more advanced and more competitive than their counterparts in the developed world. This is the case of the ethanol industry in Brazil, a model currently being exported not only to developing countries but also to the developed world. This movement is relatively new and is

[19] Report of the Secretary General: Agriculture development and food security (A/64/221).

contributing to a long journey aiming at reducing the north-south technological gap as most of these technologies developed in the pivotal countries of the South are more suitable to the realities of the countries in the South, both in terms of cost-efficiency and skills required.

Despite being a relatively new issue, South–South cooperation in biofuels is starting to gain momentum. The experience of some developing countries in the production, consumption and trade of ethanol as a substitute for fossil fuels in the transport sector has attracted the interest of dozens of countries, especially those with the resources that could potentially lead to the development of a biofuels industry. A number of the biofuels projects currently being implemented take into account not only national capacities, but also regional and global market opportunities. Brazil leads South-South cooperation projects on biofuels. The country has the oldest and possibly the most competitive biofuels industry, based on the production of ethanol from sugarcane. Biofuels have played an important role in Brazil's efforts to improve its energy security, later becoming a source of technology and knowledge exports to both developing and developed countries.

Several developed countries are also participating in South-South cooperation projects as a result of their strategic partnership with leading ethanol technology suppliers. In most cases, the technologies developed by the first generation of biofuels have been transferred in a democratic way without great concerns related to intellectual property rights (IPR) as the technology is not highly intensive. However, the circumstances may change in the coming decade, with the development of second-generation biofuels. These are more capital and technology-intensive and some countries may find it difficult to transfer in the same patterns used for the first-generation.

Second generation technologies are under development in a limited number of countries, mostly in the developed world, where intellectual property rights are of primary concern. If we consider that photosynthetic activity is generally most efficient in the South, and biomass is also the base for second-generation biofuels, there will still be a competitive edge favouring South countries in the production of advanced biofuels in the future. The scope and role that South-South cooperation will play in the development of second generation of biofuels is not yet clear but there is an immense field to be explored if the international community supports such a development. The establishment of the Green Climate Fund (GCF) agreed at the Durban Conference on Climate Change under the framework of the UNFCCC could be a source of funding in the near future in particularly for the most vulnerable countries. Currently, cooperation in advanced biofuels research and production is at an early stage in a few developing countries, for example, the cooperation framework under the India–Brazil–South Africa (IBSA) and the framework between Brazil and China are two of the most advanced examples.

4.1 South-South cooperation in Latin America

A number of organizations in Brazil, Peru, Colombia, Mexico and the Caribbean are cooperating on biofuels research and development projects with the combined goals of strengthening national strategies, improving regional dialogue, exchanging experiences, technology, knowledge and trading equipment, boosting investment and implementing appropriate policies in order to develop the biofuels sector in a sustainable way. These organizations include: Mercosur, which has created mechanisms for dialogue and a working group; the Inter-American Commission for biofuels, coordinated by the Inter-American Development Bank; and the Economic Commission for Latin America and Caribbean (ECLAC), which has coordinated a series of country and regional studies.

The Brazilian Experience in South-South Cooperation Projects

Brazil has signed a number of agreements on bilateral, regional, interregional and multilateral bases in different levels of cooperation, including technology and knowledge transfer, research and development, and trade and investment. Cooperation also takes the form of exchanging experiences (failures and success) and providing support for the implementation of national and regional biofuels policies for the development of a biofuels industry that involves the concerns and opportunities in developing this type of renewable energy source. In order to meet the demand of developing countries

for technology transfer and knowledge sharing, and in order to broaden the dialogue on policies and sustainability issues surrounding the biofuels sector, the Brazilian government has launched in 2009 a specific programme called Pro-Renova Program (Structured Support Program to other Developing Countries). The programme aims to coordinate and strengthen South-South cooperation activities with interested relevant countries and in particularly, with African countries[20].

Key areas of the project include: the organization of regional seminars with trade fairs, international seminars on renewable energy, the publication of informative materials, thematic capacity building training courses held in Brazil, capacity building in loco (16 countries since the programme was established), cooperation in research and development, field demonstration projects and technical missions. Ethanol Week is a joint project organized by the Brazilian Agency of Cooperation (ABC) and the Ministry of Agriculture, Livestock and Food Supply of Brazil to enhance technical capacity building of developing countries by holding practical courses in the sugarcane producing areas in the State of São Paulo. So far, two such weeks have been organized. The first week, in 2008, was organized for Portuguese, Spanish and French speaking countries and the second, in 2009, for English speaking countries. Participants toured sugarcane and ethanol complexes to familiarise themselves with all key stages of biofuel production, from the sugarcane raw material and industrial phases to the consumption, trade and international cooperation. Attendees also visited ethanol plants, cooperatives and interacted with key agents' suppliers of inputs such as equipment and technologies.

The Agro-ecological Zoning Seminar is one of the in loco programmes of the Pro-Renova. The joint objectives are to present the Brazilian experience in ethanol and to contribute to the capacity building of policy makers of the countries involved in the development of the biofuels sector, specifically with regard to the technical issues surrounding agro-ecological zoning for biofuels production. In 2009, the programme was organized in South Africa, Angola, Botswana, Mozambique, Tanzania, Zambia and Zimbabwe. In April 2010 a series of seminars on "Public Policies for Biofuels" were held in UEMOA countries (Burkina Faso, Benin, Côte d`Ivoire, Guine-Bissau, Mali, Senegal and Togo). In August 2010, another series of seminars were organised on the theme "Development and Innovation in the Biofuel Industry" held in Kenya, Uganda, Tanzania, Ethiopia, Sudan and Mozambique. A publication entitled "Sugarcane Bioethanol: Energy for Sustainable Development" was published in cooperation with the Ministry of Science and Technology, FAO, ECLAC, Banco Nacional de Desenvolvimento Economico e Social (BNDES) and the Centro de Gestão e de Estudos Estratégicos (CGEE) and is available online[21].

Mercosur - Southern Common Market

A Memorandum of Understanding (MoU) was signed between MERCOSUR member countries (Argentina, Brazil, Paraguay and Uruguay) in 2006, with the aim of establishing a programme for cooperation in the field of biofuels and its production technologies in the four member state countries. A Special working group on biofuels was established in 2006 with the following objectives: a) to stimulate production and consumption of biofuels, in particular, ethanol and biodiesel; a) to analyse regulation of biofuels in the context of MERCOSUR; c) to stimulate the creation of integrated chains in the sector of biofuels in MERCOSUR; d) to stimulate technical cooperation on biofuels, particularly on ethanol and biodiesel between public and private entities of the bloc; e) to stimulate a joint programme of research on production and use of biofuels, taking into consideration bilateral and regional mechanisms of cooperation already implemented; f) to facilitate exchange of information in respect of technical and technological aspects linked to the production and use of biofuels, in particular those requiring modifications necessary to adapt vehicles according to the different levels of blending of biofuels to fossil fuels; g) to promote capacity building for sustainable production of biofuels, including environmental assessment, land use, residue use and recycling of residues, infrastructure of distribution, logistic among other aspects.

[20] South-South Cooperation in bioenergy. Presentation made by Mariangela Rebuá, Director of the Department of Energy – MRE at the "1st meeting of the GBEP Working Group on Capacity Building for Sustainable Bioenergy", Tokyo, Japan, 16 November 2011
[21] Sugarcane Bioethanol: Energy for Sustainable Development available at http://www.bioetanoldecana.org/en/download/bioetanol.pdf

All members of Mercosur (Brazil, Argentina, Uruguay and Paraguay) are involved in biofuels production, albeit at different levels of development. Brazil's bioethanol industry is already established and a growing biodiesel industry is taking shape. Argentina's biodiesel industry is already well established and has started to produce bioethanol at commercial levels. Paraguay and Uruguay are also studying or implementing policies to develop the sector. Venezuela[22], which is due to become a full member of MERCOSUR, currently imports bioethanol from Brazil, but the country has the potential to develop a biofuel sector based on its sugarcane industry. Despite the importance of the sector for the countries of MERCOSUR, the bloc does not, however, have an institutional framework of biofuels cooperation at the levels of SADC and ASEAN which meet on a more regular basis and have more harmonized policy frameworks in the area of biofuels.

Brazil-CARICOM Cooperation

Brazil's cooperation with Caribbean countries was done mainly on bilateral basis with various countries of the region. In April 2010, a First Brazil-CARICOM Summit was held in Brasilia, Brazil expanding the agenda into a more regional perspective. The outcome document stated that countries agreed to further strengthen cooperation already being implemented on bilateral basis in the field of research on and development of renewable and non-renewable sources of energy and energy-saving methods. A Brazilian Mission was agreed to be sent to CARICOM to explore possibilities for institutional and entrepreneurial cooperation in this area. Considering the growing exchange between Brazil and CARICOM Member States in connection with the marketing of Biofuels, the outcome document also agreed "*to intensify joint studies on the feasibility of producing biofuels in the CARICOM region*"[23].

Brazil is by far the biggest supplier of ethanol to the United States market, accounting for 40 per cent of total direct imports. The country is also an important supplier to the United States market in triangular trade through the Caribbean countries, benefiting from the CBI (Caribbean Basin initiative), which allows imports of most products, including ethanol, duty-free from the Caribbean and Central American countries. The CBI countries export locally reprocessed ethanol (mainly of Brazilian origin) to the United States market under a duty free market access regime for a volume of up to 7 per cent of its consumption. Most ethanol imports are subject to a 2.5 per cent ad valorem tariff and a 54-cent-per-gallon added duty. While many of these products are produced in CBI countries, ethanol entering the United States under the CBI is generally produced elsewhere and reprocessed in CBI countries for export to the United States.[24] Up to 7 per cent of the United States ethanol market could be supplied duty-free by ethanol imports from CBI countries.

Cooperation on Biofuels in the framework of UNASUR

Biofuels production has been developed in a number of countries in the South America region, for , example Brazil, Argentina and Colombia. These countries have cooperated in a bilateral basis, exchanging experiences and improving investments in the sector. Food crops and non food crops are being used in these countries. Cooperation at the regional level is being implemented mainly in the framework of MERCOSUR. Most recently, the creation of UNASUR-Union of South American Nations has also contributed to broaden cooperation on Biofuels production, use and trade in South America. A Council of Energy of South America was established at the First Summit of Energy of South America held in Isla Margarita, Venezuela in 2007. In 2011, the third Summit of Latin American and Caribbean Countries set the Community of Latin American and Caribbean States (CELAC), the newest organisation of the South, which incorporates all the 33 countries of the region. CELAC gives

[22] Agreement of adhesion signed in 2006, but ratification is still pending in the Brazilian and Paraguayan congresses.

[23] Brasilia Declaration of the First Brazil and the Caribbean Community (CARICOM) Summit held on April 26.

[24] The current CBI beneficiary countries are: Antigua and Barbuda, Aruba, The Bahamas, Barbados, Belize, the British Virgin Islands, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, the Dutch Antilles, Panama, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago.

priority, among others, to infrastructure, energy integration and cooperation, creating a new regional platform for debating on the potential of sustainable biofuels once the organisation is fully working.

Biofuels was integrated in the agenda of the Council of Energy which advocates regional efforts for the production and use of renewable energy including biofuels as an instrument to "promote social; technological; agricultural and productive development in the region". Two inter-regional frameworks for cooperation in the context of UNASUR have been set and they are the South America-Africa (ASA) and South America-Arab Countries (ASPA) Summits and both have discussed and included renewable energy and biofuels on their established framework for cooperation. Furthermore, the Forum for East Asia-Latin America Cooperation (FEALAC), which includes the Latin American and East Asia, is also a potential market for biofuels produced by South American countries. Mexico and Central American countries are also setting some cooperation framework with countries of South America with different levels of development and particularly bilateral basis with Brazil taking the lead.

The Inter-American Development Bank

The Inter-American Development Bank (IADB) has become a focal point for exchanging experience on biofuels production in the Latin American and Caribbean Region. It supports "blueprints" and action plans for biofuels and technical cooperation. The regional development bank's policy on biofuels aims to: a) assess the economic viability of biofuels and bioenergy development; b) provide sustainability assessment to mitigate potential adverse factors; c) impact social and environmental change; d) assist Latin America and the Caribbean to become a leader in "climate friendly" biofuels production by increasing research and expertise in second generation biofuels; e) provide country-level policy assistance in support of biofuel development; and f) finance sustainable biofuel and bioenergy programs, including feedstock development, production facilities and related infrastructure. The IADB has supported major biofuel strategy studies and projects, including Mexico in 2006 and Guatemala in 2008. Furthermore, a Biofuels Sustainability Scorecard was launched in 2009 to encourage higher levels of sustainability in biofuels projects in the region.

4.2 South-South Cooperation in Asia

Biofuel production in Asia has risen six-fold since 2004, from just over 2 billion to almost 12 billion litres in 2008. Demand for biofuels is expected to increase dramatically over the coming decades, in order to meet transport fuel needs. The number of vehicles in ASEAN countries is forecasted to grow sharply by 2035 (three-fold in China and five-fold in India).[25] The current and forecasted biofuel mandates and blending targets in China, India, Indonesia, Philippines, Thailand, Vietnam, Japan and the Korean Republic range from 5 per cent to 20 per cent (of fuel volume at the pump), what is expected to constitute a demand of 45-50 billion litres of biofuels by the end of the next decade.[26] As a result, Asia is expected to become a powerful player in the biofuels industry, along with Brazil, the United States and the EU.

Asian countries are also expected to become highly competitive exporters of biofuels within Asia and to the western markets in the EU and in the United States. Much depends on whether or not trade barriers are raised. Several of the most advanced biofuel-producing countries in Asia have started to play a key role in South-South and Triangular Cooperation in biofuels projects. These initiatives include both technical and economic areas of cooperation. China, for instance, is investing in ASEAN countries for biofuels production in order to meet its current and projected internal demand. These countries are also an important source of raw material for China. Concerns over the food crisis led the Chinese government to ban the construction of new plants of biofuels using corn and other food crops. Consequently, most new plants concentrate on using non-food crops raw material produced nationally and imported from ASEAN countries.

[25] Biofuels in Asia: An analysis of sustainability options, USAID ASIA 2009.
[26] Authors calculation based on various source, 2009.

India is another important partner in South-South Cooperation projects in the region and other parts of the developing world such as Africa. The country has approved a new biofuels strategy with an indicative target of 20 per cent blending of petrol and diesel with biofuels by 2017. This target is predicated on a market for biofuels of nearly 16 billion litres (with China consuming 15 billion litres). Significant investment and a strategic diversion of sugar away from human consumption are required to meet this goal.[27] India has also invested in developing biodiesel made from jatropha, but imports (particularly within the region) will be necessary in order for the country to meet its biofuels target. With a population of over 1 billion people, India is becoming an example for the region for its renewable energy policies. The National Action Plan on Climate Change (NAPCC) was established in June 2008, and an entire ministry has been created to deal with the portfolio of New and Renewable Energy – the first such ministry in the world.

Countries belonging to ASEAN – Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam – have to overcome the high trade barriers in order to access the Indian biofuels market (e.g. the tariff for undernaturated alcohol is 186 per cent, one of the highest in the world). The ASEAN-India Free Trade Agreement is under negotiation and may include biofuels. China and India are playing a key role in South-South Cooperation in biofuels, both within the region and outside the Asian continent borders. Biofuels play a key role in promoting energy security and rural development in the two countries, with global impact. Their cooperation extends to technology transfer and investment in other biofuel producing countries in Asia and in Africa. This is an important framework for technical cooperation and trade facilitation in the world's primary developing countries' economies is described below.

ASEAN Biofuels Cooperation Strategy

ASEAN countries have established an institutional framework for the development of renewable energy sources, including biofuels. The work aims to: a) promote and develop renewable energy and energy supply in the region; b) strengthen the information networking in renewable energy; c) promote intra-ASEAN Cooperation on ASEAN-made products and services; and d) promote the utilization of biomass-based products and exchange of technology. Most recently, the cooperation on renewable energy issues was extended to the ASEAN Plus Three (China, Japan and Korea). A joint statement was issued on the East Asian Cooperation and the ASEAN Plus Three Cooperation Work Plan (2007-2017) adopted at the Eleventh ASEAN Plus Three Summit held in Singapore in November 2007. The Cebu declaration on East Asian Energy Security, adopted on 15 January 2007 in Cebu, Philippines, was another important political commitment, calling for countries in the region to improve energy efficiency and conservation, promote fuel diversification and enhance cooperation on research and development for new and renewable sources and technologies, including biofuels.

In October 2009, ASEAN leaders issued the Cha-am Hua Hin Statement on ASEAN Plus Three Cooperation on Food Security and Bio-Energy Development. The Statement called Ministers of Agriculture and Forest and other relevant ministers and international institutions to develop a comprehensive framework strategy on sustainable and integrated biofuels production and consumption that is compatible with food production. The Statement was a boost for promoting exchange of experiences and best practices in order to strengthen capacity building and technical cooperation, and to promote harmonization of bioenergy production standards in the region. The 4th East Asian Summit Energy Ministers Meeting held in Da Lat, Viet Nam in July 2010 reaffirming their strong interests in biofuels and calling upon members to the ensuring of supply and compatibility with the environment, protecting natural diversity and minimising impact on food security. The Ministers expected that each country will make further efforts to promote sustainable economic and social welfare by cultivation of various feedstocks and production of biofuels. The Economic Research Institute for ASEAN and East Asia (ERIA) has developed extensive research on energy efficiency, biomass and bio-fuels paving the way for regionally developed biofuels standardization for East Asia.

[27] India is the first world producer-consumer of sugar raw material and sugar product.

On the trade perspective, the ASEAN Plus Three will promote bio-energy trade and technology innovation to make biofuels a viable alternative for the region, with the goal of establishing regional policies on biofuels trade that take into account environment, land utilization and food security, collaborative research and development and technology transfer on second generation biofuels. The ASEAN-China Free Trade Agreement, which came into effect in January 2010, is also expected to make a considerable contribution to the development of the sector in the region. Furthermore, the East Asian Community (EAC) project could offer market access to China, Korea, India and Japan. Finally, the ASEAN countries are also members of the APEC Biofuels Task Force, which includes 14 APEC economies that have signed framework agreements for cooperation and the exchange of technology, knowledge and trade opportunities with the US and EU reinforcing the role of the bloc on the global agenda for the development of biofuels.

India-ASEAN countries cooperation on renewable energy

The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), a regional grouping in Southeast Asia comprised of Bangladesh, India, Sri Lanka, Myanmar, Thailand, Bhutan and Nepal, has been established to promote cooperation in economic development in the region. Under the Plan of Action to implement the ASEAN-India Partnership for Peace, Progress and Shared Prosperity, which was signed in Vientiane, Lao PDR on 30 November 2004, institutional linkages between ASEAN Centre for Energy (ACE) and India will be developed and strengthened to cooperate on research and development in new and renewable energy. It will also promote sustainable and optimal utilisation of renewable energy.

4.3 South-South biofuels cooperation in Africa

Achieving stable development in Africa has been a crucial issue for the international community and for the African continent itself for some decades. Africa has been left out of both the industrial and agricultural revolutions taking place elsewhere. South-South cooperation with developing countries has become a strategic opportunity for Africa to increase its bargaining power with both developed and developing countries, in a way that complements and enhances traditional cooperation by providing alternatives. Agriculture development and food security are the primary priorities for South-South and Triangular Cooperation. In this context, biofuels are beginning to play a role in a number of African countries, as it profit from comparative advantages to the sector, such as broad availability of land, labour and sunlight.

The African continent has sufficient land for balancing issues of food security and biofuels production. Indeed, in many cases one could be strengthened by the other, as illustrated by examples of biofuels agriculture-based production in Brazil. Figures from the Food and Agriculture Organization (FAO) indicate that in the Guinea Savannah zone alone – an area covering 25 African countries – there are 400 million hectares suitable for farming.[28] Africa is one of the world's largest sugarcane producers. Biofuels production has strong technical synergies with the established sugar industry, making biofuels a strong candidate to diversify output and add value to sugarcane activity. Challenges lie, however, in the development of strong and conducive regulatory frameworks to ensure sustainability.[29] Once the concerns about food security and environment degradation are addressed and enforced by consistent biofuels development policies, production could target the demand of regional, national and foreign markets such as the EU and the United States. An important incentive towards biofuels is that sugarcane producing LDCs, have the benefit of free access to these markets.

[28] FAO Press Release: Africa's sleeping giant: 400 million hectares of Guinea Savannah land ripe for commercial farming. June 2009.
[29] UNCTAD (2008) Making Certification Work for Sustainable Development: The Case of Biofuels.

A recent study prepared by Food Agriculture Organization (FAO) and the International Fund for Agricultural Development (IFAD)[30] have stated that "using the energy crop jatropha for biodiesel production could benefit poor farmers, particularly in semi-arid and remote areas of developing countries". The study identified also the need for crop improvement as jatropha is still essentially a wild plant with greater scope for increasing productivity. Jatropha biodiesel by-products such as seed cake can be used as fertilizer and animal feed after detoxification. Further work has to be done on this field.

Several African countries have already started to invest in developing a biofuels market to compensate for their recent losses as result of the reforms in the EU on sugar trade and subsidies. Development projects are taking place at both the commercial and family scale production levels. African countries have the potential of benefiting from the Everything but Arms (EBA) agreement, which suspends almost all tariffs for products imported into the EU from 50 LDCs including biofuels with zero tariffs. This creates a huge market advantage over countries such as Brazil and other countries competing with Africa to export biofuels to the EU market. In addition, the United States has introduced the African Growth and Opportunity Act (AGOA), which significantly liberalises access to the United States market for the 38 Sub-Saharan countries.

Options for the use of biofuels in Africa are being explored, including: a) ethanol and biodiesel as transport fuel; b) as a substitute for wood-based energy sources for cooking; c) as a source of electricity (a key issue, as Africa uses only 3 per cent of electricity used globally and as only one in four African people has access to electricity); d) the promotion of socio-economic development; and e) its role in contributing to improving energy supply and security in the continent. The latter refers also to the needs of an increasing GDP growth rate from 3.5 to 8 per cent required for Africa to meet the MDGs. Taking into account the exposed scenario, a number of African countries have implemented, or are in the process of developing or implementing national and regional biofuels strategies and policies in Africa mainly from sugarcane raw material for bio-ethanol and Jatropha for biodiesel (e.g. South Africa, Nigeria, Senegal, Ghana, Malawi, Mozambique, Sudan, Kenya, Ethiopia, Mali, Swaziland and Zimbabwe).

South-South cooperation projects aim to promote the development of the biofuels sector in Africa in a sustainable and inclusive way. At a regional level, a concrete strategic plan has been set by the Southern Africa Development Community (SADC) Biofuels Task Force, arising from dialogue and exchange of experience. This advanced institutional framework aims to explore the potential and constraints of the biofuels sector, with a view to develop a sustainable biofuels industry that meets the needs of both food and energy security and socio-economic and technological development, while at the same time increasing income in the region and an export market in the developed world. Box 3 has more details.

[30] Jatropha: A Smallholder Bioenergy Crop The Potential for Pro-Poor Development, July 2010

Box 4. Developing Institutional Frameworks: The SADC Biofuels Task Force

The SADC Biofuels Task Force (Commission) was established in July 2006 under the framework of the Southern Africa Development Community to draft legislation concerning the agro-industrial development of sugarcane. The Task Force is coordinated by the Ministry of Petroleum and includes other sectors of central government, namely: Agriculture and Rural Development, Industry, Finance, Planning, Energy and Water, Public Works, and other partners whose contribution was deemed indispensable. The creation of the Task Force was determined by the need to undertake the following: a) to develop the draft Law of Sugarcane Agro-Industrial Concessions in Angola and its respective Regulations; b) to develop a proposal on the policy for future industrial investments on sugarcane and ethanol, as part of the policy on the country's energy and industrialization, using local raw materials. The Task Force has been working on a series of publications, including a: 1) draft policy proposal for future industrial investments on sugarcane and ethanol as part of the Policy on Energy and Industrialization; 2) draft policy proposal on the Law of Sugarcane and Ethanol Agro-Industrial Concessions; 3) proposal for a contract model for concession for the surface-rights for sugarcane cultivation; and 4) proposal on the Statutes of the National Institute for Sugar and Ethanol.

South Africa and Mozambique are the two most advanced biofuel producing countries pushing SADC. South Africa and Brazil cooperate on a bilateral and inter-regional basis through the India-Brazil-South Africa (IBSA) Forum dialogue, and a framework has been agreed for cooperation for the first and second generation of biofuels. Mozambique has put in place the Community of Portuguese Speaking Countries (CPLP) framework, to cooperate with Brazilian projects. Within this framework, Brazil, Portugal and South Africa have invested in the biofuels sector in traditional (Portugal), triangular (United Kingdom and Brazil), and South-South projects. Mozambique exports 10 million tonnes of sugar annually. This represents 16 per cent of the country's exports and 34 per cent of its export revenue.[31] The biofuels sector in Mozambique has consequently become a priority, and a national policy on biofuels (prepared by the Ministry of New and Renewable Energy) was approved in 2008.

The potential of the biofuels sector in Africa has attracted a number of investors from countries such as Brazil, the EU, Israel, India, China and Japan.[32] The African biofuels sector has recently become an international issue, following the 2007/2008 food security crisis and the so-called "land grab" issues. Both are complex challenges to overcome, and therefore the "one size fits all" approach is not a valid option for either Africa or the other parties involved in the development of the biofuels sector. There is a need to develop national country-based studies and integrate them into regional agendas, as is the case with the SADC.

[31] Sweetening the poverty pill. It is time to use the end of the EU's sugar regime to reconcile trade, competitiveness and sustainable development in order to help the African, Caribbean and Pacific countries. European Voice, 8-14 December 2005. Margot Wallström and Minna Gilberg.

[32] Biofuels in Africa: A pathway for Development. International research Center for energy and Economic Development, Occasional Papers: Number 43. Tsegay Wold-Georgis and Michael H. Glantz.

Box 5: Setting a Research Agenda for biofuels in Africa

The global crises may well lead to a temporary reduction of pressure on biofuel production in Africa, but as the price of oil is likely to rise again, the biofuel issue will certainly return to the top of the agenda. In order to be prepared for this, and to avoid repeating the historic scenario, research could answer the following questions:

- What type of biofuel crop/feedstock is best suited for African needs and which can at the same time secure export markets and incomes over time?
- Do biofuels from crops other than sugarcane or those that require well-watered lands show potential?
- What scale of production of biofuel can best promote and protect the interests of African smallholders?
- How can the rights of smallholders to land and water be protected?
- Can smallholders to a larger extent produce biofuel to generate energy and incomes for their communities?
- Can smallholder farmers cooperate with large scale production units to create a win-win situation?
- Can intercropping biofuel with other crops minimize or avoid the reduction in biodiversity?
- Can intercropping help to mitigate climate change, or can biofuel crops be designed so that they generate food and energy, such as the project developed by ICRISAT (the International Crops Research Institute for the Semi-Arid Tropics) for sweet sorghum has done?

Source: Biofuel and Africa – urgent issues and knowledge gaps. Kjell Havnevik. Senior researcher, Nordic Africa Institute.

The SADC has become a solid mechanism for actions furthering the development of biofuels at national and regional basis. It has set up a Biofuels Task Force to explore both the potential and constraints of biofuels production in Southern Africa and to develop policies better adapted to the realities of the region that can also ensure the sustainability of the industry. In West Africa, the Economic Community of West African States (ECOWAS) is also working to improve the dialogue on national biofuels strategies and policies. In the East Africa Community, biofuels discussion has taken a prominent place in the regional discussions, with the African Union itself becoming a platform for debate.

Biofuels development in West Africa

As with Brazil, West African countries have comparative advantages for producing biofuels obtained from high-yield tropical plants such as sugarcane and jatropha. Tropical crops differ from those in the other regions due to their particularly high energy efficiency, their yield and their relatively low production cost. The Sub-Saharan region has wide amounts of undeveloped cultivable land, sufficient water resources and labour force.[33] Senegal is one of the few countries to have signed South-South cooperation agreements with Brazil, to develop small-scale biofuel production. In 2006, the Senegalese government set up the Association of Non Oil Producing Countries (APNPP) (or the so-called OPEC Green), uniting 15 African countries to exchange experiences on biofuel technologies and knowledge. The region also benefits from triangular South-South cooperation, with Brazil transferring technology and the Indian business community providing financial resources for the development of the biofuels sector in the region.[34]

In 2006, the Brazilian Agricultural Research Corporation (Embrapa) opened its first office in Africa, in the city of Accra in Ghana. Embrapa is a public agriculture and livestock research institution with leadership in tropical agriculture. It has been active especially in boosting cooperation in a number of areas, particularly biofuels, under the framework of the Pro-Renova. Another boost for the development of sustainable renewable energy sources in the African continent was given at the first "Brazil-Africa Dialogue on Food Security, Poverty Reduction, Hunger Fight and Rural Development" held in Brasilia in May 2010. The meeting started a framework for greater cooperation on the Biofuels sector, including the decision to establish a Brazil-Africa Centre for Bioenergy in Africa. An additional three Embrapa offices are also expected to be established in the near future in the African continent. Furthermore, an

[33] Biofuels: What strategies for developing the sector in West Africa? UNECA 2008.
[34] Senegal and Brazil sign biofuel agreement to make Africa a major supplier. Biopact, 2007.

agreement on technical cooperation between Brazil and UEMOA – Western Africa Monetary and Economic Union (Benin, Burkina Faso, Ivory Coast, Guinea-Bissau, Mali, Niger, Senegal and Togo) was signed to finance studies in the sustainable production of bioenergy and a Feasibility Study for Sustainable Bioenergy Production is underway.

Brazil's state-owned oil company, Petrobrás, is also investing in ethanol production in several African countries, including Senegal, Nigeria, Mozambique and Angola. India has recently pledged US$250 million to the West African Biofuels Fund, which is to be set up by the Bank for Investment and Development (EBID) of ECOWAS, which aims to boost biofuels production in fifteen West African countries. A workshop co-sponsored by EBID and the UNCTAD was held to foster private-public partnerships and to finance agricultural and industrial production for biofuels. EBID is providing US$35 million for a Jatropha biodiesel project in Ghana, Benin, Mali, Nigeria and Senegal, and is exploring the production of Jatropha-based biofuels.[35] In addition, China has created a long-term cassava supply channel from Nigeria for its domestic ethanol distilleries.

5 INTER-REGIONAL COOPERATION ON BIOFUELS

5.1 India Brazil South Africa (IBSA) cooperation on biofuels

The India, Brazil, South Africa (IBSA) Dialogue Forum has, since its establishment in 2003, become a powerful and results-oriented alliance. At the first IBSA Summit, held in September 2006 in Brasilia, key areas for cooperation included the energy, agriculture, transportation, trade, science, technology and information society sectors. In what refers specifically to biofuels, a Memorandum of Understanding (MoU) on Biofuels was signed with the decision to create the Trilateral Task Force on Biofuels to work on concrete areas of common interest in 2008. Previously, at the IBSA Working Group held in July 2007, cooperation on the development of second-generation biofuels, wind, and remote village electrification were highlighted. An IBSA ministerial meeting held in September 2009 in Brasilia recognized the vital role of access to energy for sustainable development. In April 2010, the Fourth Summit of IBSA produced the document "The Future of Agricultural Cooperation in IBSA", which was endorsed by the member countries, providing an overview of the current status of agriculture in the three countries and calling for a more specific study aiming to explore areas where there are significant synergies between these countries for agricultural cooperation. Biofuels was already previously identified as one of the potential areas. Also in 2010, Brazil has organized the VI Energy Working Group Meeting of IBSA and a Technical Workshop about the use of biofuels in vehicular motors in São Paulo. A Workshop about Technical Patterns and Specifications for Biofuels was held in South Africa in December 2010. A Technical Working Group was created in order to translate specifications related to biofuels and harmonize reference units in all three countries[36].

5.2 Asia-Pacific Economic Cooperation (APEC) Biofuels Task Force

The Asia-Pacific Economic Cooperation (APEC) Biofuels Task Force was established in 2006 as one of the key outcomes of the eighth meeting of APEC Energy Ministers in Darwin, Australia where the Darwin Declaration on Achieving Energy Security and Sustainable Development through Efficiency Conservation and Diversity was issued. The Task Force unites fifteen member states of the inter-regional economic dialogue, including the United States, China, Canada, Australia, Thailand, Malaysia, Indonesia, Chile, Peru, Colombia, Japan, Mexico, New Zealand, The Philippines, Russia and Thailand. The Task Force aims to assist APEC member economies to share experiences in order to improve their understanding of the potential for biofuels as a substitute to fossil fuels in the transport sector. The group focuses on joint analysis of key issues affecting the development of biofuels, including: resources, economics, infrastructure, vehicles and trade opportunities. The first working group meeting

[35] Green OPEC, Biopact and The new scramble for Africa, GRAIN July 2007.

[36] South-South Cooperation in bioenergy. Presentation made by Mariangela Rebuá, Director of the Department of Energy – MRE at the "1st meeting of the GBEP Working Group on Capacity Building for Sustainable Bioenergy", Tokyo, Japan, 16 November 2011

was held in Singapore in May 2006. In 2007, Brazil was invited to the meetings. Achievements thus far include: the Survey of Biofuel Resource Assessments and Resource Assessment Capabilities, studies on the use of second-generation biofuels, Guidelines for Biodiesel Standards and Status of Liquid Biofuels. A website was established to keep members and the public in general and the biofuels sector as a whole in the APEC region updated on the development of the Task Force. Upcoming projects include researching the resource potential of algae for biodiesel, a study of the Sustainable Biofuels Development Practices in APEC Economies and publication of a work entitled "Strategies for Developing Biofuel Transport and Distribution Infrastructure in APEC".[37]

Biofuels in the APEC region are produced from a variety of first-generation feedstock using well-established conversion technologies. For ethanol production, feedstocks include: starches from grains (cereals, feed, and grains), tubers (cassava and sweet potatoes), sugars from crops (sugar beets, sugarcane, and sweet sorghum) and food processing by-products (molasses, cheese whey and beverage waste). First-generation biodiesel feedstocks used in the APEC economies include vegetable oil (mainly soybean, rapeseed, and palm oil), used cooking oil and animal fat (tallow and cat fish oil). Second-generation feedstocks for ethanol production include lignocellulosic material, such as crop and forest residues. Economies with large-scale agriculture and forestry operations such as Canada, the United States and China have set up demonstration projects using lignocelluloses biomass for ethanol production. An advanced biodiesel feedstock includes microalgae. Several companies in the United States and New Zealand have started pilot projects to grow algae.[38]

6. TRIANGULAR COOPERATION ON BIOFUELS

Triangular Cooperation (TC), which refers to support of South-South cooperation initiatives by a northern country (traditional OECD donors) or multilateral agencies, has emerged as an innovative mechanism for integrating developed countries into South-South cooperation programmes. Japan has been at the forefront of these initiatives, with linkages going back to the time when it was a developing nation and one of the participants of the Bandung Conference in 1955. Japan has been instrumental in implementing bilateral and triangular projects with ASEAN countries, such as with the East Asia Summit (EAS), a forum for dialogue on broad strategic, political and economic issues in the region and supports the creation of an East Asia Community project that envisages establishing a EU model of integration for the region, an important example of regional cooperation with major economies such as China. Another example is the recent agreement with the Brazilian Cooperation Agency (ABC) and Japan International Cooperation Agency (JICA), to implement projects in Mozambique making use of Brazil's agricultural expertise for promoting agricultural development and food security. The Swiss Agency for Development and Cooperation (SDC) has also signed an agreement with ABC for agricultural projects in Haiti. In addition, the EU has signed an agreement with Brazil establishing the basis for Triangular Cooperation on health, agriculture and bioenergy projects in Africa.

Triangular Cooperation presents valuable opportunities for boosting development cooperation while exploring local capacity in the south, and particularly for promoting developing countries' expertise and technology. It also provides opportunities to break down some of the conditions that have transformed aid agencies into contract agencies. The critics of Triangular Cooperation, on the other hand, are

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[37] Other major APEC publications include:

- "Assessment of Biomass Resources from Marginal Lands in APEC Economies" (PDF 6.9 MB), Anelia Milbrandt and Ralph Overend, National Renewable Energy Laboratory, for the Energy Working Group (August 2009).
- "Survey of Biomass Resource Assessments and Assessment Capabilities in APEC Economies" (PDF 5.9 MB), Anelia Milbrandt and Ralph Overend, National Renewable Energy Laboratory, for the Energy Working Group (November 2008).
- "The Future of Liquid Biofuels in APEC Economies" (PDF 3.3 MB), Anelia Milbrandt and Ralph Overend, National Renewable Energy Laboratory (NREL) for the Energy Working Group (May 2008).
- "Establishment of the Guidelines for the Development of Biodiesel Standards in the APEC Region" (PDF 7.9 MB), Hart Energy Consulting (November 2007).
- "APEC Biofuels Task Force Report to the Eighth Energy Ministers Meeting (EMM-8)" (PDF 979 KB), Darwin, Australia (May 2007).
- "Future Fuels for the APEC Region, An Integrated Technology Roadmap" (PDF 1.8 MB) compiled by Minns, D. (September 2005).

[38] APEC Biofuels Task Force website http://www.biofuels.apec.org.

concerned that it could become a "Trojan Horse" instrument for some developed countries donors to implement their agenda upon emerging actors in the development cooperation arena and the recipient countries. Traditional donors simultaneously accuse the new actors of leaving behind decades of work, out of which important rules for improving development cooperation were created. The concerns and philosophy of traditional donors have been well expressed in the Paris Accord for Aid Effectiveness and the Accra Accord, both of which have been endorsed by a number of recipient countries. Obligations were taken into consideration at the Financing for Development Conference and the Monterrey Consensus of 2002 and the Doha Review Process, which took place in 2008. The establishment of the Development Cooperation Forum in 2007 under the framework of the Economic and Social Council (ECOSOC) is becoming a universal platform for dialogue on the contentious issues of both South-South and Triangular Cooperation.

6.1 UNIDO, Brazil and African Union Triangular Cooperation

The first High-Level Seminar on Biofuels in Africa, jointly organized by UNIDO, the African Union Commission and the Brazilian Government, was held in 2007. The meeting was an important gathering of experts, policy makers, the private sector and institutions, among other key stakeholders, at both national and regional levels to discuss the challenges and opportunities biofuels present to Africa. Organised within the overall framework of the 2004-2007 Strategic Plan of the African Union Commission, the Seminar envisaged the formulation of policies and strategies on new and renewable energy. The Seminar followed the 1st Conference of African Ministers meeting regarding Hydrocarbons (oil and gas) held in Cairo on 14 December 2006, during which officials requested the African Union Commission create policies and strategies for the development of clean, new and renewable energies (particularly biofuels) as an alternative solution to hydrocarbons, as a result of the rise in oil prices which had adversely effected African economies. The Seminar's key objectives were to: 1) brief policy makers, the private sector, regional institutions and other key stakeholders on the potentials, risks and trade-offs of developing biofuels in Africa; 2) facilitate the sharing of experiences in developing biofuels among countries in Africa and between Africa and Brazil and other countries and regions; 3) explore the potential of and challenges to the dissemination of priority biofuels technologies; and 4) consult key stakeholders in developing a program of action for sustainable biofuels development.

6.2 European Union/Brazil/Africa Cooperation on Agriculture

The European Union signed a strategic partnership agreement with Brazil at the first EU-Brazil Summit held in Lisbon in 2007. A number of priority areas were defined, including: climate change and the development of safer, more efficient and sustainable alternatives to fossil fuels, including types of biofuels that have a positive impact in terms of reducing greenhouse gas emissions. The promotion of renewable energy and the efforts aimed at improving both energy efficiency and access to energy is an important contribution to fulfilling sustainable development needs and achieving greater energy security. The EU-Brazil partnership focuses on the increasing energy efficiency and the share of renewable energies in the global mix.

The second summit was held in December 2008 in Rio de Janeiro, where the Joint Action Plan (JAP) for cooperation between the EU and Brazil was presented. The plan is divided into five main areas:

1) Promoting peace and comprehensive security;
2) Enhancing the Economic, Social and Environmental Partnership;
3) Promoting regional cooperation;
4) Promoting science, technology and innovation; and
5) Promoting people-to-people contacts and cultural exchanges.

Taking into account the concerns over biofuels, the EU and Brazil have agreed to develop standards of production that ensure inclusive involvement of all members in the production, trade and consumption of renewable energy. The first session of the EC-Brazil Energy Cooperation Bilateral Dialogue was held in November 2008, at which concerns over biofuels production and dissemination were discussed.

The Third EU-Brazil Summit, held in Stockholm in October 2009, focused on the development of Triangular Cooperation initiated at the Second Summit. EU and Brazil signed a joint declaration reiterating their commitment to the implementation of Triangular Cooperation projects between the EU, Brazil and interested developing countries, such as the Portuguese-speaking countries in Africa (PALOP), East Timor and Haiti, in the sectors of health, energy, agriculture, education and other appropriate areas. It was also agreed that a trilateral meeting at the expert level would be organized to discuss the potential for cooperation between the three partners. The decision was made to work together on a joint initiative developing bioenergy in Africa, focusing on biofuels and bio-electricity. The final joint declaration outlined that *"developing bio-energy on a socially, environmentally and economically sustainable basis can give an important contribution to tackling climate change, fighting poverty, and promoting access to modern forms of energy, such as for transport, cooking fuels and electricity for rural and urban areas"*. The decision was made to collaborate on country studies analysing the potential for sustainable bioenergy development, and on its impact on poverty reduction, in interested countries and regional economic communities in Africa. A coordination group will examine the initiative and its work programme, overseeing the private and public investments necessary to implement bioenergy projects.

In July 2010, the 4th Summit of the Strategic Partnership between Brazil and the European Union held in Brasilia launched a Partnership for the Sustainable Development of Bioenergy in interested African Countries, boosting triangular cooperation between Brazil and EU and developing countries on renewable energy. The triangular cooperation initiative aims to promote the *"development of feasibility studies on the potential for the sustainable production and use of bio- energy, taking into account social, environmental and economic consequences will make an important contribution to tackling climate change, fighting poverty, and promoting access to modern forms of energy, such as for transport, cooking fuels and electricity for rural and urban areas"*. A Partnership for the Sustainable Development of Bioenergy was also agreed with Mozambique[39]. The 5th Brazil-EU Summit held recently in Belgium[40] called for the strengthening of cooperation on energy issues including on biofuels.

6.3 United States-Brazil Biofuels Cooperation

In March 2007, a MoU to Advance Cooperation on Biofuels between Brazil and the United States established the strategic importance of biofuels as a transformative force to diversify energy supplies, bolster economic growth, advance social agendas, improve the environment and advance technologies and knowledge. A Steering Group was established to oversee the work being carried out under this MoU, to ensure proper coordination across the following three areas of cooperation:

I. ***Bilateral:*** to advance the research and development of next generation biofuels technology, leveraging, wherever possible, the work being done in the framework of the Brazil-US Commercial Dialogue (2006), the Consultative Committee on Agriculture (2003), the Consultative Group on Energy (2003), the Brazil/US Common Agenda for the Environment (1995) and the Joint Commission on Cooperation in Science and Technology (1984).

II. ***Third Countries:*** to work jointly to bring the benefits of biofuels to select third countries through feasibility studies and technical assistance aimed at stimulating private sector investment in biofuels, with work to begin in Central America and the Caribbean, to encourage local production and consumption of biofuels, and with a view to continue joint work in key regions across the globe. In 2008, Guatemala, Honduras, Jamaica, Guinea-Bissau and Senegal joined the original partners (the Dominican Republic, El Salvador, Haiti, and St. Kitts and Nevis).

[39] IV European Union-Brazil Summit Joint Statement, European Council Press Statement, Brasília, 14 July 2010
[40] V European Union - Brazil Summit Joint Statement, European Council Press Statement, Brussels, 4 October, 2011

III. ***Global:*** to expand the biofuels marketplace through cooperation on the establishment of uniform standards and codes, in league with the International Biofuels Forum (IBF), leveraging existing work being carried out between the National Institute of Meteorology, Standards and Industrial Quality of Brazil (INMETRO) and the United States National Institute of Standards and Technology (NIST) and coordinating with existing and complementary international fora.[41]

In March 2011, a MoU was signed between Brazil and the United States establishing a "Partnership for the Development of Aviation Biofuels", with the following goals: a) to endorse the development of sustainable biofuels for aviation as an important means of reducing aviation greenhouse gas emissions; b) to coordinate efforts towards the establishment of common standards and specifications for aviation biofuels; c) to strengthen private sector partnerships through the creation of a favourable environment for research and academic circles as well as enterprises to develop cooperation and initiatives towards the development of aviation biofuels. This includes supporting the dialogue between the Brazilian Alliance for Aviation Biofuels (ABRABA) and the Commercial Aviation Alternative Fuels Initiative (CAAFI); d) To provide for coordination in multilateral fora concerning aviation biofuels in order to prevent international barriers to biofuels trade and development and to ensure that the use of biofuels is promoted as an important contribution for GHG emissions reduction. Results could be used in triangular cooperation in the future.

7. MULTILATERAL COOPERATION ON BIOFUELS

7.1 International Biofuels Forum

In March 2007 Brazil, China, India, South Africa, the United States and the EU jointly established the International Biofuels Forum (IBF), with the goal of promoting the sustained use and production of biofuels worldwide. IBF focuses on the creation of a global market for alternative fuels, which would result in economic, social and environmental benefits for developed and developing countries alike. The IBF initiative established a mechanism to structure the dialogue among the biggest producers and consumers of biofuels, arguing that biofuels production has the potential to improve diversification and increase energy security by reducing dependence on fossil fuels and contributing to lower greenhouse gas emissions. For developing countries where conducive conditions exist, a greater use of biofuels , if implemented with well-managed policies, could significantly reduce dependence on imported oil, thereby redressing trade imbalances and potentially freeing up income for investments in health, education, social programmes and improving rural development. The IBF enables closer coordination among the field's major players to establish common standards and work towards biofuels commoditization. A meeting of the IBF was held on the sidelines of the International Conference on Biofuels at the EU Commission held in July 2007 in Brussels. The first IBF Summit was held in São Paulo in November 2008.[42]

7.2 Global Bioenergy Partnership

The Global Bioenergy Partnership (GBEP) was launched in July 2005 as one of the outcomes of the Gleneagles Summit of the G8+5 (Brazil, China, India, Mexico and South Africa). The partnership envisages "supporting wider, cost-effective biomass and biofuels deployment, particularly in developing countries where biomass use is prevalent". The GBEP was launched during the Ministerial Segment of the 14th session of the Commission on Sustainable Development (CSD14) in New York in May 2006. In January 2007, GBEP was registered as a CSD Partnership. At the G8 summit in 2007 in Heiligendamm, Germany, GBEP was requested to continue its work on biofuel best practices and to the successful and sustainable development of bioenergy. At the G8 Hokkaido Toyako Summit in 2008,

[41] MoU between the Government of the Federative Republic of Brazil and the Government of the United States of America to Advance Cooperation on Biofuels. São Paulo, March 7, 2007.
[42] International Biofuels Forum, 2007.

GBEP was requested to work with other relevant stakeholders to develop science-based benchmarks and indicators for biofuel production and use. In 2009, at L'Aquila Summit, the Partnership was requested to accelerate its work, and to boost technological cooperation and innovation in bioenergy.

The purpose of the Global Bioenergy Partnership is to provide a mechanism for Partners to organise, coordinate and implement targeted international research, development, demonstration and commercial activities related to the production, delivery, conversion and use of biomass for energy, with a focus on developing countries.

GBEP also provides a forum to develop effective policy frameworks:

- To suggest rules and tools to promote sustainable biomass and bioenergy development;
- To facilitate investments in bioenergy;
- To promote project development and implementation; and
- To foster R&D and commercial bioenergy activities.

GBEP's main functions are:

a) Promote global high-level policy dialogue on bioenergy and facilitate international cooperation;
b) Support national and regional bioenergy policy-making and market development;
c) Favour efficient and sustainable uses of biomass and develop project activities in the bioenergy field;
d) Foster exchange of information, skills and technologies through bilateral and multilateral collaboration;
e) Facilitate bioenergy integration into energy markets by tackling specific barriers in the supply chain; and
f) Act as a cross-cutting initiative, working in synergy with other relevant activities, avoiding duplications.[43]

Hosted by FAO, membership of the GBEP includes Brazil, Canada, China, the European Union, Fiji Islands, France, Germany, Italy, Japan, Mexico, Netherlands, Russian Federation, Spain, Sudan, Sweden, Switzerland, Tanzania, the United Kingdom, the United States, International Energy Agency (IEA), United Nations Conference on Trade and Development (UNCTAD), United Nations Department of Economic and Social Affairs (UN/DESA), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United Nations Industrial Development Organization (UNIDO), United Nations Foundation, World Council for Renewable Energy (WCRE) and European Biomass Industry Association (EUBIA). The list of observers includes Angola, Argentina, Australia, Austria, Colombia, Gambia, Ghana, India, Indonesia, Israel, Kenya, Madagascar, Malaysia, Mauritania, Morocco, Mozambique, Norway, Rwanda, Peru, South Africa, Tunisia, European Environment Agency (EEA), International Fund for Agricultural Development (IFAD), World Bank and the World Business Council on Sustainable Development (WBCSD). Italy and Mexico were elected Chair and Co-Chair respectively for the first biennium.[44]

8. THE UNCTAD BIOFUELS INITIATIVE

The UNCTAD Biofuels Initiative, established in June 2005, serves as a “meeting point” for existing biofuels programmes/initiatives/activities to facilitate the sharing of experiences and to provide support to developing countries.[45] The initiative is one of the outcomes of the Expert Meeting on the New and Dynamic Sectors of World Trade, 7-9 February 2005, held in Geneva, Switzerland, when experts recommended that UNCTAD should give higher priority to work on biofuels, including further

[43] Global Bioenergy Partnership, 2009.
[44] Third European Union-Brazil Summit, Joint Statement, Stockholm, 6 October, 2009.
[45] A Sustainable Agenda for Biofuel Production and Trade, Simonetta Zarrilli, UNCTAD Biofuels Initiative, United Nations Conference of Trade and Development, UNCTAD, 30 September 2009.

research, analysis, technical cooperation, and consensus building. In response, UNCTAD launched the BioFuels Initiative in June 2005 by convening an international advisory Expert Group to assist developing countries capture the multiple advantages of greater production, use and trade in bio-fuels resources and technology. The following month, the boards of the United Nations Foundation and the United Nations Fund for International Partnerships (UNFIP) decided to support the programme Biofuels Initiative – Trade, Investment and Capacity Building Opportunities.

The grant provided supports UNCTAD's efforts to assess the trade competitiveness of developing countries in the growing worldwide biofuel usage and trade, as well as market access and market entry issues related to imports of biofuels in developing countries. In 2006, the Government of Norway made a contribution to this initiative, the three key goals of which are to provide: a) economic, legal and trade policy analysis; b) capacity building activities; and c) consensus building tools. An *Ad hoc* Expert Group Meeting entitled *Biofuels: Trade and Development Implications of Present and Emerging Technologies* was held in 2007, followed by a series of publications have since been produced, serving as an instrument for policy makers involved in developing a biofuels policy strategy in general. Two advisory studies of national biofuel policies were also undertaken between 2008 and 2011, namely in Guatemala and Mexico. In 2011 UNCTAD's BioFuels Initiative collaborated with the Brazilian Reference Centre on Biomass (CENBIO) in exploring a possible triangular South–South cooperation (Brazil–Mozambique–Portugal) for the sustainable production and use of biofuels in Africa. A mission was conducted in April 2010 and the Government of Mozambique expressed a strong interest in introducing biofuels in the country. UNCTAD is assisting in developing a funding proposal to implement a project for the sustainable production of biofuels.

9. FINAL REMARKS

In light of the upcoming United Nations Conference on Sustainable Development (Rio+20) the international community has been called again to review achievements and to advance new commitments towards a sustainable development agenda. Mechanisms for monitoring such as Sustainable Development Goals are also proposed as a way to enhance the practical implementation of the concept after a two decades long debate. A proper sustainable development agenda requires that developing countries catch up with the rich world, the development of which was mostly based on two centuries of uncontrolled fossil energy consumption.

Developing countries are challenged with the need to conciliate the efforts to address long-standing development challenges such as poverty and hunger at the same time as facing emerging climate change by supporting the global call for a "Great Green Technology Transformation" as called by UN-DESA. This revolution prioritizes renewable energy which sources which are highly cost and technology intensive, and which happen to be often concentrated in the North with rare exceptions. This study shows that biofuels, despite not being a panacea solution for all the problems facing developing countries could be an opportunity for overcoming part of these challenges if well managed. The contrary is also true: badly used biofuels, such as those produced at the expense of food security and damage to ecosystems and water sources, could negate development achievements. On the other hand, the "good biofuels", those which follow sustainability standards in their production and usage, could become an important alternative in the path towards a greener and more socially inclusive economy, ultimately supporting the achievement of the MDGs.

The higher utilization of renewable energy is a key tool in tackling the issue of ever-increasing demand for energy under the constraints to continued fossil fuel utilization brought by climate change. Renewable energy options, especially those which can be competitively produced in developing countries, are of special interest due to their social and economic co-benefits. As countries face challenges of energy security, climate change and limited access to advanced renewable energy technologies, the production and usage of biofuels appears to be a promising option for developing countries. If sustainability concerns are addressed, biofuels can deliver income gains and increased value-added for agriculture in a number of developing countries in the South.

South-South Cooperation has resurged as one important element of the development cooperation agenda as result of the emergence of a number of dynamic economies of the South. Their growing role in international cooperation is leading towards a new architecture for development cooperation. Their roles are by no means a source for replacement but a way to complement traditional cooperation channels by pushing for changes and adoption of new formats that could produce more practical results. This paper explored the state of South-South and Triangular Cooperation in the production, use and trade of sustainable biofuels, their achievements and challenges ahead. In addition, this study highlights in particular the south-borne characteristics of cooperation, which challenges the conventional north-south technology and capacity-building paradigms.

Biofuel experience-sharing, investments and capacity building are taking place in an ad-hoc manner between virtually all continents, with visible South-South initiatives on biofuels between key players in Africa, Latin America and Asia. Additionally, triangular efforts are occurring in the form of partnerships between developing countries and developed areas such as the European Union and the United States. Such triangular efforts often include international organizations acting as facilitators, such as UN agencies and multilateral organizations.

While biofuels can act as a developmental multiplicator in some areas, attention shall be given to the unintended consequences of expanding their usage worldwide. As some first-generation biofuels technologies have the potential to compete for feedstock which can also serve as food, special attention must be given to policies and mechanisms which safeguard affordable access to food during the up scaling of international cooperation in biofuels. Additionally, the overall performance of South-South biofuels initiatives to foster development shall not only be associated to their production costs and efficiencies, but also in their ability to keep up to (or even lead) technology developments in the sector. Advanced biofuels technologies have the potential to expand the number of outputs derived from biomass, as well as to allow the production of energy from feedstocks which pose less conflict to food security.