

Stimulating the access to biodiversity and technologies to combat climate change

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Abstract: On 13 November 2017, in a joint statement issued by the Executive Secretaries at the UN Climate Change Conference 2017 ("COP 23") taking place in Bonn, Germany¹, the Executive Secretaries of respectively the Convention on Biological Diversity ("CBD"), the United Nations Convention to Combat Desertification ("UNCCD") and the United Nations Framework Convention on Climate Change ("UNFCCC") called for establishing a financial mechanism, called Facility, to secure finance for large projects that will help to address common issues relating to climate change: *"We are calling for the establishment of a new Project Preparation Facility to bridge this gap and promote an integrated, coherent and multi-disciplinary approach to these related issues while supporting the respective mandates of the three Rio Conventions."*² This declaration officially recognizes what was widely known; biodiversity and climate change are interconnected. Biodiversity is affected by climate change, and equally the conservation of biodiversity contributes to mitigate climate change impacts³. The promises made under the CBD and UNFCCC to conserve biodiversity and to combat climate change both rely on "access". Facilitating the access to Genetic Resources ("GR") under the CBD while facilitating the access to technologies under the UNFCCC and Paris Agreement ("PA"). This paper challenges the assumptions behind those promises (1) before it evaluates the financial mechanisms which are supposed to stimulate the access to biodiversity by developed countries and to climate change technologies by developing countries (2). It then investigates what are the legal mechanisms which could further stimulate the access to biodiversity and climate change technologies including empowering the Green Climate Fund ("GCF") to own and license climate change technologies (3).

Keywords: Biodiversity, Technology Transfer, Climate Change, Green Climate Fund, Paris Agreement on Climate Change.

Introduction

On 13 November 2017, in a joint statement issued by the Executive Secretaries at the UN Climate Change Conference 2017 ("COP 23") taking place in Bonn, Germany, the Executive Secretaries of respectively the Convention on Biological Diversity ("CBD"), the United Nations Convention to Combat Desertification ("UNCCD") and the United Nations Framework Convention on Climate Change ("UNFCCC") called for establishing a financial mechanism, called Facility, to secure finance for large projects that will help to address common issues relating to climate change:

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Materials and Methods

1. Assumptions behind stimulating the access to biodiversity and technologies

1.1 Assumptions behind stimulating the access to biodiversity

Under the CBD, one way of ensuring the conservation of biodiversity is to facilitate its access and use for commercial or research purposes by third parties through the Access and Benefit Sharing ("ABS")⁴. The promotion of access to biodiversity is based on several assumptions, three of them. First, GR from biodiversity-rich countries are 'green gold'⁵. Second, limiting access to GR will inhibit the already failing bio-prospecting activity and any financial and non financial benefits to share so that the conservation of biodiversity will be at risk⁶. Third, the access to GR is mostly between resource-rich to biodiversity rich countries also known as North-South⁷. These assumptions are challengeable. Studies reveal that access to GR by developed countries is less appealing than it first appears, due in particular to the development of biotechnology and options for off-site access to GR. There is no clear study confirming that access to biodiversity contributes to its conservation. There is a debate between conservation and preservation of biodiversity. It contends that the access and sustainable use of biodiversity don't necessarily ensure its preservation. Finally, the access and use of GR is not always north-south driven⁸. Since the assumptions behind the access to biodiversity are not fully grounded, the CBD's access mechanism is weakened.

1.2 Assumptions behind stimulating the access to technologies

(i) Technologies' coverage

The access to technologies for mitigation of, and adaptation to, climate change has been much debated especially at the Conferences of the Parties ("COP") of the UNFCCC. There is debate on what the term "technology" covers and what are the critical technologies to give access to⁹? Chapter 24 of Agenda 21 under the UNFCCC refers to "Environmentally Sound Technologies" ("ESTs"), which are intended to encompass the following technologies: technologies protecting the environment, less polluting technologies, technologies using resources in a more sustainable manner, technologies aiming at recycling of waste and products, and technologies handling residual wastes.

The Intergovernmental Panel for Climate Change ("IPCC") further distinguishes between "Climate Change Mitigation Technology" ("CCMT") and "Climate Change Adaptation Technology" ("CCAT"). CCMT covers technological change and substitution that reduce energy resource inputs and emissions, while CCAT covers technologies intended to reduce the harmful effects arising from expected climate change. Finally, the PA further specifies the stage of technology cycle which matter to give access to, it should be "early stages of the technology cycle"¹⁰, rather than mature technologies.

To sum up, the term "technology" should cover environmentally friendly technologies at early stages of the technology cycle that involve energy efficiency, alternatives to fossil fuel and carbon generation, pollution and toxic remediation, water purification, recycling, safety and health concerns, renewable resources.

(ii) Access scope to technologies

Under the UNFCCC and the PA, the access to and transfer of technologies is an encompassing notion in climate change adaptation and mitigation. The first assumption under the UNFCCC is that climate change technologies are under developed countries' ownerships and their transfer to developing countries is also under their control:

Article 4, paragraph 5 of the UNFCCC reads: "The developed country Parties shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention."

Chapter 34 of Agenda 21 of Transfer Of Environmentally Sound Technology, Cooperation And Capacity-building¹¹ further suggests that the access and transfer of "ESTs" should be promoted in a balanced manner taking into account the interests of developed and developing countries:

"To promote, facilitate, and finance, as appropriate, the access to and the transfer of environmentally sound technologies and corresponding know-how, in particular to developing countries, on favourable

*terms, including on concessional and preferential terms, as mutually agreed, taking into account the need to protect intellectual property rights as well as the special needs of developing countries for the implementation of Agenda 21.*¹²

The Kyoto Protocol also promotes the access to climate change technology in its Article 10 by repeating UNFCCC's paradigm according to which developed countries shall "take all practical steps" to facilitate the transfer of, or access to, transfer ETSs to developed countries:

*"All Parties...shall: (c) Cooperate in the promotion of effective modalities for the development, application and diffusion of, and take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, **or access to, environmentally sound technologies...** in particular to developing countries..."*¹³

More recently, the PA sets the stage for urgently needed climate change technologies' access, development and transfer. Notably, countries anchored the Technology Mechanism ("TM") within the PA and decided that it would be a key element in implementing the PA. They strengthened the TM, requesting further work on technology access, research, development and demonstration, as well as enhancing endogenous capacities and technologies (e.g. locally created and developed technologies).

The assumptions under the UNFCCC and PA are challengeable. First, there is a growing number of developing countries which are heavily engaged in climate change technologies, developing and patenting inventions in this area. For example, the Thai company Siam Cement is heavily engaged in environmental friendly paper and cement.

The Siam Cement Public Company Limited ("SCG") is a Thai company which was established over 100 years ago in Thailand in 1913, following a Royal Decree of His Majesty King Rama VI in order to eliminate reliance on imports of cement, as well as fully using own country natural resource¹⁴. The goal is to diversify and meet the economic growing in Thailand.

SCG established and participated in new industries under SCG. SCG comprises over 100 companies under 5 business groups (Cement, paper, chemical, building material, distribution) employing approximately 40,000 employees, handling more than 80,000 product items and filing over 150 patents a year. In 2005, SCG established a working committee dedicated specifically to innovation.

In 2017, SCG had nearly 1,700 staff members in the R&d department. This included over 100 PhD graduates and it has a research budget of more than 424,240,400 USD per year, again resulting in over USD 4,250,400,250.40 of sales from high value-added products.

A wide range of environmental friendly products have been invented, produced and distributed worldwide by SCG. For example, products that use minimal natural resources such as "Idea Green paper"¹⁵, which reduces the use of trees by 30 %. Another innovative product is "EL Green plastic pellets"¹⁶ (used for plastic packaging); this is biodegradable under certain temperatures and moisture levels. Another green invention is SCG Marine Cement¹⁷. It is sea water resistant and the greenhouse gas emissions resulting from its production have been reduced by at least 350 kilograms per ton of cement. These locally made and developed technologies effectively reduces greenhouse gas emissions and contribute to mitigate climate change impacts¹⁸

Second, early stage technologies are not generally opened to access and transfer to developing countries, due to their confidentiality, owners' high return on investment expectations, and delays in patenting them especially in developing countries. There is also a significant part of climate change technology which is mature technology. One example is solar technology. China has engaged into this area becoming the world's largest developer, manufacturer and exporter of solar cells. This was due partially because the technology used was several generations old and many patents were in public domain¹⁹.

Since the assumptions for facilitating access to technologies are not fully well grounded, the UNFCCC and PA access facilitation mechanisms are also weakened.

2. Financial mechanisms to stimulate the accesses to biodiversity and technologies

The financial mechanisms to stimulate the access to biodiversity and climate change technologies under the CBD, UNFCCC and PA are of various kinds; public, private and hybrid.

2.1 Financial mechanisms to stimulate the accesses to biodiversity

The financial mechanisms to stimulate the access to biodiversity are dominantly (i) private and to some extend (ii) hybrid between public and private financing sources. There is a consensus that the conservation of biodiversity cannot be fully achieved through private financial stimulants. Although the participation of the private sector in promoting the access to biodiversity through the Access and Benefit Sharing (“ABS”) scheme is encouraged under the CBD and related COPs, its real impact on the conservation of biodiversity is negligible.

(i) Private financial mechanisms

The externalization of biodiversity conservation costs is possible with the help of payments from industrialized nations' companies to developing countries for their access and use of GR and TK. Upon reviewing the COPs decisions on financial resources, they are pushing the GEF to take into account the potential of private sector involvement. However, the private sector has little or no incentive to collaborate with GEF's activities. In 1996 and in 1999, the Secretariat of the CBD submitted two proposals for Council consideration aimed at increasing the role and importance of the private sector in the GEF²⁰. However, no measures have taken place pursuant to these two proposals. The problem of biodiversity lies in the external uncompensated benefits that diverse resources render to the global community.

There is a specific mechanism under the CBD to allow private financing of biodiversity conservation known as the Access and Benefit Sharing (“ABS”) promoting the access to GR and TK and their use for commercial or non commercial purposes.

Private law contracts regulating Prior Inform Consent (“PIC”) and Material Transfer Agreement (“MTA”) are the core instruments of ABS. Conservation of biodiversity is supposed to be linked to monetary and non-monetary benefits shared by the users with the providers of the GR. According to the literature there was over-expectation on the capacity to extract value from GR especially from bio-prospecting for new industrial products, such as pharmaceuticals. These activities are unlikely to generate significant funds to conserve biodiversity. One reason for this is that a considerable percentage of the added value in bio-prospecting projects accrues outside the country where it takes place. In addition, the assumption that private companies were prepared to subject themselves to stringent conditions and complex procedures to get access to GR and associated TK has proven wrong. Companies are also unwilling to incur significant up-front costs in bio-prospecting, especially if samples of the same resources are available in other countries without or with less stringent regulations.

(ii) Hybrid financial mechanisms

Debt-for-nature swaps are financial transactions that reduce a developing country's debt stock or service in exchange for a commitment to protect nature from the debtor-government. It is a voluntary transaction whereby the donor(s) cancels the debt owned by a developing country's government. The savings from the reduced debt service are invested in conservation projects. Several organizations such as the Conservation International, The Nature Conservancy, and the World Wildlife Fund have participated in debt-for-nature swaps. The first debt-for-nature-swap took place in 1987. It was between Conservation International and the Bolivian government according to which Conservation International purchased the Bolivian debt having of an original value of USD 650,000 for the amount of USD 100,000. In return, the Bolivian government agreed to expand an environmentally protected area by 1.2 million hectares where 13 of the 18 threatened species in this country live. When looking at the conservation needs, total debt of developing countries and rarity of debt-for-nature swaps agreements this financial mechanism is of little significance to conserve biodiversity through accessing it.

2.2 Financial mechanism to stimulate the access to climate change technologies

The PA refers to "Financial Mechanism" of the UNFCCC to strengthen cooperative action on technology transfers by facilitating the access to technology, especially to "early stages of technology cycle". Article 10.5 of the PA reads as follows:

“Accelerating, encouraging and enabling innovation is critical for an effective, long-term global response to climate change and promoting economic growth and sustainable development. Such effort shall be, as appropriate, supported, including by the Technology Mechanism and, through financial means, by the Financial Mechanism of the Convention, for collaborative approaches to research and development, and facilitating access to technology, in particular for early stages of the technology cycle, to developing country Parties.”

The financial support to accessing to technologies is provided by the GCF. It cooperates with the Technology Mechanism that was first mentioned in the Copenhagen Accord in 2009 and was formally established one year later during the COP 16 held in Cancun, Mexico and is reiterated in the PA. The GCF, together with the GEF, are the two operating entities of the Financial Mechanism and as such represent the main channels through which sources of international climate finance are flowing.

The Paris Decision 1/CP.21²¹ serving as guidance for the implementation of the PA and pre-2020 action, "strongly urges developed country Parties to scale up their level of financial support, with a concrete roadmap to achieve the goal of jointly providing USD 100 billion annually by 2020 for mitigation and adaptation"²². Furthermore, the Decision adds that prior to 2025 the COP shall set a new 'collective quantified goal from a floor of USD 100 billion per year'²³.

Most climate change technologies relate to CCMT rather than CCAT²⁴. Since its establishment in 1991, the GEF has been funding projects on CCMT in developing countries. As at June 30, 2017, the GEF has supported 867 projects on CCMT with over USD 5.3 billion GEF funding in more than 165 countries²⁵. Out of 867 projects that were implemented in developing countries, 31.1 % in Asia, 25.3 % were in Africa, 18.5 % in LAC, and 17.2 % in Eastern Europe and Central Asia. In addition, there were 69 global and regional projects that account for eight per cent of the overall CCM portfolio. The table below categorizes these 867 projects in the areas of low carbon energy, energy efficiency, renewable energy, sustainable transport and urban systems. However out of the 867 projects it appears that only 67 relate to technology transfers which is approximately 7.7 %. It indicates that access to technologies by developing countries is very limited.

3. Legal mechanisms to stimulate the access to biodiversity and climate change technologies

3.1 Legal stimulants for accessing to biodiversity

The CBD relies on a contractual model to grant access to genetic resources and ensure benefit sharing in case of exploitation thereof. National policy makers determine criteria for ensuring benefits sharing. Bio-rich countries' national access regimes to biodiversity were adopted in a context of concerns which are still valid about the unauthorized access and misappropriation of GR and the lack of compensation for the benefits their commercial exploitation could generate. Access is generally regarded as a threat rather than an opportunity. Consequently, such regimes have been mostly defensive, aimed at controlling rather than facilitating the access and use of GR for research and commercial purposes²⁶. Those stringent regimes have had limited or no effects on conservation since, as we mentioned earlier, ABS mechanism has not proven to contribute to the conservation of biodiversity. The following are some examples.

South Africa's ABS regulations²⁷ require that the applicant for a permit be either a corporation registered under South African law, or a natural person who is a citizen or a permanent resident of South Africa. If the applicant is a foreign natural or corporation, they must apply jointly with a South African corporation or citizen or permanent resident. Therefore, foreign individuals, corporations or institutions cannot apply for a permit alone.

In Costa Rica²⁸, if the applicant lives in a foreign country, he or she must assign a legal representative who is a resident of Costa Rica.

India also has a differential procedure to handle foreign applications, as does the Andean Community, Brazil and others. Some countries like India have created a separate procedure depending on nationality, or if the materials accessed or research results will be sent abroad²⁹.

The Philippines has a relatively long history of regulating access to biodiversity and impose stringent conditions against bio-prospectors which deter most access to biodiversity³⁰.

(I) Legal stimulants for accessing to technologies

The challenge faced in climate change sector is to encourage innovations in this field while at the same time promoting the access, diffusion and the transfer of these technologies to developing countries. Technology transfer is crucial and is seen by developing countries as a prerequisite to adhere to treaties like the UNFCCC. For example, at the 1992 Rio Earth Summit, China and India insisted that developed countries commit themselves to technology transfer as a requirement for developing country support for the proposed agreements. Discussions in general about technology transfer for climate change mitigation have been affected by deep divides between developed and developing countries. Most developing countries see patents as a barrier to access to technologies

and their transfer, while developed countries see patents as a necessary mechanism to incentivize and license climate change technologies. Consequently, like with the access regime to biodiversity under CBD, developing countries' legislations on patent have been mostly defensive, aiming even at imposing compulsory licenses against developed countries' inventions having the potential to reduce greenhouse gas emissions. The cleavage is strong enough to explain why the PA is silent on intellectual property, including patent.

Stimulating access to technologies requires strong incentives. Most climate technologies are owned and developed by commercial companies. Giving access to their technologies by developing countries implies risking intellectual property rights and empowering existing or potential competitors. Some negotiations on climate change technology transfer have not identified this problem. At the Second COPs to the UNFCCC in 1996, the Chinese government published a booklet "The List of Chinese Government Needed Technologies" in which it demanded climate change technology equipments including integrated gasification combined cycles, fuel cells, and rice husk energy transfer instruments. However, the booklet remains silent on any compensation for technology owners. The demands of China and other developing countries to access to technologies can be driven by their desire to enhance their competitiveness explaining why such demands are usually resisted by developed countries, creating impasses about how to stimulate the access to ESTs.

GCF's juridical personality and legal capacity

Due to the difficulties to incentivize companies to give access and transfer their technologies and know how to developing countries, we should investigate whether the GCF could actually own and license technologies which would allow it to invest into R&D projects and facilitate the implementation of climate change mitigating approaches in developing countries where they are most needed. Legally speaking, there are no reasons why the GCF could not own green technologies and patents. The GCF is not only a juristic person but it also has the legal capacity to own and license patents. The Governing instrument for the GCF, decision 3/CP.17, 11 December 2011, article 7 reads as follows:

"In order to operate effectively internationally, the Fund will possess juridical personality and will have such legal capacity as is necessary for the exercise of its functions and the protection of its interests."

GCF's mandate to own and license technologies

The next question is whether it is the GCF's mandate to own and license technologies? Under the PA, the mandate of the GCF is to facilitate the access and transfer of technologies and R&D cooperation. Articles 10, 10.5 and 10.6 of the PA refer to the Technology Mechanism and Financial Mechanism as key instruments to allow the access and transfer of technologies to developing countries.

The COPs Draft Decision no. 7/CP.21 gives to the GCF some specific tasks for its future actions including "undertaking R&D activities":

"Also invites the Board of the Green Climate Fund, in line with paragraph 38 of the governing instrument of the Green Climate Fund, to consider ways to provide support, pursuant to the modalities of the Green Climate Fund, for facilitating access to environmentally sound technologies in developing country Parties, and for undertaking collaborative research and development for enabling developing country Parties to enhance their mitigation and adaptation action;"

The COPs decision 3/CP.17 at its paragraph 38 entrusts the GCF to "ensure adequate resources for [...] technology development and transfer [...]".

The 2016 Green Climate Fund's publication entitled "Support for facilitating access to environmentally sound technologies and for collaborative research and development" at paragraphs 23-28 refer to options for R&D collaboration which the GCF could undertake.

Paragraph 24 reads:

"The benefits of research and development can help countries to address their climate and sustainable development in the longer term. Even though research and development as an activity poses many risks, it is only through this process that new technologies are developed and brought to the market."

The GCF solemnly declares the need to invest in R&D and is willing to devote investment, despite the risks that are inherent.

Paragraph 25 is even more specific on the possibilities for GCF to finance R&D activities:

"GCF could provide financing for research and development activities and help countries tackle the challenges faced in the early stages of the technology development cycle [...]"

It further mentions in its Paragraph 26 possible R&D activities which it could finance as follows:

*"(a) Competitive GCF innovation funding to stimulate local/regional interest and investment through the tailored request for proposals;
(b) Promoting micro-finance for research and development projects in developing countries;
(c) Working with governments to strengthen national innovation systems;
(d) Facilitating the establishment of research center networks on environmentally sound technologies;
and
(e) Catalyzing research partnerships with relevant stakeholders, including collaboration with the private sector.*

The Board may wish to consider the following options for providing such support for research and development:

*(a) Business incubation and financial support for viable, new technologies to be deployed in developing countries; or
(b) Capacity-building programmes/request for proposals for developing countries to enhance endogenous capacities related to climate technologies."*

Paragraph 27 further explains:

"The first option [means a) above] would focus on bringing new, viable technologies to market through business incubation, and early and growth stage financing. The Private Sector Facility could potentially play an important role in this area, attracting venture capital and angel investors to deploy their capital in developing countries."

The GCF plans so explicitly to finance R&D activities in order to bring technologies to market. Certainly, the GCF is not mandated to fund basic research, which is wise, because the cycle to produce a workable technology is long and uncertain. However, the phase of industrialization of technology is often a time that patents are filed. The issue of industrial property will arise so necessarily for incubation projects in which the GCF would invest.

To summarize, the GCF has legal personality and capacity, as it may perform all legal operations that allow it to achieve its missions. The GCF should be able to own technologies and license them. This would also mean that owners of patented technologies could donate a license to GCF which may then manage a patent pool. The GCF could use these licenses for its beneficiaries, mainly developing countries.

Result & Discussion

From the review above, key findings are that facilitating the access to climate change technologies and the access to GR have shown little impacts on mitigating or adapting to climate change. This result ties well with previous studies wherein access to biodiversity hasn't necessarily resulted in improved biodiversity conservation. One concern about the findings of access to biodiversity was that limited information is available on bio-prospecting activities and how the access to biodiversity is usually retributed. Likewise, there is lack of information on technology transfers of EST, especially between private entities.

Conclusion

The conservation of biodiversity by facilitating its access to developed countries has shown little results. Most rich bio-resources countries have enacted defensive legislations which deter bio-prospectors from entering into MTAs to access to GR and TK. Furthermore, the development of biotechnology offers viable alternatives to GR. It can be concluded that continuing promoting the access to biodiversity under the CBD won't offset the fast decline of GR. Emphasizes should be placed on other mechanisms that access, for example public financial instruments. Promoting the access to climate change technologies is also challenging. However, the option for the GCF to invest in green technologies including through incubator whose mission is to support, including financially, the development of existing technologies is promising. R&D in the field of adaptation of existing technologies is conducive to collaboration, because it requires double competencies, both technological and knowledge of the

conditions specific to each country or region. In addition, it is often considered that technology held by western companies need to be adapted to the specific conditions of other countries. Integrating a licensing system into the GCF could better ensure developing countries gain easier and faster access to climate change technologies. The GCF and the Technology Mechanism are exciting new institutions offering the possibility of a global license system that ensures that intellectual property, royalties, investment etc are not barriers to technology access, and can become the missing link between innovating and giving access to technologies.

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- ³ The CBD Secretariat has published two technical series on biodiversity and climate change to support the implementation of relevant adaptation activities. Technical Series No. 10 – Interlinkages between Biological Diversity and Climate Change; <https://www.cbd.int/doc/publications/cbd-ts-10.pdf>
Technical Series No. 25 – Guidance for Promoting Synergy among Activities Addressing Biological Diversity, Desertification, Land Degradation and Climate Change; <https://www.cbd.int/doc/publications/cbd-ts-25.pdf>
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“However, the traditional view of north-south technology transfer (e.g., from resource-rich to biodiversity-rich countries in the original context of the CBD) is being challenged increasingly because south-south technology transfer is growing in importance”;
“It is likely that, in future, south-south transfer will require greater attention as more agreements are made to foster these interactions”
“It is likely that technology transfer is more frequent among countries with economic, geographic, cultural, or historic ties”.
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and, through financial means, by the Financial Mechanism of the Convention, for collaborative approaches to research and development, and facilitating access to technology, in particular for early stages of the technology cycle, to developing country Parties."

- ¹⁴Transfer Of Environmentally Sound Technology, Cooperation And Capacity-building, <http://www.un-documents.net/a21-34.htm>
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- "Key publications on the ABS regime implemented through the CBD and its protocol note its difficulties, so far, in achieving its objectives, as very few ABS agreements have been concluded and consequently very few benefits have been shared."
- "However, to our knowledge, there is not any accurate counting of either access permits granted or ABS agreements concluded since the entry into force of the CBD or the NP. I found piecemeal information indicating that the number is small but no systematic inventory. I consider that providing reliable data about access permits and ABS agreements is essential to analyze the concrete functioning of the regime. This is the core aim of our contribution."
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- ⁴⁴"Accelerating, encouraging and enabling innovation is critical for an effective, long-term global response to climate change and promoting economic growth and sustainable development. Such effort shall be, as appropriate, supported, including by the Technology Mechanism and, through financial means, by the Financial Mechanism of the Convention, for collaborative approaches to research and development, and facilitating access to technology, in particular for early stages of the technology cycle, to developing country Parties."
- ⁴⁵"Support, including financial support, shall be provided to developing country Parties for the implementation of this Article, including for strengthening cooperative action on technology development and transfer at different stages of the technology cycle, with a view to achieving a balance between support for mitigation and adaptation. The global stocktake referred to in Article 14 shall take into account available information on efforts related to support on technology development and transfer for developing country Parties."
- ⁴⁶<http://unfccc.int/resource/docs/2015/cop21/eng/l07.pdf>
- ⁴⁷Paragraph 22 of the COPs Decision no. 7/CP.21
- ⁴⁸<http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf#page=55> "The Board shall also ensure adequate resources for capacity-building and technology development and transfer. The Fund will also provide resources for innovative and replicable approaches."
- ⁴⁹GCF/B.14/02, 30 September 2016 https://www.greenclimate.fund/documents/20182/409835/GCF_B.14_02_-_Support_for_facilitating_access_to_environmentally_sound_technologies_and_for_collaborative_research_and_development.pdf/410006c7-c3f6-4abc-96fe-cfa9280994e0
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Table 1. - Summary of GEF projects on climate change mitigation by phase in USD million.

Phase		Technology transfer/ Innovative low-carbon technologies (LCTs)	Energy efficiency	Renewable energy	Transport/Urban	AFOLU	SGP	Mixed and Other	Total
GEF Pilot (1991-1994)	Number of Projects	2	7	12	2	2	0	3	28
	GEF Amount	10.1	33.3	94.5	9	4	-	46.7	197.6
	Co-financing	0.1	341.2	1,848	2	0.1	-	145.9	2,337.20
GEF-1 (1994-1998)	Number of Projects	2	16	16	0	0	0	6	40
	GEF Amount	8.2	134.4	146.9	-	-	-	27	316.4
	Co-financing	6.2	447.5	809.7	-	-	-	94.5	1,357.80
GEF -2 (1998-2002)	Number of Projects	6	32	44	6	1	0	6	95
	GEF Amount	102.3	189.9	227.8	30	0.9	-	19.1	570.1
	Co-financing	827.8	2,025.40	1,097.80	28.3	1	-	182.9	4,163.30
GEF-3 (2002-2006)	Number of Projects	4	29	53	13	0	0	14	113
	GEF Amount	64.6	228.2	248.6	88.8	-	-	76.3	706.5
	Co-financing	309.2	1,310.10	1,462.30	886.1	-	-	348.4	4,316.00
GEF-4 (2006-2010)	Number of Projects	9	83	48	20	25	3	15	203
	GEF Amount	46.3	382.5	118.9	110.9	121.5	65.3	88.6	934
	Co-financing	215.2	3,747.40	856.8	2,082.70	870.9	44.50	490.4	8,307.90
GEF-5 (2010-2014)	Number of Projects	38	38	56	27	69	10	17	255
	GEF Amount	223.7	199.1	206.6	125.3	515.9	159	105.7	1,535.30
	Co-financing	1,797.60	4,355.70	2,022.50	2,558.10	2,386.80	160.50	1,046.10	14,327.30
GEF-6 to date (2014-2017)	Number of Projects	6	15	25	25	36	11	15	133.00
	GEF Amount	16.9	119.2	143.1	203.9	485	53.3	45	1,066.50
	Co-financing	82.4	825.9	2,928.60	2,894.00	3,021.20	80.80	303.80	10,136.70
Total	Number of Projects	67	220	254	93	133	24	76	867.00
	GEF Amount	472.1	1,286.70	1,186.30	567.8	1,127.40	277.60	408.50	5,326.50
	Co-financing	3,238.30	13,053.10	11,025.70	8,451.40	6,279.90	285.90	2,611.90	44,946.20