Università
Ca'Foscari
Venezia

Master's Degree programme – Second Cycle
(*D.M. 270/2004*)
in Relazioni Internazionali Comparate -
International Relations

Ca' Foscari
Dorsoduro 3246
30123 Venezia

Final Thesis

Climate change: the Kyoto Protocol and the deforestation problem

Supervisor
Ch. Prof. Sara De Vido

Assistant supervisor
Ch. Prof. Antonio Trampus

Graduand
Stefano Cocco
832028

Academic Year
2014 / 2015

Index

Part II
From words to action: implementation and legal development of the Protocol

Part III
Towards climate change mitigation

Abstract

Il cambiamento climatico è una delle questioni più urgenti e decisive della nostra generazione. Viviamo in un mondo in cui lo sviluppo capitalistico sembra l'unico cammino percorribile per l'avanzamento del genere umano, e in cui la popolazione continua a crescere a ritmi sempre più rapidi. La sostenibilità dell'odierno ordine economico è messa in discussione dall'impatto negativo che la società industrializzata ha generato dal XVIII secolo in poi sul clima, che oggi si manifesta sempre più chiaramente: inverni progressivamente meno freddi, mancanza di precipitazioni, sovrabbondanza di precipitazioni in aree geografiche ristrette, desertificazione, eventi atmosferici estremi, sono tutti fenomeni che si palesano anche agli occhi dei meno esperti e che sono cresciuti a vista d'occhio negli ultimi anni.

I paesi che oggi chiamiamo industrializzati sono i principali responsabili di questo squilibrio, mentre quelli in via di sviluppo lo sono in misura crescente da qualche decennio, e le previsioni scientifiche indicano che questo trend al rialzo continuerà anche in futuro. Già da qualche anno i paesi del "Sud" del mondo hanno superato il "Nord" per il livello delle loro emissioni di gas serra: nei primi anni '70 i paesi non-OECD (ossia i paesi in via di sviluppo) erano responsabili all'incirca di un terzo delle emissioni globali, mentre nel 2005 erano la fonte di più della metà dell'uso globale di energia e della produzione di emissioni. Contemporaneamente, i paesi dell'OECD hanno mostrato un rallentamento nel totale delle loro emissioni, dovuto probabilmente ai primi effetti delle politiche di protezione ambientale. Questi semplici dati aggregati dimostrano fin dall'inizio della mia analisi l'importanza che giocano i paesi in via di sviluppo per l'efficacia delle politiche di mitigazione a adattamento ai cambiamenti climatici, e pongono allo stesso tempo una delle questioni più delicate e problematiche del regime multilaterale di protezione ambientale: quella dell'equità. Possono dei paesi che hanno intrapreso il cammino di industrializzazione da pochi decenni essere ritenuti responsabili al pari dei paesi del "Nord" del mondo delle conseguenze provocate dallo sviluppo senza freni e regole avvenuto negli scorsi due secoli e mezzo? La risposta che è stata data dagli organi multilaterali di protezione ambientale è negativa, e fin da subito (dagli anni '90) si è sviluppato il principio della cosiddetta "responsabilità comune ma differenziata", secondo cui i primi a doversi impegnare nella riduzione delle emissioni sono i paesi industrializzati, sia attraverso azioni a livello interno che tramite aiuti ai paesi più bisognosi di un supporto per poter sviluppare le proprie politiche di protezione ambientale. La condizione per mantenere l'ambiente al sicuro dai catastrofici effetti dei cambiamenti climatici è quella di bloccare l'aumento della temperatura entro i 2°C sopra il livello preindustriale. Per far sì che ciò avvenga, e per riuscire a stabilizzare il livello di gas serra nell'atmosfera entro questo secolo,

le emissioni annuali globali devono scendere di più del 50%. I dati forniti dal Pannello Intergovernativo sui Cambiamenti Climatici (IPCC), il massimo organo internazionale nel settore, indicano che la concentrazione di gas serra nell'atmosfera è in continua crescita, e la temperatura media globale è già salita di 1°C sopra il livello preindustriale, con un'aspettativa di crescita entro il 2100 tra i 3.7°C e i 4.8°C in caso di attività economica invariata, traiettoria che porterebbe a conseguenze catastrofiche. Come affrontare questi cambiamenti? Come prevenirli?

La prima risposta globale alle sfide del cambiamento climatico è avvenuta con la "Convenzione quadro delle Nazioni Unite sui cambiamenti climatici" (UNFCCC), l'accordo non vincolante che venne adottato su questa materia a Rio de Janeiro nel 1992, nell'ambito della "Conferenza delle Nazioni Unite sull'ambiente e lo sviluppo" (UNCED), anche nota come Summit della Terra di Rio. Riconoscendo che i cambiamenti climatici della Terra e i suoi effetti negativi sono una "preoccupazione comune" del genere umano, e notando allo stesso tempo che un'ampia fetta delle emissioni passate e presenti ha origine nei paesi sviluppati, mentre quelle pro capite nei paesi in via di sviluppo sono ancora relativamente basse, la Convenzione ha l'obiettivo di stabilizzare le concentrazioni di gas serra nell'atmosfera "ad un livello che prevenga pericolose interferenze antropogeniche con il sistema climatico" in un lasso di tempo che sia sufficiente a permettere agli ecosistemi di adattarsi naturalmente a questi cambiamenti, che assicuri che la produzione di cibo non sia messa a repentaglio e che permetta uno sviluppo economico sostenibile. Quest'ultimo principio, assieme a quello della responsabilità comune ma differenziata, rappresenta uno dei pilastri del documento. Altri principi di grande rilevanza, contenuti nell'articolo 3 dell'accordo, sono quello sui bisogni specifici e le speciali circostanze dei paesi in via di sviluppo (in particolare quelli che sono vulnerabili agli effetti sfavorevoli dei cambiamenti climatici), il principio precauzionale, secondo il quale gli Stati Parte dovrebbero intraprendere azioni preventive per minimizzare e mitigare gli effetti negativi sul clima, ed il principio di cooperazione, al fine di promuovere un sistema economico internazionale che sia di supporto all'obiettivo dello sviluppo sostenibile.

La Convenzione, inoltre, sancisce attraverso una serie di disposizioni l'impegno di tutte le Parti dell'accordo a sviluppare e mantenere un inventario nazionale delle proprie emissioni antropogeniche, a formulare ed implementare politiche nazionali (e se necessario regionali) per far fronte al problema del cambiamento climatico e a promuovere la cooperazione, sia essa per diffondere tecnologie "verdi", piani che prevengano o riducano le emissioni di gas serra o potenzino il ruolo dei bacini e dei serbatoi di gas serra, rappresentati in primo luogo dalle foreste. Oltre a questi impegni generali, gli Stati Parte dell'Annesso I, ossia i paesi sviluppati più 12 nazioni del Centro ed Est Europa con "economie in transizione", accettano impegni più specifici che comprendono l'adozione di politiche nazionali sulla mitigazione dei cambiamenti climatici per limitare le loro emissioni di gas serra (col fine non raggiunto di fermare l'aumento delle emissioni prima del 2000) e la redazione di documenti di

resoconto sulle misure intraprese (costituiti dalle comunicazioni nazionali e dall'inventario delle emissioni) da sottoporre periodicamente al fine di monitorare i progressi fatti nell'implementazione della Convenzione. La Convenzione è entrata in vigore il 21 Marzo 1994, dopo il deposito del cinquantesimo strumento di ratificazione, e conta ad oggi 197 Stati parte.

Fin da subito, gli Stati Parte riconobbero che le disposizioni e gli impegni previsti nel testo dell'UNFCCC erano insufficienti per contenere e ridurre le emissioni entro il 2000. Inoltre, la natura di "*soft law*" dell'accordo non dava alcuna certezza sulla sua effettiva applicazione. A sancire l'inadeguatezza delle misure prese, un rapporto speciale dell'IPCC stimò che anche se l'allora corrente emissione di CO_2 fosse stata stabilizzata a livello globale, le concentrazioni atmosferiche del gas avrebbero continuato a crescere per almeno due secoli. Per questo, alla prima Conferenza degli Stati Parte della Convenzione sui cambiamenti climatici (detta "Conferenza delle Parti") venne lanciato, non senza faticose discussioni tra i delegati, il cosiddetto "Mandato di Berlino", che diede il via al "processo" di Kyoto, ossia la negoziazione degli Stati Membri dell'UNFCCC che portò all'accordo su un piano di protezione dai cambiamenti climatici più efficace e concreto. Gli screzi e le divergenze tra il blocco europeo, quello guidato dagli Stati Uniti (JUSSCANNZ) e paesi in via di sviluppo (G 77 e AOSIS) rallentarono il processo, e il Protocollo venne alla luce solo alla terza Conferenza delle Parti a Kyoto nel 1997. Esso rappresenta un decisivo passo avanti nel regime internazionale sui cambiamenti climatici, dato che impegna legalmente i 38 paesi industrializzati dell'Annesso B (37 Stati più l'Unione Europea) a raggiungere nel primo periodo d'impegno (2008-2012) una riduzione globale delle emissioni almeno del 5% rispetto al livello del 1990, focalizzandosi su sei tipi di gas e cinque settori (energia, processi industriali, solventi, agricoltura e rifiuti) elencati nell'Annesso A. Il Protocollo è strutturato sui principi della Convenzione, e proprio per questa ragione è lo strumento che ne rende operativi i contenuti, allo stesso tempo potenziandoli.

Il Protocollo ha la seguente struttura di base. L'articolo 1 contiene le definizioni dei termini usati nel testo, gli articoli 2, 3, 5 e 7 descrivono gli obblighi sostanziali dei paesi parte dell'Annesso B, mentre l'articolo 10 elabora ulteriormente gli impegni dell'UNFCCC per tutte le Parti del Protocollo. L'articolo 11 riafferma sostanzialmente gli articoli 4, paragrafo 3, e 11 della Convenzione fornendo le linee guida sui finanziamenti da parte dei paesi dell'Annesso I per assistere le nazioni in via di sviluppo ad implementare gli impegni contenuti nell'articolo 10 del Protocollo. Gli articoli 9, 13, 14, 15 e 16 affrontano il tema dei ruoli istituzionali della Conferenza delle Parti dell'UNFCCC, del segretariato e degli enti sussidiari nel funzionamento del Protocollo di Kyoto. Gli articoli 4, 6, 12 e 17 autorizzano l'uso di differenti meccanismi di mercato al fine di ridurre le emissioni di gas serra: implementazione congiunta, mercato delle emissioni, meccanismo di sviluppo pulito. L'articolo 18 richiede l'elaborazione di procedure e meccanismi per verificare la conformità alle norme dell'accordo, e in caso contrario di "punire" i trasgressori. L'articolo 19 applica le disposizioni sulla

risoluzione delle controversie dell'UNFCCC anche al Protocollo. Infine, gli articoli dal 20 al 28 espongono le clausole finali riguardanti emendamenti, entrata in vigore, modalità di voto, riserve, recesso e lingue ufficiali.

Il Protocollo di Kyoto venne aperto alla firma il 16 marzo 1998, ma dato che le regole precise su come raggiungere gli obiettivi del Protocollo non vennero stabilite nella conferenza, le negoziazioni continuarono. Tre incontri delle Parti dell'UNFCCC ebbero luogo tra il 1998 ed il 2000. Il primo fu indetto nel 1998 a Buenos Aires, e si concluse con l'adozione del "Piano d'Azione di Buenos Aires" che stabiliva una scadenza per la finalizzazione del lavoro sui meccanismi di mercato del Protocollo, sulle questioni di conformità e sulle misure politiche da adottare. Nella successiva Conferenza delle Parti a Bonn nel novembre 1999 vennero fatti ulteriori passi avanti nella discussione delle questioni riguardanti la regolamentazione precisa del funzionamento del Protocollo, anche se di modesta entità. La sesta Conferenza delle Parti, invece, rappresentò un deciso passo indietro alla veloce ratificazione dell'accordo. A Le Havre le discussioni terminarono senza che fosse possibile raggiungere un accordo condiviso sui dettagli del Protocollo, soprattutto riguardo al ruolo da attribuire ai bacini e ai serbatoi di gas serra. Questo fallimento ebbe però anche un effetto secondario positivo, che consistette nell'innescare un processo di revisione delle posizioni di negoziazione di tutti i gruppi coinvolti, processo che venne catalizzato nella seguente Conferenza delle Parti di Bonn del Luglio del 2001. I Paesi raggiunsero un accordo sui dettagli del Protocollo riguardanti i bacini di emissioni e i meccanismi di flessibilità (rappresentati dall'implementazione congiunta, il mercato delle emissioni ed il meccanismo di sviluppo pulito), e nella Conferenza di Marrakech dell'ottobre 2001 le nuove disposizioni vennero completate e adottate. Questi accordi, noti come gli Accordi di Bonn e l'Accordo di Marrakech, sigillarono il patto su alcune importanti questioni riguardanti l'applicazione del Protocollo di Kyoto, come la specificazione delle regole di implementazione, le norme sulle attività di uso della terra, trasformazione dell'uso della terra e selvicoltura (LULUCF), l'istituzione di nuovi strumenti per il finanziamento, la pianificazione delle strategie di mitigazione e adattamento ai cambiamenti climatici e la creazione di una struttura per il trasferimento tecnologico.

È proprio in questo momento di successo che il ruolo rivoluzionario del Protocollo di Kyoto venne danneggiato dall'uscita degli Stati Uniti, annunciata da George W. Bush. Secondo il presidente americano, la ratificazione dell'accordo avrebbe nociuto all'economia del Paese, e l'assenza di obblighi nei confronti dei paesi in via di sviluppo nella riduzione delle emissioni rappresentava un punto su cui gli Stati Uniti erano da sempre stati contrari. Questo importante ritiro fu seguito da quello dell'Australia e influenzò negativamente l'effettività dell'accordo, anche se dall'altro lato spinse gli altri paesi ad accelerare il processo di negoziazione dei dettagli del Protocollo. Con questi due ritiri, l'entrata in vigore del Protocollo non fu facile. Infatti il testo specifica che per l'entrata in vigore dell'accordo è necessaria l'approvazione formale di almeno 55 paesi, a condizione che questi siano

responsabili di almeno il 55% delle emissioni di CO_2 degli Stati dell'Annesso I nel 1990. Con questa clausola, l'entrata in vigore era sostanzialmente in mano alla Russia, che da parte sua non aveva fretta, e decise di prendere parte al Protocollo solo nel 2004 dopo anni di appelli da parte della comunità internazionale, portando alla sua entrata in vigore nel febbraio dell'anno successivo. Conseguentemente, l'Accordo di Marrakech fu formalmente adottato dalla prima Conferenza delle Parti del Protocollo a Montreal nel dicembre del 2005.

Gli obiettivi di riduzione delle emissioni dei paesi dell'Annesso B per il primo periodo d'impegno cominciano con un -8% per l'Unione Europea. I 15 Stati che ne erano parte nel 1997, quando il Protocollo venne adottato, presero questo impegno sapendo che sarebbe poi stato redistribuito tra i vari paesi sfruttando la norma del Protocollo nota come "bolla sulle organizzazioni di integrazione economica regionale" (articolo 4): sebbene ogni Stato avesse i suoi obiettivi individuali, questa clausola permetteva un'ampia diversificazione all'interno dell'Unione che una volta combinata avrebbe fornito il risultato generale del gruppo. La stessa percentuale di riduzione venne accettata anche da Bulgaria, Repubblica Ceca, Estonia, Lituania, Liechtenstein, Lituania, Monaco, Romania, Slovacchia, Slovenia e Svizzera. Ungheria, Giappone e Polonia accettarono un obiettivo di riduzione del -6%, mentre la Croazia del -5%. Alla Nuova Zelanda, alla Federazione Russa e all'Ucraina, invece, venne concesso di rimanere ai livelli di emissioni del 1990, mentre alla Norvegia, all'Australia e all'Islanda venne riconosciuto il diritto di incrementare le loro emissioni rispettivamente dell'1%, 8% e 10%. Alcuni paesi con economie in transizione fissarono differenti linee base rispetto al 1990 per il calcolo delle emissioni: la Bulgaria stabilì come anno di riferimento il 1988, l'Ungheria la media tra gli anni 1985-1987, la Polonia il 1988, la Romania il 1989 e la Slovenia il 1986.

Già nel 2005, i Paesi che avevano ratificato il Protocollo erano sulla buona strada per raggiungere la riduzione concordata di almeno il 5% sotto il livello del 1990: in quell'anno, già prima dell'inizio del primo periodo di impegno, le emissioni erano il 15% più basse rispetto all'anno base, e i dati conclusivi del primo periodo d'impegno confermano questo trend. Il rapporto finale di contabilità del Segretariato del 2014, contenente le informazioni finali del primo periodo d'impegno, indica che rispetto al 1990 le emissioni dei paesi dell'Annesso B sono diminuite del 22.5%. Le attività di uso della terra, trasformazione dell'uso della terra e selvicoltura (LULUCF) comprese negli articoli 3, paragrafo 3 e 4 del Protocollo, e i meccanismi di flessibilità del Protocollo hanno parzialmente contribuito al raggiungimento di una sostanziale riduzione delle emissioni.

Bisogna sottolineare che questi risultati, anche se ampiamente positivi, non possono comunque testimoniare a favore dell'efficacia delle disposizioni del Protocollo. La sua principale debolezza è rappresentata dal fatto che i 37 paesi parte dell'Annesso B coprono solo una parte secondaria delle emissioni di gas serra. Inoltre la non partecipazione al Protocollo degli Stati Uniti (sino a qualche anno fa il più grande inquinatore al mondo, ora superato dalla Cina) ne ha minato l'efficacia sin

dall'inizio. Allo stesso tempo, questo risultato così generosamente positivo è stato quanto meno falsato dal fatto che la maggior parte dei tagli nelle emissioni sono venuti dai paesi dell'Est Europa, che si trovavano in turbolenze economiche in seguito alla caduta del muro di Berlino e che sarebbero comunque state soggette "naturalmente" ad un calo nelle emissioni di gas serra: togliendo la Russia e l'Ucraina dal conteggio delle emissioni a fine 2012, si arriva a malapena ad un 2.7% di riduzione aggregata. Se ciò non fosse abbastanza, nello stesso periodo le emissioni globali di carbonio sono più che duplicate rispetto al 1990 grazie al rapido sviluppo di nazioni come la Cina, l'India e il Brasile, rendendo pressoché inutili gli sforzi dell'UNFCCC.

In aggiunta, il tentativo di lanciare un secondo periodo d'impegno dal 2013 al 2020 si è scontrato con un disinteresse generale della comunità internazionale nel perpetrare l'approccio del Protocollo di Kyoto al problema dei cambiamenti climatici. L'emendamento di Doha del 2012 è stato ratificato solamente da 47 paesi, in gran parte paesi in via di sviluppo. Questo (non) risultato testimonia chiaramente la mancanza di una volontà internazionalmente condivisa nel raggiungere gli obiettivi della Convenzione in tempi brevi. La distanza tra le intenzioni e azioni, sia nazionali che internazionali, e le reali necessità che sarebbero necessarie per ridurre le emissioni di gas serra è fin qui rimasta, e l'emendamento di Doha sembra semplicemente sottolineare una volta di più la difficoltà del passare dalle parole ai fatti con un piano d'azione condiviso.

In questo contesto, l'Accordo di Parigi adottato il 12 dicembre 2015 alla ventunesima Conferenza delle Parti rappresenta l'ultima speranza per riuscire a fermare il riscaldamento globale (e i suoi disastrosi effetti sul clima) entro i prossimi 10-15 anni. In esso viene richiesto ai paesi sviluppati, come a quelli in via di sviluppo, di limitare le loro emissioni ad un livello di sicurezza che permetta di rimanere entro i 2°C di riscaldamento globale rispetto ai tempi preindustriali, con un'aspirazione a limitare questo aumento ad 1.5°C. A differenza del Protocollo di Kyoto, l'Accordo di Parigi si fonda sul contributo volontario degli Stati Parte (INDCs), che sono liberi di fissare in base alla loro situazione nazionale il target da raggiungere. Questo approccio, che rappresenta allo stesso tempo un punto di forza e di debolezza, ha portato finora alla presentazione di 119 INDCs, che coprono oltre l'86% delle emissioni globali calcolate nell'anno 2010 e l'80% delle fonti globali di emissioni. L'efficacia di questi contributi nazionali dipenderà inevitabilmente dalla capacità dell'UNFCCC di fornire gli strumenti giusti per la loro implementazione, dai trasferimenti tecnologici agli investimenti "verdi" nei paesi più a rischio di subire gli effetti negativi dei cambiamenti climatici, come anche di promuoverne il potenziamento e di sorvegliarne l'applicazione, facendo tesoro dei meccanismi di controllo sviluppati con il Protocollo di Kyoto.

A questo scopo, c'è un settore di particolare interesse all'interno del regime internazionale dei cambiamenti climatici, quello dell'uso della terra, trasformazione dell'uso della terra e selvicoltura (LULUCF), che ha rappresentato fin dai primi passi dell'UNFCCC uno dei punti su cui era difficile

trovare un compromesso e uno dei potenziali settori chiave attraverso il quale ottenere cospicue riduzioni nelle emissioni di gas serra. Le foreste, infatti, coprono un totale di 4 miliardi di ettari in tutto il mondo, equivalenti al 31% della superficie terrestre totale, e la deforestazione provoca circa il 20% delle emissioni globali di CO_2, oltre che devastanti effetti per la biodiversità e le comunità dipendenti dalle foreste, come succede soprattutto nelle aree tropicali. La particolarità del settore del LULUCF è data in primo luogo dal fatto che esso può rappresentare sia un bacino di sequestro di emissioni che una fonte di inquinamento, in base a come esso è gestito in ogni paese e regione. Inoltre, le emissioni di questo settore tendono ad essere cicliche, e possono essere influenzate positivamente o negativamente dalle politiche di gestione passate. Per questa ragione, quello del LULUCF è un settore molto sensibile che genera non pochi problemi nel calcolo efficace delle emissioni che sequestra, essendo soggetto, tra le altre cose, a saturazione e a non-permanenza, ossia alla perdita graduale del suo potere di "cattura" delle emissioni.

La risoluzione del problema della deforestazione è uno dei principali prerequisiti per un'efficace risposta ai cambiamenti climatici: la "terra" (intesa come insieme di suolo e foreste) sequestra ad oggi circa il 27% delle emissioni globali di $C0_2$, e spesso i paesi dell'Annesso I selezionano questo settore come "categoria chiave" nei loro rapporti. L'IPCC stima che le politiche di mitigazione relative alla terra potrebbero contribuire dal 20% al 60% dell'abbattimento cumulativo di emissioni nel 2030, e dal 15% al 40% entro il 2100. Al contrario, la situazione generale nei paesi in via di sviluppo è molto diversa. Anche negli Stati con ampie aree forestali, il settore del LULUCF è il responsabile di una fetta significativa delle loro emissioni. Questo avviene principalmente perché nei paesi in via di sviluppo il tasso di deforestazione è molto alto, e la mancanza degli strumenti politici e tecnici per fornire un'alternativa e proteggere le foreste non ne incentiva la preservazione.

La Convenzione sui cambiamenti climatici dell'ONU, prendendo atto dell'importanza di questo settore, richiede a tutte le Parti di promuovere azioni di mitigazione in quest'ambito e di farne rapporto nelle loro comunicazioni nazionali, fornendo delle linee guida su come calcolarne efficacemente il livello di emissioni e promuovendo il supporto nei confronti dei paesi più poveri. Il Protocollo di Kyoto, da parte sua, grazie al suo status di "*hard law*", porta il settore un gradino più in alto nella protezione ambientale, obbligando gli Stati Parte dell'Annesso B a rendere conto delle emissioni e delle rimozioni nel LULUCF indotte direttamente dall'uomo (quindi non quelle naturali, che avrebbero falsato i risultati di sequestro delle emissioni) nei settori della forestazione, riforestazione e deforestazione. Alle Parti venne permesso inoltre di eleggere volontariamente delle attività ulteriori attraverso cui potenziare il ruolo del LULUCF: esse sono il management delle foreste, il management dei terreni coltivabili, il management dei terreni da pascolo e la "rivegetazione".

Per il primo periodo d'impegno, i risultati sono stati positivi: rispetto al 1990, le emissioni totali aggregate di gas serra in questo settore sono diminuite del 16.2%. Rimuovendo la categoria del

LULUCF al totale del primo periodo d'impegno, la riduzione di emissioni cala al 10.6%. Questi dati testimoniano l'importanza che questa categoria ha ricoperto nel raggiungimento dei risultati positivi di riduzione delle emissioni nel primo periodo d'impegno, sebbene vessata da enormi problematiche di calcolo dei suoi contributi dovute a dispersione e non permanenza, e pongono le basi per una più completa inclusione di questo settore nello sviluppo di una risposta globale ai cambiamenti climatici. È per questo motivo che fin dal 2006 l'UNFCCC ha iniziato a sviluppare il progetto del REDD+, cioè la riduzione di emissioni dalla deforestazione e degradazione delle foreste nei paesi in via di sviluppo. Il cuore pulsante del meccanismo sta appunto nel cercare di fornire i mezzi tecnici e tecnologici ai paesi in via di sviluppo, centrali per ottenere la riduzione globale delle emissioni in questo settore, per far sì che essi poi possano sviluppare in maniera autonoma il proprio sistema di protezione forestale. I passi fondamentali di svolgimento del progetto possono essere riassunti in tre fasi: la prima riguarda lo sviluppo di strategie, piani d'azione, misure politiche e *capacity-building* a livello nazionale; la seconda comprende l'implementazione di queste misure e strategie nazionali, che potrebbero includere anche un ulteriore sviluppo e trasferimento della tecnologia e delle conoscenze, oltre che di attività dimostrative basate sui risultati; la terza fase, infine, dovrebbe contare sul corretto funzionamento di azioni basate sui risultati che devono essere pienamente misurate, verbalizzate e verificate, dando quindi diritto a pagamenti basati sui risultati (in inglese RBPs, *Result Based Payments*).

Il REDD+, sviluppato di Conferenza in Conferenza dall'UNFCCC, è ancora oggi in fase di dibattito, e i considerevoli bisogni finanziari per permetterne un'implementazione su larga scala non sono ancora stati trovati. Ciononostante, in riconoscimento della necessità di agire prontamente per far sì che la riduzione della deforestazione abbia un impatto significativo in termini di riduzione delle emissioni ed amplificazione della mitigazione dei cambiamenti climatici, le iniziative REDD+ sono già iniziate al di fuori della rete dell'UNFCCC, sia indipendentemente che in previsione di un meccanismo formale sul REDD+. Inoltre, già a partire dal 2008 è stato sviluppato il Programma UN-REDD per aiutarne l'implementazione immediata: il Programma, frutto dell'unione delle forze dell'Organizzazione delle Nazioni Unite per l'Alimentazione e l'Agricoltura (FAO) con il Programma delle Nazioni Unite per lo Sviluppo (UNDP) e il Programma delle Nazioni Unite sull'Ambiente (UNEP), mira ad assistere i paesi in via di sviluppo per potenziare la loro capacità di riduzione delle emissioni e di partecipazione nel meccanismo del REDD+ in due modi: attraverso il supporto diretto nella costruzione ed implementazione dei programmi nazionali dell'UN-REDD ed attraverso un supporto complementare all'azione nazionale nel contesto del REDD+. Queste azioni hanno il fine di sviluppare approcci comuni, analisi, metodologie, strumenti, dati e pratiche sviluppate attraverso il Programma globale dell'UN-REDD. Con i suoi nove progetti nazionali pilota in Africa, Sud-Est asiatico, America Latina e Caraibi, il Programma UN-REDD sta supportando i governi a

preparare le strategie nazionali per il REDD+, a costruire sistemi di raccolta delle informazioni, a coinvolgere gli *stakeholder* e a dimostrare i benefici delle azioni contro la deforestazione. Ad oggi, il Programma ha fornito programmi nazionali su vasta scala per supportare la preparazione per il REDD+ in 23 paesi, e aiuti più mirati e tecnici sono stati forniti a più di 35 paesi.

Il successo a lungo termine del Programma REDD+ dipende dall'alterazione del "*business-as-usual*" in settori che attualmente trainano le emissioni di gas serra nell'ambito della deforestazione e della degradazione delle foreste. L'agricoltura è il principale fattore di disturbo diretto, causando l'80% della deforestazione mondiale, seguito dal disboscamento e dall'uso della legna da ardere. Altri fattori di tipo indiretto provengono da processi interconnessi a livello sociale, politico, economico, tecnologico e culturale. Tutti questi elementi sono distribuiti in maniera diversa in ogni Stato, e per questa ragione è fondamentale l'approccio nazionale al fine di definire le misure più appropriate per affrontarli efficacemente, mentre si sviluppa allo stesso tempo il Programma REDD+ entro il contesto di ciascuna strategia nazionale di protezione ambientale.

In conclusione, il mio lavoro, attraverso l'analisi del Protocollo e della sua evoluzione nel tempo, ha l'obiettivo di sottolineare le debolezze e le forze del processo multilaterale di azione sul cambiamento climatico, con un particolare focus sul problema della deforestazione, e di offrire, più che un'occasione per riflettere, una motivazione ad agire. Traendo dati ed informazioni dall'IPCC, dalla Banca Mondiale, dalle documentazioni dell'UNFCCC, dalla ricca letteratura sul cambiamento climatico e dalle riviste specializzate, ciò che emerge è la complessiva inadeguatezza del "processo di Kyoto" a fornire i necessari risultati nella riduzione globale dei gas serra. Le visioni contrastanti tra i paesi industrializzati e quelli in via di sviluppo hanno rallentato le negoziazioni dell'UNFCCC, come anche l'efficacia delle sue decisioni. Era risaputo fin dall'inizio che l'implementazione del Protocollo di Kyoto sarebbe stata solo un primo passo nella mitigazione dei cambiamenti climatici, ma i progressi hanno mancato le aspettative delle parti interessate e della società civile. I meccanismi di mercato delle emissioni, se da un lato hanno contribuito ad alleviare i costi dei membri dell'Annesso B per ottenere la riduzione delle emissioni, hanno avuto effetti controproducenti (ad esempio i progetti di implementazione congiunta, che sono stati avviati in paesi con un basso costo di riduzione delle emissioni, anziché dove ce n'era più bisogno), e negli ultimi anni, principalmente per lo stallo del Protocollo, i progetti registrati sono diminuiti di molto. Inoltre, le opportunità di accrescere il potenziale di rimozione dei gas serra delle foreste, in particolare attraverso il sistema del REDD+, ha proceduto a rilento.

Il nuovo Accordo di Parigi del dicembre 2015 è virtualmente l'ultima occasione per compiere uno sforzo coordinato globalmente per combattere il cambiamento climatico, e le sue disposizioni sulla mitigazione e l'adattamento ai cambiamenti climatici dovranno essere rafforzate e adottate da tutti gli Stati membri dell'UNFCCC per avere una possibilità di ridurre le emissioni. Attualmente, esiste un

considerevole divario tra le intenzioni e le azioni a livello nazionale ed internazionale e il reale livello di impegno richiesto per tenere la temperatura media globale entro i 2°C sopra il livello preindustriale, oltre al quale gli studi scientifici mostrano un rischio ancora maggiore di conseguenze irreversibili a livello climatico. La risposta a questa minaccia richiede una forte azione governativa a tutti i livelli, in un complesso processo che comprenda la stretta collaborazione tra governi, settore privato, ONG e società civile. Questa sfida implica la costruzione di un nuovo paradigma che parta dal basso, dal principio di equità, cooperazione e consapevolezza.

List of abbreviations

AAUs = Assigned Amount Units

ADP = Ad hoc working group on the Durban Platform for enhanced action

AF = Adaptation Fund

AFOLU = Agriculture, Forests and Other Land Use

AGBM = Ad Hoc Group of the Berlin Mandate

AIE = Accredited Independent Entity

AOSIS = Alliance of Small Island States

AR = Afforestation and Reforestation

AR5 = Fifth Assessment Report

ARD = Afforestation, Reforestation and Deforestation

AWG-KP = Ad hoc Working Group on further commitments from Annex I Parties under the KP

AWG-LCA = Ad hoc Working Group on Long-term Cooperative Action

BAPA = Buenos Aires Plan of Action

BAU = Business As Usual

BR = Biennial Reports

BURs = Biennial Update Reports

CAD = Compilation and Accounting Database

CDM = Clean Development Mechanism

CEITs = Countries with Economies In Transition

CERs = Certified Emission Reductions

CFI = Carbon Farming Initiative

CGE = Consultative Group of Experts

CH_4 = Methane

CMP = Conference Of the Parties serving as the meeting of the Parties to the KP

CO_2 = Carbon Dioxide

COP = Conference Of the Parties

CPR = Commitment Period Reserve

CRF = Common Reporting Format

CTC = Climate Technology Centre

CTCN = Climate Technology Centre and Network

DOEs = Designated Operational Entities

EB = Executive Board
EGTT = Expert Group on Technological Transfer
EIT = Economies In Transition
ERTs = Expert Review Teams
ERUs = Emission Reduction Units
ESTs = Environmentally Sound Technologies
EU = European Union
EU ETS = European Union Emissions Trading Scheme
FAO = Food and Agriculture Organisation
GCF = Green Climate Fund
GDF = Green Development Fund
GDP = Gross Domestic Product
GEF = Global Environment Facility
GHG = Greenhouse Gas
GPG-LULUCF = Good Practice Guidance for Land Use, Land-Use Change and Forestry
HFCs = Hydrofluorocarbon
ICA = International Consultation and Analysis
IEA = International Energy Agency
IET = International Emissions Trading
IGOs = Intergovernmental Organisations
INC = Intergovernmental Negotiating Committee
INDCs = Intended Nationally Determined Contributions
IPCC = International Panel on Climate Change
ITL = Independent Transaction Log
JI = Joint Implementation
JISC = Joint Implementation Supervisory Committee
JUSSCANNZ = Japan, United States, Switzerland, Canada, Australia, Norway, and New Zealand
KP = Kyoto Protocol
LDCs = Least Developed Countries
LEG = Least Developed Countries Expert Group
LULUCF = Land Use, Land-Use Change and Forestry
MEAs = Multilateral Environmental Agreements
MRV = Measurement, Reporting and Verification
N_20 = Nitrous Oxide
NAMAs = Nationally Appropriate Mitigation Actions

NAPs = National Adaptation Plans
NF_3 = Nitrogen Trifluoride
NFMS = National Forest Monitoring System
NGOs = Non-Governmental Organisation
NIR = National Inventory Report
OECD = Organisation for Economic Cooperation and Development
OPEC = Organisation of Petroleum Exporting Countries
PDD = Project Designed Document
PFCs = Perfluorocarbons
PPM = Parts Per Million
QELROs = Quantified Emissions Limitation and Reduction Objectives
R&D = Research and Development
RBAs = Result-Based Actions
RBPs = Result-Based Payments
RCFs = Reasons For Concerns
RCPs = Representative Concentration Pathways
REDD+ = Reducing Emissions from Deforestation and forest Degradation
RELs = Reference Emissions Levels
RLs = Reference Levels
RMUs = Removal Units
SBI = Subsidiary Body for Implementation
SBSTA = Subsidiary Body for Scientific and Technological Advice
SCC = Social Cost of Carbon
SCCF = Special Climate Change Fund
SEF = Standard Electronic Format
SF_6 = Sulphur Hexafluoride
TEC = Technology Executive Committee
UN = United Nations
UNCBD = United Nations Convention on Biological Diversity
UNCED = United Nations Conference on Environment and Development
UNDP = United Nations Development Programme
UNEP = United Nations Environment Programme
UNFCCC = United Nations Framework Convention on Climate Change
USD = US Dollar
WCED = World Commission on Environment and Development

WMO = World Meteorological Organisation

Introduction

Climate is changing. By now it seems evident also to the most distracted people that something is wrong in our planet: warmer winters, lack of precipitations, overabundance of precipitations in restricted areas, extreme weather events. If until ten years ago these were sporadic events, in 2016 the increasing frequency of these phenomena appears to be getting out of control even in the eyes of common people. The absence of rain for two months all across Italy between November and December 2015 is a good example of an extra-ordinary climatic oddity with relevant immediate consequences: smog over the precautionary limit in the major cities of the country, air quality lower than ever, last-minute solutions on how to bring emissions back to the normal level.

How can we deal with these changes? And how can we prevent them? Climate change represents one of the most challenging, if not the most challenging, problems of our generation. We live in a world where capitalistic development seems the only path to move fore ward and grow as a country, and where the population continues to increase without any sign of slowing down. The logic of development is implicit in the evolution of human-kind, but it has started to be a real karma after the advent of the industrial revolution. We know that much of the present-day pollution in the atmosphere has been caused by the now developed countries, and that developing nations cannot be held responsible for the consequences it has caused over the climate and the environment, even if now they account for the majority of the greenhouse gas (GHG) emissions and will be the main responsible for the disastrous consequences for the future generations. The condition to keep the environment safe from catastrophic climate change effects is to lock the growth of the temperature within 2°C above pre-industrial levels. To do so, global annual emissions must fall by more than 50% if atmospheric greenhouse gas (GHG) levels are to be stabilised in this century. Meeting this target is a big problem because this halving of total emissions cannot be achieved by industrialised countries alone, but must take place in a world where more than a billion people live on less than a dollar a day and 30% of children under five-year-old are malnourished.[1] This is relevant because it is typically assumed that the solution to poverty comes from development along the same trajectories of the industrialised nations. At present, this model depends on the increase, rather than the decrease, of

[1] World Bank, *Policy brief: opportunities and challenges for climate-smart agriculture in Africa*, available at the following link: http://wwwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/03/26/000356161_20130326153740/Rendered/PDF/762470WP0CSA0P00Box374367B00PUBLIC0.pdf.

polluting energy sources. It appears clear that this path has somehow to be avoided if we want to grant a future to our planet, and for this reason the concept of sustainable development has emerged.[2]

Thus, it will be impossible for the whole world to obtain the emission levels of the industrialised countries without compromising our ecosystem, very likely forever. The challenge we are facing comes from the fact that developing countries, which have started to grow their emissions contribution over the last 20 years, do not have binding commitments to decrease their pollution level (which are likely to increase in the future in a business-as-usual projection) in current international agreements on the environment, and on the other hand, industrialised countries are not doing enough. Clearly, countries like China and India fell that the present danger we are facing is not their fault and they do not seem prone to renounce to their right to develop freely, like industrialised countries had in the past and (substantially) have now. The challenge has multiple facets, but the underlying problem lies in the principle of equity, one of the core concepts in environmental discussions. Equity between interests, the ones of developing countries, of developed countries, of the environment and the human kind, and equity between responsibilities on something that is intrinsically "common" and that must be faced together.

The climate change problem can be posed as a question of burden sharing or as a question of resource sharing.[3] In the first case, the costs of protecting the atmosphere by reducing emissions to a safe level are a burden that must be shared globally. The costs are generated by the necessary introduction of new technologies that decrease the emission levels and by the necessity of an overall reduction in consumption of non-renewable energies. In abstract terms, this perspective implies that every person in every country contribute at the same level (as the US would like) in accordance with his/her economic income proportion, because one dollar for an Australian citizen has not the same value as for a Congolese one. However, focusing on the burden of reduction obscures the question of who has been responsible for, and benefited since now of the overuse of the environment. Assessing responsibility requires to focus on the environment as an economic resource, and to account for both its unequal appropriation in the past and its unequal use today. On the contrary, we should ask ourselves who has used the resource, what benefits they have acquired from its use, and what losses will be suffered by those who cannot use as much as they otherwise would have. If the finite size of the available atmospheric space defines the total benefits that can come from its use, it is necessary to ask whether a person or country has received or will receive a fair share of the benefits. In this way we can meaningfully define overuse and underuse and define a party's obligation on this basis: parties

---

[2] The common definition of sustainable development first appeared from the report "Our common future" by the World Commission on Environment and Development's (the Brundtland Commission). (Oxford: Oxford University Press, 1987).

[3] P. Bauer, Equity, *Greenhouse gas emissions, and global common resources*, in S. H. Schneider, A. Rosencranz, J. O. Niles, *Climate change policy: a survey*, Washington, Island Press, 2002, pag. 395.

that have exceeded their share have obligations to parties that will therefore get less. [4] This is, in fact, the approach of the international environmental agreements (IEA) on climate change.

A common thread in many discussions about "fair", long-term burden-sharing is the desirability of gradually moving all countries toward equal per capita emissions. Some scholars[5] argue that this would be consistent with what many people consider "equitable". Somanathan, instead, argues that although an effective solution to climate change will require the cooperation of developing countries, achieving near-term GHG reductions in these countries will be neither feasible nor desirable because of their other priorities for economic and social development. Others[6], finally, noted that if the goal of environmental policies is greater equity in the distribution of wealth, a better solution would be to target wealth redistribution directly.[7]

The United Nations Framework Convention on Climate Change (UNFCCC), together with its Kyoto Protocol, the first ever binding agreement on climate change, are the first, even if still insufficient, multilateral steps towards an equitable commitment on GHG reduction. Equity considerations during the negotiations of the two instruments have resulted in the adoption of the principle of "common but differentiated responsibility" as an essential element of these agreements. On 12 December 2015, moreover, the Paris Climate Change Conference has adopted a new agreement on climate protection, the Paris Agreement, which should come into effect in 2020. It is not sure how the principle of common but differentiated responsibility will evolve in the Paris Agreement. What is sure is that if all developing countries will not contribute in the immediate future to the decrease of global GHG emissions, it will be impossible to stabilise atmospheric GHG concentrations, unless the most rapidly growing developing countries (China, India, Brazil among others) take on an increasingly meaningful role in reducing global emissions. Equity considerations are one of the main fields of discussion between negotiators under the UNFCCC, and the scarce results we witness in the fight to climate change are mainly due to the compromise solutions which have been implemented so far.

As a matter of fact, the idea that the environment is a "common concern" has evolved slowly in the multilateral environmental agenda. Whereas the 1972 Stockholm Declaration on the Human Environment had simply distinguished between responsibility for areas within and beyond national jurisdiction [8], the Rio treaties of the 1992 United Nations Conference on Environment and Development (UNCED) use the concept of common concern to designate the issues that involve international global responsibility.[9] By approaching the matter from a global perspective, the United

---

[4] *Ibidem*, pag. 3.
[5] Agarwala, Cao, and Frankel.
[6] Posner and Sunstein.
[7] J. E. Aldy, R. N. Stavins, *Lessons for the international policy community*, in P. Birnie, A. Boyle, C. Redgwell, *International law & the environment,* Oxford University Press, 2009, pag. 41.
[8] Principle 21.
[9] Preambles of both the Convention on Climate Change and the Convention on Biological Diversity.

Nations (UN) has acknowledged not only the artificiality of spatial boundaries but also the inappropriateness of treating the phenomena of global warming and climate change in the same way as transboundary air pollution, which is regional or bilateral in character.[10] In the Rio Declaration, a short document of environmental principles produced at the UNCED, both climate change and the environment are each expressly denominated as the "common concerns of humankind"[11], and thus point to a globalisation of international environmental law. However, although in theory this concept is right and fundamental, in practice it may carry an implicit risk due to the categorisation of "common": a lack of a defined legal status which brings to inaction. The International Panel on Climate Change (IPCC), in its 2014 *Climate Change Mitigation Assessment Report*, defines climate change as a "global commons problem, meaning reduction in emissions by any jurisdiction carries an economic cost, but the benefits (in the form of reduced damages from climate change) are spread around the world – although unevenly – due to GHG emissions mixing globally in the atmosphere."[12]
The main impact of the "common concern" principle on the international environmental agreements appear to be that it gives the international community of States both a legitimate interest in resources of global significance and a common responsibility to assist in their sustainable development.[13] Moreover, even if States continue to enjoy sovereignty over their natural resources and freedom in determining how they are to be used, this sovereignty is not unlimited or absolute, but must be exercised within the boundaries of the global responsibilities set out in the Convention on Climate Change, which are subjected to this principle.[14]
Global responsibility differs from existing transboundary environmental law in three respects. First of all, like human rights law, the global responsibilities in question may have an *erga omnes* character, and are owed to the international community as a whole, not merely to other confining States. Second, although held in common by all States, global environmental responsibilities are differentiated in various ways between developed and developing countries, and contain strong elements of equitable balancing not found in the law relating to transboundary harm. Third, although the commitment to a precautionary approach is relevant to many aspects of environmental law, it is particularly evident in matters of global concern.

---

[10] See Boyle, in Churchill and Freestone, *International law and global climate change*, Chapter 1.
[11] P. Birnie, A. Boyle, C. Redgwell, *International law & the environment,* Oxford University Press, 2009, pag. 128.
[12] R. Stavins, J. Zou, T. Brewer, M. Conte Grand, M. den Elzen, M. Finus, J. Gupta, N. Höhne, M.-K. Lee, A. Michaelowa, M. Paterson, K. Ramakrishna, G. Wen, J. Wiener, and H. Winkler, 2014: International Cooperation: Agreements and Instruments. In: *Climate Change 2014: Mitigation of Climate Change*. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pag. 1007.
[13] UNEP, *Report of the group of legal experts to examine the concept of the common concern of mankind in relation to global environmental issues*, 1990.
[14] P. Birnie, A. Boyle, C. Redgwell, *International law & the environment,* Oxford University Press, 2009, pag. 129.

The common nature of climate change exposes it to many variables that make this "sector" of international cooperation different from any other. In fact, mitigation of climate change is non-excludable, meaning it is difficult to exclude any individual, institution or entity from the shared global benefits of emissions reduction achieved by any localized actor. Also, these benefits are non-rival, meaning they may be enjoyed by any number of individuals or institutions at the same time, without reducing the extent of the benefits any one of them receives. These public good characteristics of climate protection (non-excludability and non-rivalry) create incentives for actors to "free ride" on other actors' investments in mitigation. Therefore, lack of ambition in mitigation and overuse of the atmosphere as a receptor of GHGs are likely.[15]

To analyse the implications of climate change, the majority of the studies on this matter considers the environment as an economic asset. This approach seems inevitable to develop serious considerations on mitigation and adaptation to climate change in the capitalistic neo-liberal system we live in and in order to make the objective of sustainable development "sustainable" in such a world. This, as a matter of fact, has been also the perspective used by the negotiators of the Kyoto Protocol when they have designed the flexible market mechanism to help countries with binding commitments (Annex B Parties) achieving their objectives under the Protocol. From this angle, the environment is one of the great number of economic variables which has to be kept into consideration when planning a business, becoming a good subjected to the forces of the market. To explain it better, I will take the example of the economic incentive to "free ride" on climate protection. These risks have been analysed extensively and are well-understood.[16] Essentially, they refer to the possibility of a firm (multinationals in particular) to move their business in countries with loose environmental regulations, if the country where they currently located imposes strict rules on this issue, with a clear negative effect for the "virtuous" countries. In this way, areas were the environment is subjected to over-use are created. This behaviour is the common thread of the capitalistic conception of firm, which looks for the minimisation of costs and the maximisation of profits. It is quite ironical that this conception has the opposite effect on the environment: the maximisation of costs of environmental protection and the minimisation of "profits" for the future generation. It is for this reason that the environment has to be considered a common property of which every member of the society must preserve the

---

[15] R. Stavins, et alt., *International Cooperation: Agreements and Instruments*, in *Climate Change 2014: Mitigation of Climate Change*. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2014, pag. 1007.

[16] H. S. Gordon, *The economic theory of a common-property resource: the fishery*, The Journal of Political Economy 62, 1954, pp. 124-142, available at: http:/ /www. jstor.org/stable/1825571. G. Hardin, *The tragedy of the commons*, Science 162, 1968, pp. 1243-1248. R. Stavins, *The problem of the commons: still unsettled after 100 years*, American Economic Review 101, 2011, pp. 81-108.

integrity.

The literature[17] suggests that in some cases, effective common property management of local public resources can limit or even eliminate overuse, not to say that climate protection could have also co-benefits effects. Effective common property management of the atmosphere would, though, require applying such management at a global level, by allocating rights to emit and providing disincentives for overuse through sanctions or pricing emissions.[18] There are many different authors and bodies (the IPCC on the fore), which are concerned with giving advice on how to make this environment-economic growth-sustainability triangle effective, but there are no magic formulas. Many are the variables that have to be kept into consideration when implementing environmental policies, as science shows us.[19]

When considering the environment as an economic resource, there is another principle which is central to the environmental policies discussion: the one of cost-effectiveness. Cost-effectiveness refers to the ability of a policy to attain a prescribed level of environmental performance at the least possible cost, taking into account impacts on dynamic efficiency, notably technological innovation.[20] Unlike net benefits assessment, cost-effectiveness analysis takes the environmental performance of a policy as given and seeks the least-cost strategy to attain it.[21] While analysis of a policy in terms of its cost-effectiveness still requires environmental performance of the policy to be quantified, it does not require environmental performance benefits to be monetized. Thus, analysis of a policy's cost-effectiveness may be more feasible than analysis of a policy's economic efficiency in the case of climate change, as some social benefits of climate change mitigation are difficult to monetise.[22] This is also the reason why environmental protection is so difficult to obtain in the capitalistic order. With the words of the UNFCCC, "cost-effectiveness on the adaptation side might be used when, under different climate change scenarios, a required minimum level of a public good or service (for example, flood protection) is specified and the option to deliver this good at the lowest cost is sought. Also particularly applicable to those cases where the analyst may be unwilling or unable to monetize the most important policy impact."[23] Cost-effectiveness is generally more applicable for individual

---

[17] E. Ostrom, *Reformulating the commons*, in *Protecting the Commons: A framework for resource management in the Americas*, J. Burger, E. Ostrom, R. Norgaard, D. Policansky, B. Goldstein, (eds.), Island Press, Washington, DC, 2011, pp. 17-43.

[18] J. B. Wiener, *Property and prices to protect the planet*, Duke Journal of Comparative & International Law 19, 2009, pp. 515-534. Available at: http:/ /scholarship.law. duke.edu/faculty_scholarship/2227/.

[19] On this matter, see Chapter 13.2.2 of the IPCC *Climate Change 2014: Mitigation of Climate Change,* Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

[20] A. Jaffe, R. Stavins, *Dynamic incentives of environmental regulations: The effects of alternative policy instruments on technology diffusion*, Journal of Environmental Economics and Management 29, 1995.

[21] J. Hammitt, *Evaluation endpoints and climate policy: Atmospheric stabilization, benefit-cost analysis, and near-term greenhouse-gas emissions*, Climatic Change 41, 1999, pp. 447-468.

[22] Chapter 13.2.2 of the IPCC *Climate Change 2014: Mitigation of Climate Change,* Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, pag. 1009.

[23] Unfccc.int, at the electronic page dedicated to adaptation.

project decisions that are putting into practice decision rules or procedures which have already been determined in policies, strategies, or programs, in the first place those of the UNFCCC.

With this overview, one can easily understand why climate protection is a challenging process. It has many facets and a great number of contrasting interests involved, and all this process is taking place in a fundamentally unfavourable economic environment. Probably, there is no other field of study in international law which is scattered of uncertainties and "if" like the one of climate mitigation and adaptation; what is certain is that international cooperation is (and will be increasingly) necessary to significantly reduce climate change. Being a global problem, cooperation between individuals, institutions and countries is the fundamental key word for the achievement of the objective of keeping global warming under 2°C.

My work, through the analysis of the Protocol and of its evolution hitherto, has the objective of highlighting the weaknesses and the strengths of the international process on climate change action, with a particular focus on the deforestation problem, and to offer, more than an occasion to reflect, a motivation to act. Drawing data from the IPCC, the World Bank, and the UNFCCC documentations, and from the rich climate change literature and journals, I will question the adequacy of the "Kyoto process" in providing the necessary results on global GHG reduction. Different visions and priorities between developed and developing countries have slowed the UNFCCC negotiations, as well as its effectiveness, and progresses have missed the expectations of stakeholders and civil society. Moreover, chances to enhance forests as GHG removal sinks, in particular through the REDD+ process, have been behindhand.

My research is divided in three parts. The first, introduced by a brief excursus on the foundations of the current multilateral climate change regime, i.e. the UNFCCC, is focused on the analysis of the negotiating process of the Kyoto Protocol and of its principles and provisions as they were agreed in 1997 in the Japanese city. Then, I consider the mechanisms of implementation of the Protocol in the light of the 2001 Marrakech Accords, in order to prove their effective contribution to climate change mitigation. The chapter is concluded with an examination of the compliance regime and the national communications system.

The second part of my study is centred on the analysis of the implementation of the Kyoto Protocol in the first commitment period (2008-2012) through the examination of the Parties involved and their results. The (slow) legal development of the Protocol is the fulcrum of the following paragraph: the Doha amendment marked the adoption of a second commitment period (2013-2020), which has not yet come into force. Consequently, I provide an insight on the latest developments in the negotiating process under the Convention, which saw an important result with the 2015 Paris Agreement on climate change.

The third and final part of my work is focused on the deforestation problem: the examination of the

activities of land use, land-use change, and forestry (LULUCF) under the Kyoto Protocol and of REDD+ mechanism are aimed at stressing their importance in the climate change regime and the need to enhance their scope; up to now, their role in emissions reduction policies has been marginal, but if strengthened it could make a big difference in the challenge against climate change.

Part I
Setting the foundations: the Kyoto Protocol

1.1 The framework: the United Nations Framework Convention on Climate Change

To understand why and how the Kyoto Protocol became reality, one needs to go back to the beginning of the 90s, when the concern and the scientific proofs about climate change placed the basis for a serious negotiation of a multilateral convention on this matter. Actually, the increase of scientific evidence of human interference with the global climate, together with growing public concern over international environmental issues, began to push climate change onto the political agenda already in the mid-1980s.

It is in this context that in 1988[24] the Intergovernmental Panel on Climate Change (IPCC) was set up by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO). It was established to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts, and it quickly became the leading international body for the assessment of climate change. It presented its first assessment report in July of 1990 to the Second World Climate Conference held in Geneva.[25] This report[26] provided the scientific basis for the negotiations of the Climate Change Convention[27], formally started after the resolution 45/212 of the UN General Assembly in December of 1990. The negotiations were conducted by the Intergovernmental Negotiating Committee (INC), chaired by Jean Ripert (France). The INC met for the first time in February 1991. After just 15 months, on 9 May 1992, the INC adopted by consensus the United Nations Framework Convention on Climate Change

[24] In the same year the United Nations General Assembly engaged for the first time ever in the issue of climate change following the proposal of Malta, and adopted Resolution 43/53 on the "Protection of global climate for present and future generations".

[25] This report was echoed by the Ministerial Declaration of the Second World Climate Conference, held in Geneva in October/November of that year.

[26] The report is available at the following link: https://www.ipcc.ch/ipccreports/far/wg_I/ipcc_far_wg_I_full_report.pdf

[27] S. Oberthür, T. Ott, *The Kyoto Protocol: international climate policy for the 21st century*, New York, Springer Science & Business Media, 2013, pag. 4.

(UNFCCC) during its Fifth session, held at New York from 30 April to 9 May 1992.

The UNFCCC is a "Rio Convention", one of the three opened for signature in 1992 at the United Nations Conference on Environment and Development (UNCED), also known as "Rio Earth Summit". Its sisters Rio Conventions are the UN Convention on Biological Diversity and the Convention to Combat Desertification. The UNFCCC is a framework non-binding agreement with limited specific obligations to reduce emissions of greenhouse gases. It formulates provisions on general principles, actions and goals that countries should embrace to reach its objectives. It also sets up a number of bodies and a reporting mechanism, as well as a system to review the need for further action.[28]

The Convention entered into force on 21 March 1994, in accordance with article 23, which states that "the Convention shall enter into force on the ninetieth day after the date of deposit of the fiftieth instrument of ratification, acceptance, approval or accession". At present, there are 197 Parties to the United Nations Framework Convention on Climate Change.

The purpose of the UNFCCC is to stabilise greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." The stabilisation of concentrations of polluting gases to avoid this point being reached provides the common long-term objective of the climate regime.[29] However, according to the IPCC, the stabilisation of GHG emissions at near-current levels will not be enough to balance the gas concentrations; thus, the stabilisation has to be reached in a framework of a preceding reduction of dangerous emissions, quantified within the rise of the temperature of 2ºC above the pre-industrial levels or on a concentration of emissions under 450 ppm (parts per million).

The second sentence of article 2 states that the level of stabilization "should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner". This part of the Convention reflects the concept of "ecological limits" of the environment, which must be respected and that set the threshold to the timing and degree of interventions needed to invert the tendency.[30]

As far as the general principles of the Convention are concerned, the most important is the one on the common but differentiated responsibility between developed and developing countries. Article 4 of the UNFCCC commits all Parties – "taking into account their common but differentiated responsibilities and their specific national and regional priorities, objectives and circumstances" – to formulate, implement, publish and regularly update national and, where appropriate, regional

---

[28] B. Metz, *Controlling climate change,* Cambridge University Press, 2010, pag. 320.
[29] C. Voigt, *Sustainable development as a principle of International Law,* Netherlands, Brill, 2009, pag. 59.
[30] *Ibidem,* pag. 59.

programmes containing measures that will result in the mitigation of climate change by addressing anthropogenic emissions of greenhouse gases by sources[31] and removals by sinks.[32]

The idea behind this article is that, considered that developed countries have been the cause of most part of the past and current greenhouse gas emissions, as the preamble of the Convention recognises, they should take immediate action as a first step towards a comprehensive response at the global, national and regional levels. These countries, called Annex I countries[33], belong to the Organization for Economic Cooperation and Development (OECD), and include 12 countries with "economies in transition" (EIT) from Central and Eastern Europe.[34] They should act specifically adopting national policies to mitigate climate change, submitting periodically detailed information on the measures embraced. Annex II countries, instead, are formed by the OECD members of Annex I, but without the economies in transition Parties. They are required to provide financial resources to help developing country Parties (the Non-Annex I) to comply with the objectives concerning the communication of information related to the implementation of the agreement (article 12). These countries, in fact, have vulnerable economies that are more prone to suffer from policies committed to climate change mitigation. Nonetheless, in the interest of fulfilling its ultimate goal, the Convention seeks to help such countries to limit emissions in ways that will not hinder their economic progress, such as with investments, insurances and technology transfers.

Another important principle is that of precaution. The precautionary principle is the result of the concern about new environmental problems that at the time had not been yet scientifically demonstrated and consequently publicly acknowledged. To prevent inaction of governments in the face of uncertainty, the UNFCCC – in article 3, paragraph 3 – declares that “Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures”.

This principle, anyway, is problematic with regards to the evaluation of what can represent “threats of serious or irreversible damage”[35], and the question of timing and extent of mitigation and/or

---

[31] In article 1, paragraph 9, of the UNFCCC a “source” is defined as “any process or activity which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere”.

[32] In article 1, paragraph 8, a “sink” is defined as “any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere”.

[33] Australia, Austria, Belarus **, Belgium, Bulgaria **, Canada, Croatia, Czech Republic *, Denmark, European Union, Estonia **, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia **, Liechtenstein *, Lithuania **, Luxembourg, Monaco *, Netherlands, New Zealand, Norway, Poland, Portugal, Romania **, Russian Federation **, Slovak Republic *, Slovenia **, Spain, Sweden, Switzerland, Turkey, Ukraine **, United Kingdom of Great Britain and Northern Ireland, United States of America.

* Countries added to Annex I by an amendment that entered into force on 13 August 1998, after the decision 4/CP.3 at COP 3.

** Countries that are undergoing the process of transition to market economy.

[34] Unfcc.int, at the electronic page dedicated to the Convention.

[35] Art. 3, paragraph 3, UNFCCC.

adaptation policies remains unquantified. In absence of a stringent regulation, action is fully dependant on decision makers and on their commitments in the fight against climate change.[36]

Then, in article 3, paragraph 4, Parties express the right (and duty) to promote sustainable development. The policies to address climate change promoting sustainable development should be carried out considering the specific conditions of each country and integrated with a general national development programme, which is "essential for adopting measures to address climate change".[37] To reach this aim, State Parties should cooperate among them to create a synergistic economic environment, with a particular attention to developing countries, as mentioned before.

The UNFCCC requires all State Parties to take direct action by formulating and implementing programmes containing measures to minimise emissions, protect and enhance biological carbon reservoirs, so-called "sinks"; moreover, Annex I countries have to take action with the aim of stopping growth of emissions before 2000 (which was not reached for reasons we will analyse) and assist developing countries in their actions to do so. Cooperation is fundamental to prepare for adaptation and to fuel research and development (R&D).

Finally, States have to report on emissions[38] with the so-called "national communications" (every 4-5 years for Annex I countries and less frequently for others)[39]. After 31 January 2014 (with Decision 24/CP. 19), the UNFCCC reporting guidelines[40] require each Annex I Party, by 15 April each year, to provide annual GHG inventory covering emissions and removals of direct GHGs (carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3)) from five sectors (energy, industrial processes and product use, agriculture, land use, land-use change and forestry (LULUCF), and waste), for all years from the base year (or period) to two years before the inventory is due (e.g. the inventories due 15 April 2016 will cover emissions and removals for all years from the base year up to 2014).

As for the institutions, the UNFCCC created several bodies. The main organisation, which has the task to keep under regular review the implementation of the Convention and of any related legal instruments that it may adopt, is the Conference of the Parties (COP). It can take decisions (by consensus) to promote the effective implementation of the Convention and, more in general, it guides the activities of development of measures to mitigate and/or adapt to climate change. It usually meets every year, unless the Parties decide otherwise. The seat of the Conference is Bonn, but State Parties can propose to host the session. The custom has evolved towards a tendency to hold the session in

---

[36] Visit the following IPCC report: http://www.ipcc.ch/ipccreports/tar/wg3/index.php?idp=437.
[37] Art 3.4 UNFCCC.
[38] See Art 4, paragraph 2(a).
[39] B. Metz, *Controlling climate change,* Cambridge University Press, 2010, pag. 320.
[40] Available at the link http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=2.

the region of the COP Presidency which is in charge in that moment.[41] The work of the COP and each subsidiary body is guided by a Bureau, elected by the Parties to the Convention, usually at the start of each session of the COP. The Bureau is elected for one year so as to ensure continuity during inter-sessional periods.

The third body of the United Nations Framework Convention on Climate Change is the Secretariat (art. 8). It provides administrative support for the functioning of the Convention and its bodies. Its functions are to help the COP and the State Parties to perform their duties, to prepare reports on its activities, to compile and transmit reports submitted to it, to coordinate with the Secretariats of others international bodies.

Moreover, two subsidiary bodies were created, one for Scientific and Technological Advice (art. 9), and the other for Implementation (art. 10). Their purpose is to assist the Conference of the Parties with information and advice on scientific and technological matters for the first one, and with evaluations and reviews of the effective implementation of the Convention for the second one.

Finally, the Convention established a Financial Mechanism, entrusted in COP 2 to the Global Environment Facility (GEF)[42], to coordinate all the financial efforts under the agreement. At its fourth session the COP decided (with Decision 3/CP.4[43]) to review it every four years in accordance with Article 11, paragraph 4, of the Convention. Furthermore, during the years, other three consultative bodies were created, the Consultative Group of Experts (CGE), during COP 5 in 1999, and the Least Developed Countries Expert Group (LEG) together with the Expert Group on Technology Transfer (EGTT) during COP 7.

1.2 The road to Kyoto: negotiations

The UNFCCC is universally accepted as the basis of international politics on climate change[44], and it became the legal basis for the Kyoto process. As we have seen, the weakness of the Convention was its nature of "soft" law, due to the impossibility of setting universally agreed norms and to

[41] Up to this moment, there have been 21 COP meetings starting from 1995 until the session of 2015 held in Paris. The full list of meetings is available at the following link: https://en.wikipedia.org/wiki/United_Nations_Climate_Change_conference#2015:_COP_21.2FCMP_11.2C_Paris.2C_France.

[42] The multi-billion-dollar GEF was established by the World Bank, UNEP and the UN Development Programme (UNDP) in 1991 (with a pilot phase up to 1994) to fund certain developing country projects that have global environmental benefits, not only in the area of climate change, but also in biodiversity, protection of the ozone layer and international waters.

[43] Document available at the link: http://unfccc.int/files/cooperation_and_support/financial_mechanism/application/pdf/3_cp.4.pdf.

[44] S. Oberthür, T. Ott, *The Kyoto Protocol: international climate policy for the 21st century*, New York, Springer Science & Business Media, 2013, pag. 33.

reconcile the different interests of the Parties involved.

Before the entry into force of the UNFCCC in 1994, which required the ratifications of at least 50 countries, the institutions set out by the agreement could not start any preparatory work. For this amount of time it was agreed that the INC would have worked on the issues to discuss in COP 1. In this transitory period the INC had to discuss a great number of technical issues, including the Rules of Procedure of the COP, the multilateral consultative process, the arrangements for the Financial Mechanism and the creation of a system for reviewing national communications. It slowly emerged in the years from 1992 to 1995 that the commitments undertaken in Rio were insufficient to reverse the trend of gas emissions. This inadequacy was demonstrated first by the Secretariat's compilation and synthesis of the first 15 national communications of industrialized countries, which proved to have undertaken insufficient measures to contain and reduce GHG emissions to 1990 levels by 2000.[45] Second, a special IPCC report assessed that even if current CO_2 emissions were stabilised globally, the atmospheric concentrations of the gas would have continued to grow for at least two centuries.[46]

These reports demonstrated the urgency to re-discuss the adequacy of the commitments of the Convention. Regrettably, debates between industrialised and OPEC (Organisation of Petroleum Exporting Countries) countries blocked a prompt adoption of a revision of the Convention. There had already been proposals to discuss further commitments by developed countries, but none of them was explored in depth by the negotiating Committee, and discussions were held up on the voting modality of the COP.[47]

Owing to the lack of cooperation during the preparatory process, at the first Conference of the Parties in Berlin there was no possibility to adopt a protocol to the Convention. The only possible positive result was to overcome the differences between EU and OPEC and to set the negotiations for the new process, establishing a concrete target date for adopting strengthened commitments in 1996 or 1997.[48] This is just what happened, thanks to special political dynamics that were set in motion at the Conference. A number of developments during the second half of the second of the two weeks COP helped to bring about the adoption of what became known as the Berlin Mandate. The attention of the media and the pressure put by environmental NGOs helped to speed the process of convergence of the positions of the EU and the G77, which entered into a coalition. Germany, the host country, together with other EU member States, clarified that they would have not asked any new

---

[45] See UN document A/AC.237/8, available at the link: http://unfccc.int/resource/docs/a/81.pdf.

[46] See IPCC, 1994.

[47] OPEC countries insisted that a Protocol could have been adopted only by consensus and that they should be granted a seat on the Bureau of the COP. On the other hand, industrialised countries contributed to the stalemate by requiring consensus on decisions on financial matters.

[48] S. Oberthür, T. Ott, *The Kyoto Protocol: international climate policy for the 21st century*, New York, Springer Science & Business Media, 2013, pag. 46.

commitments from developing countries in the negotiations of the protocol, and on this basis the "Green Group" was created. It was formed by the developing States of G77 except OPEC countries, and led by India.

The attention was then on the United States and – again – on OPEC countries. The US were the leading part of the informal coalition JUSSCANNZ[49], which opposed to stringent commitments on GHG emission reduction. Together, JUSSCANNZ and OPEC opposed until the last hours of the conference to the EU plus G77. Finally, the American delegation agreed to a compromise. The other countries part of the "opponent" coalition did not want to be held responsible for the block of the consensus, so they accepted, too.

Therefore, thanks to this agreement, the Berlin Mandate[50] was launched, and the Kyoto process began. The Mandate states that the pledges made in the Convention (specifically in article 4, paragraph 2(a) and (b)) were not adequate, and so agreed to begin a process that would make possible to take appropriate action starting from 2000. The strengthening of the commitments would have taken the form "of a protocol or another legal instrument"[51]. This process required Annex I countries to elaborate policies and measures, as well as to set quantified limitations and reduction objectives of their GHG emissions within "specific time-frames" (such as 2005, 2010 and 2020). As it was established in the negotiations, the exclusion of non-Annex I countries from new commitments was confirmed.

The process was to be accomplished "in the light of the best available scientific information and assessment on climate change and its impacts", and included a research and an analysis of new possible policies and measures for Annex I countries to limit and reduce their gases emissions. All that had to begin without delay and be considered as a matter of immediate urgency. The work was appointed to an open-ended ad hoc group of Parties, which has become known as the "Ad hoc Group on the Berlin Mandate" (AGBM), and the deadline was set within COP 3, where the protocol or other legal instrument should have been adopted.

At COP 1, Parties designated Ambassador Raúl Estrada-Oyuela (from Argentina) as Chairman of the AGBM. The AGBM met eight times over the course of 1995-1997, including a session immediately prior to COP 3. At AGBM 6 (held in March 1997), Estrada convened two so-called "non-groups" to initiate the work on specific issues under discussion. The term "non-group" was used to underline the fact that the groups had an informal status, in particular that they had no mandate to take decisions. The first non-group engaged in issues relating to institutions and mechanisms and introductory and

[49] Acronym of Japan, United States, Switzerland, Canada, Australia, Norway and New Zealand. Moreover, sometimes also Iceland and South Korea participated in the meetings of the group.

[50] Document available at the following link: http://unfccc.int/resource/docs/cop1/07a01.pdf#page=4.

[51] Decision 1/CP.1 in FCCC/1995/7/Add.1 pag. 4.

final clauses, and was chaired by Mr. Takao Shibata (Japan). The second addressed the question of continuing to advance the implementation of existing commitments in Article 4, paragraph 1, under the chairmanship of Mr. Evans King (Trinidad and Tobago). At AGBM 7 (held in July/August 1997), two further non-groups were convened, one on policies and measures, under the chairmanship of Mr. Mahmoud Ould El Ghaouth (Mauritania), and one on Quantified Emission Limitation and Reduction Objectives (QELROs), chaired by Mr. Luiz Gylvan Meira Filho (Brazil). These four non-groups continued to meet until the close of AGBM 8 (October 1997), and through COP 3, where they were known simply as "negotiating groups". The change in name signalled that Parties had entered into the final stage of negotiations.

As far as the relationship between the Parties of the COP is concerned, the situation was a bit tense. During the second Conference of the Parties in Geneva in the summer of 1996, Wirth, under-secretary of State for global affairs and chief American spokesperson in this meeting, announced that the US would support legally binding limits on emissions, if other countries also did so. This was a clear reversal of a longstanding reluctance of the US to commit on environmental issues. However, despite this inversion in the American policy, there was still friction in Euro-American relationship.[52]

In 1997 the White House still seemed not to give much attention to environmental matters, and Europeans countries, on their part, were trying to put pressure for action. On 3 March, the European Union called for a reduction of emissions by all industrialised counties of 15% below the 1990 level by the year 2010. Then, in July, in a special session of the UN's General Assembly to assess the progress on the Rio commitments, the Europeans attacked the United States for not supporting the process of reduction of emissions.[53] There, the current US president Bill Clinton expressed for the first time to be favourable to putting limits to emissions, but he was gainsaid the day after by a resolution passed 95-0 at the Senate telling the president not to sign any treaty that put limits on developed countries' emissions unless it also committed the rest of the world, including developing countries. Due to these pressures and to the approach of COP 3, the US administration started to work on a campaign of awareness toward the environmental problems in order to obtain the attention and the favour of the American people on the issue. The first move was to hold a conference at the White House on 6 October. There, Clinton expressed four principles to guide the policies on environmental matters: first, that science was real. Bodies like the IPCC were the source of reliable data which had no sense mistrust. Second, the US had to be prepared to commit to "realistic and binding" objectives. Third, those objectives had to let the economy expand. Fourth, having learned the lesson from the

[52] J.W. Anderson, *The Kyoto Protocol on climate change. Background, unresolved issues, next steps*, Washington, Resources for the Future, 1998, pag. 9.

[53] In this occasion Britain's prime minister, Tony Blair, said that "the biggest responsibility falls on those countries with the biggest emissions".

Senate, all the world's nations had to participate. This was clearly in contrast with what had been established by the Berlin Mandate.

The position of the US was then further specified with the 22 October program. In that occasion, Clinton stated that the United States would have committed in Kyoto to the binding and realistic target of returning to emissions of 1990's levels between 2008 and 2012, and then to continue reducing emissions in the five-year period thereafter.[54] On the other hand, Japan tried to propose a midway plan between American's and European's ones (reduction of emissions by all industrial countries of 15% below the 1990 level by the year 2010) by calling for a reduction of 5% below 1990 levels by 2012. This compromise received the critics of the Europeans countries, as well as the European plan was held up by the US because it allowed to have wide differentiation among EU member countries' objectives while opposing to any differentiation outside the EU.

The American proposal was drafted to address the long term. The first phase, from then until 2002, would have been devoted to incentives to encourage the development and installation of new technologies to produce and use energy more efficiently. This part of the "plan" would have utilised technology already existing, while the second phase (2003-2007) would have included the evaluation of what had been accomplished and the accounting of new development in science, but without obligatory actions.

The binding limits had to be applied in the third phase, from 2008 to 2012, with the objective of reducing greenhouse gas emissions at 1990 levels. The mechanism would have involved only large industrial plants, while there was no sign of directly imposed measures to citizens, for example restraints in driving. In the fourth phase, then, countries would have pushed its emissions below the 1990 level to a target not yet specified.[55]

One month and a half after Clinton had announced his program, the international Conference of Kyoto (COP 3) opened. It involved 180 countries, reunited in various groups and alliances which favoured the negotiations. It is worth summarizing here the main groups involved, even if some of them have already been mentioned. The leading industrialised union of countries was the European Union[56], which had been on the front of the environmental defence during all the 90s.[57] The EU held a share of 24.3% of CO_2 emissions in 1990 among industrialised countries, which translated into 15-16% of

[54] J.W. Anderson, *The Kyoto Protocol on climate change*, Washington, Resources for the Future, 1998, pag. 12.
[55] *Ibidem*, pag. 13.
[56] With the entry into force of the Maastricht Treaty in November 1993, the European Economic Community was renamed the European Community (EC). The habit of referring to the EC as EU comes from the fact that in the rules on a Common Foreign and Security Policy and cooperation in the area of justice and home affairs, agreed separately from the Treaty Establishing the European Community, the political union thus created was referred to as European Union (EU). It became usual, then, to call it European Union.
[57] At the time, the EU consisted of 15 States: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom.

global emissions of CO_2. Before and during Kyoto, the EU appeared as a fairly united actor[58], but in reality it suffered many internal differences. The poorer countries (Greece, Ireland, Portugal, Spain) did not want to be charged with the obligation to reduce their GHG emissions, while between the leading counties of the group (Germany, Denmark, Austria, Netherland, UK), there was not a wide consensus on the measures to be taken to fight climate change.

The second group, JUSSCANNZ, included the greatest emitter of CO_2 and GHGs in absolute as well as relative terms, the USA. Japan followed as the second largest polluter. All the other countries of the unit, except Switzerland, experienced an increase in their GHG emissions between 1990 and 1995, even if they were far less significant. Most of these countries were (and are) also prone to suffer from climate change, with Australia and New Zealand already experiencing the negative effects of human induced atmospheric changes in the Antarctic ozone layer hole. These two countries, together with the US, had also an active set of environmental movements. All these internal dynamics will affect the position of the single countries and of the group overall, generally defined as the major opponent of Europe in the Kyoto process.[59]

The third cluster of countries was formed by Russia and the "Countries with Economies in Transition" (CEITs), constituted by Belarus, Ukraine, and the former communist countries of Central and Eastern Europe (Poland, Czech Republic, Slovakia, Hungary, Bulgaria, Romania, Slovenia, Croatia). Russia was the main source of GHG of the group, accounting for 17.4% of all CO_2 emissions of industrialised countries in 1990, and there per-capita CO_2 emissions were very high, owing to their ineffective use of the energy sources. It was followed by Ukraine with about 30% of the share of the emissions of the former.

Then, we can find the big and stratified cluster of the Group of 77 (G-77), born in 1964 with the "Joint Declaration of Seventy-Seven Countries" by 77 developing countries. Usually China is associated with this group, of which it often shares the positions, and the chairman of the G-77 often speaks for the G-77 and China as a whole during the negotiations. Despite the unifying factor that joined them together (the fight for independence and against their structural dependence on the North), there are a great number of different interests as far as climate change is concerned. Two sub-groups stand out for their particular stakes: OPEC, the Organisation of Petroleum Exporting Countries, and AOSIS, the Alliance of Small Island States.

The negotiating position of OPEC is characterised by their interest in exporting oil and natural gas. Being dependent from the earnings from fossil fuels, they look at climate change policies as a danger for their economic sustainability, and they seem fairly indifferent to the possible positive effects of

---

[58] S. Oberthür, T. Ott, *The Kyoto Protocol: international climate policy for the 21st century*, New York, Springer Science & Business Media, 2013, pag. 17.

[59] *Ibidem*, pag. 17.

international measures to combat global climate change due to the geographic characteristics of the region. Despite all, their very high per-capita emissions account only for a little share of global GHG emissions.[60]

The AOSIS cluster consists of 44 island developing countries[61] sharing the concern about the impacts of climate change. Being islands which lie just a few meters above the sea-level, they are worried about its rise and by all the atmospheric consequences of climate change (hurricanes and typhoons), which are endangering their own survival. As a matter of fact, AOSIS was the first group which submitted a draft protocol to the UNFCCC in 1994, in an attempt to accelerate the negotiations towards new commitments before the first Conference of the Parties. Due to the extremely high interests at stake, the group has been able to overcome the specific concerns of the parties, calling for a strong commitment of industrialised countries to keep the faith to the pledges made in Rio and, having few resources to adapt and to mitigate climate change on their own, to transfer technology to them like the agreement required. These requirements follow the principle of equity, central for all the developing countries groups, which consist in ensuring the social and economic development of these countries without the burden of bearing the costs of a problem caused mainly, if not exclusively, by industrialised countries.[62]

During the negotiations of the Kyoto Protocol, also the "regional groups" became important. Under the Climate Change Convention these groups are Africa, Asia, Eastern Europe, Western Europe and Other Countries Group (USA, Japan, Australia, New Zealand, and Western Europe), and Latin America. These groups are meaningful too because they propose candidates for official functions in the Convention's institutions.

The Conference in Kyoto, from the 1st to the 10th of December, started very slowly, but like it happens in many negotiations, it gained speed in the last hours of the last days, thanks to the acceleration impressed by the US. On the 8 December Vice President Al Gore flew to Kyoto for a one-day stop, pushing the process forward with the message that the United States was willing to compromise by agreeing to a deeper emissions cut than the President had specified in October. Even at that point the

---

[60] Middle East countries accounted only for 730 million metric tons of total world carbon dioxide emissions from the consumption of energy in 1990, total consumption that was of 21610 t.
Source: IEA international energy statistics, available at the following link: http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=90&pid=44&aid=8&cid=regions&syid=1990&eyid=2012&unit=MMTCD.

[61] Antigua and Barbuda, Bahamas, Barbados, Belize, Cape Verde, Comoros, Cook Islands, Cuba, Dominica, Dominican Republic, Fiji, Federated States of Micronesia, Grenada, Guinea-Bissau, Guyana, Haiti, Jamaica, Kiribati, Maldives, Marshall Islands, Mauritius, Nauru, Niue, Palau, Papua New Guinea, Samoa, Singapore, Seychelles, Sao Tome and Principe, Solomon Islands, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Timor-Leste, Tonga, Trinidad and Tobago, Tuvalu, Vanuatu, plus five observers: American Samoa, Guam, Netherlands Antilles, Puerto Rico, and the United States Virgin Islands.

[62] Per-capita emissions of CO_2 in non-Annex I parties are well below the global average, with just 2.8 tons on average in 1994. Document FCCC/SBI/2005/18/Add.2.

talks arrested again over the strong resistance of some developing countries to the concept of emissions trading. The chairman of the Conference's committee of the whole[63], Raul Estrada Oyuela of Argentina, warned that the whole proceeding would have collapsed in absence of more flexibility. The committee of the whole completed the text of the Kyoto Protocol at 10.15 a.m. on 11 December, and the plenary session convened that afternoon to adopt it.

The proposed Protocol settled a number of difficult issues. The most important is the one of the targets and the timetable for emissions reduction. The outcome on this issue in the Protocol represents a compromise between the different positions of the United States and the European Union. Where the U.S. had wanted a target of returning to 1990 emissions levels and the EU had wanted a reduction of 15% from those levels, they agreed on a target 7% below the 1990 level for the U.S. and 8% below it for the EU. However, within the regional group of EU the Protocol allowed wide country-by-country variations. Japan committed to cut emissions 6% below 1990. Several smaller economies were allowed to increase emissions above 1990 levels: Iceland 10%, Australia 8% and Norway 1%. Some countries, instead, were required only to return to 1990 levels: Russia, Ukraine, and New Zealand. The others accepted to reduce emissions by varying amounts in the range from 95 to 92% below 1990, as listed in the Annex B to the Protocol. These cuts are calculated to amount to a reduction in emissions of 5.2% below 1990.

As the USA had proposed, the Conference accepted to limit the commitment period to five years, from 2008 to 2012, amendable for a subsequent commitment period (art. 3, paragraph 9). The Conference welcomed also the American proposal to include all six of the major greenhouse gases[64], whereas the EU had proposed to include only three GHGs (CO_2, CH_4, and N_2O).

Except for the 7% emissions reduction below 1990 by 2008-2012, in the Kyoto negotiations the USA obtained most of what were its objectives. It also got the so-called basket of gases, which allows countries to decide what kind of reduction they prefer to meet their targets with. Then, the US had recognized the inclusion of afforestation as sink for CO_2, of the so-called flexibility mechanisms as an instrument to trade emissions allowances between them and to use investments in projects in developing countries to compensate for reductions they would not realise at home through the so-called Clean Development Mechanism (CDM)[65]. We will analyse each of these issues in the next chapter.

The Kyoto Protocol was opened for signature from 16 March 1998, but given that the precise rules

---

[63] Body created by the COP to aid in negotiating text. It consists of the same membership as the COP. When the Committee has finished its work, it turns the text over to the COP, which finalizes and then adopts the text during a plenary session.

[64] As mentioned above, they are: carbon dioxide ($C0_2$) methane (CH_4) nitrous oxide (N_20) hydrofluorocarbons (HFCs) perfluorocarbons (PFCs) sulphur hexafluoride (SF_6).

[65] B. Metz, *Controlling climate change,* Cambridge University Press, 2010, pag. 325.

on how to meet the objective of the Protocol had not been set, the negotiations kept on.

Three meetings of the Parties to the UNFCCC were convened between 1998 and 2000. The first, COP 4, was convened on 2 November of 1998 in Buenos Aires. It concluded with the adoption of a "Buenos Aires Action Plan" (Decision 1/CP. 4) establishing deadlines for the finalisation of the work on the Kyoto mechanisms, on compliance issues and on policy measures. The plan included a number of issues to be addressed, like financial mechanisms for assisting developing countries to respond to climate change, development and transfer of technologies, rules governing the Kyoto flexible mechanisms with priority on the Clean Development Mechanism, and the commitment to discuss ceilings, long term convergence and equity issues.[66] On technology transfer, Parties broke a four-year impasse outlining a process on how to overcome the barriers to the transfer of environmentally sound technology. As far as compliance is concerned, the Conference acknowledged that a strong and comprehensive regime was needed to ensure an effective implementation of the Kyoto Protocol. On financial matters, the COP established that countries that were particularly vulnerable to the impacts of climate change needed to receive further support from the GEF to plan concreate measures for adaptation.

At COP 5 in Bonn (November 1999) further progress was made, although of modest scope. Areas of disagreement were clarified, but not tackled at this stage. Parties agreed that the next meeting, held in The Hague in November 2000 (COP 6), would have examined and hopefully resolved some difficult subjects. Unfortunately, that Conference represented a serious setback to early ratification of the Protocol.

In The Hague, the discussions ended without any agreement being reached. The failure to agree on any matter of importance had some positive aspects, though. It triggered a process of review by all Parties, starting from the negotiating positions of governments to the design and structure of the Kyoto regime itself.[67] The main reason to the failure of the talks in The Hague was the inability to find a compromise between the US and the EU on the issue of the absorption of greenhouse gases by reservoirs or sinks. The proposal by the US that countries should receive credits for carbon absorption from all managed lands under article 3, paragraph 4 (KP), met with strong opposition from the EU and the G-77. Since almost all lands are "managed" in the US, this proposal would have had the effect of eliminating the US requirement to reduce emissions. A solution was to negotiate additional activities that could be counted towards the agreed emissions targets. However, this proved impossible. The secondary reason for the flop at The Hague was procedural. As a matter of fact, the UNFCCC's multilateral decision-making process was put to the test very strongly by the scale and

---

[66] P. D. Cameron, D. Zillman, *Kyoto: from principles to practice*, Netherlands, Kluwer law international, 2001, pag. 14.

[67] To have a full analysis of COP 5, see M. Grubb, F. Yamin, *Climatic collapse at The Hague; what happened, why, and where do we go from here?*, International Affairs, Volume 77, Issue 2, 2001.

the complexity of the issues that were being addressed in The Hague. The attempts of the Chairman Jan Pronk to innovate the negotiating process did not meet the favour and the approval of the negotiators.[68] In addition, the absence of important developing countries such as China and India was seen as a big weakness, and a further obstacle to the wide acceptance of any agreement reached by Annex I countries. At this point, uncertainty reined sovereign.[69]

In the following COP 6.2 in Bonn in July 2001, the Parties discussed a deal which in the following meeting was completed. This Conference focused and reached consensus on sinks and flexible mechanisms, which in the subsequent COP 7 in Marrakech (October 2001) were completed and agreed upon. The agreements, known as the Bonn Accords and the Marrakech Agreements, sealed the pact on some important issues such as detailing rules for the implementation of the Kyoto Protocol, setting up new funding and planning instruments for adaptation, and establishing a technology transfer framework (which we will discuss later).

It is in this moment that the exit of the US from the Kyoto Protocol jeopardised its revolutionary role. As a matter of fact, US constitution requires international agreements to be approved by the 2/3 of the Senate. During the period until COP 7, when the Marrakech Accords were signed, the US, as well as other countries, waited to see the final provisions of that document to ratify the Protocol. In these years, Clinton had basically kept silence and had not pushed for the ratification of the Protocol. Then, when in January 2001 George W. Bush became president, the wind changed. In March, Bush announced that the USA would have not ratified the Protocol because it harmed the US economy and developing States had not any obligation to reduce their emissions. The first argument was gainsaid by the Third Assessment Report of the IPCC that showed that the cost of the implementation of the agreement was very low.[70] From this perspective, the private interests of American energy producers won. The second argument had been a problem since the beginning of the negotiations and finally, to put it simply, “the chickens came home to roost”.

Australia followed the USA and pulled out from the Kyoto Protocol. These two important withdrawals influenced negatively the effectiveness of the agreement, but on the other hand pushed forward the negotiations that allowed to reach convergence on the details of the Protocol.

With the USA and Australia out, the entry into force of the Protocol was not that easy. In fact, the text of the agreement (art. 25, paragraph 1) required the formal approval by 55 countries, provided that these countries accounted for at least 55% of the emissions of CO_2 of the Annex I Parties in 1990. Since the USA was responsible for 36% of those emissions, the only way to obtain the entry into force was the ratification of Russia, which from its part was not in a hurry. Russian scientific

---

[68] P. D. Cameron, D. Zillman, *Kyoto: from principles to practice*, Netherlands, Kluwer law international, 2001, pag. 15.
[69] C. Egenhofer, J. Cornillie, *Reinventing the climate negotiations: an analysis of COP6*, CEPs Policy Brief No. 1, 2001.
[70] IPCC Third Assessment Report (AR 3), available at the following link: http://www.ipcc.ch/ipccreports/tar/.

community was not convinced of the urgency to fight climate change, not even by three consecutive reports by the IPCC. On the contrary, there were serious voices that believed that climate change would be beneficial for the country because it would have implied fewer cold days, longer growing season, higher grain yields[71], and Russian top-level politicians actively lobbied against the Kyoto process. It took years of negotiations and public pleas by top scientists and policy makers (famously at the World Climate Conference in Moscow in 2003[72]) to convince Putin and the Russian government of the importance of their ratification, which finally became a reality in November 2004.

1.3 Agreement and principles of the Kyoto Protocol: an analysis

As we have seen, the Framework Convention on Climate Change of 1992 only encouraged countries to stabilise greenhouse gas emissions. With the Kyoto Protocol, a major step ahead was achieved by legally committing industrialised Parties to do so. With the words of the UNFCCC, the Kyoto Protocol "operationalises" the Convention.[73]

The Protocol is structured on the principles of the Convention, binding only developed countries in observance to the principle of common but differentiated responsibility (art. 10): it sets binding emissions reduction for 38 Parties (37 countries plus the European Union) in its first commitment period from 2008 to 2012, in order to get a reduction of global GHG emissions of at least 5% compared with 1990 levels.

The Protocol has the following basic structure. Article 1 contains definitions of terms used in the Protocol. Articles 2, 3, 5, and 7 describe the substantive obligations of Annex I Parties, while article 10 further elaborates the commitments of the UNFCCC for all Parties to the Protocol. Article 11 substantially restates articles 4, paragraph 3, and 11 of the Convention, providing guidance on financing by Annex I countries to assist developing countries in implementing commitments in article 10 of the Protocol. Articles 9, 13, 14, 15, and 16 deal with the institutional roles of the UNFCCC COP, secretariat, and subsidiary bodies with respect to the Kyoto Protocol's mode of operation. Articles 4, 6, 12, and 17 authorise the use of several market-based mechanisms to reduce GHG emissions upon respect of some prerequisites. Article 18 requires the development of compliance procedures and

---

[71] B. Metz, *Controlling climate change,* Cambridge University Press, 2010, pag. 325.

[72] The Conference, dominated by Russian scepticism, culminated in a strong appeal to Putin by the then Head of the UNFCCC Secretariat Ms. Joke Waller to ratify the Protocol in the interest of humanity.

[73] Unfccc.int, at the following link: http://unfccc.int/essential_background/kyoto_protocol/items/6034.php.

mechanisms. Article 19 applies the dispute settlement provisions of the UNFCCC to the Kyoto Protocol, too. Finally, articles from 20 to 28 set forth the final clauses dealing with amendment, entry into force, voting, reservations, withdrawal, and official languages. The two annexes, Annex A and Annex B, list the GHGs and sectors/source categories covered by the Kyoto Protocol and the emissions reduction targets for Annex I countries, respectively.

States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem, but in view of the different contributions to global environmental degradation, States have different responsibilities (common but differentiated responsibility). This principle is mainly an obligation for developed countries to cooperate in developing the law on climate change, but it has significant normative value because it sets parameters within which responsibilities are to be allocated between developed and developing States in the subsequent negotiation of further implementing agreements (Marrakech Accords) or in the interpretation of existing ones. Common but differentiated responsibility can thus be seen as a fair balance between developed and developing States in at least two senses: it allows for different standards for developing States and it makes their performance dependent on the provision of assistance by developed countries.[74]

Article 2 of the Kyoto Protocol introduces a second principle of central relevance, namely that Parties will enact national and international policies to achieve their quantified emission limitation and reduction commitments "in order to promote sustainable development". Sustainable development became the leading concept of international environmental policy with the adoption of the 1992 Rio Declaration of the United Nations Conference on Environment and Development (UNCED). Previously, the Bruntland Report, written by the World Commission on Environment and Development (WCED)[75] and published in 1987, had already defined sustainable development as a process that "meets the needs of the present without compromising the ability of future generations to meet their own needs".[76] UNEP's Governing Council helpfully added that this formulation "does not imply in any way encroachment upon national sovereignty"[77]. The notion of sustainable development is inherently complex[78] and its implementation obliges governments to think in a different manner compared to what they have always been accustomed to: social, political, and economic choices have to be taken into consideration to evaluate the right sustainable option and the

[74] P. Birnie, A. Boyle, C. Redgwell, *International law & the environment*, Oxford University Press, 2009, pag. 133.
[75] The Commission was created in 1983 when the UN General Assembly realised that there was heavy deterioration of the human environment and natural resources. It aim was to unite countries pursue sustainable development together; after the release of the Bruntland Report (by the name of the chairman of the Commission, Gro Harlem Bruntland), also known as "Our Common Future", the Commission was closed.
[76] WECD, *Our Common Future*, pag. 43.
[77] Annex II to UNEP GC decision 15/2, May 1989.
[78] P. Birnie, A. Boyle, C. Redgwell, *International law & the environment*, Oxford University Press, 2009, pag. 54.

weight that should be given to natural-resource exploitation over nature protection, to industrial development over the quality of air, water and soil, to land exploitation over forests protection, to energy consumption over the risks of climate change. Due to all these variables, a shared understanding of what constitutes sustainable development is still difficult to reach.

It has to be underlined that sustainable development does not mean absence of growth. As the Rio Declaration[79] of the UNCED states, each country has the sovereign right to exploit its own resources in accordance with its own environmental and development policies, although subject to a responsibility for environmental protection; for this reason, the Declaration calls for an "open international economic system that would lead to economic growth and sustainable development in all countries". More than absence of growth, then, sustainable development rather implies a compromise between environmental protection and economic growth, emphasising the importance of equity within the economic system, of which article 2 of the Kyoto Protocol is a proof.

The equity idea behind the sustainable development concept is both intra-generational and inter-generational. On the one hand, it seeks to redress the imbalance in wealth and economic development between the developed and the developing countries by giving priority to the needs of the poorer, and on the other hand it tries to reach a fair allocation of costs and benefits across generations[80]; in this perspective, development is sustainable if it helps the poor without compromising the needs of future generations. The Convention on Climate Change (and by reflection also the Kyoto Protocol) adopts this principle and puts it into provisions which have the final and general objective of protecting the necessities of future generations and of developing countries, providing soft law instruments (and in the case of the Kyoto Protocol hard law instruments) to reach this aim. Developing countries can benefit of the means of technology transfer and cooperation from Annex I countries, funding and capacity building through the Global Environment Facility and other sources, as well as from the recognition of common but differentiated responsibilities we have already mentioned.

To conclude the insight on sustainable development, it is worth to briefly resume the two elements of sustainable development, namely the substantive and procedural elements. The substantive elements are set out mainly in Principles 3-8 of the Rio Declaration and include the integration of environmental protection and economic development, the right to development, the sustainable utilisation of natural resources, the equitable allocation of resources both within the present generation and between present and future generations. The main procedural elements, on the other hand, deal with public participation in decision-making and environmental impact assessment.[81]

---

[79] The Rio Declaration was a short document produced at the 1992 United Nations "Conference on Environment and Development" (UNCED), consisting of 27 principles intended to guide countries in future sustainable development policy-making.

[80] Rio Declaration, Principle 3.

[81] P. Birnie, A. Boyle, C. Redgwell, *International law & the environment*, Oxford University Press, 2009, pag. 116.

Although responsibility of observing these provisions is common to all States, higher standards of conduct are explicitly set for developed States for two reasons we have already mentioned: the bigger contribution to causing problems such as ozone depletion and climate change and their greater capacity to respond to these problems. Article 10 of the Protocol reaffirms the commitments under article 4, paragraph 1, of the Convention, basically requiring all Parties to undertake a number of measures, mainly related to cooperation and information exchange, and committing developed Parties listed in Annex II to the Convention to take measures to deal with greenhouse gases.

Article 11 specifies that in the implementation of article 10, Parties shall take into account the provisions of article 4, paragraphs 4, 5, 7, 8, and 9, of the Convention. These articles deal with principles concerning: assistance to developing countries; promotion, financing and transfer of environmentally sound technologies and know-how; the dependence of developing countries on the implementation of their commitments by developed countries; special consideration for a list of countries especially at risk of climate change[82]; the specificity of each developing country that must be taken into account when deciding on funding and on transferring technology. This wide set of provisions can be attributed to the principle of sustainable development, which is the common thread that ties all the Protocol. With regards to it, article 2 states that each Party included in Annex I, in achieving its quantified emission limitation and reduction commitments, has to implement and/or further elaborate policies and measures in accordance with national circumstances and cooperate with other Parties "to enhance the individual and combined effectiveness of their policies and measures adopted". The exchange of information and of the feedbacks from their experiences according to criteria of comparability, transparency and effectiveness, is fundamental.

Moreover, the Parties included in Annex I should strive to implement policies in defence of the environment in a way that minimises adverse effects on climate change, on international trade, and on other Parties' social, environmental and economic areas, obviously with a special regard to developing countries.

Article 3 of the Kyoto Protocol contains the main provisions on the implementation of the Protocol and constitutes an element of central importance in the climate change regime. First of all, Annex I countries have the duty to respect their aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A, calculated pursuant to their QELROs.

The obligations of Annex I Parties contain clear targets and timetables. As a matter of fact, differently

[82] They are: small island countries; countries with low-lying coastal areas; countries with arid and semi-arid areas, forested areas and areas liable to forest decay; countries with areas prone to natural disasters; countries with areas liable to drought and desertification; countries with areas of high urban atmospheric pollution; countries with areas with fragile ecosystems, including mountainous ecosystems; countries whose economies are highly dependent on income generated from the production, processing and export, and/or on consumption of fossil fuels and associated energy-intensive products; and land-locked and transit countries.

form the Convention which deals with all greenhouse gases that are not covered by the Montreal Protocol to the United Nations Convention on the Protection of the Ozone Layer[83], the Kyoto Protocol focuses only on six gases (listed in Annex A to the Protocol), with the purpose of reducing global greenhouse gas emissions by at least 5% in comparison to the base year of 1990. Even if they are only six, the Kyoto gases are the cause of 75% of global warming[84], and this represents a good start to control climate change, even more so because their emissions have risen over the last 35 years: the total went up 70% between 1970 and 2004 with CO_2, the largest contributor, increasing by 80%.

It is interesting to identify the sectors from which these emissions come from to understand where there is more need of prompt action. CO_2 comes mainly from burning coal, oil and gas (75%). Secondly, smaller amounts are produced from turning oil and gas into plastics and other compounds that eventually are decomposed into CO_2 again (3%), as well as from manufacture of cement through decomposition of one of the main ingredients, limestone (3%). Unsurprisingly, about 20% of the total CO_2 emissions comes from deforestation and decomposition of peat lands, crop residues, and organic materials in agricultural soils.

CH_4 comes from a great number of different sources, of which the largest is represented by livestock (25%). Secondary sources are leaks from extraction, processing, and distribution of natural gas (15%), rice cultivation (12%), gases associated with coal production (10%), and decomposition of organic waste in waste water treatment (9%) and landfills (7%).

N_20 mainly comes from fertilised grasslands and croplands, where nitrogen fertilisers are decomposed into the soil (35%), followed by animal waste (26%). Other sources of pollution from this gas come from water polluted with nitrogen (15%), chemical factories (5%), waste water treatment (2%), and from cars with catalytic converters, which produce about 1% of the total N_2O emissions.

Hydrofluorocarbons (HCFs) are emitted mainly from air conditioners in cars and refrigerators, as well as from the production of industrial chemicals. SF_6 is mainly used as an insulator in electrical equipment.

From the perspective of the sectors/source categories of Annex A, we can have an insight of which are the sectors that produce more greenhouse gas emissions. Before the start of the first commitment period, in 2004 emissions came primarily from the energy sector (26%), followed by industry (19%), the forest management sector (17%), agriculture (14%), transport (13%), the building sector (8%), and waste management (3%)[85].

---

[83] The Montreal Protocol aim at protecting the ozone layer by phasing out the production of various gases responsible for the ozone depletion. The full list is available here: http://ozone.unep.org/pdfs/Montreal-Protocol2000.pdf.

[84] B. Metz, *Controlling climate change,* Cambridge University Press, 2010, pag. 32.

[85] *Ibidem*, pag. 33. Metz states that "confusion can arise around sector contributions, because emissions can be counted indifferent ways." The numbers given above are based on emissions at the point where they enter the atmosphere (so-called "point of emission allocation").

The largest emitter of greenhouse gases is China, followed by the U.S.A., the European Union, Indonesia, India, and Russia. It is important to notice that this ranking[86] includes all the greenhouse gases, including the land-use change sector. Leaving it out, a great number of (mostly) developing countries falls in the ranking of several positions. For example, Indonesia drops from place 4 to place 12. This is significant to understand how important the land-use change sector is for the sake of climate change mitigation.

As a matter of fact, the Kyoto Protocol recognises this importance. In addition to the energy sector, agriculture, waste, industrial processes and solvent and other product use, which are the main sector/source categories objective of the Protocol's action, also the net changes in greenhouse gas emissions by sources and removals by sinks resulting from direct human-induced land-use change and forestry activities, limited to afforestation, reforestation and deforestation since 1990, can be accounted to meet the commitments for Annex I countries. They shall be measured based on verifiable changes in carbon stocks in the commitment period, and reported in a transparent and verifiable manner. Article 3, paragraph 4, postpones to "the first session or as soon as predictable thereafter" of the COP, which serves as the meeting of the Parties to the Protocol, the task of deciding modalities, rules and guidelines on how to add or subtract additional human-induced activities related to agriculture soils, land-use change and forestry categories. This decision is to be applied in the second or subsequent commitment periods unless a Party decides to apply it from the first commitment period, provided that these activities have taken place since 1990. It is important to notice that article 3, paragraph 1, prefigures the mechanism of joint implementation by stating that "Parties included in Annex I shall, individually or jointly" ensure to respect their assigned GHG emissions reduction targets. This instrument is described more in detail in the following article 4, and together with clean development mechanism and emissions trading it will constitute the core of the Kyoto Protocol flexible mechanisms.

Article 5, paragraph 1, introduces another important aspect concerning the implementation of the Protocol. In fact, each Party included in Annex I commits to set up within a year before the start of the first commitment period a national system for the estimation of anthropogenic emissions by sources and removals by sinks of the six greenhouse gases listed in Annex A.

To compensate for the sting of "binding targets," as they are called, the agreement offers flexibility in how countries may meet their targets. The following article 6 launches a mechanism to trade GHG emissions. It consists in the transfer to or in the acquisition of another Party's emission reduction units resulting from projects aimed at reducing anthropogenic emissions in any sector of the economy, and it is subordinated to four prerequisites: the approval of the Parties involved, the projects' additionality

[86] *Ibidem*, pag. 36, Figure. 2.4.

on reduction of emissions that would otherwise occur, the respect of the obligations of the Protocol, and the supplemental nature of these projects to domestic action.

Article 7 requires all the information concerning the compliance with article 3 to be submitted in the annual inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases (for Annex I countries) and in the national communications established by the Convention (article 12 of the Convention). These information are necessary to demonstrate compliance with the commitments of the Kyoto Protocol and are to be reviewed by expert teams separately as part of the annual compilation and accounting of emissions inventories and assigned amounts, and of the review of national communications, respectively (article 8, paragraph 1).

In order to assist developing countries to achieve sustainable development (article 10) and to help Annex I countries to meet their quantified obligations of emission limitation and reduction, article 12 of the Kyoto Protocol defines a "clean development mechanism". This mechanism will enable Parties not included in Annex I to benefit from projects carried out in their territories by Annex I countries which will result in "certified emission reductions"[87]; these certified emission reductions can be used by developed States to reach their GHG emission reduction targets. Vice versa, developing countries will gain from technology transfer and capacity building. The remaining paragraphs of the article constitute the framework basis on which the COP will have to determine precisely how this mechanism will work.

The articles from 13 to 15 deal with the organisational provisions of the Protocol. Specifically, article 13 appoints the Conference of the Parties of the Convention on Climate Change as the meeting of the Parties to the Protocol, article 14 establishes that the secretariat created by the Convention will serve as the secretariat of the Protocol, too, as well as the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation will have the same functions also under the Protocol (article 15). In this sense, we can notice once again the relation of "operationalisation" that the Kyoto Protocol covers.

Interestingly, article 17 can resume the sense of the text of the Protocol. In Japan the negotiating Parties were finally able to reach a political compromise between the conflicting interests concerned and to seal a fundamental commitment on behalf of developed countries to reduce by 2012 GHG emissions of at least 5% below 1990 levels, reaffirming the principles of the Convention on common but differentiated responsibility, sustainable development, cooperation, technology transfer, capacity building and information sharing, but due to the exact fact that this was a political compromise born in the last hours of the negotiations, they were not able to define in the text the rules to implement the flexible mechanisms envisioned. In fact, this article refers to the COP the task of defining "the

[87] Art. 12, paragraph 3(a), KP.

relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability for emissions trading".

The following provision of article 18 follows referring the procedures and mechanisms to determine and to address cases of non-compliance to the COP. Finally, the Protocol applies the same rules of the Convention on settlement of disputes and (in article 20) recognises to every Party the right to propose amendments.

A great number of issues remained opened for discussion and decision after COP 7, and they will be settled only in 2001 in the Marrakech Accords. We now turn to their analysis.

1.4 Mechanisms of implementation (Marrakesh Accords)

In COP 7 in Marrakech (29 October/9 November 2001) the delegations from 172 governments finally reached consensus over the operational details for the commitments on reducing greenhouse gas emissions set out in the Kyoto Protocol. These details, elaborated on the political agreement reached in Bonn in July 2001, formally known as the Bonn Agreements on the Implementation of the Buenos Aires Plan of Action (BAPA)[88], represent the legal seal and the practical guide for the commitments outlined in the Kyoto Protocol. The Accords close the negotiating phase on the key issues of the text and signal the turning point of what has been "a politically, scientifically and legally challenging decade for climate change research and policy"[89].

The first issues the Accords deal with concern capacity building in developing countries and in countries with economies in transition, the development and transfer of technologies, and the adverse effects of climate change and impacts of response measures, as well as the implementation of article 4, paragraph 9,[90] of the Convention. The 1998 BAPA had specifically highlighted the importance of taking decisions on this issues within COP 6. Accordingly, developing country matters were the only ones that produced consensus already at COP 6.2. The financial mechanisms related to them, though, were a little more problematic, and the agreement established only the framework for the approach to the financing activities under the Protocol both for non-Annex I Parties and for countries with

---

[88] Decision 1/CP.4.

[89] S. Dessai, E. L. Schipper, *The Marrakech Accords to the Kyoto Protocol: analysis and future prospects*, UK, Elsevier Science Ltd., 2002. Document available at the following link: http://www.academia.edu/281608/The_Marrakech_Accords_to_the_Kyoto_Protocol_Analysis_and_Future_Prospects.

[90] "The Parties shall take full account of the specific needs and special situations of the least developed countries in their actions with regard to funding and transfer of technology."

economies in transition[91], setting guiding principles and approaches, the objective and the scope of capacity-building, and actions to enhance the implementation of the framework.

As far as development and transfer of technology is concerned, the Accords set forth provisions to develop meaningful and effective actions to enhance the implementation of article 4, paragraph 5, of the Convention (actions by Annex II countries) by means of transfer, access to environmentally sound technologies (ESTs) and know-how. The overall approach is characterised by the call to cooperation among various stakeholders (governments, the private sector, the donor community, bilateral and multilateral institutions, non-governmental organisations and academic and research institutions) in order to share information and knowledge.

On the adverse effects of climate change and impacts of response measures, the Accords assert the importance of a country-driven approach that allow developing countries to pursue the specific activities as it is appropriate for each national circumstance, and stress the importance of information assessments through the national communications. Moreover, the COP entrusts to the Global Environmental Facility the implementation of activities related to information and methodologies to improve data collection and the spread of awareness, and activities to control vulnerability and adaptation. To this end, the agreement creates the Special Climate Change Fund (SCCF)[92] and the Adaptation Fund (AF)[93] to support and finance the activities to fight climate change and adaptation.

On the implementation of article 4, paragraph 9, of the Convention,[94] the COP decides to provide support to least developed countries to develop national adaptation programmes of action, which will be the first step in the preparation of initial national communications, as well as it requests the subsidiary bodies to draft a decision on the issue.

Hereinafter, we will analyse the three flexible market-based mechanisms, the beating heart of the Accords.

The Parties included in Annex I, as we have seen, can make use of the so-called "flexible mechanisms of the Kyoto Protocol". These flexible mechanisms are market-based tools that allow for meeting the emissions reduction obligations by means of joint projects among Annex I Parties (called Joint Implementation – JI), projects in developing countries (Clean Development Mechanism – CDM), and International Emissions Trading (IET) among Annex I countries. On the one hand, CDM and JI are project-based mechanisms which enable Annex I countries to cooperate on specific greenhouse gas

---

[91] Annexes to Decision 2/CP.7 and 3/CP.7 of the Marrakech Accords.

[92] From the UNFCCC website: "The Special Climate Change Fund (SCCF) was established under the Convention in 2001 to finance projects relating to: adaptation; technology transfer and capacity building; energy, transport, industry, agriculture, forestry and waste management; and economic diversification."

[93] From the UNFCCC website: "The Adaptation Fund (AF) was established in 2001 to finance concrete adaptation projects and programmes in developing country Parties to the Kyoto Protocol that are particularly vulnerable to the adverse effects of climate change."

[94] "The Parties shall take full account of the specific needs and special situations of the least developed countries in their actions with regard to funding and transfer of technology."

reduction projects with other countries where abatement costs are lower, while on the other hand international emissions trading intends to establish an international market for buying and selling emission credits, which can be used to comply with the specified reduction targets.[95] Tradable emission units are divided into assigned amount units (AAUs) accorded to Annex B countries to the Protocol for emissions trading, or into Certified Emission Reductions (CERs) for CDM activities and Emission Reduction Units (ERUs) for JI. Emissions units can be traded freely on the market and their price will depend on the demand/supply balance. Each government can issue as many emissions certificates as quantified by its assigned amounts and allocate them to public and private entities according to its national climate change policy. In order to prevent overselling, a country is required to hold a certain minimum of units in its national registry at any time (the so-called Commitment Period Reserve – CPR).[96] This system aims at stimulating policy changes since polluting entities have to decide if it is more costly to buy emission certificates or reduce the amount of GHG emissions.

The flexible instruments of the Kyoto Protocol are intended to serve two goals: first, to significantly lower compliance costs of the Parties with their emission limitation and reduction obligations. Due to the fact that in the last decades a great number of developed countries have increased their emissions substantially, this means tries to help Annex I Parties to reach the global objective of reducing emissions of at least 5%. Second, the flexible mechanisms aim at providing incentives for sustainable development. However, it has been warned that these mechanisms need to be governed by clear rules for emission reduction measurement and compliance procedures to ensure that measures taken by developed countries are accompanied by genuine emission reductions.[97]

The economic rationale behind the flexibility mechanisms is based on the theory of "marginal abatement costs". In fact, the cost of financing emission reduction is relatively lower in countries with lower levels of industrialisation. Because location of abatement measures is climatically irrelevant, global cost-effectiveness basically prescribes that measures should be implemented where they are cheaper.[98]

In the discussion on the introduction of flexibility means in the context of the Kyoto Protocol, there are both arguments in favour that against. On the one hand, developed countries considered them as a way to share the burden of meeting the commitments in accordance with the principle of equity. As

---

[95] C. Voigt, *Sustainable development as a principle of international law*, Netherlands, Brill, 2009, pag. 71.

[96] The Commitment Period Reserve is set at 90% or above of a Party's assigned amount or 100% of five times its most recently reviewed inventory, whichever is the lowest (Decision 5/CP.6). This reserve can be composed of any Kyoto units valid for a commitment period. The limit adopted is supposed to protect against non-compliance by overselling without limiting the liquidity on the market. The Marrakech Accords require that "a Party shall not make a transfer which would result in these holdings (of AAUs, CERs, ERUs, and/or RMUs) below the required level of the commitment period reserve". (Annex to Decision I.J(4)/CP.7 of the Marrakech Accords).

[97] X. Wang, G. Wiser, *The implementation and compliance regimes under the Climate Change Convention and its Kyoto Protocol*, 11 (2), Reciel, Blackwell Publishers Ltd, 2002, pag. 187.

[98] C. Voigt, *Sustainable development as a principle of international law*, Netherlands, Brill, 2009, pag. 72.

a matter of fact, the "marginal costs" to implement the Protocol vary from country to country, and thus flexibility can help both countries with high costs of implementation of their environmental obligations and countries with low-cost opportunities thanks to collaboration and to the exploitation of their comparative advantages.[99] On the other hand, many authors[100] underline that in this way pollution is compared to a commodity which can be bought and sold, becoming one of the numbers of factors which have to be kept in consideration when doing business. Others focus on the economic efficiency and cost-minimisation for Annex I Parties which may consolidate the economic power of industrialised countries by allowing them to "buy their own obligations".

Another point has to be added before going on with the separate analysis of the three flexible instruments. Before the Kyoto Protocol, the use of market-based mechanisms in international agreements as a tool to address the causes of climate change had not been widely tested; only very few countries had experienced emissions trading (for example the UK emissions Trading Scheme and the Ontario SOx and NOx Trading Scheme under the Environmental Protection), and their application in international law was an absolute innovation. This clearly entails supporters and detractors of these mechanisms, as any new policy, even more so in the delicate political equilibrium of environmental matters, is destined to have.

1.4.1 International emissions trading

International emissions trading (IET) is the first of the flexible mechanisms agreed at Marrakech and subsequently adopted by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) in its first meeting in Montreal, in 2005. The Marrakech Accords set out principles, nature and scope of emissions trading and address issues relating to equity, fungibility and environmental integrity, that is, the ability of this measure to serve the purpose of climate protection. To asses these objectives, the agreement sets up strong requirements for national registries and inventories, accounting, baselines and their methods of calculation, monitoring and reporting. The achievement of the respective reduction commitments of Annex I countries will depend on the effectiveness of these requirements.[101]

Emissions trading is governed by the "cap and trade" principle, in accordance to which a maximum (cap) is set on the total amount of greenhouse gases that can be emitted by all participating (private

[99] D. Stowell, *Climate Trading. Development of greenhouse gas markets*, New York, Palgrave MacMillan, 2005, pag. 15.
[100] See M. Sagoff, *Controlling global climate: the debate over pollution trading*, Report from the Institute for Philosophy and Public Policy, 1999.
[101] C. Voigt, *Sustainable development as a principle of international law*, Netherlands, Brill, 2009, pag. 74.

or public) entities. Allowances for emissions are then auctioned off or allocated for free, and can subsequently be traded. Entities must monitor and report their CO_2 emissions, ensuring they hand in enough allowances to the authorities to cover their emissions. If emission exceeds what is permitted by its allowances, then the entity concerned must purchase allowances from others. Conversely, if an installation has performed well at reducing its emissions, it can sell its leftover credits. This allows the system to find the most cost-effective ways of reducing emissions without significant government intervention.

Under the Kyoto Protocol, each Annex I Party is required to have a National Registry in place before it can engage in transboundary or international emissions trading.[102] These registries ensure compliance with emissions limitation and reduction commitments either imposed on Parties to the Kyoto Protocol or to private/public entities within the countries.

If these conditions are met, international emissions trading can be implemented: the participant is eligible to participate and, if it is a private entity, it is authorized to hold, receive and transfer Kyoto units; it holds an account in a National Registry that complies with the requirements and technical standards set out by the Marrakech and Delhi Decisions[103] ; and the National Registry is linked to the Independent Transaction Log (ITL).[104]

The system of National Registries constitutes the heart of the international emissions trading system by making the holding, accounting, and transfer of Kyoto units possible. At the international level, the ITL links all National Registries from the countries to the Secretariat and between them, acting as a channel through which information is exchanged.[105] Once the National Registries are completed and linked up to the ITL, Kyoto (Annex I) Parties themselves will be able to transfer Kyoto units to and from their national accounts held by the National Registries. The Kyoto Protocol allows for the creation of emissions "trading schemes" in order to standardise and simplify the exchange of emissions allowances. Accordingly, in 2005 the EU emissions trading system (EU ETS) was created. The EU ETS, which follows the same cap and trade principle, is an example of a functioning market instrument to reduce emissions which has been able to put climate change on the agenda of company boards and their financial department across Europe. In 2020, emissions from sectors covered by the system will be 21% lower than in 2005. By 2030, the Commission has proposed, they would be 43%

---

[102] Marrakech Accords Decision 19/CP.7 set out the key functional requirements for National Greenhouse Gas Emissions Trading Registries to satisfy the requirements of the Kyoto Protocol. These registries are electronic databases for recording and tracking Kyoto Units, necessary for accurate accounting of the issuance, holding, transfer, acquisition, cancellation, banking, and retirement of all units.

[103]Decision 11/CP.8 establishing a five-year work programme on article 6 of the Convention. Decision available at the following link: http://unfccc.int/resource/docs/cop8/07a01.pdf#page=23.

[104] From the UNFCCC website: "The International Transaction Log (ITL) connects registries and secretariat systems that are involved in the emissions trading mechanism defined under the Kyoto Protocol and its Doha amendment. One of the key mandates of the ITL is to ensure an accurate accounting and verification of transactions proposed by registries in order to support the review and compliance process of the Kyoto Protocol."

[105] Decision 24/CP.8.

lower.[106]

An interesting element is represented by the fact that other initiatives outside the framework of the Kyoto Protocol[107], both national and sub-national, have linked with domestic trading schemes of Kyoto Protocol Annex B countries with the objective of developing a single global carbon market where States can participate irrespective of their Kyoto membership. In effect, this possibility is envisaged also by the EU ETS: companies can decide to buy a limited amount of international credits from emission-saving projects around the world. However, Voigt warns that, while all Annex B countries can exchange AAUs based on the institutional design of IET under the Kyoto Protocol, non-Members are systematically excluded from such trading; thus, if a bilateral agreement is signed with these external Parties, the risk is that if this country does not require strong safeguards to protect the environment, these exchanges could harm the utility of international emissions trading and of the entire Kyoto regime.[108]

Another point which is worth mentioning is that the participation of private companies and other private institutions in emission trading is not explicitly mentioned in the Kyoto Protocol. In contrast with other articles of the Protocol, article 17 does not make reference to the private sector. Nevertheless, it is generally accepted among Annex I countries[109] that the private sector may participate in such trading with the authorisation of the respective Party. The authorisation can be given by the implementation legislation, by government acts or by a single authorisation.

Once they have the permissions, these entities can trade the emission units they have with other private or public entities in the country or abroad. The international trading requires the reciprocal recognition by the sovereign States of each other's emission trading systems and respective allowances or credits.

The mechanism behind the necessity of the States to give their recognition to the exchange can be understood if we go a little deeper in the issue. In fact, private entities, when engaging in emission trading, cannot actually acquire, hold or transfer any of the instruments created by the Marrakech Accords. Given that the private sector is not bound by the Kyoto Protocol provisions or by international law in general, according to the traditional and widely accepted view, they cannot be held responsible for sovereign obligations that emanate from a public international legal agreement between States. For this reason, a private entity cannot be accused of non-compliance for a Party failure to respect its obligations, as well as it cannot substitute the sovereign State in fulfilling them. The exchange of emission units in the private sector is valid only in as much as the validity is

---

[106] European Commission website: http://ec.europa.eu/clima/policies/ets/index_en.htm.

[107] For example the Regional Greenhouse Gas Initiative of some US States (Connecticut, Delaware, Maine, Maryland, New Hampshire, New Jersey, New York and Vermont).

[108] C. Voigt, *Sustainable development as a principle of international law*, Netherlands, Brill, 2009, pag. 79.

[109] *Ibidem*, pag. 74.

sanctioned by the respective States. If private entities engage in a transboundary transfer of emission allowances, their transfer requires the simultaneous exchange of sovereign obligations between the two States involved.

Therefore, any transboundary transaction of tradable emission units between private entities of different countries needs to be mirrored by a sovereign transaction which leads to a "reallocation" of assigned amounts between the two involved States. De facto, this strategy stands as a reallocation of commitments with the consent of the States involved in the transaction, strategy already envisioned in the negotiating texts of the Marrakech Accords[110] and which represents a legal necessity under international law because States, whose private entities trade the emission units, will remain obliged to fulfil their quantified reduction obligations.

So the question that may arise now is: why engaging the private sector if it complicates the emissions trade mechanisms and the involvement requirements of States? Well, the question has multiple answers, all in favour of the huge importance of the engagement of the Kyoto Parties' private entities. First of all, emission of greenhouse gases is rarely the result of public activity. For the most part, emissions are generated from the doings of the private sector. On the contrary, the commitments taken in Kyoto and in Marrakech remain limited to the State Parties to the Protocol. The private sector, thus, can be regulated only thanks to this system of emission allowances as part of the governmental effort to control climate change.

Secondly, the involvement of the private sector is a way to encourage the implementation of the international emissions limitation and reduction obligations by States in the places where they actually occur. Emissions trading with private entities involvement aims at producing more cost effective regulation than the State-to-State emissions trading for the reason that significant differences in the marginal costs of emission control and reduction exist between pollution sources.[111] From this perspective, emissions trading is considered more attractive than the imposition of national carbon taxes, because a tax system requires money from firms without offering any compensation. On the other hand, emissions trading represents a "fairer" solution because a private industry buys emissions allowances to cover its emissions, purchasing a value that can also be sold in the future if its pollution levels decrease below the allowed limit (cap-and-trade system), creating an incentive to comply with the requirements of the States. Lastly, and connected to the previous point, the introduction of a cap-and-trade system helps to reduce the political resistance that the introduction of new taxes raises.[112] During the negotiations of the Kyoto Protocol, one of the concerns about emissions trading and the

---

[110] See the Report of the first part of COP 6 in FCCC/CP/2000/5/Add.3 (Vol. V) and the negotiating text proposed by the chairman in FCCC/CP/2001/2/Add.2.

[111] See J.T.B. Tripp and D. J. Dudek, *Institutional guidelines for designing successful transferable rights programs*, Yale Journal on Reg. 369, 1989, pag. 374.

[112] C. Voigt, *Sustainable development as a principle of international law*, Netherlands, Brill, 2009, pag. 76.

project mechanisms was that this system risked to exacerbate existing emission inequalities between Annex I and non-Annex I countries by encouraging the former to seek cheap reductions abroad. Therefore, the Marrakech Accords include a provision that envisages that Annex I countries "shall implement domestic action in accordance with national circumstances and with a view to reducing emissions in a manner conductive to narrowing per capita differences between developed and developing countries while working toward achievement of the ultimate objective of the Convention"[113], and inform that COP will take such considerations into account when reviewing demonstrable progress under article 3, paragraph 2, of the Protocol. This is coherent with the provision of article 17 of the Protocol which requires emissions trading to be supplemental to domestic action.

To conclude, emissions trading is a flexible and cost-effective means to meet an environmental objective that requires Annex I Parties to "take the lead" in climate mitigation.[114] It strives for finding the balance between economic interests and concerns on developmental inequalities and differentiated responsibilities, without modifying the environmental aim, in the context of the achievement of the obligations on emissions limitation and reduction of the Kyoto Protocol.

1.4.2 Clean development mechanism

The Clean Development Mechanism (CDM) was a late creation in the negotiation of the Kyoto Protocol, to the point it has been called the "Kyoto surprise"[115]. Only six months before the Kyoto negotiations, in fact, the Brazilian delegation proposed to create a Green Development Fund (GDF) that should have been supported by countries as an additional commitment to their obligations. The envisioned task of the Fund was to finance mitigation projects in developing countries, and it immediately found the support of G-77 and China, but due to the strong opposition of industrialised countries on the penalties for non-compliance the project did not come to life. On the other hand, developing countries were contrary to any instrument that would replicate the modalities of Joint Implementation (see next paragraph) on a larger scale.

As we have noticed in the previous sections, the history of the Kyoto Protocol is a history of compromise, and also in this case the solution was met halfway. The Brazilian and the American delegations proposed in November 1997 to turn the GDF into a mechanism to enable countries with commitments in the Kyoto Protocol to exceed their emissions target levels if they supported GHG

---

[113] Decision 15/CP. 7, Preamble. Link: http://unfccc.int/resource/docs/cop7/13a02.pdf.
[114] C. Voigt, *Sustainable development as a principle of international law*, Netherlands, Brill, 2009, pag. 80.
[115] J. Werksman, *The Clean Development Mechanism: unwrapping the Kyoto surprise*, Reciel vol. 17, issue 2, 1998.

reduction projects in developing countries. The substantial difference, though, would have been in the double target of promoting sustainable development and helping developed countries meet their commitments. The Clean Development Mechanism was finally integrated to the Kyoto Protocol in article 12, after long and intense negotiations.[116]

By the time the Kyoto Protocol was signed, however, that article was but a framework of theoretical principles to be filled with practical guidance. The pending issues let unresolved in Kyoto were basically two. First, Annex I and non-Annex I countries had different interpretations of what "achieving sustainable development"[117] implied. Clearly, most developed countries interpreted article 12 as a way to get easy access to cheap mitigation opportunities in developing countries[118], whereas developing countries viewed in the CDM a channel for new development assistance.[119] Second, there was an operational-economic problem represented by the fact that CDM projects would create new credits in countries without commitments that would be transferred to countries with commitments, thus increasing the total amount of emission credits in the market. This inflation bore the obvious risk that these projects would be carried out to obtain "easy" reduction that at home would have costed more. For this reason, there were strong pressures to verify beyond any doubt that the CDM was environmentally additional to any reduction that would have happened in the absence of the project activity: the consequence is that the Marrakech Accords establish that the additionality must be tested on a project-specific basis[120] and not on a general programme level as some had proposed.

The Clean Development Mechanism emerged from the negotiations of the Marrakech Accords as a way to join in a single measure two of the main objectives of the Convention and the Kyoto Protocol. The negotiations of the CDM were characterised by the attempt to give developing countries the possibility to benefit from the economic instruments laid down by the Protocol, while also, in the interest of Annex I countries, involving them in mitigation actions. Moreover, this means envisioned to provide developed countries with a cost-effective instrument to achieve their commitments under the Kyoto Protocol, and finally to contribute to the ultimate objective of the Convention. Not surprisingly, the balance between these two objectives came after very intense discussions. A matter of particular relevance was the distribution of rents[121] between the North and the South: the risk was that North countries would have jumped on this occasion to purchase emission reductions cheaply, exploiting once again developing countries. The proposals to regulate rent sharing in CDM projects,

---

[116] To have a full picture of the history of CDM, see: F. Lecocq, P. Ambrosi, *The Clean Development Mechanism: history, status and prospects*, Oxford University Press, 2007.
[117] Article 12, paragraph 2, KP.
[118] F. Lecocq, P. Ambrosi, *The Clean Development Mechanism: history, status and prospects*, Oxford University Press, 2007, pag. 135.
[119] Grubb et al., 1999.
[120] Draft Marrakech Accords, Annex to I, J/3, paragraph 45(c), and FCCC/KP/CMP/2005/8/Add.1.
[121] Project revenue.

nonetheless, were rejected, and it was agreed that the decision concerning the adequacy of each project to a country sustainable development would be made by the host country.

Finally, there were doubts on the admission of LULUCF activities in CDM projects. The suspicion was dictated by the fact that the inclusion of land use, land-use change and forestry activities in article 3, paragraph 3 and 4, of the Kyoto Protocol was explicitly negotiated among Annex I countries as a means to relieve some of the pressure created by the Kyoto targets, and according to their detractors, LULUCF projects in the CDM had the same function; moreover, there were objective measurement difficulties connected to this category. In particular, environmental NGOs were worried that activities in this sector would be environmentally unsound and would overload the market with "unsound credits", while at the same time missing their capacity building goals, for example favouring fast-growing industrial plantations over locally-based sustainable forest management.[122] The pressure of these stakeholders led to a very measured and limited scope in the Marrakech Accords of LULUCF projects in the Clean Development Mechanism (afforestation and reforestation). As a testimony to their importance in the environmental matters, the other main success of NGOs in this issue was the restriction of the import of LULUCF CDM credits into the EU Emissions Trading Scheme.

As it results from the Marrakech negotiations, the CDM is a cooperative instrument which has the objective of assisting developing countries to achieve sustainable development by promoting environmentally sound technology and investments from Annex I countries. Moreover, the Kyoto Protocol does not exclude the possibility of unilateral CDM projects where investors are developing countries businesses.[123]

With Joint Implementation, the Clean Development Mechanism represents a project-based instrument that allows for "green" investments in foreign countries to decrease GHG emissions or to increase sequestration capacities. However, for JI foreign means "other Annex I Parties with quantified emissions limitation and reduction commitments", while for CDM it means non-Annex I countries. These investments can result in certified emissions reduction (CER) credits, each equivalent to one tonne of CO_2, that, if verified by the ad hoc body, confer the right to benefit of a reduction of GHG emissions to the entity carrying out the project and to its home State, if the government recognises these credits. This will result in a help towards the meeting of the 5% reduction target of Annex I countries of the Kyoto Protocol.

Even if the CDM and JI have a set of common characteristics, for example the requirement that emission reductions need to be additional[124] or the fact that these mechanisms need the approval by

---

[122] F. Lecocq, P. Ambrosi, *The Clean Development Mechanism: history, status and prospects*, Oxford University Press, 2007, pag. 137.

[123] *The Clean Development Mechanism (CDM)*, UNEP Collaborating Centre, pag. 3.

[124] Art. 6, paragraph 1(b) for JI and article 12, paragraph 5(c) for CDM, Kyoto Protocol.

all Parties involved[125] (and in particular of the host country), there are significant differences between the two mechanisms.

In order to participate to a CDM project, there are some eligibility criteria that countries must possess, three precisely: participation in the CDM must be voluntary, host countries must have ratified the Kyoto Protocol and established a National CDM Authority. For industrialised countries, there are further requirements they must meet: the establishment of the assigned amount under article 3 of the Protocol, a national system and register for the estimation of greenhouse gases, an annual inventory, and an accounting system for the sale and purchase of emission reductions.

There are a number of sectors in which projects can be carried out: end-use energy efficiency improvements, supply-side energy efficiency improvement, renewable energy, fuel switching, agriculture (reduction of CH_4 and N_2O emissions), industrial processes (CO_2 from cement for example, and the reduction of the remaining three gases of the Kyoto Protocol HFCs, PFCs, SF_6), and sinks projects including only afforestation and reforestation.[126] Moreover, for projects in the last sector mentioned, in the first commitment period Annex I countries can only add to their amounts of reduction commitments CERs generated from sink projects up to 1% of their baseline emissions for each year of the commitment period, and no more.

In order to make small projects[127] competitive with larger ones, the Marrakech Accords establish a fast procedure with simpler eligibility rules, which were however not carried on by the CMP. Decision 9/CMP.3 revised the limit for small-scale afforestation and reforestation CDM project activities defined in the annex to decision 5/CMP.1.[128]

The implementation of the CDM is supervised by the Executive Board (EB), operating under the CMP. One of its main functions is to accredit operational independent entities (Designated Operational Entities – DOEs) that will validate a proposed activity on the basis of a Project Designed Document (PDD). Its overall objective is to verify whether implemented projects have achieved planned greenhouse gas emission reductions or not and to recommend to the CDM EB the amount of CERs that should be issued. This function, which is defined verification/certification, is flanked by the other key function of the body, which is validation. It consists in the assessment of whether a project proposal meets the eligibility requirements and subsequently in requesting the registration of the project by the CDM EB.

---

[125] Art. 6, paragraph 1(a) for JI and article 12, paragraph 5(a) for CDM, Kyoto Protocol.

[126] *The Clean Development Mechanism (CDM)*, UNEP Collaborating Centre, pp. 8-9.

[127] With "small project", the COP means: activities in renewables up to 15 megawatt, energy efficiency with a reduction of consumption either on the supply or the demand side of up to 15 gigawatthours/yr, and other projects that both reduce emissions and emit less than 15 kilotons of CO_2 equivalent annually.

[128] The CDM Project Standard, Version 09.0 defines small-scale afforestation and reforestation project activities under the CDM as "those that are expected to result in net anthropogenic greenhouse gas removals by sinks of less than 16 kt of carbon dioxide (CO_2) per year and are developed or implemented by low income communities and individuals as determined by the host Party."

When an activity is certified, a different DOE verifies and approves emissions reductions, before the Executive Board, based on the certification report by a DOE, finally issues CERs credits and distributes them to the accounts of Parties and project participants as requested by them. A share of the proceeds from a CDM activity corresponding to 2% is automatically transferred to the Adaptation Fund to finance adaptation and climate change mitigation in developing countries and to cover the administrative expenses related to CDM.

The issue of the legal ownership of CERs has been given little consideration and is not explicitly dealt with in the Kyoto Protocol and the Marrakech Accords.[129] The general approach is that in the absence of any law or contract telling the contrary, the home country of the project is the "legal owner" of the CERs and it is the exclusive entity which can deal with them. It has been argued that the nationalisation of credits by the host government would decrease incentives for investors, and factual tendencies in this direction exist, but considered the international legal nature of the Kyoto Protocol, rights and obligations are conferred to the State governments. Accordingly, CERs should generally be considered sovereign rights which can only be legally owned by governments.[130] However, the State can refer its sovereign rights to private ownerships through State contracts or laws, but in any case the sovereign rights do not cease to exist when assigned to private entities: they are transferred to the home government of an Annex I Party of the project developer to whose quantified emission limitation and reduction obligations they will be added (article 3, paragraph 12 KP). The rationale is the same as the one for international emissions trading.

The situation gets even more muddled when there are multiple projects involved in the participation of the CDM. If for example there are different land and forest owners, constructors, project manager, multi-Party joint ventures, land renters and so forth, the legal title to emission credits needs to be defined by a network of complicated legal arrangements.[131] The proceedings to obtain CERs credits require the attentive supervision of the EB and the DOEs. The high transaction costs and the long and complex process have been criticised because they create disincentive to engage in the CDM[132], and the lack of quantitative mitigation commitments of host developing countries, together with the interest of the project developers in receiving a possibly high number of credits, create incentives to inflate the amount of CERs claimed which necessitated a long and still advancing process of the COP for reliable methodologies and independent evaluation.

As we have mentioned above, additionality is one of the main features of the mechanism.[133] As a

---

[129] C. Voigt, *Sustainable development as a principle of international law*, Netherlands, Brill, 2009, pag. 81.
[130] *Ibidem*, pag. 81.
[131] C. Voigt, *Sustainable development as a principle of international law*, Netherlands, Brill, 2009, pag. 82.
[132] At COP 11/MOP 1 Parties proposed twenty-seven items of reform of the CDM relating to general issues, governance, methodological issues, broader participation, and resources.
[133] D. Tladi, *Sustainable development in international law: an analysis of key enviro-economic instruments*, Pretoria University Law Press, 2007, pag. 134.

matter of fact, if this means was used to obtain emission reductions that would have happened anyway, the CERs credits issued for these projects would undermine the integrity and the usefulness of the Kyoto Protocol regime. It is for this reason that article 12, paragraph 5(c), of the Protocol explicitly states that CDM reduction in emissions are "additional to any that would occur in the absence of the certified project activity".[134]

Over the years, the CDM has proved to be the most useful instrument of the three in promoting climate protection. Operational since 2006, despite its weaknesses and the critics on additionality and on its short term approach[135], at present the CDM counts 7685 project activities which are ongoing, and the total number of activities which have resulted in the issuance of CERs amounts to more than 2.9 billion tonnes of CO_2 equivalent in the first commitment period of the Kyoto Protocol, 2008-2012.

1.4.3 Joint implementation

The third and final flexibility mechanism of the Kyoto Protocol is Joint Implementation. The instrument was the first of the three to be foreseen already in the UNFCCC. JI *in nuce* can be recognised in articles 3, paragraph 3, 4, paragraph 2(a), and 4, paragraph 2(d). Article 3, paragraph 3, invites the Parties to take into account policies and measures that should be cost-effective "so as to ensure global benefits at the lowest possible cost", opening the first window on flexible mechanisms, while article 4, paragraph 2(a), explicitly states that Annex I countries can implement their policies jointly and assist other Parties in the achievement of the objective of the Convention, referring to the COP the further specification of these measures (paragraph 2(d)).

Developed from COP 1 to COP 7, the JI programme allows to meet jointly the commitments of article 3, paragraph 1, of the Kyoto Protocol. What does it mean jointly? It means that a Party can transfer or acquire from another Annex I Party emission reduction units resulting from investments in specific project activities aimed at the ultimate goal of reaching the objectives of the Protocol (article 6 KP), offering Parties a flexible and cost-efficient means of fulfilling a part of their commitments, while the host Party benefits from foreign investment and technology transfer.

These projects are finalised at the reduction of anthropogenic emissions by sources or at the enhancement of anthropogenic removals by sinks, and can be carried out in any sector of the economy.

---

[134] Other "safeguards" for environmental integrity are the determination of baselines, their methodology and modalities to avoid "leakage", that is, the increase of GHG emissions elsewhere. See E. Meijer, J. Werksman, *Keeping it clean. Safeguarding the environmental integrity of the clean development mechanism*, in D. Freestone, C. Streck, *Legal aspects of implementing the Kyoto Protocol mechanisms: making Kyoto work*, Oxford University Press, 2005, pp. 191-211.

[135] On this issue, see F. R FitzRoy, E. Papyrakis, *An introduction to climate change economics and policy*, London, Earthscan, 2010, pag. 110.

The final amount of ERUs acknowledged to a project will correspond to the difference between an established emissions baseline level and the final project emissions. JI projects are particularly relevant for EIT Annex I countries, such as Eastern European and ex-Russian Federation countries. Russia alone benefited from almost half of all carbon credits from projects falling under the Joint Implementation umbrella, with Ukraine capturing approximately another 20%.

The particularity of JI is its combination of elements of emissions trading under a cap and base[136] system with a baseline and credit[137] approach, which make this flexible mechanism a hybrid halfway system between CDM and international emissions trading.

Projects starting from 2000 are eligible as JI projects if they meet the relevant requirements, but ERUs were allowed to be issued for crediting only after the beginning of the first commitment period in 2008.

Paragraph 21 of the JI guidelines[138] specifies the eligibility requirements under the mechanism. First and most obviously, to be eligible a country must be a Party to the Kyoto Protocol. Second, in accordance with Decision 13/CMP.1, its assigned amount of anthropogenic emissions of GHG have been calculated and recorded. Third and most important, this country has to have in place a national system for the estimation of anthropogenic emissions by sources and anthropogenic removals by sinks of all the gases not controlled by the Montreal Protocol, a national registry, and moreover it must have submitted annually the most recent required inventory in accordance with article 5, paragraph 2, and 7, paragraph 1 KP. Finally, an Annex I country is eligible to transfer and/or acquire ERUs if it submits the supplementary information on assigned amount of GHG in respect of article 7, paragraph 1, of the Kyoto Protocol.

If a Party meets these requirements to transfer and/or acquire ERUs, then a "simplified" JI procedure may be applied (called "Track 1"), and it can benefit from emission reductions or improvement of removals from a JI project as additional to any that would otherwise occur. On the contrary, if it does not fulfil all the eligibility requirements, the verification of the effective reduction of GHG levels or the enhancement of sinks will be certified by the verification procedure under article 6 of the Supervisory Committee (JISC).[139] This procedure is also known as "Track 2" procedure. The

---

[136] A baseline system summed to a maximum amount of emissions reduction and removal which can be used to meet Annex I parties reduction targets.

[137] Under a baseline and credit scheme, an emissions intensity is set for emitting activities against a baseline (which can be business as usual or some proportion thereof) and credits are created for activities that achieve emissions intensities below the baseline and activities that have emissions intensities above the baseline have to buy such credits.
For a detailed overview on the issue, see the online article *Baseline and credits versus cap and trade emissions trading schemes*:
http://www.climateinstitute.org.au/verve/_resources/cap_and_trade_vs_baseline_briefing_paper_june_25_2009.pdf.

[138] Decision 9/CMP.1, available at the following link:
http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=2.

[139] The Joint Implementation Supervisory Committee acts under the authority and guidance of the CMP, and, inter alia, supervises the verification procedure defined in paragraphs 30-45 of the JI guidelines.

verification is executed by an independent entity accredited by the JISC to determine whether the relevant requirements have been met before the host Party can issue and transfer ERUs.
In any case, a country which meets all the eligibility requirements may at any time choose to use the Track 2 verification procedure under the JISC.
As far as criteria for baseline settings and monitoring are concerned, they are defined in Annex B of the JI guidelines. The body responsible for the review and revision of the reporting guidelines and criteria for baselines and monitoring in appendix B[140] is the JISC, which in its decisions has to keep into consideration the relevant work of the Executive Board of the CDM. In its first meeting, the CMP decided (with Decision 10/CMP.1) to apply, as appropriate, the methodologies for baselines and monitoring approved by the Executive Board. Following the request of paragraph 2 of that same decision that invited it to "develop, as soon as possible, guidance with regard to appendix B of the guidelines for the implementation of Article 6 of the Kyoto Protocol", the JISC started its work on the issue, which brought in its twenty-sixth meeting[141] to the agreement on guidance on criteria for baseline setting and monitoring.
Some words should be dedicated to the role of the independent entities in the JI mechanism. Officially known as accredited independent entities (AIE), they are independent auditors which have the task of controlling project proposals and verifying whether implemented projects have achieved the planned greenhouse gas emission reductions in the most transparent and objective way. To become an AIE an organisation has to ensure that it complies with the requirements of the Joint Implementation accreditation standard for Independent Entities, and then it has to be evaluated and accredited by the JI Assessment Team and the JI Accreditation Panel.
To conclude, even if joint implementation was relegated at the last priority positions in the negotiations of the three flexibility mechanisms, due to complex discussions on the other instruments and on compliance issues on JI, namely the absence of a cohesive political bloc of JI host countries in the negotiations and of a coherent vision on JI modalities in general, these questions were eventually resolved and the mechanism joined the then-on tripartite structure of the flexible mechanisms of the Kyoto Protocol and the Marrakech Accords.

1.4.4 Are the flexible mechanisms useful to climate protection?

The flexible mechanisms of the Kyoto Protocol have been deeply analysed in the literature. What

[140] Paragraph 3(d) of Decision 9/CMP.1.
[141] JISC 26 was held on 13-14 September 2011.

emerges is that the primary motivation for the development of these flexibility instruments was economic, not environmental and certainly not social.[142] The main aim of these means, in fact, is to cut costs, to provide cost-effectiveness. Economic considerations were at the base of their inclusion in the Protocol, and this is not surprising nor uncoherent given that the UNFCCC states that "policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost".

However, with respect to JI and CDM, there are at least two problems which can weaken their environmental integrity. First, they perpetuate the problem of environmental protection by de facto promoting the continued reliance on fossil fuels in wealthy countries: if cheap emissions reductions cannot be achieved at home, they can surely be reached in least developed countries or in countries with economies in transition. In this sense, the Kyoto Protocol encourages a business-as-usual approach to the use of fossil fuels, even if wealthier countries should be the one to take the lead in environmental protection, in accordance with the "North first" motto, and most importantly with the Convention and the Protocol provisions.[143] Second, the CDM in particular suffers from the added problem that the increase in reduction units of the investing State is not offset by a decrease in the assigned amount units of the host State. This is because the host States (non-Annex B States) do not have QELROs, and they have nonetheless been granted assigned amount units. The effect of CDM transactions, therefore, has been to increase the total amount of allowable emissions and thereby further decrease the already insufficient target under the Protocol.

In addition, emissions trading transactions are not based on specific projects and therefore do not result in any actual emissions reduction, as well as their trading, especially with Eastern countries, exacerbates the "hot air" problem: these States are allowed to sell emissions units they would in any case not use, because their business-as-usual emissions remain below their official emission ceiling established by the Kyoto Protocol.[144] Emission rights can then be traded and used to cover emissions that might have remained unused without emissions trading. Parties recognised this problem, and the Bonn and Marrakech agreements have tried to solve it with the requirement that countries should maintain a commitment period reserve of at least 90% of the country's assigned amount. The decision does not imply, though, that States cannot oversell their assigned amounts.

Even if environmental integrity under the flexible mechanisms has not been perfectly granted due to economic reasons, the positive aspect of the question is represented by the fact that a reduction of

---

[142] D. Tladi, *Sustainable development in international law: an analysis of key enviro-economic instruments,* Pretoria University Law Press, 2007, pag. 144.

[143] *Ibidem*, pag. 145.

[144] On this issue see the article of E. Woerdman, *Hot air trading under the Kyoto Protocol: an environmental problem or not?*, available at the following link: http://www.rug.nl/research/portal/files/17591854/HotAirTrading_EELR.PDF.

emissions everywhere in the world has an equally beneficial impact on the global climate system.[145] The most important element in the accounting of the usefulness of these instruments in the future will be the enhancement of the additionality requirements of the projects, which at present are not fully measurable and thus weaken the Kyoto regime.

1.5 Compliance issues under the Marrakech Accords

An important question one may ask at this point is: but if a country does not respect its obligations, what happens? Is there any instrument in the Marrakech Accords to enforce the commitments under the Kyoto Protocol?

The answer is yes, there is. As a matter of fact, in pursuit of the ultimate objective of the UNFCCC and of the effective enforcement of the Kyoto mechanisms, the Marrakech Accords instituted a set of procedures relating to compliance with the objective of facilitating, promoting and enforcing compliance with the commitments under the Protocol.

There are several guiding principles which led to the creation of the compliance rules, which is worth to summarise here. First of all, in accordance with the principle of "common but differentiated responsibility", binding compliance commitments were set only for Annex I Parties. The decisions on compliance finalised in Marrakech incorporated both enforcement features to force a Party to comply with its obligations and facilitative features to meet the possible objective difficulties on compliance. Besides, the three Kyoto flexible mechanisms represented in some way a challenge to the compliance system design, because of their three different working systems and regulating bodies. Much of the credibility of the entire Kyoto process, in fact, depended on the capability to establish a reliable and swift compliance system, which with firm authority and reasonable speed could make the mechanisms work better. Thus, efficiency and time-sparing provisions have been included.[146]

Transparency and reasonable certainty were two other essential components of the compliance regime, so that every Party knew precisely what implies inaction or action against the provisions of the Protocol. Lastly, two issues concerning the verification and the "punishments" for Parties that do not comply with their required targets were considered: to prevent unfairness, impartiality and

---

[145] E. Meijer, J. Werksman, *Keeping it clean: safeguarding the environmental integrity of the Clean Development Mechanism*, in D. Freestone, C. Streck (eds), *Legal aspects of implementing the Kyoto Protocol mechanisms: making Kyoto work*, Oxford University Press, 2005, pag. 191.

[146] X. Wang, G. Wiser, *The implementation and compliance regimes under the Climate Change Convention and its Kyoto Protocol*, Reciel 11(2), Blackwell Publishers Ltd, 2002, pp. 191-192.

unpredictability, the Marrakech Accords are based on the principles of due process and of proportionality.

The activities concerning non-compliance are entrusted to a newly created body, the Compliance Committee.[147] The Committee consists of twenty members elected by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, and functions through a plenary, a bureau of the Committee and two branches, namely the facilitative branch and the enforcement branch. Of the twenty members elected based on equitable geographical representation[148], ten serve in the facilitative branch and ten in the enforcement branch. The facilitative branch has the role of assisting all Parties in their implementation of the Protocol[149], while the enforcement branch has the task of determining if Annex I Parties have met their emissions targets, fulfilled their monitoring and reporting requirements, and met the eligibility tests for participating in the flexible mechanisms.[150] The enforcement branch is allowed to take measures when it finds that a country has failed to comply with one of these obligations. We will analyse them in detail later.

The bureau consists of a chairperson and a vice-chairperson, elected from each branch for a term of two years, who are responsible for the allocation of questions to the right branch, while the plenary carries out various administrative tasks, as for example the development of any needed rule of procedure.[151] Furthermore, for each member of the Committee, the CMP elects an alternate member. Everyone has to work for the compliance Committee in his/her individual capacity, that is, without representing the interests of the countries they are from, and be selected depending upon recognised competence in the climate change field. Finally, the UNFCCC secretariat in Bonn serves as the secretariat of the Compliance Committee.

Even if the Marrakech Accords state that it will be necessary to develop more specific rules on procedures relating to, inter alia, confidentiality, conflicts of interest, and submission of information by NGOs and intergovernmental organisations (IGOs)[152], they contain fairly detailed rules on how the Committee has to deal with compliance-related questions. Compliance proceedings can be received, through the secretariat, by questions of implementation that have been indicated in reports of expert reviews teams under article 8 of the Protocol, by submissions of any Party with respect to itself, or by submissions of any Party with respect to another Party. After the compliance procedure is started, the bureau is charged of allocating the question to the relevant branch, which will make a

---

147 The full text on the procedures and the mechanisms of the Compliance Committee can be found in the the Annex to Decision 24/CP. 7, pag. 64.

148 Ibidem, pag. 67, paragraph 1, and pag. 68, paragraph 1.

149 *Ibidem*, pag. 67.

150 X. Wang, G. Wiser, *The implementation and compliance regimes under the Climate Change Convention and its Kyoto Protocol*, Reciel 11(2), Blackwell Publishers Ltd, 2002, pag. 189.

151 Decision 24/CP. 7, pag. 66.

152 Ibidem, pag. 66, section III, paragraph 2(d).

preliminary examination[153] on the questions of implementation submitted to decide whether or not to proceed further.

The enforcement branch is the only body under the Kyoto Protocol which can theoretically compel a Party to undertake measures if it is found in non-compliance with the agreement. The text of the Compliance Committee, contained in the Marrakech Accords, includes specific provisions on the general procedures through which it executes its process, and it is aimed at protecting each member country's due process rights. There are several procedures for introducing evidence and for interested non-disputants to file information relevant to the case.[154] In addition, the member country in question has the opportunity to be represented in those hearings by an attorney or some other advocate.[155] The decision of the enforcement branch are taken by a system of double majority voting.[156] This implies that decisions can be taken only if the majority from each Annex I and non-Annex I regional bloc of the branch members approves them. This provision was included to forbid that the request of equitable geographical representation was used to justify unfair or politically motivated decisions by the branch.

If the enforcement branch finds a Party guilty of exceeding its emissions targets, that Party will have however the chance to appeal to the CMP, the supreme body of the Protocol, that will decide to accept it only if it is found that during the proceedings the Party was denied the right to a due process. In favourable case, the decision of the enforcement branch may be overturned by a three-quarters majority vote of the CMP.

The enforcement branch, as well as the facilitative branch, are empowered to apply the so-called "consequences" of the compliance-related proceeding. The facilitative branch can decide to apply one or more of the four consequences of which it has been provided: first, provision of advice and assistance; second, facilitation of financial and technical assistance (including technology transfer and capacity building); third, facilitation of financial and technical assistance taking into account article 4, paragraphs 3, 4 and 5, of the Convention; and finally, the formulation of recommendations to the Parties concerned.

The enforcement branch, instead, applies its consequences when an Annex I country fails to comply with its monitoring and reporting obligations, or when it does not pass the eligibility tests for

---

[153] The preliminary examination is aimed at ensuring that the question has three characteristics: it is supposed by sufficient information, it is not *de minimis* or ill-founded, and it is based on the requirements of the Protocol.

[154] X. Wang, G. Wiser, *The implementation and compliance regimes under the Climate Change Convention and its Kyoto Protocol*, Reciel 11(2), Blackwell Publishers Ltd, 2002, pag. 190.

[155] Decision 24/CP. 7, pag. 70, section VIII, paragraphs. 3-4, 6 and 8, section IX, paragraphs 2-3 and 7-8.

[156] *Ibidem*, pag. 66, section II, paragraph. 9 "The Committee shall make every effort to reach agreement on any decisions by consensus. If all efforts at reaching consensus have been exhausted, the decisions shall as a last resort be adopted by a majority of at least three fourths of the members present and voting. In addition, the adoption of decisions by the enforcement branch shall require a majority of members from Parties included in Annex I present and voting, as well as a majority of members from Parties not included in Annex I present and voting. "Members present and voting" means members present and casting an affirmative or a negative vote."

participating in the flexibility mechanisms, or finally and most obviously, when it does not meet its emissions target.[157] The "consequences", in this case, comprehend firstly the request to the non-compliance Party to submit to the enforcement branch an action plan that include an analysis of the causes of non-compliance, the measures that the country intends to implement in order to remedy, and a timetable to assess the implementation of the action plan within twelve months from the decision.[158] Then, in the case of non-compliance with the eligibility requirements for the Kyoto mechanisms, the enforcement branch will order the suspension of the Party's eligibility to participate in the Kyoto mechanisms until the Party in question gains back the requirements.[159] The most "severe" consequence is set aside for the case of non-compliance with the emissions targets. In fact, for every tonne of emissions by which a Party exceeds its target, 1.3 tonnes will be deducted from its emissions allocation for the following commitment periods. Moreover, the enforcement branch requires the development of a compliance action plan to explain the causes of non-compliance and to explain how it intends to meet its obligations in the second commitment period. Most importantly, the Party will not be able to use international emissions trading to sell parts of its emissions allocation until it has demonstrated that it will be able to comply with its objectives.[160]

After the Marrakech Agreements, the issue of the compulsoriness of the compliance regime was under discussion. Despite the unanimous adoption of the compliance rules at Marrakech, Parties were unable to agree on the precise legal nature of these rules. The last sentence of the Protocol's article 18, in fact, states that the compliance procedures and mechanisms "entailing binding consequences shall be adopted by means of an amendment to this Protocol". This provision is the result of the delegations' inability to agree upon the issue of consequences for non-compliance during the negotiations of COP 3 in Kyoto, and created a so-called amendment dilemma".[161]

Such a decision has also the implication that Parties are politically, but not legally, obliged to respect the decisions and the consequences of the enforcement branch if the compliance procedures and mechanisms are not adopted by a legally binding instrument, that is, an amendment to the Protocol.

Being the idea of an amendment very complicated to realise, the negotiators explored until the Bonn Agreement the possibility of developing a supplementary legal instrument which all the Parties had to ratify at the same time that they ratified or acceded to the Protocol. This means would have established the compliance system and at the same time modified the Protocol so that binding consequences could be adopted through the supplementary instrument rather than through the article 18 amendment. However, the emerging consensus towards this instrument was reversed after the US's

---

[157] Article 5, paragraph 1 or paragraph 2, or Article 7, paragraph 1 or paragraph 4, of the Protocol.
[158] Decision 24/CP. 7, pag 75, section XV, paragraphs 1-3.
[159] *Ibidem*, pag. 76, section XV, paragraph 4.
[160] *Ibidem*, paragraphs. 5-6.
[161] W. Douma, L. Massai, M. Montini, *The Kyoto Protocol and beyond*, Netherlands, T.M.C. Asser Press, 2007, pag. 100.

announce of non-ratification of the Protocol. After this event, the Annex I countries that had not been sure of the need for binding consequences prevailed at Marrakech, with the result that a provision on the question of the legal nature of the consequences was added to Decision 24/CP.7.[162]

In CMP 1 in Montreal (2005), the Conference officially approved the rules of the compliance regime as developed by the Compliance text, but this did not solve the "amendment dilemma". The problem is that the wording of article 18 makes clear that if these procedures and mechanisms entail binding consequences for the Parties, and they do, it is necessary to proceed to a formal amendment to the Protocol.[163]

At present, no formal amendments to the Kyoto Protocol compliance procedure have been approved, and right after the first meeting of the Parties to the Protocol the dilemma has emerged clearly. Montini[164] believes that none of the Parties to the Protocol (with the exception of Saudi Arabia) has proposed an amendment because most of them considered that the dispute avoidance nature of the compliance regime did not envisage within its provisions the presence of "procedures and mechanisms" entailing binding consequences for the Parties within the meaning of article 18 of the Kyoto Protocol. This is the probable reason why CMP decided to proceed with the adoption of the compliance system without de facto solving the dilemma related to whether or not it was necessary to approve it through a formal amendment.

However, it is hard not to define binding the consequences foreseen for the enforcement branch[165], given that the body has the possibility to proceed to a deduction from the Party's assigned amount for the second commitment period of 1.3 tonnes every 1 tonne over the established amount of GHG gases emission and to declare a suspension of the eligibility to make emission transfers. Notwithstanding, the Parties' to the Protocol practice seems to sanction the validity of the described compliance regime.

1.5.1 Is the compliance regime efficient?

Since the 1972 Stockholm Conference on the Human Environment, more than 200 Multilateral Environmental Agreements (MEAs) have been developed. An important challenge related to these instruments has been how to best assure the implementation and compliance with the commitments

---

[162] Pag. 64, paragraph 2. The COP "recommends that the Conference of the Parties serving as meeting of the Parties to the Kyoto Protocol, at its first session, adopt the procedures and mechanisms relating to compliance annexed hereto in terms of Article 18 of the Kyoto Protocol."

[163] The provision on the amendments to the Protocol is contained in article 20 and foresees the formal acceptance by at least ¾ of the Parties to the Protocol.

[164] W. Douma, L. Massai, M. Montini, *The Kyoto Protocol and beyond*, Netherlands, T.M.C. Asser Press, 2007, pag. 101.

[165] *Ibidem*, pag. 101.

under these treaties, including how to deal with countries which fail to meet their obligations.
The traditional approach to addressing non-compliance, in which States ask the reimbursement for damages caused by another Party or in which they suspend the respect of a treaty towards a non-complying Party, does not work well for MEAs. Dealing with "global commons", it can be difficult for a State or for an arbitrary body to establish the causal link between a specific act of non-compliance by another State and a natural consequence. Moreover, due to the reluctance of States to resolve in a confrontational manner disputes under MEAs, the theory has evolved in three other ways: preventing non-compliance, facilitating compliance and managing compliance.[166] In the Kyoto Protocol, this theory has been applied and pushed further: in addition to the facilitative branch, which has the above-mentioned tasks, the negotiators included an absolute novelty for the MEAs regime, the enforcement branch, which has the power to apply measures which go way farer than the "restorative aim" envisioned by the previous. In particular, the suspension of the Party's eligibility to participate in the Kyoto mechanisms until the Party in question gains back the requirements and the deduction of 1.3 tonnes of emissions allocation for the second commitment period for every tonne of emissions by which a Party exceeds its target seem innovative and more persuasive stratagems to favour compliance than those of previous agreements. A great number of authors[167] seem to agree that the compliance regime of the Kyoto Protocol is on the whole the most complex and ambitious of the MEAs. Beyond its role in ensuring compliance with the Protocol's emission targets, it is an essential component in securing the accurate "measurement, reporting, and verification" of greenhouse gas emissions under the Protocol and the effective functioning of its carbon-market mechanisms. The strength of the compliance system can be identified in the incentives and disincentives that the overall design of the Protocol and its implementing decisions in the Marrakech Accords have generated. Even though Parties have not made the consequences legally binding by adopting an amendment to the Protocol, they can be effectively applied as long as States do not withdraw from the Protocol. All in all, the compliance regime seems one of the strengths of the Protocol, and real weaknesses should be looked for elsewhere, for example in the low emissions reduction target set by the Protocol.

[166] X. Wang, G. Wiser, *The implementation and compliance regimes under the Climate Change Convention and its Kyoto Protocol*, Reciel 11(2), Blackwell Publishers Ltd, 2002, pag. 182.
[167] Oberthür, Lefeber, Wang, Wiser, Montini.

1.6 National communications

The Kyoto Protocol is based on the provisions on reporting communications of the UNFCCC. The reporting requirements under the Protocol, thus, are supplementary to those the Parties already have under the Convention, in accordance to which all Parties should report on the steps they are taking to implement their targets, as listed in articles 4, paragraph 1, following the guidelines of article 12. The reporting guidelines were adopted at COP 5 in Bonn, and still continue to be used to date.

Reporting and review requirements under the Convention encompass the following elements: national GHG inventories which contain information on GHG emissions, such as activity data, emission factors and methodologies used to estimate these emissions (submitted yearly); national communications (submitted by Annex I Parties every 4-5 years following decisions for each submission by the COP) which contain information on national GHG emissions, climate related policies and measures, GHG projections, vulnerability and adaption to climate change, financial assistance and technology transfer to non-Annex I Parties, and actions on raising public awareness on climate change; and biennial reports which contain information on progresses in achieving emission reductions and the provision of financial technology and capacity-building support to non-Annex I Parties.[168]

The importance of the Marrakech Accords for the reporting mechanisms of the Convention and the Kyoto Protocol is represented by the fact that at COP 7 Parties reached agreement on the details of articles 5, 7 and 8 (KP). Accordingly, the overall reporting system of the Kyoto Protocol will be adopted officially at CMP 1. The provisions in the Marrakech Accords concerning the national communications under the Convention on Climate Change deal only with the submissions of Annex I Parties. The Accords are limited to some procedural requests, de facto without adding any new element. Basically, recalling the decisions which have revisited the guidelines at COP 2 in Geneva with Decision 9/CP.2, at COP 4 in Buenos Aires with Decision 11/CP.4, at COP 5 in Bonn, and the articles of the Convention concerning national communications, the COP requested the secretariat to apply the procedures for the review of national communications for the national communications submitted by Annex I Parties until that moment[169] and to prepare the compilation and synthesis of national

[168] Unfccc.int, at the electronic page dedicated to the reporting and review for Annex I Parties under the Convention and the Kyoto Protocol.

[169] Most of the 41 Annex I Parties submitted their first report in 1994 or 1995, their second in 1997–1998 and the third after 30 November 2001.

communications submitted.[170] In addition, the COP requested the SBSTA to develop technical standards for the purpose of ensuring the accurate, transparent and efficient exchange of data between national registries, the clean development mechanism registry and the transaction log.

Interestingly, the draft version of the Marrakech Accords contained a decision on national communications for Parties not included in Annex I, which instead in the final version disappeared. The draft decision[171] recognised that these Parties were fulfilling their commitments under article 4, paragraph 1(a), of the Convention and that they were taking measures to address climate change and its adverse impacts, and took procedural decisions to continue the compilation and synthesis of the initial national communications from non-Annex I Parties.[172] It will not be until COP 13, through the Bali Action Plan, that a comprehensive system for non-Annex I countries report will be created. There, Parties agreed on the principle of applying measurement, reporting and verification (MRV) requirements for developing country Parties. This tripartite basis laid the foundation for the subsequent elaboration of the existing comprehensive MRV framework for developing Parties. Measurement (M) for non-Annex I Parties applies both to efforts to address climate change and to the impacts of these efforts. It occurs at the national level and refers to GHG emissions, mitigation actions and their effects, and the support needed and received. These measurement efforts will be further defined through the Nationally Appropriate Mitigation Actions (NAMAs), agreed upon at COP 18 in Doha. Reporting (R) for non-Annex I Parties is implemented through the national communications and Biennial Update Reports (BURs, required from non-Annex I Parties only), where Parties report on their actions to address climate change; Verification (V), then, is addressed at the international level by the UNFCCC, through the International Consultation and Analysis (ICA) of BURs. It can also occur at the national level, but is voluntary. Moreover, in accordance with Decision 14/CP.19, developing Parties can report also on activities on reducing emissions from deforestation and forest degradation (REDD+) in order to obtain payments for result-based actions on this issue.

According to the guidelines on reporting and review agreed in Bonn, the objectives of national communications are to assist Parties in meeting their commitments, to promote the consistent, transparent and complete process of assessment of the information, and to assist the Conference of the Parties to carry out its responsibilities to review the implementation of the Convention. The decision sets out the precise structure of the national communications in its annex[173] in order to simplify comparability between different States' reports. Every report is opened by an executive

[170] Decision 33/CP.7, pag. 23, paragraphs 1-2.
[171] Marrakech Accords draft, Decision-/07, VII B(1).
[172] FCC/SBI/2001/14 and Add. 1.
[173] FCCC/CP/1999/7, pag. 99.

summary that summarises the information and data from the full document, and it is followed by the description of national circumstances relevant to GHG emissions and removals, inter alia a description of how national situations affect greenhouse gas emissions and removals, and how national circumstances and changes in national circumstances affect greenhouse gas emissions and removals over time[174]. Then, the central part of the report includes greenhouse gas inventory information, policies and measures implemented to combat climate change and enhance adaptation, projections and the total effects of these measures, plus an assessment of the expected impacts on climate change and on the vulnerability of each country's territory. The national communication is closed by provisions on financial resources and transfer of technology, a description of the national policy on research and on education, training and public awareness. The entire report is required to be complemented with tables and statistical data.

National communications are reviewed, within 1-2 years from the submission date, by international expert review teams (ERTs) following specific mandates included in COP decisions. Moreover, the UNFCCC secretariat prepares the "compilation and synthesis reports" on Annex I and non-Annex I national communications, which are considered by the subsidiary bodies and the COP as a basis for an effective discussion on the implementation of the Convention by Annex I Parties.

It is important to remind that national communications are but a part of the total set of Kyoto Protocol reports. The Kyoto regime, in fact, to date includes also an initial report[175] (which had to be submitted by Annex I Parties by 31 December 2006 or one year after the entry into force of the Protocol for that Party), a set of annual reports on GHG inventory, LULUCF and assigned amount information, possible changes in national systems and in national registries, information on adverse effects of climate change and/or the impacts of response measures (article 7, paragraph 1 KP), and a true-up period report, which is due at the end of the commitment period to enable the determination of Parties' compliance with Kyoto commitments.

At present, Annex I Parties have submitted their sixth national communications, due within 1 January 2014, as requested by Decision 9/CP.16, while the majority of non-Annex I Parties is still at the initial national communication. Only Mexico has got to the submission of the fourth and the fifth communications.

The negotiators of the Climate Change Convention and the Kyoto Protocol have built a strong and complex reporting scheme which is the vanguard of the climate change regime. The accounting, reporting and review systems set out in the COP's decisions and in the Marrakesh

---

[174] *Ibidem*, pag. 81.

[175] Initial reports include: the Party's calculation of its assigned amount, the Party's calculation of its commitment period reserve (CPR), a description of the national registry, a description of the Party's national system, parameters related to the accounting of LULUCF activities under article 3, paragraphs 3 and 4.

Accords aim at creating transparent communication mechanisms, so that all data (except those designated as confidential) are to be made publicly available. Providing information on a range of issues relating to the implementation of the Convention, such as, inter alia, greenhouse gas emission trends, projections and estimates of the total effect of policies and measures, the provisions of financial, technological and capacity-building support to developing country Parties, and public awareness, national communications constitute a fundamental tool to monitor the implementation of the Convention's and Protocol's commitments both by the governing bodies of the UNFCCC and by stakeholders involved in this process. The only real problem with the national communication system is represented by the fact that compliance requirements for the communications by non-Annex I Parties do not seem to be efficient enough so as to allow the periodic accounting of these Parties. Objective national difficulties in carrying out the communication process have to be tackled by the COP as a matter of urgency, given the fact that developing countries play a fundamental role in the enhancement of the climate change regime.

Part II
From words to action: implementation and legal development of the Protocol

2.1 First commitment period (2008-2012)

The Marrakech Accords were formally adopted by the CMP at its first session in Montreal, Canada, in December 2005. There, the "rulebook" of the Kyoto Protocol was finalised, soon after the entry into force of the Protocol on 16 February 2005. Richard Kilney, acting Head of the United Nations Climate Change Secretariat, said: "The adoption of the Marrakech Accords formally launches emissions trading and the other two mechanisms under the Kyoto Protocol. Carbon now has a market value. Under the clean development mechanism, investing in projects that provide sustainable development and reduce emissions makes sound business sense".[176]

With the decisions adopted, Parties to the Kyoto Protocol established the Joint Implementation Supervisory Board and made fully operational the clean development mechanism. Other decisions defined a wide range of operational matters for the implementation of the Protocol: how emissions of countries are accounted for, precise guidelines on the data systems that have to be set up, the rules governing how absorption of carbon dioxide by agricultural soils and forests is measured, procedures and mechanisms relating to compliance under the Kyoto Protocol.

Moreover, giving full effect to Decision 18/CP.7 on emissions trading, the CMP de facto creates a new commodity. As a matter of fact, allowing countries to sell the excessing emission units they do not use to countries that are over their targets, a new commodity in the form of emission reductions or removals is forged. Since carbon dioxide is the principal greenhouse gas, people speak simply of trading in carbon, which is now tracked and traded like any other commodity. This exchange is known as the "carbon market."[177]

It is worth to summarise the different types of emissions units which can be acquired and sold under

[176] UNFCCC press release, *Montreal climate conference adopts "rule book" of the Kyoto Protocol*.
[177] UNFCCC website. Link: http://unfccc.int/kyoto_protocol/mechanisms/emissions_trading/items/2731.php.

the Kyoto mechanisms. In addition to emissions trading's assigned amount units (AAUs), there are: removal units (RMUs) on the basis of LULUCF activities (afforestation and reforestation in the first commitment period), emission reduction units (ERUs) generated by a joint implementation project, and certified emission reductions (CERs) produced from a clean development mechanism activity. They each correspond to one tonne of CO_2. In addition, in order to address the "overselling" of units, each Party is required to maintain a commitment period reserve in its national registry of at least 90% of the Party's assigned amount or 100% of five times its most recently reviewed inventory, depending on which is the lowest.

The determination of compliance with the commitments depends on a very articulated series of procedures set out in the Marrakech Accords which determine emissions and assigned amount prior to, during and at the end of the commitment period. They strengthen and improve the Convention's reporting requirements and review procedures in order to track with the minimum degree of doubt the evolution by Parties at the national level. The Kyoto Protocol accounting system is centred on two parallel information streams, GHG inventories and assigned amount units (AAUs) information, as defined by the paramount CMP Decision 13/CMP.1, Decision 15/CMP.1 and Decision 22/CMP.1. First, emissions and assigned amount must be accounted at the national level: each Annex I country is required to establish and maintain a national system for the preparation of its national GHG inventory and to establish a national registry[178] for tracking its Kyoto units. Second, assigned amount and inventory[179] data collected in the national reports are subjected to the review and compliance procedures of the Kyoto Protocol, aimed at verifying the levels of assigned amounts and of emissions, as well as the eligibility to participate in the Kyoto mechanisms. Third, the accounting is reviewed by the secretariat and finally it is recorded as official in a database to catalogue and account for emissions and assigned amounts of Annex I Parties.

The national registry must be established following the detailed technical standards that cover data format, data exchange and communication between registries, data security, serial numbers of Kyoto units and transaction rules, including the termination of invalid transactions.[180] The system must be in place before the submission of the initial report of Annex I countries, due within 1 January 2007.

As for CDM, the CMP established in its first meeting that the CDM Executive Board was responsible for the maintenance of a CDM registry, according to the requirements set out in appendix D to Decision 3/CMP.1.[181] The registry, administered by the secretariat under the guidance of the CDM EB, is responsible for the issuance and the distribution of CERs to the accounts of the mechanism

[178] Annex to Decision 13/CMP.1, section II.
[179] *Ibidem*, section III. The reporting guidelines on annual inventories were updated by Decision 14/CP.11.
[180] *Kyoto Protocol reference manual on accounting of emissions and assigned amount*, UNFCCC, 2008, pag. 22.
[181] FCCC/KP/CMP/2005/8/Add.1.

participants in Annex I Parties national registries.

Furthermore, the Kyoto Protocol maintains and extends the two previous reporting commitments for Annex I Parties established under the Convention, the annual report and the periodic national communication. Countries which are both part of the Climate Change Convention and of the Kyoto Protocol do not have to submit two different sets of reports, but the annual reports and the national communications under the Protocol also fulfil the reporting obligations under the Convention. For the annual report, each Annex I Party is required to submit an annual national GHG emission inventory by 15 April of each year, as required by the Convention, besides any supplementary information on the implementation of the Protocol. National communications, on the other hand, provide supplementary data on its more long-term implementation efforts, inter alia a description of its national system and of its national registry, as well as an explanation of its supplementary extra-domestic efforts and of its support to developing countries.

But how does a country get practically ready for the first commitment period? First of all, a country has to establish the "initial assigned amount", which is calculated, in accordance with article 3, paragraphs 7 and 8 of the KP, as the percentage inscribed for it in Annex B to the Kyoto Protocol of its aggregate anthropogenic CO_2 eq emissions of the GHGs from sources listed in Annex A to the Kyoto Protocol in the base year, multiplied by five. The exact quantity of each Party's initial assigned amount in terms of CO_2 equivalent must be established before the commitment period or within one year from the entry into force of the Kyoto Protocol for the Party, whichever comes later. The document with the initial assigned amounts can be found in the 2008 *Annual compilation and accounting report for Annex B Parties under the Kyoto Protocol.*[182]

The process for establishing a Party's assigned amount is initiated by the Party's submission of its initial report, divided in two parts[183], which should provide information on: the Party's national GHG inventory, comprehending a complete set of common reporting format (CRF) tables for the Party's base year up to the most recent year, and a national inventory report; the Party's selection of its base year for the fluorinated gases HFCs, PFCs and SF_6; any agreement between Annex I Parties reached under article 4 on Joint Implementation; the Party's calculation of its assigned amount; the Party's calculation of its commitment period reserve; the identification of the Party's forest parameter and the activities that the Party elects for use in the accounting of its activities under Article 3, paragraphs 3 and 4 KP (afforestation, reforestation, deforestation and forest management, revegetation, cropland management and grazing land management); the identification of the frequency of accounting for each activity; and a description of the Party's national system and national registry.[184] Each Party is

[182] FCCC/KP/CMP/2008/9/Rev.1.

[183] Decision 13/CMP.1, paragraph 2, and annexes, paragraphs 5-8.

[184] If a country has already submitted all or part of these information, it has to make reference to where it can be found.

required to submit its initial report before 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party. Of the (to date) 39 Annex I countries, 31 submitted their initial report within the established deadline, while 6 (Australia, Bulgaria, Canada, Iceland, Romania and the Russian Federation) presented theirs with delay, with Australia being the most latecomer submitting its initial report on 11 March 2008. 2 Annex I countries, namely Croatia and Monaco, became Parties to the Kyoto Protocol on 28 August 2007 and 28 May 2006 respectively; therefore, their initial report was due one year thereafter, as they did.

After the review of the initial report by an expert review team (ERT)[185], and after any question of implementation has been resolved by the Compliance Committee, the Party's initial assigned amount is recorded, jointly with other information related to the accounting of emissions and assigned amount, in the secretariat's Compilation and Accounting Database (CAD), without any chance of being subsequently changed.[186] The secretariat published the first compilation and accounting report containing the initial accounting parameters recorded in the CAD in November 2008, after the completion of the initial review under the Kyoto Protocol by ERTs and the resolution of questions of implementation.

Once the value of a Party's initial assigned amount and the status of its eligibility to participate in the Kyoto mechanisms have been recorded in the CAD, the information will be provided to the International Transaction Log (ITL). At this point, the Party can begin to issue AAUs in its national registry. If the Party meets the eligibility requirements, it can also begin to transfer and acquire units through the other Kyoto instruments. Once a Party has completed these steps, the initial accounting phase is completed and the annual accounting phase begins.

The annual review of individual inventories of each Annex I Party became mandatory in 2003 with Decision 19/CP.8. After its approval, the UNFCCC COP revised these guidelines only in 2014 with Decision 13/CP.20. The annual accounting phase tracks each Party's emissions and assigned amount during the commitment period, in which each Party will accumulate Annex A emissions, and will account also for LULUCF activities it elected.[187] The exchange and the transfer of emission units in the framework of the Kyoto mechanisms, their addition and subtraction from the assigned amount, are facilitated by the above-mentioned submission of annual reports and their corresponding reviews and compliance procedures.

---

[185] From the UNFCCC website: "Members of the ERTs are selected on an ad hoc basis from the UNFCCC roster of experts nominated by Parties and intergovernmental organisations. The secretariat selects experts to ensure coverage of all inventory sectors, and to achieve an overall balance in the participation of experts from Annex and non-Annex I Parties. Two lead reviewers, one each from an Annex I and a non-Annex I Party, guide the work of the teams. Lead reviewers ensure that the reviews in which they participate are performed by each ERT according to the relevant review guidelines and consistently across Parties."

[186] Annex to Decision 13/CMP.1, paragraph 10.

[187] Annex to Decision 15/CMP.1, paragraph 5.

Each Party included in Annex I, for the purpose of ensuring compliance with Article 3, has to include the necessary supplementary information required by the guidelines in its annual inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol, prepared in accordance with Article 5, paragraph 2, and submitted in accordance with decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, taking into account any relevant decisions of the Conference of the Parties (COP). A Party included in Annex I does not need to separately submit an inventory under Article 12, paragraph 1(a), of the Convention.[188]

The first annual report under the Kyoto Protocol was due on 15 April 2010, the year of the submission of national inventories for the first year of the commitment period. At that time, submission of the annual report containing GHG inventory and the supplementary information required by article 7 KP became mandatory. However, that article recognizes to Parties the right to voluntarily submit annual reports in advance to the formal 2010 submission date.

These are the requirements for the annual reports under the Kyoto Protocol: for the years starting with the first submission year after the establishment of the Party's initial assigned amount through the year in which the Party first transfers or acquires units[189] by means of the Kyoto mechanisms, a complete GHG inventory is the only requirement for the annual report. Besides, information on any significant changes to a Party's national system, or to its national registry must be included in the annual report whenever such changes occur. Once a Party has transferred or acquired units under the Kyoto mechanisms, it must include data on its holdings and transactions of the Kyoto units in the annual report for the following calendar year.[190] Then, within 2010, each Annex I Party must include information on its emissions and removals for each activity of article 3, paragraph 4. If a Party has chosen annual accounting of any of these activities, it must also include its calculation of the "accounting quantity" for that activity annually, beginning in 2010. To the contrary, if a Party has elected commitment period accounting for an activity, then the Party must include the calculation of the accounting quantity for this activity in its annual report for the last year of the commitment period, to be submitted in 2014.

As of 2010, each Party must submit information on implementation of their commitments under article 3, paragraph 14, of the Kyoto Protocol (adverse impacts on developing countries). Following the review of each annual report, and any related compliance procedure, its GHG emissions, its emissions and removals and accounting quantities for LULUCF activities, its holdings of Kyoto units,

---

[188] *Ibidem*, paragraph 2.

[189] Emission reduction units, certified emission reductions, including temporary certified reductions and long-term certified emission reductions, assigned amount units and removal units.

[190] That is, from 1 January to 31 December.

and any change in the status of the Party's eligibility to participate in the Kyoto mechanisms will be recorded in the CAD.[191] Any change in the status of a member State's eligibility requirements to participate in the flexible mechanisms and the accounting quantity for each LULUCF activity will be transmitted when relevant by the CAD to the International Transaction Log[192], which will notify the Party, via its national registry, of any action required by the State in response to the updated data, such as the cancellation of units for emissions from a LULUCF activity.[193]

The annual report containing the inventory for the last year of the first commitment period was submitted in 2014 and counts the total additions to or subtractions from the assigned amount and the total quantity of ERUs, CERs, AAUs and RMUs in the account of each Party for that commitment period.[194] After the conclusion of the review and of the compliance procedures for that year, too, the secretariat recorded in the CAD the aggregate anthropogenic emissions of the GHGs and of the sources listed in Annex A.[195]

Once the final annual report has been submitted, the only remaining procedure to fulfil is the end-of-commitment-period accounting. This accounting provides the final report of each Party's assigned amount for the commitment period and enables the determination of whether the Party is in compliance with the commitments of article 3. In accordance with the additional period for the fulfilment of commitments (true-up period)[196], Parties have additional 100 days after the date set by the CMP for the completion of the expert review process under article 8 of the Protocol to continue to acquire and transfer emissions with the purpose of re-balancing any possible difference between Parties' total emissions during the commitment period and units retired for compliance.[197] Before the end of the true-up period, each Party will be required to demonstrate that it meets its commitments with the Kyoto Protocol: in order to do so, each Party has to "retire" a quantity of Kyoto units equal to or greater than its total Annex A emissions for the commitment period[198]. It does so by transferring these units to a designated account in its national registry.[199]

---

[191] Annex to Decision 13/CMP.1, paragraph 52-58.

[192] Remind that the ITL is responsible for the connection of registries and secretariat system that are involved in the IET mechanism. One of the key tasks of the ITL is to ensure an accurate accounting and verification of transactions proposed by registries in order to support the review and compliance process of the Protocol.

[193] *Kyoto Protocol reference manual on accounting of emissions and assigned amount*, UNFCCC, 2008, pag. 36.

[194] Annex to Decision 13/CMP.1 paragraph. 59.

[195] *Ibidem*, paragraph 60.

[196] See the Annex to Decision 27/CMP.1, section XIII, where the CMP establishes that "For the purpose of fulfilling commitments under Article 3, paragraph 1, of the Protocol, a Party may, until the hundredth day after the date set by the Conference of the Parties serving as the meeting of the Parties to the Protocol for the completion of the expert review process under Article 8 of the Protocol for the last year of the commitment period, continue to acquire, and other Parties may transfer to such Party, emission reduction units, certified emission reductions, assigned amount units and removal units under Articles 6, 12 and 17 of the Protocol, from the preceding commitment period". The modalities for the true-up period accounting are contained in the Annex to Decision 13/CMP.1, paragraph 49.

[197] For the detailed scope of the review, see Annex to Decision 22/CMP.1, paragraph 83.

[198] Annex to Decision 13/CMP.1 paragraph. 14.

[199] *Kyoto Protocol reference manual on accounting of emissions and assigned amount*, UNFCCC, 2008, pag. 37.

The true-up period report must contain all the information that is normally reported annually on assigned amount, including the transaction information in the standard electronic format (SEF)[200] for the period from the beginning of the current calendar year until the end of the true-up period. In addition, the report must include a complete list, by serial number, of the units that the Party has retired, including retirements already reported in previous annual reports. If a Party has AAUs, ERUs or CERs remaining in its registry after it has retired sufficient units to cover its emissions, it may request to carry on these units to the subsequent commitment period.

Subsequently, the compliance with the commitments will be determined by an ERT by the comparison of the quantity of units retired by the Party with the Party's total emissions for the commitment period. It is interesting to mention a clause that was inserted during the Kyoto negotiations on the flexible mechanisms. As a matter of fact, Parties recognised that in some circumstances, emissions from a single industrial process project that was put into operation after 1990 could significantly impact a Party's ability to meet its commitments. Therefore, to address this problem, Decision 14/CP.7 allowed Parties that meet specific requirements to exclude these emissions from their Annex A total emissions for the purpose of determining their compliance: these are specific conditions that both the country and the project concerned must respect[201], which if met enable the Party to exclude that portion of the project's CO_2 emissions that could cause it to exceed its assigned amount from its total emissions. The remaining part of the emissions that do not cause the Party's total emissions to exceed its assigned amount will be included in the compliance assessment for the Party.

The ERT responsible for the review of a Party's true-up period report will first verify that the Party has taken the necessary actions in its registry related to the cancellation and replacement of units. If a Party has not cancelled sufficient units to replace its total emissions, or has not undertaken the necessary transactions to reflect a correction in the CAD, then the ERT will deduct the corresponding quantity of units from the Party's reported quantity of retired units.

Then, the ERT will compare the resulting quantity of units in the Party's retirement account to the Party's total emissions for the commitment period, and will include a clear assessment of whether the Party's total emissions for the commitment period are less than or equal to the quantity of units retired by the Party. If a Party is determined to be in non-compliance with the previous requirements, the enforcement branch of the Compliance Committee will apply its consequences in accordance with the Compliance Committee text (Decision 27/CP.7).

---

[200] FCCC/KP/CMP/2005/8/Add.2, pag. 38.

[201] These conditions are: (a) the Party's total CO_2 emissions in 1990 must be less than 0,05% of the total CO_2 emissions from Annex I Parties in that year; (b) the project must be an industrial process facility at a single stage that has entered into operation after 1990, or which has expanded an already existing industrial process facility at a single site that was operational in 1990 after that date; (c) the project must use renewable energy and apply best environmental practice and best available technology in order to minimize emissions.

Moreover, the ERT will also review the quantity of units that the Party wishes to carry over to the subsequent commitment period to verify that it has no corrections to make and to ensure that the units requested suit the rules for carry-over. On this last point, it has to be underlined that LULUCF units cannot be carried over.

In accordance with the review and the compliance procedures, the total quantity of units available for carry-over will be recorded in the CAD and provided to the ITL. Once the ITL has knowledge of the total quantity of units available to a Party carry-over, the Party may initiate the transfer of units, which will be validated by the Party's registry and by the ITL for the subsequent commitment period. The Party should report on the units carried over in its next report submitted for the second commitment period.

The information on the possible retirement of additional units, or on pending correction will be provided by the same ITL, which will not approve the carry-over of units until the Party has undertaken all necessary retirement of units, as well as any action necessary to respect a correction applied by the Compliance Committee. With this operation the accounting for the commitment period is over.[202]

2.1.1 Parties and results

The targets for the first commitment period of Annex B assigned amounts of the Kyoto Protocol start with the EU -8% reduction of its emissions. The 15 States who were EU members in 1997, when the Kyoto Protocol was adopted, took on that 8% target knowing that it would be redistributed among themselves, taking advantage of a scheme under the Protocol known as a "bubble" (art. 4 KP)[203]: even though countries have different individual targets, this clause allowed an important internal diversification which combined made the overall target for that group of countries.[204] This same percentage of emissions reduction was accepted also by Bulgaria, Czech Republic, Estonia, Latvia, Liechtenstein, Lithuania, Monaco, Romania, Slovakia, Slovenia, and Switzerland. Hungary, Japan and Poland agreed for a -6% reduction, while Croatia agreed for -5%. New Zealand, the Russian

[202] *Kyoto Protocol reference manual on accounting of emissions and assigned amount*, UNFCCC, 2008, pag. 39.

[203] The "regional economic integration organisation" bubble clause was adopted almost expressly for the EU and its Member States at the moment when the Kyoto Protocol was ratified. The "bubble" clause provides the EU and its Member States with the possibility of taking a joint commitment translated into a common quantified emission reduction of emissions commitment of -8% by 2012 below 1990 levels, thus having the possibility to diversify the commitments within its Members. These diversified targets where defined as follows: Germany -21.0%, United Kingdom -12.5%, Italy -6.5%, Denmark -21.0%, Netherlands -6.0%, Belgium -7.5%, Austria -13.0%, Luxembourg -28.0%, Finland 0.0%, France 0.0%, Sweden +4.0%, Ireland +13.0%, Portugal +27.0%, Greece +25.0%, Spain +15.0%.

[204] For a detailed insight on internal European emissions trends, see: http://www.eea.europa.eu/publications/ghg-trends-and-projections-2012.

Federation and Ukraine were allowed to keep their 1990 emissions levels, while Norway, Australia and Iceland were recognised the right to increase their emissions, respectively of +1%, +8% and +10%. Some EITs have different baselines from the 1990 standard. These countries are Bulgaria (1988), Hungary (average of 1985-1987), Poland (1988), Romania (1989), Slovenia (1986).

During CMP 2 in Nairobi in 2006, Parties to the Protocol adopted an amendment to Annex B to the Protocol with Decision 10/CMP.2. The amendment consisted in the inclusion of Belarus between Austria and Belgium in the Annex. In accordance with article 20, the amendment is subjected to acceptance by Parties to the Kyoto Protocol: to enter into force the amendment has to be accepted by at least three fourths of the Parties to the Kyoto Protocol, and at present this has not happened. Currently, only 29 Parties[205] have accepted the amendment to Annex B, but nevertheless Belarus has undertaken the Kyoto commitments.

Before the start of the commitment period, CO_2 emissions from fossil-fuel burning increased by only 1% a year on average in the 1990s, but grew by 3% a year from 2000 to 2005.[206] Emission growth is a function of economic growth, growth in energy intensity (of GDP) and growth in carbon intensity (of energy). In the 2000s decade, there has been an acceleration in the growth of all these three variables, and a more in depth analysis of this trend shows that disaggregating data between OECD developed and non-OECD developing countries, the driver of the recent raise of CO_2 emissions is the non-OECD group. Although in the early 1970s non-OECD countries were responsible for more or less one-third of global emissions, energy and output (GDP), in 2005 they became accountable for just over half of global energy use and emissions, and 45% of global output. In addition, since 2000 non-OECD emissions have been growing almost six times as fast as OECD emissions, accounting for 85% of their growth, due to the fact that OECD countries show a general slowdown in growth of emissions in recent years.[207] There has also been a significant reduction among the OECD countries in the rate of the energy intensity of economic activity and the carbon intensity of energy use.

The 1990s saw a rapid decline in energy intensity in the non-OECD group. Energy grew at only a quarter of the rate of GDP, and emissions grew slightly more than energy. The 2000s decade, on the other hand, saw the upswing of energy-intensive and carbon-intensive growth in the developing world: in fact, energy use has grown at three-quarters the rate of GDP, and carbon emissions five times faster than energy use.

According to the IPCC's *Fourth Assessment Report*[208], in 2004 CO_2 from fossil-fuel use and industrial

---

[205] Armenia, Australia, Azerbaijan, Belarus, China, Cuba, Czech Republic, Egypt, Georgia, India, Iran, Israel, Kazakhstan, Kyrgyzstan, Mauritius, Mexico, Morocco, Norway, Peru, Republic of Korea, Republic of Moldova, Russian Federation, Serbia, South Africa, Syrian Arab Republic, Turkmenistan, Ukraine, Uzbekistan, Vietnam.

[206] D. Helm, *The economics and politics of climate change*, Oxford University Press, 2009, pag. 83.

[207] *Ibidem*, pag. 84.

[208] For a synthesis on the Fourth Assessment Report of the IPCC see the IPCC *Climate Change Synthesis Report* available at the following link: https://www.ipcc.ch/report/ar4/syr/.

processes contributed 59% of the greenhouse gas emissions. CO_2 from land-use change and forestry contributed 17%, and non-CO_2 emissions contributed the remaining 23%. Of the non-CO_2 emissions, methane and nitrous oxide, two of the most important gases object of the Kyoto Protocol's commitments, constituted 14 and 8% of the total emissions.[209]

Already in 2005, the countries that ratified the Kyoto Protocol were on track to meet the overall agreed reduction of 5% below 1990 by 2008-2012. In that year, their emissions were 15% below the 1990 level (excluding LULUCF emissions)[210]; however, there were large differences between Annex B countries: States with economies in transition were about 35% below and the non-EIT 3% above, and individual-country analysis shows even bigger differences: Latvia was 59% below its 1990 level, while Spain was 53% above (with a target of +15%). Including LULUCF does not change this picture radically, except for Latvia, which had negative overall emissions, that is, the fixation of CO_2 in forests was bigger than the emissions of GHGs to the atmosphere from all other sources. It is striking that Canada's emissions were 54% above 1990 in 2005 (with a target of 6%), while the U.S.A., which is not part of Kyoto, saw a 16% increase above 1990 in 2005. This confirms the complete lack of implementation of the Kyoto Protocol obligations in Canada, which in fact on 15 December 2011, withdrew from the Kyoto Protocol. This action became effective on 15 December 2012.

However, the final accounting report of the first commitment period for Annex B Parties under the Kyoto Protocol for 2015, which contains the national greenhouse gas inventory data for 2012, reveals that the results of the Protocol have not been so widely neglected as it was perceived before the start of the commitment period.

On the contrary, according to the information submitted by Annex B Parties in 2014, the total GHG emissions in 2012 of Annex B Parties from sources listed in Annex A to the Kyoto Protocol amounted to 9,307.6 Mt CO_2 eq. The total aggregate GHG emissions for all Annex B countries decreased by 22.5% compared to 1990.[211] The average annual GHG emissions of Annex B Parties in the first commitment period from sources listed in Annex A to the Kyoto Protocol amounted to 9,344.6 Mt CO_2 eq, which is 22.2% lower than the base year level defined under the Kyoto Protocol.

Twenty-eight Parties chose to account for LULUCF activities under article 3, paragraph 3 (afforestation, reforestation, deforestation), of the Kyoto Protocol for the entire commitment period (accounting once at the end of the commitment period) and eight chose to account for them annually; finally, twelve Parties chose not to account for any of the eligible LULUCF activities under article 3,

---

[209] Fluorinated are not included in these projections owning to their small size (about 1% of GHG emissions) and the difficulties of making comparisons with the Special Report Emissions Scenario (SRES) of the IPCC using these gases.

[210] B. Metz, *Controlling climate change,* Cambridge University Press, 2010, pag. 326. See also the figures at pag. 327.

[211] Annual compilation and accounting report for Annex B Parties under the Kyoto Protocol for 2014 (FCCC/KP/CMP/2015/6), pag. 1, available at the following link: http://unfccc.int/resource/docs/2015/cmp11/eng/06a01rev01.pdf.

paragraph 4 (forest management, revegetation, cropland management and grazing land management), whereas the other Parties chose to account for at least one of them. The total net GHG emissions and removals for 2012 is positive on the whole, with a -102.9249.175 t CO_2 eq.

Assigned amounts and total greenhouse gas emissions from Annex A sources for the first commitment period of the Kyoto Protocol[212]

Party	Assigned amounts pursuant to article 3, paragraph 7 and 8 (t CO_2 eq.)	Total GHG emissions from Annex A sources (t CO_2 eq.)	Difference between emissions and from assigned amounts (%)	Kyoto Protocol target (%)
Australia	295 7579 143	271 1153 476	-8,3	8,0
Bulgaria	610 045 827	312 859 911	-48,7	-8,0
Croatia	148 788 503	144 820 156	-2,7	-5,0
Czech Republic	893 541 801	680 149 966	-23,9	-8,0
Estonia	196 062 637	95 304 517	-51,4	-8,0
European Union	19 621 381 509	18 822 263 095	-4,1	-8,0
- Austria	343 866 009	414 658 054	20,6	-13,0
- Belgium	673 955 528	626 308 776	-7,1	-7,5
- Denmark	276 838 955	297 947 591	7,6	-21,0
- Finland	355 017 545	338 353 531	-4,7	0,0
- France	2 819 626 640	2 538 856 531	-10,0	0,0
- Germany	4 868 096 694	4 706 574 671	-3,3	-21,0
- Greece	668 669 806	598 504 091	-10,5	25,0
- Ireland	314 184 272	308 508 846	-1,8	13,0
- Italy	2 416 277 898	2 479 638 840	2,6	-6,5
- Luxembourg	47 402 996	60 116 132	26,8	-28,0
- Netherlands	1 001 262 141	997 119 267	-0,4	-6,0
- Portugal	381 937 527	362 098 075	-5,2	27,0
- Spain	1 666 195 929	1 791 980 049	7,5	15,0
- Sweden	375 188 561	305 573 749	-18,6	4,0
- United Kingdom	3 412 080 630	3 017 236 560	-11,6	-12,5
Hungary	542 366 600	335 956 338	-38,1	-6,0
Iceland	18 523 847	23 356 071	26,1	10,0
Japan	5 928 257 666	6 392 411 719	7,8	-6,0

[212] Source: Annual compilation and accounting report for Annex B Parties under the Kyoto Protocol for 2015 (FCCC/KP/CMP/2015/6), Table 6, pag. 14.

Latvia	119 182 130	56 453 901	-52,6	-8,0
Liechtenstein	1 055 623	1 175 109	11,3	-8,0
Lithuania	227 306 177	109 786 321	-51,7	-8,0
Monaco	495 221	471 255	-4,8	-8,0
New Zealand	309 564 733	372n797 621	20,4	0,0
Norway	250 576 797	266 824 503	6,5	1,0
Poland	2 648 181 038	2 006 265 534	-24,2	-6,0
Romania	1 279 835 099	615 929 959	-51,9	-8,0
Russian Federation	16 617 095 319	11 187 543 419	-32,7	0,0
Slovakia	331 433 516	227 690 025	-31,3	-8,0
Slovenia	93 628 593	98 542 441	5,2	-8,0
Switzerland	242 838 402	261 721 729	7,8	-8,0
Ukraine	4 604 184 663	1 999 434 250	-56,6	0,0
Total	**57 641 914 844**	**46 722 911 316**	**-18,9**	

As far as transactions of Kyoto Protocol units[213] are concerned, for the 36 Annex B Parties that reported information on Kyoto Protocol units there were 59616.1 million Kyoto Protocol units by the end of 2014, year of the final accounting on the first commitment period. Of these units, there were 56793.5 million AAUs, 871.6 million ERUs, 669.5 million RMUs, 1275 million CERs and 6.5 million t CERs in the different holding accounts, including different cancellation and retirement accounts.[214]

All Annex B Parties, as of 9 November 2015, were eligible to participate in the flexibility mechanisms with respect to the first commitment period.[215] The flexible mechanisms of the Kyoto Protocol have helped Parties to achieve (and over-achieve) their objectives: the total investment in registered or registering CDM projects as of June 2012 is estimated at USD 215.4 billion. The annual investment peaked in 2008 at USD 13.9 billion (operating projects) and USD 40.4 billion (all projects), but the large number of projects undergoing validation could lead to a new, much higher, peak in 2012 or thereafter.[216] For the 2008-2012 commitment period, it is estimated that there have been cost savings due to the use of CERs by both firms and governments. The average investment per project is

[213] Kyoto Protocol units are divided in internal and external. An internal transaction does not involve another national registry, whereas an external transaction involve the transaction of units from one national registry to another.

[214] Detailed information on the status of accounts for each Annex B Party can be found in document FCC/KP/CMP/2015/6/Add.1.

[215] FCCC/KP/CMP/2015/6, paragraph 16, pag. 7.

[216] G. A. Kirkman, S. Seres, E. Haltes, R. Spalding-Fecher, *Benefits of the Clean Development Mechanism, 2012*, UNFCCC, pag. 58.

approximately of USD 45 million. Non-Annex I countries China and India account for 65% of the total investment with 45% of the projects. The reason why projects in East Asia have relatively large capital investment is due to the capital-intensive nature of the projects undertaken (renewables) and their large average size. In contrast, the capital investment per project of almost every other region is equal to or below the overall average. A comparison of renewable energy CDM projects with similar projects in Annex I countries shows that CDM projects there are often much larger and less capital-intensive than corresponding projects in Annex I countries. Approximately 90% of CDM projects in Annex I countries are domestically financed. However, there is a strong indication[217] that the share of foreign investment is increasing in CDM Annex I projects. The pattern of foreign investment in CDM projects is complex, with funds coming from both developed and developing countries and often from multiple countries for a single project.

Most CDM project types have an average estimated mitigation cost below 10 USD per tonne of carbon dioxide equivalent (t CO_2 eq). These costs vary significantly by project type, with solar being the most expensive technology deployed in the CDM (more than 300 USD/t CO_2 eq). The average mitigation cost has increased over time, reflecting the change in the mix of project types with fewer low-cost industrial gas projects in recent years. However, it may also reflect a more stringent assessment of additionality over time leading to fewer project activities that are economically viable without the revenue from the sale of CERs.

As far as Joint Implementation is concerned, at the end of the first commitment period there were 520 JI projects which issued approximately 809 330 496 ERUs through the two verification procedures (Track 1 and Track 2).[218] The Annual report of the Joint Implementation Supervisory Committee of 2012[219] underlines how the "history" of JI has been characterised by "(1) a slow start-up, for a variety of reasons, such as delays in the establishment of necessary domestic regulations in host Parties; (2) a period of steady development, implementation and improvement, accompanied by a growing interest and participation in the mechanism; and (3) the present stage of uncertainty, during which the JISC has focused its attention on consolidating the progress made in implementing JI and formulating, and seeking adoption of, recommendations that would ensure that this valuable tool continues to be available to Parties in the future." This is the best possible resume for the flexible mechanism's overall situation in the first commitment period.

A more general insight on the overall Annex I countries' results is useful to understand the impact of the Kyoto Protocol in the framework of the Climate Change Convention. The data and the figures[220]

---

[217] *Ibidem.*
[218] FCCC/KP/CMP/2013/4, pag. 4.
[219] FCCC/KP/CMP/2012/4.
[220] FCCC/SBI/2014/20, Figure 2, pag. 8.

of the accounting report show that there has been a general reduction of emissions in Annex I countries, concentrated in the 2008-2009 period, which has been followed by a small increase approximately from the year 2009 to 2010 for Annex I non-EIT Parties and from 2009 to 2012 for EIT Parties. The data from the last two years of the commitment period witness a further reduction in emissions of Annex I countries, from 5.1% to 1.9% excluding LULUCF and from 4.2% to 0.3% including it. All in all, since the start of the commitment period and compared to the levels of the beginning of the 2000s, small progresses have been made in the achievement of the Convention objectives.

Countries with economies in transition saw a reduction of GHG emissions excluding and including LULUCF by 39.1% and 49.7%, respectively. For Annex I Parties which do not have economies in transition (OECD countries), GHG emissions for the same categories increased by 1.9% and 0.3% respectively. Notwithstanding, wide differences emerge between the individual results of Annex I countries. Excluding LULUCF, of the total 43 States, 28 showed a decrease in emissions by more than 1%, while 15 States showed an opposite increase of emissions of more than 1%.[221] For example, Australia increased its emissions by 31% from 1990, as well as United States and New Zealand increased theirs by 4.3% and 25.4%, respectively. Between the smaller countries, it is striking to notice how Malta incremented its emissions by 57.7%, Cyprus by 52.1%, and Iceland exceeded its assigned amount with a 26.3% growth of emissions. However, there were also positive surprises which made the overall result of Annex I countries. For example, the European Union decreased its emission by 19.2%, and a great number of economies-in-transition countries ranged on reductions between 55 and 45%.

Including LULUCF, the overall situation does not change very much. Compared to 1990, in 2012 29 Parties show a decrease in emissions by more than 1%, one (Liechtenstein) shows a decrease in emissions within 1%, while 13 Parties show an increase in emissions by more than 1%.[222] There are, however, some surprising differences, for example the total change in emissions in Latvia including LULUCF activities amount to -120.8%, more than the double that without counting them, as well as New Zealand increases exponentially from a 25.4 to a 111.4% from 1990.

Although the Kyoto Protocol met its main objective of GHGs emissions reduction, it was common perception to think that the Protocol alone would not meet the objective of the UNFCCC, i.e. the fundamental stabilisation of GHG concentrations in the atmosphere at a level that would avoid dangerous anthropogenic interference with the climate. Due to the small reduction in global GHG emissions that Annex B countries can produce, the Protocol recognises the need for additional commitment periods and for immediate action. It is for this reason that CMP 1 met this requirement

[221] *Ibidem*, Table 5, pag. 14.
[222] *Ibidem*, Table 6, pag. 15.

by establishing the Ad Hoc Working Group on Further Commitments from Annex I Parties under the Kyoto Protocol (AWG-KP, formerly AWG). Moreover, COP 11[223] established a Dialogue on Long-term Cooperative Action to Address Climate Change by Enhancing Implementation of the Convention. The work of the dialogue produced at COP 13 (2007) a range of suggestions regarding the essential elements of a post-2012 climate regime[224], which had to include a long-term goal which provided an overall direction to the regime, national climate change strategies covering both mitigation and adaptation, market mechanisms, including the carbon market and other mechanisms to reduce the cost of mitigation, the need to ensure that adaptation is addressed with a sense of urgency, efforts to stimulate the diffusion, transfer and deployment of existing lower emission technologies, and mitigation opportunities in specific sectors that would allow countries with different national circumstances to contribute to the effort.[225]

It can be said that the absence of the USA represented the main failure of the Kyoto Protocol. If the American country had been involved, its positive contribution could have made the Kyoto's objective much more global, even if it would have not been enough anyway, given that the Protocol applies mostly to industrialised nations. Besides, the results of Annex B countries result falsified by the fact that most of the cuts came from Eastern European countries which were in economic troubles after the fall of the Berlin Wall; these reductions would have happened anyway, with or without the Protocol. Without Russia and Ukraine (and without Canada's withdrawal) the Kyoto Protocol Parties would only have reduced their emissions by a scarce 2.7%. This is well below the 5% target. It is only the fact that carbon emissions were reduced in Russia and Ukraine by a combined 32.4% that brings the Kyoto Protocol figures down to a 22.5% reduction.[226]

In the same period, global carbon emissions have more than doubled compared to 1990,[227] thanks to the rapid industrialisation of nations such as China, not covered by the deal. On this aspect, the Kyoto Protocol has been a drop in the sea of global emissions, which urges to be complemented by a more global action.

---

[223] Decision 1/CP.11.

[224] Scenario note on the fourth Dialogue workshop, section 2, paragraph 6.

[225] *The United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, a guide to the climate change negotiations*, IPIECA, 2008.

[226] Source: http://www.circularecology.com/news/the-kyoto-protocol-climate-change-success-or-global-warming-failure#.VogDRRXhDIU.

[227] See graph 1 at the following link at www.carbonbrief.org: http://www.carbonbrief.org/2012s-carbon-emissions-in-five-graphs.

2.2 Doha amendment

COP 13 (2007) agreed the Bali Action Plan (informally known as the Bali Road Map), which included precisely the six above-mentioned elements[228] and called for a two-year negotiation to reach agreement on most of these issues, in parallel with the AWG-KP deliberations, and to guide the negotiation of a framework that built on and succeeded the Kyoto Protocol. The road map identified many important issues that gave new nourishment to the following meetings of the Parties of the Convention and the Kyoto Protocol, and finally brought to the adoption of the Doha amendment to the Kyoto Protocol.

The Bali Action Plan[229] is divided into five main categories: shared vision, mitigation, adaptation, technology and financing. The shared vision refers to the long-term cooperative action, including a long-term global goal for emission reductions. Mitigation has the objective of enhancing measurable, reportable and verifiable nationally appropriate mitigation commitments and actions, improving national mitigation efforts by developing country Parties in the context of sustainable development, promoting new policies to fight deforestation and forest degradation in developing countries, cooperation between multilateral bodies, the public and the private sector and civil society. Adaptation is an inevitable action facing the more and more problematic effects of climate change: international cooperation has to be enhanced, risk management and risk reduction strategies have to be developed, especially in developing countries that are particularly vulnerable to the adverse effects of climate change. The development of new technologies and new financial resources to support action on mitigation and adaptation is acknowledged as paramount in order to remove obstacles to promote access and diffusion of affordable environmentally sound technologies.

The Bali Action Plan was very ambitious, and moreover it underestimated the (notably long) time the international community needed to build a global response to it. In fact, it requested to the Ad Hoc Working Group on Long-Term Cooperative Action (AWG-LCA)[230], which worked in parallel with the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP), to complete its work within 2009 and present the outcome of its work to the COP for adoption at its fifteenth session in Copenhagen.

However, COP 15 was highly disappointing, and it did not see any relevant outcome. Fundamental

---

[228] A long-term goal to the climate change regime, national climate change strategies covering both mitigation and adaptation, market mechanisms, including the carbon market and other mechanisms to reduce the cost of mitigation, the need to ensure that adaptation is addressed with a sense of urgency, efforts to stimulate the diffusion, transfer and deployment of existing lower emission technologies, and mitigation opportunities in specific sectors that would allow countries with different national circumstances to contribute to the effort.

[229] Decision 1/CP.13 (FCCC/CP/2007/6/Add.1), pag. 3.

[230] *Ibidem*, pag. 5, paragraph 2.

differences between developed and developing countries and the political circumstances in the USA resulted in a failure to agree on a comprehensive treaty for the period after 2012.[231] The result of Copenhagen was an informal declaration, called the Copenhagen Accord, supported by more than 100 countries.[232] The most important elements of the Accord are, inter alia, a recognition that global temperature increase should be limited to 2°C (or even 1.5°C) above pre-industrial levels[233], pledges by individual developed and developing countries for action on climate change towards 2020, a promise of industrialised countries to deliver UDS 30 billion for funding mitigation and adaptation actions in developing countries (with priority to the least developed countries) for the period 2010-2012 and an intent to mobilise USD 100 billion per year in public or private funding by 2020, and the intention to establish new mechanisms under the UNFCCC for adaptation, financing technology transfer, forest preservation, and a new fund for supporting developing countries.

Despite this informal understanding, all in all Copenhagen resulted in the peak of distrust between developed and developing countries, particularly on the legal form of an agreement: non-Annex I countries refused to include further actions on their part into a second commitment period of the Kyoto Protocol or in a new global agreement, although they knew that all Parties would be expected to do more in the second commitment period. On the other side, developed countries refused to put their commitments in the Kyoto Protocol unless the USA and major developing countries were also bound to legal obligations.

Clearly, the task of the AWG-LCA was not completed within that deadline, and the COP extended its mandate enabling it to continue its work with the aim of presenting the results in 2010 at COP 16/CMP 6 in Cancun. These developments were catalysed in that Conference and produced the Cancun Agreements.

The Cancun Agreements represent the largest collective effort to reduce emissions, with national and international strategies bound together under the banner of the UNFCCC and the most comprehensive package ever agreed by governments[234] to help developing nations to deal with climate change. Finance, technology and capacity-building provisions were included so as to help these nations to implement mitigation and adaptation strategies.

As far as mitigation is concerned, the main goals were to establish a clear deadline for reducing human-generated greenhouse gas emissions to keep the global temperature rise below 2°C in respect

---

[231] B. Metz, *Controlling climate change,* Cambridge University Press, 2010, pag. 347.

[232] Copenhagen Accord, see http://unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&priref=600005735#beg.

[233] Assessments of the global impact of the Copenhagen Accord pledges shows they are insufficient to be on track to limiting temperature increase to 2°C, let alone 1,5°C . The projected emission levels in 2020 are actually consistent with a temperature increase of 2.5 to 5°C. UNEP, *The emissions gap report: are the Copenhagen Accord pledges sufficient to limit global warming to 2°C or 1.5°C? A preliminary assessment*, Nairobi 2010.

[234] Unfccc.int, at the electronic page dedicated to the Cancun Agreements.

of pre-industrial levels and to encourage the participation of all countries in this effort.

In fact, all Annex I countries and more than forty developing countries submitted economy-wide emission reduction targets[235] for the period beyond 2012 until 2020. It was agreed that industrialised countries will boost the regular reporting of progress towards these targets by submitting detailed annual inventories of greenhouse gas emissions and by reporting on progress in emission reductions every two years. However, the total sum of official emission reduction pledges from all countries amounted to only around 60% of what was needed to limit the temperature increase to 2°C, the temperature ceiling that would give us a reasonable chance of avoiding the worst impacts of climate change. This 40% gap has been the object of special annual "emissions gap" reports from the UNEP since 2010. The report of 2012, the year of the end of the first commitment period, gave an updated estimate of the 2020 emissions gap of 8 to 13 gigatonnes of equivalent CO_2, which is larger than previous estimates. This is due to the higher than expected economic growth, especially in developing countries like China and India, which provokes inconsistency with the hoped path of staying within the 2°C temperature rise.[236]

The developing countries submissions on their plans to limit the growth of their emissions were displayed in the framework of expected Nationally Appropriate Mitigation Actions (NAMAs). The Cancun Agreements provide an international registry for these actions and strengthen the ways to make them more exploitable and transparent. Specifically, developing countries will provide information on the actions for which they are seeking support, whereas industrialised countries will provide information on available support for these actions. Supported actions will be measured, reported and verified internationally, whereas for domestically supported actions this will be done at the national level. It was also agreed that developing countries strengthen their efforts on reporting on progresses towards their mitigation objectives, although always in a differentiated way.

On adaptation, the Conference decided to establish the Cancun Adaptation Framework, in order to strengthen action on adaptation in developing countries through international cooperation, education, and public awareness. In addition, the COP also instituted an Adaptation Committee to promote the implementation on all the issues that concern adaptation, namely technical support and guidance, knowledge-sharing and cooperation with stakeholders, and to set up a process for least developed countries (LDCs) and other interested developing States to develop and put into practice national adaptation plans (NAPs) to face their medium and long-term adaptation needs. Finally, a clear work programme on how to address loss and damage from climate change impacts in developing countries was established.[237]

---

[235] FCCC/SB/2011/INF.1/Rev.1.

[236] *The Emissions Gap Report 2012*, UNEP Synthesis Report, available at the following link: http://www.unep.org/publications/ebooks/emissionsgap2012/.

[237] Decision 1/CMP.6, paragraph 6(e).

Then, the third pillar of the Cancun Agreements is represented by financial, technology and capacity-building support. They provide support to both adaptation and mitigation actions by developing countries. Following the pledge made in Copenhagen, in Cancun the COP took note of the collective commitment of developed countries to provide USD 30 billion for the period 2010-2012 (fast-start finance), reaffirming they will be invested to help least developed countries. The procedure will be made fully operational during COP 17 and 18. Moreover, in order to scale up the provision of long-term financing for developing countries, Parties decided to create a Green Climate Fund (GCF), under the direct control of the Conference of the Parties. The Fund will support projects, programmes, policies and other activities in developing countries. Governed by the GCF Board, initially its assets have been administered by the World Bank as an interim trustee. The GCF became independent within COP 19, after the approval of the "Governing Instrument for the GCF"[238], the establishment of the independent GCF secretariat and the selection of the Executive Director of the GCF by the GCF Board.

In the broad context of long-term financial support, industrialised countries committed to raise the collection of funds to USD 100 billion per year by 2020 to support concrete mitigation actions that are implemented in a transparent way by developing countries. These funds are to be raised from a mix of public and private sources.

To strengthen technology development and transfer, Parties established the Technology Mechanism, which supports the efforts of countries to accelerate and enhance action on climate change, providing help to develop and transfer climate technologies so that they can effectively reduce greenhouse gas emissions and prepare for adaptation. The mechanism reflexes the strong stress of the COP/CMP on technology, one of its main concerns and means to fight climate change. Renewable energies, drought-resistant crops, early warning systems and sea walls, energy-efficient practices and know-how are the main drivers of this effort. The mechanism includes the Technology Executive Committee (TEC), which has the aim of strengthening the development and deployment of new technologies, as well as to increase public and private investment in technology development and transfer.

Finally, with Decision 2/CMP.6 concerning LULUCF[239], the CMP requested each Annex I Party to submit to the secretariat, within 28 February 2011, information on the forest management reference levels included in the appendix to the annex I[240] to that decision. In response to that, the full financing

[238] FCCC/CP/2011/9/Add.1. Document available at the following link: http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf#page=58.

[239] FCCC/KP/CMP/2010/12/Add.1, pag. 5, paragraph 5.

[240] "The forest management reference levels were set taking into account the following parameters: (a) removals or emissions from forest management as shown in greenhouse gas inventories and relevant historical data; (b) age-class structure; (c) forest management activities already undertaken; (d) projected forest management activities under a 'business as usual' scenario; (e) continuity with the treatment of forest management in the first commitment period; (f) the need to exclude removals from accounting in accordance with decision 16/CMP.1, paragraph 1. Points (c), (d) and (e) above were applied where relevant. The forest management reference levels also took into account the need for

options for the implementation of mitigation actions concerning forests will be addressed in Durban in the next session.

As a matter of fact, in the next meeting of the Parties, the Annex to Decision 2/CMP.7 defined the rules and guidelines that drive LULUCF activities.[241] The 2011 Climate Change Conference in Durban was important for several other developments in the negotiations. After Cancun, Parties openly recognised the need of a comprehensive answer to climate change that dealt with it beyond 2020, in the form of a new universal legal agreement. In short, Parties once again recognised the need of a global plan that could effectively reach the Convention's objective of stabilising "greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

In order to do so, the Durban outcomes tried to address these challenges by taking, as we have already mentioned, a more forward-looking approach by enclosing a road map for implementation which covers four main coordinated and complementary action areas: 1) second commitment period of the Kyoto Protocol, which in Decision 1/CMP.7 is agreed to begin on 1 January 2013 and end either on 31 December 2017 or 31 December 2020. Moreover, the COP decided to launch a process to develop a protocol or another instrument with legal force in order to be able to adopt it at its twenty-first session in 2015; 2) the task of drafting this legal instrument was demanded to a newly created body, the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP)[242]; 3) the Durban outcomes also decided to conclude within 2012 the work of the existing broad-based stream of negotiations, managed by the AWG-LCA, to make, inter alia, the existing national emission limitation and reduction plans[243] more transparent and effective; 4) acknowledging that "there is a gap between the aggregate level of reduction in emissions of greenhouse gases to be achieved through global mitigation efforts and the reduction needed as part of the global effort to achieve the range indicated in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change"[244], the COP decided to conduct a review of the growing climate challenges in order to ensure if the limit of 2°C rise was enough or if Parties had to lower it to 1.5°C. The Conference decided that the national communications for the second commitment period had to continue to be submitted every four years, and complemented with the *UNFCCC biennial reporting guidelines for developed country Parties*, which have the role of ensuring that information on the progresses made by Annex I Parties in achieving their quantified economy-wide emission reduction targets, projected emissions, and the

consistency with the inclusion of carbon pools. Reference levels including and excluding 'force majeure' should be provided."

[241] FCCC/KP/CMP/2011/10/Add.1, Annex from pag. 13.

[242] Decision 1/CP.17.

[243] See FCCC/SB/2011/INF.1/Rev.1.

[244] Decision 2/CP.17, section II(a), pag. 5.

provision of financial, technological and capacity-building support to non-Annex I Parties are respected. On this last point, the COP decided that they should submit their first biennial update report by December 2014, but the least-developed country Parties and small-island developing States may submit biennial update reports at their discretion.

The next year, COP 18/CMP 8 in Doha produced an important result in the recent negotiation on climate change, together with many outcomes that moved the international agenda fore ward. First of all, the Kyoto Protocol, the only binding agreement under which developed countries are obliged to cut their greenhouse emissions, was amended for a second commitment period (the so-called Doha amendment).[245]

However, in the climate negotiations, nothing comes easily. Adopted on 8 December 2012, the amendment will enter into force, in accordance with Article 20, paragraph 4, for those Parties having accepted it on the ninetieth day after the date of receipt by the Depositary of an instrument of acceptance by at least three fourths of the Parties to the Kyoto Protocol. For the amendment, a total of 144 instruments of acceptance are required for its entry into force. At present, more than three years after its adoption, it has not yet entered into force. So far, just 47 Parties, mostly developing countries, ratified the amendment.[246] Of the Annex I countries, only Hungary, Iceland, Liechtenstein, Monaco, New Zealand, Norway, and Switzerland ratified it.

Twenty years after the draft of the Convention, the outcome of Doha pictures well the lack of international coordination in reaching the UNFCCC's objectives "within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner." The distance between the current national and international actions, intentions to reduce emissions and the actual necessities of the environment had so far remained, and the Doha amendment seemed just to underline once again the difficulty of passing from words to actions.

In paragraph 5 of Decision 1/CMP.8, the CMP recognised that Parties may provisionally apply the amendment pending its entry into force in accordance with Articles 20 and 21 of the Kyoto Protocol, providing notification to the Depositary of their intention to provisionally apply the amendment. There are 38 Parties[247] listed in the second commitment period Annex B that have

---

[245] Decision 1/CMP.8.

[246] Algeria, Argentina, Azerbaijan, Bahamas, Bangladesh, Barbados, Bhutan, Brunei Darussalam, Cambodia, Chile, China, Comoros, Congo, Djibouti, Ecuador, Ethiopia, Grenada, Guyana, Honduras, Hungary, Iceland, Indonesia, Kenya, Liberia, Liechtenstein, Madagascar, Maldives, Marshall Islands, Mauritius, Mexico, Micronesia, Monaco, Morocco, Namibia, Nauru, New Zealand, Norway, Palau, Panama, Peru, Republic of Korea, Rwanda, Samoa, San Marino, Seychelles, Singapore, Solomon Islands, South Africa, Sri Lanka, Sudan, Switzerland, Thailand, Trinidad and Tobago, Tuvalu, Uganda, United Arab Emirates, Vietnam.

[247] Australia, Austria, Belarus, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, European Union, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine and the United Kingdom of Great Britain and Northern Ireland.

QELROs targets, with a view to reducing their overall emissions of GHG gases by at least 18% below 1990 levels between 2013 and 2020. In Annex A to the Protocol, it has been added a seventh greenhouse gas, nitrogen trifluoride.[248]

The accounting rules of the first commitment period were preserved, as well as its flexible market mechanisms of Joint Implementation, Clean Development Mechanism and Emissions Trading, which remain available for every developed country that will accept the targets for the second commitment period. The biennial reports were added to the measurement, reporting and verification framework in the form of tables known as common tabular format, in order to improve transparency. In addition, Parties simplified the negotiations, completing the work under the Bali Action Plan, in order to progress on the work towards a 2015 international agreement under a single negotiating stream in the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP).

With regards to technology and finance, there were small developments. In Doha, governments advanced the completion of new infrastructures to channel technology and financing to developing countries. First, the COP endorsed the selection of the Republic of Korea as the headquarter of the Green Climate Fund and the work plan of the Standing Committee on Finance[249], and confirmed the selection of UNEP as the host of the Climate Technology Centre (CTC), the implementing arm of the UNFCCC Technology Mechanism for an initial term of five years.[250] Parties also agreed on the constitution of the Climate Technology Centre and Network (CTCN) Advisory Board. Besides, developed countries pledged to scale up their long-term financial supports to developing countries, with a view to mobilising USD 100 billion annually by 2020 for adaptation and mitigation.[251] In the period 2010-2012 the annual level of financial funds was around USD 30 billion: the gap to fill, thus, is very big.[252]

Apparently not convinced by the (at the time) four IPCC's Assessment Reports (the last in 2007), governments launched a process of review of the long-term temperature goal, with the objective of checking the current state of the advance of the temperature-rise danger.

On adaptation, governments tried to provide ways to implement the National Adaptation Plans (NAPs) established under the Cancun Adaptation Framework[253] to help least developed countries, and identified a pathway to further strengthen the adaptive capacities of the most vulnerable through better planning. They also completed a registry to record developing country mitigation actions which are

[248] FCCC/KP/CMP/2012/13/Add.1, Annex I, Doha amendment to the Kyoto Protocol, pag. 7.
[249] Decision 6/CP.18, paragraph 3.
[250] Decision 14/CP.18, paragraph 2.
[251] Decision 4/CP.18, paragraph 2.
[252] Governments are to continue a work programme on long-term finance during 2013 to identify pathways for mobilizing scaled-up finance to reach the 100 billion target by 2020. A high-level roundtable on finance is planned for COP19/ CMP9 in Warsaw so that ministers can provide general guidance.
[253] Decision 1/CP.16, section II, paragraphs 11-35, pag. 4.

looking for recognition and financial support. With the experience gathered from the first commitment period, a work programme to elaborate the new market-based mechanisms under the UNFCCC was agreed, together with a work programme to develop a framework for recognising mechanisms established outside the UNFCCC – such as nationally-administered or bilateral offset programmes – and to consider their role in helping countries to meet their mitigation targets.

On LULUCF, the COP took some procedural decisions on the REDD+ Programme (Reducing emissions from deforestation and forest degradation,[254] first introduced in Montreal at the 11th session of the Conference), inter alia it decided to undertake a work programme on result-based finance to progress the full implementation of policies regarding reducing emissions from REDD+ activities. Plus, it further clarified ways to measure deforestation and to ensure that efforts to support LULUCF activities through REDD+ are effective.

On the whole, the results of the Doha round seems once again too impalpable and intangible. On the one hand, minor progresses were made in some of the operational procedures on the enhancement of the existing institutions to advance in the implementation of the Bali Road Map and the Cancun Agreements, most notably agreeing on the details of a new commitment period for the Kyoto Protocol. On the other hand, the new institutions created, especially the Green Climate Fund, received insufficient pledges of funding.[255] Moreover, negotiators failed to make substantial progresses towards a new international agreement to adopt in 2015.

The Doha Conference was thought to be a low-key, largely procedural meeting[256] with relatively easy tasks to accomplish. Given the largely technical nature of the discussions, at first the negotiations had not been expected to be particularly critical. The agenda appeared manageable, and it seemed likely that the closure of the two main "further commitments' tracks" – the LCA and the AWG-KP – and the establishment of a work program for a new global agreement (the Ad Hoc Working Group on the Durban Platform for Enhanced Action – ADP) would have been easy tasks. Nevertheless, the final three days saw the re-emergence of deep-rooted positions on cross cutting issues.

The Doha round revealed to be a complicated negotiation that ended a full 24 hours after the official closing of the Conference on 7th of December. The unification of the negotiation of the new agreement on climate change under the LCA was not easy, with tensions between developed and developing countries prolonging the exhausting research of a compromise, a common thread of all the history of

---

[254] *Ibidem*, section II(c), paragraphs 34-38.

[255] Beyond the unilateral allocations of countries such as Great Britain, Germany and the same EU, which amount to USD 7 billion, the commitment of the international community is essentially missing. See the online article *Doha: gateway verso il nulla*, A. Zoratti, 9 December 2012, available at the following link: http://www.altreconomia.it/site/fr_contenuto_detail.php?intId=3799.

[256] N. Hultman, C. Langley, *The "Doha Climate Gateway": limited progress toward a global agreement*, 10 December 2012, article on www.brookings.edu, available at the following link: http://www.brookings.edu/blogs/up-front/posts/2012/12/10-doha-climate-hultman.

the COP. During the stock plenary the American delegation chief Todd Stern declared that the new international agreement could not be submitted to the constitutive principles of the Convention.[257] This implicitly meant that the US still required the principles of differentiated responsibility and equity to be re-thought in order to participate in a global multilateral climate agreement.

Despite the overall good will of the decisions approved in Doha, the amendment underlines the lack of a serious commitment from Parties to implement urgently the measures proposed. The long-term approach seems pointless if it is not accompanied by practical actions from the national governments, especially of developed countries. Greenhouse gas emissions continue to rise, making the globally agreed target of keeping atmospheric temperature increase below 2°C more and more difficult to achieve. According to the IPCC, the current trajectory of greenhouse gas emission rates will cause global temperatures to increase by 4°C by the end of this century. The most pressing problem of the UNFCCC's negotiations seems the unwillingness of bending (or at least stemming) the political and economic priorities of each regional block to a collaborative approach which could help to spare time (the other great problem of the UNFCCC) in the enhancement of the commitments of every nation. While on the one hand Parties acknowledge in every decision the necessity of immediate action, on the other hand they discredit their same provisions by prolonging and postponing a global solution to climate change.

A number of other reports underlined the inadequate level of commitments from the COP and the disastrous effects over the next century if action is not undertaken now and fully. The IPCC's *Fifth Assessment Report* (AR5) of 2014, the World Bank's *Turn down the heat: why a 4°C warmer world must be avoided* and the *Global risks*[258] reports by the World Economic Forum, all warn of the likelihood of severe and irreversible changes in the ecosystems and on impacts for human life. In Alaska, South America, Central Asia, and across all the world, glaciers are receding at an unprecedented speed.[259] As temperatures continue to warm, their melting will bring more water to farms and cities earlier in the growing season, raising the risk of damaging floods. Within a few decades, however, the risk of flood in these areas will become risk of drought. Without action to stop the drivers of climate change, most of the Andean glaciers and two-thirds of Central Asia's glaciers could be gone by the end of the century.[260] The *Turn down the heat* report of 2014 recognises that these changes are already underway, with, global temperatures 0.8°C above pre-industrial times, and with growing impacts on food security, water supplies, aridity, droughts and sea-level rise which are just beginning.

---

[257] Article, *Doha: gateway verso il nulla,* A. Zoratti, 9 December 2012.

[258] See the last report *Global risks 2015*, World Economic Forum, Geneva, 2015.

[259] See on this matter the documentary *Chasing Ice*, winner of the 2014 news and documentary Emmy award.

[260] World Bank Group, *Turn down the heat: confronting the new climate normal*. Washington, DC: World Bank, pp. IX-X. World Bank: https://openknowledge.worldbank.org/handle/10986/20595 License: CC BY-NC-ND 3.0 IGO.

Across the three regions object of that study (Latin America and the Carribean, the Middle East and North Africa and Eastern Europe and Central Asia), the data show there is growing evidence that even in case of immediate global mitigation action the impact of climate change has already locked into Earth's atmospheric system a global warming close to 1.5°C above pre-industrial by past and predicted greenhouse gas emissions. A vicious cycle is thereby established: heat extremes and heat waves all over the world will become more common; melting permafrost will release methane, a powerful greenhouse gas that will drive more warming in a dangerous feedback loop. The growing heat will mean more severe droughts and global sea-level rise, which is progressing at an unprecedented speed[261] threatening the life of millions of people in coastal areas, increasing the risk of damages from storms, hurricanes and crop loss, thus raising the cost of adaptation in many regions of the world.

Forests, including the Amazon, are also at risk. Although projected future precipitation and the effects of CO_2 fertilization on tropical tree growth remain the processes with the highest uncertainty, climate-driven changes due to deforestation and forest degradation, two of the main LULUCF activities addressed by the Kyoto Protocol, are also factors which will crucially influence future changes in vegetation carbon. In any case, projections are not positive, and reflex the relatively small impact of the positive results of the first commitment of the Kyoto Protocol. Gumpenberger et al.[262] found relative changes in carbon stocks between -35% and +40% in a protection scenario without deforestation and between -55% and -5% with 50% deforestation in a 4°C warmer world. Poulter et al.[263] found a 24.5% agreement of projections for a decrease in biomass in simulations with 9 GCMs in a 4°C warmer world. A critical tipping point has been identified at around 40% deforestation, when altered water and energy feedbacks between remaining tropical forest and climate may lead to a decrease in precipitation.[264]

The positive aspect is that over the past decade awareness regarding the threats posed by environmental change to social, political and economic security has grown. As the *Global Risks Perception Survey 2014* highlights, three of the top ten risks in terms of impact over the next 10 years are environmental risks: water crises, failure of climate-change adaptation and biodiversity loss. Furthermore,

---

[261] The present rate of sea level rise is the highest in recent history: the rate of sea-level rise increased from tenths of mm per year in the stable climate of the last 5,000 years to 1.7 mm per year during the 20th century - and 3.2 mm per year from 1993-2010. (Church et al. 2013) The IPCC projects rates of up to 16 mm per year by the end of the 21st century.

[262] M. Gumpenberger, K. Vohland, U. Heyder, B. Poulter, K. Macey, A. Rammig, A. Popp, W. Cramer, *Predicting Pan-tropical Climate-change-induced Forest Stock Gains and Losses—Implications for REDD*, Environmental Research Letters, 5(1), 2010.

[263] B. Poulter, L. Aragão, U. Heyder, M. Gumpenberger, J. Heinke, F. Langerwisch, A. Rammig, K. Thonicke, W. Cramer, *Net Biome Production of the Amazon Basin in the 21st Century*, Global Change Biology, 16(7), 2010, pp. 2062-2075.

[264] World Bank Group, *Turn down the heat: confronting the new climate normal*. Washington, DC: World Bank, pag. 75. World Bank: https://openknowledge.worldbank.org/handle/10986/20595 License: CC BY-NC-ND 3.0 IGO.

both water crises and failure of climate-change adaptation are also perceived as more likely and impactful than average risks. Global water requirements are projected to be pushed beyond sustainable water supplies by 40% by 2030.[265] Agriculture already accounts for an average 70% of total water consumption[266] and, according to the World Bank, food production will need to increase by 50% by 2030 as the population grows and dietary habits change.[267] The International Energy Agency (IEA) further projects that water consumption to meet the needs of energy generation and production will increase by 85% by 2035.

The link between food, water, energy and climate change is one of the major connections that will contribute to shape the world in 2030[268], thus, decision makers will be forced to make tough choices about allocations of water that will impact users across the economy. Overfishing, deforestation, ocean acidification, and the inadequate management of fragile ecosystems (for example coral reefs) are increasing the stress on food and water systems, endangering ecosystems and people depending on the environment they live in. The World Bank estimates that 75% of the world's poor, or 870 million people, make a living from ecosystems, including food production, the goods they produce and tourism. For this reasons, governments should realise that biodiversity loss is not a second-order issue but is intrinsically linked to economic development and to challenges like food and water security.

The urgency of a coordinated and global action on climate change was reinforced in April and November 2014 by the IPCC's release of its *Fifth Assessment Report* and the associated update, where it reconfirmed that global warming is unequivocally happening and that it is "extremely likely" that human influence has been the dominant cause. Atmospheric concentrations of three major greenhouse gases (carbon dioxide, methane and nitrous oxide) are at their highest level in 800,000 years. According to the *Global Risks 2015* survey, at the heart of the problem there is a risk-management[269] approach based on responsive measures that assume things go back to normal after a crisis. This approach fails to understand the complex and slowly evolving nature of environmental risks and climate change. Up to now, stakeholders have been slow to address the underlying causes of environmental risks or to address their economic, social, political and humanitarian consequences.

Attempts to express the costs of climate change damages from inaction or bad practices is an

---

[265] 2030 Water Resources Group, 2009.

[266] Food and Agriculture Organisation (FAO) of the United Nations: http://www.fao.org/nr/water/aquastat/water_use/index.stm.

[267] World Bank, Food Security: http://www.worldbank.org/en/topic/foodsecurity/overview#1.

[268] *Global risks 2015*, World Economic Forum, Geneva, 2015, pag. 21.

[269] In the environmental sector, risk management means considering the risks of climate change impacts, how reduction of greenhouse gas emissions, increasing forest carbon reservoirs and adaptation could reduce those risks, what the costs and co-benefits of those actions are, and what policy actions would be needed to realize these actions. B. Metz*, Controlling climate change*, Cambridge University Press, 2010, pag. 74.

extremely difficult exercise [270], but, although non-secondary calculation problems and many uncertainties, evaluation have been made. For a global average temperature increase of about 4°C, most estimates show a global average loss that varies from 1% to 5% of global GDP, with some studies going up to about 10% loss for about 6°C warming. Once again, developing countries are the ones which face the higher losses for every catastrophic event which happens: the drought in Southern Africa in 1991-1992, for example, caused a drop in GPD of over than 8%, while hurricane Mitch caused losses in Honduras of about USD 1250 per inhabitant, 50% more than the per capita income. [271] Metz states that costs can also be expressed in a different way through the so-called "social cost of carbon" (SCC), by calculating the total future damages that are caused by 1 tonne of CO_2 emitted today and to discount these future costs to today. Estimates for SCC vary widely, too, but based on available studies the estimate is a cost of USD 5-95 per tonne of CO_2-equivalent emitted today. The advantage of using this SCC approach is that it can easily be compared with the costs of avoiding this amount of CO_2-equivalent emissions. Since most emission reduction technologies have a cost of less than USD 100 per tonne today, avoidance becomes attractive. For emissions in the future the SCC will be higher, because damages increase at higher greenhouse gas concentrations in the atmosphere. For a tonne emitted in 2030 for instance the SCC is estimated to be something like USD 10-190 per tonne of CO_2-equivalent. This is of the same order of magnitude or higher than the expected costs of drastic reductions of emissions, leading to stabilisation at very low concentrations (of the order of USD 30-120/tCO_2-eq).

All this data suggest that the sooner the action begins, the lower will be the costs for governments and for the climate. This relationship is well known in the international community, but it has somehow not sorted the sufficient lever for a responsible action. Let's now see how the last developments in the negotiation process of the UNFCCC are trying to reverse this trend.

2.3 Second commitment period (2013-2020)

The "Doha Amendment to the Kyoto Protocol" was adopted on 8 December 2012. By 21 December, it was circulated by the Secretary-General of the United Nations, acting in his capacity as Depositary, to all Parties to the Kyoto Protocol in accordance with Articles 20 and 21 of the Protocol, for the hoped soon ratification by all Parties.

During the first commitment period, there were 37 industrialised countries and the European

[270] See B. Metz, *Controlling climate change*, Cambridge University Press, 2010, pp. 71-73.
[271] *Ibidem*, pag. 73.

Community committed to reduce GHG emissions to an average of 5% below 1990 levels. During the second commitment period, Parties committed to reduce GHG emissions by at least 18% below 1990 levels in the eight-year period from 2013 to 2020; however, the composition of Parties in the second commitment period is different from the first. In fact, at present, only 57 countries have ratified the amendment, mostly developing countries and economies in transition, and it has not yet entered into force. The United Nations is encouraging governments to ratify as soon as they can the amendment relating to the second commitment period of the Kyoto Protocol, but the negotiations seem to have moved their focus towards a new global deal. If, on the one hand, the fault has to searched for in the failure of the Kyoto Protocol to provide attractive instruments for a more long-term approach towards climate change, on the other hand a major obstacle has been once again of political character, namely the difficulty of involving the US in a binding agreement. In this sense, the abandonment of the Protocol is coherent with the vision of its provisions as a first step towards a truly global agreement on emissions reduction that will stabilise GHG emissions, but it represents nonetheless a fiasco for the idea of a binding agreement on this matter. As we will see, this will have its weight in the following negotiations.

Given the fact that the second commitment period has not come into force, an analysis of its outcomes until now is not possible. The report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol and the supplementary information under Article 7, paragraph 1, of the Kyoto Protocol have not been received by the secretariat because the full set of decisions on reporting, review, accounting and adjustments for the second commitment period of the Kyoto Protocol has not been adopted.[272] The only available data to examine the progress made towards the hoped 2020 agreement comes from the quantified economy-wide emission reduction targets for 2020. These targets are the product of the important 2009 Copenhagen Accord (Decision 2/CP.15), where "Annex I Parties commit to implement individually or jointly the quantified economy wide emissions targets for 2020".[273] The COP, by Decision 1/CP.16, took note of the quantified economy-wide emission reduction targets to be implemented by Annex I Parties contained in document FCCC/SB/2011/INF.1, as communicated by them. These goals represent the transitional step between the first commitment period of the Kyoto Protocol and the global agreement which should start in 2020, with the objective of rapid GHGs reductions thereafter to 40-70% below 2010 levels by 2050.

It is interesting to notice the different prerogatives of Annex I countries in their submissions. The targets communicated are generally not represented by a single irremovable value, but as a range of values subordinated to some precise conditions. While for a number of Parties the lower targets are

[272] FCCC/KP/CMP/2015/6/Add.1/Rev.1, pag. 2, paragraph 2.
[273] Decision 2/CP.15, paragraph 4.

unconditional, more severe targets are usually dependent on conditions and assumptions about the new global agreement on climate change. Only one country, Monaco, submitted a single unconditional target (anyway a quite high 30%), while five countries presented their lower targets as unconditional (Australia 5%, European Union 20%, Liechtenstein 20%, Norway 30% and Switzerland 20%).[274] Only Kazakhstan[275] stated a single target without mentioning any specific condition. The higher targets for 2020 have generally common prerequisites: achieving a global climate agreement with the participation of the major economies of the world; developed countries agreeing to comparable mitigation efforts; developing countries taking action in accordance with their common but differentiated responsibility and respective capabilities; and all Parties contributing with their own means to an as far as possible cost-effective global emissions reduction path.

Australia specifically linked its higher target to a global deal capable of stabilizing GHG concentrations in the atmosphere at 450 ppm CO_2 equivalent or lower, while setting at the same time a clear pathway to achieving an early global peak in emissions, in particular with the definition of a "peaking year" for major developing countries and an aggregate reduction from Annex I countries and non-Annex I countries respectively of 25% and 20% below 1990 levels by 2020. The European Union made reference to the overall goal of keeping the average global temperature increase below 2°C, which requires global GHG emissions to peak by 2020 at the latest and then to be reduced at least 50% below 1990 levels by 2050. The European Union high target is conditional on a global agreement for the period beyond 2012, provided that all Parties contribute to a cost-effective global emission reduction pathway where other developed countries commit themselves to comparable emission reductions and developing countries contribute adequately according to their responsibilities and respective capabilities.[276] Moreover, Croatia and Iceland linked their targets with the joint efforts of the European Union countries. Instead, the United States communicated a target in the range of a 17% emissions reduction compared to 2005. The submission of the target by the United States was made on the assumption that other Annex I Parties, as well as more advanced non-Annex I Parties, would associate with the Copenhagen Accord and submit mitigation actions in accordance with paragraph 5 of the understanding ("Non-Annex I Parties to the Convention will implement mitigation actions"). Canada's target was aligned with the one of the United States. Ukraine and Belarus made a reference to maintaining their status under the Convention as countries with economies in transition, with Belarus specifically mentioning the importance of the intensification on technology transfer and capacity-building actions.

---

[274] FCCC/TP/2011/1, pag. 11, paragraph 11.

[275] Kazakhstan is an Annex I Party for the purposes of the Kyoto Protocol, in accordance with article 1, paragraph 7, of the Kyoto Protocol, but not an Annex I Party for the purposes of the Convention.

[276] FCCC/TP/2011/1, pag. 7.

The targets of many Parties depend on the definition of the rules for the use of market-based mechanisms and LULUCF (for example for Belarus, Iceland, New Zealand, Norway, Russian Federation and Ukraine). During the workshop, the European Union acknowledged that rules for the use of market-based mechanisms and LULUCF considerably influence the level of their targets and stressed the need for strict and consistent accounting rules, in particular on the coverage of sectors and gases, and on common metrics to calculate the CO_2 equivalence of GHGs. Norway noted as a condition for its target the continuation of the Kyoto Protocol or its basic elements as part of a future framework, in particular the availability of market-based mechanisms. The United States also noted that LULUCF is part of an economy-wide target to reduce emissions from all sectors that have mitigation potential. Finally, some countries envisioned LULUCF to be a potential source of emissions removals (Australia, EU, Japan), but much depends on the accounting rules for LULUCF that will be determined in the negotiations.

2.3.1 Paris Conference (COP 21/CMP 11)

2015 represents an important year for the effective moving from talking of problems to action. As a matter of fact, the Paris UNFCCC's COP 21/CMP 11 (30 November, 12 December), after long and draining negotiations, adopted the Paris Climate Deal, the new global agreement which represents the best (and for someone maybe the last) chance to save the planet from catastrophic consequences. Until recently, the expectation was that governments would struggle to finalize a strong global climate accord in time for the Paris Climate Conference in December 2015. But the tide begun to turn at the United Nations Secretary-General's Climate Summit in September 2014, where over 1,000 businesses and investors signalled their support for global carbon pricing. So did some 73 countries, covering 52% of global GDP and 54% of global emissions.[277] Major consumer companies and financial institutions saw the need to reduce global climate risks and take responsible action along their supply chains, for example through the New York Declaration on Forests (a non-legally binding political declaration that calls for a cut in natural forest loss of a half by 2020, and strives to end it by 2030)[278] and the move towards climate-friendly coolants. The Oil & Gas Climate Initiative signalled refreshed engagement from major energy producers: CEOs of ten global oil and gas companies made a collaborative declaration on climate change. The Initiative was established following discussions

[277] *Global risks 2015*, World Economic Forum, Geneva, 2015, pag. 21.
[278] New York Declaration on Forests available here:
http://www.un.org/climatechange/summit/wp-content/uploads/sites/2/2014/07/New-York-Declaration-on-Forest-%E2%80%93-Action-Statement-and-Action-Plan.pdf.

during the 2014 Davos meeting of the World Economic Forum Annual Meeting, and was officially launched at the UN Secretary General's Climate Summit in New York on 23 September 2014. Another positive signal was the agreement between the United States and China in November 2014, which produced the USA-China Joint announcement on Climate Change.[279] The momentum was favourable as never to seal the expected agreement that the UNFCCC's negotiations had envisioned for more than five years.

The previous climate Conferences in Warsaw (2013) and Lima (2014) agreed that all countries were to put forward their proposed emissions reduction targets for the 2015 agreement as "intended nationally determined contributions" well in advance of the Paris conference. A negotiating text for the 2015 agreement was agreed in Geneva in February 2015.

In Paris, ministers from 196 countries found agreement on the first global deal on climate change. It was not an easy process, because as soon as Parties examined the draft agreement, they started raising concerns. South Africa was concerned over "loss and damage" issues: for developed countries, this meant the question of whether developing countries should be entitled to special aid in the event of climate-related disasters; for the developing ones, it meant compensation and responsibility, which the US were against. For China, a key point was "common but differentiated responsibility", in respect of the fact that developing countries have less responsibility for climate change. For the US, some parts of the deal could not be legally binding in order to pass Congress.[280] After two more days of negotiation, a consensus emerged. No government wanted to be held responsible for the clash of the negotiation, and so a compromise was reached. The EU abandoned its requirement that the national intended emission reductions were legally binding, and the US accepted the wording of the "loss and damage" provisions; China and India agreed to the ambitious goal of keeping global warming to 1.5°C.

Paris produced what has been called an "historic, durable and ambitious" agreement. Developed and developing countries are both required to limit their emissions to relatively safe levels, in order to keep temperature rise within 2°C with an aspiration of 1.5°C, with regular reviews to ensure these commitments can be increased in line with scientific advice. Finance will be provided to poor nations to help them cut emissions and cope with the effects of extreme weather. Countries affected by climate-related disasters will gain urgent aid, although it is not clear if the funds which should be allocated will be enough.[281]

---

[279] Announcement available here: https://www.whitehouse.gov/the-press-office/2014/11/11/us-china-joint-announcement-climate-change.

[280] *Paris climate change agreement: the world's greatest diplomatic success*, F. Harvey, article on the online website of The Guardian, available at the following link: http://www.theguardian.com/environment/2015/dec/13/paris-climate-deal-cop-diplomacy-developing-united-nations.

[281] *Ibidem*.

The Paris Agreement, contained the annex to Decision 1/CP.21, is a programmatic deal that holds countries accountable and builds ambition over time. Pursuant to the Durban Platform for Enhanced Action established by Decision 1/CP.17 of the COP, the agreement is divided in several parts, which deal with the core issues related to climate change: mitigation, adaptation, loss and damage, finance, technology development and transfer, capacity-building, transparency of action and support, facilitating implementation and compliance. Recognising the need for an urgent response to climate change challenges, which represent a "common concern of humankind", the deal adopts a number of provisions which find their base in the UNFCCC and in the Kyoto Protocol.

The objective of the agreement, expressed in article 2, is "to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty".[282] This implies three results, namely holding the increase in the global average temperature well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C; increasing the ability to adapt to the adverse impacts of climate change and promote low GHG emissions development in a manner that does not endanger food production; making finance flows consistent with a pathway towards low GHG emissions and climate-resilient development. The provisions of the deal have been written to respect equity and the principle of common but differentiated responsibilities and respective capabilities.

The global peaking of greenhouse gas emissions is to be reached as soon as possible, but national contributions are dependant just from voluntary actions (article 4, paragraph 2). This is a major step back from the Kyoto Protocol, but one that could have been hardly avoided if developing countries were to participate. Each Party shall communicate, as soon as possible, its first intended nationally determined contribution (INDCs)[283] (to update every five years) in accordance with Decision 1/CP.21, adding every information necessary for clarity, transparency and understanding. Article 5 remembers the important role of sinks and reservoirs of greenhouse gas, including forests, but it is limited to some "encouragement" provisions to support the existing REDD+ framework for LULUCF activities.

While article 4 recognises the right of Parties to decide to what extent to engage in climate policies, article 6 recognises that some Parties can also choose to pursue "voluntary cooperation in the implementation of their nationally determined contributions"[284] Moreover, recognising an important role to no-better-specified international transfer mitigation outcomes, this article establishes the framework for a mechanism which should contribute to the mitigation of GHG emissions and to

[282] Paris Agreement, article, 2, paragraph 1.

[283] Already with Decision 1/CP.19, the COP invited all Parties to initiate or intensify domestic preparation for their intended nationally determined contributions (INDCs) to progress in the achievement of the objective of the Convention as set out in article 2.

[284] Paris Agreement, article 6, paragraph 1.

support sustainable development.[285] Theoretically, this new mechanism that draws from the CDM represents a novelty that could help to boost the coordination of the mitigation efforts, but much will depend on how it will be set up by the following decisions of the COP.

Article 7 deals with adaptation, defined "a global goal to reduce vulnerability and strengthen resilience to climate change". The action on this matter is mainly attributed to a country-driven approach, but the importance of reciprocal support and international cooperation is recognised. Article 8 deals with loss and damages provoked by climate change. The Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts, established in 2013, has to be strengthened to spread knowledge on how to minimise the adverse impacts of the climate.

On finance, article 9 states that developed countries should provide financial resources to assist developing country Parties with respect to both mitigation and adaptation, in continuation of their existing obligations under the Convention. Scaled-up finance assistance will be subjected to biennially quantitative and qualitative information communications including, where available, projected levels of public financial resources to be provided to developing country Parties. Other Parties providing resources are encouraged to communicate biennially such information on a voluntary basis.

The financial and the technological mechanisms established under the Convention will serve as the financial and technological mechanisms under the Paris Agreement. Article 10 establishes the framework of a technological means to promote and facilitate enhanced action on technology development and transfer: accelerating the effective and wide innovation of the sources of pollution is fundamental for the fulfilment of the long-term global response to climate change.[286]

Another country-led effort that Parties should undertake is capacity-building. The reasons for which it should be country-driven, the Agreement specifies, are that capacity-building actions should be responsive to national needs and foster country ownership of Parties. Notwithstanding, this provision does not prevent developed country Parties to "enhance support for capacity-building actions in developing country Parties".[287]

Article 13 contains another innovative element, i.e. the establishment of an enhanced transparency framework for action and support. The framework, all to be designed by future COP meetings, has the purpose of providing a clear understanding of climate change action in the light of the objectives set out in article 2, and Parties should "regularly provide" a national inventory report of anthropogenic

---

[285] Its objectives are: a) to promote the mitigation of greenhouse gas emissions while fostering sustainable development; (b) to incentivize and facilitate participation in the mitigation of greenhouse gas emissions by public and private entities authorized by a Party; (c) to contribute to the reduction of emission levels in the host Party, which will benefit from mitigation activities resulting in emission reductions that can also be used by another Party to fulfil its nationally determined contribution; and (d) to deliver an overall mitigation in global emissions.

[286] Paris Agreement, article 10, paragraps 4-5.

[287] *Ibidem*, article 11, paragraph 3.

emissions by sources and removals by sinks of GHG and information necessary to track progress made in implementing and achieving their nationally determined contributions (article 4). Voluntarily, all the information on financial and technological transfer, as well as on capacity-building, can be included. Then, these information shall be analysed through a technical expert review.

In order to promote implementation and compliance with the agreement, article 15 establishes a mechanism which has not been agreed upon yet. All we know is that it will consist of a committee of expert with a facilitative task in the fulfilment of the deal. In this way, the Kyoto compliance system is definitely surpassed: the enforcement branch is abandoned in favour of "transparent, non-adversarial and non-punitive measures.[288] The role of "meeting of the Parties" to the Paris Agreement will be performed by the Conference of the Parties (article 16), and the Convention's secretariat will serve as the secretariat of the Agreement (article 17). The same is valid for the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation (article 18). Amendments to the Agreements are subjected to the rules of articles 15 and 16 of the Convention (articles 22 and 23), as well as article 14 on settlement of disputes (article 24). No reservations can be made by Parties when they decide to become a Party to this agreement.

The Paris Agreement will be opened for signature from 22 April 2016 to 21 April 2017, and will enter into force on the thirtieth day after the 55th instrument of ratification, acceptance, approval or accession which account for at least 55% of the total global GHG emissions. In accordance with article 14, the Conference of the Parties, serving as the meeting of the Parties to the Paris Agreement, shall periodically monitor the progress in the implementation of the deal. The technical name for this assessment is "global stocktake"; the first will be undertaken in 2023 and then every five years thereafter.

If everything goes as planned, the Agreement will not enter into force before 2020. Due to the stalemate of the Kyoto Protocol, the only binding deal on the reduction of greenhouse gas emissions, the risk of inadequate action before the entry into force of the Paris Agreement is something that has to be prevented. Under the Convention, the copious decisions to mitigate climate change and promote international collaboration have not been sufficient to lead to a reduction of GHG emissions. For these reasons, Decision 1/CP.21 of the COP dedicates a section to "enhanced action prior to 2020". The Parties commit to ensure the highest possible mitigation efforts already before 2020, first of all by urging countries which have not done so to ratify and implement the Doha Amendment to the Kyoto Protocol and the mitigation pledges under the Cancun Agreements, recommending all Parties to participate in the reporting and assessment procedures under those agreements and inviting developing Parties which have not done so to submit their first biennial update reports.[289] In addition,

[288] *Ibidem*, article 15, paragraph 2.
[289] Decision 1/CP.21, section IV, paragraph 106.

Parties reiterate their will to accelerate the full implementation of the Bali Action Plan.

Another objective for the period 2016-2020 is to strengthen the advancement of the Durban Platform with its technical examination process on mitigation as defined by Decision 1/CP.19, paragraph 5(a),[290] and Decision 1/CP.20, paragraph 19,[291] by, inter alia, collaborating with all the organisations involved in this process (Convention bodies, international organisations, non-governmental organisations, civil society), improving participation of developing country Parties' experts, and requesting the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTCN)[292] to collaborate in scaling up the support to Parties in the implementation of mitigation policies. Financial support, one of the main arguments of discussion of the climate change negotiations in the last years, is object of further pledges in Decision 1/CP.21, with a strong appeal to developed countries to scale up the level of financial support with a clear roadmap on how to reach the goal of mobilising USD 100 billion annually by 2020 for mitigation and adaptation.

In order to facilitate the negotiations of the following meetings of the Parties on the road to 2020, the COP decided to conduct a facilitative dialogue in conjunction with its twenty-second session to assess the progress in implementing Decision 1/CP.19, paragraphs 3 and 4. The aim of this decision is to identify relevant opportunities to enhance the provision of financial resources, including also technology development and transfer and capacity-building support, with a view to finding ways to enhance the ambition of mitigation efforts by all Parties, including identifying relevant opportunities to enhance the provision and mobilization of support and enabling environments. In addition, a high-level event, built on the Lima-Paris Action Agenda, will be convened in conjunction with each session of the Conference of the Parties during the period 2016-2020. This meeting should provide an opportunity to strengthen the commitments of Parties and the implementation of policy options and actions on climate change mitigation, and to coordinate the negotiations between groups and coalition to overcome differences more easily. The coordination of this event will be appointed to two "high-level champions" which will act on behalf of the President of the COP.[293] Finally, the COP decided to launch (for the same period) a technical examination process on adaptation, conducted by the Adaptation Committee and organised jointly by the SBI and the SBSTA. In view of a hotter world, adaptation actions and technology are vital to assure a future to many developing country areas, in particular the ones contained under article 4, paragraph 8, of the UNFCCC.

On the whole, the Paris Agreement is the most promising and ambitious outcome the Paris

---

[290] Decision available at the following link: http://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf#page=3.

[291] Decision available at the following link: http://unfccc.int/resource/docs/2014/cop20/eng/10a01.pdf#page=2.

[292] To facilitate action on climate technology, the Conference of the Parties established in 2010 the Technology Mechanism, which consists of two complementary bodies (the TEC and the CTCN) that work together to achieve its objective.

[293] Decision 1/CP.21, section IV, paragraph 122.

Conference could produce. The last global attempt to resolve the different views on climate change at Copenhagen, in 2009, collapsed into chaos and recriminations, thus the fact that Parties were able to agree on a global action plan to stop climate change (even if once again in extra time)[294] cannot but be welcomed positively. However, being a product of political compromise, like all the negotiating process of the UNFCCC, it has its weaknesses. The Agreement, in fact, is based on voluntary commitments by Parties, which should responsibly set the degree of their commitments[295] in the reduction of GHG emissions and climate change, which only in that moment will be "binding". Many are the risks this voluntary approach entails, and a lot could change before the envisioned entry into force of the agreement in 2020: being based on "intended" commitments, governments have in their hands the achievement of what the negotiators proclaimed in Paris. The sense of responsibility and the political will of Parties, up to now insufficient, will play a fundamental role in this challenge. The hope is that the positive momentum of the agreement will help to set binding commitments before its entry into force.

On 30 October 2015, the secretariat published a synthesis report on the aggregate effect of the INDCs by then submitted (119 INDCs of 147 Parties)[296] on emission levels in 2025 and 2030. These submissions cover 75% of the Parties to the Convention and 86% of global emissions in 2010. Not all sectors and gases are covered by the communicated INDCs, but anyway 80% of the global emissions are covered. Moreover, all Parties included information on their mitigation contributions, and a total of 100 Parties, accounting for 84% of the INDCs, also included an adaptation component in their INDCs.[297]

Most of the submissions describe national-projected contributions, which include economy-wide mitigation targets. They address all major national GHG emissions or at least the most significant sources, but they do so in a variety of forms, i.e. reductions relative to business as usual (half of the

---

[294] The Paris Climate Change Conference was due from 30 November to 11 December, but negotiators sealed the agreement on Saturday evening (12 December).

[295] At present, there have been 160 INDCs submissions, which correspond to 188 countries.

[296] Albania, Algeria, Andorra, Argentina, Armenia, Australia, Azerbaijan, Bangladesh, Barbados, Belarus, Belize, Benin, Bhutan, Botswana, Brazil, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Canada, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Costa Rica, Cote d'Ivoire, Democratic Republic of the Congo, Djibouti, Dominica, Dominican Republic, Ecuador, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Iceland, India, Indonesia, Israel, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Lao People's Democratic Republic, Latvia and the European Commission on behalf of the European Union and its member States (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom of Great Britain and Northern Ireland) acting jointly, Lebanon, Lesotho, Liberia, Liechtenstein, Madagascar, Malawi, Maldives, Mali, Marshall Islands, Mauritania, Mauritius, Mexico, Monaco, Mongolia, Montenegro, Mozambique, Myanmar, Namibia, New Zealand, Niger, Norway, Papua New Guinea, Paraguay, Peru, Philippines, Republic of Korea, Republic of Moldova, Russian Federation, Rwanda, Samoa, San Marino, Sao Tome and Principe, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Solomon Islands, South Africa, Swaziland, Switzerland, Tajikistan, Thailand, the former Yugoslav Republic of Macedonia, Togo, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Ukraine, United Republic of Tanzania, United Stated of America, Uruguay, Vanuatu, Viet Nam, Zambia and Zimbabwe.

[297] FCCC/CP/2015/7.

INDCs include relative targets for reducing emissions below the "business as usual" (BAU) level, either for the whole economy or for specific sectors, ranging from 1.5 to 89%); absolute emission targets (targets expressed as emission reductions below the level of a specified base year[298] and ranging from 9.8 to 90%); policies and actions for low GHG emission development reflecting the respective Parties' national circumstances, in accordance with Decision 1/CP.20, paragraph 1; intensity targets (reductions in GHG emissions per unit of gross domestic product (GDP) or per capita ranging from 13 to 65% relative to the level in a base year or to the absolute level of per capita emissions by 2025 or 2030 in a business as usual situation), peak targets (the year or time frame in which the respective Party's emissions are expected to peak).[299]

In addition to setting mitigation objectives for 2025 or 2030, some Parties included, with a wide set of parameters and timeframes, a longer-term vision for low-emission development, which, in some cases, was specified as an aim to achieve zero emissions. Related goals range from a 25% GHG emission reduction by 2050 below BAU, to a base year level to lower per capita emission levels in the future or achieving carbon neutrality by 2050 or 2085. The information contained in the secretariat's report clearly state that, compared to global emissions in 1990, global aggregate emission levels resulting from the INDCs are expected to be higher by 34-36% in 2025 and 37-52% in 2030. The picture does get better if the relative growth in emissions from 2010 to 2030 is analysed: emissions should fall between 10-57%, reflecting the impact of the INDCs. Nonetheless, the comprehension of what efforts Member States should implement to reduce that 47% gap is not-secondary if they truly want to fulfil the objective of remaining within the 2°C global temperature increase.[300]

Compared with the emission levels consistent with the least-cost 2°C scenarios, aggregate GHG emission levels resulting from the INDCs are expected to be higher by 8.7 (4.7-13.0) Gt CO_2 equivalent (19% higher) in 2025 and by 15.1 (11.1-21.7) Gt CO_2 equivalent (35% higher) in 2030. The data speak for themselves, and the report is adamant in saying that "the estimated aggregate annual global emission levels resulting from the implementation of the INDCs do not fall within least-cost 2°C scenarios by 2025 and 2030".

In the light of these evidences, the Paris Agreement must unavoidably be enhanced if sufficient results are to be reached. To do so, the emission reduction commitments have to be scaled up not by little. Predictions taken from the AR5[301] scenario database consistent with limiting the global average

---

[298] As the reference point, some Parties chose 1990, a few chose 2005 and others referred in their contributions to 2000, 2010, 2013, 2014 or 2015. FCCC/CP/2015/7, pag. 6, paragraph 17.

[299] See Figure 1, FCCC/CP/2015/7.

[300] The absolute growth in global emissions over the period 2010–2030 compared with 1990–2010 is expected to be 10% lower (median) with a range from 12% higher to 46% lower. Source: FCCC/CP/2015/7, pag. 9, paragraph 33.

[301] IPCC *Fifth Assessment Report*, 2014.

temperature rise below 2°C above pre-industrial levels following a least-cost emission trajectory from 2010 onwards (so-called P1 scenarios) with a greater than 66% likelihood of staying below 2°C correspond to 44.3 (38.2-46.6) Gt CO_2 equivalent emissions in 2025 and 42.7 (38.3-43.6) Gt CO_2 equivalent emissions in 2030. Instead, scenarios that follow an economically optimal emission trajectory with delay from 2020 onwards (so-called P2 scenarios) with a greater than 66% likelihood of staying below 2°C correspond to 49.7 (46.2-51.6) Gt CO_2 equivalent emissions in 2025 and 38.1 (30.3-45.0) Gt CO_2 equivalent emissions in 2030. Finally, in a delay-to-2030 scenario (P3) with a higher than 50% likelihood of staying below 2°C, the average annual emission reductions for the period between 2030 and 2050 for the least-cost scenarios are estimated at 3.3 (2.7-3.9)%. This is almost double the rate in relation to least-cost scenarios that assume enhanced mitigation action by 2020, which require annual emission reductions of only 1.6 (0.7-2.0)% in the same period.

All in all, these individual and differentiated contributions can, on the one hand, positively affect national implementation due to the fact that each country decides its level of commitments and the results to achieve, eliminating the problem of finding a compromise between all the Parties involved, but on the other hand this will be the "final" test for the credibility of the multilateral approach as it has been developed in these years by the UNFCCC. Opportunities for the short-term enhancement of mitigation actions should be caught to minimise the economic impact of climate change policies, but the time is almost running out.

Many experts showed a mixed reaction to the Agreement. After the Conference risked to come close to a nothing done, the deal was in itself a blessing and everyone welcomed it positively, but once the enthusiasm started to vanish, scholars have started to raise some issues. Stephen Harrison, of the University of Exeter, showed prudence and pointed the attention on the effects that the 1°C temperature rise over pre-industrial levels has triggered so far: melting of mountain glaciers, significant sea-level rise, devastating droughts, and flooding. These effects are likely to get much worse in the future with even modest temperature increase. He hit a core problem of the current scientific knowledge on climate change (and thus of the policies surrounding them) when he stated that "keeping temperatures to manageable levels also assumes that we know what the precise link is between atmospheric greenhouse gas concentrations and the global temperature response. We don't know this, nor the nature and strength of natural feedbacks in the climate system that might drive future warming."[302] Kelman (UCL), showed concern for the lack of a clear time scale for the implementation of the agreement, in particular in respect to the actions prior to 2020, because clear targets and deadlines are absent, while Arnell (University of Reading) underlined that the text is vague on the overall ambition. As a matter of fact, the provisions of the agreement do not specify a date for

[302] *Paris climate deal: reaction from the experts*, The Guardian online website. Article available at the following link: http://www.theguardian.com/environment/2015/dec/13/paris-climate-deal-reaction-experts.

the peaking of emissions, expressing as timetable only a general "greenhouse gas emissions neutrality" in the second half of the century. Others (Palmer, Shuckburgh) focused on the dramatically high changes provoked by human activities, although recognising that the Paris Conference has demonstrated that the UNFCCC is taking the climate change threat seriously.

If the Paris Agreement will not be respected and bolstered, the effects on the environment will be even more disastrous than they will be inevitably with a 2°C temperature rise. Also, the extent to which efforts to reduce emissions will be sufficient to limit the global average temperature rise to less than 2°C above pre-industrial levels strongly depends on the long-term changes in the key economic drivers that will be induced by the implementation of the current INDCs, namely the transition to a low-carbon economy and the financial cooperation with least-developed countries in accordance with the equity principle, as well as the determination of Parties to increase levels of ambition before and after 2020.[303] The two key words in every government agenda should be ambition, which must be raised, and implementation, which has to be guaranteed.

[303] FCCC/CP/2015/7, pag 12, paragraph 41.

Part III
Towards climate change mitigation

3.1 LULUCF activities under the Convention and the Kyoto Protocol

3.1.1 Why is LULUCF different from other sectors?

Forests cover a total of 4 billion hectares worldwide, equivalent to 31% of the total land area. Between 1990 and 2000 there was a net loss of 8.3 million hectares per year, followed in the next decade by a net loss of 6.2 million hectares per year. Although the rate of loss has slowed, it remains very high, with the vast majority occurring in tropical regions.[304] Aside from the devastating effects tropical forest loss has on biodiversity and forest-dependent communities, a major consequence of deforestation and forest degradation is the release into the atmosphere of carbon dioxide, one of the main gases responsible for the greenhouse effect and the primary component of anthropogenic emissions. Forests provide vast carbon sinks that when destroyed emit CO_2 into the atmosphere, either by burning or degradation of organic matter. Moreover, the conversion of forests to other land uses is responsible for around 10% of net global carbon dioxide emissions. Solving the problem of deforestation is one of the main prerequisites for an effective response to climate change. Under the multilateral climate protection framework, the UNFCCC is the leading body in the enhancement of its protection and in its promotion as one of the main sources to fight climate change.

Before starting to analyse the issue of land use, land-use change, and forestry activities (or LULUCF) under the Convention and the Kyoto Protocol, it is better to introduce the argument with some preliminary information.

What is land use? Depending on the country and on how land is used, there are many ways to categorise it. For the sake of this text I will adopt and focus on the six land-use categories proposed

[304] Source: FAO, *Global Forest Resources Assessment*, Main report, 2010.

by the Intergovernmental Panel on Climate Change in the *Good practice guidance for land use, land-use change and forestry* and in the 2006 *IPCC guidelines for national inventories, Volume 4, Agriculture and other land use*. These categories are: forest land, cropland, grassland, wetlands, settlements, and other lands (ice, rock, bare soil).[305] These categories are used in the second of the two documents with the purpose of estimating anthropogenic emissions and removals from land use, land-use change and forestry, and they have also become the standard for the UNFCCC Common Reporting Format (CRF) for submissions of Annex I countries GHG inventories.

LULUCF activities contribute with other sectors[306], even if separately, to the accounting and reporting system of the UNFCCC and the Kyoto Protocol to reduce GHG emissions. However, it has to be underlined that LULUCF is different from other sectors in many ways.

First of all, land use can act as a sink or a source of emissions, depending on how it is used in each region and country. For a great part of developed countries land and forests are a net sink, but for a few ones they represent a net source.[307] Secondly, instead of measuring directly the fluxes of emissions like in other sectors, to estimate emissions and removals in land use experts calculate the difference in carbon stocks[308] between a standard expected for the kind of use that land has and the actual stock of carbon of that piece of land. Unlike other sectors, natural events can have a large effect on LULUCF. The impact of hurricanes, floods, droughts, tsunamis, storms and fires can change significantly the balance of emissions and removal capacity of a land sink, and with the last-years growth of unpredictable extreme natural events this phenomenon has increased its influence. Furthermore, it is difficult to separate natural and anthropogenic effects. In other words, it is hard to divide and quantify the natural causes of emissions and removals from the "unnatural" ones. For example, emissions from fires can have a natural or a human source, or both, but it is not easy to separate the two categories.

Another difference from other sectors of action on greenhouse gases reduction is that emissions from LULUCF activities tend to be cyclical, following for example the cycle of the agricultural sector or the seasonal cut of forest's trees. These cycles can cause anomalies in the accounting of data if the length of the time of a full cycle is longer than the base year system used for the reporting system.

Being a "living" source of emissions and removals, land and forest can be affected in the long term by natural disturbances and past-management decisions; in particular, actions that affect the age distribution of plantation forests can have a long-term effect on carbon fluxes. This legacy impact on

---

[305] P. Iversen, D. Lee, M. Rocha, *Understanding land use in UNFCCC*, 2014, pag. 3.

[306] These sectors are: fuel combustion, fugitive emissions, industrial processes, solvents and other product use, agriculture, and waste.

[307] P. Iversen, D. Lee, M. Rocha, *Understanding land use in UNFCCC*, 2014, pag. 6.

[308] Different land uses have different carbon stocks. When converting from one land use to another one, it is usually expected that the carbon stocks will reach the average carbon stocks of the new land use.

emissions, anyway, is not exclusive to the land sector. In the energy sector, for example, emissions are influenced by the current state of investment on green technology and fuels, and the switch to a more sustainable way of producing energy will take time to produce its effects, more or less like in the case of the land use sector. What is exclusive of this sector is the cyclical legacy effects related to deforestation and reforestation identified earlier.[309]

When considering the land use sector, there are also risks of saturation and non-permanence. The term saturation means the fall of the storage capacity of carbon of an area of land to zero due to the balancing of the gains due to growth and the losses due to decay. Non-permanence refers to the risk that terrestrial carbon is released into the atmosphere due to natural and/or anthropogenic causes. This creates inconsistencies when the CO_2 removed is accounted in the emission reductions target of a country, given that it could be released naturally later. Currently this risk is accounted for only by the Clean Development Mechanism for afforestation and deforestation.

In contrast with the energy sector, which usually provokes emissions from specific point-sources (like factories, power plants, industrial areas), land and forestry, being intrinsically distributed all over the earth, cause distributed emissions and removals, which have estimation and management consequences that are very different from others areas. How can you state clearly that a certain amount of emissions in LULUCF is attributable to a specific country, especially in bordering areas? Technology is helping to manage the attribution of emissions in this field, but there are obvious obstacles. If, on the one hand, land use creates significantly more uncertainties than other fields like industry or energy in the quantification of emissions, on the other hand, LULUCF can account only for a small part of total gross GHG emissions, making these uncertainties a "minor concern". The European Environment Agency, in its 2013 annual EU greenhouse gas inventory, estimated that in the total emissions of 15 Annex I European Countries, only 2.8% came from LULUCF.[310]

Finally, there is a problem of general technical nature that is valid also for the other sectors responsible for GHG emissions, namely the improvement of the methodology for estimating emissions and removals. Given that reports are made from a base year, the yearly reports create a path of the trend of this or that country, providing important information for tracking the effects of measures and actions to reduce emissions. However, if a country improves its methods or data, or simply if it changes them, then the new standard should recalculate the entire series of reports, otherwise the trend will be distorted.

As you can notice, there are many obstacles and peculiarities that makes LULUCF a challenging sector, but it remains nonetheless a central one in the battle for the reduction of GHG emissions, and

---

[309] P. Iversen, D. Lee, M. Rocha, *Understanding land use in UNFCCC*, 2014, pag. 7.

[310] European Environment Agency, *Annual European Union greenhouse gas inventory, 1990-2011 and inventory report 2013: Submission to the UNFCCC Secretariat*, 27 May 2013.

now we will analyse why.

3.1.2 Why is LULUCF important?

As we have seen, our planet's terrestrial ecosystem both absorbs and emits significant amounts of greenhouse gases in the atmosphere. This process takes place even without the presence of human activity, but its insertion in the system has brought forth unbalances in the relationship, thus reducing or increasing the land reservoir of carbon. Land currently sequestrates around 27% of global CO_2 emissions[311], and often Annex I countries select this sector as a "key category" in their reports.[312] The IPCC estimates that land-related mitigation policies could contribute from 20 to 60% of the total cumulative abatement in 2030, and from 15 to 40% within 2100.[313] For the vast majority of the countries of this group, LULUCF activities represent a net sink of emission, even though there is a big gap in the percentage of contribution in the overall removals of GHG from State to State; of the different categories of land, forests represent the most central and relevant in this aspect, while cropland is a net source of emissions for most countries.[314]

By contrast, the general situation for developing countries is very different. Even in the ones with wide areas of forests, LULUCF can be responsible for a significant clove of their emissions. The fact that developing countries do not have any mandatory reporting system does not help the awareness of the proportion of this phenomenon. There are few official national data on emissions from land use on the part of developing countries, usually submitted through their National Communications.[315] This problem is particularly strong in least developed countries where there is a lack of the basic structures of a nation, due to past and present civil wars and political instability. Even more in these cases, it becomes central the means of technology transfer to fill the black gaps.

Be it a net sink or a net cause of emissions, LULUCF has a common enemy which puts at risk its role

---

311 Oceans sequestrate another 26%, while the remaining 47% is absorbed in the atmosphere. Source: Ciais, P., C. Sabine, G. Bala, L. Bopp, V. Brovkin, J. Canadell, A. Chhabra, R. DeFries, J. Galloway, M. Heimann, C. Jones, C. Le Quéré, R.B. Myneni, S. Piao and P. Thornton, *Carbon and Other Biogeochemical Cycles*., in *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2013, Table 6.1.

312 A key category is one that is prioritized within the national inventory system because its estimate has a significant influence on a country's total GHG emissions in terms of the absolute level, the trend, or the uncertainty in emissions and removals. Source: P. Iversen, D. Lee, M. Rocha, *Understanding land use in UNFCCC*, 2014, pag. 11.

313 IPCC Working Group III contribution to the IPCC 5th Assessment Report Climate Change 2014: Mitigation of Climate Change, Chapter 11 Agriculture, Forestry and Other Land Use (AFOLU).

314 P. Iversen, D. Lee, M. Rocha, *Understanding land use in UNFCCC*, 2014, pag. 11, Figure 7.

315 The full list of non-Annex I countries communications is available at the following link: http://unfccc.int/national_reports/non-annex_i_natcom/submitted_natcom/items/653.php.

at the root: climate change. Due to these changes, some areas will have better growing conditions or longer growing seasons, and others will experience the opposite; extreme weather conditions and human induced vegetation diseases will also affect LULUCF as a reservoir of CO_2 emissions. In this context, both the reporting systems under the UNFCCC and the Kyoto Protocol appear as vital steps towards the mitigation of these negative effects. Before analysing the reporting system under the Kyoto Protocol, a general overview of the one under the UNFCCC is worth.

When the 1992 Earth Summit in Rio de Janeiro was held, the objective was to find a comprehensive strategy for "sustainable development" with the aim to meet our present needs without compromising the ability of future generations to meet their own.[316] It was for this reason that the United Nations Framework Convention on Climate Change was adopted. Together with the Convention on Biological Diversity (UNCBD), they instantly became the two most important agreements concerned with the conservation of the existing variety of ecosystems addressing the full range of human activities affecting particular natural systems, and served as the legal basis for the ratification of the specialised Protocols.[317] The complementarity of the two Conventions is due to the fact that climate change is a major threat to biodiversity, and that action undertaken to fight climate change could potentially harm biodiversity. This would in theory imply a close relationship and cooperation between the two agreements and the bodies that oversee their application. Unfortunately this has not always happened, mainly because each Convention focuses on a specific environmental issue without taking into account the natural interdependency of the two systems. The global nature and the global influence that environmental issues can have goes beyond the single-issue approach, and maybe this is one of the great number of reasons why the results have been so meagre until now.

In this background, forestry and land use activities contribute to climate change mitigation as sinks where carbon stocks and greenhouse gases are eliminated from the atmosphere, and at the same time they protect biological diversity.[318] Carbon, which is stored both above and below ground[319], as well as in oceans and in the atmosphere, is captured by terrestrial ecosystems such as forests with the process of photosynthesis and is partly retained inside the soil and in the vegetation, giving back oxygen.

Under the UNFCCC, all Parties have committed to promote mitigation actions and to report anthropogenic emissions by sources and removals by sinks, including from LULUCF sector (as stated

---

[316] A. Caparròs Gass, F. Jacquemont, *Biodiversity and Carbon Sequestration in forests: Economic and Legal Issues*, in M. Bothe, E. Rehbinde, *Climate Change Policy*, Eleven International Publishing, 2005, pag. 149.

[317] The Kyoto Protocol and the Cartagena Protocol, respectively.

[318] Biological diversity, or biodiversity, means the variability among forest living organisms and ecological processes of which they are part. This includes diversity in forests within species, between species and of ecosystems and landscapes (proposed definition by the ad hoc Technical Expert Group on Forest Biological Diversity under CBD) (UNEP/CBD/SBSTTA 2001).

[319] Below-ground stocks are greater than above-ground, particularly in non-wet areas such as grasslands, savannahs, tundra, and croplands (CBD 2001).

in article 4 paragraph 1(a) and 1(d)), thorough their National Communications (every 4 years for both Annex and non-Annex I countries) and National GHG Inventories (every year for Annex I countries and included in the National Communications for others). The degree of detail of the information required varies for Annex I and non-Annex I countries. The guide on how to estimate anthropogenic emissions and removals in the land-use sector is contained in the *1996 Revised IPCC Guidelines*[320] and the *2006 IPCC Guidelines*[321], product of the revision asked by the UNFCCC's Subsidiary Body on Scientific and Technical Advice. These Guidelines are to be used from 2014 by developed countries to submit their reports. Furthermore, in 2001, in the context of the Marrakech Accords (COP 7), the Parties invited the IPCC with decision 11/CP.7 "to prepare a report on good practice guidance and uncertainty management relating to the measurement, estimation, assessment of uncertainties, monitoring and reporting of net carbon stock changes and anthropogenic greenhouse gas emissions by sources and removals by sinks in the land use, land-use change and forestry sector".[322] As a result, the IPCC released in 2003 the *Good practice guidance for Land Use, Land-Use Change and Forestry* (GPG-LULUCF).

In 2003, at COP 9, Parties decided that Annex I countries had to use this guide for preparing their annual National Inventory Report (NIR)[323], beginning from 2005. As far as non-Annex I countries are concerned, the GPG-LULUCF is the recommended instrument for their National Communications, to the possible extent their means allow them to apply it.

In addition to the NIR, developed country Parties also have reporting requirements for LULUCF under the Biennial Reports (BR), particularly as far as economy-wide reduction targets are concerned (starting from January 2014), while developing countries have to submit Biennial Update Reports (starting from December 2014), which can include also LULUCF data, as appropriate and to the extent that their capacities permit. Least developed countries are released from the burden of the periodic reports by having the possibility to submit them at their discretion.

The reporting system on land use under the UNFCCC is comprehensive, that is, it includes all categories of land and all pools.[324] Furthermore, starting from the *2006 Guidelines*, agriculture is addressed together with all the LULUCF sector into a single volume called "Agriculture, Forests and Other Land Use" (or AFOLU). To make the reporting easier and to facilitate the comparability of data

---

[320] Available at the following link http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html.

[321] Available at the following link: http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html.

[322] In that occasion, Parties also asked the IPCC to "elaborate methods to estimate, measure, monitor, and report changes in carbon stocks and anthropogenic greenhouse gas emissions by sources and removals by sinks resulting from land use, land-use change and forestry activities under Article 3, paragraphs 3 and 4, and Articles 6 and 12 of the Kyoto Protocol, on the basis of the *Revised 1996 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories*.

[323] This report is included in the National GHG Inventories along with the CRF Tables.

[324] Living biomass (separate above- and below-ground values required by the KP), dead organic matter (deadwood and litter), soil organic carbon (mineral and organic).

in national GHG inventories, CRF tables have been developed, including for LULUCF and Agriculture. However, national reports continue to have two different chapters: one for LULUCF and another for Agriculture.

To understand how important this sector is in meeting credible result in the mitigation of climate change, it is sufficient to make two final considerations. First, the UNFCCC refers repeatedly to "emissions by sources and removals by sinks" in reference to both inventories of emissions and mitigation policies, as well as the Berlin Mandate clarifies that one of the guidelines for a Protocol must be the "coverage of all greenhouse gases, their emissions by sources and removals by sinks, and all relevant sectors". Second, expert stated that, being fossil fuels the largest contributors to the increase in atmospheric CO_2, any possible solution had to concentrate in fossil-fuels emissions. On the other hand, the risk was that countries would have tried to meet their obligations by increasing carbon stocks in the terrestrial biosphere avoiding to take serious measures to control the emissions of CO_2 from combustion of fossil fuels. This would imply an increase the cost of mitigation in the medium/long term if there is a lack of motivation – or obligations – to develop new technology and new projects to enhance reductions.

3.1.3 LULUCF genesis under the Kyoto Protocol

In the weeks before the Kyoto Conference, it seemed that LULUCF activities would not be considered for inclusion in the Protocol, because countries did not understand the implications for emission reduction targets of including carbon sinks in the biosphere, in part because of the lack of reporting of national data on LULUCF.[325]

Until the last moment, LULUCF activities were not included in the final text.[326] Being carbon sinks, these areas were of difficult handling. The opportunity that LULUCF activities offered was finally taken into consideration and included by Parties. Land use and land-use change represented a chance to reduce net CO_2 emissions to the atmosphere or to increase the net removal of carbon from the atmosphere, especially in the short term. The inclusion was supported by possible indirect benefits for biodiversity, water quality, and soil quality.

The countries and the groups involved in the negotiations in Kyoto had very different views on the inclusion of LULUCF activities. The United States, Norway, New Zealand, and Australia supported

[325] B. Schlamadinger, G. Marland, *Land Use & Global Climate Change. Forests, Land Management and The Kyoto Protocol*, Pew Center on Global Climate Change, 2000, pag. 15.

[326] The key sentences relative to LULUCF can be found in the 10th December final version, but not in the 9th December draft.

the comprehensive inclusion of sinks for meeting commitments under the Kyoto Protocol, given that they are countries with a great abundance of forest resources. Canada aimed at the inclusion of full carbon accounting and carbon sinks in soils, but also wanted to consider the adjustment of credits in accordance with the uncertainty of their measurement. The inclusion of sinks was supported explicitly also by the Russian Federation, Iceland, and Peru. Another cluster of countries, represented by Japan, the Marshall Islands, and Nauru, suggested they should be included only after methodological problems were resolved.

As far as the European Union is concerned, the position kept during the negotiations was similar to the one of Japan, affirming that sinks should be included only after the appropriate organisations had found the right methods and accounting rules. The EU main concern was concentrated on methodological difficulties in measuring and verifying sinks, and their negotiators were worried about the long-term fate of carbon absorbed in sinks and about the effects that this sector would have had on national commitments if it had been included. When finally the incorporation of LULUCF activities was decided, the European Union pushed for putting a limit on the types of activities by which sinks could be used to meet commitments. Together with the G77, the EU was able to constrain credits to a limited list of "direct human-induced activities". By the 9th of December these words had appeared on the draft of the Protocol. They remained also in the final text of the Protocol, and they were inserted for a reason that we have already mentioned in this paragraph, namely to avoid that States Parties could claim credit for increases in the terrestrial biosphere pool that were occurring regardless to mitigation policies efforts.[327]

In the end, thirty-seven countries (plus the European Union), listed in Annex B of the Protocol, agreed to reduce annual emissions for the period 2008 to 2012 by an average of 5% below emissions in 1990. The United States agreed to a reduction of 7%, but as we know it never ratified the agreement. Under the final text of the Kyoto Protocol, land-use change and forestry activities are regulated under article 3, paragraph 3 and 4. The first comprehends three obligatory activities, namely afforestation, deforestation and reforestation, while the second postponed to the first COP/CMP the task of defining "how, and which, additional human-induced activities related to changes in greenhouse gas emissions by sources and removals by sinks in the agricultural soils and the land-use change and forestry categories shall be added to, or subtracted from, the assigned amounts for Parties included in Annex I". The changes in carbon stock or GHG emissions relating to LULUCF activities by Annex I Parties must be reported for every year of the commitment period (the first going from 2008 to 2012 and the second starting from 2013 until 2020, as you know), beginning from the start of the commitment period or with the start of the activity, whichever comes later.

---

[327] B. Schlamadinger, G. Marland, *Land Use & Global Climate Change. Forests, Land Management and The Kyoto Protocol*, Pew Center on Global Climate Change, 2000, pag. 20.

The rules regarding which emissions are to be counted and how they are to be counted were not clearly defined in Kyoto, but they were established four years later during COP 7 in Marrakech, where the accounting system of LULUCF activities was defined in detail, the elective activities were agreed (forest management, cropland management, grazing land management, and revegetation) and the areas of land use where divided between the net-net accounting system and the gross-net[328] accounting system.

The first system, net-net accounting, is used in the first commitment period to calculate emissions and removals from cropland management, grazing land management, and revegetation, comparing the data of current year with the ones in previous periods (base year or base period, established at 1990). By using the net-net accounting, any long-term trend in carbon fluxes due to increases in temperatures, CO_2 levels, or nitrogen deposit will tend to be deleted between these periods. Consequently, this approach reduces the likelihood of the possibility to account for removals from indirect and natural effects. If emissions in the atmosphere are reduced over time, if the atmospheric capability to absorb emissions is increased over time, or if removals simply surpass emissions, the absence of longer trends in the reports will help Parties to reach their commitments. Net-net accounting implies that once mitigation benefits of a LULUCF activity decrease, the difference of the emission increase or the removal decrease will have to be compensated by other measures.[329]

This approach and the peculiarity of the sectors to which it is practiced, in particular cropland and grazing land management, make them a source of wide potential sink strength. Most cropland and grazing land are subjected to human activity every year, and they are considered a source of emissions in many countries. Nonetheless, they can be positively influenced so as to be transformed from source to sink in a short amount of time, more or less the time frame of a commitment period or two. Even in countries where they represent a sink, cropland and grazing lands can be enhanced more easily than other areas of LULUCF. Their correct management can create opportunities to reduce the emissions of CO_2 in the short term, and this is why the net-net approach was found acceptable by the majority of Annex B countries.

Nevertheless, this approach could not fit the management of forestry areas. Net-net accounting for a country containing forests with non-uniform age-class distribution will be affected negatively by the fact that as the dominant age class approaches maturity, the rate of removals of CO_2 from the atmosphere will decrease. Consequently, the country could have a debit in its account, caused by the natural consequence of the existing age-class distribution, and would have to meet its target through

[328] According to Iversen and Lee, the word "gross" is used because there is no comparison of net emissions in the accounting years to net emissions in a base year or base period (or reference level). Alternately, "gross" can simply considered to mean that net emissions in the accounting period is compared to the value zero.

[329] P. Iversen, D. Lee, M. Rocha, *Understanding land use in UNFCCC*, 2014, pag. 27.

the reduction of emissions from other activities. For a great number of countries, reforestation policies had begun years before the first commitment period and even before the base year, and many forests could be reaching maturity and carbon saturation in that commitment period. In this situation, net-net accounting would cause debits even if a country had put into practice the right land-use management policies. Therefore, a different approach was adopted to fit better the results of forest management (article 3, paragraph 4 of the Kyoto Protocol) and afforestation, reforestation, deforestation (article 3, paragraph 3 of the Kyoto Protocol) in the first commitment period under the Kyoto Protocol: gross-net accounting system.[330]

Gross-net accounting considers emissions and removals during the commitment period only, without considering the 1990 base year and emissions and removals of a previous time period. If a forest management activity leads to net emissions in the commitment period, these emissions are added to emissions from fossil fuels and other sources to determine if a country has met its reduction targets. On the other hand, if a forest management activity leads to net removals from the atmosphere in the commitment period, these removals can be subtracted from emissions from fossil fuels and other sources in determining the compliance with the targets.[331] For a country that is removing CO_2 with forestry activities, gross-net accounting will make possible to have a positive influence on the total balance of emissions even if forestry management removals are diminishing over time. Vice versa, even if a country is reducing its emissions in this area, it could be in any case in negative in its emissions' balance.

Gross-net accounting focuses more on the impacts of indirect and natural effects, particularly effects of past management practices, than the net-net accounting does. This can create a situation of "unearned" rates of removals, for example when there are natural and indirect effects, responses to other aspects of climate change, or changes in CO_2 stocks simply from the already-mentioned age-class distribution of trees, even if no forest management policy has been undertaken. To avoid the possibility of inaction due to these "windfall credits"[332], the use of the gross-net accounting under the Marrakech Accords and the Kyoto Protocol was flanked by a simultaneous agreement to exclude indirect and natural effects on carbon stocks.[333] In the case of forest management, therefore, the Kyoto

---

[330] B. Schlamadinger, G. Marland, *Land Use & Global Climate Change. Forests, Land Management and The Kyoto Protocol*, Pew Center on Global Climate Change, 2000, pag. 17.

[331] B. Schlamadinger , N. Bird, T. Johns, S. Brown, J. Canadell, L. Ciccarese, M. Dutschke, J. Fiedler, A. Fischlin, P. Fearnside, C. Forner, A. Freibauer, P. Frumhoff, N. Hoehne, M.U.F. Kirschbaum, A. Labat, G. Marland, A. Michaelowa, L. Montanarella, P. Moutinho, D. Murdiyarso, N. Pena, K. Pingoud, Z. Rakonczay, E. Rametsteiner, J. Rock, M.J. Sanz, U.A. Schneider, A. Shvidenko, M. Skutsch, P. Smith, Z. Somogyi, E. Trines, M. Ward, Y. Yamagata, *A synopsis of land use, land-use change and forestry (LULUCF) under the Kyoto Protocol and Marrakech Accords*, Elsevier, Environmental science & policy 10, 2007, pag. 277.

[332] *Ibidem*.

[333] Decision 16/CMP.1 affirms that "accounting excludes removals resulting from: (i) elevated carbon dioxide concentrations above their pre-industrial level; (ii) indirect nitrogen deposition; and (iii) the dynamic effects of age structure resulting from activities and practices before the

Protocol limits the extent to which removals can be used to meet commitments by excluding indirect and natural effects. For afforestation and reforestation, instead, it can be argued that in the absence of these activities no or little carbon stock increase would result from indirect and natural effects, or from pre-1990 age-class effects. Therefore, no further "factoring out" measures were deemed necessary.

The negotiators, concerned with other possible "backfires" from the accounting of emissions and removals from specific LULUCF activities, established a clever four-tier capping system, under which: (1) a Party's afforestation, reforestation and deforestation activity which results in more emissions then removal can be offset through forest management activities, up to a total level of 9 megatons of carbon per year for the five-year commitment period; (2) the extent to which forest management activities can be accounted for to help meet emission targets beyond 9 megatons of carbon per year is subject to an individual cap for each Party, specified in an appendix to the decision on LULUCF (this cap includes joint implementation projects involving forest management); (3) as it has been already said, emissions and removals from cropland management, grazing land management and revegetation can be accounted for to help meet emission targets on a net basis; (4) annex B countries can choose to undertake projects in non-Annex B countries in accordance with the terms of the Clean Development Mechanism (CDM), but limited to afforestation and reforestation projects up to a limit of 1% of the Annex B country's total emissions in 1990. In addition, under the flexible mechanism of Joint Implementation (JI), an Annex I Party may purchase ERUs from projects that sequester carbon in another Annex I country.[334]

Once a country has achieved net removals of greenhouse gases from eligible LULUCF activities, the UNFCCC's reporting and review procedure, carried out by expert review teams, generates the so-called removal units (RMUs), that Annex I Parties can use to help meeting their emission targets. In contrast to emissions from Annex A sources, the Kyoto Protocol requires Parties to account for emissions and removals from LULUCF activities by adding them from their initial assigned amount. These units cannot be "banked", i.e. they cannot be carried over to future commitment periods. On the contrary, in the case where such LULUCF activities result in a net source of greenhouse gas emissions, there would be a cancellation of assigned amount units and/or units issued from articles 6, 12 and 17 for the Party concerned.

In accordance with the Marrakech Accords, the decisions relating to LULUCF were officially adopted by the CMP in its first meeting in 2005. For the first commitment period, the guidelines which were followed in the calculation of the changes in greenhouse gas emissions by sources and removals by

---

reference year."

[334] Source: UNFCCC website, under the section dedicated to the Kyoto Protocol. Link: http://unfccc.int/kyoto_protocol/mechanisms/joint_implementation/items/1674.php.

sinks are contained in Decision 15/CMP.1 and Decision 17/CMP.1, and emissions and removals by LULUCF activities have been reported using the indications provided by the CMP with their official decisions during the meetings. In addition, the already mentioned GPG-LULUCF in Chapter 4 provided guidance for methods and good practices on the matter. As a consequence of the new set of rules for the second commitment period entered into force with Decision 2/CMP.7 taken in Durban in 2011, new "good practice guides" had to be reviewed and updated. The IPCC was invited to "review and, if necessary, update supplementary methodologies for estimating anthropogenic greenhouse gas emissions by sources and removals by sinks resulting from land use, land-use change and forestry activities under Article 3, paragraph 3 and 4, of the Kyoto Protocol, related to the annex to this decision, on the basis of, inter alia, chapter 4 of its Good Practice Guidance for Land Use, Land-Use Change and Forestry". The "invitation" produced as a result the *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*, which is an updated version of Chapter 4 of GPG-LULUCF. At CMP 9 in 2013 Parties agreed, with Decision 6/CMP.9, that the guide shall be applied in the second commitment period of the KP, following the indications taken with Conference's decisions.

As far as the relationship between UNFCCC and Kyoto Protocol is concerned, it has to be underlined that the information reported under the Kyoto Protocol is supplementary to the one reported under the Convention. Country Parties to the KP do not have to submit two separate inventories but can include the supplementary information in their inventory report.[335] Practically, the reporting system works like that: States can choose the sequence in which the reporting information will be compiled; depending on national circumstances, and specifically the technical details of the carbon accounting systems put into place by each country, the order could be different. For example, it is possible to start with the UNFCCC inventory (with the additional spatial information required for Kyoto Protocol reporting) and expand it to the Kyoto Protocol inventory, or it is possible to use a system that generates the information for both UNFCCC and Kyoto Protocol reporting.

3.1.4 LULUCF in the 2008-2012 commitment period

The main feature of the Kyoto Protocol accounting system for LULUCF activities is based on an effort to reflect emissions and removals from direct human-induced LULUCF activities.[336] In addition to the compulsory accounting of afforestation, reforestation and deforestation, Parties were

[335] Article 7, paragraph 1 of the Kyoto Protocol affirms: "Each Party included in Annex I shall incorporate in its annual inventory […] the necessary supplementary information for the purposes of ensuring compliance with Article 3 […]."
[336] P. Iversen, D. Lee, M. Rocha, *Understanding land use in UNFCCC*, 2014, pag. 17.

allowed to account for emissions or removals generated from the additional activities of forest management, cropland management, grazing land management, and revegetation. This elective activity-based approach[337] allows to choose different voluntary activities covered in the KP-LULUCF accounting system. When a country select an activity, it is obliged to continue to report it also in future commitment periods. In the first commitment period, 24 countries elected forest Management, 4 countries elected cropland management, 3 countries elected land management and 3 countries elected revegetation.[338]

It is worth to notice that the limitation to "direct human-induced" effects on carbon stocks was a consequence of the fact that it is still not known precisely how big is the residual carbon uptake in the terrestrial biosphere. Emissions from industrial countries can be measured with a good degree of confidence, but even after the inclusion of known biosphere sources and sinks, the reconciliation of observed increases in atmospheric CO_2 concentrations with known fossil-fuel emissions and oceanic removals of CO_2 suggests that this uptake is quite large (2.3 Gt C/year). This information was important during the negotiation of LULUCF activities, because it is not known how much of this residual emission's absorption is occurring in Annex B countries. The main concern was that a country could result to be meeting its emission reduction obligations just by (or largely through) claiming a portion of this residual carbon uptake to be within its national boundaries, reducing the interest in a serious effort to reduce emissions from fossil fuel use.[339] Addressing activities in the LULUCF sector to "direct human-induced" was one of the solutions to avoid this scenario. This accomplishment is also the outcome of a compromise between countries which wanted the Kyoto Protocol to focus on emissions from fossil fuel sources and those which felt that LULUCF activities should be included.

The afforestation, reforestation and deforestation (ARD) activities are conceptually long-term changes from non-forest to forest or vice versa, such as the conversion of croplands or grasslands into forests.[340] Wood harvesting is not considered as deforestation as long as it is not followed by a change in land use. Emissions caused by deforestation are considered to occur in the year of the disturbance for accounting purposes; however, carbon removals from the atmosphere (stock increases in the biosphere) resulting from afforestation and reforestation, as we have seen, occur over an extended period of time. As a consequence, the restriction on the period which can be used to meet commitments – carbon stock changes resulting from activities undertaken since 1990 – causes an imbalance towards emissions from deforestation, particularly in the first commitment period. This

---

337 *Ibidem*, pag. 18.

338 Annual compilation and accounting report for Annex B Parties under the Kyoto Protocol for 2013. Document available at: http://unfccc.int/resource/docs/2013/cmp9/eng/06.pdf.

339 B. Schlamadinger, et alt., cit., Elsevier, Environmental science & policy 10 (2007), pag. 276.

340 *Ibidem,* pag. 275.

accounting imbalance resulted in a peculiar situation for some countries: even though their forest areas and carbon stocks may be increasing, they may nonetheless incur in a net debit due to inclusion of deforestation that occurs within the commitment period but exclusion of atmospheric removals from afforestation and reforestation that result from pre 1990.

For the first commitment period, the role of non-Annex I countries in LULUCF mitigation activities has been limited to afforestation and reforestation (AR) projects through the Clean Development Mechanism. AR projects under the CDM are restricted to areas that in 1990 were not forests and, like all CDM activities, to those projects which would have not been realised without the CDM financing. In contrast with other CDM projects, afforestation and reforestation projects receive credits that have pre-defined expiration dates (temporary CERs and long-term CERs). Moreover, the use of AR CDM credits by Annex B countries is limited to 1% of their base-year emissions per year.

The activity of avoiding deforestation was not accepted in the Marrakech Accords as an eligible CDM activity because it was acknowledged that projects in this area could have a significant threshold of uncertainty and imprecision in the quantification of leakage of carbon emissions.[341] Furthermore, also the opposite possibility that the scale of carbon credits could be quite large played a role in the decision to exclude avoided deforestation from CDM projects.

Unfortunately, deforestation in developing countries accounts for approximately one-quarter of global greenhouse gas emissions, and thus it becomes very important to regulate emissions concerning this activity, even if the Kyoto Protocol does not account for it. A great number of projects to avoid deforestation have been initiated in the past few years. These projects have been designed and implemented with a structure that involves both the community and the landowner to avoid carbon leakage. If a project is designed properly, it is possible to reduce emissions from deforestation in a relatively short amount of time, but the action from governmental organisations on this issue has been scarce so far.

As far as the data from the first commitment period LULUCF activities, these are the results. The total GHG emissions for 36 Annex B Parties[342] in the 1990 base year amounted to 12,012.4 million tonnes of carbon dioxide equivalent (Mt CO_2 eq), including total GHG emissions of 11,879.5 Mt CO_2 eq from the sources listed in Annex A to the Kyoto Protocol and emissions from LULUCF (net emissions and removals in the base year from the conversion of forests (deforestation)) of 132.9 Mt CO_2 eq.[343] For Annex B countries, thus, LULUCF covered a small part of their emissions in the base year.

---

[341] The term refers to a reduction of emissions within an accounted project while simultaneously another source, which is not accounted for under LULUCF reporting, is emitting more carbon. For example, if a forestry are is protected but another is not, the deforestation process can however take place in the zone not subjected to LULUCF reporting.

[342] Excluding the EU as a group and Canada, which withdrew from the Protocol.

[343] Source: FCCC/KP/CMP/2015/6.

From 1990 to 2012, total aggregate GHG emissions including LULUCF decreased by 16.2%, from 17,981.4 Tg (teragrams, equal to one million tonnes) CO_2 eq to 15,068.8 Tg CO_2 eq. From 2000 to 2012, GHG emissions including LULUCF decreased by 6.5%. Between 2011 and 2012, GHG emissions decreased by 1.0% including LULUCF. Interestingly, removing land-use change activities on the period 1990-2012 reduces the decrease of emissions to a 10.6%. The data testify the importance that this sector has covered in the achievement of the emissions reductions results under the Kyoto Protocol, which even under enormous difficulties represented by leakage and non-permanence, between the others, put the base for a more all-round inclusion of LULUCF activities in the development of a global response to climate change.

3.1.5 LULUCF in the 2013-2020 commitment period

Before anything else, it must be said that the Kyoto Protocol has undergone a stalemate after the end of the first commitment period, and thus it has not yet entered into force. In accordance, the following provisions and developments to the LULUCF sector continue to be valid only on a "theoretical" plan. In any case, it has to be added that the implementation of the provisions concerning the protection of forests and lands is continuing under the broader context of the UNFCCC.

For the second commitment period, forest management became mandatory while cropland management, grazing land management and revegetation remained voluntary, and a new elective area was added: wetland drainage and rewetting.[344] Parties may include in the accounting of forest management under Article 3, paragraph 4, anthropogenic greenhouse gas emissions by sources and removals by sinks resulting from the harvest and conversion of forest plantations to non-forest land. Parties have partially reported which of the voluntary activities they have selected in their 2015 NIR.[345] The requirements for these Annex I countries can be summarised in the duty to report anthropogenic emissions and removals based on land-use categories in the context of the submission of their national report to the UNFCCC and to furnish supplementary data for the accounting of anthropogenic emissions and removals from the mandatory and elected LULUCF activities, in the context of the Kyoto Protocol commitments, as stated in articles 7, paragraph 1, and 7, paragraph 2,

[344] "Wetland drainage and rewetting" is a system of practices for draining and rewetting on land with organic soil that covers a minimum area of 1 hectare. The activity applies to all lands that have been drained since 1990 and to all lands that have been rewetted since 1990 and that are not accounted for under any other activity as defined above, where drainage is the direct human-induced lowering of the soil water table and rewetting is the direct human-induced partial or total reversal of drainage. *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol.*

[345] The list of the countries' submissions is available here: https://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8812.php.

of the KP.

The changes brought to the accounting of the LULUCF sector in the second commitment period implied in the first place the update of the guidelines on which it was based. Chapter 4 of the GPG-LULUCF, which was used as guidance on supplementary methods and good practice for LULUCF activities during the first commitment period, was not suitable anymore to the developments in this sector. The need to update Chapter 4, based on the general GHG inventory guidance provided in other chapters of the GPG-LULUCF and the rules governing the treatment of LULUCF activities in the first commitment period of the Kyoto Protocol[346], arose mainly for two reasons: first, the rules for the accounting of LULUCF in the second commitment period are partly different from the ones in the first commitment period; second, the update was needed after the decision of the CMP to use the 2006 IPCC Guidelines for the second commitment period under the Kyoto Protocol (Decision 4/CMP.7). The version of Chapter 4 before the revision did not contain the new rules for the treatment of LULUCF in a great number of areas object of the second commitment period, such as forest management, natural disturbances[347] in forest management and afforestation and reforestation areas, harvested wood products, and wetland, drainage and rewetting.

The IPCC, then, took into consideration the substantive changes reflecting the revised rules governing the treatment of LULUCF in the second commitment period (the already mentioned mandatory forest management provision and the eligibility of wetland drainage and rewetting, as well as new provisions on harvested wood products[348] and natural disturbances). A secondary work of the international body consisted in changing the references to the "second commitment period" and updating the references to CMP decisions.

The *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (KP Supplement)* is the result of that work. It keeps the structure and general content of Chapter 4 in GPG-LULUCF. It is divided in two chapters, corresponding to the two main sections of Chapter 4 of the GPG-LULUCF: in the first it deals with the steps to estimate and report supplementary information for the activities under articles 3, paragraph 3, and 3, paragraph 4, and

---

[346] T. Hiraishi, T. Krug, K. Tanabe, N. Srivastava, B. Jamsranjav, M. Fukuda, T. Troxler*, 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*, pag. O.4.

[347] Natural disturbances are defined as non-anthropogenic circumstances. For the purpose of Decision 2/CMP.7, these events or circumstances are those that cause significant emissions in forests and are beyond the control of, and not materially influenced by, a Party. These may include wildfires, insect and disease infestations, extreme weather events and/or geological disturbances, beyond the control of, and not materially influenced by, a Party. These exclude harvesting and prescribed burning.

[348] The main issues on Harvested Wood Products are: emissions from Harvested Wood Products removed from a Party's forests which are accounted for under article 3.3 and 3.4 shall be accounted for by that Party only; imported Harvested Wood Products, irrespective of their origins, shall not be accounted by the importing Party.
Accounting of Harvested Wood Products shall be on the basis of instantaneous oxidation, and emissions that occur in the second commitment period from Harvested Wood Products removed from forests prior to the start of the second commitment period shall also be accounted for. Instead, emissions form Harvested Wood Products already accounted for during the first commitment period on the basis of instantaneous oxidation shall be excluded.

with general rules and their categorisation. Moreover, there is a section dedicated to the relationship between Annex I national inventories and CDM projects. In the second chapter, the KP Supplement deals with generic and activity-specific methodological guidance on area identification, stratification and reporting, and estimation of carbon stock changes and non-CO_2 GHG emissions. Some new sections have been added and the existing guidance in Chapter 4 has been widely revised and expanded to reflect the changes arisen from Decision 4/CMP.7 and the use of the 2006 IPCC Guidelines. The new version was finally adopted with Decision 6/CMP.9, paragraph 9, of the Kyoto Conference of the Parties.

For the Kyoto Protocol reporting, the KP Supplement represents the main tool to put into action the provisions set out for the second commitment period. First of all, it provides guidance on estimating and reporting anthropogenic emissions and removals. Contrariwise, it does not deal with accounting, except as far as accounting rules need to be reflected in guidance on emissions and removals estimation and reporting. Secondly, the KP Supplement provides advice on achieving transparency on the identification of the areas subjected to the sector of LULUCF. Furthermore, it clarifies how to establish the hierarchies between articles 3, paragraph 3, and article 3, paragraph 4, activities[349] and provides guidance for those Parties who want to report natural disturbances activities. Emissions and removals on lands affected by natural disturbances have to be removed from the accounting unless there is land-use change or if they come from salvage logging.[350] Finally, the KP Supplement avoids to make judgements about the possible rules beyond the second commitment period, for example concerning land-use change occurring after the end of the period on a piece of land to which natural disturbance provisions were applied, and so emissions excluded during the second commitment period.[351]

There are three steps to estimate and report supplementary information for activities under articles 3, paragraph 3, and 3, paragraph 4, in the second commitment period. The first step is to apply, or continue to apply, the definition of forest and subsequently of natural forest and planted forest, and to establish a hierarchy among article 3, paragraph 3, forest management and elected article 3, paragraph 4, activities to provide a framework for consistent attribution.[352] The second step of the inventory assessment consists in the identification of areas on which the activities have taken place since 1990. This step is divided in three parts. The first is stratification: the country has to be divided

[349] It keeps the prioritisation in the order of deforestation under article 3, paragraph 3. This has the consequence that Deforestation land can contain trees if it has been later subjected to Afforestation and Deforestation.

[350] This provision reflects the difficulty of separating the emissions and removals due to a disturbance from other emissions and removals.

[351] T. Hiraishi, T. Krug, K. Tanabe, N. Srivastava, B. Jamsranjav, M. Fukuda, T. Troxler*, 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*, pag. O.14.

[352] In addition, it is good practice to establish a hierarchy among elected article 3, paragraph 4 activities: Cropland Management (CM), Grazing Land Management (GM), and/or Revegetation (RV). Wetland Drainage and Rewetting (WDR) is by definition the lowest level of the hierarchy.

into areas of land for which the geographic boundaries will be reported, as well as the areas of land subject to article 3, paragraph 3, and the areas of land subject to article 3, paragraph 4, within these geographic boundaries.[353] The second part is the compilation of land-use and land-cover information in 1990 for the mandatory and elected activities. Using the selected definitions of forest, countries have to determine forest and non-forest areas on 31 December 1989. Once they have done that, by using maps and statistical data, all forest-related land-use change activities since 1 January 1990 can then be determined. The third and final part is accomplished by identifying and estimating the width of the land subjected to LULUCF activities within each country's geographic boundary. Done that, the third step of the reporting of LULUCF activities consists in the estimation of GHG emissions and removals on identified lands. This is to be done for each year of the commitment period, trying to ensure the absence of gaps and double counting. The estimation begins with the onset of the activity or the beginning of the commitment period, depending on which one comes later. As at 20 October 2014, all 37 Annex B Parties had submitted their annual GHG inventories with LULUCF activities, including both the common reporting format tables and the national inventory reports, for the period from the base year to 2012, thus covering the first commitment period. The more recent reports have been delayed due to the stalemate of the Kyoto Protocol and the update of the CRF Reporter software, which had to be redesigned, and at present only 9 countries[354] have submitted their NIR with their designed LULUCF activities.

In conclusion, considerable progress has been made in the reporting and accounting standards in this critical area of climate protection. If on the one hand the fact that the only binding agreement on the issue is not being carried on by Parties is a certain step back, on the other hand the recent developments of the UNFCCC on this matter let space for moderate hope of a more global accounting of LULUCF activities. The new Paris Agreement does not mention LULUCF explicitly, but it envisions that Parties, when establishing their nationally determined contributions, also account for "the existing framework as set out in related guidance and decisions already agreed under the Convention for: policy approaches and positive incentives for activities relating to reducing emissions from deforestation and forest degradation, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries; and alternative policy

---

[353] Stratification of the country should occur at the following four levels:
- Level 1: stratify the country into areas subjected to the six land-use categories
- Level 2: stratify the land-use categories into areas of land subjected to mandatory or elected activities or not subjected to any mandatory or elected activity
- Level 3: stratify the area subjected to activities into areas of mineral soils and organic soils
- Level 4: where such activities do occur, stratify areas with organic soils into areas subject to drainage or rewetting or neither drained or rewetted.

Source: T. Hiraishi, T. Krug, K. Tanabe, N. Srivastava, B. Jamsranjav, M. Fukuda, T. Troxler*, 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*, pag. 1.9.

[354] Australia, Canada, Japan, Kazakhstan, New Zealand, Switzerland, Ukraine, United Kingdom, United States.

approaches, such as joint mitigation and adaptation approaches for the integral and sustainable management of forests, while reaffirming the importance of incentivizing, as appropriate, non-carbon benefits associated with such approaches".[355]

In the next chapter, I will examine one of the activities set out by the previous article, namely REDD+, more in detail.

3.2 REDD+

As far as developing countries are involved in forest protection, the Kyoto Protocol provisions do not compel them to take any action to mitigate climate change, as implicit in the principle of "common but differentiated responsibility".

In order to promote the proactive involvement of non-Annex I countries in this matter, in 2005, at the eleventh Conference of the Parties (COP 11), the agenda item on "reducing emissions from deforestation in developing countries and approaches to stimulate action" (REDD) was launched. The governments of Papua New Guinea and Costa Rica, supported by 8 other Parties, requested for this issue to be discussed[356], and the proposal received the general support of the Parties, who were, by the time, well aware of the importance of the issue in the context of climate change mitigation, inasmuch the contribution to the emissions from deforestation in developing countries to global greenhouse gas emission was already very high. Consequently, the item was taken up and Parties agreed to initiate to make considerations on possible provisions on this matter at the twenty-fourth SBSTA session in May 2006.

The meeting of the body, held in Bonn, began the work on the issue by noting there was the need to "address reducing emissions from deforestation in developing countries as part of mitigation efforts to achieve the ultimate objective of the Convention". The SBSTA discussed a great number of scientific, socio-economic, technical, and methodological issues related to the role and the possible policy options in developing countries, and underlined from the beginning the importance of a policy approach that gave positive incentives to reduce emissions from deforestation and that enhanced the economic and technological collaboration between developing and developed countries, in order to reduce uncertainties and unavailability of data.

Following these considerations, in December 2007, COP 13 in Bali adopted two important decisions: the Bali Action Plan (Decision 1/CP.13) and a series of approaches to stimulate action on reducing

[355] Paris Agreement, article 5, paragraph 2.
[356] Through their submission FCCC/CP/2005/MISC.1.

emissions from deforestation in developing countries (Decision 2/CP.13). The first and most important decision proposed a set of "policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries", and acknowledged the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.[357] The objectives of the Bali Action Plan are to halt forest cover loss in developing countries by 2030 "at the latest" and to reduce gross deforestation in developing countries by at least 50% by 2020 compared to the current 2007 levels. Besides, with Decision 2/CP.13 the COP invited Parties to further strengthen and support the efforts to reduce emissions from deforestation and forest degradation on a voluntary basis, encouraging Parties in the position to do so to support capacity-building, to provide technical and technological transfer to improve data collection and emission estimation, and to explore a range of actions to address deforestation in their own country.

Being this a framework for an action plan on deforestation, several issues remained undefined. First of all, it was not clear, at the time, what should be included in the definition of REDD. Should it be only applied to forestry or all LULUCF sector? Should it concern conservation or sustainable management of forests? Secondly, there was not accord on the methodology of the assessment of REDD policies, as well as on the rights that had to be reckoned to indigenous people. Being local communities stakeholders of this process, what had to be the extent of their rights in term of participation, land tenure, distribution of funds? The issue of financing was a further obstacle. If REDD was to be considered as a Nationally Appropriate Mitigation Action (NAMA), REDD projects would not be eligible for funding through a market mechanism, thus reducing the possibilities to finance it through the fund established under the COP or through a government to government capacity-building support.[358]

The endeavour ahead was huge, and for this reason COP 11 also established three working groups: the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP), appointed to the negotiation of future commitments from industrialised nations in the Kyoto Protocol, the Ad Hoc Working Group on Long Term Cooperative Action under the Convention (AWG-LCA), in charge of developing a plan for a long-term cooperation between developing and industrialised countries[359], and the already existing Subsidiary Body for Scientific and Technological Advice (SBSTA), which discussed the technical aspects of REDD.

The SBSTA, along with the two other Working Groups, continued its work until SBSTA 29, where there was a major change in the definition of the scope of REDD, even if it was achieved just by a

[357] Decision 1/CP.13 Paragraph 1 (b).
[358] *The History of REDD Policy*, Carbon Planet White Paper, 2009, pag. 13.
[359] It focused on mitigation, adaptation, technology transfer and financial provision.

small orthographic correction. The definition of REDD changed from "reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" to "reducing emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries". The only difference between the two sentences is the change of a semi-colon with a comma between "developing countries" and "and the role of"[360]. This change meant that conservation, sustainable management, and emissions reductions had all the same level of priority in the negotiation. This modification was achieved thanks to the pressures of developing countries headed by India. From that moment, REDD has been referred to as REDD+. Another noteworthy development was that US, Canada, New Zealand, and Australia (the most part of JUSSCANZ group) blocked the inclusion of references to indigenous people and the explicit mention of rights.[361]

2009 saw the introduction of the negotiating text, prepared in the second meeting of the fifth session of the AWG-LCA in Bonn, Germany.[362] The text was prepared by the Chair of the AWG-LCA incorporating the ideas submitted by the Parties[363] with the objective of simplifying the negotiations among them, in view of the adoption of the final text at COP 15 in Copenhagen in December 2009. The concern with the inclusion of all the issues and the interests at stake took the negotiating text from 56 pages to some 200 pages. So it was more a matter of ensuring and comprising all interests more that reaching consensus, but on one issue the delegates seemed to agree: the long-term accounting of land-use emissions should be done on a land-basis instead of an activity-basis accounting. The first system measured the total emissions and sinks on a given area of land while the second one measured only emissions and sinks from certain land-use activities, and this convergence was the symptom of a movement away from REDD as pure natural forest conservation towards the REDD+ model, because land-based accounting reflects better land's true relation with the environment.

Not the same consensus was reached in Bonn over the matter of indigenous rights, which continued to be opposed by the US and other JUSSCANZ countries. During these sessions, however, there was the news of the introduction of the concept of equitable distribution of funds: "A REDD+ mechanism should be transparent, efficient, and equitable; and it should ensure a fair distribution of REDD derived benefits among all relevant stakeholders and indigenous peoples and local communities, in response of their efforts in REDD activities".[364]

---

[360] FCCC/SBSTA/2008/13 pp. 8-9.
[361] FCCC/SBSTA/2008/L.23 pag. 2.
[362] This was also the Seventh session of the AWG-KP.
[363] FCCC/SBSTA/2008/L.23, paragraph 13.
[364] The lack of agreement on the issue of indigenous people and their engagement is demonstrated by the negotiating text,

In this conference, discussions surrounding financing moved towards a hybrid model of many of the discussed mechanisms. The link of REDD+ with the carbon trading mechanisms was the object of mounting concern from developing countries: if developed countries were to use REDD credits to meet their emissions reduction targets, rules to clarify how much of these reductions could be achieved by REDD had to be established.

Another important question, on natural forests, was fluctuating. During the last day of negotiations of the 7th Session of the AWG-LCA in Bangkok, in September/October 2009, the provision on the safeguard against the conversion of natural forests to plantation was removed from the negotiating text due to the opposition of the EU supported by the Democratic Republic of the Congo speaking in behalf of Cameroon and Equatorial Guinea[365], but during the following discussions in November in Barcelona the part of the text regarding natural forests reappeared in brackets in two different options, suggesting there was still no consensus.[366] In Barcelona there was still no certainty about financing mechanisms; options varied from establishing a public fund under the COP, to auctioning allowances, a market based mechanism, or a combination of these and other approaches. There was even the inclusion of the option for general "innovative funding sources".

COP 15 in Copenhagen, although disastrous in establishing a new global climate change deal, provided the REDD+ strategy an important momentum. This objective was reached in two ways. The first was through a COP decision[367] in which the Conference of the Parties, recalling Decision 2/CP.13, requested developing country Parties to take action to identify the drivers of deforestation and forest degradation, to identify activities within each country that result in reduced emissions and increased removals, with the aim of stabilising forest carbon stocks, to use the most recent IPCC guidelines to estimate forest-related anthropogenic emissions, and finally and most importantly to establish a "robust and transparent national forest monitoring system", giving then further indication on how to set the system up. The second way through which REDD+ kept its centrality in the climate change talks was thanks to references to it in the Copenhagen Accords.[368] In 2010, to nourish this momentum,

---

where elements in brackets mean the lack of consensus: "[[There should be full and effective engagement of][Indigenous peoples and] local communities [[should] [shall] be involved] [must not be only like assistant to the implementation, but must begin with] [in design plans and actions [in their land] and their rights [should be] respected, [including the right of full prior and informed consent,] [including prior and informed consent,] [consistent with the provisions established under the respective national legislation [or], [and][in its absence,]] [in accordance with the United Nations Declaration on the Rights of Indigenous People][consistent with relevant international instruments, obligations, obligations and national legislation]. [The CBD and its Expanded Work Programme on Biodiversity in forest should be observed to avoid inconsistencies at level of national implementation.]]".

365 UNFCCC, AWG-LCA Non-paper No. 18, 08 October 2009.

366 "[Promote] actions that are consistent with the conservation of biological diversity [, and do not provide incentives for conversion of natural forests][, including safeguards on the conversion of natural forests] and enhance other social and environmental benefits[,including [environmental] [ecosystem] services], complementary to the aims and objectives of relevant international conventions and agreements".

367 Decision 4/CP.15 of the COP 15.

368 Decision 2/CP.15 of the COP 15, paragraphs 6, 8, 10.

the interim and country-led REDD+ Partnership was established. Its role was to support the growth of the REDD+ program while the mechanism was still being negotiated under the UNFCCC.

At COP 16 in Cancun, in the framework of the comprehensive "Cancun Agreements"[369], REDD became officially REDD+, in order to reflect its new components of conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks. [370] Moreover, the COP encouraged all Parties to find effective ways to reduce the human pressure on forests that results in greenhouse gas emissions, and agreed on the REDD+ policy approaches and scope, including guidance on nationally and internationally coordinated activities to mitigate climate change and to promote and support capacity building. In the meantime, many countries called for immediate and significantly scaled-up action to build capacity and readiness to address the multiple challenges associated with reducing emissions from LULUCF activities, as well as addressing conservation, sustainable management of forests and enhancement of forest carbon stock.[371] Finally, the Cancun Agreements established the following safeguards for REDD+ initiatives:

a) actions that complement or are consistent with the objectives of national forest programmes and relevant international conventions and agreements;

b) transparent and effective national forest governance structures, taking into account national legislation and sovereignty;

c) respect for the knowledge and rights of indigenous peoples and members of local communities, by taking into account relevant international obligations, national circumstances and laws, and noting that the General Assembly has adopted the United Nations Declaration on the Rights of Indigenous Peoples;

d) full and effective participation of relevant stakeholders, including, in particular, indigenous peoples and local communities;

e) actions that are consistent with the conservation of natural forests and biological diversity, ensuring that actions are not used for the conversion of natural forests, but are instead used to incentivize the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits;

f) actions to address the risks of reversals;

g) actions to reduce displacement of emissions.[372]

The steps set out in the Cancun Agreements to implement the REDD+ program can be resumed in three phases. The first phase concerns the development of national strategies or action plans, policies

[369] Decision 1/CP.16.
[370] I*bidem*, paragraph 70.
[371] *The UN-REDD Programme Strategy 2011-2015*, pag. 3.
[372] Decision1/CP.16, Annex I, paragraph 2.

and measures, and capacity building. The following phase comprehends the implementation of these national measures and strategies that could involve further capacity building, technology, development and transfer, and results-based demonstration activities. The third phase should count on result-based actions that should be fully measured, reported and verified, thus giving right to Result Based Payments (RBPs).

To help the immediate implementation of REDD+, in September 2008 the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme) was created. It builds on the convening role and technical expertise of the Food and Agriculture Organisation of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). Its purpose is to assist partner developing countries[373] to build capacity to reduce emissions and to participate in the REDD+ mechanism in two ways: with the direct support to the design and implementation of UN-REDD National Programmes and with complementary support to national REDD+ action through common approaches, analyses, methodologies, tools, data and practices developed through the UN-REDD Global Programme.[374] Through its initial nine pilot country National Programs in Africa, Asia-Pacific, Latin America, and the Caribbean[375], the UN-REDD Programme is supporting governments to prepare national REDD+ strategies, build information collection systems, engage stakeholders and demonstrate the benefits of the actions against deforestation.

In order to optimise the approach and effectiveness of the UN-REDD Programme, the three participating UN organisations embarked on the preparation of a Programme Strategy, the first covering the period 2011-2015, and a new one for the period 2016-2020 is still in a draft version. This five-year strategy was adopted by the three UN-REDD Programme agencies and endorsed by the UN-REDD, and represents a "living document that will be adjusted as appropriate in response to the development of the REDD+ mechanism".[376]

Recalling the three phases division, the UN-REDD Programme is already active in phase one and has delivered technical support and funding for the development of national REDD+ strategies in pilot countries. Even if, clearly, the three phases are country-specific, and many countries are likely to remain in phase one for some more time, the Programme has a meaningful role also in phase two concerning the implementation of national policies.

---

[373] At present the number of partner countries is 64: http://www.unredd.net/index.php?option=com_unregions&view=overview&Itemid=495.

[374] Available at the following link: http://www.unredd.net/index.php?option=com_targetedsupport&view=targetedsupportoverview&Itemid=524.

[375] These nine pilot projects were launched in the following countries: Democratic Republic of the Congo (DRC), Tanzania, Zambia, Papua New Guinea (PNG), Vietnam, Bolivia, Panama, Paraguay.

[376] *The UN-REDD Programme Strategy 2011-2015*, pag. 2.

The demand for the UN-REDD Programme's support has grown rapidly since 2008. As of today, the Programme has provided full-scale national programmes for REDD+ readiness to 23 countries, and smaller targeted support and policy/technical advice has been provided to over 35 countries[377]. A global programme has allowed the UN-REDD Programme to move the REDD+ discussion fore ward through the development of guidance, tools and briefs.

Meanwhile, COP17 in Durban (2011) presented all-encompassing guidelines[378] for assessing the Reference Emissions Levels (RELs), that is, the level by which the progress in the reduction of CO_2 emissions will be measured. As more specific technical details were not elaborated, the SBSTA was requested to develop guidance for a process of technical assessment of the proposed forest reference emissions levels (RELs) and/or forest reference levels (RLs).

At COP 19 in Warsaw in 2013 most of the work on the programme of REDD+ was finalised. SBSTA concluded its work providing technical guidance for the implementation of REDD+ activities. These decisions were on modalities for national forest monitoring systems (NFMS), modalities for measuring, reporting and verifying (MRV), the technical assessment of proposed forest reference emission levels/forest reference levels, safeguards information systems, and addressing the drivers of deforestation and forest degradation. These issues, in particular MRV and RELs, have been the subject of extensive debate and have taken up much negotiating time since first proposed at COP 16 in Cancun.

The seven decisions[379] adopted by the COP took the name of "Warsaw Framework for REDD+" and included all the above-mentioned aspects of REDD+. Altogether, with this outcome the COP set out the guidelines to start the effective implementation of REDD+, giving the chance to developing countries to have the results of their REDD+ activities recognised for Results-Based Payments (RBPs). In this direction, the support of the UN-REDD Programme was crucial.

At present, the details of the REDD+ mechanism continue to be debated under the UNFCCC, and the considerable financial needs for full-scale implementation have not yet been met. A final mechanism is therefore not yet in place and operating at scale. Despite this, in recognition of the need for urgent action if we want that reducing deforestation has a meaningful effect in terms of reducing emissions and amplifying mitigation of climate change, REDD+ initiatives have already been started outside the framework of the UNFCCC, both independently and in anticipation of a formal REDD+ mechanism.[380] Programmes like the Australian Carbon Farming Initiative (CFI), the U.S. Forestry Offset Projects, as well as the Brazilian Amazon Fund and several voluntary carbon standards, are

---

377 *The UN-REDD Programme Strategy, 2016-2020*, pag. 2.
378 Decision 12/CP.17.
379 Decisions from 9/CP.19 to 15/CP.19.
380 Source: The REDD Desk. www.theredddesk.org.

the first practical results to stop deforestation that the REDD+ process has triggered.

As for the UN-REDD, the commitment of the Programme are being updated and reviewed with the creation of the new UN-REDD Programme strategy for 2016-2020. The overall development goal has been defined as "to reduce forest emissions and enhance carbon stocks from forests while contributing to national sustainable development".[381] Recognising that the effective impact on the environment can only be reached by the cumulative effects of its policies, the UN-REDD Programme will support for the next five years changes that impact both on how countries meet their requirements under the UNFCCC, progressing from REDD+ readiness to RBPs, and on the implementation of national REDD+ policies and measures that produce results-based benefits on carbon and non-carbon emissions.

The UN-REDD Programme effectiveness in the future will depend on the continuity of the support to developing countries that intend to contribute to climate change mitigation as defined in the UNFCCC. The results of the Programme will have to be measured both on the fulfilment of the requirements of the Convention (to qualify for RBPs) and through countries implementing a range of reforms and measures to address the correct use and management of natural resources.

The Programme has accumulated considerable knowledge and experience that can be used to support countries in this area. Needless to say, the majority of the results will come as a consequence of the development of national laws, policies and measures to generate carbon and non-carbon benefits. The overall political will of a country to enact legislation or introduce new measures to move towards a "low-carbon development"[382] is fundamental. Following the recommendations of the UN-REDD Programme Strategy, other important drivers to encourage change through result-based actions (RBAs) will include directing investments towards actions that address deforestation and forest degradation, the agreement on the wide benefits of non-carbon strategies, the availability of data and information on social and environmental benefits, as well as the effective operation of safeguards. The wide range of activities and actions to realise the changes envisaged requests the capability of inter-sectoral collaboration, which is another reason why the UN-REDD Programme is well placed to provide support.

In concert with other REDD+ initiatives funded through national, bilateral and multilateral arrangements, it is envisaged that an important outcome of the Programme will be to scale up support for REDD+ RBAs in a limited number of countries. The desired changes in terms of GHG emissions require concerted efforts to change natural resource management policies and practices affecting the forest sector, which will be rewarded through RBPs. These changes will have to be measured and reported regularly in a manner consistent with the GHG inventory. The Programme reaffirms that

---

[381] *The UN-REDD Programme Strategy, 2016-2020*, pag. 7.

[382] *Ibidem,* pag. 9.

credible and agreed policies and measures will require further consultations and negotiations as well as careful design of investment schemes. Identification of appropriate reforms (for example to ensure greater tenure security for marginalised populations) is the first step, but follow up will often be needed to ensure implementation. Effective management of the flow of REDD+ funds and continued attention to safeguards are also critical.

To conclude, we know that deforestation and forest degradation can occur from direct and indirect causes. These causes, known as drivers, vary among regions and countries, and are often outside the forest sector. The long-term success of REDD+ depends on altering business-as-usual activities in sectors currently driving GHG emissions from deforestation and forest degradation. Agriculture is estimated to be the largest direct driver, accounting for about 80% of deforestation worldwide. Mining, infrastructure and urban expansion are important but less prominent.[383] Major drivers for forest degradation include unsustainable logging (both legal and illegal) and the use of fuelwood and charcoal, the latter in particular in Africa. Indirect drivers for both deforestation and forest degradation include a range of causes that are often interrelated, combining social, economic, political, technological and cultural processes that operate at a range of scales. Drivers are different from country to country and addressing them effectively will depend on a variety of factors.[384]

For this reason, the national approach is fundamental. Assessments at country level become essential for defining the most appropriate measures to sustainably address the drivers while developing REDD+ within the context of a national strategy or action plan. Moreover, critical underlying drivers of deforestation and degradation are represented in many countries by weak governance of institutions in forest-related sectors, including capacity deficiencies, conflicting cross-sectoral legislation and policies, and illegal activities (related to corruption and weak enforcement). Thus, achieving REDD+ results will entail that the three direct, indirect and underlying drivers of deforestation are identified at the country level at the same time, and that national stakeholders contribute by identifying and recommending the most strategic policies and measures to most sustainably address drivers of deforestation and degradation, as well as "+" activities, including linkages to broader low carbon, climate change and/or sustainable development strategies.

Given the lack of capacity and funds for REDD+ monitoring in many countries, greater integration of carbon, social and environmental results monitoring (both across scales and between disciplines) could help make the process more cost-effective. To promote such integration, Duchelle, Herold, and De Sassi suggest that advancements are needed in three key areas. The first area which needs to be improved is the cross-scale coordination in measuring, reporting and verifying of carbon and non-

---

[383] G. Kissinger, M. Herold, V. De Sy, *Drivers of deforestation and forest degradation: a synthesis report for REDD+ policymakers*, Lexeme Consulting, Vancouver Canada, August 2012, pag. 4.

[384] *Ibidem,* pag. 10.

carbon impacts of REDD+. In this direction, the experience and guidelines of the UNFCCC, the Kyoto Protocol and the sustainable forest management criteria and indicators which stem from the Forest Principles defined at the UNCED in Rio de Janeiro in 1992, are particularly important. These criteria and indicators, which consider social, economic, environmental, and cultural dimensions, are to be applied at regional, national and local (i.e. forest management unit) levels, and are commonly accepted as appropriate tools for defining, assessing and monitoring progress toward sustainable forest management.[385] Second, there is a need to fine-tune monitoring methods and databases to facilitate the choice of the appropriate REDD+ monitoring indicators. For REDD+ monitoring to work, it is critical to understand how these systems can be elaborated from existing national policies, indicators and data so that monitoring requirements are a source of support and not a burden. REDD+ country experiences in establishing Safeguard Information Systems and advancing with monitoring efforts should be widely disseminated and contribute to the international policy process in a "bottom up" way, so that countries can learn from and incorporate advances already made at subnational levels. The incorporation of the lessons learned by subnational jurisdictions and projects could help cost-effectiveness as the system is consolidated at the national level. In this context, there is the opportunity to think beyond forests and forest monitoring towards the engagement of multiple sectors and stakeholders in measuring sustainability more broadly. Considerable needs for research and action lie in this area.[386] Third, the promotion of a more interdisciplinary approach in monitoring systems could reduce costs and advance the understanding of synergies and trade-off between carbon and non-carbon benefits.

The most important element, however, common to all the climate change regime, continues to be the necessity to implement these actions as a matter of urgency. The slowness of the negotiations has been a weakness the multilateral process has not yet been able to overcome, leading to expectations which then do not find their counterpart in real practical actions. For example, the objectives of the Bali Action Plan to halt forest cover loss in developing countries by 2030 "at the latest" and to reduce gross deforestation in developing countries by at least 50% by 2020 compared to 2007 levels are far from the current path.[387] REDD+ and LULUCF activities give the chance to join the protection of forest to the one of the people who depend on them for their own survival, fighting poverty and food scarcity, like no other sector of climate change. This is a chance that has to be caught in order to promote sustainable development.

---

[385] F. Castañeda, *Criteria and indicators for sustainable forest management: international processes, current status and the way ahead*. Unasylva, 203(51), 2000, pp. 34-40.

[386] A. E. Duchelle, M. Herold, C. De Sassi, *Monitoring REDD+ impacts: cross scale coordination and interdisciplinary integration*, in A. E. Latawiec, D. Agol (eds.) Sustainability Indicators in Practice, Berlin, De Gruyter, 55-79, 2015, pag. 72.

[387] See: http://www.ipcc.ch/ipccreports/sres/emission/index.php?idp=77.

Conclusion: The future of climate change

It is useful to reflect on the lessons that can be learned from examining the Kyoto Protocol's strengths and weaknesses, in order to draw a picture of what could be the useful experiences that should be kept into account in the implementation of the future UNFCCC's developments, in particular concerning the Paris Agreement. Among the Protocol strengths there is the creation of the three market-based mechanisms discussed in the first chapter. Emission Trading (IET), Joint Implementation (JI) and Clean Development Mechanism (CDM) represent on the whole cost-effective measures to improve the global climate change regime. However, if this in theory is truth, in practice the mechanisms have triggered some counterproductive effects. Following the stalemate of the Kyoto Protocol, registered projects in JI and CDM have been declining since 2012, and subsequently, the issuance trend of CERs and ERUs is currently stalling. In theory, IET could reduce abatement costs by as much as 50% if trades took place among Annex B countries.[388] In practice, though, trading under this mechanism has been limited, in part because of the nature of the trading system, in part for the absence of the United States. Also, early expectations were that the main traders would be national governments, and that States would not operate as efficient traders, because they are not cost-minimisers.[389] In practice, increasing shares of trades have been made by private sector firms, which may increase cost-effectiveness.[390] The same discussion is valid also for JI: it could improve cost-effectiveness but practice suggests that it has not been that way. Most part of JI projects have been in IET countries, especially Russia and Ukraine, given the relative low cost of emission reduction there.[391] The distribution of JI projects is not consistent with the theoretical potential, due to the fact that some countries, such as Ukraine, supported JI, while others, including Russia, lacked

---

[388] G. J. Blanford, R. G. Richels, T. F. Rutherford, *Revised emissions growth projections for China: Why post-Kyoto climate policy must look east*, in J. E. Aldy, R. N. Stavins, (eds.), *Post-Kyoto International Climate Policy: Implementing Architectures for Agreement*, Cambridge University Press, New York, 2010, pp. 822-856.
See also H. D. Jacoby, M. H. Babiker, S. Paltsev, J. M. Reilly, *Sharing the burden of GHG reductions*, in J. E. Aldy, R. N. Stavins, (eds.), *Post-Kyoto International Climate Policy: Implementing Architectures for Agreement*, Cambridge University Press, Cambridge, UK, 2010, pp. 753-785.

[389] R. W. Hahn, R. Stavins, *What Has the Kyoto Protocol Wrought? The Real Architecture of International Tradable Permit Markets*, Resources for the Future, Washington, DC, 1999.

[390] E. L. Aldrich, C. L Koerner, *Unveiling Assigned Amount Unit (AAU) trades: Current market impacts and prospects for the future*, Atmosphere 3, 2012, pp. 229-245.

[391] From 2008 to July 2013, JI led to the issuance of over 0.8 billion emission reduction unit (ERU) credits, each, equivalent to one TCO_2eq of reported emission abatement. Over half of this volume was issued by Ukraine and Russia. Source: IPCC *Climate Change 2014: Mitigation of Climate Change*, pag. 1044.

to support these project at the political level, making it hard to establish an efficient framework.

The CDM raises the most concerns, because of its possible emission credits that are not "additional, real, verifiable, and permanent."[392] The mechanism, which aims at reducing mitigation costs for Annex B countries and contribute to sustainable development in non-Annex B countries, has faced challenges in baseline determination, monitoring, and transaction costs, and attempts of regulators to standardise baselines have triggered a debate regarding their impacts on environmental effectiveness and transaction costs.[393] The distribution of projects has been concentrated in a relatively small number of developing countries.[394] Given that private companies in developing countries finance CDM projects out of their own resources and eventually sell the credits as a new export product, with the CDM consultant receiving a share, a substantial amount of the rents remains in the host country. The fear, even if unfounded, of losing this export revenue may be a deterrent against taking up national emissions commitments, although in practice many industrialised countries are developing policies aimed at emissions limitations. Therefore, it has been proposed to discount CDM credits to provide an incentive for taking up stricter national targets.[395] On the whole, the contribution of CDM to cost-effectiveness on the long term depends from the ability of the Executive Body to promote technology transfer and innovation when these projects are carried out. At present, about one third of the CDM projects involve technology transfer. Seres et al.[396] found that 36% of 3296 registered and proposed projects accounting for 59% of the annual emission reductions claim to involve technology transfer. Assuring additionality is one of the main objectives that reforms will have to deal with, and the preferential treatment in procedures and methodology to certain project categories, certain sectors, notably forestry,[397] or certain regions[398] might expand the effectiveness of CDM. However, a great number of researches underline that, because there are very large start-up costs for creating new institutions, the best option is to maintain existing institutions and improving them.[399]

Another advantage of the Kyoto Protocol is that it provides flexibility for States Parties to meet their

---

[392] The underlying rules of the Clean Development Mechanism (CDM) were supposed to be reformed at the 2013 Climate Change Conference in Warsaw. However, countries could not agree on the types of reform needed and postponed the necessary decisions. In the meantime, the CDM commissioned a technical paper and launched a consultation process for governments and other stakeholder. Document FCCC/TP/2014/1, available at the following link: http://unfccc.int/resource/docs/2014/tp/01.pdf.

[393] IPCC *Climate Change 2014: Mitigation of Climate Change*, pag. 1046.

[394] K. Yamada, M. Fujimori, *Current status and critical issues of the CDM*, in T. Toyota, R. Fujikura, (eds.), *Climate Change Mitigation and Development Cooperation*, Routledge, Oxford, 2012, pp. 37-48.

[395] L. Schneider, *Assessing the additionality of CDM projects: Practical experiences and lessons learned*, Climate Policy 9, 2009, pp. 242-254.

[396] S. Seres, E. Haites, K. Murphy, *Analysis of technology transfer in CDM projects: An update*, Energy Policy 37, 2009, pp. 4919-4926.

[397] S. Thomas, P. Dargusch, S. Harrison, J. Herbohn, *Why are there so few afforestation and reforestation Clean Development Mechanism projects?*, Land Use Policy 27, 2010, pp. 880–887.

[398] N. T. Nguyen, M. Ha-Duong, S. Greiner, M. Mehling, *Improving the Clean Development Mechanism post-2012: A developing country perspective*, Carbon and Climate Law Review, 2010, 76–85.

[399] J. E. Aldy, R. N. Stavins, *Lessons for the international Policy community*, in J. E. Aldy, R. N. Stavins, *Post-Kyoto International Climate Policy,* Cambridge University Press, 2009, pag. 45.

national emission targets, as stated in article 2 of the Protocol. Accordingly, Parties can pursue their commitments with the policies and the actions they prefer. This element was both a consequence of the need to let a certain amount of "freedom" in Annex B Parties commitments in order to assure the largest participation possible on emission commitments, and a way to let Parties adopt measures which fitted their specific regional need. This idea has been also taken on in the Paris Agreement, where it stands as one of the pillars of the deal, in article 4, paragraph 2.[400]

Moreover, the Kyoto Protocol has been a widely ratified agreement, given that currently there are 192 Parties (191 States and 1 regional economic integration organisation), and the 37 Annex B Parties have globally reached and exceeded the objective of reducing emission by at least 5% compared to 1990. According to UNFCCC GHG inventories, aggregate GHG emissions from all Annex I countries were reduced by 16.2% from 1990-2012 (if land use and forestry-sector changes are taken into account, and 10.6% if they are not). Not counting the EITs, however, the remaining Annex I countries' aggregate GHG emissions increased by 0.3% and 1.9% from 1990 to 2012, with and without LULUCF, respectively.[401] This last data are the symptom of one of the main issues with the Kyoto Protocol, namely that such an over-dimensioned result was the consequence of peculiar economic and social situations in EITs Annex I countries. Annex B EITs were credited for emissions reductions that would have occurred without the Protocol due to their significant economic contraction during the 1990s. In principle, these countries were allowed to sell resultant surplus emissions-reduction credits to other Annex B Parties, which might have further reduced environmental effectiveness. However, in practice, other Parties bought few AAUs relative to the stock available from EITs during the first commitment period, and thus environmental effectiveness was not affected as much as it could have been.[402]

Another problem of the Kyoto Protocol lies at its root, in how it has been built and in how it has developed its formula for fighting climate change. The first and most discussed question is that the Protocol, with its Annex B Parties, covers only a secondary part of global emissions[403], and it is insufficient to be considered as "The" response to climate change issues. This was mainly due to the well-known absence of some of the world's leading GHG emitters, with the United States before everyone else. The US should have contributed with a reduction of 7%, which would have amounted to over 40% of the total Annex B emissions commitments. In addition, Canada withdrew from the Protocol in 2011. Until recently the US was the country with the largest share of global emissions,

---

400 "Each Party shall prepare, communicate and maintain successive nationally determined contributions that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions."

401 Source: FCCC/SBI/2014/20, pp. 7-8.

402 IPCC *Climate Change 2014: Mitigation of Climate Change*, pag. 1044.

403 Since 1990, the Annex B countries' share of global GHG emissions has declined significantly, from approximately 56% of global emissions in 1990 to approximately 39% in 2010.

but it has been surpassed by the most rapidly growing developing country, China. Moreover, other developing countries contribute with large shares to the increase of the greenhouse effect and pollution: among others, India, Brazil, South Africa, Indonesia, Korea, and Mexico. Rapidly growing countries have produced rapid rates of growth in energy use, and hence CO_2 emissions. Together with continued deforestation in tropical countries, the result is that developing countries have overtaken the industrialised world in the total GHG emissions.[404]

The question, which stands at the heart of the climate change discussions, is: how to deal with the principle of common but differentiated responsibility (restated also in the Paris Agreement) in a world were developing countries are the ones which at present produce most part of the emissions? The Paris Agreement seems to have resolved this issue by asking for "nationally determined contributions". In this way much will depend on the degree of responsibility each Party will be willing to pursue, in particular of course developing countries, whose involvement will be crucial to step up the multilateral climate change regime.

A second weakness of the Kyoto Protocol is associated with the relatively small number of countries being asked to take action. Besides the insufficient GHG coverage, another effect is to drive up the costs of producing carbon-intensive goods and services within the group of countries taking action. To this consequence, however, the forces of international trade, multinationals in particular, answer by moving the production of carbon-intensive goods and services in countries which do not have binding emissions targets under the agreement. This phenomenon, known as "carbon leakage", implies a shift of industrial activities and associated economic benefits to emerging economies. In addition, there is an additional risk for non-participants to free-ride on the efforts of those countries that are committed to mitigating their emissions through the Kyoto Protocol.[405]

In addition to these obstacles, the short-term approach is the final main reason for the reduced environmental effectiveness of the Protocol. With its five-year time horizon in the first commitment period, it represents a short-term approach for what is fundamentally a long-term problem. Scientists tell us that GHGs have residence times in the atmosphere of decades to centuries, thus to address effectively this problem the role of green technological evolution is central. However, policy responses from the private sector have been weak, mainly because the short-term horizon did not provide sufficient reasons to commit.[406] Moreover, in terms of intertemporal distributional equity, some have noted that climate change mitigation that requires emissions reductions in the short term for uncertain long-term benefits also involves inter-generational distributional impacts.[407]

---

[404] J. E. Aldy, R. N. Stavins, *Post-Kyoto International Climate Policy,* Cambridge University Press, 2009, pag. 5.
[405] *Ibidem*, pag. 6.
[406] *Ibidem*, pag. 7.
[407] T. C. Schelling, *The cost of combating global warming: Facing the tradeoffs*, Foreign Affairs 76, 1997, pp. 8-14. See also A. J. Leach, *The welfare implications of climate change policy*, Journal of Environmental Economics and

On a general level, there is broad agreement in the literature that global emissions reductions objectives through 2020 implied by the Cancun pledges are inconsistent with cost-effective mitigation scenarios, which are based on the immediate onset of mitigation that maintain temperature change below 2°C with a greater than 50% probability. The Paris Agreement opens a new window of hope in this direction, but much will depend on the sense of responsibility of each State. The need to implement more stringent pledges, applying more severe accounting rules for credits from forests and surplus emission units, strengthening the support to developing countries through capacity-building and technology transfer, has been acknowledged both by Parties[408] that by the literature and science. The gap between current multilateral commitments and the necessary emissions reduction of GHG emissions could be filled at present only by distributed and global action with bottom-up initiatives utilising the knowledge and the instruments that international environmental bodies, the IPCC *in primis*, have provided on GHGs calculation, accounting and prevention. Initiatives by non-State actors have led to new standards for carbon credits, emissions accounting systems, carbon labelling schemes and collaborations between cities. Environmentalists have long extolled "the advantages of governing from the "bottom up", believing it provides more scope for experimenting with new approaches, fits better with local priorities and allows deeper citizen engagement".[409]

But why should one care about climate change, of which the average common person does not perceive its effects? Truth is that globally this has been an underestimated concern, and not generally acknowledged by everyone. At least until recently, sceptics have been an important element of climate change discussions.

By now, human influence on climate change is clear. The IPCC, the leading international body on the assessment of climate evolution, has always been clear on this point, since its first assessment report in 1995.[410] Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane and nitrous oxide that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century. Since 1950, observed changes are unprecedented over decades to millennia: each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850. The period from 1983 to 2012 was likely the warmest

---

Management 57, 2009, pp. 151-165.

[408] In the chapeau to the Paris Agreement, Parties recognise "the need for an effective and progressive response to the urgent threat of climate change on the basis of the best available scientific knowledge".

[409] A. Jordan, H. Van Asselt, *Can bottom-up climate action save the day?,* 10 August 2015, article on www.futureearth.org, available at the following link: http://www.futureearth.org/blog/2015-aug-10/can-bottom-climate-action-save-day.

[410] IPCC *First Assessment Report*, pag XIII.

30-year period of the last 1400 years in the Northern Hemisphere, where such assessment is possible with a good degree of confidence from science. Since when multiple independently produced datasets exist, the globally averaged combined land and ocean surface temperature data as calculated by a linear trend show a warming of 0.85 (0.65 to 1.06) °C over the period 1880-2012.[411]

Until a peak in global GHG emissions is not reached, increasing greenhouse gas concentration will continue to have many negative effects. The first and most known is the increase in Earth's average temperature, of both atmosphere and oceans. Even if for the period 1998-2012 the warming trend has decreased roughly of one third to one half of the trend over the period from 1951 to 2012 (maybe also thanks to the Kyoto Protocol efforts), this progression is largely due to natural causes, namely to a reduced trend in radiative forcing (the difference of sunlight absorbed by the Earth and energy radiated back to space) and cooling contribution from natural internal variability. This testifies how unclear it still is the relationship between GHG emissions-natural changes in the environment and temperature rise. The independent estimates of radiative forcing, of surface warming and of observed heat storage combine to give a heating range for the Earth that is consistent with the assessed likely range of equilibrium climate sensitivity[412] (1.5-4.5ºC).[413] Almost the entire globe has experienced surface warming, and ocean warming dominates the increase in energy stored in the climate system: on a global scale, the ocean warming is the largest near the surface of the Earth, and this triggers another series of negative effects: sea-level rise, increase of acidity of the oceans, influence on the patterns and amounts of precipitations. Sea-level rise data are stunning: from the start of the XIX century to 2010, global mean sea level rose by 0.19 meters. The IPCC expresses high confidence when it states that the rise rate has been larger than the mean rate during the previous two millennia. The causes are mainly related to thermal expansion from warming, melting of glaciers (these two explaining 75% of the observed global mean sea-level rise), Greenland, Antarctic ice sheet and land water storage.[414] Moreover, since the beginning of the industrial era, oceanic uptake of CO_2 has resulted in acidification of the ocean corresponding to a 26% increase, with disrupting effects on oceanic biodiversity, and with a peculiar effect on precipitations. In fact, a "wet-get-wetter" and "dry-get-drier" response is trackable at global scale. This trend is a consequence of a change in the water vapour content carried by circulations, which otherwise have changed very little.[415] This is another

[411] Source: IPCC AR5.

[412] The equilibrium climate sensitivity (ECS) refers to the equilibrium change in global average near-surface air temperature that would result from a sustained doubling of the atmospheric carbon dioxide concentration.

[413] The connection between the heating range and the so-called "equilibrium climate sensitivity", which is the long-term surface warming under an assumed doubling of the atmospheric CO_2 concentration, arises because a warmer surface causes enhanced radiation to space which counteracts the increase in the Earth's heat content. How much the radiation to space increases for a given increase in surface temperature depends on the same feedback processes (e.g., cloud feedback, water vapour feedback) that determine equilibrium climate sensitivity. Source: IPCC.

[414] Source: IPCC AR5.

[415] IPCC AR5, pag. 624.

example of a vicious circle created by climate change: wet regions are wet because they import moisture from dry regions, increasingly so with warmer temperatures.

Over the last two decades, there has been a reduction in ice and snow cover, as well as permafrost. The Greenland and Antarctic ice covers have been losing mass, as well as all the mountain glaciers across the planet and the spring snow cover. The annual mean Arctic sea ice extent decreased over the period 1979-2012, with a rate of decrease very likely in the range of 3.5 to 4.1% per decade. Science expresses high confidence that permafrost temperatures have increased in most regions of the Northern Hemisphere since the early 1980s, with reductions in thickness and areal extent in some regions in response to increased surface temperature and changing snow cover. By the end of the century, it is nearly certain that the near-surface permafrost extent at northern latitudes will continue to be reduced as global mean surface temperature increases.[416]

All these negative effects on the climate have harmful impacts on ecosystems and human groups. The increasingly irreversible changes in the natural environment have led to higher risks of extinction for many terrestrial, freshwater and marine species compared to pre-industrial times, and loss of biodiversity is already happening, as well as shifts in ecosystems characteristics. Especially in sensitive regions, climate change will provoke global marine species redistribution and marine biodiversity reduction, and will challenge the sustained provision of fisheries productivity and other ecosystem services, especially at low latitudes.[417] Marine ecosystems, especially coral reefs and polar ecosystems, are at risk from ocean acidification, which has impacts on the physiology, behaviour and population dynamics of organisms. This phenomenon acts together with other global changes (for example, warming, progressively lower oxygen levels) and with local changes (pollution, eutrophication), leading to interactive, complex and amplified impacts for species and ecosystems.

But if these dangers are not enough for one to worry, people should be alarmed at least by the threats climate change poses to human health. Scarcity of water will be one of the main problem of a hotter planet. “Underdeveloped” and poor populations, notably the ones which suffer the most from the increasing unpredictability of the climate, will unavoidably see the erosion of their vital environments. The fractions of the global population that will experience water scarcity are projected to increase with the level of warming in the 21st century, because climate change is reducing renewable surface water and groundwater resources in most dry subtropical regions. Food security too is concerned, in particular in the agricultural sector. Without adaptation techniques, rural areas producing wheat, rice and maize cultivations (inter alia) in tropical and temperate regions will be increasingly negatively impacted. Instead, in urban areas climate change is projected to increase risks for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland

[416] Reductions varies from a reduction of 37% to 81%.
[417] IPCC AR5, pag. 67.

and coastal flooding, landslides, air pollution, drought, water scarcity, sea-level rise and storm surges. These risks will be amplified for those areas lacking essential infrastructure and services to prevent and respond to climate change.

To raise awareness, five "Reasons For Concerns "(RFCs) of the IPCC have provided a framework for summarising key risks since the IPCC's *Third Assessment Report*. They illustrate the implications of warming and of adaptation limits for people, economies and ecosystems across sectors and regions, and provide a starting point for evaluating dangerous anthropogenic interference with the climate system. The first reason appeals to our sense of responsibility towards the unlucky populations of the world which suffer (and will increasingly suffer) the effects of climate change in "unique and threatened systems": some peculiar ecosystems and cultures have already been put at serious risk from climate change. With the objective of limiting global warming to around 1.5°C (just 0.5°C more than what is now), UNFCCC's policies will not in any case prevent the increase of the number of unique and threatened systems to suffer severe consequences. Many systems (and their populations) with limited adaptive capacity, particularly those associated with Arctic sea ice and coral reefs, are subject to very high risks with additional warming of 2°C. Small island countries and countries with low-lying coastal areas, in addition to risks resulting from the magnitude of warming, are suffering from the loss of marine species that are sensitive to the rate and degree of ocean acidification and the erosion of coastal areas, thus losing what in these poor areas of the planet are their sources of sustenance.

Second, extreme weather events should catch the attention of everybody: hurricanes, heat waves, heavy precipitation, coastal flooding, and snow waves are more and more common. With 1°C additional warming, climate change related risks from extreme events are high.[418] Risks associated with some types of extreme events (for example with extreme heat) increase progressively with further warming, and thus should be addressed now.

Further worries are generated by the uneven distribution of climate change impacts. This is a really delicate issue, because to be addressed it implies the awareness and the acknowledgement of the unevenly distributed impacts between groups of people and between regions of each country, and the will to act in this direction. Nonetheless, risks are generally greater for disadvantaged people and communities everywhere. Risks are already moderate because of regional differences in observed climate change impacts, particularly for crop production. Based on projected decreases in regional crop yields and water availability, risks of unevenly distributed impacts are high under additional warming of above 2°C.

Fourth, global aggregate impacts are directly proportional to the increase of temperature: under the

[418] Source: IPCC AR5.

agreed objective of limiting global warming to 1.5 °C, risks of global aggregate impacts are moderate, given that as we have seen the regional impact of climate change is an important element; but at around 3°C additional warming extensive biodiversity loss, with associated loss of ecosystem goods and services, is projected to high risks. Aggregate economic damages accelerate with increasing temperature, but few quantitative estimates are available for additional warming above 3°C.

Five, large-scale singular events will lead to irreversible and abrupt changes in the climate. With increasing warming, some physical and ecological systems are especially at risk: warming will continue beyond 2100 under all representative concentration pathways (RCPs) scenarios,[419] as well as global average sea-level rise and acidification. The IPCC states that "risks associated with such tipping points are moderate between 0 and 1°C additional warming, since there are signs that both warm-water coral reefs and Arctic ecosystems are already experiencing irreversible regime shifts". Risks increase at a steepening rate under an additional warming of 1 to 2°C and become high above 3°C, due to the potential for large and irreversible sea-level rise from ice sheet loss. A tragic and catastrophic scenario informs us that in case of sustained warming above some threshold greater than ~0.5°C additional warming, but less than ~3.5°C, the near-complete loss of the Greenland ice sheet would occur over a millennium or more, eventually contributing up to 7 meters to global mean sea-level rise.

Future changes will depend from the rate at which GHG concentrations in the atmosphere continue to increase, from how effective the measures undertaken by States will be, and from how features of the climate (sea-level, precipitations, atmosphere, lands, forests) will intrinsically respond to the expected increase in GHG concentrations. Even when the peak will be reached, hopefully but not very realistically in 2020, during the reduction trend of GHG emissions consequences on climate change will continue at least over all the 21st century.

Today, we are in a crucial moment for the future of the credibility of the multilaterally-led global effort to stop climate change. Recent high-emissions trends do not imply a certain high-emitting pathway if there is a move toward rapid, technically and economically feasible mitigation. As was confirmed in the 2013 *UNEP Emissions Gap Report*[420] and in successive International Energy Agency Assessments[421], there are many measures that could close the gap between estimated global greenhouse gas emissions levels by 2020 and levels consistent with pathways that keep warming below 2°C. The required emission reductions over the 21st century were estimated by IPCC Working Group III (WGIII) AR5 to lead to an annualised reduction in consumption growth limited to 0.04-

[419] Representative Concentration Pathways (RCPs) are four greenhouse gas concentration (not emissions) trajectories adopted by the IPCC in its fifth Assessment Report in 2014. They replace the Special Report on Emissions Scenarios (SRES) projections published in 2000.

[420] UNEP, 2013.

[421] International Energy Agency, 2013.

0.14 percentage points, relative to baseline growth of 1.6-3% per year. This calculation does not include the co-benefits, including for example health and environmental benefits from reduced co-emitted dangerous gases, poverty reductions and net employment gains. Delaying additional mitigation increases mitigation costs in the medium to long-term. That is why the Paris Agreement is virtually the last chance for the governmental process on climate change to be effective. The Paris Agreement, as it has been adopted at COP 21, is not enough to provide additional mitigation effects, which are globally lacking at present, for the exception of the positive result of the first commitment period of the Kyoto Protocol. Much will depend from what Parties will do in these five years before the theoretical entry into force of the Agreement. CO_2 emissions from fossil fuel combustion and industrial processes contributed about 78% of the total GHG emission increase from 1970 to 2010, with a similar percentage contribution for the period 2000-2010. National States are the only ones which can bind the industrial sector to a greener development path, on which depends a great part of the future of the planet, and one of the objectives of the Paris Agreement is exactly "making finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development".

Data show that the negotiating process of the UNFCCC has not been effective in providing solutions and policies to decrease emissions. Annual anthropogenic GHG emissions have increased by 10 Gt CO_2eq between 2000 and 2010, with this increase directly coming from energy supply (47%), industry (30%), transport (11%) and buildings (3%) sectors. Accounting for indirect emissions raises the contributions of the building and industry sectors. Only LULUCF activities did not grow in the last decade, and the REDD+ platform should be seen as a strength point of the climate change mitigation process, more than a bonus. LULUCF activities play a central role for food security and sustainable development. The most cost-effective mitigation options in forestry are afforestation, sustainable forest management and reducing deforestation, even if with large differences in their relative importance across regions.[422] In agriculture, the most cost-effective mitigation options are cropland management, grazing land management, and restoration of organic soils. These activities are all part of the Kyoto Protocol second commitment period, which at present rests blocked in the flux of the negotiations, and should be applied also for the new Paris Agreement's mitigation and adaptation policies. Article 5 of the deal expressly mentions forests as sinks and reservoirs of greenhouse gases[423], but their role should become more central in the future negotiations in order to use this resource effectively. The economic mitigation potential of supply-side measures could be

[422] IPCC WGIII AR5 (SPM), pag. 24.

[423] Article 5, paragraph 1: "Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1(d), of the Convention, including forests."

very high with relatively small enforcement costs, under the present available mitigation options.[424] Demand-side measures, such as changes in diet and reductions of losses in the food supply chain, have a further significant, but uncertain, potential to reduce GHG emissions from food production.

The *Summary for Policymakers* of the Working Group III contribution to the IPCC's *Fifth Assessment Report* underlines that policies governing agricultural practices and forest conservation and management are more effective when involving both mitigation and adaptation. Although some mitigation options in the LULUCF sector (such as soil and forest carbon stocks) may be vulnerable to climate change, when implemented sustainably, activities to reduce emissions from land-use, deforestation and forest degradation are cost-effective policy options for slowing down climate change with potential economic, social and other environmental and adaptation co-benefits (for example, conservation of biodiversity and water resources, reduction of soil erosion). Despite the need to adapt policies to the geographical area in which they are applied, about 90% of the potential emissions reduction for agriculture comes from increasing soil carbon reservoirs, while avoidance of deforestation represents a large share of the total mitigation potential. In South America and Africa it is by far the most important measure. Depending on the specific study, the cost level considered, and the timeframe, the contribution of reduced deforestation to climate change mitigation ranges from 30% to more than 50%.[425]

Besides the implementation of the REDD+ instrument, the Paris Agreement, to take advantage of the immense potential of the LULUCF sector, should enhance the Clean Development Mechanism platform to make it more appropriate to support projects in this sector. At present, there are a number of difficulties that prevented its wider inclusion, inter alia, the problematic questions are how to determine a baseline of deforestation in a country, how to avoid leakage, how to measure the carbon stocks maintained, and how to monitor implementation.[426] Science has the burden of reducing the level of these uncertainties, but in the meanwhile the new Paris international climate change deal and international climate policy-makers will have to adjust the existing regulations in a sector that is different from all the others. Financial incentives, in particular, seem quite important to favour reforestation and avoided deforestation.

Globally, economic and population growth continue to be the most important drivers of increases in CO_2 emissions from fossil fuel combustion. The contribution of population growth between 2000 and 2010 remained roughly identical to the previous three decades, while the contribution of economic

---

[424] LULUCF is estimated to have a mitigation potential of 7.2 to 11 $GtCO_2eq$/year in 2030 for mitigation efforts consistent with carbon prices up to 100 USD/tCO_2eq (used in many studies as a proxy to represent the level of effort in mitigation policies), about a third of which can be achieved at a implementation of available mitigation options.

[425] B. Metz, *Controlling climate change,* Cambridge University Press, 2010, pag. 247.

[426] To have a wider overview on this point, see B. Metz, *Controlling climate change,* Cambridge University Press, 2010, pag. 257.

growth has risen sharply. Without additional efforts to reduce GHG emissions beyond those in place today, emissions growth is expected to persist, driven by growth in global population and economic activities. Baseline scenarios, those without additional mitigation, result in global mean surface temperature increases in 2100 from 3.7°C to 4.8°C compared to pre-industrial levels.

It is clear that individual action will never be an adequate response to the climate change threat. Responding to the climate threat requires strong government action at all levels, but not just of that. What is important is cooperation and information sharing between all the parties involved: governments, the private sector, NGOs, civil society, and scientists. Mitigation of climate change implies a new paradigm, and a determined change of development paths, which can be reached only if all the parts of society are involved in it. Of course, some contributors are more important than others, as for example the private sector, which is accountable for a major part of the industrial emissions. One of the key areas in which this collective action must take place is in green investments designed to reduce our emissions on a mass scale. That mean buses, subways, streetcars and rail systems that are not only everywhere but affordable to everyone; energy-efficient affordable housing along those transit lines; smart electrical grids carrying renewable energy; control of multinationals and big firms; and a massive research effort to ensure that we are using the best methods possible.[427] Real climate solutions are the ones that address these interventions in a way that devolves power and control to the community level, whether through community-controlled renewable energy, local organic agriculture or transport systems genuinely accountable to their users. The crucial element in this new paradigm appears to be planning a long-term low-carbon development plan. The strategic framework to develop in a sustainable way requires a nationally determined long-term scenario which accounts for the specific circumstances of each country, its areas of weakness and its strengths. The necessary condition for this plan to be implemented, however, is that the government bodies share the vision of how important mitigation of and adaptation to climate change are for the future of the planet. It is for this reason that awareness and educational practices on climate are more important than ever to build a society which is environmentally responsible.

To conclude, it appears evident that changing development path is generally the result of a multitude of actions, as was explained above. Often these actions are not coordinated or are even spontaneous, result of business and civil society initiatives that are not in line with government policy. The more coherent individual actions are with the one of governments, the higher the probability that changes will lead to a more sustainable development path. One important element in such a transition management is coherence in government policy, something that is not at all self-evident.[428] To be

---

[427] N. Klein, *Capitalism Vs. the climate*, article on The Nation website, 9/11/2011, available at the following link: http://www.thenation.com/article/capitalism-vs-climate/.

[428] B. Metz, *Controlling climate change,* Cambridge University Press, 2010, pag. 102.

more effective, transition management should be extended to the role of business and civil society by creating dialogue, networks, and public-private partnerships and by encouraging local action and experimentation to find promising approaches. The capacity to manage transitions is thus an important condition for the effective mainstreaming of climate change in development policies. Equity (towards the poor, towards least developed countries), responsibility and cooperation should be guiding principles of this process, which implies not least but a revision of the current individualistic capitalistic system in favour of one based on solidarity and joint responsibility. The challenge is immense, but the price at stake is, too.

Bibliography:

- *A guide to the Climate Change Convention*, Climate Change Secretariat, Bonn, 2002, available at the link: http://unfccc.int/resource/process/guideprocess-p.pdf
- A. CAPARROS GASS, F. JACQUEMENT, *Biodiversity and Carbon Sequestration in forests: Economic and Legal Issues*, in M. Bothe, E. Rehbinde, *Climate Change Policy*, Eleven International Publishing, 2005
- ALDRICH L., KOERNER C. L, *Unveiling Assigned Amount Unit (AAU) trades: Current market impacts and prospects for the future*, Atmosphere 3, 2012, pp. 229-245
- ALDY J., STAVINS R., *Post-Kyoto International Climate Policy,* Cambridge University Press, 2009
- ANDERSON J.W., *The Kyoto Protocol on climate change*, Washington, Resources for the Future, 1998
- ANGELSEN A., BROCKHAUS M., SUNDERLIN W., VERCHOT L., *Analysing REDD+: challenges and choices*, Indonesia, CIFOR, 2012
- BARRIE PITTOCK A., *Climate change: the science, impacts and solutions,* Australia, CSIRO Publishing, 2009
- BAUER P., Equity, *Greenhouse gas emissions, and global common resources*, in SCHNEIDER S. H., ROSENCRANZ A., NILES J. O., *Climate change policy: a survey*, Washington, Island Press, 2002
- BEYERLIN-MARAUHN, *International environmental law*, Hart Publishing, 2011
- BIRNIE P., BOYLE A., REDGWELL C., *International law & the environment,* Oxford University Press, 2009
- BLANFORD G. J., RICHELS R. G., T. F. Rutherford, *Revised emissions growth projections for China: Why post-Kyoto climate policy must look east*, in ALDY J. E., STAVINS R. N., (eds.), *Post-Kyoto International Climate Policy: Implementing Architectures for Agreement*, Cambridge University Press, New York, 2010, pp. 822-856
- BODANSKY D., BRUNNEE J., HEY E., *The Oxford handbook of international environmental law*, Oxford University Press, 2007
- BROWN M., *Redeeming REDD: policies, incentives and social feasibility for avoided deforestation,* New York, Routledge, 2103
- CAMERON P. D., ZILLMAN D., *Kyoto: from principles to practice,* Netherlands, Kluwer law international, 2001

- CASTANEDA F., *Criteria and indicators for sustainable forest management: international processes, current status and the way ahead*. Unasylva, 203(51), 2000, pp. 34-40
- CINNAMON P. CARLARNE, *Climate change law and politics: EU and US approaches,* Oxford University Press, 2010
- *Climate Change 2014: Mitigation of Climate Change*, Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [EDENHOFER O., PICHS-MADRUGA R., SOKONA Y., FARAHANI E., KADNER S., SEYBOTH K., ADLER A., BAUM I., BRUNNER S., EICKMEIER P., KRIEMANN B., SAVOLAINEN J., SCHLOMER S., VON STECHOW C., ZWICKEL T., MINX J.C. (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA
- *Climate protection strategies for the 21st century*, German Advisory Council on Global Change, 2003
- COWIE J., *Climate change: biological and human aspects*, Cambridge University Press, 2007
- DESSAI S., E. L. SCHIPPER E. L., *The Marrakech Accords to the Kyoto Protocol: analysis and future prospects*, UK, Elsevier Science Ltd., 2002
- DOUMA W., MASSAI L., MONTINI M., *The Kyoto Protocol and beyond*, Netherlands, T.M.C. Asser Press, 2007
- DUCHELLE A. E., HEROLD M., DE SASSI C., *Monitoring REDD+ impacts: cross scale coordination and interdisciplinary integration,* in A. E. Latawiec, D. Agol (eds.), *Sustainability Indicators in Practice,* Berlin, De Gruyter, pp. 55-79, 2015
- EGENHOFER C., CORNILLIE J., *Reinventing the climate negotiations: an analysis of COP6*, CEPs Policy Brief No. 1, 2001
- FITZROY F. R., PAPYRAKIS E., *An introduction to climate change economics and policy,* London, Earthscan, 2010
- FODELLA A., PINESCHI L., *La protezione dell'ambiente nel diritto internazionale*, Torino, Giappichelli Editore, 2009
- GORDON H. S, *The economic theory of a common-property resource: the fishery*, The Journal of Political Economy 62, 1954, pp. 124-142, available at: http:/ /www. jstor.org/stable/1825571
- GRUBB M., YAMIN F., *Climatic collapse at The Hague; what happened, why, and where do we go from here?*, International Affairs, Volume 77, Issue 2, 2001
- GRUBB M.,VROLIJK C.,BRACK D., *The Kyoto Protocol: a guide and assessment*, London, Earthscan, 1999
- GUMPENBERGER M., VOHLAND K., HEYDER U., POULTER B., MACEY K.,

RAMMING A., POPP A., CRAMER W., *Predicting Pan-tropical Climate-change-induced Forest Stock Gains and Losses-Implications for REDD*, Environmental Research Letters, 5(1), 2010

- HAHN R. W., STAVINS R., *What Has the Kyoto Protocol Wrought? The Real Architecture of International Tradable Permit Markets*, Resources for the Future, Washington, DC, 1999
- HAMMITT J., *Evaluation endpoints and climate policy: Atmospheric stabilization, benefit-cost analysis, and near-term greenhouse-gas emissions*, Climatic Change 41, 1999, pp. 447-468
- HARDIN G., , *The tragedy of the commons*, Science 162, 1968, pp. 1243-1248
- HELM D., *Climate-change policy*, Oxford University Press, 2005
- HELM D., *The economics and politics of climate change*, Oxford University Press, 2009
- HUMPREYS S., *Human rights and climate change*, Cambridge University Press, 2010
- IPCC 2014 *Climate Change Synthesis Report*
- IVERSEN P., LEE D., ROCHA M., *Understanding land use in UNFCCC*, 2014
- JACOBY H. D., BABIKER M. H., PALTSEV S., J. M. Reilly, *Sharing the burden of GHG reductions*, in ALDY J. E., STAVINS R. N., (eds.), *Post-Kyoto International Climate Policy: Implementing Architectures for Agreement*, Cambridge University Press, Cambridge, UK, 2010, pp. 753-785
- JAFFE A., STAVINS R., *Dynamic incentives of environmental regulations: The effects of alternative policy instruments on technology diffusion*, Journal of Environmental Economics and Management 29, 1995
- KIRKMAN G. A., SERES S., HALTES E., SPALDING-FECHER R., *Benefits of the Clean Development Mechanism, 2012*, UNFCCC
- KISSINGER, HEROLD G. M., DE SY V., *Drivers of deforestation and forest degradation: a synthesis report for REDD+ policymakers*, Lexeme Consulting, Vancouver Canada, August 2012
- *Kyoto Protocol reference manual on accounting of emissions and assigned amount*, UNFCCC, 2008
- LEACH A. J., *The welfare implications of climate change policy*, Journal of Environmental Economics and Management 57, 2009, pp. 151-165
- LECOCQ F., AMBROSI P., *The Clean Development Mechanism: history, status and prospects*, Oxford University Press, 2007
- MEIJER E., WERKSMAN J., *Keeping it clean: safeguarding the environmental integrity of the Clean Development Mechanism*, in FEESTONE D., STRECK C. (eds), *Legal aspects of*

implementing the Kyoto Protocol mechanisms: making Kyoto work, Oxford University Press, 2005

- METZ B., *Controlling climate change,* Cambridge University Press, 2010
- MOSS N., NUSSBAUM R., *A review of three REDD+ safeguard initiatives*, UN-REDD Program, 2011
- NANDA P., PRING G., *International environmental law and policy for the 21st Century,* Boston, Martinus Nijhoff Publishers, 2013
- NGUYEN N. T., HA-DUONG M., GREINER S., MEHLING M., *Improving the Clean Development Mechanism post-2012: A developing country perspective*, Carbon and Climate Law Review, 2010, pp- 76-85
- OBERTHÜR S., OTT H., *The Kyoto Protocol: international climate policy for the 21st century*, New York, Springer Science & Business Media, 2013
- OSTROM E., *Reformulating the commons*, in *Protecting the Commons: A framework for resource management in the Americas*, BURGER J., OSTROM E., NORGAARD R., POLICANSKY D., B. Goldstein, (eds.), Island Press, Washington, DC, 2011, pp. 17-43
- POULTER B., ARAGAO, L., HEYDER U., GUMPENBERGER M., HEINKE J., LANGERWISCH F., RAMMING A., THONICKE K., CRAMER W., *Net Biome Production of the Amazon Basin in the 21st Century*, Global Change Biology, 16(7), 2010, pp. 2062-2075
- SCHELLING T. C., *The cost of combating global warming: Facing the tradeoffs*. Foreign Affairs 76, 1997, pp. 8-14
- SCHLAMADINGER B., BIRD N., JOHNS T, BROWN S., CANADELL J., CICCARESE L., DUTSCHKE M., FIEDLER J., FISCHLIN A., FEARNSIDE P., FORNER C., FREIBAUER A., FRUMHOFF P., HOEHNHE N., KIRSCHBAUM M.U.F., LABAT A., MARLAND G., MICHAELOWA A., MONTANARELLA L., MOUTINHO P., MURDIYARSO D., PENA N., PINGOUD K., RAKONCZAY Z., RAMETSTEINER E., ROCK J., SANZ M.J., SCHNEIDER U.A., SHVIDENKO A., SKUTSCH M., SMITH P., SOMOGYI Z., TRINES E., WARD M., YAMAGATA Y., *A synopsis of land use, land-use change and forestry (LULUCF) under the Kyoto Protocol and Marrakech Accords*, Elsevier, Environmental science & policy 10, 2007
- SCHNEIDER L., *Assessing the additionality of CDM projects: Practical experiences and lessons learned*, Climate Policy 9, 2009, pp. 242-254
- SERES S., HAITES E. , MURPHY K., *Analysis of technology transfer in CDM projects: An update*, Energy Policy 37, 2009, pp. 4919-4926
- STAVINS R., *The problem of the commons: still unsettled after 100 years,* American

Economic Review 101, 2011, pp. 81-108

- STOWELL D., *Climate Trading: Development of greenhouse gas markets*, New York, Palgrave MacMillan, 2005
- *The Clean Development Mechanism (CDM)*, UNEP Collaborating Centre
- *The Marrakesh Accords & the Marrakesh Declaration*, Conference of the Parties, 2001
- *The United Nations Framework Convention on Climate Change (UNFCCC and its Kyoto Protocol: a guide to the climate change negotiations*, IPIECA, 2008
- *The UN-REDD Programme Strategy 2011-2015*
- THOMAS S., DARGUSCH P., HARRISON S., HERBOHN J., *Why are there so few afforestation and reforestation Clean Development Mechanism projects?*, Land Use Policy 27, 2010, pp. 880-887
- TLADI D., *Sustainable development in international law: an analysis of key enviro-economic instruments,* Pretoria University Law Press, 2007
- VOIGT C., *Sustainable development as a principle of international law*, Netherlands, Brill, 2009
- WANG X., WISER G., *The implementation and compliance regimes under the Climate Change Convention and its Kyoto Protocol*, Reciel 11(2), Blackwell Publishers Ltd, 2002
- WERKSMAN J., *The Clean Development Mechanism: unwrapping the Kyoto surprise*, Reciel vol. 17, issue 2, 1998
- WIENER J. B., *Property and prices to protect the planet*, Duke Journal of Comparative & International Law 19, 2009, pp. 515-534. Available at: http:/ /scholarship.law. duke.edu/faculty_scholarship/2227/
- World Bank Group*, Turn Down the Heat: Confronting the New Climate Normal,* Washington, DC, World Bank, 2014
- YAMADA K., FUJIMORI M., *Current status and critical issues of the CDM*, in TOYOTA T., FUJIKURA R., (eds.), *Climate Change Mitigation and Development Cooperation*, Routledge, Oxford, 2012, pp. 37-48

Articles:

- HARVEY F., *Paris climate change agreement: the world's greatest diplomatic success*, article on the online website of The Guardian
- JORDAN A., VAN HASSELT H., *Can bottom-up climate action save the day?,* 10 August

2015, article on www.futureearth.org, available at the following link: http://www.futureearth.org/blog/2015-aug-10/can-bottom-climate-action-save-day

- KLEIN N., *Capitalism Vs. the climate*, article on The Nation website, 9/11/2011, available at the following link: http://www.thenation.com/article/capitalism-vs-climate/
- *Paris climate deal: reaction from the experts,* The Guardian online website. Article available at the following link: http://www.theguardian.com/environment/2015/dec/13/paris-climate-deal-reaction-experts
- WOERDMAN E., *Hot air trading under the Kyoto Protocol: an environmental problem or not?,* available at the following link: http://www.rug.nl/research/portal/files/17591854/HotAirTrading_EELR.PDF
- ZORRATTI A., *Doha: gateway verso il nulla*, 9 December 2012, Altreconomia website

Websites:

- www.eea.europa.eu
- www.ipcc.ch
- www.iucn.org
- www.oecd.org
- www.thegef.org
- www.theredddesk.org
- www.unep.org
- www.unfccc.int
- www.un-redd.org
- www.worldbank.org
- www-carbonbrief.org