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Desertification and environmental refugees: concrete problems in the context of climate change

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Abstract

Il cambiamento climatico è una delle più grandi sfide odierne. Le sue conseguenze sono evidenti in tutto il mondo, spaziando dall'aumento della temperatura globale, all'innalzamento del livello del mare per arrivare ad eventi catastrofici come le inondazioni. La gravità e l'impellenza del problema sono dimostrate dalle numerose riunioni internazionali che come oggetto hanno proprio questa questione. Una delle ultime, nonché una delle più importanti, è stata la XXI Conferenza delle Parti della Convezione quadro delle Nazioni Unite sui cambiamenti climatici tenutasi a Parigi nel 2015. Dalla COP21 è scaturito l'Accordo di Parigi che è entrato in vigore a novembre 2016 e il cui obiettivo principale è limitare l'incremento del riscaldamento globale a meno di 2˚ C rispetto ai livelli pre-industriali.

In queste circostanze stanno avendo luogo degli eventi paralleli che sono legati al cambiamento climatico, tra cui la desertificazione e la migrazione dovuta al cambiamento ambientale e climatico. La mia tesi si occuperà di questi ultimi nel contesto del cambiamento climatico, volendo mostrare come desertificazione e migranti ambientali siano problemi reali che necessitino di accurata attenzione.

Come sostenuto nel quinto rapporto di valutazione del Gruppo intergovernativo sul cambiamento climatico, il cambiamento climatico è inequivocabile e, dagli anni 50, i cambiamenti sono senza precedenti. Gli effetti sono tangibili e colpiscono diversi elementi del pianeta, tra cui la temperatura media globale, gli oceani che si surriscaldano, le calotte polari e i ghiacciai che si sciolgono. La causa principale è attribuita all'attività umana che aumenta l'effetto serra. Quest'ultimo consiste nel surriscaldamento globale causato da alcuni gas (anidride carbonica, metano e ossido di diazoto) che trattengono il valore nell'atmosfera, non permettendogli di uscire

verso lo spazio. La concentrazione di questi gas nell'atmosfera è a livelli mai visti prima, in particolare, l'anidride carbonica è la maggiore influente sul surriscaldamento globale. Inevitabilmente, gli impatti si verificano sulla vita umana e naturale. Infatti, molte specie terrestri e marine hanno subito le conseguenze del cambiamento climatico. Allo stesso modo, il sistema idrologico è stato alterato portando a precipitazioni a carattere violento, fenomeni di ruscellamento e scioglimento del permafrost. Dall'altro lato si verificano ondate di calore che provocano siccità, incendi e perdite di raccolto. Questi impatti si

ripercuotono poi sulla produzione di cibo e sulla disponibilità d'acqua, così come sulla mortalità e sulla migrazione. La migrazione influenzata dal cambiamento climatico e ambientale è un fenomeno complesso perché questi non sono considerati come la causa diretta dello spostamento, ma possono influire indirettamente sui driver migratori. I driver sono suddivisi in cinque categorie (sociali, politici, economici, ambientali e demografici), differiscono nel grado di importanza in base ai contesti e spesso sono interdipendenti. Il cambiamento climatico e ambientale influiscono, dunque, su questi driver dato che i primi due colpiscono l'ecosistema e l'esposizione ad eventi estremi. I cambiamenti ambientali vengono suddivisi in due categorie: driver climatici e driver non climatici. I primi si distinguono in processi climatici (innalzamento del livello del mare, incremento della temperatura, cambiamento della chimica atmosferica e scioglimento dei ghiacciai) ed eventi climatici (cicloni e tempeste tropicali, cambiamento nel regime delle precipitazioni); i secondi sono causati dall'uomo e riguardano la degradazione del suolo e quella degli ecosistemi marini e costieri. Anche i cambiamenti ambientali hanno diversi gradi di influenza sui driver migratori e possono portare a prendere in considerazione la possibilità di spostamento. Dall'altro lato, si può ottenere il risultato opposto: la scelta o la costrizione di rimanere nel luogo in cui si è esposti al pericolo. Chi ha accumulato capitale nel tempo, avrà più possibilità di poter migrare; inoltre, è favorito anche chi ha contatti (capitale sociale) nel paese che ha scelto come destinazione. Chi, invece, si trova in ristrettezze economiche o in situazioni di conflitto può rimanere intrappolato in situazioni di pericolo e avere meno, o nessuna, possibilità di spostarsi. Questi elementi portano al cosiddetto “double dilemma”: i più poveri si ritrovano ad essere i più colpiti sia perché dipendono dall’ecosistema per quanto riguarda la loro sopravvivenza e le loro entrate economiche, sia perché non hanno possibilità di migrare.

Predire quale sarà il futuro del cambiamento climatico e le relative conseguenze risulta difficile per diversi motivi, quali: le migrazioni climatiche avverranno in un contesto di cambiamenti senza precedenti riguardanti il numero e la distribuzione della popolazione mondiale; non esiste una figura di riferimento per gli attuali trend migratori; gli effetti del cambiamento climatico nella seconda metà del XXI secolo dipendono dalle azioni umane presenti; non c’è certezza a proposito della quantità futura di emissioni di gas serra; non ci sono sufficienti conoscenze per alcuni processi climatici perciò le previsioni sono incerte; il

clima è un sistema caotico ed assieme alla sua variabilità rendono complicate le predizioni. Nonostante queste difficoltà, sono stati tracciati degli scenari futuri: la temperatura media globale continuerà ad aumentare, le precipitazioni cresceranno cambiando il ciclo idrologico che porterà a forti e frequenti eventi estremi (siccità, tempeste e inondazioni), gli oceani continueranno a surriscaldarsi e il livello dei mari si innalzerà ancora. Nel lungo periodo, anche la degradazione marina e del suolo subiranno un peggioramento. Tutto ciò amplificherà e genererà inevitabilmente nuovi impatti, come il rischio di malattie e mortalità, danni alle infrastrutture, insicurezza alimentare ed economica, perdita della biodiversità e degli ecosistemi.

È in questo contesto che il problema della desertificazione, esistente di per sé, si enfatizza. La desertificazione non è un concetto nuovo, infatti i primi richiami appaiono nel 400 d.C. riferendosi a zone abbandonate a causa della loro ridotta produttività o in seguito a campagne militari. Il concetto fu riconosciuto nella Conferenza delle Nazioni Unite sulla desertificazione tenutasi nel 1977 e fu definito come la diminuzione del potenziale biologico del suolo che può portare a condizioni desertiche. Subito dopo questa convezione iniziarono le prime iniziative europee sul tema e, allo stesso tempo, continuarono i dibattiti internazionali sulla definizione del termine "desertificazione". Infatti, la spiegazione del 1977 era molto ampia, senza restrizioni geografiche né riferimenti a cause o processi. Questa mancata precisione diede vita alla propagazione di molte altre definizioni, finché nel 1994 alla Conferenza delle Nazioni Unite per combattere la desertificazione si determinò che desertificazione significa degradazione del suolo in aree aride e semiaride derivante da vari fattori come la variazione climatica e l'attività umana. In quest'ultima definizione fu aggiunta la sfumatura essenziale del cambiamento climatico che fino ad allora era assente.

Essendo un processo reale, la desertificazione si compone di cause e conseguenze. È un fenomeno multi causale, ma le ragioni possono essere suddivise in due macrogruppi: fattori umani e cause naturali. I primi riguardano l'uso del suolo, infatti quest'ultimo subisce delle trasformazioni dovute alla crescente popolazione e allo sviluppo urbano e industriale che induce cambi attraverso l'intensificazione dell'uso delle terre agricole, l'uso di fertilizzanti e prodotti chimici. Altre forme di utilizzo non sostenibile del terreno sono lo sovra sfruttamento da coltivazione e pascolo, deforestazione, incendi e poca o sbagliata irrigazione. Le seconde comprendono il clima (intensità estrema e irregolarità delle

precipitazioni annuali), la topografia (vegetazione diradata, inclinazione dei pendii), l'erosione del suolo e lo stato della vegetazione. Le conseguenze possono essere classificate in immediate e a lungo termine. Quelle immediate sono: la degradazione ambientale che riduce la capacità di recupero dalla variabilità climatica, la diminuzione del potenziale di produttività di cibo e l'incremento di carestie, le pressioni indirette sulle aree esterne a quelle colpite da desertificazione e l'instabilità socioeconomica. Quelle a lungo termine, invece, sono: la diminuzione della vegetazione, la riduzione quantitativa e qualitativa delle risorse acquifere superficiali e nel sottosuolo, la perdita della biodiversità, l'insicurezza alimentare data dai cali di produzione e dal incremento dei prezzi, i rischi di malattie e perdite nelle economie nazionali.

La desertificazione è accentuata dal cambiamento climatico perché l'incremento di siccità e forti precipitazioni porteranno ad un ulteriore degradazione del suolo. La relazione tra i due processi, però, non si muove in un'unica direzione. Infatti, la degradazione del suolo è sia una causa che una conseguenza del cambiamento climatico, perciò è possibile che la prima influenzi il secondo. Ad esempio, l'intensa attività agricola aumenta le emissioni di anidride carbonica che non viene assorbita a causa della poca vegetazione e della degradazione del suolo. Questo porta ad avere maggiore anidride carbonica nell'atmosfera che incide sul cambiamento climatico. Ancora, la ridotta disponibilità d'acqua non permette l'evaporazione per mezzo dell'energia solare, così questa surriscalda il suolo ed aumenta le temperature.

L'area mediterranea sta subendo il fenomeno della desertificazione, anche se varia di livello a seconda delle zone. La regione nordafricana e quella mediorientale sono le più colpite, mentre quella a nord del Mediterraneo è a minor rischio.

Vista la portata del fenomeno che potrebbe segnare lo sviluppo nel Mediterraneo, ci sono già parecchie organizzazioni che, direttamente o indirettamente, si battono per contrastare la desertificazione. Tra le più importanti possono essere citate l'Unione Europea, l'Unione per il Mediterraneo, e le Nazioni Unite con la Convenzione per combattere la desertificazione. L'Unione Europea, che agisce attraverso la direzione generale Azione per il clima (DG CLIMA), è attualmente impegnata nel raggiungere degli obiettivi regionali posti in essere nel 2007 e che hanno come termine ultimo il 2020. Questi comprendono la riduzione di almeno il 20% dei gas serra rispetto al 1990, l'aumento del 20% della quantità

di energie rinnovabili. Questi obiettivi prefissati per il 2020, altro non sono che traguardi intermedi posti per raggiungerne altri entro il 2050. Questi ultimi includono la riduzione dell'80-95% dei gas serra rispetto al 1990 per portare a termine l'impegno preso di non superare il surriscaldamento globale di 2˚C. Inoltre, entro il 2030 ci si prefigge di ridurre almeno del 40% i gas serra rispetto al 1990 e di utilizzare obbligatoriamente almeno il 27% dell'energia mediante quelle rinnovabili. Allo stesso tempo, l'UE sta portando avanti una strategia di adattamento che serve a prepararsi ai correnti e futuri impatti climatici. Questa strategia ha tre obiettivi principali: promuovere azioni da parte degli Stati membri, fornire informazioni per adottare le migliori politiche possibili e favorire l'adattamento nei settori più vulnerabili. Infine, l'UE si impegna anche sul piano internazionale prendendo parte ad azioni globali come la Convenzione quadro delle Nazioni Unite sui cambiamenti climatici, la Convezione per combattere la desertificazione, il Gruppo intergovernativo sul cambiamento climatico ed altri. Si può perciò dire che l'UE sia indirettamente impegnata nella lotta contro la desertificazione, in quanto, attraverso le politiche riguardanti il cambiamento climatico, si ottengono riscontri anche sul piano della degradazione del suolo essendo i due fenomeni collegati.

L'Unione per il Mediterraneo è un'organizzazione che favorisce il dialogo e la cooperazione regionale, così come progetti ed iniziative concrete nel settore dell'energia e del clima. Più precisamente, il gruppo di esperti sul cambiamento climatico intraprende discussioni tecniche sull'adattamento e sulla mitigazione. Dall'altro lato, promuove progetti che prevedono lo sviluppo attraverso l'utilizzo esiguo di carbonio, mira a migliorare i finanziamenti su questo campo e sottolinea l'emergenza di azioni a livello regionale. Nel caso dell'Unione per il Mediterraneo, quindi, questa supporta dei progetti piuttosto che crearli.

La più importante organizzazione impegnata direttamente contro la desertificazione a livello internazionale, nonché l'unica che propone quadri obbligatori, è l'ONU attraverso la Convenzione per combattere la desertificazione. Il suo obiettivo principale è, appunto, quello di combattere la desertificazione e mitigare gli effetti della siccità nei paesi più colpiti. Nella Conferenza delle parti, vengono definite delle strategie che successivamente vengono fatte proprie da ogni stato e applicate attraverso i piani d'azione nazionale. Nell'ultima COP13 del 2017 sono stati definiti gli obiettivi dal 2018 al 2030. Questi

prevedono il miglioramento degli ecosistemi, la promozione dell'uso sostenibile del suolo, il miglioramento delle condizioni di vita delle popolazioni colpite, l'aumento della capacità di recupero delle popolazioni e dell'ecosistema e l'incoraggiamento a finanziare per sostenere la convenzione. Come già anticipato, le strategie, con annessi obiettivi, vengono implementate attraverso i programmi d'azione nazionale. Il problema di questi ultimi è che incontrano delle difficoltà di applicazione, spesso perché le soluzioni sono adottate dall'alto senza dare molta importanza alle autorità locali nel processo di pianificazione. Per questo ora la convenzione propone di lasciare più spazio alle autorità locali nello sviluppo dei programmi.

Altri attori che hanno a che fare con la desertificazione sono: la Comunità degli Stati del Sahel e del Sahara, l'Osservatorio del Sahel e del Sahara, l'Organizzazione delle Nazioni Unite per l'alimentazione e l'agricoltura, il Meccanismo Globale della Convezione per combattere la desertificazione, il Fondo internazionale per lo sviluppo agricolo e la Banca Mondiale.

Nonostante ci si stia muovendo per arginare i problemi creati da desertificazione e cambiamento climatico, alcuni impatti sono già ben avviati. Uno di questi riguarda i migranti ambientali. Anche se il cambiamento climatico non è un driver migratorio diretto ma li influenza soltanto, è stata ammessa l'esistenza del nesso tra questo e la migrazione. I rifugiati ambientali, però, non sono riconosciuti dalla comunità internazionale, infatti all'interno di essa è in corso un dibattito a proposito della definizione e della protezione di questo tipo di rifugiati. Nel tempo sono state proposte svariate definizioni, ma tuttavia non ne esiste una condivisa. Questo perché è difficile attribuire lo spostamento soltanto al cambiamento delle condizioni ambientali, vista la natura multi causale dei processi migratori. Inoltre, è difficile definire se siano volontari o forzati e se temporanei o definitivi. Peraltro, si discute anche sul termine stesso da utilizzare: la parola rifugiati non è giuridicamente corretta perché, stando alla Convenzione di Ginevra del 1951, chi si sposta per motivi ambientali o di clima non gode dello status. D'altro canto, il termine migranti ha delle connotazioni negative che sembrano ridurre la responsabilità della comunità internazionale nei confronti di queste persone. L'assenza dello status legale è una mancanza sostanziale in quanto significa che i migranti ambientali non godono di protezione specifica per il loro caso. Non essendo inclusi nella Convenzione di Ginevra non

hanno i diritti riservati ai rifugiati, ma, allo stesso tempo, non hanno nemmeno una legislazione che sia in grado di dar loro delle garanzie specifiche. Nonostante ciò, alcuni strumenti internazionali sono utili per garantire alcuni diritti, anche se non sono diritti specifici. Tra questi figurano i diritti umani che non possono essere negati a nessuno perché diritti fondamentali. In alcune situazioni ristrette anche la Convenzione di Ginevra può essere utilizzata, ma si finirebbe per spostare il focus della migrazione sui conflitti nel caso in cui qualcuno si spostasse dal proprio paese a causa di un conflitto generato dall'inacessibilità alle risorse ambientali. Può essere inoltre offerta la cosiddetta protezione complementare, che fornisce protezione legale a chi, per il principio di non-refoulement, non può essere rimandato nel paese in cui potrebbe subire maltrattamenti. Il problema qui è che, oltre a non esserci protezione specifica, questo tipo di legge dev'essere integrata nell'ordinamento interno dello stato. Un altro strumento è quello dei Principi guida sugli sfollati interni. Gli sfollati interni sono quelle persone che si spostano all'interno dei confini nazionali; a loro sono garantiti diritti fondamentali, la sicurezza e sono protetti durante e dopo lo spostamento. I limiti dei Principi guida, però, sono che anch'essi sono obbligatori solo se incorporati nella legge nazionale di uno stato e non sono comunque specifici per il caso dei migranti ambientali. A fronte di queste mancanze di protezione specifica, sono state avanzate alcune proposte in risposta al problema. La prima è stata quella di ampliare la Convenzione di Ginevra includendo i disastri ambientali ai motivi per cui venga accordata la protezione; è stata però contestata perché si teme che la protezione dei rifugiati venga sottovalutata e che vengano trattati in maniera inadeguata. La seconda proposta è stata quella di espandere il concetto di sfollato interno: dato che i Principi guida fanno esplicitamente riferimento alle ragioni ambientali, si è pensato di estendere a livello internazionale la protezione fornita agli sfollati interni, magari restringendo il campo più specificamente su questi ultimi. Nonostante sia un'idea promettente, è rischiosa a causa dei limiti già esistenti per gli sfollati interni. La terza opzione è quella di stilare un nuovo strumento legale. È stata abbozzata una convenzione che istituisce nuovi diritti, uno status specifico e i meccanismi di implementazione, ma è stata criticata perché sarebbe troppo macchinosa a livello istituzionale e potrebbe essere un pretesto degli Stati per non aderirvi. La quarta proposta è l'aggiunta di un protocollo alla Convenzione quadro delle Nazioni Unite sui cambiamenti climatici che prevede la protezione e il ricollocamento. La quinta

opzione suggerisce l'utilizzo della protezione temporanea per accogliere sfollati a causa del cambiamento ambientale. Anche questa proposta è stata criticata perché sembra non essere adeguata ai futuri scenari migratori.

Oltre a tutte queste proposte, si discute anche su alcune politiche preventive, quali: ridurre l'influenza del cambiamento ambientale sulla migrazione, aumentare la capacità di adattamento e migliorare la capacità di ripresa delle comunità dopo i disastri ambientali e climatici.

Anche l'UE nel suo piccolo cerca di dare risposte al problema dei migranti ambientali attraverso la protezione temporanea, la protezione complementare, il ricollocamento o applicando delle misure direttamente nei territori colpiti all'esterno dei confini europei. Anche in questo caso però esistono dei limiti di protezione che devono essere superati.

Concludendo, visto che le previsioni future per il cambiamento climatico e conseguentemente per la desertificazione non sono rosee e considerata la concretezza dei problemi, è doveroso porre l'adeguata attenzione e i necessari sforzi per cercare di trovare le migliori soluzioni a queste situazioni difficoltose e incerte.

Introduction

Climate change is one of the major challenges of our times. From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are clear all over the world and, nowadays, they are more intense than ever. The seriousness and the worsening of the situation is proven by the fact that the whole international system, from countries to international organizations, has taken remedial actions urgently. As a matter of fact, many has been the international gatherings to discuss this issue. One of the latest, most important was the 21st Conference of Parties of the United Nations Climate Change Conference held in Paris in 2015. Here, the Paris Agreement was adopted: its main aims are to keep the global temperature rise this century below 2˚C above pre-industrial levels and to strengthen the ability of countries to deal with the impacts of climate change. It entered into force in November 2016, after the ratification.

In this context, simultaneous events are occurring, which are strictly linked to climate change. These, together with others, are desertification and migration due to environmental and climate change.

Desertification is a phenomenon of land degradation and it is connected to climate change because they influence and worsen each other. Therefore desertification is both a consequence and a cause of climate change.

Environmental migration is the displacement of people caused by environmental factors, that, likewise the other migration drivers, are affected by climate change. Given the increase in the number of events that, suddenly or in the long-term, damage the environment, also the amount of people moving for this reason is growing. The problem is that there are no specific provisions for environmentally displaced persons that can guarantee legal protection. They benefit from human rights law, but they are not recognized as refugees, consequently lacking legal protection.

Although climate change is a threat that exacerbates already existing problems, it is sometimes underestimated and taken slightly.

The purpose of my thesis is to show that, in the context of climate change, desertification and environmental migration are concrete problems that are happening now and that deserve extremely close attention.

The work is divided in three chapters: the first dealing with climate change, the second concerning desertification in the Mediterranean area and the third examines the situation of environmentally displaced persons.

The first chapter deals with the context in which events are happening, that is climate change. It begins with an overview of climate change, describing its causes and consequences. It continues illustrating further impacts on human and natural systems. Following, it explains the connection between migration and climate change, making reference to theories dealing with migration which incorporate the role of environment and empirical evidence. It describes the drivers of migration and how climate change influences them, leading people to displace. Consequently, the outcomes deriving from the influence of climate and environmental change on migration drivers are described: routine and short-term displacement, trapped people and the "double dilemma". The chapter concludes displaying possible future global environmental change and its related risks and impacts.

The second chapter starts with the definition of desertification and its variations over time. It follows with the causes, which are mainly human-induced or natural factors, and the consequences that can be distinguished in immediate effects and long-term risks. Then, it explains the relationship between climate change and desertification, stating that the latter is both a cause and a consequence of the former. It mentions the main organizations operating in the region with the aim of combating desertification, analyzing, then, their role one by one. These are: the European Union which is striving for reach some objectives within 2050, it is also embracing adaption strategies; the Union for the Mediterranean which promotes regional dialogue and cooperation as well as concrete projects; the United Nation Convention to Combat Desertification which fights for combating desertification through UNCCD 2018–2030 Strategic Framework, the Ten-year strategic plan and framework to enhance the implementation of the Convention for 2008-2018 and the UN Decade for Deserts and the Fight against Desertification. It concludes briefly describing other players that deal with desertification.

The third and last chapter concerns the issue of environmental refugees. It begins summarizing the link between environment and migration, then it talks about the discussion on the definition of "environmental refugee": there is still no agreement both on

the definition and on the terminology. Speaking of that, the chapter proceeds introducing the debate on whether to use the word “refugee” or “migrant”. It follows showing that environmental migrants lack specific legal protect and that they are not recognized as refugees according to the 1951 Geneva Convention Relating to the Status of Refugees. It, then, distinguish Internally Displaced Persons, who move within their national borders, from those who cross boundary lines. It continues analyzing which are the existing legal framework that can be partially used to protect environmental migrants and which are their limitations. It follows describing which are the possible responses to fill these protection gaps. It ends discussing the situation of environmentally displaced persons in the EU: internal measure to manage this issue and its intervention beyond EU borders.

CHAPTER 1

1. The link between climate change and migration

1.1 An overview of climate change: causes and consequences

Climate change has been subject of great debate in recent years. Despite differing opinions, climate change is happening now and it is a real and serious issue. As stated in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), "warming in the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia".[1] Therefore, climate change is one of the main challenges the international society is facing with, nowadays and in the days to come. Ban Ki-moon, the Secretary-General of the UN, highlighted this during the UN Climate Change Conference held in Paris on 12 December 2015 asserting that climate change consequences are higher than ever and that is necessary to take action to reduce climate risk and protect communities.[2]

The effects of climate change are tangible and proven; they affect different elements of our planet, such as the atmosphere and the cryosphere, oceans and sea level. The IPCC perfectly describes the impacts on its Fifth Assessment Report: one after the other, the last three decades has been gradually warmer at the Earth's surface than any preceding decade since 1850; the period from 1983 to 2012 was the warmest 30-year period of the last 800 years in the Northern Hemisphere. The globally averaged temperature of land and ocean surface has warmed of 0.85˚C over the period 1880 to 2012.[3] 2016 was the warmest year on record in the last 35 years and, in addition to that, eight months out of twelve of that year (from January to September, excluding June) were the warmest on record.[4] The following image shows the difference in degrees Celsius between the average global temperature of the period 1892-1896 and 2012-2016.

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[1] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 40

[2] United Nations Publications, *Time of Test, Era of Opportunities: Selected Speeches of United Nations Secretary-General Ban Ki-moon 2007-2016,* New York, 2016, p.159-160

[3] IPCC, *Climate Change 2014: Synthesis Report.,* p. 40

[4] NASA/Robert B. Schmunk, *Five-year global temperature anomalies from 1880 to 2016,* 18 January 2017 https://climate.nasa.gov/climate_resources/139/

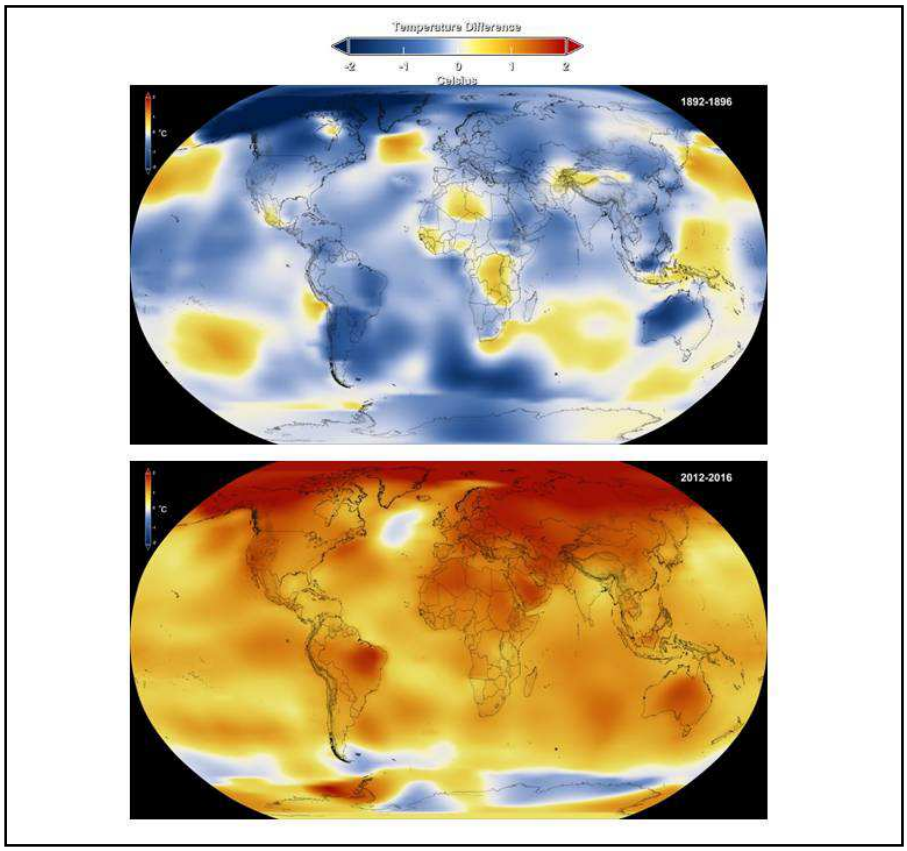

Figure 1: Difference in degrees Celsius between the average global temperature of the period 1892-1896 and 2012-2016. Source: NASA/Robert B. Schmunk, *Five-year global temperature anomalies from 1880 to 2016,* 18 January 2017 https://climate.nasa.gov/climate_resources/139/

The oceans have stored much of this increased heat: between 1971 and 2010, more than 90% of it has been absorbed by oceans, while only 1% has been stored in the atmosphere. This caused oceans to warm. Ocean surface, that is the upper 75 metres, warmed by 0.11˚C per decade over the period 1971 to 2010.

Due to the ocean warming, the Greenland and Antarctic ice sheets have decreased in mass over the last two decades.[5] Data from NASA's Gravity Recovery and Climate Experiment show Greenland lost 150 to 250 cubic kilometers of ice per year between 2002 and 2006, while Antarctica lost about 152 cubic kilometers of ice between 2002 and 2005. Both ice sheets have seen an acceleration of ice mass loss since 2009.

[5] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 42

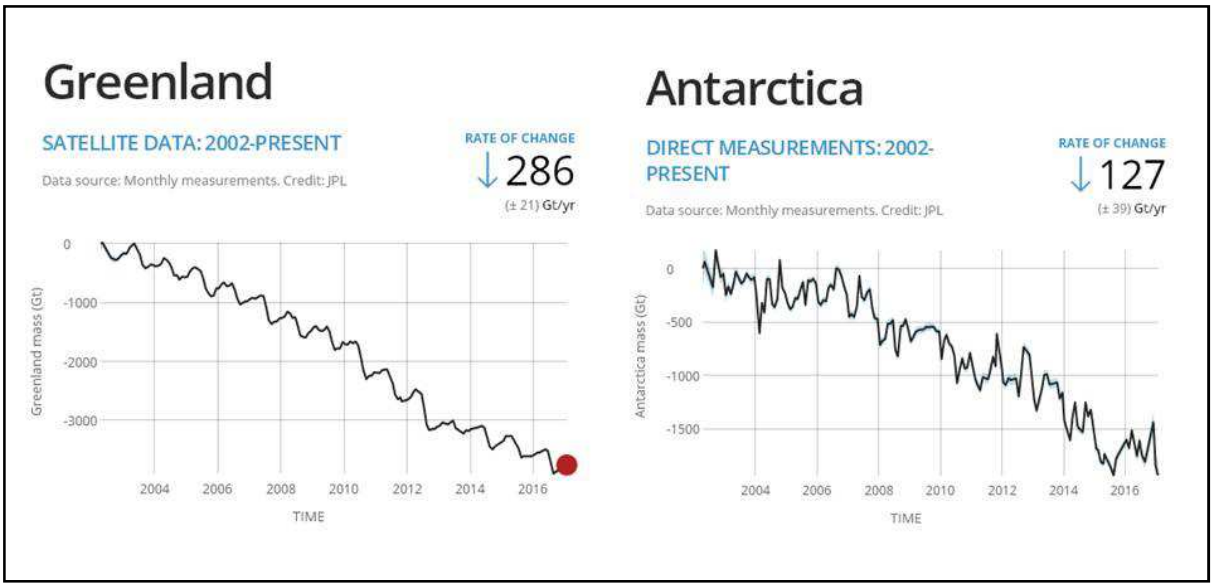

Figure 2: Greenland and Antarctica ice mass change over the period 2002-2017.
Source: NASA, *Understanding sea level, Key Indicators, Greenland*, 2017, https://sealevel.nasa.gov/understanding-sea-level/key-indicators/greenland
NASA, *Understanding sea level, Key indicators, Antarctica*, 2017, https://sealevel.nasa.gov/understanding-sea-level/key-indicators/antarctica

As regards the Arctic, its sea ice extent decreased in the range 3.5 to 4.1% per decade from 1979 to 2012.[6]

As a consequence, glaciers have continued retreating everywhere and contributed to sea level rise throughout the 20th century. Global mean sea level rose by 0.19 metres over the period 1901-2010; 75% of this rise is explained by glaciers mass loss and oceans thermal expansion since 1970s.[7]

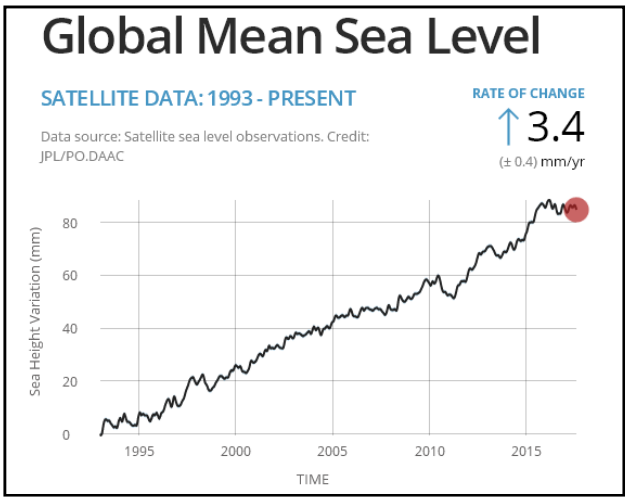

Figure 3: Global mean sea level rise over the period 1993-2017.
Source: NASA, *Understanding sea level, Key indicators, Global mean sea level*, 2017, https://sealevel.nasa.gov/understanding-sea-level/key-indicators/global-mean-sea-level

[6] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 42
[7] IPCC, *Climate Change 2014: Synthesis Report.*, p. 42

Most scientists assert that the main cause of climate change is to be attributed to human activity by expanding the greenhouse effect. As a matter of fact, IPCC Fifth Report notifies:

> "Human influence on climate system is clear, and recent anthropogenic emissions of greenhouse gases (GHGs) are the highest in history".[8]

Greenhouse effect consists in global warming caused by certain gases that trap heat in the atmosphere, not allowing it to escape from Earth towards space. Those gases are: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Carbon dioxide is the most important driver of climate change: it is released through natural processes such as respiration and volcano eruptions and through human activities such as deforestation, land use changes, and burning fossil fuels. Methane is a hydrocarbon gas produced both through natural sources and human activities, including the decomposition of wastes in landfills, agriculture, and especially rice cultivation, as well as ruminant digestion and manure management associated with domestic livestock. Nitrous oxide is a powerful greenhouse gas produced by soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.[9]

Concentration of GHGs in the atmosphere are at levels never seen at least in the last 800,000 years. Their anthropogenic emissions have increased by 40% since the pre-industrial era[10], but the highest in history were recorded between 2000 and 2010.[11] This increase directly came from the energy (47%), industry (30%), transport (11%) and building (3%) sectors. As shown in the graphic, the use of GHGs rised visibly from 1970 to 2010.

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[8] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 40

[9] NASA, *Global climate change, Facts, Causes, A blanket around the Earth. https://climate.nasa.gov/causes/*

[10] Maria Grazia Midulla, Andrea Stocchiero, *Migrazione e cambiamento climatico,* 2015, p. 2

[11] IPCC, *Climate Change 2014: Synthesis Report.,* p. 44

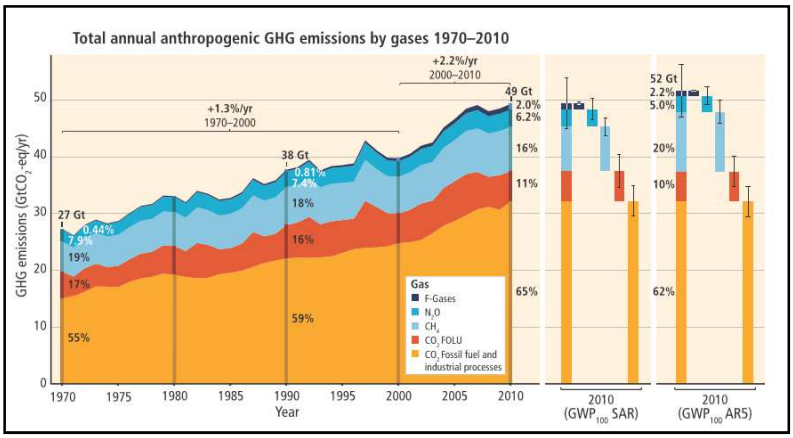

Figure 4: Total annual anthropogenic GHG emissions by gases 1970-2010.
Source: IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 46

As already said, carbon dioxide is the largest contributor to global warming. About 40% of these anthropogenic CO_2 emissions have remained in the atmosphere since 1750. The remaining part was eliminated from the atmosphere by carbon sinks, and accumulated in natural carbon cycle reservoirs. For instance, the ocean, being a reservoir, has stored about 30% of CO_2 produced by human activity. As a consequence, this has led to ocean acidification. About half of the anthropogenic CO_2 amount of the period 1750-2011 has been emitted in the last 40 years. About 78% of the total GHG emission raise between 1970 and 2010 was provoked by CO_2 emissions deriving from fossil fuel combustion and industrial processes. A similar contribution occurred over the decade 2000-2010.

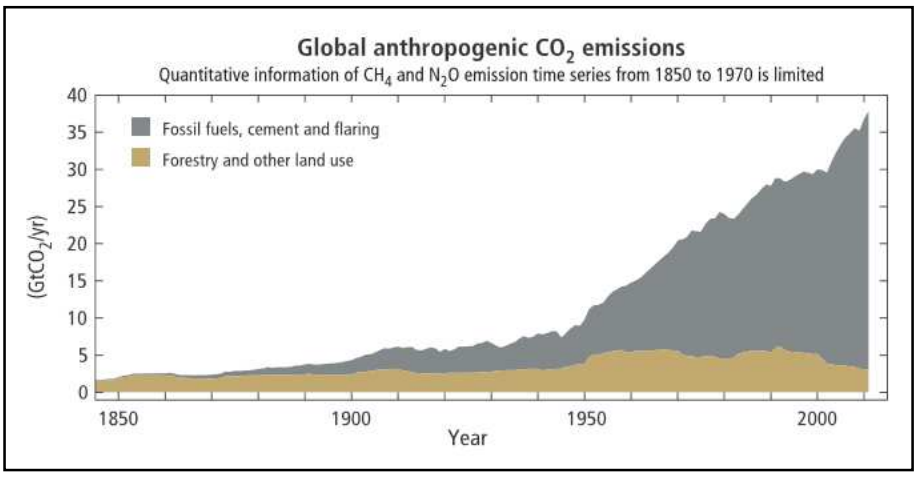

Figure 5: Global anthropogenic CO_2 emissions.
Source: IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 45

At global level, the main contributors to CO_2 emissions are economic growth and population growth because they combust from fossil fuels. Population growth influence between 2000 and 2010 was identical compared to that of the previous three decades, while economic growth contributed much more than before.[12]

The increasing release of GHGs deriving from human activity is, therefore, the main responsible for climate change and, if not diminished, it risks to turn our planet in an unlivable place for humans, animals and plants.

1.2 Impacts of climate change

Unavoidably, climate change has provoked impacts on human and natural systems all over the continents and oceans. This points out the sensitivity of humans, animals and plants to this phenomenon. Most evident impacts have occurred in natural system, but, successively, they have affected human lives.[13]

Many terrestrial and marine species suffered the consequences of climate change: oceans and seas acidification, due to rising CO_2 stored in them, together with oceans warming have repercussions on the barrier reef. It has already been whitening and it could even disappear and not grow anymore.[14] Some warm-water corals and their reefs have responded to warming with species replacement, bleaching, and decreased coral cover causing habitat loss.[15]

Hydrological system has altered: in many regions, heavy precipitations have increased. These events take place particularly in North America and Europe. In addition, melting snow and ice affect the runoff and water resources downstream. Permafrost is warming and thawing in high-latitude regions and high-elevation regions.[16]

On the other hand, there has been the opposite problem: heat waves, causing drought, wildfires and crop losses. Irredeemably, these phenomena provoke the alteration of the ecosystem, problems related to food production and water shortages.[17] Repercussions on

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[12] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 46

[13] IPCC, *Climate Change 2014: Synthesis Report.,* p. 47

[14] Maria Grazia Midulla, Andrea Stocchiero, *Migrazione e cambiamento climatico,* 2015, p. 3

[15] IPCC, *Climate Change 2014: Synthesis Report.,* p. 51

[16] IPCC, *Climate Change 2014: Synthesis Report.,* p. 51

[17] Maria Grazia Midulla, Andrea Stocchiero, *Migrazione e cambiamento climatico*, p. 3

guaranteeing basic needs: crop yields have been negatively affected, particularly wheat and maize in the global aggregate.[18]

Heat waves are also linked to mortality: they result in increment in mortality in North America and in Europe with impacts that vary according to people's age, location and socio-economic factors.[19]

IPCC summarizes the impacts of climate change in the world, dividing them in impacts for natural systems (physical and biological systems) and human system, as represented below:

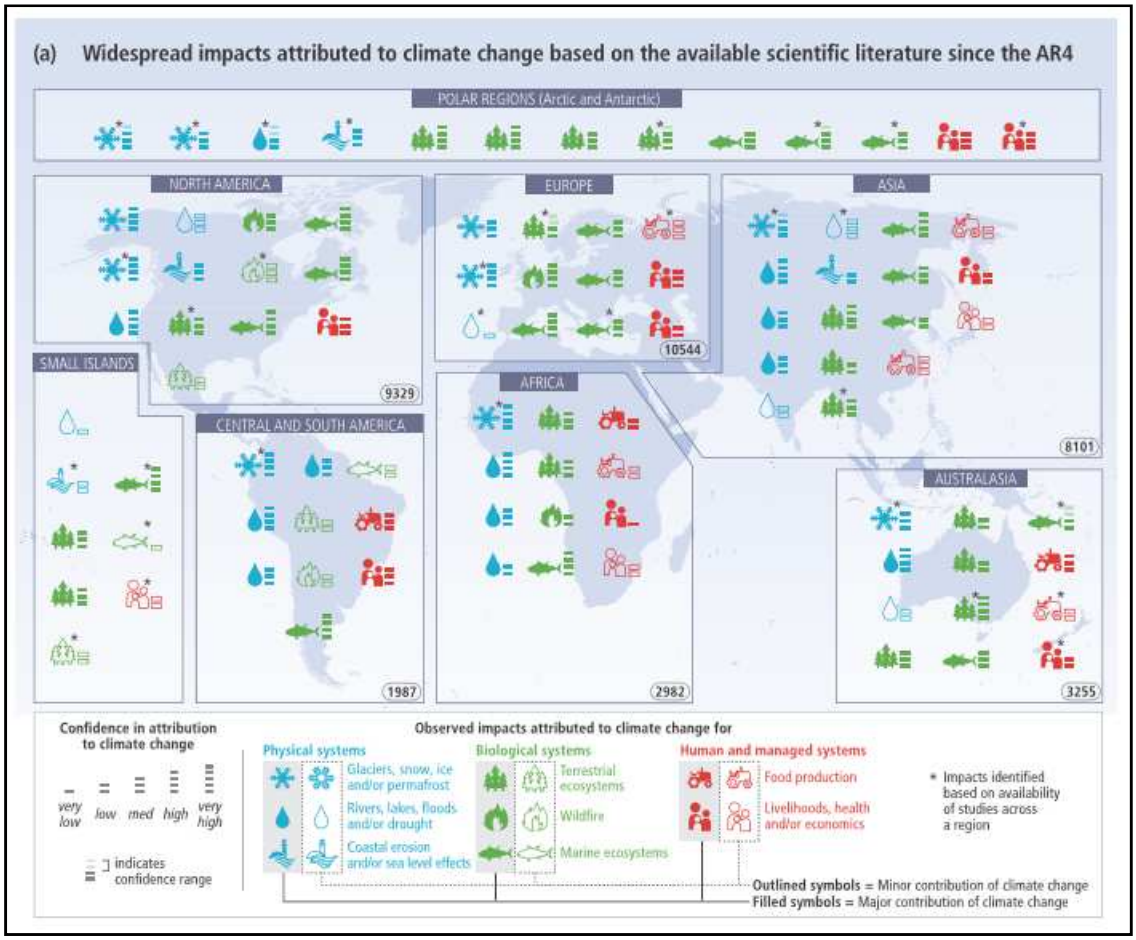

Figure 6: Impacts of climate change in the world

Source: IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 50

Consequences and impacts of climate change lead to migration and displacement to protect and/or enhance one's own life.

[18] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p.51

[19] IPCC, *Climate Change 2014: Synthesis Report.*, p.53

1.3 What is the connection between migration and climate change?

Obviously, climate change will cause a worsening of the situation due to the future unreliability of food and water supply and due to the increasing probability of extreme environmental events. All this will lead people to migrate to more livable places.

Predicting future climate migration is very difficult, but this phenomenon is not new. There are theories dealing with migration which incorporate the role of environment and also empirical evidence of that.

As far as theories are concerned, the sociologist William Peterson was among the first, in 1958, to consider the role of the environment conceptualizing migration in primitive times as being the movement from ecologically risky areas to safer ones. In 1966, Wolpert developed the "stress-threshold model", which is the first migration model to include non-economic aspects. This model considers the environment both as a "stressor", which may lead to think about the idea to migrate, and as a mean to choose the destination. Similarly, Speare, in 1974, thought about the environment as "locational characteristic" providing amenities and disamenities, where individuals undergo the effects of social and contextual factors. When the threshold of dissatisfaction is crossed, migration is taken into account. Later, in 1981, De Jong and Fawcett conceived the "value-expectancy model", asserting that migration is driven by the interaction of different goals (such as wealth, status, stimulation, autonomy, afflation and morality) and the perceived probability that a chosen behaviour will lead to these goals. Here, the environment is considered as helping to provide a more pleasant residential location and/or a less stressful one.[20]

As regards to empirical evidence, archeological proofs show that, since ancient times, human beings have repeatedly moved because of changes in the climate. The first large urban societies arose from climatic and environmental drying. For instance, Egyptian and Mesopotamian societies developed when people migrated away from dry lands to settle in riverine territories. Later, during the 4th century, the Hun and the German hordes had to move away from growing aridity and freezing temperatures of the Volga and Rhine in order to populate the milder Gallic area. In the 8th century, Muslims expanded in the

[20] Frank Laczko and Christine Aghazarm, *Migration, environment and climate change: assessing the evidence*, Geneva, 2009, p. 69

Mediterranean area and in southern Europe, partially, because of the draught in the Middle East.[21]

The migratory phenomenon influenced by climate and environment is complex because it is multi-causal. Sometimes, climate change leads people to take into account migration as a solution to escape the problem, but this is not always possible for straitened circumstances, for example. Precisely because it is multi-causal, it is difficult to quantify the number of migrants derived only from climate change. It is wrong to think that migration takes place only due to people living in an "at-risk" zone because it would mean neglect the essential factors. This is not to undermine the importance of environment in the choice of migration: environment affects migration but in a complicated way. Climate and, consequently, environmental change have impacts in the drivers of migration, but they are not the direct cause for it.

The drivers are the direct factors that influence migration. They are usually divided into five categories: social, political, economic, environmental and demographic. The existence of spatial and temporal variability creates the conditions for migration.[22]

Social drivers include familiar or cultural expectations, the research for educational opportunities and cultural practices. Having family, social or other networks furthers migration, while having few or no bonds creates the opposite result. Sometimes, migration has a central role in some communities. It is a rite of passage: displacing is a synonym for becoming adult; it is a key stage in an individual's life. Other times, gaining access to education becomes a reason to migrate (even if it is not always the case).

Political drivers cover a large set of elements such as: conflict, security, discrimination and persecution. For example, migration can be induced by the breakdown of governance structures or the emergence of violent conflict. Also public policies trying to increase or decrease migration can create feelings of discrimination or marginalisation, leading to displacement.

Economic drivers include employment opportunities and income differences between places. In this case, migration is driven by diversities in labour market, wages and individual cost-benefit analysis.

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[21] Oil Brown, *Migration and climate change,* Geneva, 2008, p. 21

[22] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p. 44

Environmental drivers include the availability and access to ecosystem services and the occurrence of extreme events. Without any doubt, the availability of ecosystem sources is fundamental for all human beings because it allows them to survive, but it is even, and above all, important for those economies depending on agriculture, fishery and forestry. If a change in the ecosystem service or a extreme event takes place, human well-being and demand for migration are affected. Migration is merely one of the many responses to extreme events and it is usually the last option. Whether to leave or not depends also on the other drivers (social, economic and political ones). Therefore, environment affects migration but combined with other factors.

Demographic drivers incorporate the size and structure of populations and the diffusion of diseases. Traditional migration theories base on the idea that as population grows, the pressure exerted on natural and agricultural resources increases as well, leading to outmigration. This is in part true; also in this case, it has to be pointed out that demographic pressures could probably influence more the decision to migrate if associated with other drivers. The age structures of a population shouldn't be underestimated in demographic migration considering that young populations are likely to be a source of migrants, whereas aging population could generate a demand for migration.[23]

Drivers differ in the degree of importance because they are context specific. Economic drivers seem to be the most influential in individuals' lives. Specifically, the possibility of being hired is perceived as more significant than wages differentials. Another fundamental driver is the social one: it usually comes after economic factors.

It is necessary to highlight that, often, drivers are interdependent: they do not act alone. The easiest example to think about is that of demographic drivers that never work in isolation. Even if population increases sharply, it hasn't to be taken for granted that demographic pressure would lead to migration. It depends on other factors.

Political drivers, instead, are often more influential together with economic drivers. This is due to the fact that if conflict is involved in political drivers, it alone does not affect migration without other factor contributing. Economic elements are usually those that influence migration in case of conflict, rather than conflict by itself.

[23] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p. 44 - 45

As far as environment is concerned, ecosystem services are important drivers, both alone or together with other factors. Actually, environment is not considered a dominant driver of migration, but it is safe to say that ecosystem services, intended as fresh water, productive soil and energy, play an essential role in the people's choice of staying or leaving.[24]

In this context, climate and environmental change play a key role. As shown in the image below, environmental change affects the drivers of migration.

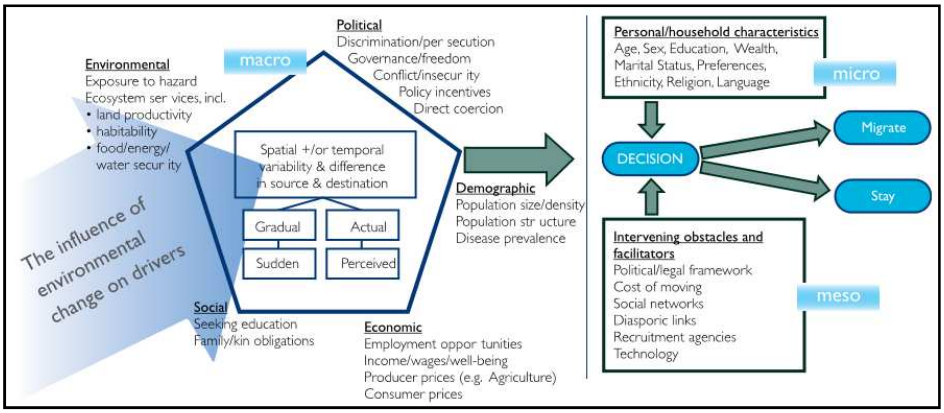

Figure 7: Drivers of migration and the influence of environmental change on them
Source: Richard Black, *Foresight: Migration and Global Environmental Change,* 2011, London, p. 33

Environmental and climate change influence the drivers of migration because they affect the natural world, the variability of supply of ecosystem services and the exposure to extreme events.[25]

Robert McLeman, a professor specialised in research on the human dimensions of environmental change, classifies environmental changes affecting migration in two categories: climate drivers and non-climate drivers.

Climate drivers, in turn, are subdivided in climate processes and climate events. Climate processes are slow-onset changes[26]; they are:

- Sea-level rise: it leads to coastal flooding, erosion of coastal lands and salinisation of agricultural lands. Particularly, the latter decreases the soil production and also freshwater supply. Obviously, possible permanent inundations could lower agricultural areas and affect fish-dependent livelihoods.
- Increases in temperature: affecting land productivity, they could increase the risk of

[24] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p. 47 - 48
[25] Richard Black, *Foresight: Migration and Global Environmental Change,* p. 50
[26] Oil Brown, *Migration and climate change,* Geneva, 2008, p. 17

crop failure; they could also generate wildfires. Heat-waves could also affect human-health.

- Changes in atmospheric chemistry: they would associate with changes in rainfall and temperature and would lead to all the related consequences. These changes would regard also oceans modifying the productivity of coastal and marine ecosystem.
- Melting of mountain glaciers: it could produce glacial lake outburst floods and increase the risk of rock avalanches. In the longer term, it could change mountain ecosystem affecting water, agricultural productivity and the energetic sector.[27]

Climate events are sudden and damaging phenomena[28]; they are:

- Tropical storms and cyclones: they increase coastal flooding that, without any doubt, would damage coastal settlements and have negative effects on agricultural productivity.
- Changes in rainfall regime: it could have consequences in two opposite ways. On one hand, heavy precipitations could provoke soil erosion and waterlogging; damaged crop as a consequence of rainfalls could influence agricultural income and well-being. On the other hand, reduced precipitations could cause loss of agricultural productivity, lower rural wages and rise crop prices.[29]

Non-climate drivers are environmental changes due to man[30]. These are:

- Land degradation: wrong agricultural practices, extreme weather events and climate change deteriorate soil quality and land productivity. It affects agriculture and crops, so food security. Furthermore, eliminating vegetation cover the risk of flooding with the consequent human displacement.
- Coastal and marine ecosystem degradation: it causes the loss of aquatic species and features needed to protect ecosystem from coastal storms. For this reason, coastal communities are exposed to risks and to the possible loss of fishery production (essential for the survival of these communities).[31]

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[27] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p. 51 - 52
[28] Oil Brown, *Migration and climate change,* Geneva, 2008, p. 18
[29] Richard Black, *Foresight: Migration and Global Environmental Change,* p. 51
[30] Oil Brown, *Migration and climate change,* p. 18
[31] Richard Black, *Foresight: Migration and Global Environmental Change,* p. 52

It has to be added that also vulnerability and adaptive capacity contribute as non-climate drivers. An extreme event becomes a disaster if a community is particularly exposed and vulnerable to its impacts (for example if there are no early-warning system and if people are uniformed of what to do in these cases); in this situation is important the adaptive capacity that is the ability to face the extreme event and recover after it.[32]

As for migration drivers, also environmental changes have different degrees of influence on the drivers. Economic driver is the most related to environmental changes because the latter have effects on geographical aspects of agricultural productivity, affecting employment, wages and prices. Concerning the relationship between environmental changes and economic drivers, it is important to remember that the decision to migrate is also taken considering household livelihoods: if agricultural livelihoods are threatened by environmental change, individuals can migrate to diversify income.

Political, social and demographic drivers suffer less the effects of environmental change, but, by the way, they play a role interacting with economic and environmental drivers. Political drivers could be susceptible to environmental change in order to relocate vulnerable populations or to apply, in anticipation or in response to environmental change, polices implying migration.[33]

The diagram below sum up the variable influence of environmental change on the diverse drivers of migration.

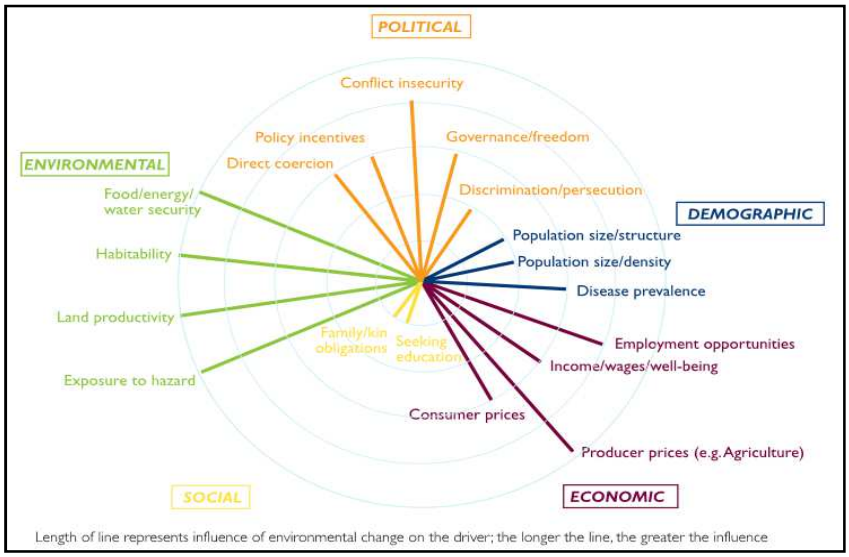

Figure 8: "The relative influence of environmental change on the different drivers of migration"
Source: Richard Black, *Foresight: Migration and Global Environmental Change,* 2011, London, p. 54

[32] Oil Brown, *Migration and climate change,* Geneva, 2008, p. 18
[33] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p. 53

On the contrary, environmental change could lead to the opposite result: the choice or being force to stay in places where people are exposed to environmental risk.

People could choose to stay in vulnerable areas and to try to face the problem investing in irrigation and water management. This is not to say that they won't be affected by events, particularly if continuing investments lack.

The decision to stay could also be influenced by personal and familiar characteristic (micro-drivers). Age, gender, wealth or disability are factors that affect migration. This means that any impact of environmental change on migration drivers is nullified, due to absence of personal characteristics or, above all, financial resources. In addition, given that environmental change mostly affects the most vulnerable and the poorest, it could further reduce the possibility to access to migration options.[34]

For these reasons, climate and environmental change could have opposed effects on drivers of migration.

To sum up, environment-migration link is complex. Migration is driven by many interrelated factor that are influenced, with different degrees, by environmental change. It is not safe to say that climate and environmental change would certainly lead to migration, because that depends not only on macro-drivers (economic, social, political, environmental and demographic drivers) but also on micro-drovers (personal and household characteristics). Some individuals could also be trapped in the situation and have no choice but stay.

1.3.1 Influence of environmental change on migration drivers and outcome

As already illustrated in the previous paragraph, environmental change is not a direct cause of migration, but, without any doubt, it affects the drivers. It is, then, the variability of key drivers that influence the choice to move. In the specific case of environmental change, it is a factor that particularly influences the economic driver. Indeed, some studies demonstrate that deterioration of the environment can condition drivers of migration such as the ability of the household to fulfill needs and ambitions. Those who have accumulated capital over the long term have greater capacity to migrate, but the situation turns out to be complicated for people who don’t have capital.

[34] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p. 55

First of all, two types of migration have to be distinguished that can take place due to environmental change influence on the drivers. On one hand, "routine" economic migration can occur: it involves household members looking for employment in non-rural context (urban or mining areas); on the other hand, displacement associated with the impacts of intense environmental events can happen: they are likely to be short term, over short distances and to involve whole families.[35]

Sometimes the distinction between the two types is confused because it may happen that one type evolves into another, so the line can be blurred. Temporary displacement caused by sudden-onset events may, through experience, lead households to accumulate over time a motivation for a longer-term or permanent move. "Routine" migration, together with progressive and serious environment degradation, can pave the way to displacement, and, later, to longer-distance, longer-term migration.[36]

Furthermore, environmental change influences political and social drivers and causes different migration outcomes. Social capital is a key factor in the choice of where to move, when people decide to migrate. Social capital means pre-existing family or community contacts providing information about employment opportunities and accommodation, and support in terms of integration into the host population.[37]

Moreover, conflict and poverty play a role interacting with environmental change: because of them, migration may not be an option and, consequently, people can be extremely exposed to risks and 'trapped' in hazardous situations. Conflict can be induced by resources shortages and competition for them; although there is disagreement as to whether environmental change leads to conflict, it is clear that communities which are subject to increasing environmental variability and disruption are likely to become poorer. The important point is that poverty decreases their ability to react in a planned and controlled way to threats. This means that planned migration, which is often an appropriate response to these threats, is likely to be restricted by low capital and conflict.[38]

All those elements lead people who are most vulnerable to the impact of global environmental change on their livelihoods to the so-called "double dilemma", as they are

[35] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p.71
[36] Richard Black, *Foresight: Migration and Global Environmental Change, p. 72*
[37] Richard Black, *Foresight: Migration and Global Environmental Change*, p.72
[38] Richard Black, *Foresight: Migration and Global Environmental Change,* p.73

also least likely to be able to secure their livelihoods through planned migration. The characteristics of migration and its outcomes, which are different at social level, are affected by the correlation between environmental change and the drivers of migration, together with the forms of capital. In fact, the first groups that feel the effects of resource scarcity due to environmental change are those depending on ecosystem services for their income and having the lowest possibilities to diversify their livelihoods. Those categories include the poorer and less educated, which result to be more exposed to environmental changes affecting ecosystem services in rural areas. On the contrary, more educated and wealthier groups are likely to have greater possibilities to migrate. So, in this situation, the poor are challenged with a double dilemma: being more dependent on ecosystem services, they are not able to diversify their incomes in advance of an environmental change, neither have they the opportunity to migrate or to pursue other strategies to enhance their conditions. As a result, there is a significant number of persons that lacks the possibility to go away from places which are vulnerable to environmental change. It may happen that, if conditions become intolerable, these people could be displaced with short forewarning.[39]
This suggests that poor people are more exposed to dangers derived from environmental change. Hence, much attention should be given to populations who are moving to vulnerable areas or trapped in vulnerable areas and to the risks and harms they could experience.

1.4 Future global environmental change

Even if meteorological science and climate modelling techniques have developed noticeably over the past decade, the future effects of environmental change are difficult to predict. These predictions are complicated by many factors:

- First, forced climate migration will occur against a background of unprecedented changes concerning the number and distribution of the world's population. The global population is currently growing at a rate of 1.1 per cent and, from its 2005 level of 6.54 billion, is predicted to reach 9.075 billion by 2050. In the meantime, there is an increasing displacement to urban areas. Already 49 per cent of the world's population live in cities, and the growth rate of the urban population is

[39] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p.74

almost double (2%) that of total population growth. These trends are especially marked in low and middle-income countries. Clearly it would be absurd to attribute the entire urban drift to climate change, but separating the role that climate change might play in rural-urban migration is speculative.

- Second, there is no base-line figure for present migratory movements. Furthermore, neither developing countries nor the international community are able to collect this kind of data, particularly for internal migration. Considering that a majority of forced climate migrants won't move outside the borders of their counties, it is impossible to collect data on these movements.
- Third, the events that will occur in the second half of the 21st century will be, to a great extent, the result of what we do today. Until 2050 the degree of inertia (that is a delay or slowness in the response) in the climate system means that climate change over the next 50 years is largely pre-determined by past actions. However, the impacts of climate change after 2050 will derive from by present emissions.[40]
- Fourth, there is uncertainty over the amount of future GHG emissions. So there are doubts about the future development of climate change, due to uncertainty over future economic growth and the efficiency of climate policies.
- Fifth, predictions are made uncertain because some climate processes, such as the interactions and feedbacks between some processes, are not sufficiently studied from a scientific standpoint; the models foreseeing changes vary from one to another, even though the large-scale characteristics of change are constant in qualitative terms. This means that land warms more than oceans and the greatest warming and largest increases in rainfall will happen at high latitudes.
- Sixth, the climate is a chaotic system. As a matter of fact, the impacts of a raise in GHG concentrations have to be added to natural variability at all timescales. This variability may exacerbate the consequences of increasing GHG amounts, and, in turn, also be affected by them.[41]

Despite these difficulties, some scenarios of what the world would be in the future, due to the effects of climate change, are traced.

[40] Oil Brown, *Migration and climate change,* Geneva, 2008, p. 24-25
[41] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p.56

The global mean surface temperature change for the period 2016– 2035 comparaed to 1986–2005 will be between 0.3˚C and 0.7˚C. Past anthropogenic emissions, as well as future anthropogenic emissions and natural climate variability, will affect future climate. Global surface temperature change for the end of the 21st century (2081–2100) will exceed 1.5˚C, compared to the period 1850–1900.[42] By 2099 the world is expected to be on average between 1.8˚C and 4˚C hotter than it is now.[43] Global mean surface warming by the late 21st century and beyond is mainly caused by rising emissions of CO_2. As a matter of fact, data point out a strong connection between net cumulative CO_2 emissions and foreseen global temperature change to the year 2100. IPCC's Fifth Report confirms:

> "the global mean peak surface temperature change per trillion tonnes of CO_2 emitted is likely in the range of 0.8˚C to 2.5˚C. Warming caused by CO_2 emissions is in effect irreversible over multi-century timescales unless measures are taken to remove CO_2 from the atmosphere."[44]

The Arctic region will continue to warm more rapidly than the global mean. The mean warming over land will be larger than over the ocean. As global mean surface temperature increases, it has been foreseen that, concerning temperature extremes, there will be more frequent hot periods and fewer cold ones over most land areas; the frequency of heat waves will be higher and they will last for a longer lapse of time.[45]

Changes in precipitation in a warming world will not be uniform. As temperatures rise, there will be a consequent increase in evaporation from the oceans, hence global rainfall is expected to raise. Annual mean precipitation may increase in the high latitudes and in the equatorial Pacific by the end of this century. Mean precipitation will decrease in many mid-latitude and subtropical dry regions, whereas, in many mid-latitude wet regions, mean precipitation will increase. Cases of extreme precipitation over most mid-latitude areas and over wet tropical regions will exacerbate and increase their frequency as global mean

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[42] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 60

[43] Oil Brown, *Migration and climate change,* Geneva, 2008, p. 16

[44] IPCC, *Climate Change 2014: Synthesis Report.*, p. 62 - 63

[45] IPCC, *Climate Change 2014: Synthesis Report.*, p. 60

surface temperature increases.[46] Changed rainfall patterns and a more intense hydrological cycle will cause extreme weather events (such as droughts, storms and floods) to become every time more frequent and severe.[47]

The temperature of global ocean will continue to raise during the 21st century. Tropical and Northern Hemisphere subtropical regions will suffer the most intense ocean warming. At greater depth the warming will be most marked in the Southern Ocean.[48] Ocean will continue to store anthropogenic CO_2; the higher the concentration of CO_2, the higher the absorption. Due to global mean surface temperature increase, near-surface permafrost extent at high northern latitudes will diminish. Global mean sea level will become higher during the 21st century, but sea level rise will not be homogeneous across regions. By the end of the 21st century, sea level will rise in more than about 95% of the ocean area.[49] Global average sea level is predicted to rise between 8 cm and 13 cm by 2030, between 17 cm and 29 cm by 2050, and between 35 cm and 82 cm by 2100.[50]

The following figure shows the change in average surface temperature, average precipitation and average sea level foreseen for the period 2081-2100 and the past predictions for the period 1986-2005. The difference of projections between the two periods results clear observing the different intensity of the colours.

[46] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 60

[47] Oil Brown, *Migration and climate change,* Geneva, 2008, p. 16

[48] IPCC, *Climate Change 2014: Synthesis Report.*, p. 60

[49] IPCC, *Climate Change 2014: Synthesis Report.*, p. 60

[50] Oil Brown, *Migration and climate change,* p. 17

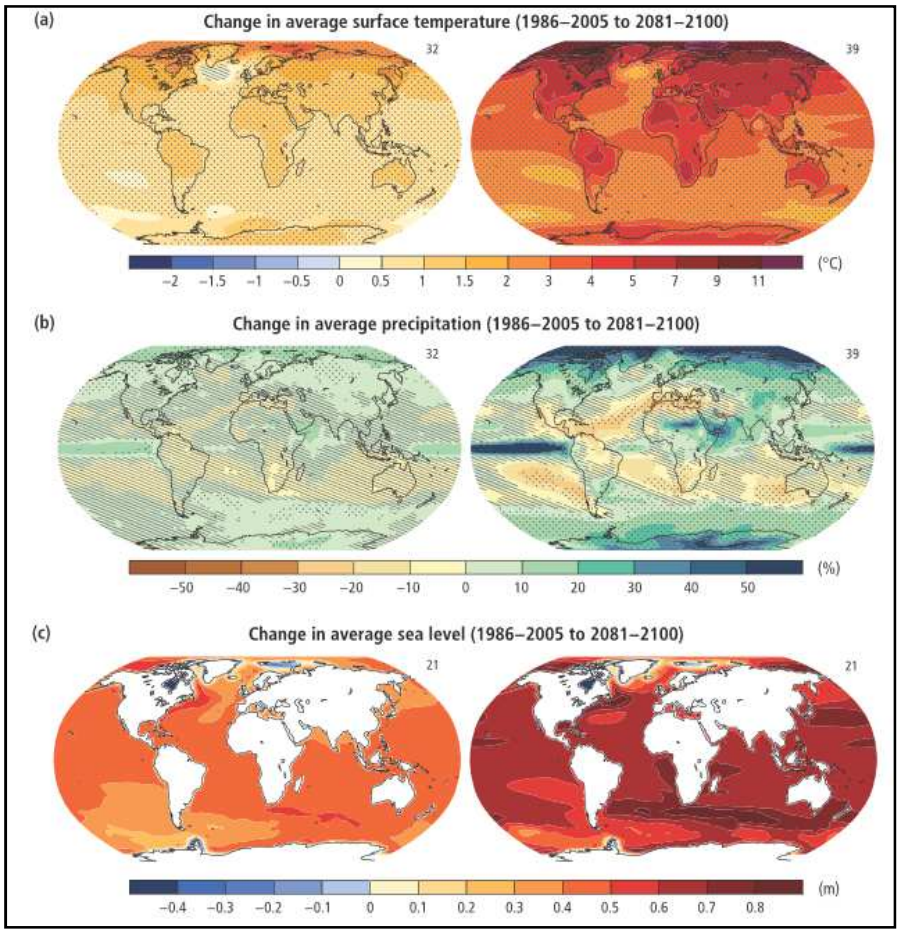

Figure 9: Change in average surface temperature (1986-2005 to 2081-2100)
Source: IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 61

In the long term, also the situations of land and marine degradation can worsen noticeably as a consequence of the incessant climate change.

Land degradation is a slow-onset problem, often with increasing changes over time, and it is difficult to estimate with any level of precision. If there are difficulties in calculating the current extent of land degradation, making predictions for the future is even more complicated. This is because land degradation is a complex phenomenon influenced by an interaction of human and environmental factors such as agricultural practices, extreme weather events and climate change. Each of elements is uncertain and likely to change in the future. Furthermore, information concerning degradation thresholds and recovery potential is scarce.

Coastal and marine ecosystem are affected by many factors: external terrestrial elements such as river floods and inputs of sediment or pollutants, external marine factors such as

storm surges and tsunamis, climate change such as sea-level rise, and the direct impact of human activities, which have had the most important consequences over the past century and are likely to continue to change in the future.[51]

Concluding there are no sufficient data about the natural system, but there is even fewer information concerning human and natural interaction.

The situation for the imminent years to come is not optimistic: it is predetermined by the past actions, of which it is now too late to avoid the consequences. The subsequent problem is that the future effects of climate change will further influence human lives and nature.

1.4.1 Future risks and impacts caused by climate change

Future consequences of climate change will expand current risks and generate new risks for natural and human systems. The correlation between climate-related dangers and the vulnerability of human and natural systems determines climate-linked impacts. These latter usually have more implications for disadvantaged people and groups, whether a country is developed or developing. Risks deriving from serious impacts are essential to understanding how much dangerous are the results of the connection between man and climate system. The identification of risks is based on large relevance or high probability of impacts, irreversibility or timing of impacts, persistent vulnerability or exposure, or limited potential to reduce risks. Hypothesize risks is fundamental given the vulnerability of societies and systems exposed. Key risks supposed by IPCC include the following:

1. "Risk of severe diseases and disrupted livelihoods resulting from storm surges, sea level rise and coastal flooding; inland flooding in some urban regions; and periods of extreme heat.
2. Systemic risks caused by extreme weather events leading to damages of infrastructure networks and critical services.
3. Risk of food and water insecurity and loss of rural livelihoods and income, mainly for poorer populations.
4. Risk of loss of ecosystems, biodiversity and ecosystem goods, functions and services."[52]

[51] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p. 58

The overall risks of future climate change impacts can be reduced by limiting the rate and magnitude of climate change. The possible outcomes are unpleasant because they threaten unique systems: they could lead to the extinction of many species, to large risks to food security and compromised normal human activities (such as food production or working outdoors in some areas for parts of the year due to the combination of high temperature and humidity). Risks of damaging impacts on ecosystems and human systems increase as the rates and magnitudes of warming, ocean acidification, sea level rise and other factors of climate change increase. Considering that natural global climate change, at rates lower than existing anthropogenic climate change, caused noteworthy ecosystem shifts and species extinctions during the past millions of years, it is possible to estimate that future risks will be greater.

A large portion of terrestrial, freshwater and marine species are already suffering increased extinction threat due to climate change during and they will be even more jeopardized beyond the 21st century. They are particularly subjected to hazard as climate change interacts with other stressors, such as habitat modification, over-exploitation of stocks, pollution and invasive species. The sustained provision of fisheries productivity and other ecosystem services will be challenged by global marine species redistribution and marine biodiversity reduction under climate change. Marine ecosystems, in particular coral reefs and polar ecosystems, are jeopardized by ocean acidification that acts together with other global changes, such as warming, progressively lower oxygen levels, and with local changes, that means pollution and eutrophication (enrichment of water with chemical nutrients), leading to interactive, complex and amplified impacts for species and ecosystems.[53]

Sea level rise, causing submergence, flooding and erosion, will put at risk coastal systems and low-lying areas throughout the 21st century and beyond. Moreover, sea level rise will increase the number of people and assets exposed to coastal risks. On the other hand, human pressures on coastal ecosystems will raise considerably in the next decades due to population growth, economic development and urbanization. Climatic and non-climatic

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[52] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 65

[53] IPCC, *Climate Change 2014: Synthesis Report.*, p. 67

drivers affecting coral reefs will erode habitats, increase coastline exposure to waves and storms and degrade environmental features important to fisheries and tourism.[54]

As the level of warming increase during the 21st century, global population will undergo water scarcity and will be affected by river floods. For the same reason, renewable surface water and groundwater resources are projected to reduce in most dry subtropical regions. Furthermore food security is threatened by climate change, that will affect food production, access, use and price stability.[55]

Human health will be affected by climate change: already existing health problems will be worsened. Throughout the 21st century, many regions, especially in developing countries with low income, will be hit by an increase in illnesses provoked by climate change. More intense heat waves and fires will cause impacts on health: greater probability of injury and death, increased risks from foodborne and waterborne diseases. In addition, work capacity and labour productivity will be lessened in vulnerable populations; risks of undernutrition will increase. Globally, the magnitude and harshness of negative impacts will increasingly prevail over positive impacts.

Also in urban areas, future conditions will not be positive: increased risks for people, assets, economies and ecosystems are projected. Among these risks there are: heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges. On the other hand, rural areas are expected to experience major impacts on water availability and supply, food security, infrastructure and agricultural incomes. [56]

Economic growth will get complicated, making poverty reduction more difficult. Food security will be further threatened and existing poverty traps will be amplified. Indirect violent conflict can develop from poverty and economic shocks that are documented factors of these disputes.

Another big risk related to climate change concerns displacement of people. Populations lacking the resources for planned migration and which are highly exposed to extreme weather events (such as floods and droughts), could consider the idea of displacement. This

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[54] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 67

[55] IPCC, *Climate Change 2014: Synthesis Report.*, p. 67 - 69

[56] IPCC, *Climate Change 2014: Synthesis Report.*, p. 69

is because mobility could become an opportunity to slow down vulnerability: in fact, migration can be a way to react to or to defend from both extreme weather events and longer term climate variability and change. Finally, migration could also be adopted as an adaptation strategy.[57]

If this is the situation that figures out for the imminent future to come, that following the year 2100 will not be any better: many consequences will last for centuries, even if anthropogenic emissions of greenhouse gases would be stopped.

Warming will continue beyond 2100: surface temperatures will remain at about the same levels as actual ones for many centuries, even if, hypothetically, net anthropogenic CO_2 emissions would completely cease. Climate change and its effects deriving from CO_2 emissions are irreversible from now for several future centuries, unless a large amount of CO_2 is removed from the atmosphere over a prolonged period.[58]

As CO_2 emissions continue, ocean acidification will prolong over centuries. Marine ecosystems will strongly feel the effect of this, and the impact will be exacerbated by increasing temperature extremes. Even global mean sea level will continue to become higher for many centuries beyond 2100 and sustained mass loss by ice sheets could contribute to that. Part of the mass loss might even be irreversible: if global mean warming was to increase from 1˚C to about 4˚C with respect to pre-industrial temperatures, it would lead to the near-complete loss of the Greenland ice sheet over a millennium or more, causing a sea level rise of up to 7 m.[59]

Within the 21st century, the composition, structure and function of marine, terrestrial and freshwater ecosystems at regional scale will suddenly and irreversibly change according to supposed magnitudes and rates of climate change resulting from medium to high CO_2 emission scenarios.

If the emissions continue to be elevated also after the 21st century, the conditions can nothing but getting worse and worse. Hypothesizing different quantities of CO_2 emitted in the atmosphere, circumstances beyond 2100 can be summarized as in the following figure.

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[57] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 73

[58] IPCC, *Climate Change 2014: Synthesis Report.*, p. 73

[59] IPCC, *Climate Change 2014: Synthesis Report.*, p. 74

(Each different line colour represents a different amount of CO_2 emitted: red is very high, orange is high, light blue is medium and blue is low.)

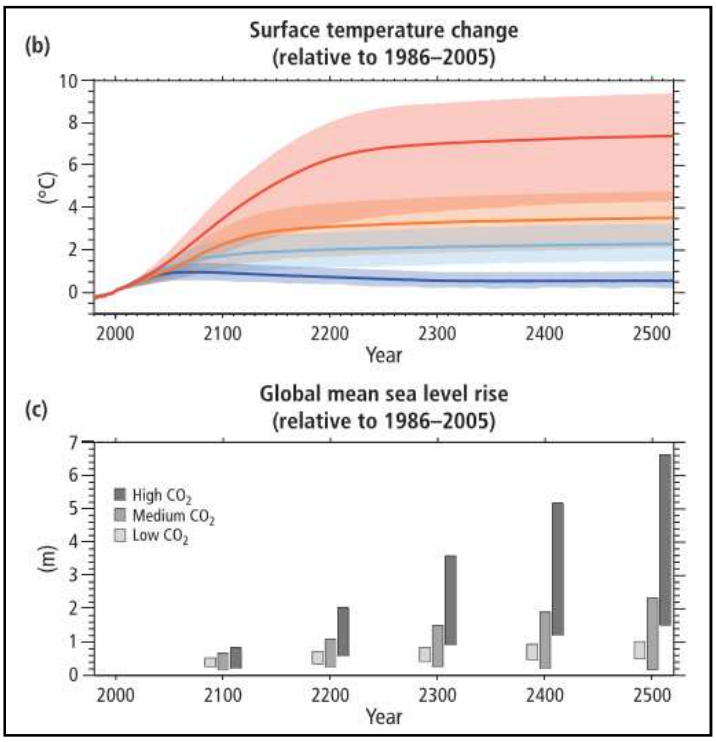

Figure 10: Estimate surface temperature change and global mean sea level rise beyond 2100
Source: IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]*, Geneva, 2014, p. 74

It is clear that the higher the emissions are, the dangerous the impacts for the planet and human beings. Even if a portion of the forthcoming future effects and impacts are predetermined, it would be reasonable to try to limit the emissions aiming at containing, in this way, the effects that will arise in the remote future.

CHAPTER 2

2. The problem of desertification in the Mediterranean area

2.1 What is desertification?

Desertification is not a new concept. The first references to this process appear in the Codex of the Teodosio II (438 A.D.) with several references to the *agri deserti* or abandoned zone because of its low productivity or as consequence of military campaigns.

At the scientific level, the French ecologist Aubreville (1949) used this term for the first time to refer to soil degradative processes in tropical humid zones. However, the concept was recognized world-wide only in the United Nations Conference on Desertification (UNCOD) that took place in Nairobi (Kenya) in 1977, organised by the United Nations Environment Programme (UNEP).[60] In that occasion desertification was described as:

> "the diminution or reduction of the biological potential of the land, and can lead ultimately to desert-like conditions. It is an aspect of the widespread deterioration of ecosystems and has diminished or destroyed the biological potential, i.e. the plant and animal production, for multiple use purposes at a time when increased productivity is needed to support growing populations in quest of development".[61]

This first global Conference on Desertification estimated the magnitude and intensity of the process and established action plans to control and mitigate the scope of the problem.[62]

Early European initiatives began soon after the UNCOD meeting. In 1984, in Mytilene (Greece) the first European scientific meeting on desertification was held under the sponsorship of the EU. A few years later (1987), in Valencia, the second European conference on desertification called "Strategies to Combat Desertification in the Mediterranean Europe" was held, promoted by the CEE, Generalitat Valenciana and the CSIC (Consejo Superior en Investigaciones Científicas).

Throughout the 1980s, no clear definition of the term "desertification" was broadly accepted. The definition given by UNCOD was wide, with no geographical or bioclimatological restrictions and without specifying involved processes or causes, but, by

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[60] J. L. Rubio, L. Recatalá, *The relevance and consequences of Mediterranean desertification including security aspects*, Valencia, 2006

[61] F. Perez-Trejo, *Desertification and land degradation in the European Mediterranean*, Luxemburg, 1994, p. 8

[62] J. L. Rubio, L. Recatalá, V. Andreu, *European desertification*, Valencia, 1998, p. 4

the way, it was the most widely used because of its synthetic character and ease for transmitting a warning and developing awareness. As such, it was able to mobilise international organisations, the scientific community and the general public. Together with it, it has generated important resources to undertake the fight against this process in Third World drylands.[63]

However, the lack of precision of this definition gave place to certain confusion and also to the propagation of many other definitions and different scopes over the meaning of desertification. Some examples are:

- "desertification is a comprehensive expression of economic and social processes as well as those natural or induced ones which destroy the equilibrium of the soil, vegetation, air and water in the areas subject to edaphic and/or climatic aridity." (FAO/UNEP)[64]
- "desertification is a process of sustained land (soil and vegetation) degradation in arid, semi-arid and dry sub-humid areas, caused at least partly by man. It reduces productive potential to an extent which can neither be readily reversed by removing the cause nor easily reclaimed without substantial investment." (World Bank)[65]

In 1991, also UNEP redefined its initial version of 1977 to consider desertification, describing it as "land degradation in arid, semi-arid and dry sub-humid areas as a basic result of adverse human conduct". In this definition, the term "land" includes the soil, the local hydrological resources, the land surface and the natural vegetation. "Degradation" implies the reduction of the resources potential by one or several combined processes acting on land. These processes are: water erosion and sedimentation, decrease at short term of the quantity and diversity of the natural vegetation or diminution on crop production, and soil salinization and sodification.[66]

Later, in 1992 at the United Nations Conference on Environment and Development held in Rio de Janeiro, the United Nations General Assembly was called on to establish an Intergovernmental Committee which had to prepare a Convention to Combat

[63] J. L. Rubio, L. Recatalá, *The relevance and consequences of Mediterranean desertification including security aspects*, Valencia, 2006

[64] F. Perez-Trejo, *Desertification and land degradation in the European Mediterranean*, Luxemburg, 1994, p. 8

[65] F. Perez-Trejo, *Desertification and land degradation,* p. 9

[66] J. L. Rubio, L. Recatalá, *The relevance and consequences of Mediterranean desertification including security aspects*

Desertification. After negotiations, the Convention was adopted by consensus among more than a hundred countries in Paris, in October 1994, at the "International Convention to Combat Desertification in Countries Affected by Serious Drought or Desertification, mainly in Africa" (UNCCD). This Convention on Desertification, together with those on Biodiversity and Climate Change, established the international setting of the United Nations to undertake the present main global environmental problems. UNCCD includes a new definition which establishes a better conceptual framework. This definition (article 1) determines that desertification means "the land degradation of arid, semiarid and dry sub-humid areas resulting from various factors including climatic variations and human activities".[67]

In the 1994 definition, an essential nuance is added: the "climatic variations". They are one of the key factors in the triggering of desertification processes and relating by this way the issue of arid lands degradation to the climatic change problem.

In this definition, land degradation is intended as the "reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rained cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as:

- soil erosion caused by wind and/or water;
- deterioration of the physical, chemical and biological or economic properties of soil;
- long-term loss of natural vegetation".

The concept of arid, semi-arid and dry sub-humid areas, instead, means "areas, other than polar and sub-polar regions, in which the ratio of annual precipitation to potential evapotranspiration falls within the range from 0.05 to 0.65".[68]

2.2 Causes of desertification

Even if the main causes of desertification are attributed to climatic variability and unsustainable human activity, there are a range of other factors that have been identified as major causes of desertification. Desertification is a complex multi-causal phenomenon: a

[67] J. L. Rubio, L. Recatalá, *The relevance and consequences of Mediterranean desertification including security aspects*, Valencia, 2006

[68] J. L. Rubio, L. Recatalá, *The relevance and consequences*, 2006

multiplicity of processes are involved in the growth and maintenance of soils, vegetation, food production and population dynamics and are inextricably tied to climate. By the way, they can be divided in two macro groups: human induced factors and natural causes.

Human induced factors concern land use. Land undergoes transformations resulting from growing population and urban-industrial development, which induce changes through the intensification of the use of agricultural land in terms of mechanisation, extensive use of fertilisers and agro-chemicals.[69] Other most commonly cited forms of unsustainable land use are over-cultivation, over-grazing, deforestation, burning and poor irrigation practices. Seventy percent of the world's dry-lands (excluding hyper-arid deserts), or some 3,600 million hectares, are degraded.[70]

The practice of intensive cropping generally reduces the structure of the soil, and as the soil structure degrades, it is exposed to erosion. The overuse of land may result from specific economic conditions or from inappropriate land laws or customs. In many cases, unregulated access to land resources may lead some individuals to maximize their own gains by overexploiting the land at the expense of the community as a whole. Poor people often lack access to the best land, depending instead on the most fragile areas and resources. Their poverty may give them little alternative but to extract what they can from the scarce resources available to them, even though this degrades the land. International economic forces can also encourage people to overexploit their land. International trade patterns can lead to the short-term exploitation of local resources for export, leaving little profit at the community level for managing or restoring the land.[71] Similarly, the development of an economy based on cash crops as a result of local or regional governmental pressures, or the imposition of taxes, can distort local markets and promote overexploitation of the land.[72]

High densities of farm animals can lead to vegetation degradation and, in turn, to compaction of the soil. Overgrazing can affect the health of the plants, even producing a change in species composition. Moreover, the decline in vegetation accelerated by

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[69] F. Perez-Trejo, *Desertification and land degradation in the European Mediterranean*, Luxemburg, 1994, p. 29

[70] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 5

[71] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, p. 5

[72] F. Perez-Trejo, *Desertification and land degradation in the European Mediterranean*, p. 30

overgrazing can result in a loss of those plant species which help to maintain soil structure. All this exacerbates the process of land degradation.[73]

The progressive deforestation of land for pasture and crop cultivation, as well as wood for fuel and construction lead to a substantial reduction of the areas covered by forests. In addition, the growing needs of industry and the demands of the tourist sector resulted in large scale deforestation. The consequences of this phenomenon are significant because they produce a change of balance in the water cycle and promote soil erosion. In this sense, deforestation in a threat to the onset of desertification: in areas where vegetation is sparse, both trees and woodland play a key role in maintaining soil stability and the removal of trees exposes land to the forces of wind and rain as well as to the effects of intensive heat from the sun.[74]

In arid areas, characterised by uncertain rainfall, the problem is often solved by constructing irrigation channels. This seems to be the most practical and logical solution because it diverts rivers and stream flows to irrigate arid lands. Actually, after an increased agricultural productivity, poor management becomes responsible for many difficulties such as waterlogging and salinization. But the main problem is that maintaining irrigation structures and channels is expansive, so the tendency is to favour the production of cash crops. As already seen, that means overexploitation of the soil that leads to desertification.[75]

Since ever, fire has been an ecological mechanism for the natural regeneration of forest: man has traditionally used fire as a management tool to change plant community structures, which, in some cases, regenerate and favour grazing and attract game, facilitating hunting. However, the forest area burned has intensively increased in the last decades according to the increase in the number of fires occurred. In many cases, the consequences of these fires are alarming because they affect soil nutrients, vegetation, fauna and habitats, leading to soil erosion.[76]

Also intense urban expansion and infrastructure have contributed to land degradation. Human pressure has been also significant for thousands of years due to the

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[73] F. Perez-Trejo, *Desertification and land degradation in the European Mediterranean,* Luxemburg, 1994, p. 31

[74] F. Perez-Trejo, *Desertification and land degradation,* p. 31

[75] F. Perez-Trejo, *Desertification and land degradation,* p. 31 - 32

[76] J. L. Rubio, L. Recatalá, V. Andreu, *European desertification*, Valencia, 1998, p. 8

accommodation of many civilisations, but it has been particularly accentuated over the last decades as consequence of the recent techno-environmental revolution.[77] Air, water and soil contamination and landscape deterioration have intensively increased together with the industrial-urban expansion. Actions and activities of civil engineering (such as the preparation of an area to be urbanised, digging, cementation, building, drainage networks, sewer systems, roads, paths, etc.) lead to soil loss because of it remains permanently buried.[78]

High population growth increases pressure on limited and fragile land resources. High densities in little space generate favourable conditions for deforestation and overexploitation of land that lead to land degradation as a large and growing rural population, struggling to survive in a limited natural resource base result in the over-utilization of the available natural resources.[79]

Related to current development, tourism can be cited as an economic activity exerting a significant impact on the environment, particularly with respect to land-use patterns and water resources availability. The most serious consequence of the increasing development of tourism is the substantial reduction in water availability due to the excessive water consumption by hotels and leisure facilities. The change in water allocation can reduce access to water for agriculture and lead to the abandonment of cultivated land, resulting in land degradation.[80]

Ignorance, errors and man-made disasters can also contribute to land degradation. The rate of land degradation in many developed and developing countries has increased in recent decades due to wrong policies (such as national and international programmes and policies for increasing land exploitation and production) or technologies. Land productivity is weakened by disasters such as wars and national emergencies. In fact, they could cause the displacement of managers or the migration of people that concentrate in other areas overburdening them and, consequently, compromising their productivity. It is also possible to say that population expansion is a contributing factor to desertification. The higher the

[77] J. L. Rubio, L. Recatalá, V. Andreu, *European desertification*, Valencia, 1998, p. 5
[78] J. L. Rubio, L. Recatalá, V. Andreu, *European desertification*, p. 8
[79] United Nations Economic and Social Council, *Africa Review Report on Drought and Desertification,* Ethiopia, 2007, p. 5
[80] F. Perez-Trejo, *Desertification and land degradation in the European Mediterranean,* Luxemburg, 1994, p. 36

amount of people in area, the more intense the exploitation of resources in that area. Sometimes this overuse of land is indirect: for instance, when increasing urban populations ask rural areas for help to get food. [81]

If, on one hand, there are human induced factor causing desertification, on the other hand there are natural causes.

Even if land degradation is in many ways a product of human activity, nevertheless it is significantly amplified by natural factors. Among natural causes there are: climate, topography, soil erodability and vegetation status.

The extreme intensity and irregularity of annual precipitation events is a primary cause of soil erosion. During such rainfall events, the energetic impact of rainfall at the soil surface modifies the physical soil properties: the soil particles detach from land and then the running water drag them down slope. Moreover, the pressure exerted by raindrops make the soil more compact and consolidated on its surface, creating an impermeable crust that complicates infiltration and increases runoff. Furthermore, aridity facilitates soil evaporation and impedes drainage provoking accumulation of salts at soil surface.[82]

In addition to precipitation variability (also said climatic fluctuations), dry-lands have, by definition, limited freshwater supplies. Seasonal precipitation variability is aggravated by wide fluctuations taking place over years and decades, frequently leading to drought. Due to this, the biological and economic resources of dry-lands, particularly soil quality, freshwater supplies, vegetation, and crops, are easily damaged.[83]

The topography of any region exerts a powerful influence on settlement and land-use practices, as well as being a contributory factor in soil erosion. In some areas, large proportions of land are dominated by sparse vegetation. Such a physical condition, presents ideal circumstances for the generation of water erosion on slope and consequent loss of soil productivity, leading to desertification. The slope inclination also influences infiltration and favours runoff. The steepest slopes often generate mass movements, such

[81] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 5

[82] F. Perez-Trejo, *Desertification and land degradation in the European Mediterranean,* Luxemburg, 1994, p. 19 - 20

[83] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, p. 5

as landslides, mudflows and avalanches. These latter damage vegetation cover and, in turn, provoke further erosion.[84]

Erosion is a gradual phenomenon exacerbated by human activity. It is the result of an evolutionary process and of an evolving system. In this process, parent materials, climate and vegetation, together with human activity, are responsible for land degradation.[85]

The degree of soil degradation is also a reflection of the state of vegetation that covers lands. The vegetation patterns which cover the landscape affect the soil in all its dynamics, including water redistribution over and within the soil. It is vegetation interaction that generate and maintain soil structure in the top 20 centimetres layer of the land through the process of aggregation of granules to form the soil. If there is no vegetation, the aggregation process fails, leaving space for erosion and land degradation.[86]

There is little doubt that the combined effect of all these factors pose a significant threat to land degradation. Hence, there is a need for development of conservation measures for sensitive soil to help control or alleviate the worst excesses of land degradation. Obviously, these measures have to be linked to choices concerning the economic forces (such as not overexploit soil for cash crops) that affect land degradation.

2.3 Consequences of desertification

Inevitably, desertification produces consequences. There are both immediate consequences and long-term risks of desertification.

Immediate consequences are:

- reduction of land's resilience to climate variability;
- weakened potential for food production and increased famine;
- impacts caused by activities happening on places far away from the immediately affected areas;
- socio-economic instability.[87]

[84] F. Perez-Trejo, *Desertification and land degradation in the European Mediterranean,* Luxemburg, 1994, p. 21

[85] F. Perez-Trejo, *Desertification and land degradation in the European Mediterranean,* p. 22

[86] F. Perez-Trejo, *Desertification and land degradation,* p. 24

[87] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 6

Land's resilience to natural climate variability is decreased by desertification: soil, vegetation, freshwater supplies, and other dry-land resources are inclined to be resilient. That means that they can initially recover from climatic disturbances, such as drought, and even from human-induced impacts, such as overgrazing. As a consequence, these systems develop an important resilience capacity, which allow them to regenerate. When land is degraded, however, this resilience is greatly weakened, resulting in both physical and socio-economic consequences. Soil becomes less productive when exposed and eroded topsoil is blown away by the wind or washed away by rainstorms. The soil's physical structure and biochemical composition can then deteriorate as vital nutrients are removed by wind or water. When soil is trampled and compacted by livestock, it can lose its ability to support plant growth and to hold moisture, resulting in increased evaporation and surface run-off. These soil degradation processes seriously affect the soil functions and capacities to provide goods and services.[88]

The link between desertification and food production is also strong. A nutritionally adequate diet for populations implies tripling food production over the next 50 years, but this will probably be unfeasible even under favourable circumstances. Adequate levels of food production are essential to ensure the maintenance of export levels and to feed local populations. However, if the extent of desertification is not reversed in the coming years, territories dedicated to agriculture in many affected areas will probably reduce. Malnutrition, starvation, and ultimately famine may result, although famine typically occurs in areas that also suffer from poverty, civil unrest, or war. Drought and land degradation often help to generate a crisis, which is then made worse by poor food distribution and the inability to buy what is available. The relationship between soil degradation and crop yields, however, is seldom straightforward. Productivity is affected by many different factors, such as the weather, disease and pests, farming methods, external markets and other economic forces.[89]

Some of the consequences of desertification are also provoked by people living outside the immediately affected area. For example, downstream flooding, reduced water quality, sedimentation in rivers and lakes can be the result of human activities that take place away

[88] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 6

[89] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, p. 6

from the degraded land. It can also cause dust storms and air pollution, resulting in damaged machinery, reduced visibility, unwanted sediment deposits, and mental stress. Wind-blown dust can also worsen health problems, including eye infections, respiratory illnesses, and allergies.[90]

There are also immense social costs that are caused by the incidence of desertification. Many people are forced to migrate to other countries due to drought and dry-land degradation. The environmental resources in and around the cities and camps where these people settle come under severe pressure. Other indirect economic and social costs suffered outside the affected areas, including the influx of "environmental refugees" and losses to national food production, could possibly be even greater.[91]

Long-term risks of desertification are:

- reduction of vegetation cover;
- quantitative and qualitative depletion of superficial and underground water resources;
- loss of biodiversity;[92]
- food insecurity due to reduced production and high price;
- threatened public health;
- losses to national economies.[93]

The loss of vegetation cover is both a consequence and a cause of land degradation. Deteriorated soil can cover plants with sand, bury them, or expose their roots to air. Also edible plants may extinguish when pastures are overgrazed by too many animals, leaving place to inedible species.[94]

The problem of the water supply reduction, both in quantitative and qualitative way, is an effect of drought and desertification. Quantitatively talking, much water is overused by human activities, mainly industry and agriculture, and this high and increasing overexploitation provokes the diminution of water resources. Qualitatively talking,

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[90] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 7

[91] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, p. 7

[92] J. L. Rubio, L. Recatalá, V. Andreu, *European desertification*, Valencia, 1998, p. 12

[93] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, p. 8 - 9

[94] J. L. Rubio, L. Recatalá, V. Andreu, *European desertification*, p. 11

salinisation processes seriously affect soils and drinking water in many coastal areas as a consequence of salt-water intrusion caused by overexploitation. In addition, water pollution would become still worse as pollutants become more concentrated with reductions in river flow.[95]

Biodiversity can be reduced because of the loss of habitats due to destruction, modification and fragmentation of ecosystems by intensive farming methods, land urbanisation, etc. Moreover, desertification processes threaten the genetic pool of very interesting indigenous varieties for its adaptation and resistance to climatic variations and disease.[96]

Concerning food security, livestock production would suffer due to a deterioration in the quality of pasture associated with higher concentrations of atmospheric carbon dioxide and to changes in areas of rangeland such as changes in climate. Dealing with agriculture, harvest can be lessened by different factors: increases in competition for water, pests and diseases, land losses through desertification and sea level rise. Reduced crop and climate change lead, in turn, to increases in world prices for many key commodities: wheat, maize, soybean meal and poultry could become very expansive. The combination of higher prices and crop losses would lead to a deterioration in levels of food security, especially in the poorer countries.[97]

The logical consequence of food insecurity are malnutrition and hunger for loads of people. Heat and pollution could provoke respiratory illnesses among urban populations; extreme weather events could cause death and make injury rates become higher; water shortages and damaged infrastructure could lead to cholera and dysentery; higher temperatures might then increment the diffusion of infectious diseases, such as malaria, dengue fever and yellow fever.[98]

As the livelihood of millions is threatened, serious social disruption and international tensions over resources increases. Forced and disorganised displacement resulting from desertification, poor harvests and any rise in sea levels could generate social tumults. Considering the decline in water availability, securing water resources could create sharp

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[95] J. L. Rubio, L. Recatalá, V. Andreu, *European desertification*, Valencia, 1998, p. 12

[96] J. L. Rubio, L. Recatalá, V. Andreu, *European desertification*, p. 12

[97] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 8

[98] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, p. 8

conflicts. National economies would also suffer negative effects due to crop failure in countries where the main sector is agriculture. Also adaption policies to fight consequences would result in a high expanse for states.[99]

2.4 The relationship between the desertification and climate change

Desertification is, on one hand, a phenomenon accentuated by climate change. This is because an intensification of extreme events such as droughts and heavy rains resulting from climate change will further degrade land, exacerbating already existing problems as poverty, forced migration and, in some areas, conflicts. Desertification is already considered as a cause for forced migration and, in addition, if the situation will worsen, more than a billion people (one in seven of the current world population) could be forced to leave their homes between now and 2050.[100] The rise in average temperatures in Europe will be greater than in the rest of the world, with more significant effects in winter in northern Europe and in summer in the south of the continent. At the same time, we will see increased precipitation in northern Europe and a significant drop in the number of rainy days in most of the Mediterranean, resulting in increased risk of drought. Despite the continuing uncertainty over the development of reliable climate models at regional level and the difficulty inherent in analysing climate impacts on environmental and socio-economic compartments, it is clear that desertification can only get worse in a region, like the Mediterranean, that already suffers from endemic water scarcity. For the Mediterranean area, this prospect represents one of the greatest environmental challenges of our time, with undeniably serious environmental, social, economic and political repercussions. The interaction of climate change with the processes of desertification has various immediate direct and indirect effects, including: environmental degradation diminishing the area's resilience to climate variation; endangered food production potential; more frequent droughts and famines; and the resulting increase in social and economic instability. In the longer term, the possible effects of such interaction could be to cause more frequent water scarcity and a deterioration in water quality, compromise food security, thus putting at risk health and social welfare, permanently damage the state of

[99] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 9

[100] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean,* p. 4

natural resources with possible ramifications for national economies, and lead to increased migratory flows both within countries (from the countryside to the towns) and between sovereign states (from the south to the north).[101]

The relationship between the two processes does not, however, move in only one direction: land degradation is both a cause and a consequence of climate change, therefore it is also possible that desertification may affect climate change. Land degradation and climate change create feedback loops where intensive agricultural production increases emissions, while the loss of soil and vegetation significantly reduces carbon absorption. The result is more carbon in the atmosphere feeding an energetic cycle of land degradation, biodiversity loss and climate change.[102] Moreover, due to the reduced surface moisture, only few sun's energy is used to make water evaporate, so the remaining energy is left on the ground warming it and, consequently, increasing temperatures. At the same time, dry-lands produce dust that the wind transports within atmosphere. These particles of dust absorb the sun's rays, helping to cool the Earth's surface. However, simultaneously, the energy they absorb can warm the lower atmosphere and in this way increase temperature compared to the other atmosphere's layers; this can lead to fewer rain-showers and thus drier land. Finally, the unsustainable use of fuel-wood and charcoal, a major cause of land degradation, also contributes to greenhouse gas emissions.[103]

[101] ARLEM, *Report on the link between desertification and climate change in the Mediterranean,* Bari, 2012, p. 5 - 6

[102] UNCCD, *Land matters for climate, Reducing the gap and approaching the target*, 2015, p. 8

[103] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 4

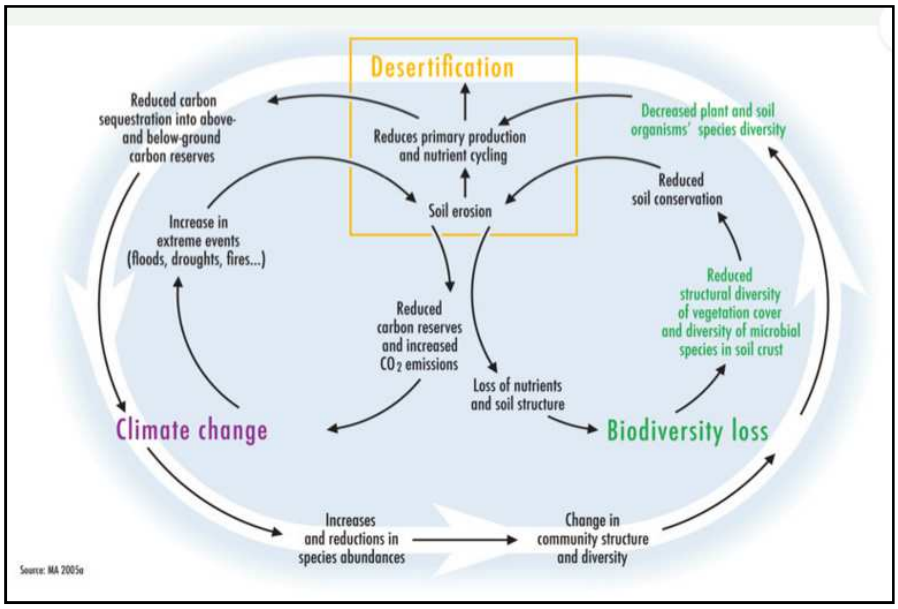

Figure 11: Linkages and feedback loops among desertification, global climate change and biodiversity loss
Source: Grid Arendal, *Resources: Global environment Outlook 4: Linkages and feedback loops among desertification, global climate change and biodiversity loss*, 2006
http://www.grida.no/resources/5569

2.5 Regional patterns of desertification in the Mediterranean

The northern, eastern, and southern areas of the Mediterranean are suffering desertification to some degree, and they will probably experience it to a higher degree in the future. However, the amounts of desertified land, or land threatened by desertification, is not the same in each country across the region. The MENA region (Middle East and North Africa region) is the Mediterranean area mostly hit by desertification. The northern rim of that region, instead, is the one that suffer less the phenomenon, even if the situation in Albania is concerning because much of the country is under threat of desertification. As shown in the figure below, the situation is reaching critical levels in Morocco, Lebanon, Syria, Israel and Turkey.[104]

[104] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 9

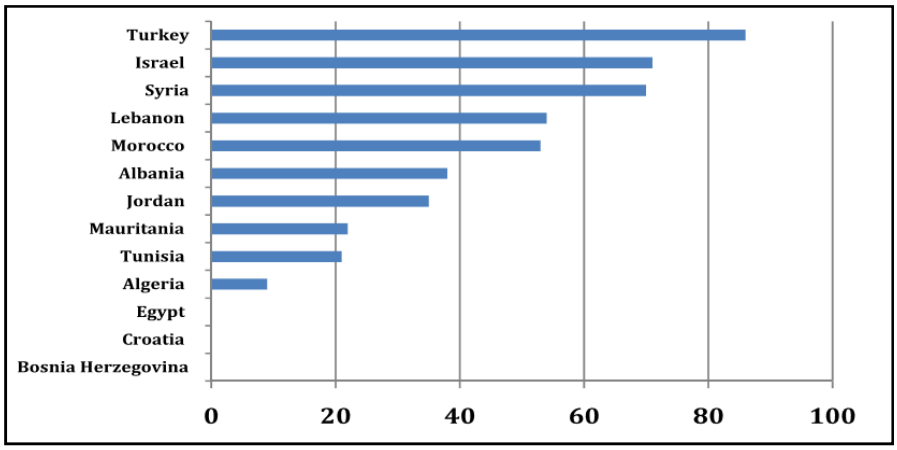

Figure 12: The most desertified countries in the Mediterranean area
Source: Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 10

It should be noted that the distribution of dry-lands then varies within countries. For instance, while only 9 per cent of Algeria's total land area is under threat of desertification, much of this occurs in and around heavily populated areas.

2.6 Key players that deal with desertification in the Mediterranean

Due to the important social, economic, political and environmental consequences of desertification and climate change that are likely to shape the development of the Mediterranean, there are already a large number of organisations operating in the region with the aim of combating desertification. Key organisations are:

- The European Union: it has been committed in reducing and managing climate change since at least 1992. In 2010 it established a specific Directorate-General (DG CLIMA) to coordinate its actions in this area.[105] The Directorate-General for Climate Action (DG CLIMA) leads the European Commission's efforts to fight climate change at EU and international level. DG CLIMA has a staff of around 220 persons. It was set up in 2010; previously, climate change was handled by the Commission's DG Environment. It formulates and implements cost-effective policies for the European Union to meet its climate targets. It also ensures that climate change is taken into account in all other EU policies and that adaptation measures will reduce the EU's vulnerability to the impacts of climate change. Finally, it leads the Commission task

[105] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 12

forces in international negotiations on climate change and ozone-depleting substances, and coordinate bi-lateral and multi-lateral partnerships on climate change with non-EU countries.[106]

- The Union for the Mediterranean: it deals with desertification, climate change and their effects on agricultural production. As a proof, the Joint Declaration of the Paris Summit of the Union for the Mediterranean of 13 July 2008 mentions these problems. Moreover, climate change and desertification were subject of discussion during the Union for the Mediterranean Summit in Marseille on 3–4 November 2008, including their effects on tourism. The Union for the Mediterranean Agenda focuses on four main priorities: water governance, water and climate change adaptation, water demand management and water financing.[107]
- United Nations, with the Convention to Combat Desertification: desertification has been widely recognized by the international community as an economic, social and environmental problem affecting many countries everywhere in the world. The Convention to Combat Desertification (UNCCD) was adopted in Paris on 17 June 1994 and opened for signature there on 14-15 October 1994. It entered into force on 26 December 1996. The supreme governing body of the Convention is the Conference of the Parties (COP), while the Interim Secretariat of the UNCCD have the task providing countries with information and expertise. Countries affected by desertification are bound to implement the Convention by developing and carrying out national, sub-regional, and regional action programmes. Criteria for preparing these programmes are described in the five annexes of the Convention, one for each region of the world: Africa, Asia, Latin America and the Caribbean, the Northern Mediterranean, and Central and Eastern Europe.[108]

[106] European Commission, *Climate action - What we do https://ec.europa.eu/clima/about-us/mission_en*
[107] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean,* Birmingham, 2011, p. 12
[108] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, p. 13

2.6.1 The European Union

Since the second post-war period, the European nations have always strongly supported the creation of multilateral institutions and there has always been the belief that global problems should be addressed multilaterally. In the case of environmental protection, the United Nations has been the preferred institution to discuss about pollution. Indeed, the sustainability question was elevated for the first time to the UN level in Stockholm in 1972. Later, in 1992 at the "Earth Summit" in Rio de Janeiro, the UN Framework Convention on Climate Change (UNFCCC) was agreed. In 1997, the EU agreed the Kyoto Protocol that was later ratified in April 2002. So, the EU has always had a tradition of multilateralism, preferring to deal with environmental problems at the UN level, but, since 1987, it has started to draft its own climate policies.[109]

EU climate policy basically began as part of environmental policy. Its starting point can be established in the Single European Act, which entered into force in 1987. Through that Act, new measures were added to the EU Treaty dealing with the environment. These provided that the Council could, together with the European Parliament, decide upon environmental laws on the basis of qualified majority. Today, there is almost a complete set of EU legislation dealing with environmental protection of air quality, water, waste and biodiversity.

It was unavoidable for EU to take its own decisions concerning environmental policies because it needed to speak as one voice at international negotiations. Moreover, the development of the EU's Single Market for goods and services accelerated in the 1980s and 1990s. This led to think that it would have been better that the EU adopted rules to protect the environment at European level. A debate raised on whether to use also economic instruments pricing economic externalities and in which way to do that. This could be achieved through direct economic instruments, such as taxes for polluting, or setting defined quantities of pollution allowed. In 1990s the idea to price economic externalities through taxes seemed to be favoured, but, after a decade of difficult negotiations between the European Council and Parliament, the tax route was abandoned and the debate shifted to the setting of a cap to pollution levels.[110]

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[109] Jos Delbeke, Peter Vis, *EU Climate Policy Explained*, New York, 2016, p. 8 - 9

[110] Jos Delbeke, Peter Vis, *EU Climate Policy Explained*, p. 9 - 10

EU succeeded with its previous goal to decrease GHG emissions: from 1990 to 2013, emissions decreased by 19%. Meanwhile, GDP increased by 45%, so the EU has also gained the challenge of decoupling its emissions from economic growth. At the same time, Kyoto Protocol obligations were achieved and surpassed: a reduction of 8% was promised but a reduction of 18% was delivered.[111]

Nowadays, it is committed in reaching its regional objectives established in 2007 and enacted in legislation in 2009. These targets, that have to be achieved within 2020, are:

- "to achieve at least a 20% reduction of greenhouse gases by 2020 compared to 1990 levels;
- a mandatory EU target to increase of 20% the share of renewable energy by 2020."[112]

To meet the 20% reduction target in greenhouse gas emissions it was decided that the sources covered by the EU's Emissions Trading System (ETS) should reduce their greenhouse gas emissions by 21% compared to 2005.[113]

The EU's Emissions Trading System is the EU's key tool for cutting greenhouse gas emissions from large-scale facilities in the power and industry sectors, as well as the aviation sector. It covers the following sectors and gases with the focus on emissions that can be measured, reported and verified with a high level of accuracy:

- "carbon dioxide (CO_2) from
    1. power and heat generation
    2. energy-intensive industry sectors including oil refineries, steel works and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals
    3. commercial aviation
- nitrous oxide (N_2O) from production of nitric, adipic and glyoxylic acids and glyoxal
- perfluorocarbons (PFCs) from aluminium production."[114]

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[111] Jos Delbeke, Peter Vis, *EU Climate Policy Explained*, New York, 2016, p. 17

[112] Commission of the European Communities, *Package of Implementation measures for the EU's objectives on climate change and renewable energy for 2020,* Brussels, 2008, p. 2

[113] Jos Delbeke, Peter Vis, *EU Climate Policy Explained*, p. 18

[114] European Commission, *Climate Action – The EU Emission Trading System (EU ETS) https://ec.europa.eu/clima/policies/ets_en*

The costs of the targets have to be distributed in a smart combination, differentiating them to reflect fairness and solidarity, because an equal marginal cost of abatement per Member State would be unfair for lower-income countries. They would face higher costs in relative terms, because of their relatively higher energy use and because of their relatively lower GDP. On the other hand, policy instruments have to be used to ensure a cost-effective implementation. The principle of using cost-effective policy instruments is exemplified by the use of the EU ETS as an EU-wide market-based instrument. The principle of ensuring a fair distribution of the effort was achieved in several ways. First, in the EU ETS, this was accomplished through ensuring a redistribution of the revenues that each Member State could expect. Second, when setting emissions targets for each Member State in sectors not covered by the EU ETS (notably transport, buildings, agriculture and smaller businesses), account was taken of the national per capita income, leading to the differentiated targets for each Member State.[115]

These goal set for 2020 are only intermediate objectives to reach those of 2050. These latter include a 80-95% reduction of greenhouse gases compared to 1990, as a result of the commitment taken by the EU not to exceed 2˚C of global warming. For this reason, in 2011, the European Commission produced a Low Carbon Roadmap and an Energy Roadmap to analyze the perspective towards 2050. Its purpose was not to try to forecast the possible changes over such a long time frame, but rather to understand if it was possible for the EU to complete its commitment and how to do that. It showed that, as part of a global effort to meet 2°C, it is technologically and economically feasible for the EU to achieve domestic emission reductions of at least 80% compared to 1990 in 2050. The Roadmap also sets out interim reductions, so called "milestones", of 40% by 2030 and 60% by 2040.[116] Moreover, in October 2014, the European Council adopted a series of targets in view of 2030:

- "at least 40% domestic greenhouse gas reduction target (below 1990 levels),
- at least 27% for renewable energy binding at EU level,
- an indicative target of at least 23-27% for energy efficiency,
- a reduction of emissions from the EU ETS sectors of 43% compared to their level in 2005,

[115] Jos Delbeke, Peter Vis, *EU Climate Policy Explained*, New York, 2016, p. 19
[116] Jos Delbeke, Peter Vis, *EU Climate Policy Explained*, p. 21

- for the sectors not covered by the ETS, a reduction of emissions of 30% compared to 2005."[117]

In the meantime, the EU embraced an adaption strategy to climate change. The EU Strategy on adaptation to climate change, adopted by the European Commission in April 2013, sets out a framework and mechanisms to prepare EU to current and future climate impacts to a new level. The EU Adaptation Strategy has three objectives:

1. "promoting action by Member States: the Commission encourages all Member States to adopt comprehensive adaptation strategies and will provide guidance and funding to help them build up their adaptation capacities and take action. The Commission will also support adaptation in cities by launching a voluntary commitment based on the Covenant of Mayors initiative;
2. promoting better informed decision-making by addressing gaps in knowledge about adaptation and further developing the European Climate Adaptation Platform (a partnership between the European Commission and the European Environment Agency to support Europe in adapting to climate change) as the 'one-stop shop' for adaptation information in Europe;
3. promoting adaptation in key vulnerable sectors through agriculture, fisheries and cohesion policy, ensuring that Europe's infrastructure is made more resilient, and encouraging the use of insurance against natural and man-made disasters."[118]

The EU is committed also at international level and it is working to promote ambitious global action through:

- the UN climate convention (UNFCCC) and other international fora
- bilateral relations with non-EU countries.

The United Nations Framework Convention on Climate Change (UNFCCC), agreed in 1992, is the main international treaty to combat climate change. It aims at preventing dangerous man-made interference with the global climate system. The EU and all its member countries are among the 197 Parties of the Convention. Being part of the UNFCCC, the EU adopted the Paris Agreement in December 2015: the first-ever universal, legally binding global climate agreement starting in the year 2020.

[117] Jos Delbeke, Peter Vis, *EU Climate Policy Explained*, New York, 2016, p. 23
[118] European Commission, *The EU Strategy on adaptation to climate change,* 2013

Before the Paris Agreement, the Kyoto Protocol was the only legally binding instrument for reducing greenhouse gas emissions. The Protocol has been ratified by 192 of the UNFCCC Parties, including the EU and its member countries. It establishes 2 commitment periods:

- 1st period (2008-12): industrialised countries committed to reduce emissions by an average of 5% below 1990 levels;
- 2nd period (2013-20): parties who joined this period committed to reduce emissions by at least 18% below 1990 levels.

Other international fora to which the EU and its member countries participate actively include the:

- Intergovernmental Panel on Climate Change (IPCC): it is the international body for assessing the science related to climate change that provides a scientific basis for governments at all levels to develop climate-related policies;
- G7 and G20: G7 is an inter-governmental political forum to which participate the world's most industrialized countries; G20 is an international forum made up of the world's 20 leading industrialized and emerging economies;
- Major Economies Forum on Energy and Climate (MEF): it is a forum is intended to facilitate a candid dialogue among major developed and developing economies;
- Organisation for Economic Cooperation and Development (OECD): it is an organization that promotes policies that will improve the economic and social well-being of people around the world;
- International Energy Agency (IEA): it is an organisation that works to ensure reliable, affordable and clean energy.[119]

Concerning bilateral agreements with non-EU countries, the Commission has arrangements with key partners and works with a number of regional organisations:

- OECD countries (e.g. US, Canada, Japan, Australia);
- other UNFCCC Annex I countries (e.g. Russia, Ukraine);
- emerging economies (e.g. Brazil, China, India, South Africa, South Korea);
- regional groupings (e.g. African, Caribbean and Pacific (ACP) countries, African Ministerial Conference on the Environment (AMCEN), Asia Europe Meeting (ASEM),

[119] European Commission, *Climate Action - Climate Negotiations* *https://ec.europa.eu/clima/policies/international/negotiations_en*

Association of South East Asian Nations (ASEAN), Gulf Cooperation Council (GCC), Latin American and Caribbean (LAC) countries, Organisation of the Petroleum Exporting Countries (OPEC)).[120]

Concluding, EU has always been committed directly and indirectly in combating desertification. It is indirectly fighting it with its strategies and projects dealing with climate change. Due to the fact that climate change and desertification are related issues, because one influences the other, to adopt measures against climate change means also trying to limit the worsening of desertification and its related consequences. Restricting climate change entails the reduction of extreme events that exacerbate desertification with its connected poverty, food and migration problems.
Being part of the United Nations to Combat Desertification, EU is also directly dealing with desertification, but this will be discussed in the paragraph concerning UNCCD.

2.6.2 The Union for the Mediterranean

The Union for the Mediterranean (UfM) aims at facilitating and promoting regional dialogue and cooperation. Its purpose is also to foster projects and initiatives in the fields of Energy and Climate Action in order to face energy and climate change challenges in the region.[121] Indeed, as regards climate change, in the Final Statement of the UfM Ministerial conference held in Marseille in 2008, it is declared:

> "[…]climate change could adversely affect the environment and human activities in the Mediterranean. Ministers recalled the need to intensify co-operation on climate change through the establishment of a Euro-Mediterranean Climate Change Network to provide the forum for the sharing of information and experience as well as to build relationships in an informal working environment in support of regional efforts to combat climate change. Euro-Mediterranean interaction on climate change may lead to

[120] European Commission, *Climate Action - Cooperation with non-EU countries and regions* *https://ec.europa.eu/clima/policies/international/cooperation_en*
[121] Union for the Mediterranean, *Energy & Climate Action* http://ufmsecretariat.org/energy-and-climate-action/

enhancement of capabilities of implementation of projects and programmes of mutual interest."[122]

Later, during the UfM Ministerial Meeting on Environment and Climate Change, held on 13th May 2014 in Athens, climate change was included for the first time as a priority area of cooperation for the UfM. It was established the UfM Climate Change Expert Group with the purpose to meet with other relevant institutions, including international and private ones, to promote cooperation and discussions on climate change priority actions, and to develop projects and initiatives.[123] In this meeting, the urgency to take action on climate change was highlighted because of its close connection with other major regional concerns, such as energy, water scarcity, desertification, food security, overpopulation and resilience to extreme weather events.[124] In line with this declaration and with the UfM's general mandate, the UfM Climate Action relies on 2 pillars: Regional Dialogue and Project Promotion.

Concerning Regional Dialogue, the UfM Climate Change Expert Group is the main regional platform to strengthen regional dialogue and identify new axes of work. More precisely, the UfM Climate Change Expert Group undertakes technical discussions on climate mitigation and adaption. It has met four times since October 2014 and it gathered representatives of the UfM Member States, as well as scientists, civil society representatives, international organisations, international financial institutions and private sector representatives active on climate action in the EuroMediterranean region. The UfM Climate Change Expert Group is working in collaboration with other UfM regional dialogue platforms, such as the UfM Renewable Energy and Energy Efficiency platform.[125]

As regards Project promotion, the UfM Climate Change Expert Group has three main objectives:

1. fostering projects on low-carbon development;
2. working towards enhanced efficient climate finance;

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[122] Council of the European Union, *Barcelona Process: Union for the Mediterranean ministerial conference – Final Declaration,* Marseille, 2008, p. 16

[123] Union for the Mediterranean, *Union for the Mediterranean Ministerial Meeting on Environment and Climate Change*, Athens, 2014, p. 7

[124] Union for the Mediterranean, *UfM Climate Change Expert Group* http://ufmsecretariat.org/ufm-climate-change-expert-group/

[125] Union for the Mediterranean, *UfM Climate Action – Enhancing climate action through regional cooperation in the Mediterranean,* Barcelona, 2016, p. 2

3. supporting the emergence of regional actions.

As far as the first objective is concerned, the UfM supports projects and initiatives aiming at reducing CO_2 emissions through improving resilience, seizing business opportunities and investing in the future.[126] The UfM is promoting the so-called "Desalination Facility for the Gaza strip" project: it consists in creating a Desalination Plant of 55 million cubic meter per year, a North-South conveyance system and a Non-Revenue Water reduction project. The UfM fosters this project implementing a fund-raising plan.[127] The UfM invests in the future through the project "UfM Energy University by Schneider Electric": it offers free online courses for engineers and professionals of the energy sector from UfM members. The objectives of the project are the development of expertise in energy efficiency and renewable energy; a group of UfM countries acts as project facilitators to ensure that the content of the courses meets the needs and priorities of the region.[128]

As regards enhancing climate finance, the UfM Secretariat has launched the Regional Finance Cooperation Committee for Climate Action in March 2016. It is a regional initiative that aims at enhancing cooperation through sharing information among International Financial Institutions and donors active in climate finance in the Mediterranean region. Moreover, the UfM created the Urban Projects Finance Initiative (UPFI): it is the financial component of the Euro-Mediterranean Sustainable Urban Development Strategy, which aims to create a shared and common framework for sustainable urban and territorial development strategies and projects. The purpose of this financial initiative is to select sustainable urban development projects likely to be endorsed by the Union for the Mediterranean and financed and implemented in the short term.[129]

Concerning the support to the emergence of regional action, the UfM acts as a third party to support the development of projects focusing on ensuring adequate political endorsement of projects, mobilising relevant financial institutions, encouraging knowledge sharing and project presentation. For instance, the UfM Secretariat is working, in cooperation with the European Union, on the intensification of cooperation among local

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[126] Union for the Mediterranean, *UfM Climate Action – Enhancing climate action through regional cooperation in the Mediterranean,* Barcelona, 2016, p. 3

[127] Union for the Mediterranean Secretariat, *Gaza Desalination Project -The Largest Single Facility to be built in Gaza*, Barcelona, 2011, p. 1 - 4

[128] Union for the Mediterranean, *UfM Energy University by Schneider Electric* http://ufmsecretariat.org/project/ufm-energy-university-by-schneider-electric/

[129] Union for the Mediterranean, *UfM Climate Action – Enhancing climate action*, p. 4

authorities in the Mediterranean region, especially through the establishment of a Mediterranean Covenant of Mayors: it supports local and regional authorities, voluntarily committing to increase energy efficiency and the use of renewable energy.[130]

Concluding, unlike EU, UfM does not create its own projects, but rather supports the ones that are ongoing in different ways: simply fostering actions against desertification or related to it, trying to attract financial resources to implement plans or enhancing and supporting regional cooperation through the development of projects and making sure that financial institutions will have a look at them. Not less important is the promotion of regional dialogue and sharing knowledge and information.

2.6.3 The United Nation Convention to Combat Desertification

The fight against desertification is a commitment that has been lasting since long time in the international community. In 1977, a Plan of Action to Combat Desertification was adopted by the United Nations Conference on Desertification (UNCOD), but, nonetheless, in 1991, the United Nations Environment Programme (UNEP) declared the worsening of land degradation in arid, semi-arid and dry sub-humid areas.[131] In 1992, during the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, the UN General Assembly was urged to establish the Intergovernmental Negotiating Committee which had to elaborate a Convention to combat desertification in countries experiencing serious drought and/or desertification, particularly in Africa. In December 1992, the General Assembly agreed and adopted resolution 47/188 on this matter. Working to a tight schedule, the Committee completed its negotiations in five sessions. The Convention was adopted in Paris on 17 June 1994 and entered into force on 26 December 1996, ratified by 50 countries.[132] 195 countries and the European Union are Parties as at April 2017.[133] The UNCCD aims to promote effective actions to combat

[130] Union for the Mediterranean, *UfM Climate Action – Enhancing climate action through regional cooperation in the Mediterranean,* Barcelona, 2016, p. 5

[131] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 13

[132] Catherine Bowyer, Sirini Withana, Ian Fenn, Samuela Bassi, Megan Lewis, Tamsin Cooper, Patricia Benito, Shailendra Mudgal, *Land Degradation and Desertification,* Brussels, 2009, p. 49

[133] UNCCD, *UNCCD History*
http://www2.unccd.int/convention/about-convention/unccd-history

desertification through action programmes and supportive international partnerships. Indeed, article 2 of the Convention states:

> "The objective of this Convention is to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective action at all levels, supported by international cooperation and partnership arrangements […]".[134]

Countries affected by desertification, land degradation and drought observe the Convention through the development and implementation of National Action Programmes, as well as regional and sub-regional action programmes. According to the Convention, these programmes must adopt a democratic, bottom-up approach that permits local people to overturn land degradation by themselves. Governments in countries affected by desertification, land degradation and drought have to create favourable conditions, through politically sensitive changes, with the purpose that programmes would be put into practice.[135]

The Convention is managed by the Conference of Parties (COP): it was established by the Convention as the supreme decision-making body; it is responsible for reviewing the implementation of the Convention. It meets every two years and is made up of national governments that have ratified the Convention as well as regional economic integration organisations, such as the European Union. One of the main functions of the COP is to review reports submitted by the Parties detailing how they are carrying out their commitments; the COP makes recommendations on the basis of these reports. It also has the power to make amendments to the Convention or to adopt new annexes. In this way, the COP can guide the Convention as global circumstances and national needs change.[136]

At UNCCD COP13, that took place in September 2017 in Ordos (China), the countries have adopted a new global agreement to fight land degradation: they decided to implement the UNCCD 2018−2030 Strategic Framework. It is the most complete global commitment to

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[134] UNCCD, *United Nations Convention to Combat Desertification in those countries experiencing serious drought and/or desertification, particularly in Africa,* Paris, 1994, p. 5

[135] Catherine Bowyer, Sirini Withana, Ian Fenn, Samuela Bassi, Megan Lewis, Tamsin Cooper, Patricia Benito, Shailendra Mudgal, *Land Degradation and Desertification,* Brussels, 2009, p. 49

[136] Catherine Bowyer, Sirini Withana, Ian Fenn, Samuela Bassi, Megan Lewis, Tamsin Cooper, Patricia Benito, Shailendra Mudgal, *Land Degradation and Desertification*, p. 50

reach Land Degradation Neutrality (LDN), which has been defined as follows by the Parties of UNCCD:

> "a state whereby the amount and quality of land resources, necessary to support ecosystem functions and services and enhance food security, remains stable or increases within specified temporal and spatial scales and ecosystems."[137]

It has to be achieved in order to restore the productivity of vast areas of degraded land, to enhance the livelihoods of more than 1.3 billion people, and to reduce the impacts of drought on vulnerable populations.[138] Precisely, the vision expressed in the official document is:

> "a future that avoids, minimizes, and reverses desertification/land degradation and mitigates the effects of drought in affected areas at all levels and strive to achieve a land degradation-neutral world consistent with the 2030 Agenda for Sustainable Development, within the scope of the Convention."[139]

The UNCCD 2018-2030 Strategic Framework has five strategic objectives:

1. "To improve the condition of affected ecosystems, combat desertification/land degradation, promote sustainable land management and contribute to land degradation neutrality; expected impacts are: to maintain or enhance land productivity and related ecosystems services, to reduce the vulnerability of affected ecosystems and the resilience of ecosystems, to set and adopt national voluntary land degradation neutrality targets by countries wishing to do and so, to share, promote and implement measures for sustainable land management and the combating of desertification/land degradation;
2. To improve the living conditions of affected populations; expected impacts are: to improve food security and enhance access to water for people in affected areas, to improve and diversify the livelihoods of people in affected areas, to empower local people especially women and youth making them participate in decision-making processes, to reduce migration forced by desertification and land degradation;

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[137] UNCCD, *Land Degradation Neutrality*
http://www2.unccd.int/issues/land-sdgs/land-degradation-neutrality
[138] UNCCD, *UNCCD COP13, Ordos, China*
http://www2.unccd.int/convention/conference-parties-cop/unccd-cop13-ordos-china
[139] UNCCD, *2030 Agenda for Sustainable Development: implications for the United Nations Convention to Combat Desertification - The future strategic framework of the Convention,* Ordos, 2017, p. 3

3. To mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems; expected impacts are: to reduce ecosystems' vulnerability to drought and to increase communities' resilience to drought;
4. To generate global environmental benefits through effective implementation of the UNCCD; expected impacts are: to contribute to the conservation and sustainable use of biodiversity and to address climate change through sustainable land management and the combating of desertification/land degradation, to enhance synergies with other multilateral environmental agreements and processes;
5. To mobilize substantial and additional financial and non-financial resources to support the implementation of the Convention by building effective partnerships at global and national level; expected impacts are: to mobilize and make available adequate and timely public and private financial resources, to provide international support for implementing effective and targeted capacity-building and "on-the-ground interventions" in affected country Parties to support the implementation of the Convention, to implement extensive efforts to promote technology transfer, especially on favourable terms, and to mobilize other non-financial resources."[140]

Actions at national or subregional levels, supported by UNCCD institutions, are the primary mean through which the Strategy will be implemented. Parties are the responsible agents for the implementation of The Strategy, including through their national action programmes, and they have to guide fulfillment in accordance with their national priorities and in a spirit of international solidarity and partnership. Through this Strategy and in accordance with their obligations as stated in the Convention, Parties aim to: "develop, implement, revise and regularly monitor national, subregional and regional action programmes and/or plans as effective tools for UNCCD implementation; establish policies and enabling environments for promoting and implementing solutions to combat desertification/land degradation and mitigate the effects of drought; implement sustainable land management practices; establish systems for sharing information and

[140] UNCCD, *2030 Agenda for Sustainable Development: implications for the United Nations Convention to Combat Desertification - The future strategic framework of the Convention,* Ordos, 2017, p. 3 - 4

knowledge and facilitate networking on best practices and approaches to drought management."[141]

If this is the new project to aim for in the future, there is also an ongoing one that was establish in COP8 that took place in Madrid in September 2007. It is the Ten-year strategic plan and framework to enhance the implementation of the Convention for 2008-2018 (The Strategy). It aims to create a global partnership to reverse and prevent desertification and land degradation and to mitigate the effects of drought in order to support poverty reduction and environmental sustainability.[142] Its mission is to provide a global framework to support the development and implementation of national and regional policies, programmes and measures, raising public awareness, standard setting, advocacy and resource mobilisation.[143] The Strategy sets four long-term strategic objectives with their related expected impacts that are the effects intended by the strategic objectives. These objectives are:

1. "To improve the living conditions of affected populations; expected impacts are: to improve and diversify livelihood base and to benefit from income generated from sustainable land management; to reduce affected populations' socio-economic and environmental vulnerability to climate change, climate variability and drought;
2. To improve the condition of affected ecosystems; expected impacts are: to enhance land productivity and other ecosystem goods and services in affected areas in a sustainable manner; to reduce the vulnerability of affected ecosystems to climate change, climate variability and drought;
3. To generate global benefits through effective implementation of the UNCCD; expected impacts are: to contribute to the conservation and sustainable use of biodiversity and the mitigation of climate change through sustainable land management and combating desertification/land degradation;
4. To mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors; expected impacts are: to make available increased financial, technical and technological

[141] UNCCD, *2030 Agenda for Sustainable Development: implications for the United Nations Convention to Combat Desertification - The future strategic framework of the Convention,* Ordos, 2017, p. 5 - 6
[142] UNCCD, *Ten-year strategic plan and framework to enhance the implementation of the Convention (2008–2018),* Madrid, 2007, p. 9
[143] UNCCD, *Ten-year strategic plan*, p. 11

resources to affected developing country Parties to implement the Convention; to improve enabling policy environments for UNCCD implementation at all levels."[144]

The Parties of the UNCCD are requested to implement the Strategy and align their action programmes to its objectives according to their national priorities and in a spirit of international solidarity and collaboration. In particular, affected developing country Parties are urged to update their action programmes and other relevant implementation activities related to the Convention, with The Strategy.

The UNCCD Secretariat is also committed in the UN Decade for Deserts and the Fight against Desertification. This project began in January 2010 and it will end in December 2020. Its aim is to promote actions that will protect the dry-lands. The Decade is viewed as an opportunity to make critical changes to secure the long-term ability of dry-lands to provide value for humanity's well being. The Decade has three objectives:

1. "Raising awareness of the causes of and solutions to ongoing land degradation and desertification in the framework of a ten-year strategic plan and framework to enhance implementation of the Convention for 2008-2018 (The Strategy);
2. Mobilizing financial and technical support to sustain special initiatives with the purpose to observe the Decade;
3. Monitoring and reporting on progress."[145]

The European Union participates in the UNCCD. It ratified the United Nations Convention to Combat Desertification on 26 March 1998. The Convention came into force in the EU on 24 June 1998. As a party to the Convention, the EU supports the implementation of the UNCCD through dialogue, bilateral development cooperation assistance at the national and regional level, and support for programmes in affected countries that seek to combat desertification and mitigate the effects of drought. All EU Member States (with the exception of Estonia) are Parties to the UNCCD. Several EU Member States in Central and Eastern Europe and the Northern Mediterranean are considered to be "affected" by drought and/or desertification. Under the measures of the Convention, affected countries are obliged to:

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[144] UNCCD, *Ten-year strategic plan and framework to enhance the implementation of the Convention (2008–2018),* Madrid, 2007, p. 9 - 10

[145] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 13

- prioritise efforts to combat desertification and mitigate the effects of drought, allocating adequate resources to this purpose;
- establish appropriate strategies and priorities within the framework of national sustainable development plans/policies to combat desertification and mitigate the effects of drought;
- create an enabling environment by strengthening relevant existing legislation, adopting new laws and establishing long-term policies and action programmes.

Affected countries are also required to prepare national action programmes, and where appropriate sub-regional, regional and joint action programmes, which outline practical measures to combat desertification and mitigate the effects of drought.

All other EU Member States that are Parties to the Convention, have obligations to provide financial resources and other support for the plans and strategies of affected developing countries, particularly those in Africa, and least developed countries, to combat desertification and mitigate the effects of drought; promote the mobilisation of new and additional funding and resources; facilitate access to appropriate technology and knowledge by affected countries; and to report regularly on their activities as donor countries. The EU formally approves the Convention and recognises that desertification is a major environmental problem, but it states that it has adopted measures in areas governed by the Convention and that environmental, development cooperation, and research policies of the community contribute to the objectives of the Convention.[146]

Given that affected countries have been pushed for drawing up National Action Plans, they took action in this sense. Measures to cope with the problem included reforestation, establishment of shelter or green belts, protection of existing forest reserves, soil and water conservation measures. However, many of the national and regional action programmes have been hampered by lack of political will or poor financial resources.[147]

Within the National Action Programmes of EU Member States there is no defined structure for a NAP, which means that important details may be omitted. The priority areas identified by each country differs, reflecting varying national circumstances on a geographical basis and the capacity with which they can respond to address the causes and effects of

[146] Catherine Bowyer, Sirini Withana, Ian Fenn, Samuela Bassi, Megan Lewis, Tamsin Cooper, Patricia Benito, Shailendra Mudgal, *Land Degradation and Desertification,* Brussels, 2009, p. 56 - 57

[147] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 19

desertification and land degradation. The NAPs also differ in their success in terms of facilitating the fulfillment of the Convention, which varies according to the level of detail provided for established measures to combat desertification, for the proposed institutional framework, and for the implementation/monitoring mechanisms drawn up. The difficulty to implement NAPs is largely a result of the limited participatory process in the preparation of NAPs and structural changes in certain countries in the region. In terms of the EU's approach to implementation of the Convention, this is largely focused on EU actions in third countries. Little attention is afforded at this level to the problems facing a number of EU Member States concerning desertification and land degradation within their national territories.[148]

Also African countries are contracting parties to the UNCCD and are engaged in various activities and making progress in meeting their obligations in implementing the Convention. They are developing and implementing their National Action Programmes to combat desertification, which are created through highly participatory processes. NAPs are conceived as general strategies for specific land and drought-related problems; they also serve as important tools in guiding the implementation, donor coordination and monitoring of efforts in combating desertification and poverty reduction.

As said, implementation of NAPs has started in some African states, but, in many countries, limited progress has been made in fulfilling them. Factors identified by many countries as impediments to NAP implementation include capacity and resource constraints, as well as lack of systematic integration of desertification control plans into planning and budgetary frameworks at various levels.[149]

As noted both in the case for the EU and for African countries, difficulties has been met in the implementation of NAPs. The cause for this is attributed also to the little importance given to local authorities in participating to project planning.

It has been realized, on the part of the UNCCD, that traditional solutions adopted against the effects of desertification have too often been excessively "top-down" in their approach. Traditionally, the planning process for implementation of national and regional action programmes started with the definition of objectives, activities, and expected outputs.

[148] Catherine Bowyer, Sirini Withana, Ian Fenn, Samuela Bassi, Megan Lewis, Tamsin Cooper, Patricia Benito, Shailendra Mudgal, *Land Degradation and Desertification,* Brussels, 2009, p. 59

[149] United Nations Economic and Social Council, *Africa Review Report on Drought and Desertification,* Ethiopia, 2007, p. 16 - 17

After that, it continued with a visit to the concerned area to consult local authorities, inform them of the plan, and invite the community to help in executing projects. The problem with this method was that it was carried out by experts belonging to the international organization but not coming from the place to which the project would have applied. For this reason, the UNCCD now proposes to reverse this approach, hghlighting the importance of local participation to the process due to the recognition of relevance of authorities of the place. Currently, it is suggested to draw action programmes to combat desertification up from the local level and to be base them on genuine local participation. This is because the key factor to implement this programmes is a shared ownership of planned initiatives.

The increased focus on local participation in project planning is considered to be so important because previous attempts to combat desertification, usually coordinated by international organizations, failed to take into account the views, perceptions and capacities of local people. Consequently, they were usually unsuccessful. Indeed, despite their wide competence, outside experts could not be able to identify local needs and priorities, or to found effective solutions to them. Local communities, on the other hand, know and appreciate in a special way their own environment. Thus, local communities have rights over their resources and participatory development grants them the opportunity to enhance agricultural productivity and to ensure the long-term ecological balance of their fragile lands. In addition, local participation in planning and decision-making is useful to make local capacity better.

Clarified the obstacles to the implementation of NAPs, it is now easier to determine who should participate to decision-making processes and in what way.

First of all, active participants to the process have to be the figures that are directly involved in the management, use and benefits of a particular resource. Concerning desertification, those figures include small farmers, breeders and other local land users because they are in close contact with the land and the main users. Also local leaders, such as village elders and representatives of community groups, and local authorities have to be involved in the process. It shouldn't be forgotten that the contribution of technical experts, researchers, non-governmental organizations (NGOs) and voluntary associations is helpful to better create projects.

Secondly, the local level has to participate peremptorily at the development of the initiatives, establishing the objectives and activities. During the implementation of the programme, regular reports on progress and eventual obstacles should be handed in. Every time that a phase of the project ends, the local level should be involved in the process of evaluation of the results and it should also participate to the agreement of the successive objectives. Sometimes, it would be useful if the central government gives more possibilities to decide to decentralized authorities, given that they are closer to local level which is the direct user of land.

Thirdly, the civil society should be willing and present because the decision-making process requires a lot of time and effort, and then it may be further adapted and strengthen. The community has to learn to use in the best way the resources it receives with the purpose of benefitting from them as much as possible. National Action Programmes have to be promoted through awareness campaigns and people should be informed about the projects.

Fourthly, decisions taken at local level, which result from both informal discussions or organized meeting, should be communicated to provincial and regional level. This allows regions to manage in the best way possible cooperation and coordination between different villages. Successively, the results of those meetings should be submitted to the central government that transforms them into a National Action Programme. In addition, the national government provide an "enabling environment" in order to make aspirations of local level real. It should, therefore, provide a legislative framework, public infrastructure and technical assistance that favour the implementation of programmes. It is also responsible for the management of foreign aids.

In theory, with this type of process, a continuous exchange of ideas, information and decisions is expected among all the different participating levels. Thus, the best method to fight desertification is to apply a bottom-up approach. It disposes the participation and collaboration among local people, national authorities and the international community.[150]

Concluding, UNCCD is the only internationally binding framework that directly copes with desertification. The parties that ratified the Convention have to implement it following the

[150] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 19

instructions given in the Annexes of the Convention text. The world has been divided in five regions (Africa, Asia, Latin America and the Caribbean, Northern Mediterranean and Central and Eastern Europe) and each of them have their own regulations on how to develop and implement action programmes. In the Conference of Parties sessions, strategic plans are drawn up and the parties are urged to align their action plans according to these objectives. The problem with National Action Plan is that they have always been developed in a top-down way, thus they are too theoretical but not practical enough; now, having understood the mistake, NAPs are drawn up in a bottom-up way involving also local communities. This has also been the obstacle in implementing actions plans in EU member states and in Africa. EU as a single party of the UNCCD is more committed in helping developing countries than in focusing on its own member states facing desertification.

2.7 Other players that deal with desertification

Other, but not less important, players that cope with desertification are:

- The Community of Sahel-Saharan States (CEN-SAD): the Community of Sahel-Saharan States was instituted with the purpose to support an effective fight against desertification in the region.[151]
- The Sahara and Sahel Observatory (OSS): it is an international and intergovernmental organization established in Tunis in 1992. OSS specializes in environmental monitoring and natural resource management, with a focus on land and water. The organization operates in Africa's Sahel-Sahara region. Key themes in the organization's work are aligned with the challenges facing this vulnerable region: land degradation, desertification and drought, water stress and the impacts of climate change on ecosystems and populations. From the outset, the OSS Environment programme sought to support the implementation of the United Nations Conference to Combat Desertification in OSS member countries by strengthening national systems of environmental observation and monitoring-evaluation.[152] Its experience in, and support for implementation of the UNCCD have been lasting since more than ten years in serving the region, its sub-regions and

[151] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 13
[152] OSS, *OSS at glance,* Tunis, 2017, p. 1

their states. It has developed a regional programme to combat desertification, aiming at strengthening cooperation and sustainable development.[153] One of the projects, concerning desertification, that OSS implements is the MENA-DELP: Middle East and North Africa Desert and Ecosystems Livelihoods Programme. OSS deals with the Desert Ecosystems and Livelihoods Knowledge Sharing and Coordination of the regional project. The MENA-DELP project aims at a better understanding of the linkages between desert ecosystem services and desert livelihoods for an informed decision-making, mainly through: enhanced knowledge of the linkages, improved knowledge-sharing systems on questions related to desert ecosystem and livelihoods, improved networks and information flows on desert ecosystems at the national and international level.[154]

- United Nations Food and Agricultural Organisation (FAO): given that this organization deals with nutrition and agriculture, it monitors desertification and drought processes with a dietary purpose. Furthermore, it collects information on food, agriculture and fishery sectors. In areas affected by desertification, FAO researches focus on natural resources, their potential and vulnerability and their state of degradation or conservation. Also covered are the social and economic conditions, particularly nutrition, linked to the use of these natural resources by the various sectors.[155] Among its commitments, FAO implements the Action Against Desertification, an initiative that supports national UNCCD action plans to promote sustainable land management and restore dry lands and degraded lands. Action Against Desertification aims to strengthen the resilience of people and natural systems by helping local communities in the sustainable management and use of forests, rangelands and other natural resources in dry lands. The initiative has three main objectives: improve the living conditions of populations in the arid zones and reduce their vulnerability to climate change, improve the state and health of ecosystems in the arid zones and their resilience to climate change, mobilize

[153] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 14
[154] OSS, *Desert Ecosystems and Livelihoods Knowledge Sharing and Coordination project (MENA-DELP)* http://www.oss-online.org/en/mena-delp
[155] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, p. 14

resources through the establishment of partnerships between national, regional and international stakeholders.[156] Areas of intervention include: sustainable management of natural resources, sustainable rural production systems, sustainable production, processing and marketing, stimulation of job creation and offer income generation activities, knowledge exchange.[157] Moreover, FAO developed a methodology for evaluating and mapping desertification. this enabled it to prepare some maps showing the extension and level of desertification in the world. Regional maps were drawn for sub-Saharan Africa and for the Middle East region.

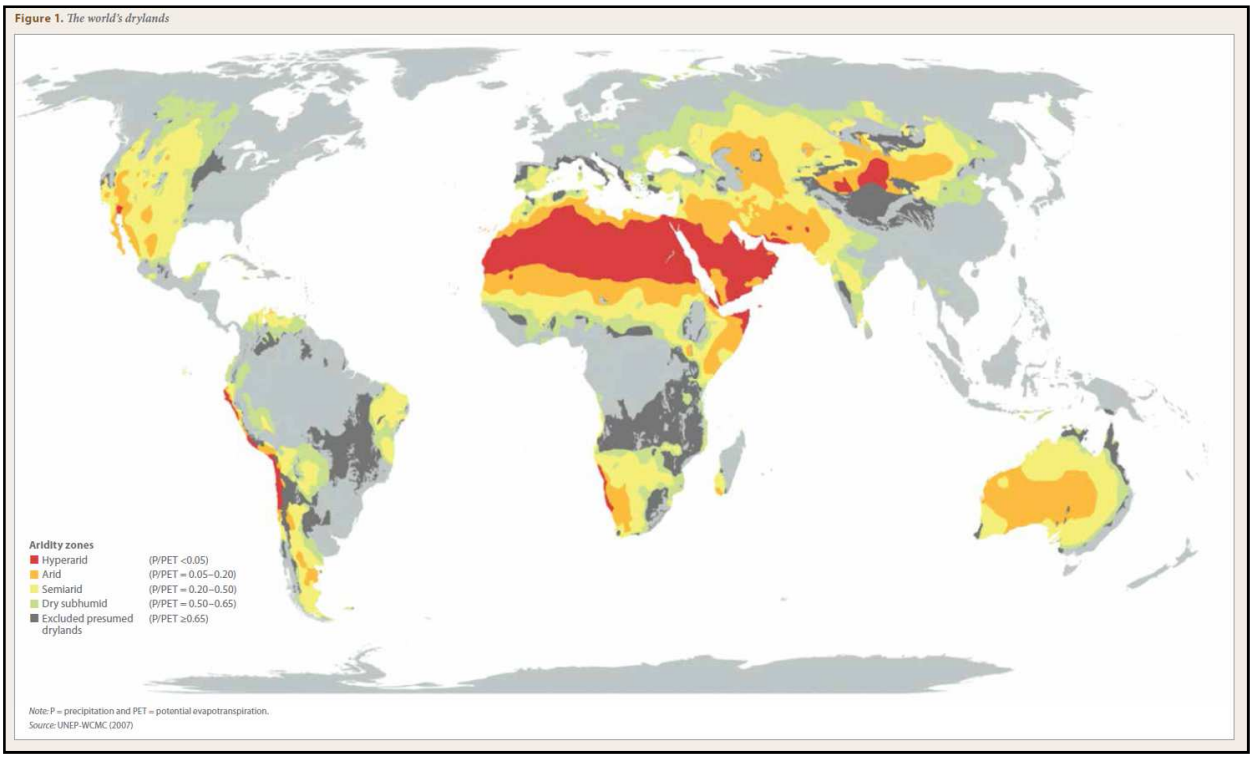

Figure 13: The world's drylands
Source: FAO, *Trees, forests and land use in drylands – The first global assessment,* Rome, 2016, p. 4 - 5

[156] FAO, *Action Against Desertification – Objectives*
http://www.fao.org/in-action/action-against-desertification/background/objectives/en/
[157] FAO, *Action Against Desertification – Activities*
http://www.fao.org/in-action/action-against-desertification/activities/en/

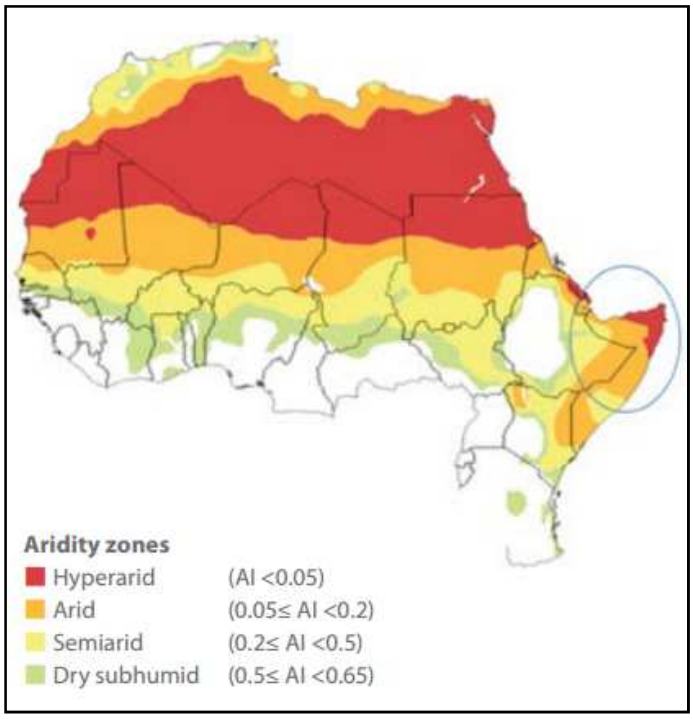

Figure 14: Aridity level in North Africa

Source: FAO, *Trees, forests and land use in drylands – The first global assessment,* Rome, 2016, p. 8

FAO has developed, together with UNEP, projects of monitoring and evaluation of the evolution of pastoral and ecological ecosystems in various parts of the Mediterranean.[158]

- Global Mechanism (GM): the Global Mechanism of the United Nations Convention to Combat Desertification (UNCCD is a subsidiary body of the Convention and was established in 1997. According to article 21 of the UNCCD, it has the task of "increasing the effectiveness and efficiency of existing financial mechanisms […] and promoting actions leading to the mobilization and channelling of substantial financial resources to affected developing country Parties".[159] The GM works with country Parties in mobilizing financial resources, harmonizing and aligning the emerging practices within the international community of with national development priorities, in the context of national budgeting processes.[160] It also

[158] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 14
[159] UNCCD, *United Nations Convention to Combat Desertification in those countries experiencing serious drought and/or desertification, particularly in Africa,* Paris, 1994, p. 19
[160] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, p. 14

identifies and draws up an inventory of relevant bilateral and multilateral cooperation programmes that are available to implement the Convention and provides interested Parties and relevant intergovernmental and nongovernmental organizations with information on available sources of funds and on funding patterns in order to facilitate coordination among them.[161]

- International Fund For Agricultural Development (IFAD): it is a specialized agency of the United Nations, established as an international financial institution in 1977; it aims at helping the rural poor to defeat poverty. For this reason, its mission is connected to the fight of land degradation. IFAD invests also in programmes, grants and policy initiatives related to desertification. Indeed, over the past 25 years, IFAD has committed over 3.5 billion US dollars to supporting dry-land development and combating land degradation worldwide, with a large share of this devoted to the MENA region in particular.[162] Moreover, in 2001, IFAD became an executing agency of the Global Environment Facility (GEF). This was in recognition of its proven expertise in rural sustainable development, integrated natural resource management, sustainable land management and its role in implementing the UNCCD.[163]
- World Bank Partnership on Combating Desertification (WBPCD): the WBPCD is financed by the World Bank to create suitable environments to implement the Convention to Combat Desertification in developing countries affected by desertification. To support UNCCD in the specific region of Middle East and North Africa, the World Bank supported the Collaboration to Control Natural Resource Degradation of Arid Lands in the Middle East (Desertification Initiative). The initiative provided a vehicle for collaboration in addressing problems common to the states of the region. Its objective was to contribute to the control of natural resource degradation and, where applicable, to restore the productivity of arid lands. The emphasis of the initiative was on collaborative networking for

[161] UNCCD, *United Nations Convention to Combat Desertification in those countries experiencing serious drought and/or desertification, particularly in Africa,* Paris, 1994, p. 19
[162] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 15
[163] IFAD, *Tackling land degradation and desertification https://www.ifad.org/topic/resource/tags/desertification/2085419*

dissemination of best practices and institutional capacity building for human resources development. The objectives of the Desertification Initiative were to be achieved through technology sharing, application of research, provision of training, and identification of investment priorities.[164] Moreover, more generally, the partnership supports the Secretariat of the United Nations Convention to Combat Desertification, Global Mechanism, International Fund for Agricultural Development (IFAD), United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), Food and Agriculture Organization (FAO) of the United Nations, sub- regional organizations, and countries in their activities to combat desertification. Specific partnership activities include: development and undertaking of awareness and advocacy actions in the context of the Convention to Combat Desertification; the establishment, implementation and maintenance of the Financial Information Engine on Land Degradation (FIELD) system for searching, collecting, and spreading financial information related to land degradation; resource mobilization from bilateral donors, the UN system, multilateral financial institutions, regional and sub-regional financial mechanisms, and non-governmental organizations, foundations and other private sector entities; and making these available to affected countries; contributing to National Action Programmes (NAPs) in affected countries by financing actions designed to combat desertification and/or mitigate the effects of drought; and support of community based activities that will lead to effective measures aimed at combating land degradation.[165]

To sum up, desertification is a complex phenomenon made up of several anthropogenic and natural causes and many consequences involving both nature and human beings. What is fundamental is that desertification and climate change are strictly related: extreme events caused by climate change exacerbate desertification and, conversely, some aspects of desertification contribute to climate change. The Mediterranean area is experiencing desertification, particularly in its southern side, and many institutions are dealing with it. The most important, at international level, is UNCCD to which EU and many countries of the

[164] World Bank, *Desertification – Implementing the Convention, A World Bank view,* Washington, 1994, p. 17
[165] Aston Centre for Europe, *The relationship between desertification and climate change in the Mediterranean*, Birmingham, 2011, p. 16

Mediterranean region participate. At regional level, EU and the Union for the Mediterranean are committed to fight desertification. Much effort is being made but, sometimes, is indirect or not accurately enough managed, such as for the case of NAPs. More attention should be paid when developing and implementing plans. In addition, given that desertification is related to other fundamental difficulties, such as poverty, underdevelopment and lack of food security, the fight against desertification has to be simultaneous to the fight against poverty and to the guarantee of the basic needs of rural people. Reversing the processes of land degradation and protecting soil, water and biological resources would help to mitigate desertification. For this purpose, governments should promote sustainable socio-economic development in order to eradicate poverty and ensure food and energy security, as well as the improvement of living conditions and the wider natural environment. Therefore, fighting desertification is a very complex issue, involving organization and cooperation. Great effort is being put to cope with this critical situation, but more commitment is needed in all fronts to reverse these conditions.

CHAPTER 3

3. The open issue of environmental refugees

3.1 Summary of the environment-migration link

As already explained in chapter one, population displacement due to degraded ecosystem and climate change is a phenomenon that has always been repeating in the history of humankind. The difference between the past and the present is that, nowadays, environmental change caused by human activity is so fast and intense that turns out to be unpredictable, as demonstrated by the sudden natural disasters. It is evident that ecosystem degradation has and will have impacts on human societies and among the alternatives to face them there is the one of migration, especially when adaption is not possible any longer.

In this context, scientists agree on stating that, even if the direct link between environmental change and migration is difficult to identify, the former influences the drivers of migration. There is growing consensus on the multiple and overlapping causes and motivations in migration flows which is increasingly supported by empirical evidence. The different types of environmental migration hardly ever have only one single cause. Environmental degradation normally affects and is linked to other factors such as social and economic exclusion, poverty and inequitable distribution of resources, land issues, demographic developments, institutional constraints, inter-group tensions and conflict in countries of origin as well as several factors in countries of destination. Precisely because environmental migration is multi-causal and connected with other factors, sometimes, climate change and the consequent environmental degradation are underestimated as affecting elements, but, actually, they influence the drivers of migration. Therefore, environmental migration includes all movements, which are mainly driven by an environmental factor, irrespective of whether these movements cross international borders or remain inside the country, whether they are of a voluntary or forced nature, or a combination of both categories.

The understanding of the complex relationship between environmental change and migration also requires taking human agency into consideration. People have not the same access to resources which are necessary to adapt to environmental change that can be described in terms of vulnerability or adaptive capacity. The occurrence of migration

therefore depends on the ways in which population affected by adverse environmental changes are able to respond and adapt. The identification of the regions likely to be affected by climate change, hence, does not imply that migration will necessarily occur in these geographical zones.

Moreover, climate change is also likely to impact differently on different social groups. In particular, as a result of the fact that migration is a social process which is inherently gendered, climate and environmental change will generate different migratory experiences and impacts for women and men. First of all, women in their social location as care-givers may have different attitudes in respect to dealing with environmental degradation and environmental disasters which may influence the household's decision for instance for earlier evacuation.

Women are also increasingly migrating on their own due to shifts in the global labour demands and the cultural expectation that women are particular suitable for domestic employment opportunities. Therefore, women are increasingly carrying the burden of their households. The migration of women can also have emancipating effects due to increased wage-earning potential and personal autonomy. But the out-migration of women does not necessarily translate into more egalitarian household divisions of labour and can even reinforce patriarchal gender relations.

The migration decision of women is also influenced by cultural norms and/or the life and family cycle. The obligations women may have towards parents and children can be a barrier of migration. The impact of women's out-migration on other women, in the household or in the extended family is also an area which is not yet well explored.

But women are also affected by environmentally induced migration when they are not migrating themselves. Male out-migration often results in increased workloads for the women left behind. The increased reliance on male-migrant incomes can also have negative effects on female empowerment.

In general, the impacts of migration on gendered roles vary by household characteristics, cultural setting and the migrant experience and therefore have to be assessed on a case to case basis. The gender differentiated impact of climate and environmental change on the migration propensity is not specific for environmental factor and should therefore be seen in relation to other reasons for migration.

The access to financial resources is also a core variable in the construction of vulnerability as this determines the ability to migrate. In many cases climate change affects disproportionally poor agricultural communities which have not the financial means to leave their home or resources may further decline due to climate and environmental change which may result in a decreasing number of people having the ability to migrate. As these remarks show, the impacts of climate change on migration vary widely according to the context which illustrates the importance of embedding studies in the social and cultural context.

However, climate change and environmental factors can exacerbate migration pressure and it is very likely that extreme weather events, slow-onset environmental degradation and sea-level rise will contribute to an increased level of mobility and to changing migration patterns.[166]

In the COP 16 of United Nations Framework Convention on Climate Change held in Cancun in November 2010, it has been explicitly recognized the link between climate change and migration. Indeed, in the report, Parties are invited to undertake:

> "measures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at the national, regional and international levels".[167]

3.2 Who are environmental refugees?

Although almost all the international community identifies the connection between climate change and migration, there is still no agreement on a precise definition of environmental refugee.

In 1970, in the pages of the scientific peer-review academic journal "Science", the American environmentalist and founder of the WorldWatch Institute Lester Brown used for the first time the expression environmental refugees, but there is no agreement on an univocal definition.[168] When the term "environmental refugees" was first introduced in the 1970s

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[166] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 17 - 18

[167] UNFCCC, *Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010 - Part Two: Action taken by the Conference of the Parties at its sixteenth session,* Geneva, 2011, p. 5

[168] Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali: cambiamento climatico e migrazioni forzate,* Rome, 2013, p. 15

experts were divided in their characterization of the phenomenon and generally fell into two groups:

- The alarmists who see environment as the direct cause of population movements and predict that hundreds of millions will be affected;
- The skeptics who are questioning the simplified models used to generate these estimates.

Natural scientist dealing with climate change have tended to join the alarmist group and have used the notion of "environmental refugees" to push for increased efforts for environmental protection, while migration experts have tended to join the skeptics' side, amongst others to avoid a potential repercussion against migrants in general. Although there are no shared experts opinions about environmental migration, alarmist predictions are a way to catch the public attention. Nonetheless, both migration specialists and environmental scientists express their observations: migration experts consider also the function of environment when they study migration dynamics, while environmental scientists treat more carefully the statistics about the amount of potentially affected people.[169]

Despite the recently increasing interest of migration experts in environmental migration the links between environmental conditions and migration is not completely new.

In the 1980s, the UN Environment Programme (UNEP) researcher Essam el-Hinnawi defined environmental refugees as:

> "…those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life".[170]

El-Hinnawi distinguished three types of refugees:

1. Persons leaving temporarily because of environmental stresses due to both natural disasters and damages provoked by man that successively could go back to the those places to begin the reconstruction;

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[169] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 16 - 17

[170] WorldWatch Institute, *Environment a Growing Driver in Displacement of People http://www.worldwatch.org/node/5888#notes*

2. Persons leaving permanently and reallocated in other areas; this type of migrants suffer the effects of disasters caused by development projects (such as dams) and natural disasters;
3. Persons leaving provisionally or permanently because natural resources, due to land degradation, can't feed them.[171]

During the last twenty years, the use of the term "environmental refugee", in the sense hereby intended, has been criticized. For instance, professor Gaim Kibreab, in 1997, stated that the term has been invented to depoliticize the causes of migration, allowing to the countries to avoid the duty of granting asylum. International laws does not oblige countries to grant asylum to refugees for environmental reasons, so, because of this, many tend to adduce these reasons to exclude them from asylum. Others amplified the definition emphasizing that the decision to move is imposed by external forces. This definition introduces the consideration that it is not climate change by itself to force people to migrate, but it is its effects that worsen human life conditions and lead individuals to move.[172]

In 1990s the English environmentalist Norman Myers, considered one of the most influential experts of the subject, defined environmental refugees as:

> "people who can no longer gain a secure livelihood in their traditional homelands because of environmental factors of unusual scope, notably drought, desertification, deforestation, soil erosion, water shortages and climate change, also natural disasters such as cyclones , storm surges and floods. In face of these environmental threats, people feel they have no alternative but to seek sustenance elsewhere, whether within their own countries or beyond and whether on a semi-permanent or permanent basis".[173]

To these environmental problems listed in the definition, it can be added other factors that exacerbate the situation and that, often, derive from environmental issues: demographic growth, poverty, famine and diseases. Due to these problems, people have no alternative

[171] Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali: cambiamento climatico e migrazioni forzate,* Rome, 2013, p. 16
[172] Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali*, p. 16
[173] Norman Myers, Jennifer Kent, *Environmental Exodus – An Emergent Crisis in the Global Arena,* Washington, 1995, p. 18

but to seek sustenance in other place, both in their country and in other countries, and both permanently and semi-permanently.[174]

The problem with the terminology has been faced also by many organisations such as UNHCR, IOM or OECD as well as by several migration researchers. For instance, the United Nations High Commissioner for Refugees (UNHCR) asserts that the use of these terms (environmental refugees or climate refugees) is not correct because they don't find support in international refugee law.[175] In 2007, UNHCR adopted a definition that excluded the use of the term "refugee". It talks about individuals who are force their traditional residence because their sustenance means has been put at risk by environmental degradation processes, irreversible ecological damages and climate change. The Institute for Environment and Human Security (UNU-EHS) successively distinguished between migrants forced by environmental factors and pushed by environmental factors, depending on whether they have suffered a traumatic event or they have chosen to move for the need to enhance their lives.[176]

The International Organsation for Migration, in its 2008 report dealing with migration and climate change, defines environmental migrants as follows:

> "persons or groups of persons who, for compelling reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad".[177]

According to the Organisation for Economic Cooperation and Development (OSCE), environmental refugees are persons forced to migrate due to environmental reasons, degradation, disappearing lands where they live or environmental disasters. This definition excludes the temporary abandonment of lands.[178]

Researchers of the Institute for Environment and Human Security (UNU-EHS) have written an article in 2011 where they divide environmentally induced migrants in categories. The distinction lists three groups:

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[174] Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali: cambiamento climatico e migrazioni forzate,* Rome, 2013, p. 17

[175] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 28

[176] Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali*, p. 17

[177] IOM, *Climate Change and Migration: Improving Methodologies to Estimate Flows,* Geneva, 2008, p. 31

[178] Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali*, p. 17

1. Environmental emergency migrants;
2. Environmentally forced migrants;
3. Environmentally motivated migrants.

"Environmental emergency migrants" are people who have to move because of the rapidity of an environmental event in order to save their lives. Environmental factors are therefore the main motivation for displacement while other factors are less important. Examples of those rapid disasters are hurricanes, tsunamis or earthquakes. In most of the cases affected people remain within their country but the category of environmental emergency migrants should also apply to people who move across borders.

"Environmentally forced migrants" are people that have to leave their place of original residence with a slower rapidity than that of environmental emergency migrants. In some cases the affected people may not have the opportunity to go back to their place of origin due to the loss of their land through extreme degradation of soil or sea-level rise. Since socio-economic factors also play a role it might be difficult to distinguish between environmental and socio-economic factors.

"Environmentally motivated migrants" is the third category involving people who leave a constantly deteriorating environment to prevent the worst effects. Migration is, in this case, not the last option or a response to an emergency. Socio-economic factors may play a dominant role and migration appears as a strategy to avoid a worsening of living conditions.[179]

The characteristics of these categories are further explained in the following figure.

[179] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 30

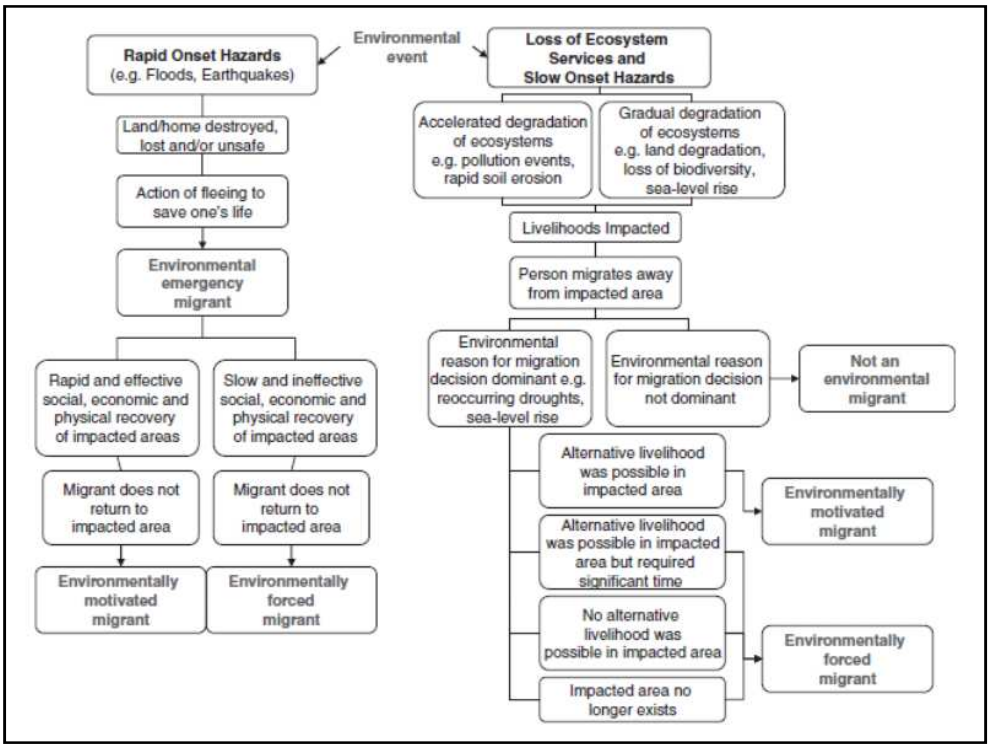

Figure 15: Framework for environmentally induced migration
Source: Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 31

The expressions "environmentally induced population movements" (EIPM) and "environmentally displaced persons" (EDP) are alternatives that designate the environment as the decisive factor for migration, but not as the only one. Those expressions has been criticized for being vague and not attractive enough for the public. The concept of "environmentally displaced persons" was used by the EACH-FOR project, a major research study promoted by the European Community. The term includes three categories: environmental migrants, environmental displacees and development displacees.

- Environmental migrants decide to displace voluntarily from their usual place of residence primarily for environmental concerns or reasons;
- Environmental displacees have no choice but to go away from their usual place of residence. This forced decision is the result of adverse environmental processes and events (they could be natural or human-induced) that threaten people lives, livelihoods and welfare;

- Development displacees designate a category that is intentionally relocated or resettled because land use changes as part of an established plan.[180]

There is no agreed terminology to describe people compelled to move because of climate or environmental change. This is because it is difficult to attribute this movement only to these changing conditions, due to the many drivers affecting migration. In addition, a continuum of processes of movement, that can be voluntary or forced, in relation to environmental drivers, make such a definition hard to determine. Nevertheless, the increasing number of researches on the subject demonstrates how much urgent to come to a shared definition of environmental refugees, juridically recognize this category and provide for an adequate legislative protection at international level.

3.3 Refugees or migrants?

Whether people displaced by climate change should be defined as "climate refugees" or as "climate migrants" is one of the many discussions about the subject. This is not just a matter of semantics: the eventual expression that will be adopted, will have repercussions concerning the obligations of the international community under international law.

The phrases "environmental refugee" or "climate refugee" have been the most used for a long time because they better gave the need for urgency that the issue required. Furthermore, campaigners have stated that the purely literal sense of the words perfectly conveys the message that those people need and look for refuge from the impacts of climate change. They didn't want to use any other terminology because they argue that, in that way, the difficulties of these persons would have been underestimated. Moreover, the word "refugee" could also be accepted by the general public who perceive them as a threat. It also carries fewer negative connotations than "migrant" which tends to imply a voluntary move towards a more attractive lifestyle.

However, the use of the word "refugee" to describe those fleeing from environmental pressures does not fully respect international law. As a matter of fact, the United Nations' 1951 Convention and 1967 Protocol relating to the status of refugees clearly says that the

[180] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 29

term should be applied to those fleeing persecution; and environment is not seen as a persecutor.

There are other problems with the usage of the term “refugee”. First of all, generally, the term refugee refers to a person who cross an international border, while the ones who displace within their own country are defined as “Internally Displaced Persons” (IDPs). Given that the majority of people displaced by climate change tends to stay within the borders of their state, restricting the definition to those who cross international borders may seriously understate the extent of the problem.

Second, in some kinds of environmental changes such as sea-level rise, it is impossible for migrants to go back to their country of origin. The concept of a “refugee” implies the right of return when the persecution in the origin country has ceased. Also for this reason, it is not accurate to use the term refugee in compliance with international law.

Third, the option of broadening the definition of a refugee including environmental stressors as causes of persecution is not widely accepted. There is the concern that it would weaken the available protection for existing categories of refugees and that it would reduce the goodwill to look after them.

The issue of definition causes the beginning of a heated debate amongst international human rights lawyers. The proposal to expand the definition of a refugee is criticized by the international community. Developed countries fear that accepting the term refugee would oblige them to offer the same protections as political refugees. Meanwhile, the international institutions currently charged with providing for refugees, principally the office of the United Nations High Commissioner for Refugees (UNHCR), are already overstretched and are unable to cope with their current amount of refugees. The UNHCR itself is taking on an expanded role in the provision of care to IDPs and so is resistant to any further expansion of its mandate.

Even if the term “climate refugee” is not widely accepted and denotes some restrictions, it is still used, in part, for lack of a good alternative. Other options such as “climate evacuee” implies temporary movement within national borders, while “climate migrant” gives more relevance to the “pull” of the destination more than the “push” of the source country and carries negative connotations which reduce the responsibility of the international community for their welfare.

But the real problem is that, because of the lack of an adequate and shared definition under international law, these migrants are abandoned: no institution is responsible for collecting data on their numbers, they are let alone providing them only with basic services. Given that they are not able to prove their persecution in their country of origin, they are not considered in asylum law. [181]

Finally, if, on one hand, the word “climate migrant” has a negative connotation and the expression “climate refugees” is not the most correct because, actually, they aren’t officially recognized as refugees, how then should we categorize these people? A suggestion could be “environmentally displaced people” that focuses on the cause of displacement and in its involuntary nature, avoiding the reference to the legal status of the displaced person.

3.4 Legal status for environmental refugees

The wide use of the term "refugee" in the definitions proposed in the last twenty years doesn't mean that migrants for environmental reasons have been recognized as refugees by international law with the consequent juridical protection.

Despite the numerous international instruments used to protect the environment, it doesn't exist a legal protection, at international level, adequate for this category of migrants, because environmental reasons for migration are not, until now, recognized by international law. To make protection possible, it is, first of all, necessary to recognize the juridical status of those who are forced to move because of environmental disasters and climate change.

As the researcher Jean Lambert highlights, "by recognizing environmental refugees you recognize the problem; by recognizing the problem you start on the road to accepting responsibility and implementing solutions”.[182] Defining the legal status of the environmental migrant is a hard task because the variables that compose the phenomenon are many and it is often difficult to recognize climate change as a cause of migration.

"Environmental refugee" is the most used term to define environmental migration. From the juridical standpoint, a refugee is a person to whom is recognized the refugee status,

[181] Oil Brown, *Migration and climate change,* Geneva, 2008, p. 13 – 14 – 15

[182] Aurélie Sgro, *Towards recognition of environmental refugees by the European Union* http://www.reseau-terra.eu/article844.html

but, until now, this status is still not recognized to environmental migrants. Complementary forms of protection are provided by some countries to these categories of migrants that are not included in the conventional definition of refugee, but that deserve protection due to treaties that have human rights as object. Complementary protection regimes are subject to national legislations that specify the admissibility criteria, as well as the right and the expectations of the beneficiary of the complementary protection. Those who leave their country due to environmental reasons could obtain, depending on the authorities of the country that host them, humanitarian protection even if they are not recognized.[183]

The juridical status of the refugee is disciplined by the 1951 Geneva Convention Relating to the Status of Refugees. Its article 1 states that:

> "the term refugee shall apply to any person who, owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it."[184]

Differently from migrants, refugees don't have any other choice but flee: they can't go back to their country of origin if not to the detriment of their safety. Hence, the concept of persecution is fundamental in the definition that is based on human rights, as well as on the need of defense from persecution, of assistance and protection. It is clear that environmental migrants are excluded from protection.

According to the Convention, four are the elements that a migrant needs to be qualified as refugee and, therefore, to take advantage of legal protection. These elements are:

1. Find himself or herself outside the borders of his country of origin;
2. His or her country of origin hasn't to be able to offer protection or grant the possibility of return;
3. The cause of migration has to be unavoidable and mandatory;

[183] Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali: cambiamento climatico e migrazioni forzate,* Rome, 2013, p. 18

[184] UNHCR, *Convention and Protocol Relating to the Status of Refugees,* Geneva, 1951, p. 14

4. The cause of migration has to be related to reasons of race, nationality, politic opinion and membership to a social group.[185]

Migrants that do have these characteristics are recognized as refugees according to the Convention, while all the others are considered "voluntary migrants". This latter category is divided in:

- Migrants in orbit: individuals that seek for asylum in a third country, different from the first residency country;
- De facto migrants: persons who are hosted by a country for humanitarian reasons;
- Immigrant: people who migrate for economic reasons and that are not protected by UNHCR because they are not persecuted;
- Environmental migrants: people who flee from environmental disasters and who are only provided with primary assistance for humanitarian reasons by UNHCR.[186]

The traditional term "refugee" as intended in the Geneva Convention is not adequate to define the phenomenon of forced migration in all its expressions anymore. This is due to the various causes that influence this type of migration. Nowadays, it is difficult to link displacement to one single cause due to the many political, social and environmental crisis. Existing dynamics lead to adapt the concept of refugee to new problems concerning environmental transformation. Extending the refugee status to environmental migrants through an expansion of the existing definition is a way suggested by many, but it shows some limits. The absence of displacement beyond borders, the lack of the element of oppression and the possibility to go back to one's country are elements that lead to exclude the recognition of refugee status for environmental migrants. In addition, same countries claim that this extension could weaken the protection system for conventional refugees because elements that increase countries discretion to concede asylum would be introduced. Actually, these limits could be assumed as valid until 1950s, but they don't reflect present needs: who flees from damaged lands is not sure to go back to them because territories could be irreversibly compromised. Concerning persecution, it is true

[185] Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali*, p. 18
[186] Maurizio Gubbiotti, Tiziana Finelli, Francesco Falcone, *Profughi ambientali: cambiamento climatico e migrazioni forzate,* Rome, 2011, p. 9

that desertification and soil erosion don't trap, threat or torture, but they force to escape from a real persecution: hunger.

On the other hand, it can be said that the extension of conventional refugee status to environmental migrants doesn't require the production of new rights, neither the recognition of a new official status. It is only a matter of extending an already existing protection.

The possibility of an ad hoc Statute for environmental refugees has been suggested. It is based on the consideration of obtaining an admissible life quality as a fundamental human right, that has to be defended even in front of environmental disasters. Exactly as the condition of who is escaping from political and religious oppressions is protected, also environmental migrants has to be defended as individuals looking for a better life.

One of the most important points deals with the destination of environmental migrants because it involves completely different legal consequences. Frequently, environmental migrants remain within their country, falling into the "Internally Displaced Persons" (IDPs) category and, in this way, remaining under the protection of their own country. The matter is whether an eventual international Statute would include the protection of this category of migrants without creating interference problems within the internal affairs of any State.

Actual international law has a problem of erga omnes viability of an eventual Convention on environmental migrants: even if this eventual Convention found a wide international consensus and it was ratified by some countries, it would take years before non-signatory countries would subscribe. All this without taking into account the time needed to write a shared text through the phases of negotiation, writing and ratification.

Despite this, it would be a step forward and a specific international juridical instrument that would represent the best guarantee possible for the protection of environmental refugees. This Convention would presumably deal with some fundamental points:

- Formulate a clear definition that takes into account the evolution of the international debate and that is as inclusive as possible, rather than exclusive;
- Recognize that for environmental refugees it does not imply a separation with the country of origin, as for the conventional refugees, but only a temporary inactive relationship with it due to environmental disaster. The host country will have to supply temporary protection and the juridical bond with the country of

origin will be reactivate if the refugee goes back to it, with the automatic loss of the environmental refugees status;

- Distinguish between temporary and definitive environmental refugees and provide regulations also for the latter, for instance through relocalization programmes;
- Choose which type of juridical protection (which type of humanitarian assistance, whether the protection is on international or regional basis, etc)
- Clearly recognize the collective character of the victims of environmental disasters, that will be valid both in the phase of request for protection and in case of loss of their environmental refugees status;
- Choose between the distinction of victims according to different environmental phenomena (earthquake, sea-level rise, etc) or create a unique flexible category with a protection mechanism based on the consequences of event rather than on the causes;
- Impose immigration policies and the duty of non-refoulement (which impedes the rendering of a refugee to his persecutor) and the respect for the dignity principle towards environmental refugees.[187]

3.5 Internally Displaced Persons

The majority of environmental migrants generally moves within national borders, hence excluding them from the protection of the 1951 Geneva Convention, but including them in the wide category of Internal Displaced Persons.

According to the Guiding Principles on Internal Displacement adopted in 1998 by UN Commission for Human Rights, Internally Displaced Persons (IDPs) are:

> "persons or group of persons who have been forced or obliged to flee or to leave their home or places of habitual residence, in particular as a result of or in order to avoid the effects armed conflicts, situations of generalized violence, violation of human rights or natural or human-made disasters, and who have not crossed an internationally recognized State border".[188]

[187] Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali: cambiamento climatico e migrazioni forzate,* Rome, 2013, p. 19

[188] OCHA, *Guiding Principles on Internal Displacement,* Geneva, 2004, p.1

They continue to be citizens of their country and have the same freedom as the rest of the population.

Differently from the refuges, protected by international instruments as the 1951 Geneva Convention or other regional or ONU-specific agencies conventions, similar protection norms or mechanisms do not exist for IDPs. Probably, IDPs should be a matter of internal law but, very often, States do not have the possibility or are not willing to put into practice this duty, and, calling for national sovereignty, impede international actors to act in their place. To solve this problem, UN produced the Guiding Principles on Internal Displacement, that identify the rights and guarantees for the protection of people forced to move, also during the transfer and the eventual return and reintegration. To make these principles effective, governments has to incorporate them in internal law and in policies concerning displaced persons. Nonetheless, a clear protection gap exists also for Internal Displaced People because there are poor legal standards and the status of the Guiding Principles on Internal Displacement is weak due to the non-binding nature of its principles.

The Internal Displacement Monitoring Centre (IDMC), created in 1998 by the Norwegian Refugee Council, is the leader international organization that deals with monitoring the internal displacement of populations worldwide. Through its work, IDMC contributes to improve the capacity of States and international community to protect and assist millions of individuals that had to move from their places of residence because of persecutions or environmental disasters.[189]

According to the Internal Displacement Monitoring Centre, the number of Internally Displaced Persons has increased during 2011. In some areas of Africa, environmental disasters have put in danger food security, health and access to fresh water by communities leading them to displacement.[190]

Following a map showing Internally Displaced Persons worldwide in 2011.

[189] Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali: cambiamento climatico e migrazioni forzate,* Rome, 2013, p. 20 - 21

[190] Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali: cambiamento climatico e migrazioni forzate,* Rome, 2012, p. 20

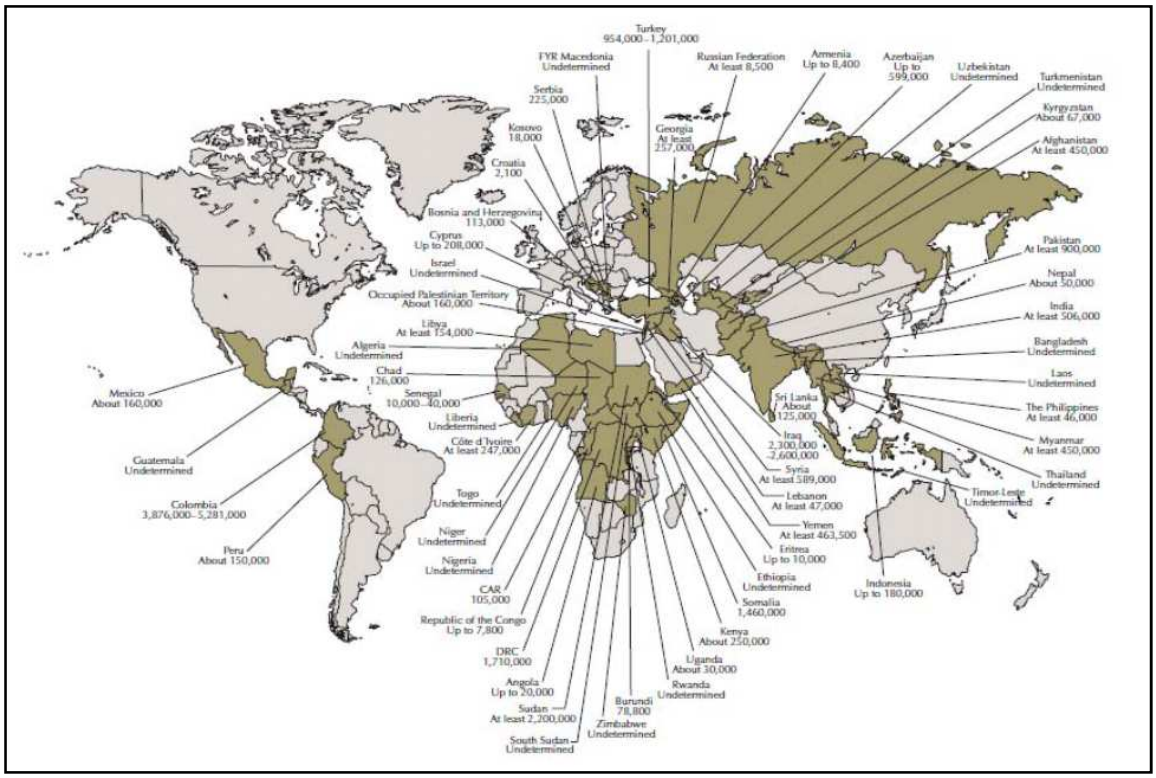

Figure 16: Internally Displaced Persons worldwide in 2011
Source: Maurizio Gubbiotti, Tiziana Finelli, Elena Peruzzi, *Profughi ambientali: cambiamento climatico e migrazioni forzate,* Rome, 2012, p. 20

3.6 Existing international legal frameworks and their limitations

The existence of protection gaps is surprising given the amount of instruments that allow to protect other forcibly displaced groups and vulnerable populations available both in domestic and international human rights law. In parallel, there are many human rights that allow to protect people forcibly displaced by natural disasters but only from an humanitarian standpoint.

There are no international norms that deal specifically with migrants displaced by environmental or climatic factors, either internally within a country or internationally. The lack of any international standards to guarantee protection to environmentally displaced people produces protection gaps that are even more exacerbated compared to the rights assured to other categories of displaced persons and migrants. Nonetheless, some international instruments can be useful to grant some rights to environmental migrants, even if only to some extent given that they are not case-specific.

Among these, there are human rights: all displaced persons, whether internal or international, benefit from fundamental human rights. These rights include the right to life,

health, food, shelter and movement and they are owed equally to every human being by state parties to the treaties protecting them. Some environmental issues could be the reason why protection is recognized under international human rights law. For example, a person who permanently loses his or her house due to flood, can ask for the right to protection under international law given that his or her right to life is at risk.[191]

As already mentioned, it is widely accepted that a person escaping from the impacts of climate change is not recognized as 'refugee' according to the 1951 Refugee Convention. However, the Geneva Convention could apply in very specific cases linked to environmental events. One scenario is, where the government is not able to protect a particular group which has been affected by the effects of environmental change (e.g. indigenous group). This could be a reason to demand for refugee status, given that members of that group run away to another state because their country of origin failed to protect them. Another potential reason to ask for refugee status could be the escape deriving from a conflict affecting a particular social group over access to environmental resources, such as scarce water resources or agricultural land. Actually, in this case, people are not considered as climate migrants, but as refugees persecuted by a war in their country of origin. Despite these few examples, the Geneva Convention is far from giving a complete and specific protection to environmental refugees.[192]

Furthermore, there are cases of complementary protection, as previously explained. Complementary protection is a form of legal protection recognised to a person who does not benefit from protection under the 1951 Convention. Nonetheless, this individual can't be returned to his or her country of origin because of the non-refoulement principle, that doesn't allow to return a person to serious ill-treatment such as torture, cruel, inhuman and degrading treatment or punishment. This kind of protection is subjected to domestic law. Even in this case, complementary protection doesn't provide specific protection to environmental refugees, but give assistance to migrants on the base of human rights.[193]

Another instrument is the Guiding Principles on Internal Displacement: they are thirty principles that protect internally displaced persons; they provide rights and guarantees to

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[191] Roger Zetter, *Protecting environmentally displaced people - Developing the capacity of legal and normative frameworks*, Oxford, 2011, p. 16

[192] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 39

[193] Roger Zetter, *Protecting environmentally displaced people*, p. 19

IDPs that were forced to displace and they are relevant to protect and assist IDPs from displacement to the achievement of a solution. The potential significance of 1998 Guiding Principles on Internal Displacement is widely recognized not only because, as already noted, the majority of people who are displaced by changing environmental conditions will move within their own countries. The Guiding Principles, therefore, dispose some legal norms which could provide protection and related rights to such environmentally displaced people. The Guiding Principles are based on binding international human rights, refugee law and humanitarian law instruments. However, the Guiding Principles themselves are not binding; they are only if they have been domestically incorporated.

The Guiding Principles include the right to:

- "basic rights including the right to life, food and housing and nondiscrimination against Internally Displaced Persons in distributing assistance;
- dignity and security;
- participation in decision making in relation to displacement, return or relocation;
- move, remain together as a family/household or to be reunited if separated."[194]

Even though the value of the Guiding Principles is accepted, there are several significant limitations in their application. As just said above, although these standards are clear, most are not binding: there are no effective measures for enforcement and accountability. For these reasons, they are regarded as "soft" law. An obvious disadvantage of the non-binding nature of the Guiding Principles is the fact that States can't be held accountable if they disregard them and that, as such, they can't be invoked in legal proceedings at the domestic level. Another limitations is that they don't deal specifically with environmental causes for displacement, but they include a set of reasons (such as armed conflict, violence, violation of human rights).[195] Thus, even if they have a good basis, they lack of a complete set of norms dealing with internal displacement resulting from environmental change. This currently constitutes a major protection gap.

3.7 Possible policy responses

In this context lacking a concrete and specific legal framework for environmental refugees, some possible options to tackle the issue have been proposed. Reconciling legal

[194] IML Course, *Protection of Internally Displaced Persons,* New York, 2011
[195] IML Course, *Protection of Internally Displaced Persons,* New York, 2011

praxis related to environmentally induced displacement with knowledge of the migratory impacts of climate and environmental change is the starting point to fill the protection gaps. A key element of this process is to understand what forms of protection for environmentally displaced people currently exist and what forms of protection could be developed as these population movements increase. The initiatives try to develop a concept of protection lays its foundations on international law. They support the both the adaptation and broadening of existing legal apparatus and the proposal of new international instruments. On the other hand, others propose to intervene preventively in order to avoid displacement.

Before discussing the options presented, it is important to highlight that it is difficult to find solutions because it is hard to answer to some key points in preparation for proposing frameworks to protect environmental refugees. As a matter of fact, there are three recurrent and overlapping challenges in defining and responding to the protection gaps. These challenges are to determine whether displacement is:

- voluntary or forced;
- temporary or permanent;
- how protection needs differ between internal and cross-border displacement.

The challenge of distinguishing between forced and voluntary movement is much greater in the case of slow-onset climate and environmental change than sudden onset disasters. In the former situation, migration might start as a partially voluntary process (both internally and across international borders), but may become involuntary or forced when living conditions become unbearable due to permanent reduction of resources. Furthermore, the distinction between forced or voluntary displacement also becomes more significant depending on whether it is temporary or permanent. For example, extreme hazard events, such as flooding, undoubtedly force displacement; but the significance of the displacement and the rights to be protected change if the displacement then becomes permanent. Concerning the third point, those who are internally displaced due to environmental or climatic events have more established rights protections than those who cross international borders. As already discussed, even if the existing international rights frameworks favours internal over international migrants, a significant protection gap still exists for those who

are, or will be, internally displaced because of poor or lacking implementation of legal standards. For those who cross international borders there are significant gaps.[196]

Despite this first difficulty, some suggestion have been submitted.

The first option possible is the expansion of the 1951 Geneva Convention relating to the status of Refugees and its 1967 Protocol. Given that the Convention doesn't include environmental disasters to the reasons for which one can deserve protection, an expansion in this sense has been proposed. The inclusion of a protocol in the Geneva Convention or its expansion was raised during a meeting with representatives of governments, environmental and humanitarian organizations, and United Nations agencies organized by the government of the Maldives in 2006. In that occasion, it was proposed the extension of the definition of a refugee and an amendment of Article 1A of the Geneva Convention by adding degraded environment as a factor that endanger life, health, livelihoods and the use of resources. This option is supported by someone and rejected by others. One main advantage of an expansion of the Geneva Convention is given by its relatively unproblematic implementation due to the fact that all States Parties to the Geneva Convention already have a system of recognition of refugees in place, that can be used also for climate-related displacement. In this way, there would not be the complications related to the creation of a new framework for the identification and practical protection of environmental refugees. On the other hand, there are disadvantages: there is much concern that the broadening of the refugee definition would lead to undermine the current protection for conventional refugees. Experts suppose that it may lead receiving states to treat refugees in an inadequate way and to lessen their responsibilities and protection standards. Also UNHCR shares the same vision. Furthermore, since the Convention deals with individuals moving beyond national borders, its broadening would refer only to them, leaving out internally displaced persons. Finally, the Convention protects people who are fleeing from persecution for which a concrete agent is considered voluntary responsible. In the case of environmentally induced displacement, no clear responsibility can be established given that nature doesn't jeopardize man voluntarily.[197]

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[196] Roger Zetter, *Protecting environmentally displaced people - Developing the capacity of legal and normative frameworks*, Oxford, 2011, p. 14 - 15

[197] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 40 - 41

Another option is broadening the concept of internally displaced persons. The Guiding Principles on Internal Displacement, that discipline forced internal displacement, explicitly refer to people that move because of environmental reasons, but they only apply to those who don't cross national borders. Making direct reference to environmental causes, they are considered a good starting point to construct a more complete international instrument to cope with environmental-induced migration. Despite it is discussed as the most promising approach, broadening the Guiding Principles on Internal Displacement is a challenging tasks due to protection gap existing for IDPs. Besides the non-binding nature of the principles that have to be incorporated in domestic law to be effective, their implementation is not controlled by any international institution. Another aspect is that economic motivations are excluded from the definition. This creates problems because part of displacement resulting from environmental factors will have economic issues as primary reason: in fact, affected populations escape from deteriorating living conditions resulting from environmental degradation. Thus, it is not clear whether those escaping from a gradual deterioration of living conditions are covered by the principles.[198]

A third option suggested by several academics and policy makers is a new legal instrument. The draft convention on the international status of environmentally displaced persons, written by law specialists at the University of Limoges in 2008, is the most complete protection package. This draft convention institutes new rights, a specific status and implementation mechanisms. The new rights are in reality inspired by rights recognized for refugees with the difference that here these new rights apply both to externally displace and internally displaced. In addition to these specific rights linked to the displacement, other rights guaranteed are classic human rights, simply recalled here to highlight that they are not suspended in time of crisis. The general objective of the draft convention is to guarantee these rights for environmentally displaced persons who currently do not fall in any category of protected persons. The principal innovation of the convention concerns the right of environmentally displaced persons to freely choose the region or receiving country; it is based on the right to liberty and freedom of movement. The free choice of the receiving country can only be exercised on condition that states have an obligation to receive the displaced. This is why there is a duty to accept environmentally displaced

[198] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 42

persons; this obligation is founded on the principle of solidarity and the principle of non-discrimination, which doesn't allow to limit the choice for reasons of sex, language, color, age, etc. The convention requires a national special commission to attribute the status of environmentally displaced; the national commission decides to grant or refuse the status to persons or groups of people, according to the criteria which are set forth in the international guidelines. To guarantee the effectiveness of this special status of environmentally displaced and to ensure that the convention is not simply a piece of paper, the draft convention institutes a principle of effectiveness by establishing a global agency for environmentally displaced persons and a principle of proportionality aimed at implementing an international system of financial aid to assist the beneficiaries of the status of displaced.[199] Despite being the most complete proposal, it has been contested because it foresees too heavy an institutional machinery, which risks becoming a pretext for non-adherence by states.

Another proposal has been suggested by Dana Zartner Falstrom, a specialist in international and comparative law: she proposes a convention addressing the specific issue of environmentally-induced migration which includes an extensive set of rights and obligations and their mechanism of implementation. The proposed convention has been critised for disproportionally placing developing countries under obligations because these countries are mainly affected by environmental change and displacement.[200]

Despite the comprehensive proposals, there is a wide consensus that a specific legal framework is unlikely to materialize because of the possible lack of political will to realize protection for people displaced by climate change.

A fourth option is the addition of a protocol on climate induced migration to the United Nations Framework Convention on Climate Change. It has been suggested to build the protocol on "recognition, protection and resettlement", developing it upon five core principles:

1. "The Principle of Planned Re-location and Resettlement": it gives the main guidelines to focus on planned and voluntary resettlement over longer periods of time;

[199] Michel Prieur, *Draft Convention on the International Status of Environmentally-Displaced Persons*, Limoges, 2008, p. 7- 8- 9

[200] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 44

2. “The Principle of Resettlement Instead of Temporary Asylum”: it is dedicated to environmentally displaced persons who will not be able to go back to their homes;
3. “The Principle of Collective Rights for Local Population”: it provides rights to affected cities, provinces, small island states etc.;
4. “The Principle of International Assistance for Domestic Measures”:it deals with the support to governments, local communities and agencies to protect people within their territory as well as financing resettlement programmes;
5. “The Principle of International Burden-sharing”: it disposes cooperation to face problems jointly given that climate change is a global problem and industrialised countries have the main responsibility for it.

In order to put in practice the previous points, specific agencies are required.[201]

Considering that UNFCCC has always been discussing climate induced displacement, it is a good idea to take into account in this context the proposal of adding a protocol on climate-induced migration. Above all because UNFCCC has explicitly made reference to the relationship between climate change and migration in its 2010 Cancun COP16.

A fifth possible option is using temporary protection as an instrument for accommodating persons displaced because of environmental factors. United states have already used this kind of protection through the United States Immigration Act of 1990. It provides with temporary protection status in particular conditions such as drought, flood, epidemics or earthquakes, when the state of origin can’t manage the repatriation of its nationals. Protection is granted for six months, then it could be extended to eighteen months but only if the conditions don’t improve in the affected country and if this latter makes a formal request to prolong the stay.[202] Similarly, Finland provides with temporary protections those foreigners who need international protection and can’t go back safely to their home country due to, amongst the causes, environmental disaster. Here, temporary protection can last for a maximum of three years.[203] These kinds of protection have been criticized because they seem to be too context-specific and not adequate to future migration

[201] Albert Kraler, Tatiana Cernei, Marion Noack, *“Climate Refugees” Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 45
[202] Albert Kraler, Tatiana Cernei, Marion Noack, *“Climate Refugees”*, p. 46
[203] Albert Kraler, Tatiana Cernei, Marion Noack, *“Climate Refugees”*, p. 56

scenarios, but, however, they could be an instrument to give an initial status of protection to displaced persons.

In this context of possible responses, it has been discussed also that preventive polices, and sometimes in the nations where environmental disasters happen, could be useful to avoid migration when possible.

Three different strategies are suggested in this case:

1. Reducing the influence of global environmental change on migration;
2. Increasing the adaption capacity of populations mainly hit by environmental and climate change;
3. Enhancing resilience capacity of communities affected by environmental and climate change.

The first strategic policy approach concerns the diverse areas of policy that would reduce the need for migration influenced by environmental change. Climate mitigation is a high and urgent policy priority for all countries. Even if climate mitigation policies are unlikely to have a noteworthy effect on how environmental change influences the drivers of migration before 2030, early implementation is necessary to reduce climate impacts in the longer term, and thereby avoid potential large-scale deterioration of economies and settlements, and consequent implications for migration patterns and flows. The reduction of the rate and impact of global environmental change can be achieved through policies aiming at limiting future emissions of GHGs or slowing the rate of land degradation.[204]

The second strategic policy focuses on different measures, such as:

- Actions aiming at reducing disaster risk through forecasting, dissemination of warnings and emergency response. Forecasting is helpful to improve security, diminish threats to livelihoods and reduce the risk of displacement. It is even more useful if associated with warning systems: the existence of a process and network for the dissemination of warnings, the availability of knowledge and skills within communities and organizations to react to warnings, and the mobilization of emergency responses are vitally important.[205]

[204] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p. 135
[205] Richard Black, *Foresight: Migration and Global Environmental Change,* p. 139

- Actions that seek to reduce ahead of time the physical impacts of environmental change. Important policy measures are aimed at reducing the impacts of environmental change by modifying the physical impact of events. Structural measures include infrastructure and planning: for instance, flood protection works measures to prevent riverbank erosion and measures to alleviate the effects of drought.
- Actions that aim to reduce exposure to the event, through measures such as spatial planning and control of the use of agricultural practices. Policy measures can also decrease the impact of events and changes in ecosystem services by reducing the exposure to loss. For floods and storms, this concerns reducing development in hazard-prone locations. Changes in cultivation practices, soil improvement measures and the use of different crop varieties are means to diminish the risk of farmers of crop failure due to floods, water shortage or salinity. [206]
- Planned forced displacement of populations from areas hit by climate change and their resettlement. Migration and resettlement are increasingly recognized as adaptation strategies; it can be seen as a strategy to reduce population pressures in areas with a fragile environment and it has been understood as inevitable for seriously affected populations.[207]

The third strategic policy focus on reducing the impacts of environmental events by building the long-term resilience of communities. Resilience is defined as the ability of a system to face adverse events, absorb shocks and recover after a disturbance. There are two specific areas of policy which have most relevance to migration: enhancement of livelihoods and insurance. Measures to improve livelihoods may lead to long-term resilience of communities. Those measures mainly apply to the rural context. Policies are composed by measures that support farmers in changes to agricultural practices, that improve access to markets, that diversify income.[208] The other set of measures concerning insurance is increasingly used in low-income environments, particularly for protection against agricultural losses. It often happens that payouts are based on the value of some

[206] Richard Black, *Foresight: Migration and Global Environmental Change,* p. 141
[207] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 47
[208] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees",* p. 48

weather-related index (for example rainfall deficit) at a defined location, rather than indemnity insurance, which is based on the actual value of loss.[209]

Concluding, if preventing migration is a way to avoid the burden of solving the problems related to the status of environmental refugees, their recognition and the creation of a potential convention establishing their rights, it could also reveal to be an inappropriate response in the long-term. Indeed, migration is often an important method for households to diversify their incomes. Therefore, reduced options for migration decrease income support, such as remittances, and in the long term may make it unbearable for households and communities to remain in their home country, ultimately leading to a much larger migration, potentially in an unplanned and vulnerable way.

The debate on the conditions of environmentally displaced people still remain open and without certain answers and solutions. It could turn in an issue difficult to manage if climate and environmental change got worse and the number of displaced increased.

3.8 Environmental refugees in the EU

3.8.1 Complementary and Temporary Protection

Currently, there are no instruments at EU level that specifically protect environmentally displaced persons. Legal scholars have argued that, to an extent or another, complementary forms of protection for environmentally displaced individuals at the EU level could be provided through the Council Directive 2004/83/EC of 29th April 2004 (Qualification Directive) and the Council Directive 2001/55/EC of 20th July 2001 (Temporary Protection Directive). These directives could only give complementary protection because they don't deal specifically with environmentally displaced persons. Qualification Directive determines the minimum standards for the qualification and status of third country nationals or stateless persons as refugees or as persons who otherwise need international protection and the content of the protection granted; Temporary Protection Directive establishes minimum standards for giving temporary protection in the event of a mass influx of displaced persons and the measures promoting a balance of efforts between Member States in receiving such persons and managing the consequences of that.[210]

[209] Richard Black, *Foresight: Migration and Global Environmental Change,* London, 2011, p. 143

[210] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 51

Qualification Directive aims to establish minimum standards for the recognition of the third country nationals (TCNs) or stateless persons as refugees or as persons who otherwise need international protection; it provides also the content of the granted protection. One of the main purposes of the Qualification Directive was to harmonize the disparate standards in EU member states by establishing common minimum standards. Instead of creating new protection obligations addressed to particular individuals, the Qualification Directive thus clarifies and codifies existing international and Community obligations and practices.[211] Considering that environmentally displaced individuals do not qualify under the refugee category according to the 1951 Geneva Convention, how are they, otherwise, considered by the Qualification Directive? Are they included in the refugee group? An analysis is required on whether this category may qualify under the complementary protection according to Qualification Directive. First, it is important to mention that according to Article 8 of Qualification Directive, complementary protection can't be granted if:

> "in a part of the country of origin there is no well-founded fear of being persecuted or no real risk of suffering serious harm and the applicant can reasonably be expected to stay in that part of the country" ("internal flight alternative").[212]

At the same time, it has to be taken into consideration also the personal circumstances of the applicant and whether there are technical obstacles to return to the country of origin. Therefore, the application for protection of an environmentally displaced individual might not be accepted if protection is available in at least a part of the country.[213] Obviously, there are few cases where an entire country has been affected by an environmental disaster. As a consequence, if the country has been only partially damaged and if there is a part of territory where the protection can be guaranteed, then the individual can't ask for international protection. Article 15 explicitly limits the notion of "serious harm" by establishing an exhaustive list of situations constituting serious harm. It consists of:

- "(a) Death penalty or execution;

[211] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees",* p. 51
[212] Council of the European Union, *Council Directive 2004/83/EC,* Luxemburg, 2004, p. 5
[213] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 52

- (b) Torture or inhuman or degrading treatment or punishment of an applicant in the country of origin;
- (c) Serious and individual threat to a civilian's life or person by reason of indiscriminate violence in situations of international or internal armed conflict."[214]

None of the previous options are applicable to environmentally displaced individuals. From this list, only paragraph (b) might be applicable, but the problem here is that the legislator didn't go further in specifying the criteria for qualifying the level of severity concerning inhuman or degrading treatment. However, the European Court of Human Rights has never considered environmental conditions as part of inhuman or degrading treatment.[215]

To provide environmental migrants with assistance, an obvious option in this context would be to extend the concept of complementary protection and include environmental disasters as one of the protected grounds, notably by amending paragraph (c) to include, besides the armed conflict, also the environmental disasters. The status awarded may initially be more temporary and made dependent on the evolution of the situation in the country of origin. A first debate on that was held within the European Commission in 1999 in the context of the discussions regarding the scope and form of complementary protection. It considered extending the scope of complementary protection to environmental displaces, but the suggestion was early forgotten.[216]

Nowadays the need to amend Article 15(c) of the Qualification Directive is not contemplated because the relevant provisions can be considered compatible with the European Convention on Human Rights.

On the other hand, the aim of the Temporary Protection Directive (Directive 2001/55/EC) is to establish minimum standards for giving temporary protection in the event of a mass influx of displaced persons from third countries that are unable to return to their country of origin. At the same time, its purpose is also to promote a balance of effort between member states in receiving and bearing the consequences from receiving such persons. In comparison with the Qualification Directive, that grants protection only in the cases

[214] Council of the European Union, *Council Directive 2004/83/EC,* p. 8
[215] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees",* p. 52
[216] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 53

specified in an exhaustive list, the Temporary Protection Directive's list is not limited given that the wording of the provision of Article 2(c) specifies:

> " 'displaced persons' means third-country nationals or stateless persons who have had to leave their country or region of origin, or have been evacuated, in particular in response to an appeal by international organisations, and are unable to return in safe and durable conditions because of the situation prevailing in that country, who may fall within the scope of Article 1A of the Geneva Convention or other international or national instruments giving international protection, in particular:
>
> - persons have fled areas of armed conflict or endemic violence;
> - persons at serious risk of, or who have been victims of, systematic or generalized violations of their human rights".[217]

Interpreting these dispositions in broad manner, environmentally displaced individuals could be considered as people deserving Temporary Protection. However, a deeper analysis of Directive's provisions shows some important limitations. Above all, the Directive is applicable in only cases of mass influx. As a matter of fact, Article 1 states:

> "The purpose of this Directive is to establish minimum standards for giving temporary protection in the event of a mass influx of displaced persons from third countries who are unable to return to their country of origin […]"[218]

Furthermore, temporary protection is granted only in exceptional cases. Paragraph (a) of Article 2 establishes that:

> " 'temporary protection' means a procedure of exceptional character to provide, in the event of a mass influx or imminent mass influx of displaced persons from third countries who are unable to return to their country of origin, immediate and temporary protection to such persons […]".[219]

Moreover, it should be noted that the Directive does not provide for a clear mechanism of protection but rather provides a discretionary financial and political mechanism.[220]

Considering that this Directive is applicable only in cases of mass influx and, therefore, does not include cases involving individual applications; that temporary protection is seen only

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[217] Council of the European Union, *Council Directive 2001/55/EC,* Brussels, 2001, p. 3
[218] Council of the European Union, *Council Directive 2001/55/EC,* p. 3
[219] Council of the European Union, *Council Directive 2001/55/EC*, p. 3
[220] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 54

as an exceptional response and, taking into account the high political thresholds to activate the Directive and considering that the Directive's mechanism has never been used in practice, makes the Directive less effective in dealing with migrants displaced by environmental disasters. A flexible and immediate protection mechanism such as complementary protection will be more relevant for individuals displaced due to environmental disasters.

3.8.2 Resettlement in the European Union

Resettlement in the context of environmental or climate change impacts can apply in three different scenarios. Firstly, populations, individuals or families forcibly displaced by the impacts of environmental or climate change might need to be resettled from the area or state in which the affected people have sought protection to a third state or another area within the country. Secondly, persons who have been displaced by conflict and sought protection in areas which are under environmental pressure might be in need for resettlement. And thirdly, as previously discussed, resettlement can be chosen by governments as an adaptation measure when they seek to move populations away from dangers due to changing risks, for example increasing frequency of floods, or from areas where livelihoods are no longer bearable.

It should also be noted that a clear distinction seems necessary between the resettlement of refugees from outside EU territory to an EU member state and intra-EU resettlement of refugees. The first category of resettlement might be considered as an expression of solidarity between EU and affected third countries, while the second category of resettlement is an expression of solidarity among EU member states themselves.[221]

The European Commission published a communication on the "Establishment of a Joint EU Resettlement Programme" to dispose guidelines about the resettlement of refugees from outside the EU to an EU member state. The European Commission highlighted that the EU should devote more energies to the resettlement of refugees from third countries. This would show EU international solidarity and it would mean to share the burden of the countries in the regions of origin which accommodate the vast majority of refugees. Regional Protection Programmes were also designed to include a resettlement component,

[221] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 60

whereby EU member states undertake, on a voluntary basis, to offer resettlement places in their countries. In its communication on the Establishment of Joint EU Resettlement Programme, the Commission underlined that the resettlement needs are much greater than the available resettlement places. It would therefore be necessary to involve more member states in resettlement activities which is not only a humanitarian purpose regarding those people who are actually resettled, but also burden sharing with those countries which accommodate a large number of refugees.[222]

Besides the lack of available resettlement places and the absence of a structured coordination regarding resettlement policies within the EU, the European Commission also highlighted the need for better targeting of resettlement priorities and financial support. The European Refugee Fund deals with financial assistance for the resettlement of refugees from third countries to the EU member states. Article 13, paragraph (3) of the Decision establishing the European Refugee Fund lists four categories of displaced for which the EU member states are provided with financial support per refugee resettled. These categories are:

- "(a) persons from a country or region designated for the implementation of a Regional Protection Programme;
- (b) unaccompanied minors;
- (c) children and women at risk, particularly from psychological, physical or sexual violence or exploitation;
- (d) persons with serious medical needs that can only be addressed through resettlement."[223]

The European Commission suggested to extend the categories because they are too rigid and not sufficiently adaptable in order to respond to newly arising needs.[224]

However, it should be noted that from the practical perspective it appears that there is neither uniform way of exchanging the information between EU member states, nor standard coordination at EU level on resettlement issues. Moreover, resettlement is also implemented on the voluntary basis only. Up to now, EU member states have expressed a

[222] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011*,* p. 61
[223] European Parliament and the Council of the EU, *DECISION No 573/2007/EC,* Brussels, 207, p. 9
[224] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees",* p. 61

low willingness for the resettlement of refugees, with the number of refugees resettled to a European country being far lower than the number of refugees resettled to other industrialized States.

Besides the discussed option that the EU commits to resettlement of refugees or displaced persons from outside EU territory to an EU member state, the EU could also support third countries in establishing effective resettlement mechanisms which reflect the rights of the displaced populations concerned. Resettlement occurs to a high proportion within countries and this tendency is likely to increase as an effect of climate-related displacement and resettlement. In many cases resettlement within third countries lacks consultations between the local government and communities. Furthermore, resettlement programmes are often under-funded. Some preconditions to make solutions sustainable include the inclusive participation of the affected communities as well as the transparent information on the process. These measures ensure that the affected individuals make voluntary decisions. As experiences with forced relocations show, forced relocation tend not to be successful. Additionally, resettlement sites should be safe from further threats and recurrent disasters and need to be carefully selected. Other factors which should be taken into account when looking for durable and sustainable solutions are the recovery or creation of livelihoods, compensation for lost or damaged property in case of prohibition of return and the provision of proper housing to services such as health or education.[225]

3.8.3 Measures taken by EU outside its territories

In addition to support third countries in establishing effective resettlement mechanisms, EU also helps these countries affected by climate change to deal with it internally with other actions.

Migration as adaptation strategy could be supported through development cooperation for example through the establishment of service centres for migrants in order to maximize the impacts of migration on human development. Therefore, governments in developing countries could benefit from capacity building activities on better management of migration flows.[226] With regards to capacity building, the European Commission is a major

[225] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 63

[226] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees",* p. 66

supporter of the Climate Change Capacity Development project. Launched in 2003, it is helping developing countries respond to causes and impacts of climate change, particularly those that affect the poorest and most vulnerable.[227]

Furthermore, given that research is crucial to improve the understanding of climate change and to develop the most effective strategies for adaption and mitigation, climate change has consequently become an increasingly important area in the EU's research and technological development. EU research activities have a strong international dimension that benefits developing countries. The EU's research and technological development programmes are open to cooperation with research institutions in third countries. Many projects concern global or regional climate change questions of relevance to the developing countries.[228]

The European Union could also help third countries by strengthening protection mechanisms existing within them to enhance protection of environmental displaced outside the European Union. The European Commission activities could also include projects and actions improving the general protection situation in the host country. Developing countries could be supported in integrating the Guiding Principles on Internal Displacement in National law and in recognizing that environmental displaced people might deserve to enjoy specific rights. In particular, the Mobility Partnerships provide for the necessary framework to start a dialogue on migration, mobility and security between the EU and third countries. Therefore, these may also cover, among other aspects, environmental migration issues. Under the Mobility Partnership framework the EU can help strengthening the domestic capacities of the third countries in dealing with the internal displaced individuals related to the climate change circumstances. It could also cooperate to assure stability, respect for human rights and good governance in the concerned countries.[229]

Concluding, even inside the borders of EU the protection of environmental refugees has many gaps. Some rights are granted to environmentally displaced persons, but indirectly: this means that they are not recognized ad environmental refugees, but they benefit from

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[227] European Commission, *EU Action against Climate Change – Helping developing countries cope with climate change,* Luxemburg, 2006, p. 13

[228] European Commission, *EU Action against Climate Change,* p. 23

[229] Albert Kraler, Tatiana Cernei, Marion Noack, *"Climate Refugees" Legal and policy responses to environmentally induced migration,* Brussels, 2011, p. 68

complementary protection because they need protection and they can't be taken back home. In other cases, the environmental cause of their migration is recognized and is given to them temporary protection, but only in case of mass displacement. Clearly, also EU has protection gaps. Concerning resettlement, it is weak in the EU due to the lack of available resettlement places and the absence of a structured coordination. It has been adopted measures to help third countries internally to adapt and strengthen their protection mechanisms. Nonetheless, there are no specific definition and regulations for environmentally displaced individuals. Hence, even in the EU uncertainty rules.

To conclude, the situation of environmental refugees is characterized by uncertainty: there are no agreed term, no shared definition and a specific status with annexed protection lack. Because of these gaps, many efforts are required to stem the problems.

Conclusion

Assuming that the possible scenarios of the future world are depicted as worse than the current ones due to the effects of climate change, the impacts will be greater and more intense. As a consequence, desertification and environmental migrants will be affected and will exacerbate their conditions.

As shown, desertification is a phenomenon that is already ongoing and that has serious consequences, above all related to human beings that they suffer famine, agricultural loss and water scarcity. If the situation get worse, it is unavoidable that the effects will be more intense. Therefore, it is fundamental to apply in the most efficient way the existing policies to fight desertification and to try to enhance them with the purpose of obtaining the best result possible. Eradicating ongoing effects is almost impossible because they are the outcome of past actions, but it is possible to try to limit the future ones. This through a strict implementation of the policies that, for this reason, acquire a special relevance. Even if much effort is being made, sometimes it is indirect or not accurately enough managed, such as for the case of National Action Plans. For this reason, it is essential to devote more commitment to this issue, even because it involves other subsequent difficulties, such as poverty, underdevelopment and lack of food security.

Applying and improving those policies is useful also for restricting the migratory impact. Indeed, the link between environment and migration is recognized, even if not extensively, as well as the influence of climate change on it. Hence, if the possibility of environmental degradation and sudden disasters rises, also the number of environmental migrants will increase consequently. It is necessary, therefore, to guarantee specific rights to those people who move for environmental reasons. First of all, it is indispensable to find a common name for them and a precise, shared and univocal definition. After that, protection gaps can be filled and it will be possible to think about a complete legal protection and to plan a correct management of flows. In this sense, it is useful to act preventively, but also in the sense of local adaption or resettlement of communities. Well-planned migration is a challenge, but it is helpful to reduce the risks of people moving to more dangerous areas.

In this intricate context and considering that these issues are already having reverberations, it is right and proper to make every effort possible to find better solutions.

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