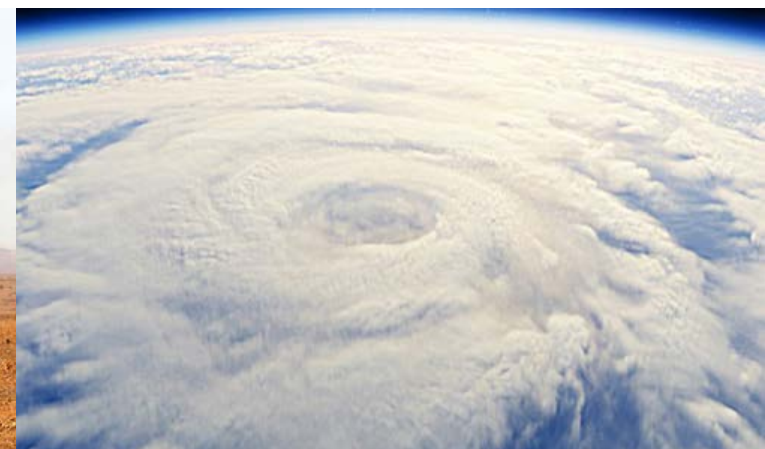




**Euro South Mediterranean Initiative:
Climate Resilient Societies
Supported by Low Carbon Economies**

**HANDBOOK N°1:
based on the proceedings
of the ClimaSouth
regional seminar
held in Brussels
17–18 February 2014**



Key developments in climate change policies



Project funded by the
European Union



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FOREWORD

The Mediterranean region has been identified as a climate change hotspot by the Intergovernmental Panel on Climate Change (IPCC). Most countries in the region are already experiencing rising temperature, increasing water scarcity, rising frequency of droughts and forest fires, as well as growing rates of desertification.

A common understanding is thus emerging in the region that fighting climate change is essential, by employing both mitigation and adaptation measures. These may also open new opportunities for further economic development, particularly those associated with low carbon options.

The EU-funded ClimaSouth project supports climate change mitigation and adaptation in 9 Southern Mediterranean partners: Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine and Tunisia.

The project assists partner countries and their administrations in transition towards low carbon society while building climate resilience and promoting opportunities for sustainable economic growth and employment. The project also supports South-South cooperation and information sharing on climate change issues within the region as well as closer dialogue and partnership with the European Union.

As part of its efforts to enhance climate change strategic planning, the ClimaSouth project is producing a series of handbooks tailored to the needs of the South Mediterranean region. These handbooks, based on peer-to-peer seminars held by the project, are designed to support national administrations in the development and implementation of climate change policy; they further help stakeholders in the region to engage more effectively in the global climate change framework.

The key users targeted by the ClimaSouth handbooks include relevant government departments at operational and policy levels, climate change units and committees, decision makers, meteorological services, members of local government, the private sector and civil society.

This first handbook in the series is devoted to key developments in climate change policies, both on the adaptation and the mitigation aspects.

We wish you an interesting reading.

Stéphane Halgand

European Commission
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CLIMASOUTH HANDBOOKS

Handbook N.1 : Building capacity & mainstreaming climate change policy

Handbook N.2 : Improving Climate Information

Handbook N.3 : Greenhouse Gas Inventory and MRV (forthcoming)

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LIST OF ACRONYMS

BUR	Biennial Updated Report
CC	Climate Change
CDM	Clean Development Mechanism
COP	Conference of the Parties (UNFCCC)
EC	European Commission
ENP	European Neighbourhood Policy
EU	European Union
GEF	Global Environment Facility
GHG	Greenhouse Gases
IPCC	Intergovernmental Panel on Climate Change
LCDS	Low Carbon Development Strategy
LEDS	Low Emission Development Strategy
MRV	Monitoring, Reporting, Verification, also Measurement, Reporting
MtCO ₂ eq	Million tons of CO ₂ equivalent
NAMA	Nationally Appropriate Mitigation Action
NAP	National Adaptation Plan
NC	National Communication
NMM	New Market Mechanism
tCO ₂ eq	Tons of CO ₂ equivalent
ToR	Terms of Reference
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

UNFCCC MILESTONES

Year Conference of the Parties ¹

2015 COP 21, Paris, France

2014 COP 20, Lima, Peru

2013 COP 19, Warsaw

Key decisions adopted at this conference include decisions on further advancing the Durban Platform, the Green Climate Fund and Long-Term Finance, the Warsaw Framework for REDD Plus, the Warsaw International Mechanism for Loss and Damage and other decisions.

Report: [FCCC/CP/2013/10](http://fccc.org/CP/2013/10)

2012 COP 18 Doha, Qatar

At the 2012 UN Climate Change Conference governments consolidated the gains of the last three years of international climate change negotiations and opened a gateway to necessary greater ambition and action on all levels. Among the many decisions taken, governments:

- Strengthened their resolve and set out a timetable to adopt a universal climate agreement by 2015, which will come into effect in 2020;

¹ Selected information from the UNFCCC Website www.unfccc.int

- Streamlined the negotiations, completing the work under the Bali Action Plan to concentrate on the new work towards a 2015 agreement under a single negotiating stream in the Ad hoc Working Group on the Durban Platform for Enhanced Action (ADP);
- Emphasized the need to increase their ambition to cut greenhouse gases (GHGs) and to help vulnerable countries to adapt;
- Launched a new commitment period under the Kyoto Protocol, thereby ensuring that this treaty's important legal and accounting models remain in place and underlining the principle that developed countries lead mandated action to cut greenhouse gas emissions;
- Made further progress towards establishing the financial and technology support and new institutions to enable clean energy investments and sustainable growth in developing countries.

Report: [FCCC/CP/2011/9](http://fccc.org/CP/2011/9)

2011 COP 17, Durban

All governments committed to a comprehensive plan that would come closer over time to delivering the ultimate objective of the Climate Change Convention: to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent our dangerous interference with the climate system and at the same time will preserve the right to sustainable development.

[Decision 1/CP.17 Ad Hoc Working Group on the Durban Platform for Enhanced Action \(ADP\)](#)

2010 COP 16, Cancun

The Cancun Agreements were a set of significant decisions by the international community to address the long-term challenge of climate change collectively and comprehensively over time, and to take concrete action immediately to speed up the global response to it.

- Establish clear goals and a timely schedule for reducing human-generated greenhouse gas emissions over time to keep the global average temperature rise below two degrees;
- Encourage the participation of all countries in reducing these emissions, in accordance with each country's different responsibilities and capabilities to do so;
- Review progress made towards two-degree objective, and a review by 2015 on whether the objective needs to be strengthened in future, including the consideration of a 1.5C goal, on the basis of the best scientific knowledge available.

Report : [FCCC/CP/2010/7/Add.1](http://fccc.org/CP/2010/7/Add.1)

2009 COP 15 Copenhagen, Denmark.

2008 COP 14 Poznan, Poland

2007 COP13 Bali

The Bali Road Map includes the Bali Action Plan, which charts the course for a new negotiating process designed to tackle climate change. The Bali Action Plan is a comprehensive process to enable

the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012, in order to reach an agreed outcome and adopt a decision. All Parties to the Convention were involved in crafting the Bali Road Map. The COP decided that the process would be conducted under a subsidiary body under the Convention, the Ad Hoc Working Group on Long-term Cooperative Action (AWG-LCA).

2006 COP 12, Nairobi

- Decision 1/CP.12: Further guidance to an entity entrusted with the operation of the financial mechanism of the Convention, for the operation of the Special Climate Change Fund:

2005 COP11, Montreal

- Decisions on CDM, Adaptation Fund and LDCF (Further guidance for the operation of the Least Developed Countries Fund LDCF). Additional guidance to an operating entity of the financial mechanism.

2004 COP 10. Buenos Aires

- Decision 1/CP.10: Buenos Aires programme of work on adaptation and response measures.
- Decision 8/CP.10: Additional guidance to an operating entity of the financial mechanism.

2003 COP9 Milan

2002 COP8 New Delhi

2001 COP7 Marrakesh – Marrakesh Accords

- Decision 10/CP.7.: Establishment of the Adaptation Fund.

2000 COP6 The Hague

- Bonn agreements on the Implementation of the Buenos Aires Plan of Action, Decision 5/CP.6.

1998 COP4 Buenos Aires

- Buenos Aires Action Plan – Decision 2/CP.4.

1. INTRODUCTION

ClimaSouth organised a two-day seminar in Brussels to increase technical knowledge and facilitate exchange of experiences for the mutual benefit of all parties with the ultimate objective of increasing capacity in international climate change policy making. Three participants per country (staff/experts) involved in the work of the national teams in preparation of the international process were invited to the seminar to:

- Increase awareness of the participants on the technical and financial issues under the UNFCCC process.
- Enhance exchange of views to increase mutual understanding between the EU and partner countries.
- Facilitate direct exchange of views among partner countries to create a better regional overview on on-going climate change issues.

The ClimaSouth project team is grateful to the speakers who contributed to this meeting to make it a success, in particular, Jake Werksman (DG CLIMA), Jean-Pascal van Ypersele (IPCC) Stéfan Agne (DG Clima), Donald Singue Tanko (UNFCCC Secretariat), Amr Mageed (CEDARE) Egypt, Jamal Al-Dadah, Palestinian Water Authority, Gaza Strip, José Picatoste Ruggeroni (Spain), Clarisse Kehler Siebert, Stockholm Environment Institute, Sarah Kuen, Services Changements Climatiques (Belgium), Vincent van Steenberghe (Services Changements Climatiques, Belgium), Zsolt Lengyl (Team Leader ClimaEast) and Léa Kai Aboudjaoude (Environnement Liban).

A video coverage during the seminar had the double objectives of:

- Recording video-interviews with national focal points, other members of the delegations and key stakeholders participating in the project events, as a basis for audiovisual (AV) elements to be uploaded to the project's web site.
- Recording AV material covering the event as a basis for the production of a short video story (3–5 minutes) as further element to be uploaded to the ClimaSouth project's web site.
- Six interviews were filmed involving the following national delegations: Egypt, Israel, Jordan, Libya, Morocco and Palestine. The remaining three national delegations present in Brussels (Algeria, Lebanon, Tunisia), declined the project's invitation to record video interviews.
- Interviews were also recorded with representatives of DEVCO, DGCLIMA, the IPCC, as well as the project's team leader and the project's mitigation and adaptation key experts.
- The video (also recordings) included extensive coverage of the proceedings of the workshop as well as exterior images (EU premises).
- The videos are uploaded on the ClimaSouth website : www.climasouth.eu

2. A ROADMAP FOR MOVING TO A COMPETITIVE LOW CARBON ECONOMY IN THE EU BY 2050

Mr. Jake Werksman, Principal Adviser to DG CLIMA and an EU Lead Negotiator gave an update on the international UNFCCC negotiations, the state of play after the 19th CoP in Warsaw as well as the latest developments on the EU climate change policy. Many outcomes were fulfilled on the three sets of EU expectations for COP19 in Warsaw, which were to:

1. Progress on timeline and key elements the 2015 Agreement
2. Discuss options for deepening GHG cuts pre 2020; and
3. Review the implementation of previous decisions.

On the progress on the 2015 Agreement:

- The 2°C objective was confirmed;
- **The principle of Inclusiveness was agreed upon:** domestic preparations are “*applicable to all*”;
- **Fairness:** nationally determined contributions and the Convention’s principles should be respected;
- **Comprehensiveness is foreseen** with all elements of the Durban platform to be included;
- **Urgency:** contributions by Parties are expected by the first quarter of 2015, i.e. well in advance of the COP 21 in Paris;
- **Legal form:** an “*outcome with legal force*” but without prejudice to the legal nature of nationally determined contributions.



On enhancing the pre–2020 ambition:

- Some countries moved backwards domestically (or internationally) on Cancun/CPH pledges; but
- **A formal technical process** will take place in 2014 to strengthen action through sharing of good practice;
- A June **High-level ministerial dialogue on ADP** and ambition in parallel to Kyoto Ambition Mechanism will offer opportunities to dialogue;
- The **Forum for Cities and Subnational Authorities** is a positive signal;
- Ongoing effort to catalyze non-UNFCCC processes, e.g. under the **G20 for the phase out of fossil fuel subsidies**, the **Montreal Protocol (HFCs)**, the **UN post 2015 development process** (including MDG/SDGs and ‘Sustainable Energy For All’ Initiative) are taking place.

On climate finance:

- A pathway and operational definitions for delivering on the Copenhagen USD 100 billion promise;
- Biennial ministerial dialogues will be systematically organized;
- The EU
 - has over-delivered its fast start pledge: €7.34 billion 2010-2012- instead of €7.2 as pledged in Cancun².
 - has already delivered €5.5 billion for 2013;
 - the indicative contributions for 2014 are expected to be at least at the same level as in 2013;
- The launch of the capitalization of the Green Climate Fund is expected in 2014
- The adaptation fund pledges total US\$ 100m (EU MS: 55 m) REDD+: US, Norway, UK pledged US\$ 280m.

On Adaptation and Loss and Damages:

- The “Warsaw International Mechanism on Loss and Damage”³ was approved; it now remains to:
 - Enhance action and support to address loss and damage;
 - Improve knowledge and strengthen coordination ;
 - Define the Institutional set-up drawing on the existing Cancun Adaptation Framework.

On implementation:

- The “Pre-2020 MRV regime” is finalised, including for developing countries⁴:

² http://ec.europa.eu/clima/policies/finance/international/index_en.htm

³ Decision 2/CP.19 Warsaw international mechanism for loss and damage associated with climate change impacts

⁴ Decision 21/CP.19 General Guidelines for domestic measurement, reporting and verification of domestically supported nationally appropriate mitigation actions by Developing country Parties

- A technical team of experts to analyse the reports will be established;
- An extension of the mandate of the Consultative Group of Experts to provide technical assistance in implementing reporting obligations is approved;
- The REDD+ package is completed, especially its methodological aspects, finance and coordination of finance;
- Near agreement on a full set of Kyoto Protocol rules and accounting modalities for CP2, but which is not formally adopted due to disagreement on paragraph related to Ukraine (application para. 3.7ter KP).

In conclusion, the main challenges remaining to be tackled during the preparation of COP 20 (in November 2014 in Lima) and COP 21 (in 2015 in Paris) are:

- On GHG mitigation, reaching a critical mass of ambitious and timely “intended contributions”. From the EU side there is work in progress with the ‘2030 climate and energy framework’;
- On the “Applicable to all” principle, the issue of putting the “CBDRRC”⁵ principle into practice is raised with regards to commitments and “Rules-based” multilateral system;
- On adaptation, to define the way to address this issue under the 2015 Agreement;
- On climate finance, to build confidence and manage expectations with all Parties;
- On the character of the legal form of the agreement and the “nationally intended contributions”.

⁵ Common but differentiated responsibilities and respective capabilities (Ref: UNFCCC Convention Article 3, Principles)

All the following issues will be discussed during the up-coming following UN sessions:

10–14 MARCH
Inter-sessional meeting on the Durban Platform, Bonn

4–15 JUNE
Inter-sessional meeting, Bonn (incl. Ministerial meetings)

OCTOBER
A likely additional session of the ADP, Bonn

1–12 DECEMBER
At the COP/CMP in Lima, Peru

Other opportunities for progress in 2014 are linked to:

- Domestic preparations in all capitals;
- Major Economies Forum which is essential to build convergence and momentum;
- G20 (Australia)/G8 (Russia) meetings;
- The UN SG Ban Ki-moon Leaders' Summit on 23 September 2014 – first time Leaders will discuss climate since Copenhagen COP in 2009 + May 3-4 "Ascent" Meeting in Abu Dhabi.

Leaving the international scene, the DG CLIMA presenter moved to the recent 'EU's 2020 Climate and Energy Framework' proposal currently under discussion. Much has been achieved since the EU adopted its first package of climate and energy measures in 2008.

- The EU had reduced greenhouse gas (GHG) emissions by around 18% compared to 1990 levels and is now well on track to meet the 2020 target of 20%.
- The EU had installed about 44% of the world's renewable energy capacity amounting to 13% of gross final energy consumed in the Union.
- It had also reduced the energy intensity of the economy by around a quarter in the period 1990-2010 thanks to improving use of energy in buildings, products, industrial processes and vehicles and by industry which improved its energy efficiency by 30%.

These achievements are the more significant given that the European economy has grown by around 45% in real terms. The 20/20/20 targets for greenhouse gas emissions, renewable energy and energy savings have played a key role in driving this progress and sustaining the 3 or so million people employed in various eco-industries. But,

much has also changed since 2008. The most obvious change is the impact of the economic and financial crisis. Fossil fuel prices remain high which negatively affects the Union's trade balance and energy costs. In 2012, the EU's oil and gas import bill amounted to more than €400 billion or approximately 3.2% of the Union's GDP. The internal energy market has developed but new risks for fragmentation have emerged.

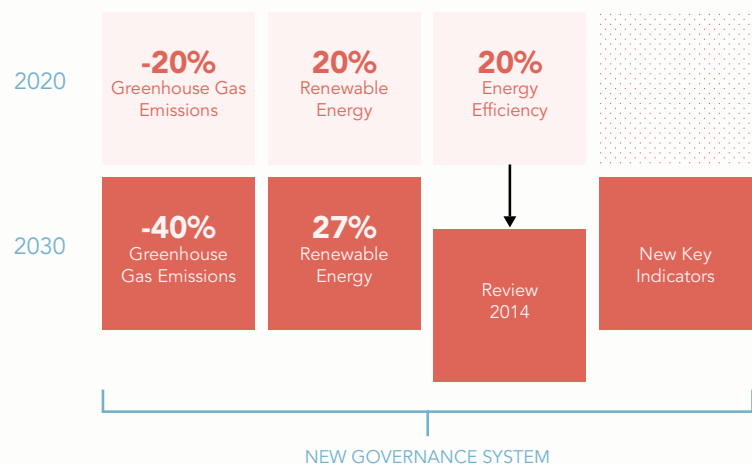
There is also a growing perception that the EU's Emissions Trading System is not driving investments in low-carbon technologies sufficiently well and the rapid development of renewable energy sources poses new challenges for the energy system. It is time to reflect on the policy framework needed for 2030, in line with stakeholders' responses to the Green Paper, there is a need to continue to drive progress towards a low-carbon economy which:

- ensures competitive energy prices for business, affordable energy prices for consumers, creates new opportunities for growth and jobs;
- provides greater security of energy supplies to the European Union as a whole.

Moreover, there is the need to make an ambitious commitment to make further greenhouse gas emission reductions in line with the cost-effective pathway described in the "2050 roadmaps", and to do so in time for the upcoming negotiations on an international climate agreement. The Commission is proposing to provide regulatory certainty as early as possible for investors in low-carbon technologies spurring research, development and innovation and up scaling and industrialisation of supply chains for new

technologies. This must all be done in a way, which takes account of the prevailing economic and political realities and builds on our experience of the current policy framework.

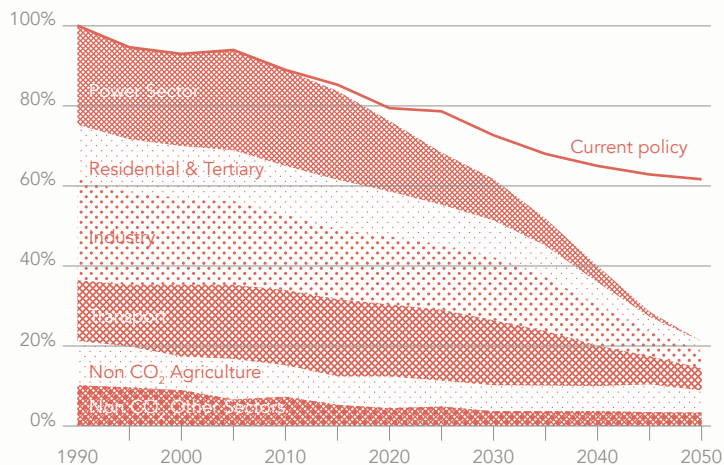
The European Commission recently proposed a GHG target of 40% binding at EU and Member States level, i.e., this is a DOMESTIC target. The proposals will set out plans for an EU-wide [binding] RES target, set at a cost-effective level of at least 27%. A new governance system for the 2030 framework will require Member States to establish national plans for competitive, secure and sustainable energy – including the level of ambition for renewable energy. The Aim of these plans is to create more investor certainty, greater transparency, enhance coherence, EU coordination and surveillance. Energy efficiency remains central in the strategy. The next steps will be decided after the review of Energy Efficiency Directive in 2014.



What are the lessons learnt from the past?

Over the years 1990-2012, the EU was quite successful in decoupling emissions from its economic growth:

- The EU-28 GDP growth was above 44% while GHG emissions decreased by 21.4%;
- EU-28 emissions intensity (tonnes GHG/m€ produced) were reduced by 43.9% (from 691 to 388).



In 2000-2011 only, the EU energy intensity of industry and energy sector decreased by 1.5% each year. **The 2030 climate and energy framework is to accelerate these trends, while realising further opportunities from low-emission development.** The improvement of the energy intensity of the manufacturing sector applies not only for industry at large but for energy intensive industries themselves. Whereas the chemicals industry, paper and pulp, basic metals and non-metallic minerals industries in the EU grew in the period 1995 and 2010 with 54%, 8%, 1% and 0%, their respective CO₂

This proposed EU package was agreed by the European leaders meeting in Brussels on 23 October 2014. The EU as a whole has now committed to cut greenhouse gases by at least 40% by 2030, compared with 1990 levels. This sets the EU on an ambitious climate path ahead of the Paris summit in 2015 when the terms of a new global climate agreement are to be negotiated.

emissions reduced by 12%, 18%, 30% and 22%. The 2030 climate and energy framework is meant to accelerate these trends, while realising further opportunities from low-emission development. Accelerating the decoupling economic growth from GHG emissions is creating a multiple win-win approach:

- **The current oil and gas imports** to the EU is reaching 400 bn per year therefore the need is to shift from “fuel expenditure” to an investment approach;
- **Fuel savings** may reap €18 bn fuel per year in next 2 decades, but it requires additional investments of €38 billion per year over the next 2 decades;
- **From an energy security perspective**, it leads to an additional 11% cut in energy imports in 2030;
- **Regarding the innovation aspect**, the EU eco-industry is now creating 4.2 million jobs;
- **Health and air pollution benefits** can reach €7-13.5 bn in 2030.

The EU long-term planning relies on the following strategy:

- **A cost-efficient pathway to 80% domestic reductions in 2050;**
- **40% domestic reductions by 2030** that will lead to;
- Cutting emissions below 2t/per cap by 2050, down from current 7.5 t/per cap;
- Improving the GHG intensity of EU economy by another 50% in the next two decades.

The EU decarbonisation pathway would include the following elements:

- Additional domestic investment: €270bn/year in 2010-2050, 1.5% EU-GDP;
- Investments in buildings €75bn, transport €150bn, power sector €30bn;

With 40% by 2030 target	1990	2000	2010	2020	2030	2040	2050
Population (million)		486	504	517	525	528	526
Assumed GDP growth rates p.a				1,5%	1,6%	1,4%	1,4%
Total GHG emissions (MtCO ₂ e)	5684	5216	4847	4260	3379	1960	1146
Emission intensity (t of CO ₂ /M€10)		487,2	394,0	299,0	202,7	102,3	52,2
Energy related CO ₂ em./cap		8,2	7,5	6,2	5,0	2,8	1,5
GHG em. Wrt. 1990		-8%	-15%	-25%	-41%	-66%	-80%
Low carbon electricity		46%	49%	60%	73%	85%	94%

- “Investment” in the EU economy and EU jobs, and not defining it as “cost”;
- Delaying action increases overall investment needs;
- Investments with fuel savings: on average €175 to 320bn/year in 2010-2050;
- Air quality and health benefits: €27bn by 2030, €88bn by 2050.

The EU’s “2030 Framework for Climate and Energy” could also fix the EU carbon market because:

- There is a large and persistent market imbalance (surplus >2 billion tonnes);
- A back-loading of auction volume is only a first, temporary step;
- A proposal to create a market stability reserve from 2021 onwards would make EU Emissions Trading System more resilient to demand shocks;
- After a decision is made on 40% Greenhouse Gas Emissions reduction target, a linear increase of the reduction factor as of 2021 from 1.74 % to 2.2% to align the Emissions Trading System cap to agreed 2030 target will be possible;

- Carbon leakage⁶ offered a stable framework for this decade, will be continued but more focused free allocation after 2020.

Finally, the commission's proposal includes the following elements related to the international dimension:

- It is designed and timed to set a high standard for transparency, accountability and ambition;
- 40% headline GHG emissions reduction target are domestic and unconditional;
- Nonetheless it reflects sensitivities of EU's energy intensive industries to international competitiveness concerns;
- *"Should the outcome of the [2015 Agreement] negotiations warrant a more ambitious target for the Union, this additional effort could be balanced by allowing access to international credits"*.

To conclude, the proposal for a "2030 Framework for Climate and Energy" is an ambitious and achievable contribution to the global process, proposing:

- A legally binding, economy-wide reduction target;
- A long-term plan designed to reduce emissions by 80-95% from 1990 levels by 2050, consistent with a fair and effective EU contribution to the 2 degree objective;

⁶ Carbon leakage is the term often used to describe the situation that may occur if, for reasons of costs related to climate policies, businesses were to transfer production to other countries which have laxer constraints on greenhouse gas emissions. This could lead to an increase in their total emissions. The risk of carbon leakage may be higher in certain energy-intensive industries. The sectors and sub-sectors which are deemed to be exposed to a significant risk of carbon leakage are those that figure in an official list which is valid for five years.

- To continue decoupling of EU economy from fossil fuel dependence:
 - To keep growing economically while reducing GHG emissions per capita to 6 tonnes by 2030 and below 2 tonnes by 2050, further reducing EU level of CO₂ per unit of GDP, already a global standard of CO₂ efficiency.

This will need however, a substantial transformation of key economic sectors with:

- Low carbon power generation: 49% in 2010 > 60% in 2020 > 73% in 2030;
- The implementation of the Transport White Paper⁷ including the Indicative goal of 60% transport emissions cut by 2050 which will require gradual transformation of the entire transport system.

In addition further strengthening of the legislation and policies already cutting emission connected to innovation, investment in new technologies, jobs creation and economic growth.

Responding to the question about the efforts of the EU on the issues of energy and mitigation of GHG emissions versus adaptation and loss & damage, his response was that the EU believes that the response to climate change relies on a complementary mitigation-adaptation approach. However, mitigation is the first step for an adaptation strategy as it reduces the expected impacts of climate change. The EU has adopted last year only its own regional adaptation strategy, and similar strategies are in place or

⁷ Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, Brussels, 28.3.2011 COM(2011) 144 final.

underway in Member States. The EU is also committed to ensuring adaptation is included in the 2015 Agreement, but the main challenge in 2015 is raising ambition on mitigation.

How do developing countries can make commitments on a voluntary basis? The transition of reducing GHG emissions by 20% (2020) to 40% (2030) is a huge challenge. So, how countries whose energy supply is essentially based on fossil energy will achieve this goal?

In international law, all Parties enter into commitments is voluntarily, however once an agreement is made, each party must honor its commitments. Even under a binding agreement, commitments can be expressed in more or less mandatory terms. The Commission proposal is indeed an ambitious commitment, and in the process of decarbonizing the EU economy will mean the EU becomes less dependent on the use and the import of fossil fuels – including imports from the region. As for our trading partners, meeting the climate challenge will require a further diversification of our economy, which in turn will make it more resilient to climatic and economic changes.

Several developed countries would like to discuss the loss and damage issue in the framework of adaptation:

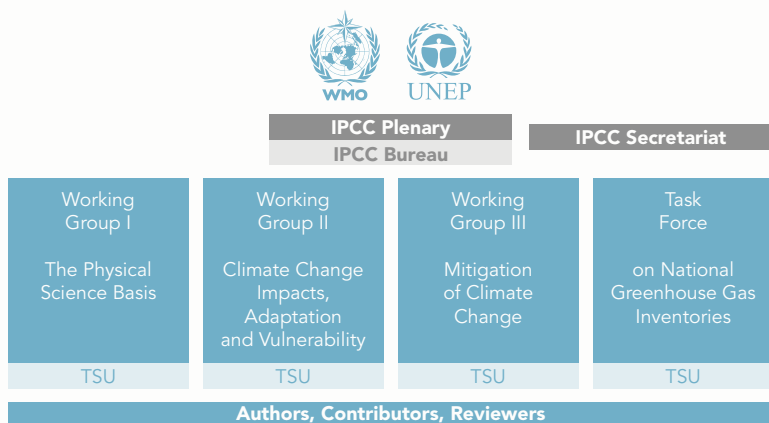
Indeed, there is no substantive difference between the two concepts: adaptation rather focuses on resilience while losses and damages address the climate change impacts. Therefore the EU believes that the Cancun Adaptation Framework as the most appropriate framework to address the issue of loss and damage, and looks forward to participating in the mechanism on loss and damage set up in Warsaw.

3. GLOBAL & REGIONAL CLIMATE SCIENCE

Climate change: Some key messages from the IPCC WGI,

by Jean-Pascal van Ypersele⁸ IPCC Vice-chair, Université catholique de Louvain, Belgium

Prof. J.P. van Ypersele gave first a general presentation on the IPCC itself, including its structure composed of 3 working groups and a task force, and outputs. The Intergovernmental Panel on Climate Change (IPCC, www.ipcc.ch) was established by UNEP and WMO in 1988 to provide policy - makers with an objective source of information about:



- The causes of climate change dealt with in Working Group I.
- Potential environmental and socio-economic impacts and adaptation options dealt with in Working Group II.
- Options for mitigation (emission reductions) dealt with in Working Group III.

The IPCC writing cycle over 4 years is composed of the following open and transparent steps:

- The table of content of reports is decided in Plenary session after a scoping effort;
- The Bureau appoints world-class scientists as authors, based on publication record and geographical balance
- Authors assess all scientific literature;
- The drafts produced are subject to an Expert Review, and authors have to take each comment into account. This process is accompanied by Review editors for each chapter;
- The 2nd Draft Report and 1st Draft of the Summary for Policy Makers (SPM) are submitted to a combined expert/government review;
- A final (3rd) Draft is produced; the 2nd Draft of the SPM is subject to a Government review;
- The Approval of the SPM and the acceptance of the full reports take place in plenary, offering and interaction between authors and governments representatives; the scientists however have the last word.

⁸ E-mail: vanyp@climate.be; Twitter: @JPvanYpersele; Facebook page: www.facebook.com/JPvanYpersele

The work is produced by 831 Lead authors, selected from around 3000 CV submitted by all countries.

The five IPCC assessments reports have influenced global action on an unprecedented scale as stated in the box (right).

The 5th Assessment Report (AR5) currently under approval, is undoubtedly the best and most comprehensive report ever produced by the IPCC.

As illustrated on the left side, it is a comprehensive assessment offering:

- A better integration of Mitigation and Adaptation;
- Improved risk-management approach;
- Evolving away from the non-mitigation SRES scenarios (SRES=Special Report on Emission Scenarios, 2000);
- Special effort was made to provide regional information when available;
- Sustainable development & equity aspects;
- More comprehensive treatment of economic aspects, and of cross-cutting issues;
- Emerging issues handled (geo-engineering, ...);
- Better handling & communication of uncertainties.

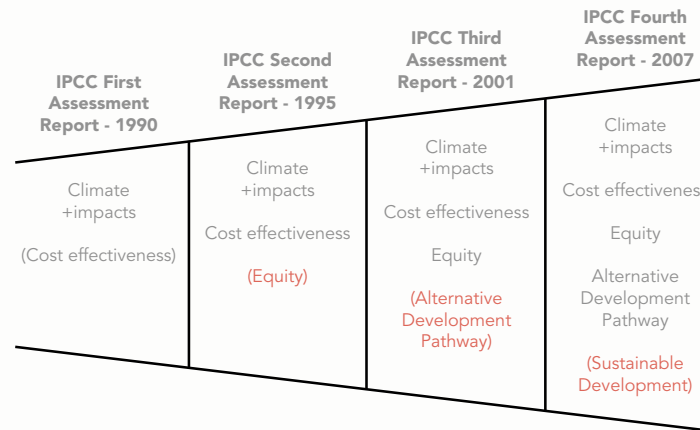
The First Assessment Report (FAR, 1990) had a major impact in defining the content of the UNFCCC

The Second Assessment Report (SAR, 1996) was largely influential in defining the provisions of the Kyoto Protocol

The Third Assessment Report (TAR, 2001) focused attention on the impacts of climate change and the need for adaptation

The Fourth Assessment Report (AR4, 2007) informed the decision on the ultimate objective (2°C) and created a strong basis for a post-Kyoto Protocol agreement

The Fifth Assessment Report (AR5, 2013-14) will inform the review of the 2°C objective, and will be the context for preparing the Paris 2015 agreement.



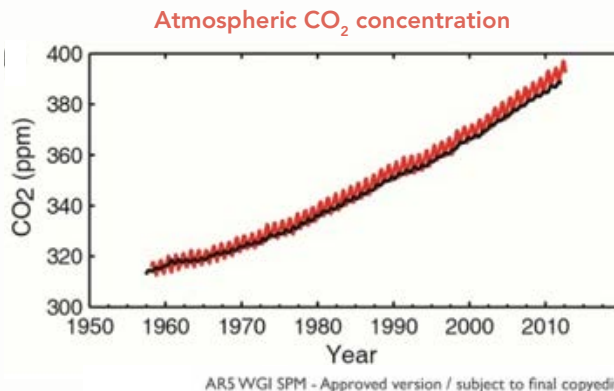
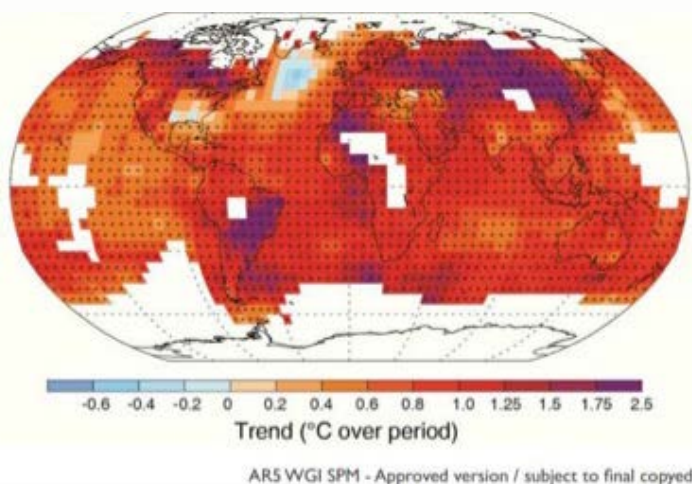
Najam et al., 2003 and Alam, 2007

The Key Messages of the Working Group I Summary for Policy Makers⁹ (SPM) were worded under 19 Headlines. They are summarized in the 3 following points:

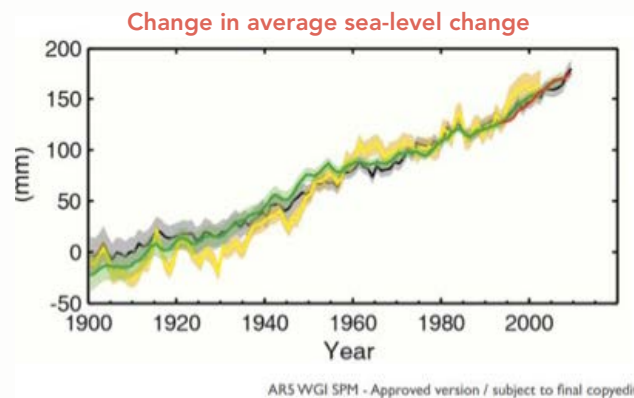
- Warming of the climate system is unequivocal;
- Human influence on the climate system is clear;
- Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions.

These are visually summarized in some selected slides of the IPCC AR5 below.

Warming in the climate system is unequivocal



Sea levels are rising faster now than the mean rate over the previous two millennia, and the rise will continue to accelerate – regardless of the emissions scenario¹⁰ even with strong climate mitigation. This is due to the inertia in the system.



⁹ IPCC AR5 WGII will be released on March 31, 2014, and WGIII on April 13, 2014. All available on www.ipcc.ch

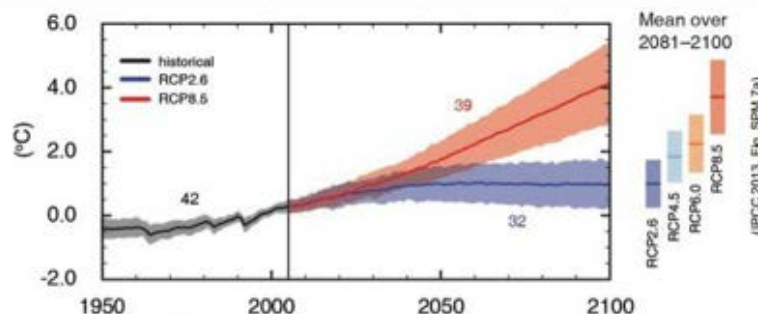
¹⁰ Source IPCC: The AR5 is built on scenarios called 'Representative Concentration Pathways' (RCPs) which for the first time include scenarios that explore approaches to climate change mitigation in addition to the traditional "no climate policy scenarios". All the RCP data is available from: www.iiasa.ac.at/

The future warming by 2100 – with comparable emission scenarios – is **about the same as projected in the previous report**. For the highest scenario however, the best-estimate warming by 2100 is still 4 °C.

The AR5 also includes a **Regional Atlas** of regional projections produced by WG 1 providing:

- > 70 pages of maps, initially provided for RCP4.5 only: “temperature and precipitation changes” (winter & summer average climate, including model uncertainties);
- Other RCPs & seasons available as supplement material;
- As shown on the right slide, the maps for the Middle East and North Africa are to be found pages 44 to 47 of the IPCC Report.

Global average surface temperature change

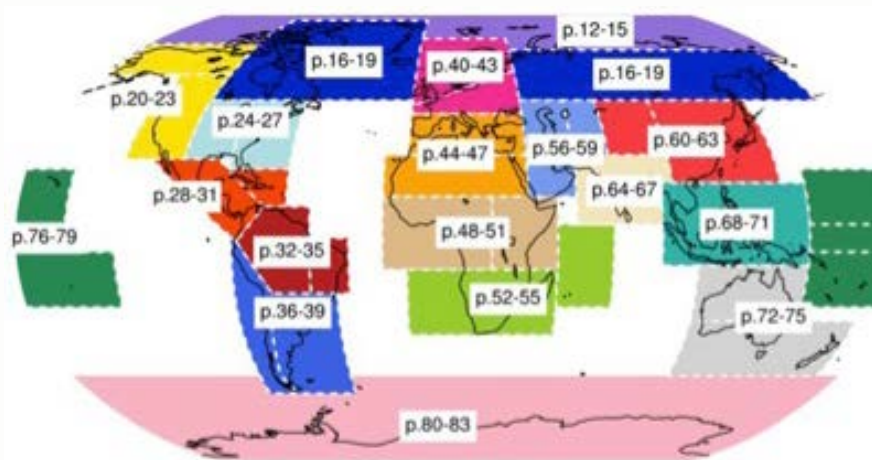


Global surface temperature change for the end of the 21st century is *likely* to exceed 1.5°C relative to 1850 for all scenarios

IPCC AR5 Working Group I
Climate Change 2013: The Physical Science Basis

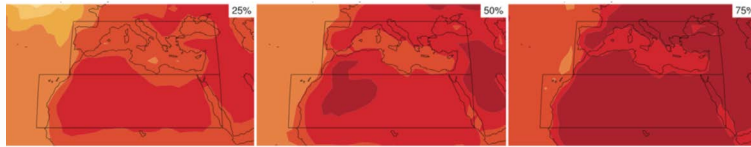
ipcc
www.ipcc.org
www.climatechange.org

The future temperature development in the highest emissions scenario (RCP 8.5 in red) and in a scenario with successful climate mitigation (RCP 2.6 in blue) – the “4-degree world” and the “2-degree world.”



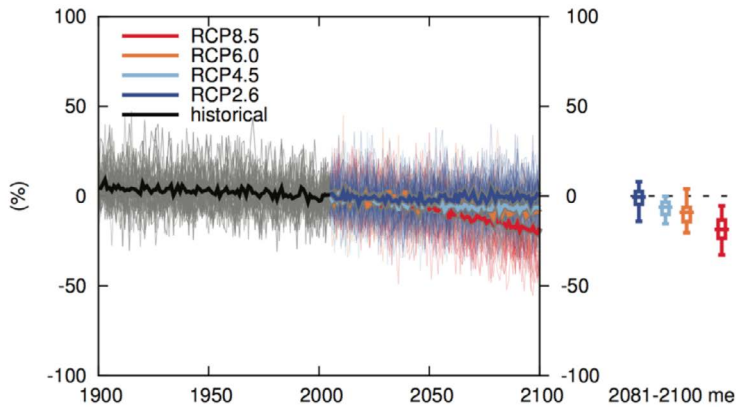
The IPCC expects that dry areas become drier due to temperature increase; in the Mediterranean region and Middle East, temperature increase could have an important impact as shown under scenario RCP8.5 (even with a successful adaptation).

South Europe – Maps of temperature changes in 2081-2100 with respect to 1986-2005 in the RCP8.5 scenario (annual)



IPCC WG1 Fifth Assessment Report-Atlas of Global and Regional Climate Projections (Final Draft)

Precipitation change – South Europe / Mediterranean annual



IPCC WG1 Fifth Assessment Report-Atlas of Global and Regional Climate Projections (Final Draft)

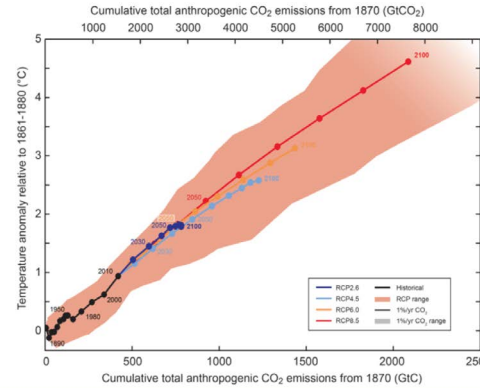


Fig. SPM.10

Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions.

IPCC AR5 Working Group I
Climate Change 2013: The Physical Science Basis



RCP2.6

RCP8.5

Change in average surface temperature (1986-2005 to 2081-2100)

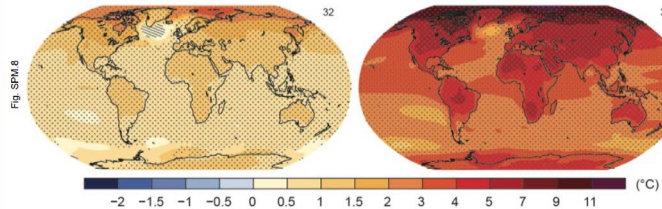


Fig. SPM.8

We have a choice.

IPCC AR5 Working Group I
Climate Change 2013: The Physical Science Basis



The slide above shows IPCC projections for temperatures increase in the future - relative to their average levels (between 1986 and 2005 to 2081-2100) according to scenario RCP2.6 (left), a low emissions scenario where carbon emissions are rapidly cut, and RCP8.5 (right), a high emissions scenario with no carbon cuts.

Since the First assessment Report (FAR, or AR1) in 1990, a progression of the understanding the climate change issue by the IPCC is noticeable: in particular, the recognition now considered even more certain (> 95%) that **human influence has been the dominant cause** of the observed warming since the mid-20th century. (See quotes from all the reports on the right) The likelihood of further changes (such as extreme weather and climate events) is also more strongly assessed from “*Virtually certain*” to “*Very likely*” (see Table below from AR5).

- AR1 (1990): “unequivocal detection **not likely for a decade**”
- AR2 (1995): “balance of evidence suggests **discernible human influence**”
- AR3 (2001): “most of the warming of the past 50 years is **likely** (odds 2 out of 3) due to human activities”
- AR4 (2007): “most of the warming is **very likely** (odds 9 out of 10) due to greenhouse gases” IPCC
- AR5 (2013): «It is **extremely likely** (odds 95 out of 100) that human influence has been the dominant cause...».

Extreme weather and climate events:

Phenomenon and direction of trend	Assessment that changes occurred (typically since 1950 unless otherwise indicated)	Assessment of a human contribution to observed changes	Likelihood of further changes	
			Early 21st century	Late 21st century
Warmer and/or fewer cold days and nights over most land areas	<i>Very likely</i>	<i>Very likely</i>	<i>Likely</i>	<i>Virtually certain</i>
Warmer and/or more frequent hot days and nights over most land areas	<i>Very likely</i>	<i>Very likely</i>	<i>Likely</i>	<i>Virtually certain</i>
Warm spells/heat waves. Frequency and/or duration increases over most land areas	<i>Medium confidence</i> on a global scale. <i>Likely</i> in large parts of Europe, Asia, and Australia	<i>Likely</i>	<i>Not formally assessed</i>	<i>Very likely</i>
Heavy precipitation events. Increase in the frequency, intensity, and/or amount of heavy precipitation	<i>Likely</i> more land areas with increases than decreases	<i>Medium confidence</i>	<i>Likely</i> over many land areas	<i>Very likely</i> over most of the mid-latitude land masses and over wet tropical regions
Increases in intensity and/or duration of drought	<i>Low confidence</i> on a global scale. <i>Likely</i> changes in some regions	<i>Low confidence</i>	<i>Low confidence</i>	<i>Likely</i> (medium confidence) on a regional to global scale
Increases in intense tropical cyclone activity	<i>Low confidence</i> in long term (centennial) changes <i>Virtually certain</i> in North Atlantic since 1970	<i>Low confidence</i>	<i>Low confidence</i>	<i>More likely than not</i> in the Western North Pacific and North Atlantic
Increased incidence and/or magnitude of extreme high sea level	<i>Likely</i> (since 1970)	<i>Likely</i>	<i>Likely</i>	<i>Very likely</i>

IPCC, AR5, Table SPM.1

4. CLIMATE FINANCE

4.1 Climate Finance under the UNFCCC

by Donald Singue Tanko,

Associate Programme Officer, Finance Sub-programme, UNFCCC Secretariat.

Several entities under the Convention are currently delivering finance:

- **The Global Environment Facility** has been operating as an operating entity since 1994, and currently undergoing its sixth replenishment (GEF5 finishes on 30 June). How much will be allocated to climate change under GEF6 is to be seen because of other focal areas e.g. mercury and biodiversity are also competing.
- **The Green Climate Fund:** the board decided on its business model framework in 2013, and is now awaiting for initial mobilization of resources, as guided by COP 19. Possible first round of initial mobilization is

expected by third quarter of this year (based on the progress made by the GCF Board in completing the requirements for the viability of the Fund).

- **The Adaptation Fund** is regarded as one of the innovative climate change financing mechanism because of its autonomous replenishment system by using 2% of the CERs, and the possibility for developing countries to directly access the fund through their national implementing entities. At COP 19, developed country Parties pledged \$100M to enable the fund to continue its operations in 2014.

The climate finance architecture evolved considerably from the COP in Bali (2007) to the last COP in Warsaw (2013)



Climate finance work in the Convention is characterized by the following approaches:

- **Enabling Parties** to make informed decisions through technical work and recommendations done by the Standing Committee on Finance.
- **Implementation phase** of the climate finance architecture to ensure effective mobilization, delivery and deployment of climate finance.
- **Confidence-building** in the ability of the Convention to deliver concrete support to enhanced actions on mitigation and adaptation in developing countries.
- **Expansion and engagement** of key players, e.g. private sector, multilateral/bilateral organizations, in the mobilization and deployment of climate finance is a work in progress.

The major COP/CMP mandates from Warsaw relevant to climate finance are listed below

Area of work	Mandate
ADP ¹¹	<ul style="list-style-type: none"> • Adopt a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties at COP 21, which will include elements related to climate finance
Long-term finance (LTF)	<ul style="list-style-type: none"> • In the context of mobilization goal of USD 100 billion per year by 2020, in-session workshops on strategies and approaches for scaling up climate finance, cooperation on enhanced enabling environments and support for readiness activities, and on needs for support to developing countries, from 2014 to 2020 • A biennial high level ministerial dialogue on climate finance starting in 2014 and ending in 2020
Standing Committee on Finance (SCF)	<ul style="list-style-type: none"> • Prepare the first biennial assessment and overview of climate finance flows by COP 20, in the context of MRV of support provided to developing country Parties • Organize a forum for the communication and continued exchange of information among bodies and entities dealing with climate finance, which will focus on adaptation finance in 2014 and financing for forests at the earliest possible • Provide to the COP draft guidance for the operating entities of the financial mechanism of the Convention (the GEF and the GCF) • Provide expert input to the fifth review of the financial mechanism, with a view to the review being finalized by COP 20 • Consider ongoing technical work on operational definition of climate finance
Global Climate Fund (GCF)	<ul style="list-style-type: none"> • Finalize as soon as possible the essential requirements to receive, manage, programme and disburse financial resources so that the GCF can commence its initial mobilization process as soon as possible and transition subsequently to a formal replenishment process
Global Environment Facility (GEF)	<ul style="list-style-type: none"> • Clarify the concept of co-financing and its application in the projects and programmes of the GEF • Further specify the steps that it has undertaken in response to the request to enable activities for the preparation of the NAP process for developing country Parties
Adaptation Fund (AF)	<ul style="list-style-type: none"> • An account held in the CDM registry for the AF shall be the recipient of the 2 per cent share of proceeds levied on AAUs/ERUs during CP 2 • SBI to consider the second review of the AF, with a view to recommending a draft decision for consideration and adoption by CMP 10

¹¹ Ad Hoc Working Group on the Durban Platform for Enhanced Action (AP) 2011.

4.2 EU perspective on Climate Finance

by Stefan Agne, Directorate General for Climate Action, European Commission

A wide range of international commitments were made on climate change. Therefore, cooperation must be country specific taking into account different development needs and expectations. Enabling a “*spectrum of commitments*” in the 2015 Agreement requires a “*spectrum of cooperation*” and country-specific support linked the respective national climate policies.

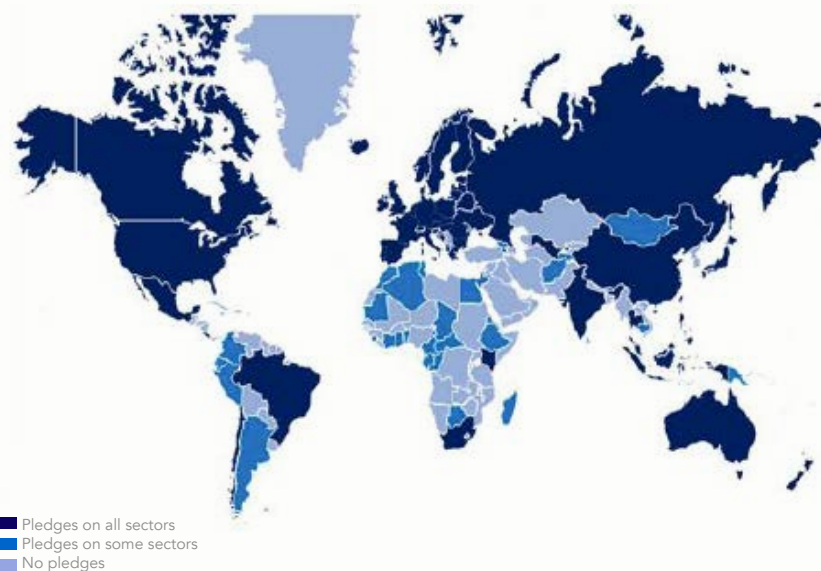
Effective climate policies are linked to the overall development policies of a country. It is essential to ensure consistency and seek synergies between the various planning tools (National development plans and strategies, Low Emission and Climate Resilient Development Strategies (LECRDS), National Adaptation Plans (NAPs), and REDD+ strategies) and **the respective national and international financing instruments**. The EU supports climate actions the in the Southern Neighbourhood through a variety of different instruments.

Firstly, the EU supports programmes such as the “*ClimaSouth Programme*” or the “*Low-emission Capacity Building Programme*” (LECB) which provide **platforms for policy dialogue and capacity building** in the host countries and regions.

Secondly, the **EU’s Neighbourhood Investment Facility (NIF)** co-finances climate relevant investment projects. Since its launch in 2008, the NIF has approved more than 80 investment projects with a grant contribution from the EU budget of over €750 million, of which about 60% for climate relevant projects. The total investment volume of these projects amounted to more than €20 bn.

Thirdly, the **European Investment Bank (EIB)** promotes investments in the Mediterranean Partner Countries (MPCs) through the **Facility for Euro-Mediterranean Investment and Partnership (FEMIP)** with the objective to support the modernization and opening of economies in partner countries through:

- investment to support the private sector and create an investment-friendly environment,
- dialogue between Euro-Mediterranean partners through an advisory governance structure (FEMIP Ministerial meetings, FEMIP Committee meetings, FEMIP Conferences).



EIB operations in the Southern and Eastern Mediterranean countries considered climate as a priority under the current mandate (2007-2013), particularly from 2010 onwards, and it will remain as a priority under the new mandate of (2014-2020). From 2010 to 2013, nearly EUR 1bn was invested in climate operations in countries in the region, representing approximately 17% of the overall investment portfolio.

Climate operations include both mitigation and adaptation actions; they are in support of energy efficiency, renewable energy, sustainable transport, water resource management, water supply and wastewater.

The table on the right gives an overview of climate relevant operations in the Southern Neighbourhood, which were co-financed by the EIB / FEMIP.

The EU has first-hand experience in climate and development policy making and implementation and in designing financial instruments to mobilise private investment in low-emission climate resilient infrastructure. The key issue at stake is how to attract private investment in low-emission and climate resilient infrastructure and technologies. With effective national climate policies and enabling environments in place, financial instruments can speed up the transition to a low-emission and climate resilient development path.

Country	Year of Signature	Operation name	Project Description	Total Climate Action signed EUR M
Morocco	2008	FONDS CAPITAL CARBONE MAROC	Equity participation in closed-end carbon fund	5
Egypt	2009	WIND FARM GULF OF EL ZAYT	Large-scale onshore wind farm on Red Sea coast, south-east of Cairo, to supply national power	50
Morocco	2009	TRAMWAY RABAT	Tramway Rabat	15
Tunisia	2010	RÉSEAU FERROVIAIRE RAPIDE	First phase of construction of 18 km of priority railway lines in Tunis	119
Israel	2011	SOREK DESALINATION PLANT	Construction of reverse-osmosis sea water desalination plant in Sorek, south of Tel Aviv, Israel	71
Israel	2011	MEKOROT ASHOD DESALINATION PLANT	Construction of reverse osmosis seawater desalination plant in Ashdod (south of Tel Aviv)	60
Egypt	2012	CAIRO METRO LINE 3 (PHASE 3) A	Extension of Line 3 (Phase 3) of the Cairo Metro with 17.7 km to serve the main transportation corridors of urban greater Cairo.	200
Israel	2012	BETTER PLACE ELECTRIC VEHICLE SERVICE	R&D and start-up of electric vehicle infrastructure and service scheme	11
Israel	2012	ISRAEL CHEMICALS LTD IPP	Construction of combined cycle gas turbine combined heat and power plant near Sdom (southern part of Dead Sea)	100
Lebanon	2012	LEBANON ENERGY EFFICIENCY AND RENEWABLES GL	Financing of renewable energy and energy efficiency projects carried out by private sector companies	50
Morocco	2012	CENTRALE SOLAIRE DE OUARZAZATE	Construction of first phase of solar power complex in Ouarzazate	100
Morocco	2012	PLAN MAROC VERT PNEEI	Part-financing of national irrigation water saving programme comprising upgrading of public irrigation systems	13
Jordan	2013	TAFILA WIND FARM	The project concerns the development, construction and operation of a 117 MW wind farm as well as the associated electrical facilities in the Tafila Governorate	53
Morocco	2013	ONEE-PROJET EOLIEN	Ce projet concerne le développement de trois parcs éoliens dans le cadre de la phase II du Programme Eolien Intégré de l'ONEE sur les sites de Tanger II (150 MW), Midelt (100 MW) et Jbel Lahdid (Essaouira - 200 MW)	200
Total				1,047

EIB's portfolio of climate relevant operations in the Southern Neighbourhood 2008–2013

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5. ADAPTATION: APPROACHES AT LOCAL, SECTORAL AND NATIONAL LEVELS

This session was designed to present adaptation measures taken at three levels: at the local level, with the example of a community based adaptation implemented in Egypt, at the sectoral level with adaptation measures applied in the sector of agriculture in Palestine and at the country level with the case of the National Adaptation Plan in Spain.

5.1 Social, Ecological and Agricultural Resilience

by Dr. Amr Abdel Mageed, SEARCH CEDARE Presentation made by Clarisse Kehler Siebert

At the community level, the experience of the SEARCH¹¹ Project implemented in Egypt through the operational methodology called “Participatory Planning Cycle (PPC)” has defined the key challenges to address resilience to climate change in Beni-Suef and Minya Governorate:

- pressure on natural resources,
- other emerging factors such as increase in population; and
- water managed in a highly centralized manner, which

¹¹ SEARCH “Social, Ecological and Agricultural Resilience in the Face of Climate Change” is implemented in Egypt, Jordan, Palestine, Morocco, and Lebanon through a partnership of 13 partners aiming to increase joint learning and community climate change resilience by demonstration sites and development activities

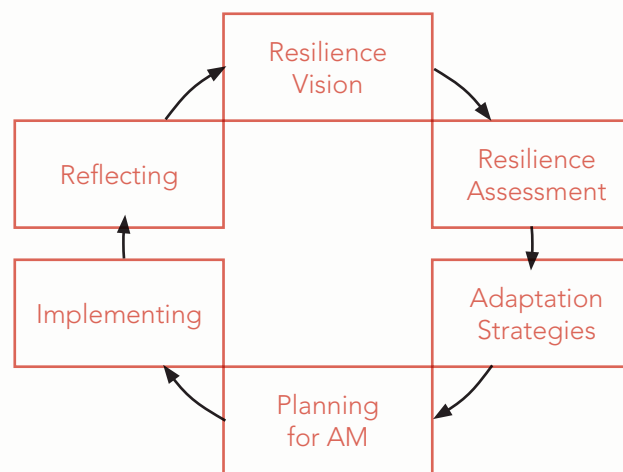
failed to integrate the ecosystem management and satisfy the end users needs.

A framework including diversity, self-organization and governance, innovation and green infrastructure, and learning was the basis for developing resilience plans in the communities.

The capacity of stakeholders to deal with climate change and design adaptation measures especially within the water and agriculture sectors is likely the key challenges.

Two other equally important challenges concerns:

- Increase efforts to integrate knowledge across scales in order to transfer the right messages to target farmers.
- Enhance awareness on adaptation to CC through innovative approaches. In the Egyptian Experience: the pilot schools of the farmers have been adopted for job training as well as CC was incorporated into awareness programs to the farmers.



SEARCH Participatory Planning Cycle

A brief review of Pilot activities Farmer field schools in the vulnerable EI-Masharka and Mayana villages, through an agricultural Extension in order to transfer messages and knowledge to target farmers has allowed to enhance Knowledge level (pre assessment average was 68% and the post assessment is 94%) as well a positive elements such as awareness on the relation between adaptation to climate change on agricultural production.

5.2 Planning agriculture water demand management under vulnerable climate changes

by Jamal Al-Dadah, Head of Planning Department, Palestinian Water Authority Gaza Strip

At the sectoral level, the experience in planning agriculture water demand management in Palestine under vulnerable climate, has highlighted the need to simultaneously integrate the local as well the national levels.

The main findings are:

- The prioritization of no-regrets adaptation options, working from an adaptation perspective rather than a mitigation entry point
- Define a set of integrated prioritized actions
- Improving water management and conservation through policy, technological and management interventions. Concentrating on water saving, not only because of climate change, but as a long-term solution to water shortage.
- Managing water demand through efficient pricing, cost recovery and regulatory measures, and related education and training;

- Focus on the use of fertilizers in socio- economic terms, pollution control and affordable mitigation measure.
- Upgrading the irrigation technology needs as well as irrigation institutions need to become more service oriented and water-saving technologies should be promoted.
- Introduce or enhance Agricultural Technologies for Climate change mitigation and adaptation in the Palestinian lands for farmers and agriculture.
- Using relevant technology adapted to low-income / poor developing countries.
- Encouraging farmers to apply cheap mitigation measures (and already familiar to them) such as organic agriculture and urban agriculture.
- Focus on waste water reuse as a mitigation measure for water shortage and climate change.
- Carry out regional projects to implement climate change mitigation measures and exchange experience among countries interested in climate change.

Climate information need for water planning:

- **Long-term** (10-50 years): climate change information is needed for strategic policy and planning purposes
- **Medium-term** (6-9 months): information on climate variability is needed for planning and operational purposes
- **Short-term** (0-10 days): weather data are needed at operational ends (e.g. flood warnings)



- Focus on the potential risks like sea water intrusions and sea water level etc. at the regional level.
- Although, the immediate focus of Palestine is to address the local and national as priorities, but the key priority is at the sub-regional level and feels the need to enhance cooperation in the Mediterranean Sea basin.

The key challenge is to enhance the mainstreaming of measures to address climate change into ongoing planning and management processes, so as to ensure the long-term viability and sustainability of sectoral and development investments.

5.3 The Spanish National Adaptation Plan

by Jose R. Picatoste Ruggeroni , Ministerio de Agricultura, Alimentación y Medio Ambiente, (Spain)

At the national level, the Spanish experience in the development of the National Adaptation Plan to Climate Change (NAPCC) has highlighted several lessons:

- Establish a coordination framework that has the legitimacy to bring together all national partners
- Facilitate a participatory approach involving all participants and ensure ownership of this strategy
- The need to adopt a scientific approach in order to benefit from the support of research & Development, including methods and tool for assessing impacts and vulnerability.
- The opportunity to create a communication platform¹².

This Spanish experience of adaptation planning at the national level has drawn the attention of participants. The

¹² The Spanish adaptation platform AdapteCCa <http://adaptecca.es/>

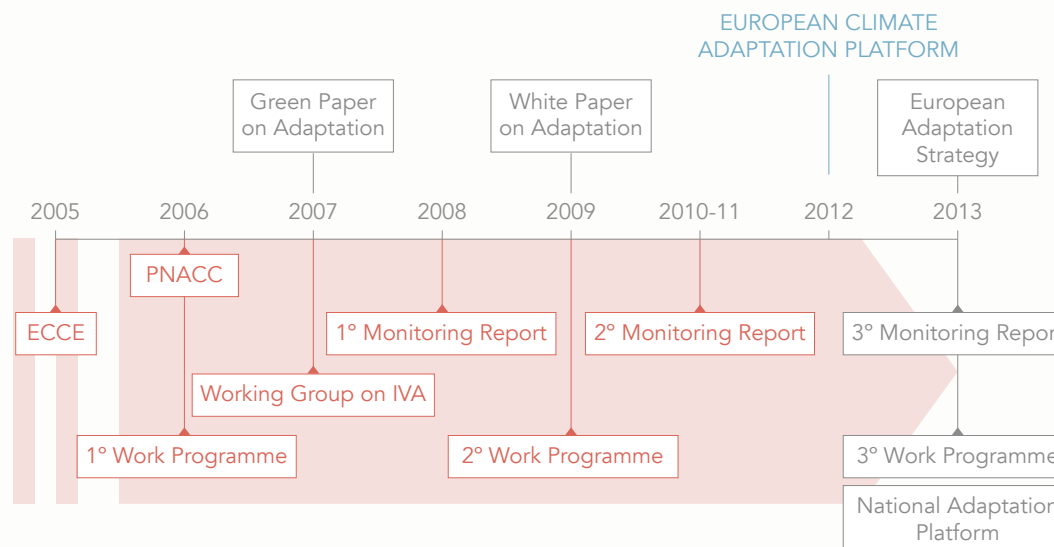
interest was particularly focused on the budget of the PNACC as well as the sources of funding. Likewise, other questions in relation to priority sectors and how can the PNACC contribute to the mainstreaming of climate change in the process of development planning. In fact the budget for the elaboration of the PNACC comes essentially from the Spanish Climate Change Office as well as contributions from other sectors.

In 2006 (see chart below) at the start on the reflection on the PNACC three priority sectors (water, biodiversity and coastal regions) have been identified. Thereafter several sectors/geographic territories expressed their interest and were subsequently integrated (13 sector/activities and 6 geographic territories). Similarly, through coordination within the PNACC, assessing the impacts of CC

The Spanish National Adaptation Plan (PNACC)

- The general objective is to integrate adaptation to climate change into the planning strategy of the different socioeconomic sectors and ecological systems.
- The coordination framework:
 - The Coordination Commission of Climate Change Policies (CCPCC)/ Working Group on Adaptation
 - Inter-ministerial Commission for Climate Change
 - The National Climate Council.
- The Structure: Four axis and two pillars for the Adaptation Cycle

Overview of recent milestones



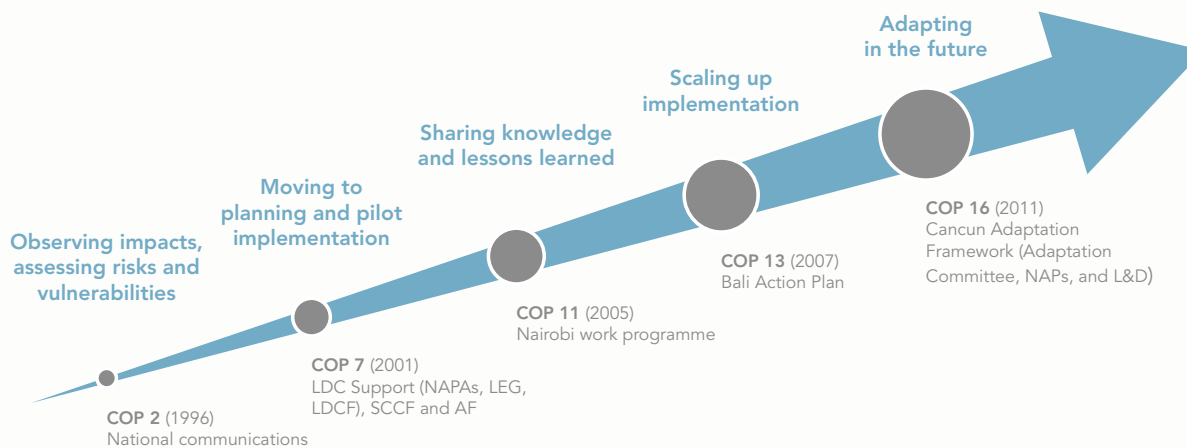
on water resources was conducted based on several CC scenarios and referring to 17 watersheds. Thereafter, this information was integrated into the planning process development through the following assumptions: Northern Spain; a decrease of 2 to 3% in water availability is projected, while the South of Spain (more arid); the expected decrease reached 11%. The Mediterranean region provides opportunities for cooperation through sharing experience and capacities in the adaptation field for specific Mediterranean climate change challenges.

5.4 Overcoming adaptation challenges

by Clarisse Kheler Sieber, Research Fellow, Stockholm Environment Institute

Understandings of the importance, necessity and limits of adaptation have changed over time. As illustrated in the Adaptation Committee’s 2013 report (see figure ‘*Evolution of adaptation under the Convention*’), the international policy community has moved from thinking about intentional adaptation to implementing it. This development has been described as a progression from asking ‘*Do we need to adapt?*’ to ‘*How can we adapt?*’ then, to ‘*How can we integrate adaptation into other relevant policies?*’

A significant adaptation policy landmark was the Cancun Adaptation Framework (CAF) under the 2010 Cancun Agreements (see Figure ‘*Cancun Agreements*’). Under the CAF, a number of processes and institutions were established, and the CAF demonstrates that adaptation is an important focus under the UNFCCC. But adaptation does not happen at the states level at international negotiations; rather it happens at the level of, and by, people affected tangibly by climate change. Commu-



From The State of Adaptation under the UNFCCC: 2013 Thematic Report. A report of the Adaptation Committee, at p.12.

Evolution of adaptation under the Convention

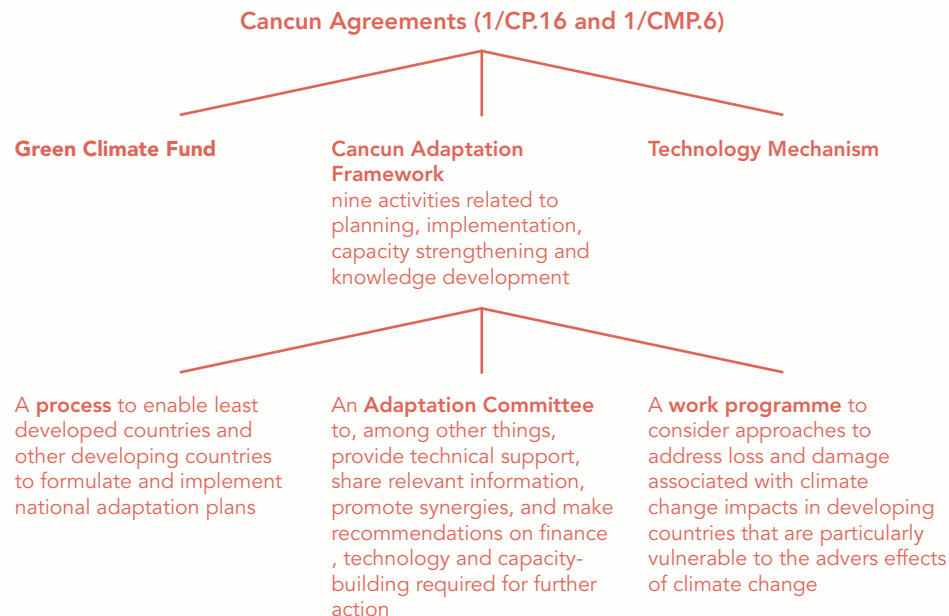
nity-based adaptation aims to empower communities to use their own knowledge and decision-making processes to take action.

The fact that adaptation is regarded as important under the UNFCCC does not mean that other practical challenges to planning, financing and implementing adaptation have been overcome. An attempt was made to summarise some of the challenges and lessons that can be drawn from the preceding presentations.

- A first group of challenges were grouped as ‘*conceptual challenges*’. These include the clear fact that adaptation is part of a much larger ‘*climate change complex*’ that includes not only mitigation, but also all kinds of

other considerations including societal, economic, and scientific considerations. While adaptation is clearly important and necessary, so are many other issues, and adaptation needs do not alone drive policy and investment decisions. In addition, it is relatively recent that the ‘adaptation taboo’ has lifted: for a long time, adaptation was clearly a least preferred or secondary response to climate change.

- A second set of challenges were classified as ‘**capacity and information challenges**’. These challenges can be as basic as there being a lack of awareness about climate change at the community level, to the fact that both climate change and adaptation are esoteric concepts and need to be explained in language that is relevant and appropriate to local conditions. Building capacity at a community or local level is now the focus of many adaptation activities, but it is far there is much still to be done.
- A third group of challenges were challenges to ‘**financing adaptation**’. This was mentioned only briefly as financing is covered in great detail elsewhere in the workshop – though in sum it can be said that as a private good or service, adaptation activities broadly have more difficulty attracting investment than mitigation as a public good.
- Finally, a fourth set of challenges were clustered under ‘**challenges to integrating policies**’ (‘*mainstreaming*’). Mainstreaming here means integrating adaptation policies and measures into broader, on-going policies and investments. This is, it is argued, more effective and efficient than designing and implementing adaptation policies completely separately.



Source SEI Richard Klein

A group activity was organised to allow participants to consider the relative importance of four levels of adaptation policies. These levels were local communities, national governments, regional cooperation and international cooperation (under the UNFCCC). The following activity was used to start these group discussions.

On a scale of 1 to 3, (1: unimportant, 2: neutral, and 3: very important), participants were asked to rate the importance of these 4 levels of adaptation policies in assessing adaptation needs, creating policy, and implementing adaptation according to following the table:

	Assessing needs	Creating Policy	Implementing
Local			
National			
Sub-Regional			
International (UNFCCC, etc.)			

A set of two questions guided each group to allow participants in sharing experiences and expressing their views on gaps and bottlenecks to overcome methodological, institutional, legal, financial issues to make progress on adaptation planning and implementation.

Group 1: The bottom Up/Local approach

Benefits of bottom-up:

If we want to build viable strategies we should start with a precise assessment of needs of those most affected communities. Moreover, adaptation indicators generally relate to improving the resilience of these communities

to climate risks (People are indicators in the end). Similarly, action at the local level allows making decisions at the closest possible level to implementation as well as and promotes ownership. Finally, transparency and accountability is needed and this is most easily achieved at a community level where participation is ensured.

Challenges:

- Changing a culture: sometimes we need to convince a community that changes are required in order to reduce vulnerability and adapt to climate impacts. Past experiences are there to show the weight of this community culture which results in scepticism in top-down approaches as well as unwillingness to take bottom up initiative.
- Make the link with the CC: because of a low level of knowledge, some problems related to climate risks are perhaps seen but not linked to CC. It is appropriate to innovate in the capacity building by ensuring a proximity with vulnerable communities and adopting a participatory approach.
- Institutionalize the process: It is necessary to ensure broad participation of all stakeholders including the university, citizen associations, private sector, etc. This approach should be supported by a legal framework to ensure sustainability.

Key message:

Adopt an integrated approach because the local level is essential for judicious identification of needs however; the situation becomes complicated when it comes to raising funds and resources necessary for implementation. Therefore, the coordination with the national level as intermediary, is helping with prioritising, scaling up, etc. To address these gaps, top down and bottom up approaches must operate in an integrated manner.

Group 1:

1. What are the benefits of carrying out adaptation needs assessment, formulating adaptation policy, and implementing them at the local level?
2. What are the challenges in carrying out adaptation needs assessment, making adaptation policy, and implementing them locally? Are there limits that require engaging other levels of engagement (e.g. national, regional, international)?

Group 2:

1. What are the benefits to carrying out adaptation needs assessment, making adaptation policy, and implementing them at the Sub-regional/National level?
2. What are the challenges carrying out adaptation needs assessment, making adaptation policy, and implementing it internationally? Are there limits that require engaging other levels of engagement (e.g. local, national, Sub regional)?

Group 2: The sub-regional/National levels

Importance of involvement of local to national in assessment needs, policy and implementation:

The local level is directly concerned with implementation of adaptation measures on the ground as final users. So, the best start is expected to be at the local level than scale it to national level so that national policy feeds from local needs. In fact, the national level should make policy and get inspiration from the local ground.

Sub regional and international levels were less popular; however, participants recognize the importance of the International level to mobilize finance and capacity building for adaptation through linkages to the UNFCCC and others legal agreements. Opinions were more divergent for the sub-regional level. The exercise was felt too basic but at the same time too complex because of the large number of variables that cannot be dissociated. All finally agreed on indispensable linkages between these level as well as the synergies in the implementation phase.

Conclusion

A top-down adaptation approach is needed to mainstream climate change issues in the planning process at national level, to avoid inappropriate actions and ensure coherence between measures and sectors. However, actions applied to a specific context requires a bottom-up approach reflecting local realities. This approach helps ensuring a minimum ownership by beneficiaries. Top down and bottom up approaches should interact in an integrated manner to ensure that the needs of local community are reflected at the national level thereby ensuring their integration into the development planning process. In conclusion, the main lesson is that adaptation is a continuous process, essentially relying on learning by doing.

6. CLIMATE CHANGE MITIGATION

6.1 Current and future GHG reporting procedures to the UNFCCC

by Sarah Kuen, MRV Expert Climate change policy

The objectives, the differences and the overlap between National Communication and Biennial Up-Date Report were presented in this session. The origins of these requirements for the Parties to the UNFCCC are found in:

- the UNFCCC obligations on Reporting: Article 4 (§§ 1, 3, 7), 5, 7 (§2a-c), 12 (§§ 1, 5, 6,7)
- the Cancun Agreement (COP 16) in 2010 : Decision 1/CP.16 § 60 c) and
- in the Durban Decision 2/CP.17 (§§ 39-42; 54-62)

Summary of Guidelines and frequency for National Communications and Biennial Up-date Reports

National Communications (NC)	Biennial Up-date Reports (BuR):
<p>Guidelines adopted for non-Annex I Parties¹⁶ in New Delhi (2002)at COP 8 :</p> <p>Decision 17/CP.8</p>	<p>Guidelines adopted for non-Annex I Parties (Durban 2011) at COP 17 in:</p> <p>Annex III to Decision 2/CP.17 The “<i>International Consultation and Analysis (ICA) modalities and guidelines</i>” were adopted in Annex IV to Decision 2/CP.17 (procedure for verifying the information reported in the BuR, a set of rules pertaining to the MRV regime applying to non-Annex I parties between 2013-2020). Furthermore, “<i>General guidelines for domestic measurement, reporting and verification of domestically supported nationally appropriate mitigation actions by developing country Parties</i>” were adopted at COP 19 (Warsaw, 2013), in Decision 21/CP.19 ¹⁷.</p>
<p>Frequency: Regarding the submission of the second national communication, non-Annex I Parties should submit their second and subsequent (third) national communications within four years of receipt of financial resources for the actual preparation of the national communication. Parties may also apply for a one-year extension if they are unable to complete their national communication within the four-year period (decision 8/CP.11).</p>	<p>Frequency: Every 2 years, included in the National Communication for the year a NC is submitted, or as a stand-alone update report -- some flexibility for LDCs and SIDS</p>

¹³ Refers to countries that have ratified or acceded to the United Nations Framework Convention on Climate Change that are not included in Annex I of the Convention (Developing Countries).

¹⁴ For domestic MRV, Parties are free to define and describe these arrangements as they wish, in line with national circumstances.

The two documents also have overlapping as well as divergent objectives, as summarized in the table below

Purpose of National Communications (NC)	Purpose of Biennial Up-date Reports (BuR):
<ul style="list-style-type: none"> Assist in meeting reporting requirements under the Convention; Encourage the presentation of information in a consistent, transparent and comparable, as well as; Flexible, manner, taking into account specific national circumstances; Facilitate the presentation of information on support required for the preparation and improvement of national communications from NAI Parties; Policy guidance to the operating entity of the financial mechanism; Ensure that the COP has sufficient information to carry out its responsibility for assessing the implementation of the Convention by Parties. 	<ul style="list-style-type: none"> Assist in meeting reporting requirements under Article 4, paragraph 1(a), and Article 12 of the Convention and decision 1/CP.16 (Cancun Agreement); Encourage the presentation of information in a consistent, transparent, complete, accurate and timely manner, taking into account specific national and domestic circumstances; Enable enhanced reporting by NAI Parties on mitigation actions and their effects, needs and support received, in accordance with their national circumstances, capacities and respective capabilities, and the availability of support; Policy guidance to an operating entity of the financial mechanism; Facilitate the presentation of information on finance, technology and capacity-building support needed and received, including for the preparation of biennial update reports; Facilitate reporting by NAI Parties, to the extent possible, on any economic and social consequences of response measures.

Overlaps and differences

The two documents contain overlapping, but also divergent information, as summarized in the table below

National Communications provide according to Art. 12.1 of the UNFCCC	Biennial Up-date Reports provide an update to the most recently submitted NC in the following areas
<ul style="list-style-type: none"> A National Greenhouse Gas inventory, using comparable methodologies to be promoted and agreed upon by the Conference of the Parties; A general description of steps taken or envisaged to implement the Convention; Any other information considered relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication, including, if feasible, material relevant for calculations of global emission trends. 	<ul style="list-style-type: none"> Information on national circumstances and institutional arrangements relevant to the preparation of the NC on a continuous basis; National GHG inventory, including a national inventory report (NIR); Information on mitigation actions and their effects, including associated methodologies and assumptions; Constraints and gaps, and related financial, technical and capacity needs, including a description of support needed and received; Information on the level of support received to enable the preparation and submission of BUR; Information on domestic MRV; Any other information that the NAI Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its BUR.

Requirements for the submission of the GHG information

The requirements for the submission of GHG information reported is not systematically harmonized: concerning National Communications, Decision 17/CP.8 contains some tabular format that should also be used for the BuR. However, there is no common tabular format for the BuRs. In order to help countries to structure the reported information, the CGE (Consultative Group of Experts) produced some country examples in its training material available on the UNFCCC website (see section 7 References and bibliography).

6.2 GHG Emissions analysis for decision-making

Transition towards a low carbon society in 2050 – GHG long term modelling for Belgium

by Vincent van Steenberghe, Economist, Brussels

- Why modelling likely GHG emissions evolutions?

To assess how GHG emissions are likely to evolve in a 'business-as-usual' situation and/or what are the impacts of mitigation policies?

- Historical data are required: GHG emissions and energy consumption per sector and per activity; statistics on activity levels;
- Analysis of the national and regional/international situations, including indicators other than GHG or energy, is necessary;
- Sensitivity analyses are recommended ;
- Impacts other than GHG: growth, employment, air pollution, energy security, public revenues...etc

- What are the different modelling approaches?

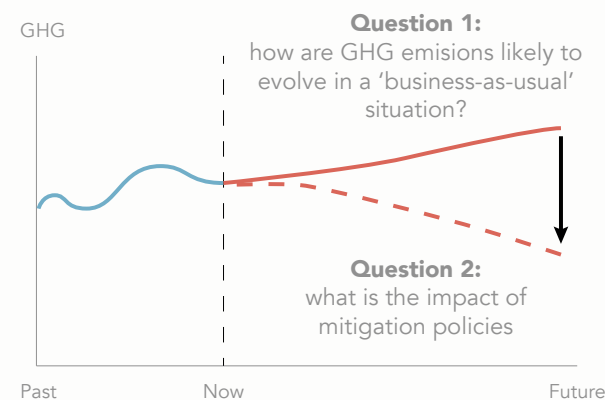
They are characterized by their transparency, whether they are user friendly, their coherence/interactions and comprehensiveness or both. There are trade-offs between both group of characteristics.

Accounting models

Defining activity drivers and pathways for energy efficiency or carbon intensity improvements at the sectoral levels are the core elements of the methodology. Technologies are implicit (no 'production function') and the costs are often considered in an ex-post calculation.

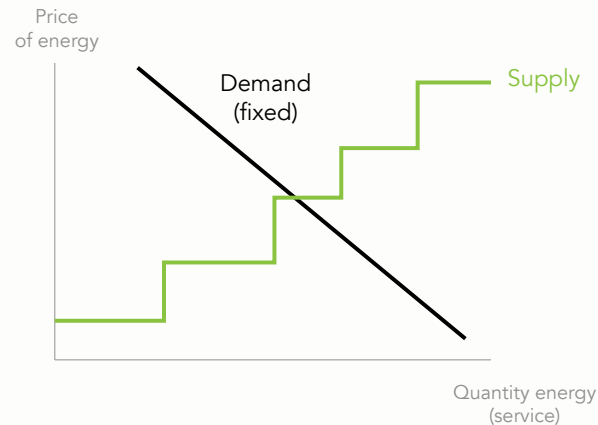
The particular strengths of accounting models are the following:

- Their transparency and flexibility in presenting energy analysis concepts whilst guaranteeing consistency in energy accounting
- They can be useful to explore possible pathways and provide more quantitative analysis on the required targets to be reached by the underlying hypothesis at sectoral levels
- Can be useful to explore the social acceptance of the transition as well as its contours by stakeholder consultation as they provide powerful reporting capabilities.



Partial equilibrium models for energy systems:

- have a detailed representation of technologies in a consistent framework.
- it means that the energy demand (curve) is fixed which is NOT the case in macroeconomic models.



Macro-economic models:

- They represent the whole economic system and include feedback mechanisms from and to the energy system.
- Econometric models are more oriented towards the adjustment path in the short to medium term allowing market disequilibrium.
- Combination of the models developed on the national and federal levels.
- Some assumptions common to EU member states are taken into account in modelling process.

The costing issues of mitigation policies is incorporated in different ways:

- For **Accounting models**: energy system costs such as Capex or Opex, fuel expenses (computed ex-post)
- **Partial equilibrium models**: energy system costs (with endogenous prices) including loss of consumer surplus such as
 - Costs of technologies
 - Possibly, loss of consumer surplus.
- **Macroeconomic models**: GDP or welfare:
 - Macroeconom(etr)ic models and some CGE models, required feedback of, typically, changes in energy system on the whole economy, including public sector (fiscal policies).
 - Thus level of economic activity (GDP), also per sector, employment effects, possibly competitiveness, public sector revenues, etc.
 - Computable general equilibrium (CGE) models, i.e. based on utility function, thus relative change in Utility (%) is computed.
- **Other** important costs (or benefits) are usually not included in models and must be computed separately: health effects of changes in emissions, energy security, traffic congestion.

In Belgium, reported projections are based on a combination of models developed at regional and federal levels, with some assumptions common for the EU (such as the carbon price on the EU ETS). The techniques and applications used to produce the Belgian report “Transition towards a low carbon society by 2050” as well as the consultative process with relevant stakeholders and decision makers has been presented. One BAU scenario and five low carbon scenarios using the different levers i.e. reduction could be through behaviour change, technologies etc... or a combination of all these options.

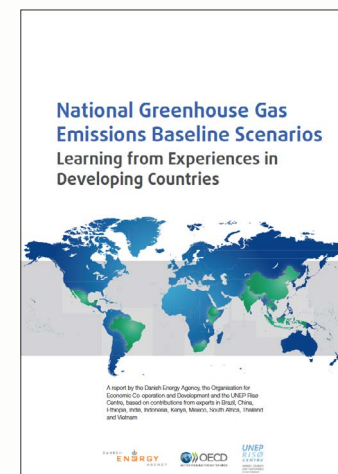
To conclude, there is no one size fit all models and a good interpretation of results is very important. Regarding the current and future energy prices they use the prices of IEA and regarding the energy mix Belgium decided to phase out the nuclear by 2025 replacing it by RE and by gas fire power plants, also as back-up. Regarding the renewable energy resources in Belgium it is mentioned the biomass, geothermal, and wind (solar to a lower extent). The projection showing the trends is not a prediction, there is also a need to carry out a sensitivity analysis.

Other relevant GHG modelling lessons in developing country

by Zsolt Lengyel, Team Leader, ClimaEast¹⁵.

The session focused on relevant GHG modelling lessons learnt in developing countries as analysed in a DEA/OECD/UNEP publication ¹⁶. The countries studied are Brazil, China, Ethiopia, India, Indonesia, Kenya, Mexico, South Africa, Thailand and Vietnam. The review concluded that:

- The choice of modelling tool used to prepare baseline scenarios tends to be driven by a **trade-off between performance** (in the form of sophistication and anticipated accuracy) **and resources available** (including human capacities and data availability)
- To model **energy sector emissions**, most participating countries rely on **bottom-up models**, which provide a fairly detailed representation of the energy system (top-down & hybrid in China, India, South Africa)
- Most countries use **existing models** to develop their baseline scenarios
- Baseline scenarios support broader national and often international processes.



¹⁵ The EU-funded ClimaEast project works with seven Partner Countries - the ENP partner countries: Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine and the Russian Federation - on developing approaches to climate change mitigation and adaptation, in order to better equip partners to achieve greenhouse-gas emission reductions, and deal more effectively with the impacts of climate change.

¹⁶ GHG modelling experiences - an OECD review Copyright 2013 owned by the Danish Energy Agency (DEA), the Organisation for Economic Co-operation and Development, (DEA-OECD)
http://www.ens.dk/sites/ens.dk/files/dokumenter/side/national_greenhouse_gas_emissions_baseline_scenarios_-_web_-_spreads.pdf

The table below provides a “*strength and weakness*” assessment of the 3 main categories of models (bottom-up, Top-down and Hybrid) that can be used. The following page provides a quick selection of the key terminology in this field.

Overview of model types

	Bottom-up		Top-down		Hybrid
	Accounting	Optimisation	Simple extrapolation	Computable general equilibrium	
Strengths	Ease-of-use and potentially small data needs	Technological and least cost projections	Ease-of-use and potentially small data needs	Feed-back effects on macroeconomic variables	Technological detail and consistency with economic projections
Weaknesses	Linkages with broader macroeconomic developments missing		Lack of technological detail		Can be very resource-intensive
Examples	LEAP, MEDEE and MAED	MARKAL/TIMES, POLES, RESGEN and EFOM	Spreadsheet models	ENV-Linkages (OECD), SGM and CETA	WEM (IEA), NEMS, MARKAL-MACRO and IPAC

Key terminology

Base year: An historical year which marks the transition from emissions estimates based on an inventory to modelling-based estimates of emissions volumes. In many countries the base year coincides with the latest year for which emissions inventory data are available. In other instances, there may be a gap of a few years between the latest year for which inventory data are available and the initial year for which projections are made

Exclusion criteria: A sub-set of assumptions concerning policies or technologies which, while feasible in principle, are ruled out on ideological or economic grounds.

Existing policies: Existing policies are those that have been legally adopted by a certain cut-off date. Some policies that have been implemented before the cut-off date may have had impact on emissions before that date, while others may only have an impact later on.

Forecast: A projection to which a high likelihood is attached.

Model: A schematic (mathematical, computer-based) description of a system that accounts for its known or inferred properties. The terms '*model*' and '*modelling tool*' are used interchangeably in this publication.

Projection: Estimates of future values for individual parameters, notably those that are key drivers of emissions in a scenario.

Reference year: Year against which emissions reduction pledges are measured. This could be a past year (for example, 1990, in the case of the European Union's commitment under the Kyoto Protocol) or a future year (as is the case for those non-Annex I countries that have defined their pledge relative to a baseline scenario).

Scenario: A coherent, internally consistent and plausible description of a possible future state of the world given a pre-established set of assumptions. Several scenarios can be adopted to reflect, as well as possible, the range of uncertainty in those assumptions.

Baseline scenario: A scenario that describes future greenhouse-gas emissions levels in the absence of future, additional mitigation efforts and policies. The term is often used interchangeably with business-as-usual scenario and reference scenario.

Mitigation scenario: A scenario that describes future emissions levels taking account of a specified set of future.

Assumptions and sensitivity analyses

- There is no commonly-agreed definition of baseline scenario; it could be *“a scenario that describes future greenhouse-gas emissions levels in the absence of future, additional mitigation efforts and policies”*;
- The estimated effects of some existing policies in the baselines are included (how to model the impacts of any one approach? *‘No policies’* or *‘only existing policies’*).

All countries introduced:

- Exclusion criteria in the baselines (cost minimisation)
- The choice of modelling tool used to prepare baseline scenarios tends to be driven by a trade-off between performance (in the form of sophistication and anticipated accuracy) and resources available (including human capacities and data availability) The choice of base year (or start year) for the baseline scenario depends on both technical and political considerations;
- Key modelling assumptions regarding socio-economic and other factors driving projections may be politically determined;
- Most countries use national data sources for key drivers;
- Extent of sensitivity analyses carried out to date has been limited

Data management:

- Problems were encountered with **basic data availability**; a key challenge is to **reconcile existing data collection frameworks with the IPCC** source categories;
- The **accuracy of emissions factors** used in baseline calculations differs greatly among countries (country specific emissions factors is a resource-intensive task);
- The inventory included in a country’s most recent

national communication to the UNFCCC may not contain the **latest data available**;

- Improving data accuracy represents an ongoing concern for most countries (lack of high quality data).

	Energy	LULUCF	Agriculture	Industrial Processes	Waste
Brazil (UFRJ)	Bottom-up (MESSAGE / MAED)	Simple extrapolation of historical annual deforestation			
China (ERI)	Hybrid model (IPAC)				
Ethiopia	Top-down (simple extrapolation using spreadsheets and bottom-up (MAC curves)				
India (TERI)	Bottom-up (MARKAL/ TIMES) and CGE models			Included in energy modelling	
Indonesia	Bottom-up (LEAP) for both provincial and national level	LUWES/Abacus - spatial planning approach	included in LULUCF modeling	Included in energy modelling	Simple linear projection model
Kenya	Bottom-up (intensity extrapolation)				
Mexico	Bottom-up (in-house) Planned future work: bottom-up (LEAP)				
South Africa (ERC)	Bottom-up (MARKAL / TIMES) and CGE-model	Spreadsheet model	Spreadsheet model	Spreadsheet model	Spreadsheet model
Thailand	Bottom-up (LEAP)				
Vietnam	Bottom-up (LEAP)	COMAP	Based on IPCC guidelines		

Transparency and inclusiveness in baseline setting:

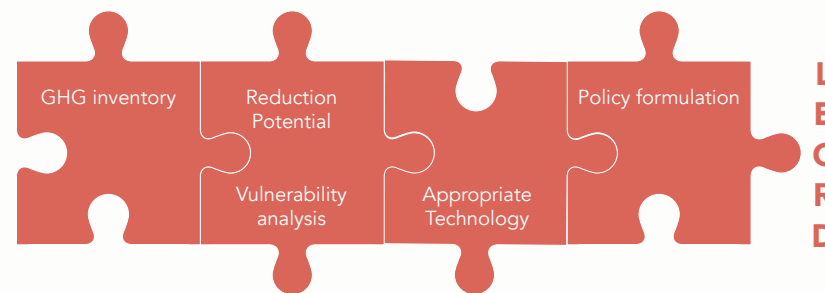
- Countries have made available varying levels of information regarding the assumptions chosen for the preparation of the baseline;
- Countries have varying experiences with stakeholder consultation in the baseline development process, including the extent to which stakeholders are consulted and at which stage in the process;
- International review of national baselines can be a politically sensitive matter (=> peer reviews; comparing and understanding differences across various studies on baselines for the same country).

The Technology Needs Assessment for Climate Change for Lebanon

by Lea Kai Aboujaoudé, Ministry of Environment, Lebanon

A Technology needs assessment (TNA) is a planning tool for developing and implementing policies and measures for the development and transfer of environmentally sound technologies (ESTs). It is a collective, dynamic and iterative process highly dependent on stakeholder engagement. Lebanon went through this process as part a UNDP/UNEP/GEF project. The graph shows that this step, after a GHG inventory, the assessment of GHG potential and vulnerability analysis, comes just before the policy formulation towards Low-Emission Climate-Resilient Development Strategies (LECRD)¹⁷ whose full roadmap is shown in the graph.

¹⁷ Preparing Low-Emission Climate-Resilient Development Strategies United Nations Development Programme A UNDP Guidebook



LECRD Road Map: towards Low Emission Climate Resilient Development

The prioritization of sectors was done based on the Second National Communication and engaged a large spectrum of stakeholders. Technologies options were prioritized for the energy and transportation sectors for mitigation and for the agriculture and water resources for adaptation (see list on next page). As described in the road map, a barrier analysis and an enabling framework were carried out leading to the formulation of project ideas. Lebanon welcomes sharing this experience with other ClimaSouth countries¹⁸. The process of technological needs assessment is a collective, dynamic and iterative process highly dependent on stakeholder engagement.

¹⁸ Technology Needs Assessment, Lebanon, December 2012, Ministry of Environment http://www.undp.org.lb/communication/publications/downloads/TNA_Book.pdf

Introduction
LECRDS objectives, participatory process followed, actors involved, and methodologies

1. Climate Profiles
1.1 Description of geographical context and general economic and demographic data on which analyses and scenarios will be built
1.2 Key development issues and priorities
1.3 Past and on-going climate change and related risk management actions
1.4 Projection of possible climate scenarios and relevant spatial and temporal scales (2050 / 2075 / 2100)

2. Vulnerability Assessments
2.1 Assessment of existing climate and socio-economic vulnerabilities
2.2 Simulation of the physical and economic impacts of future climate scenarios in the most vulnerable sectors (agriculture, water, coastal-zone management, health, tourism, etc.)
2.3 Assessment of impacts on most vulnerable groups
2.4 Present and future vulnerability maps

3. Greenhouse Gas Emissions
3.1 Assessment of existing GHG emissions by sector (energy, transport, buildings, industry, waste, agriculture and forestry)
3.2 Assessment of expected GHG emissions by 2020-2050 under a business-as-usual and alternative development scenarios

4. Mitigation and Adaptations Options Towards Low-Emission Climate-Resilient Development
4.1 Selection criteria and key sectors identified for low-emission climate-resilient development policies and measures
4.2 Description of main low-emission climate-resilient opportunities identified in each sector
4.3 Technical and social feasibility and cost benefit analysis of the different options and comparison of these options
4.4 List of priority mitigation and adaptation options (no regrets / low regrets, negative cost, no cost, low cost, higher-cost options; short-term, medium-term, long-term; political and social acceptance, regulatory needs, capacity and financial requirements)

5 LECRDS Action Plan
5.1 Review of existing climate change policy / financial instruments and institutional implementation arrangements
5.2 For each priority option, description of matching policy / financing instruments to attract and drive direct investment towards lower-emission, climate resilient development activities – sectoral pathways
5.3 Detailed first portfolio of no-regrets actions identified in the early stages of the process and already under implementation by the LECRDS is finalized
5.4 List of priority low-emission climate-resilient projects (public policies and investments) adopted by sector and highlighting those that cross sectors
5.5 LECRDS implementation, monitoring, MRV (Measurement, Reporting and verification), learning for feedback, evolving roles of different sectors and levels (national, regional, local authorities; private sector; civil society; etc.), including LECRDS steering committee and thematic working groups

List of prioritized technologies for Lebanon



- For the energy sector:**
- Combined Heat and Power
 - Combined- Cycle Gas
 - Turbines
 - Reciprocating Engines
 - Wind Power
 - PV Cells
 - Hydro Power
 - Network Losses Reduction
 - Biomass energy
- For the transport sector**
- Fuel efficient gasoline cars
 - Hybrid electric vehicles
 - Plug-in hybrid electric vehicles
 - Battery electric vehicles
 - Natural gas vehicles
 - Bus technologies & dedicated lanes
- For the agriculture sector**
- Conservation Agriculture
 - Risk Coping Production Systems
 - Selection of adapted varieties and rootstocks
 - Integrated Pest Management
 - Integrated Production and Protection for greenhouses
 - Early Warning System – ICT
 - Index Insurance

Discussion on adaptation and mitigation multiple benefits

Mr. Elsayed Mansour, from the ClimaSouth team, presented the case of a Solar Water Pumping NAMA project planned to be carried out in Jordan as national activity to demonstrating the synergy between mitigation and adaptation in the context of a climate action.

The representative of Jordan explained the need and the benefits of a solar project for water resources & agriculture also offering energy savings and GHG reduction opportunities. Participants from Palestine, Libya, Tunisia and Lebanon agreed that it is an appropriate approach if the project is a national priority and not considered as a prerequisite for funding an adaptation project; others argued that some activities are adaptation only, not containing mitigation co-benefits. The question remained open and efforts to build confidence and continue the dialogue on this very important topic.

The **greatest contributor of GHG emissions** is the electricity sector which is also **the most climate vulnerable** because of the need to increase water supply => exacerbating GHG emissions.

Electricity consumption for water pumping is already high, will further grow with climate change.

Jordan receives a high amount of solar radiation (20.4 MJ/m²): photovoltaic electricity a viable renewable energy option.

Water technologies, (table water pumping) are very energy intensive: meeting energy needs in a resilient, carbon-neutral manner is essential.



Low Carbon Development direct benefits:

Expected CO₂ reduction: 4501,575 ton CO₂/year; annual economic savings for 243 SWP= saving of total annual consumption of fossil fuel & electricity= 434700 JOD = \$613361.

Socio/economic co-benefits:

Stability for residents in the Jordan Valley, encouraging farmers to adopt such actions; job creation from temporary construction jobs; gives local communities opportunity for economic development; increase the income of the farmers by \$ 2526/unit (average annual fuel cost).

Environmental co-benefits:

Air pollution reduction thus improving health conditions.

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