1. Defining mainstreaming of adaptation

The term 'mainstreaming' refers to the integration of climate change adaptation into related government policies in several sectors[1]. Mainstreaming – which could in addition to adaptation also cover mitigation – is sometimes also referred to as 'climate policy integration' (CPI)[2]. Mainstreaming means that adaptation to climate change will be directly brought in when sustainable development planning is undertaken, and in the development of sector policies. Adaptation would then not be 'added' through dedicated policy instruments. Mainstreaming can also involve setting up institutional or organisational structures, or designing and implementing projects in a way that they 'automatically' take adaptation into account. The assumption of mainstreaming is that a project or policy has a goal – related to for example mobility, population well-being or health care – and that the sustainability and impact of the initiative can be increased by taking into account potential climate change impacts[3].

The first calls for climate change mainstreaming were voiced during the World Summit on Sustainable Development in Johannesburg in 2002 ('Rio+10'). Following this Summit, mainstreaming was defined as "the integration of policies and measures to address climate change into ongoing sectoral and development planning and decision-making, so as to ensure the long-term sustainability of investments as well as to reduce the sensitivity of development activities to both today's and tomorrow's climate"[4].

2. Guidance for effective adaptation mainstreaming

Several international organisations have prepared guidelines for mainstreaming adaptation. Although the success of mainstreaming efforts depends on the specificities of policies, countries and processes, some general good practice guidelines can be identified, as well as critical barriers to be overcome[5,6,7,8].

2.1 Information and awareness

In order for mainstreaming to be effective, decision-making should take place on the basis of the best available knowledge with regard to, for example, climate data and potential implications of climate change for different regions and sectors, as well as potential adaptation options. Related barriers include the absence of data or the dispersion of information and knowledge between different organisations, which may not be willing to share data and cooperate. A complete picture of climate change and risks is unrealistic. Continuous efforts should thus be made to improve the quantity, quality and policy relevance of information, keeping in mind that uncertainties will always exist. A close relationship between policy makers, climate scientists, researchers and adaptation specialists is key[9].

Mainstreaming adaptation is constrained by a lack of awareness of the risks of climate change. Education and capacity building is required to overcome this barrier. Especially the potential effects of climate change on the achievement of national development priorities, and the economic costs of the impacts of climate change, should be communicated. Scientific information should therefore be 'translated' into language that is relevant for policy-makers and can easily be understood by them[10,11].

2.2 Stakeholder involvement and coordination

A broad range of stakeholders needs to be involved in adaptation mainstreaming efforts, ranging from national government ministries to sector authorities, sub-national governments and civil society. Stakeholder involvement helps to ensure that policies are informed by practical knowledge and experience 'from the ground'[12,13].

In order to make optimal use of the involvement of all stakeholders and ensure the success of adaptation mainstreaming, strong government leadership and coordinated action across

government departments and agencies is needed, for example through an inter-departmental coordination mechanism. Without such coordination, fragmentation of government actions hinders efforts to minimise the risks associated with climate change. A challenge is often that this process is coordinated by a ministry of environment or meteorological organisation. Adaptation to climate change is then often seen as merely an environmental issue, rather than a broader issue that affects the development of the country. Instead, there should be active involvement of for example the ministries of finance and planning, as well as the president's or prime minister's office[14].

Strong coordination also facilitates horizontal integration across sectors. In the case of fragmented government action, mainstreaming in one policy area or sector may transfer the vulnerability from this sector to another. Therefore, a detailed crosscheck assessment should be made in order to avoid merely transferring risks from one group, sector or region to another.

2.3 Relationship between near-term sectoral and long-term adaptation benefits

Instead of adding climate change adaptation as a new policy, it should be integrated (mainstreamed) into existing decision-making and policy processes. Adaptation should be facilitated in consistency with development objectives and aligned with existing governance structures.

While climate change adaptation planning is usually focussed at impacts that may occur decades in the future, sectoral policy-making normally has a short-term focus. This discrepancy leads to a lack of political will to mainstream climate change, as short-term sectoral objectives are often given more importance. Policy makers may be wary that the adaptation objectives will weaken the sectoral objectives of a policy. This barrier can be overcome by integrating adaptation in a manner that both immediate objectives are attained and long-term resilience is increased, in other words by creating win-win situations.

Especially sectoral authorities in sectors that receive considerable financial support from the EU budget, such as the agricultural sector, tend to resist reforms. There may also be a lack of consensus on the costs and damage that mainstreaming will do to sectors, and this can prolong opposition from policymakers, especially in powerful sectors.

2.4 Monitor, evaluate and improve

Monitoring and evaluating the processes of climate change adaptation mainstreaming helps policy-makers to determine if the desired outcomes are achieved. Evaluating also enables the timely adjustment of policies, may circumstances require so. In this way, the mainstreaming policies can be adaptive in themselves.

3. Mainstreaming in EU policy

One of the three objectives of the EU Adaptation Strategy (see also: Overview of adaptation policy in the EU) is to promote adaptation in key vulnerable sectors. According to the European Commission (EC), adaptation concerns have already been mainstreamed in legislation in several sectors[15]. The EC argues that mainstreaming climate concerns (both mitigation and adaptation) into other policies is the most effective way to address climate change and spend climate finance budgets. In addition to mainstreaming of climate change into policies and programmes, it is therefore also important to mainstream climate change into the EU budget.

The key organisational element of the EC's mainstreaming strategy is the establishment of a directorate-general for climate action (DG Clima) in 2010. Upon the establishment of this department, its Commissioner was given "a cross cutting responsibility for developing adaptation to climate change inside the EU and for working with other Commissioners to ensure that an appropriate climate dimension is present in all Community policies"[16]. One of the tasks of DG Clima is thus to ensure that mainstreaming takes place and to lessen the danger that mainstreaming strategies are pursued in isolation, without cross-sectoral integration[17].

4. Priority mainstreaming measures

On behalf of DG Clima, a prioritisation of mainstreaming measures has been made. The main prioritised sector-specific recommendations are for the energy, infrastructure, urban areas, and agriculture sectors[18]. Changes to current policies, or new legislation, are usually not triggered by mainstreaming climate change, but by other purposes. However, all EU initiatives should undergo an impact assessment including considerations on the climate, following the guidelines by the EC.

It must be noted that mainstreaming of climate change adaptation should take place not only at the EU level, but at all levels of government. Most adaptation measures will require to be integrated into national policies and into local policy implementation. The four following priority mainstreaming measures are from an EU policy point of view.

4.1 Energy

Major threats to the security of energy supply include extreme meteorological events, increasing electricity demand peaks, and overheating of thermal and nuclear power stations[19]. On the energy demand side, policy measures for energy efficiency not only contribute to climate change mitigation goals, but also decrease demand peaks, and therefore the risk of blackouts. On the supply and transmission side, adaptation measures have a high relevance, as energy supply, transmission and distribution are considered as critical infrastructure. Climate-proofing of these electricity networks can be achieved in a cost-effective way by integrating it into grid overhaul and expansion[20].

4.2 Transport infrastructure

Infrastructure is one of the prioritised sectors for climate change mainstreaming, as infrastructure is threatened by summer heat (especially in Southern Europe) as well as extreme precipitation[21]. Infrastructure projects are long-term investments, thus also future climate change has to be taken into account. The European Union can influence mainstreaming in infrastructure for example through its regional infrastructure funds, such as the Cohesion Policy, and the TEN-T Guidelines for the trans-European transport network[22], that include climate resilience: "During infrastructure planning, Member States and other project promoters should give due consideration to the risk assessments and adaptation measures adequately improving resilience to climate change and environmental disasters." Specific technical measures in the infrastructure sector are the adaptation of railways and roads to higher temperatures, better surface asphalt for airport runways to cope with heat and extreme precipitation, and retrofitting existing infrastructure drainage systems.

4.3 Urban areas

Urban areas in Europe are vulnerable as a result of general temperature increases and extreme weather events including heat waves, heavy precipitation and floods, and storms. Minimum requirements for new and existing buildings, such as in the Energy performance of Buildings Directive, Eurocodes, and national plans, could include concrete methodologies and guidelines for climate-proofing of buildings[23]. Key technical adaptation measures in urban areas, as proposed in the report for DG Clima, include the development of more green spaces in cities, as well as green roofs on buildings.

4.4 Agriculture

The impacts of climate change become increasingly evident for the agricultural sector, as well as rural areas in general. Farming activities directly depend on climatic conditions, and European farmers are affected by decreasing rainfall in some regions, as well as sudden heatwaves, droughts, storms and floods in many regions across the EU. Climate change adaptation has therefore been integrated into the Common Agricultural Policy (CAP) of the EU, as well as in Rural Development Programmes (RDPs). A new feature of the CAP for 2014-2020 is that farmers can be rewarded for

services to the wider public, including climate stability measures24. Suggested technical adaptation measures for farms include crop rotation, adjustment of sowing dates and using crop varieties better suited to new weather conditions25 (see also Technical Options for Climate Change Mitigation in EU Agriculture).

Sources

- 1. Parry, M.L., Canziani, O.F., Palutikof, J.P., Van der Linden, P.J. & Hanson, C.E. [eds.] (2007). Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007. (Cambridge: Cambridge University Press). Online: http://www.ipcc.ch/publications_and_data/ar4/wg2/en/contents.html (accessed 27 February 2015).
- 2. Rayner, T. & Berkhout, F. (2012). EU Climate Policy Mainstreaming. Background paper for RESPONSES/IEEP symposion, 12th July 2012, Brussels. Online: http://www.responsesproject.eu/pdf/Symposium_background%20paper_24_06_12... (accessed 27 February 2015). Page 3.
- 3. CARE (2009). Mainstreaming Climate Change Adaptation: A Practitioner's Handbook. (Hanoi: CARE International in Vietnam). Online: http://www.careclimatechange.org/files/adaptation/CARE_VN_Mainstreaming_... (accessed 27 February 2015). Page 22.
- 4. Klein, R.J.T., Schipper, E.L. & Dessai, S. (2003). Integrating mitigation and adaptation into climate and development policy: three research questions. Tyndall Centre Working Paper No. 40. (Norwich: Tyndall Centre for Climate Change Research). Online: http://www.tyndall.ac.uk/sites/default/files/wp40.pdf (accessed 27 February 2015).
- 5. Rayner, T. & Berkhout, F. (2012). EU Climate Policy Mainstreaming. Background paper for RESPONSES/IEEP symposion, 12th July 2012, Brussels. Online: http://www.responsesproject.eu/pdf/Symposium_background%20paper_24_06_12... (accessed 27 February 2015). Pages 11-15.
- 6. CARE (2009). Mainstreaming Climate Change Adaptation: A Practitioner's Handbook. (Hanoi: CARE International in Vietnam). Online: http://www.careclimatechange.org/files/adaptation/CARE_VN_Mainstreaming_... (accessed 27 February 2015).
- 7. Parry, J.E. & Taylor, S. (2012). Mainstreaming Adaptation to Climate Change into National Policy: An overview for adaptation practitioners. (Adaptation Partnership/International Institute for Sustainable Development). Online: https://www.iisd.org/pdf/2012/mainstreaming_adaptation_climate_change_na... (accessed 27 February 2015). Pages 5-11.
- 8. UNDP-UNEP Poverty-Environment Facility (2011). Mainstreaming Climate Change Adaptation into Development Planning: A Guide for Practitioners. (Nairobi: UNDP-UNEP). Online: http://www.unep.org/pdf/mainstreaming-cc-adaptation-web.pdf (accessed 27 February 2015). Page 16.
- 9. Mitchell, T., Tanner, T. & Wilkinson, E. (2006). Overcoming the barriers: Mainstreaming climate change adaptation in developing countries. Tearfund Climate Change Briefing Paper 1. (Teddington: Tearfund). Online: http://www.tearfund.org/webdocs/website/Campaigning/Policy%20and%20resea... (accessed 27 February 2015).
- 10. Rayner, T. & Berkhout, F. (2012). EU Climate Policy Mainstreaming. Background paper for RESPONSES/IEEP symposion, 12th July 2012, Brussels. Online: http://www.responsesproject.eu/pdf/Symposium_background%20paper_24_06_12... (accessed 27 February 2015). Page 9.
- 11. Parry, J.E. & Taylor, S. (2012). Mainstreaming Adaptation to Climate Change into National Policy: An overview for adaptation practitioners. (Adaptation Partnership/International Institute for Sustainable Development). Online: https://www.iisd.org/pdf/2012/mainstreaming_adaptation_climate_change_na... (accessed 27 February 2015). Page 7.
- 12. Rayner, T. & Berkhout, F. (2012). EU Climate Policy Mainstreaming. Background paper for RESPONSES/IEEP symposion, 12th July 2012, Brussels. Online:

http://www.responsesproject.eu/pdf/Symposium_background%20paper_24_06_12... (accessed 27 February 2015). Page 14.
- 13. Parry, J.E. & Taylor, S. (2012). Mainstreaming Adaptation to Climate Change into National Policy: An overview for adaptation practitioners. (Adaptation Partnership/International Institute for Sustainable Development). Online: https://www.iisd.org/pdf/2012/mainstreaming_adaptation_climate_change_na... (accessed 27 February 2015). Page 9.
- 14. CARE (2009). Mainstreaming Climate Change Adaptation: A Practitioner's Handbook. (Hanoi: CARE International in Vietnam). Online: http://www.careclimatechange.org/files/adaptation/CARE_VN_Mainstreaming_... (accessed 27 February 2015). Pages 23-24.
- 15. European Commission (2013). Communication: An EU Strategy on Adaptation to Climate Change. COM (2013) 216. Online: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0216... (accessed 27 February 2015).
- 16. Literal quote from the letter by the EC's president Barroso to the new Commissioner for Climate Action, Connie Hedegaard, dated 27 November 2009.
- 17. Rayner, T. & Berkhout, F. (2012). EU Climate Policy Mainstreaming. Background paper for RESPONSES/IEEP symposion, 12th July 2012, Brussels. Online: http://www.responsesproject.eu/pdf/Symposium_background%20paper_24_06_12... (accessed 27 February 2015). Page 8.
- 18. Altvater, S., Görlach, B., Osberghaus, D., McCallum, S., Dworak, T., Klostermann, J., Van de Sandt, K., Tröltzsch, J. & Frelih Larsen, A. (2011): Recommendations on priority measures for EU policy mainstreaming on adaptation – task 3 report. (Berlin: Ecologic Institute). Online: http://ec.europa.eu/clima/policies/adaptation/what/docs/ccp_task3_en.pdf (accessed 27 February 2015).
- 19. Altvater, S., Görlach, B., Osberghaus, D., McCallum, S., Dworak, T., Klostermann, J., Van de Sandt, K., Tröltzsch, J. & Frelih Larsen, A. (2011): Recommendations on priority measures for EU policy mainstreaming on adaptation – task 3 report. (Berlin: Ecologic Institute). Online: http://ec.europa.eu/clima/policies/adaptation/what/docs/ccp_task3_en.pdf (accessed 27 February 2015). Page 15.
- 20. Altvater, S., Görlach, B., Osberghaus, D., McCallum, S., Dworak, T., Klostermann, J., Van de Sandt, K., Tröltzsch, J. & Frelih Larsen, A. (2011): Recommendations on priority measures for EU policy mainstreaming on adaptation – task 3 report. (Berlin: Ecologic Institute). Online: http://ec.europa.eu/clima/policies/adaptation/what/docs/ccp_task3_en.pdf (accessed 27 February 2015). Pages 17-21.
- 21. Altvater, S., Görlach, B., Osberghaus, D., McCallum, S., Dworak, T., Klostermann, J., Van de Sandt, K., Tröltzsch, J. & Frelih Larsen, A. (2011): Recommendations on priority measures for EU policy mainstreaming on adaptation – task 3 report. (Berlin: Ecologic Institute). Online: http://ec.europa.eu/clima/policies/adaptation/what/docs/ccp_task3_en.pdf (accessed 27 February 2015). Page 21.
- 22. European Union (2013). REGULATION OF THE EUROPE AN PARLIAMENT AND OF THE COUNCIL on Union guidelines for the development of the trans - European transport network and repealing Decision No 661/2010/EU. Online: http://register.consilium.europa.eu/doc/srv?l=EN&f=PE%2042%202013%20INIT (accessed 2 March 2015).
- 23. Altvater, S., Görlach, B., Osberghaus, D., McCallum, S., Dworak, T., Klostermann, J., Van de Sandt, K., Tröltzsch, J. & Frelih Larsen, A. (2011): Recommendations on priority measures for EU policy mainstreaming on adaptation – task 3 report. (Berlin: Ecologic Institute). Online: http://ec.europa.eu/clima/policies/adaptation/what/docs/ccp_task3_en.pdf (accessed 27 February 2015). Pages 27-29.
- 24. European Commission (2013). "Overview of CAP Reform 2014-2020", Agricultural Policy Perspectives Brief, no. 5. Online: http://ec.europa.eu/agriculture/policy-perspectives/policy-briefs/05_en.pdf (accessed 4 March 2015).
- 25. European Commission (2015). "Agriculture and climate change", European Commission

website: Agriculture and Rural Development. Online: http://ec.europa.eu/agriculture/climate-change/index_en.htm (accessed 4 March 2015).