SIC adapt!

Tools & Measures

Findings and conclusions from the Cluster projects' adaptation tools and measures

Investing in Opportunities

This project has received European Regional Development Funding through INTERREG IV B.

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INTERREG IVB

EXECUTIVE SUMMARY

Background

There is a general scientific and political agreement that climate change is happening and that the impacts could have severe consequences for human and natural systems (IPCC 2007). Regionally tailored strategies to adapt to climate change are required in order to manage the expected impacts. The European Union assigns the task of adaptation as a matter of joint responsibility with the Member States and regions.

SIC adapt! is a Strategic Initiative Cluster (SIC) of eight projects concerned with adaptation to the spatial impacts of climate change under the INTERREG IV B North-West Europe Programme. These transnational projects are active in seven member states in North West Europe and comprise nearly one hundred organisations including all levels of public authorities, scientific institutions, non-profit and private organisations.The constituent Cluster projects are focussed on dealing with the effects of climate change and the development of possible adaptation strategies with the intention of finding sustainable, cost-efficient, good-practice solutions across four action fields:

- Built environment (urban and regional),
- Water environment (rivers, urban water management, coastal / marine),
- Natural environment (forest / nature / agriculture) and
- Social environment (society / behaviour change).

The Cluster Expert Board (CEB) brings together representatives from a diverse range of organisations with the aim to provide effective knowledge transfer from the local / regional level (responsible for actual implementation of adaptation measures) to the national / EU level (responsible for the strategic framework) and vice versa in order to align these approaches. The expert participants were nominated by Cluster projects, from allied projects, from the scientific community and policy makers respectively. The CEB is scheduled to meet once a year to share views and expertise and to discuss the interim results of the Cluster. Thew initial CEB meeting was held in Holzwickede / Dortmund, Germany in June 2011 with second (CEB2) meeting planned for June 2012 in Brussels.

To date, the main activities of the Cluster have been to:

- compile and compare selected adaptation tools and measures developed and implemented by the eight Cluster projects – categorised by purpose, spatial scope, technical outline, target group, applicability and various other attributes,
- reflect upon the findings by analysing those tools and measures during the 1st CEB meeting,
- set up the basis for the *SIC adapt!* knowledge platform (containing a compilation of experts, tools and measures) and
- prepare key messages as basis for policy recommendations (in preparation for the second phase of Cluster activities).

This paper 'Tools & Measures – Findings and conclusions' is the output resulting from the first phase of Cluster activities and comprises:

- the updated Discussion Paper 'Tools & Measures' prepared in advance of the first Cluster Expert Board meeting (Part I),
- a documentation of results from the CEB1 meeting (Part II) and
- the catalogues of the selected 60 tools and 45 measures (Appendices T and M).

The paper will be send out to all CEB1 participants in order to ensure that the results reach the Cluster projects' to inform their on-going work. Key messages will be also communicated to a wider target group, in preparation for the second phase of the Cluster's activities which is focussed on policy recommendations.

Results

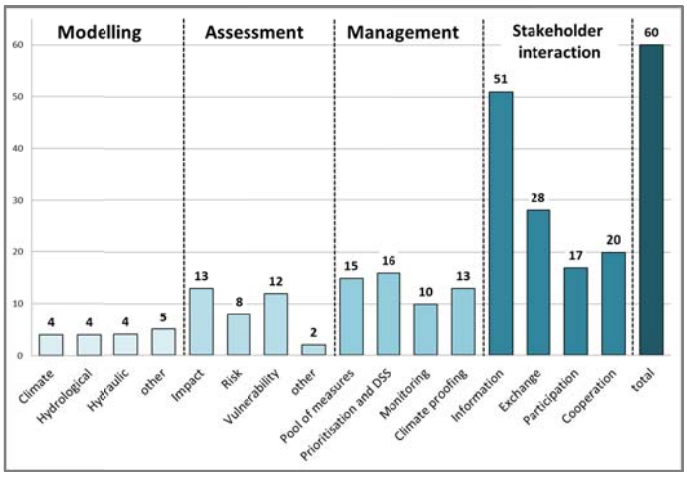

Figure 1 Purpose of the selected adaptation tools

The analysis revealed a broad range of tools and measures in use or in development by the Cluster projects. Their scope is wide ranging and covers different

- modelling,
- assessment,
- management and
- stakeholder interaction tools as well as
- practical solutions on how to adapt to climate change at local and regional level (adaptation measures).

Based on collated information the direct applicability or transferability after modification was discussed at CEB1 with reference to the distinct action fields, the spatial scope and the target groups.

Modelling and mapping tools are important and necessary for providing basic information. It was concluded that there is already a wealth of experience in this field and that the development of modelling tools is not in the main focus of the Cluster projects. They instead concentrate on the practical application of already existing (and partly approved) modelling tools. On this, the INTERREG programme can make significant contributions as

- harmonisation of modelling is needed e.g. within river catchments across borders / regions and
- cross-sectoral agreements are needed which (climate) scenarios are used.

With respect to assessment tools it became obvious that in practice currently vulnerability assessments are the biggest challenge. The analysed management tools show a broad range of purpose and are of significant relevance to the Cluster projects. These employ INTERREG funding to further develop, apply and test management tools with the aim of gaining practical experience and to assist with the effective implementation of adaptation measures. It was concluded that it is important to integrate the adaptation to climate change into existing and already approved (planning) processes rather than introducing totally new processes. This was especially true for the Natural environment action field where it was agreed that additional monitoring of effects and outcome is needed given that the normal duration of projects is often too short.

Regarding stakeholder interaction tools it was concluded that tools that improve information, exchange, participation and cooperation are most important as one of the primary challenges of climate change adaptation is increasing adaptive capacity and therefore institutional change is essential and needs to be initiated and supported. The rather technical tools in the Built, Water and Natural environment action fields should therefore always comprise elements suitable for

- awareness raising,
- creating knowledge,
- knowledge transfer,
- activation of stakeholders and
- reaching actors.

In addition to the discussion on tools it was agreed that measures exclusively for the purpose of adapting to climate change effects are scarce. Instead, it was suggested that the actual implementation of adaptation measures could be fostered by combining measures for different purposes and using windows of opportunities. Therefore adaptation to climate change will be the most successful if linked to ongoing activities and feed into routine processes.

When considering the built environment it was concluded that it is extremely important to highlight an added value of adaptation measures for urban and regional development. Multidisciplinary measures – although more difficult in planning, coordination and implementation – may be best suited to include the issue of climate change adaptation and a focus on multifunctional landuse may help to actually implement adaptation measures.

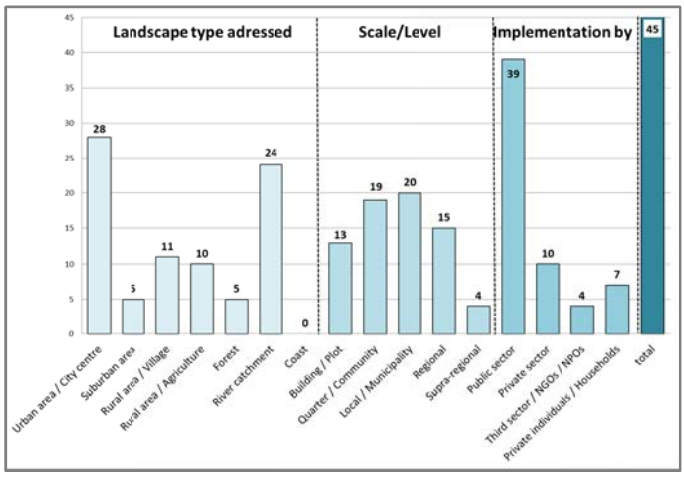

Figure 2 Purpose of the selected adaptation measures

Initial Conclusions

1. Climate change adaptation will only be successful and effective if the development of technical adaptation tools and measures includes stakeholders as part of the process. Particular focus needs to be given to vulnerable groups and to building institutional capacity to develop and implement effective adaptation strategies.

2. The main challenges lie in improving communication, facilitating organisational change and increasing institional capacity and more specifically in a better coordination and cooperation between:
   a) the different (sectoral) planning disciplines and
   b) the distinct spatial scopes – especially between the regional, district and local level.

3. Special attention needs to be paid to the local and neighbourhood dimension of climate change and the target groups Small to Medium Enterprises, smaller communities and actors that are hard to engage.

4. The emphasis on uncertainties within the context of climate change – often highlighted in academic debate – should not be considered an obstacle as planners are familiar to planning for the future without knowing exactly what that future will hold.

5. The Cluster cross-project exchange mechanism should be used to expand on certain key topics. Those could be action field related topics like:
   - Heat and bio-climatic stress in urban areas (Built environment),
   - Impacts of flash floods and possible counteractive measures (Water environment) and
   - Multifunctional land-use: approaches – experiences – recommendations (Natural environment)

   and more general topics like:
   - vulnerability assessment: procedures – experiences – recommendations and
   - climate proofing: procedures – experiences – recommendations.

The full paper 'Tools & Measures – Findings and conclusions' including all appendices can be downloaded from the *SIC adapt!* webpage at http://www.sic-adapt.eu/download.html

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- Revision notification matrices
- T – Analysis matrix about the Cluster projects' adaptation tools
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Update notice: Part I (sections 1-3) updated and newly layouted (changes in figures and tables), Part II (sections 4-5) newly added, section 6 updated, analysis matrices T and M in appendices updated (cp. revision notification) and changed in style. Executive Summary added.

PART I – Discussion Paper 'Tools & Measures'

1 Introduction

1.1 Background

Impacts and vulnerabilities in North-West Europe due to climate change

There is a general scientific and political agreement that climate change is happening and that the impacts could have severe consequences for human and natural systems (IPCC 2007). In North-West Europe (NWE) for the summer season, reduced precipitation and an increasing risk of droughts are anticipated. Water availability and crop yields could decrease; biodiversity loss, forest fires and heat-waves may increase. However, in winter and spring, the intensity and frequency of river floods may increase significantly due to more and heavier precipitation. Low-lying coastal areas could face major impacts due to sea level rise and a possible increased frequency of severe storm surges. More intense storms could affect shipping, tourism and links to island communities. Cities and urban areas become even more threatened by heat waves, flooding and droughts. And although climate change may also offer certain short- and medium-term opportunities such as increased forest or tourism growth, at the same time the potential for greater damage due to, for example, winter storms and the rising risk of forest fires are to be expected (EEA 2010).

Status quo of action regarding adaptation to the spatial impacts of climate change in NWE

Regionally tailored strategies to adapt to climate change are therefore needed to manage these expected impacts. The EU understands the task of adaptation as a matter of joint responsibility with the Member States and regions (CEC 2009, 2007). Whereas the EU adaptation framework aims at developing a comprehensive European Adaptation Strategy by 2013 – complemented by a clearing-house mechanism – most of the Member States have already developed National Adaptation Strategies (PEER 2009). Besides the continued political discussion on the need for adaptation, in practice adaptation to the expected effects of climate change is already taking place albeit at specific locations and at different scales. Although the question of how to deal with uncertainties regarding future climate conditions often hinders proactive action, a certain amount of new developed adaptation tools and proactive adaptation measures can, indeed, be identified. These are often developed within the scope of European and national funding schemes. While the majority of funding programmes focus on research, INTERREG helps to bring climate change adaptation into action and practical implementation.

1.2 Approach of *SIC adapt!*

The Cluster's objectives and actions

SIC adapt! is a Strategic Initiative Cluster (SIC) of the INTERREG IV B NWE Programme dealing with adaptation to the impacts of climate change in seven Member States. Eight current transnational projects with around 100 partner organisations are involved in the initiative which includes representatives from all levels of public authorities, scientific institutions, non-profit and private organisations.

In addition to the aims of each project the Cluster will:

- ensure that the outputs from the projects illustrate how existing management instruments can be tailored to facilitate adaptation across a range of sectors and locations,
- foster implementation of adaptation measures by widely tested and known good practice examples throughout NWE and beyond for use by regions with similar projected impacts,
- encourage policy recommendations in order to develop policy frameworks that will support local, regional and national adaptation initiatives across NWE,
- strengthen the impact of each project, especially at higher policy levels.

General information on the eight Cluster projects (see also separate PDF 'Climate change sooperation projects at a glance' with compilation of project flyers distributed at the CEB1 meeting)

The eight Cluster projects all deal with the effects of climate change and possible adaptation strategies. All look for sustainable, cost-efficient, good-practice solutions across four action fields:

- Built environment (urban and regional)
- Water environment (rivers, urban water management, coastal / marine)
- Natural environment (forest / nature / agriculture)
- Social environment (society / behaviour change)

SIC adapt! is lead by the German Water Board Lippeverband. The eight Cluster projects are:

Name and meaning of acronym		Lead Partner	Contents
ALFA www.alfa-project.eu	Adaptive Land Use for Flood Alleviation	Rijkswaterstaat, NL	ALFA aims to protect citizens in the North West Europe region against the effects of the risk of flooding due to climate change. This will be done by creating new capacity for water storage or discharge of peak floods within river catchments in Belgium, France, Germany, United Kingdom and The Netherlands
AMICE www.amice-project.eu	Adaptation of the Meuse to the Impacts of Climate Evolutions	Etablissement Public d'Aménagement de la Meuse et de ses Affluents (EPAMA), FR	AMICE is about the adaptation of the Meuse river basin to the impacts of flooding and low waters from climate change.
C-CHANGE www.cchangeproject.org	Changing Climate - Changing Lives	Groundwork London, UK	C-CHANGE demonstrates how changes to both local open spaces and to day-to-day behaviour can help city regions to cope with a changing climate. C-Change will also enable all its Partner Regions to examine their spatial planning strategies and adapt them in response to the challenges posed by climate change.
FRC www.floodresiliencity.eu	FloodResilienCity	Rijkswaterstaat, NL	FRC enables responsible public authorities in eight cities in North West Europe to better cope with floods in urban areas. This will be done through a combination of transnational cooperation and regional investments.
ForeStClim http://forestclim.eu	Transnational Forestry Management Strategies in Response to Regional Climate Change Impacts	Landesforsten Rheinland-Pfalz, DE	ForeStClim aims of is to develop proactive and adaptive regional forestry management and forest protection strategies in the face of the expected climate change scenarios.
Future Cities www.future-cities.eu	Urban networks to face climate change	Lippeverband, DE	Future Cities aims at making city regions in Northwest Europe fit to cope with the predicted climate change impacts. The Future Cities strategy combines selected strategic urban key components - green structures, water systems and energy efficiency - for a proactive transformation of urban structures.
IMCORE www.imcore.eu	Innovative Management for Europe's Changing Coastal Resource	Coastal & Marine Resources Centre, University College Cork, IE	IMCORE aims at building adaptive capacity to deal with coastal climate change. Nine partnerships from across North West Europe's coastal areas are developing adaptation strategies to address the economic, social and environmental implications of climate change.
WAVE www.waveproject.eu	Water Adaptation is Valuable for Everybody	Waterschap Regge en Dinkel, NL	WAVE aims to prepare for future changes in regional water systems brought about by climate change. It will contribute to the development of more climate-proof water systems. The WAVE project is intended to improve the integration of water management into spatial planning; regional risk analysis is an important aspect of this.

	The 4 Action Fields			
	1 Built environment	2 Water environment	3 Nature environment	4 Social environment
ALFA		alfa	alfa	
AMICE		amice	amice	
C-Change	Change			Change
FRC	FRC	FRC		
ForeStClim				
Future Cities	Future Cities	Future Cities		
IMCORE		IMCORE		IMCORE
WAVE		WAVE	WAVE	

Figure 1 Allocation of Cluster projects to the 4 action fields

1.3 Purpose and target group of this paper

The purpose of this paper is to:

- present the findings from analysing the adaptation tools and measures developed and implemented by the eight Cluster projects,
- reflect those findings taking the actual status of discussion on adaptation tools and measures in Europe into account,
- give answers to the questions posed to the participants of the first Cluster Expert Board (CEB 1) meeting, 20-21 June 2011, Holzwickede / Dortmund, Germany (cp. version 1 of this paper),
- present the results of the CEB 1 meeting,
- set up the basis for the *SIC adapt!* knowledge platform (containing a compilation of experts, tools and measures) and
- prepare key messages as basis for policy recommendations (outlook on second phase of Cluster activities).

The target group for this paper was initially participants of CEB 1. However, as the revised, updated and amended version of the paper is put online now after this discussion process a broader audience will be reached. Furthermore, it is envisaged to disseminate the main results of the discussion process as well as the paper itself to selected policy makers at regional, national and EU levels.

2 Terms and methodology

2.1 Definition of relevant terms

Within *SIC adapt!* **mitigation** is understood as effort to mitigate further climate change (e.g. by reducing the emission of greenhouse gases) and **adaptation** is understood as adaptation to the impacts of climate change (e.g. the impacts of changing climate conditions like raising temperature and changing precipitation patterns, increase of extreme weather events etc.) (cp. Smit et al. 2000).

With respect to analysis of the Cluster's projects' adaptation tools and measures we interpret **adaptation tools** as instruments which help to:

- identify climate change itself (by climate / hydrological / hydraulic etc. modelling),
- assess risks and opportunities posed by climate change (by impact / risk / vulnerability assessment),
- identify appropriate adaptation measures and to foster implementation of these measures and
- raise awareness and acceptance concerning the issue climate change itself as well as concerning the adaptation measures to be realised to tackle the impacts of climate change.

Overarching strategies, planning concepts and working methodologies are also regarded as 'tools' as they support adaptation processes.

In contrast, **adaptation measures** in the *SIC adapt!* terminology are understood as to a specific location oriented, operational, often sector-specific actions with tangible results. They help to adapt a certain element / receptor (e.g. a building, a drainage system) to the expected impacts of climate change. These may be structural (technical, engineering) or non-structural (juridical, planning, communication) measures.

2.2 Methodology of analysis

To analyse the Cluster projects' approaches a combination of **expert interviews and a desktop study was commissioned to review** the projects' materials (i.e. application forms, web pages, reports, presentations etc.). Early in 2011 all Lead Partners (LP), partly joined by relevant Project Partners (PP), were visited and interviewed in order to select and compile the Cluster relevant adaptation tools and measures originating from the distinct Cluster projects. As the focus of *SIC adapt!* is on adaptation no stand-alone mitigation tool / measure was taken into account but combined adaptation and mitigation measures have been considered. The presented compilation and assessment of tools and measures was agreed on using repeated **feedback loops** on LP and PP level. The results are shown in **two matrices** (Appendices T and M) and contain the tools and the measures selected to date **categorised** by purpose, spatial scope, technical outline, target group, applicability and various other attributes. These matrices have formed the basis for the comparative analysis detailed in Section 3 (below). In general, the matrices are **open for further input** as the Cluster projects progress. However, as some of the Cluster projects activities have just started or are currently in a conceptual state there is scope for additional input regarding the purpose and intention of the tool or measure in the majority of cases.

The analysis itself does not claim to be a statistical examination in the strictest sense although it does present some statistical information on the amount and allocation of tools and measures with regard to the chosen categories. Instead, the descriptive presentation of the compiled information on the Cluster projects' adaptation tools and measures in the following chapters is intended to give evidence on the status quo of practical climate change adaptation in NWE and to raise questions for further discussion regarding the applicability and transferability of the identified approaches in relation to distinct action fields, spatial scopes and target groups.

3 Findings from analysing the eight projects' approaches and interim results

3.1 Tools and measures identified

To date, the **'tools'** and **'measures' matrices** comprise around **60 and 50 entries**, which show a selection of examples from the Cluster projects' on-going work. The **range of tools** reaches from different modelling tools to assessment, management and communication / engagement tools. Often the tools are based on existing approaches and show a further development or the integration of different, already existing approaches in order to tackle climate change impacts. This also holds for the **measures** which mostly follow known procedures that are adapted to the issue of climate change.

The comparative analysis reveals that certain **meta tools** are being developed that comprise multiple tools. What also may be of interest is that most measures are – although implemented locally – part of larger scale **strategic approaches**. The analysis also revealed that within the different Cluster projects the steps from analysis to action follow (though not explicitly but implicitly) known **strategy cycles.** For example the Flood risk management strategy cycle or the UKCIP Adaptation Wizard, the ETC/ACC Guiding principles for adaptation to climate change in Europe or the Ecologic guidelines for the elaboration of Regional Climate Change Adaptation Strategies (Prutsch et al. 2010, Ribeiro et al. 2009).

Figure 2 Strategy cycle for the development of regional adaptation strategies (Ribeiro et al. 2009:19)

Table 1 Overview on selected tools per Cluster project (updated, status 21-06-2011)

	Project	Action field*				Purpose of tool*															
						to identify climate change				to identify and assess risks and opportunities				to identify adaptation measures and to foster implementation				to raise awareness and acceptance			
						Modelling				Assessment				Management				Stakeholder interaction			
Sum of selected tools per project		Built environment	Water environment	Natural environment	Social environment	Climate modelling	Hydrological modelling	Hydraulic modelling	Other	Impact assessment	Risk assessment	Vulnerability assessment	Other	Providing a pool of existing measures	Prioritisation and Decision support	Monitoring of effect and outcome of measures	Climate proofing spatial plans	Information	Exchange	Participation	Cooperation
6	ALFA	1	5	5	3	-	-	-	1	1	1	-	2	1	1	1	2	4	1	2	1
6	AMICE	-	5	-	-	1	1	1	-	1	1	1	-	1	2	1	1	5	-	-	5
6	C-Change	4	1	3	3	-	-	-	-	-	-	-	-	1	-	-	4	5	4	3	3
8	FRC	8	8	2	2	-	1	1	1	3	2	5	-	4	2	-	-	8	2	1	1
11	ForeStClim	1	3	11	2	2	1	-	1	5	1	1	-	-	3	5	-	11	4	2	1
11	Future Cities	10	9	2	7	-	-	-	-	2	-	4	-	6	6	3	5	10	9	4	6
7	IMCORE	1	4	1	5	-	-	-	2	-	2	1	-	2	2	-	1	5	4	4	3
5	WAVE	3	4	-	3	1	1	2	-	1	1		-	-	-	-	-	3	4	1	-
60	TOTAL	28	39	24	25	4	4	4	5	13	8	12	2	15	16	10	13	51	28	17	20

* multiple nominations possible

Table 2 Overview on selected measures per Cluster project (updated, status 21-06-2011)

Sum of selected measures per project	Project	Action field*				Type of measure*					Approach	
		Built environment	Water environment	Natural environment	Social environment	Adaptation	Mitigation	Combined adaptation and mitigation	Structural (technical, engineering)	Non-structural (juridical, planning, communication)	Strategic approach	Single measure
5	ALFA	-	5	5	2	5	-	-	5	1	3	2
7	AMICE	1	7	5	1	5	-	2	4	5	5	3
1	C-Change	-	-	-	1	-	-	1	1	1	-	1
6	FloodResilienCity	6	6	-	1	5	-	1	5	3	2	4
1	ForeStClim	-	-	1	-	-	-	1	1	-	1	-
17	Future Cities	17	9	4	2	11	-	6	17	1	13	4
-	IMCORE	-	-	-	-	-	-	-	-	-	-	-
8	WAVE	3	8	5	2	5	-	3	6	2	5	3
45	TOTAL	27	35	20	9	31	-	14	39	13	29	17

* multiple nominations possible

3.2 Categorisation of tools (analogue matrix of analysis, cp. Appendix T)

Modelling tools

With respect to the tools identified there are some approaches aiming to **increase the regional knowledge basis** concerning climate change (modelling tools).

These are, for example, the ForeStClim regional climate scenarios (T24) providing datasets for the analysis and interpretation of regional climate change. These are also the creation of climate change scenarios for the international river basin of the Meuse (T6) within AMICE or the 'Flood Modelling and Visualisation' approach (T56) within the scope of the WAVE project. For those three projects focused specifically on the natural environment, the provision of regional climate scenarios and respective regionalised data sets is an important precondition to carry out the other project work packages. The other Cluster projects either did not include their modelling work as being Cluster relevant or do not include model development in their work plan. Most of the Cluster projects do not concentrate on new model development as existing models developed (by other organisations or in previous projects) can be readily applied.

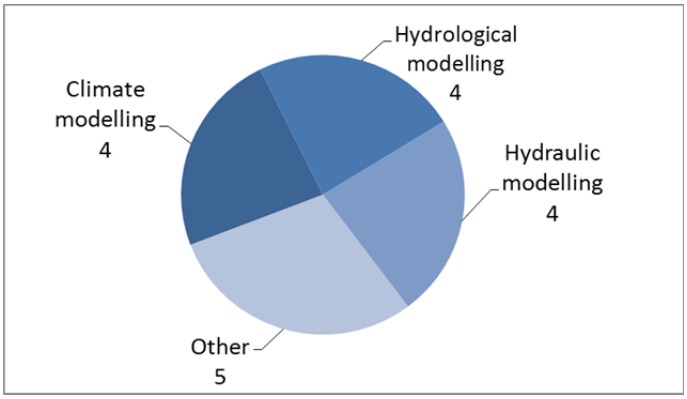


Figure 3 Tools to identify climate change – modelling tools (multiple nominations possible)

Assessment tools

The impact, risk and vulnerability assessments carried out by nearly all of the Cluster projects (assessment tools) are intended to **increase the regional knowledge basis** and to **support the decision making processes and their actors.**

These are often GIS based regional analyses leading, for example, to vulnerability maps and reports [see the examples for vulnerability assessment from ForeStClim and Future Cities (T26, T41) or the GIS for urban resilience from FloodResilienCity (T22)]. Apart from those studies several of the Cluster projects also developed guidelines, handbooks and computerised tools on risk and vulnerability assessments focusing on different sectors and target groups. The FloodResilienCity project, for example, has developed guides on flood proofing of existing and new (public) infrastructure and buildings such as 'Construction in flood-prone areas' (T19) or the 'Project developers guide' (T20). IMCORE has developed an integrated 'Futures approach' (T51) comprising GIS, web based virtual reality and a customised simulator suite.

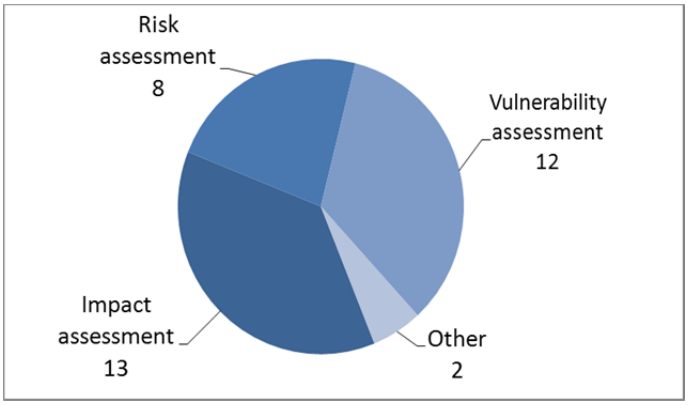


Figure 4 Tools to assess climate change risks and opportunities – assessment tools (multiple nominations possible)

Management Tools

In order to **identify appropriate adaptation measures and to assist decision makers** the Cluster projects present different approaches on how to provide a pool of existing adaptation measures and how to develop methodologies for climate proofing spatial plans or existing management concepts (management tools).

These are for example the **meta tools** 'Web based information portal' (T23) providing information and training material, originating from FloodResilienCity, and the Toolbox on Urban Heat Islands (T35, Future Cities). Other examples include Future Cities' Adaptation Compass (T37) which is meant to help planners, experts and water boards to structure the working steps (involving e.g. a pre-structured vulnerability assessment), to give examples for best-practice and experiences of Future Cities partners and highlight possible barriers. With respect to climate proofing of spatial plans, C-Change is working on transnational planning recommendations based on the experience of climate proofing of different spatial plans. These include spatial development plans on the state and local levels in Germany, The Netherlands and Luxembourg (T12, T15, T16). With respect to the adaptation of management concepts an example is the ForeStClim approach of integrating existing impact assessment, soil and water assessment and forest management tools in order to optimise the predictions of forest growth under future climate conditions (T25).

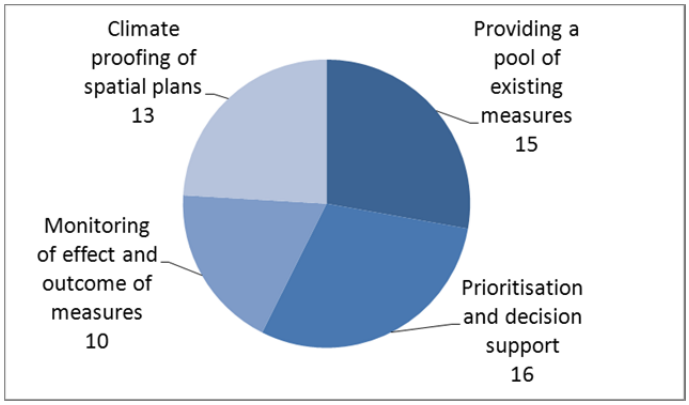


Figure 5 Tools to identify adaptation measures and to foster implementation – management tools (multiple nominations possible)

Although figure 5 above shows 10 tools for 'monitoring of effect and outcome of measures' it can be stated that this is an issue still not covered well in practice. Looking at Table 1 (Page 7) reveals that 5 out of these 10 tools originate from ForeStClim where they are developed and applied in a research dominated context. Therefore it can be concluded that procedures for prioritisation of adaptation measures and for monitoring the effect of adaptation measures are still rare in practice.

Tools for stakeholder interaction

In addition to (climate) modelling, assessment and management tools all the Cluster projects are heavily involved in developing and implementing tools for **stakeholder engagement and communication** (tools for stakeholder interaction). These are aimed at raising awareness and acceptance regarding the issue of climate change, the potential impacts and the necessity of developing adaption measures.

The communication and stakeholder engagement tools differ in their purpose.

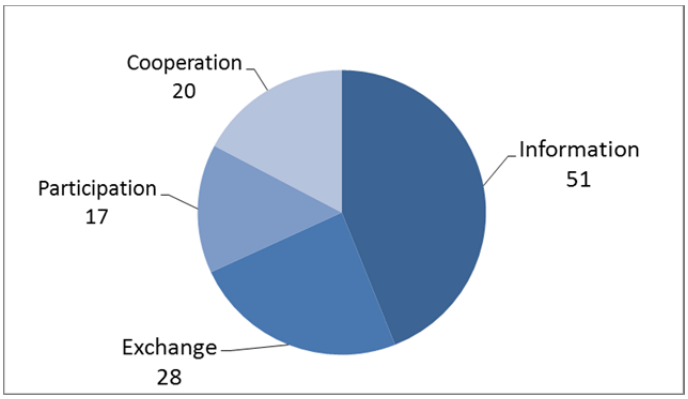


Figure 6 Tools for rasing awareness and acceptance – stakeholder interaction tools (multiple nominations possible)

Pure informational tools (one-way flow of information from sender to receiver) were identified such as the WAVE movie (T54) or the Coastal legal codex (T47) from IMCORE. Bi-lateral tools, designed to provide exchanges of knowledge and experience are also been developed, for example, the information and educational schemes (T1, T32, T33) developed by ALFA and ForeStClim. Many of the assessment and management tools also fulfil the objective of actively engaging stakeholders in the project development and decision making, for example the Multimedia Distance Learning Tool (T52) from IMCORE or Future Cities' Adaptation Compass (T37). Again, both of these are meta tools comprising a range of different tools and methodologies.

There are tools also aiming at facilitating a process of collaborative working where stakeholders are partners and joint decision-makers for project development and direction. These are for example the games and role plays (T36, Future Cities and T53 WAVE) or the 'Guidelines on Stakeholders Engagement for Driver and Issue Identification Workshops' (T49) complemented by the 'Training of Trainers' (T50), both originating from IMCORE, the latter can be also applied in fields outside of climate change.

Other innovative approaches in engaging stakeholders are the Healthy Climate WeZt project (T12, C-Change) where young people with diverse ethnic and cultural backgrounds have been engaged and empowered to develop climate proof spatial plans for their neighbourhood; or the Klimaroute (T17, C-Change) informing and inviting visitors to educate themselves at certain art and design stations along the River Main in Germany.

Analysis of further categories

The **technical outline** of the tools shows a great variety from checklists over guidelines/ guidance books, reports/ maps, computerised tools through to role plays/ games and other outputs.

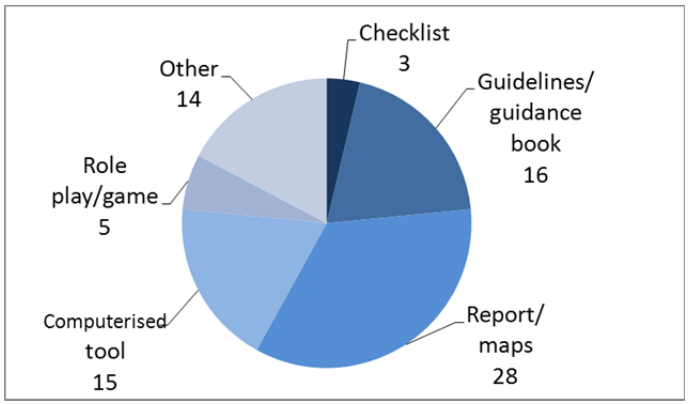


Figure 7 Variety of technical properties of tools – technical outline (multiple nominations possible)

The **target groups** addressed are mainly, but not exclusively, experts/ professionals from public authorities (mostly for the modelling, assessment and management tools). Experts and laymen from civil society are also being targeted (in general focussed on information and communication tools).

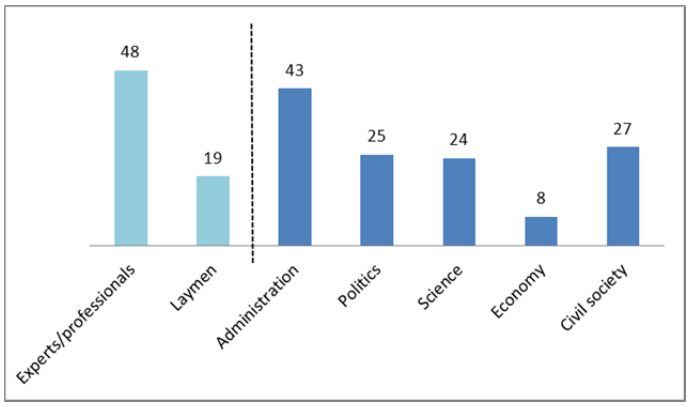


Figure 8 Target groups addressed (multiple nominations possible)

The **spatial scope** of the tools also varies from building level, to quarter/ community, level, local/municipality level and regional level up to the supra-regional level but is mainly focused on the local and regional level - unsurprising given the INTERREG funding context.

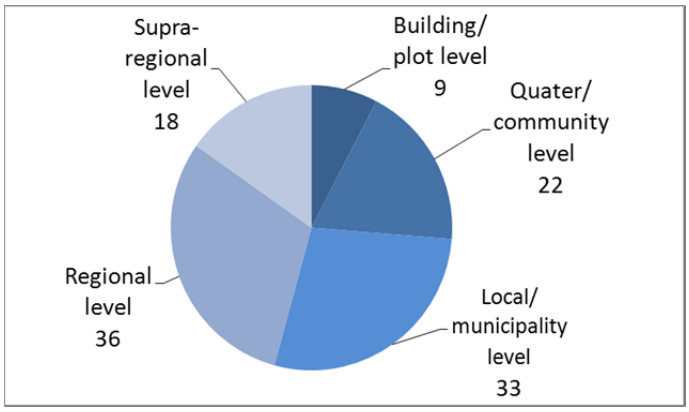


Figure 9 Spatial level addressed by tools (multiple nominations possible)

Summary regarding the analysed adaptation tools:

It is evidently clear that there is a focus on management and stakeholder interaction tools and that these tools tend to concentrate on local and regional level. As to be expected within the INTERREG context the core target group is experts in public authorities but there is equal emphasis in engaging with politicians, scientists and civil society.

3.3 Categorisation of measures (analogue matrix of analysis, cp. Appendix M)

Type of measures

As the focus of *SIC adapt!* is on climate change **adaptation**, measures that help to adapt certain discrete elements like a building, an urban green space or a floodplain to the expected impacts of climate change have been identified. Nevertheless, many of those measures also fulfil **mitigation** goals by actively contributing to reduce greenhouse gas emissions. These are mainly measures in the urban context which deal with green spaces like a natural Playground (M12) designed and to be implemented in Amsterdam (C-Change) or the various green walls and green roofs projects (M21 - M26) being part of Future Cities. Also large structural measures such as the Lock of Ham (M7) in Belgium, (AMICE) are intended to contribute to the adaptation of the River Meuse by decreasing the problem of low flows whilst improving green energy production.

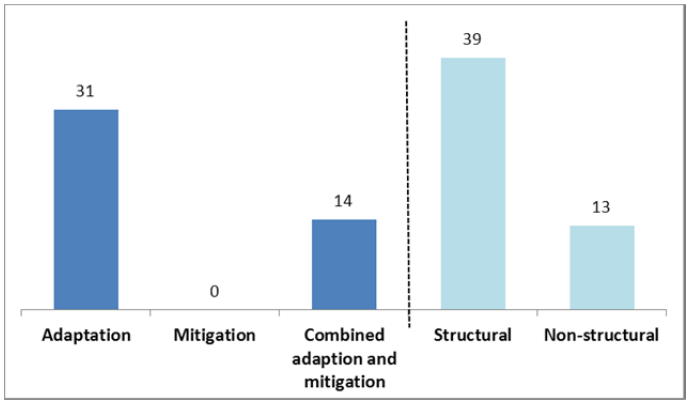


Figure 10 Aim of measure – type of measure

Approach of measures

More than half of the measures follow a **strategic approach** being part of a broader strategy at local, regional or national level. This could be a local strategy like the strategy for 'Greening the city of Nijmegen' (M21, Future Cities) which frames all measures on green structures in Nijmegen. It could be a regional strategy like the concept for 'Natural Water Retention in the Ardennes' (M9, AMICE) aiming to build a whole network of wetlands. Or it can be a national strategy like the Dutch programme 'Room for the River' which build the framework for many flood risk reduction investments in several of the Cluster projects. Less than half of the measures are **single measures**, i.e. locally and sectorally oriented measures with the input of a large deadwood pile in the middle of the River Rur, Germany, in order to use the natural hydro-energy for river restoration works (M40, WAVE) being one example of a single measure.

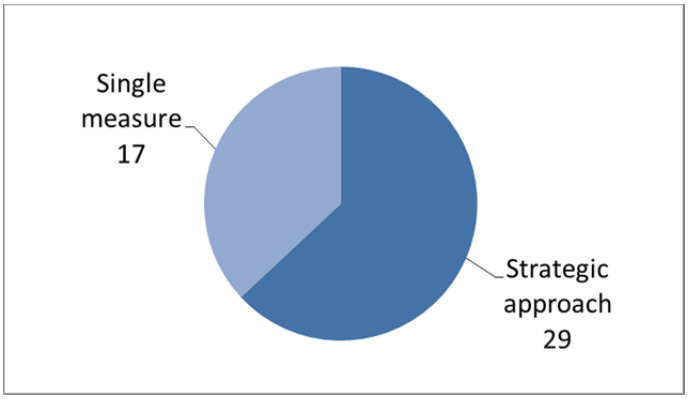


Figure 11 Distinction between single measure and measures underlying strategic approaches

Climate change impact addressed

Looking at the **climate change impact addressed** the majority of measures focuses on the issue of river flooding and heavy rainfall. These are often measures about water retention, water storage, channelling and directing water flows. The 'Streets as Streams and Road as Rivers' approach from Dublin City Council (M16, FloodResilienCity) is one innovative example for the re-configuration of streets and other topographic features for managing surface waters away from critical areas. Considerably fewer measures address drought and heat. The 'Green Transformation of the Nijmegen City Centre' (M24) as part of the Future Cities project is one example of the use of public and private green structures for cooling a city. Wind / storm and fire are of less relevance and none of the measures addresses sea level rise. Most of the measures are suitable to tackle more than one climate change impact. Only a limited amount of measures concentrates on one impact type.

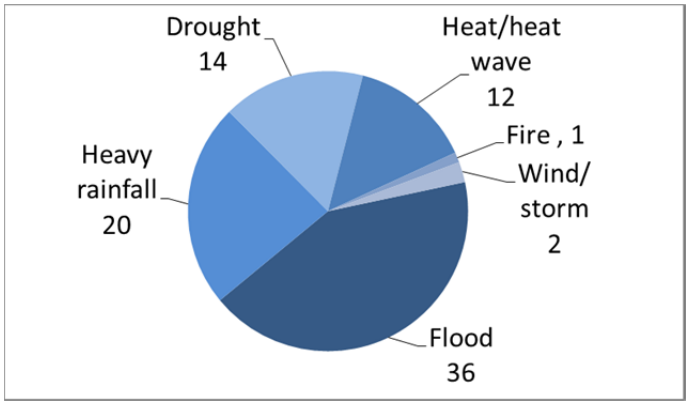


Figure 12 Measures relating to different climate change impacts (multiple nominations possible)

Temporal and spatial scope

With regard to the **temporal scope** it was interesting to find out that most of the measures tend to have short-term impact (e.g. immediately reducing the risk of inundation in case of a flood event) or at least a medium term perspective (effect within 5 to 10 years, applies e.g. to some river restoration works). But there are also many activities of the Cluster project's that deal with perceived long-term issues. These are for example the dyke relocation at the Overdiepse Polder, Netherlands (M5, ALFA) or the Climate dyke Tiel, Netherlands (M36, Future Cities).

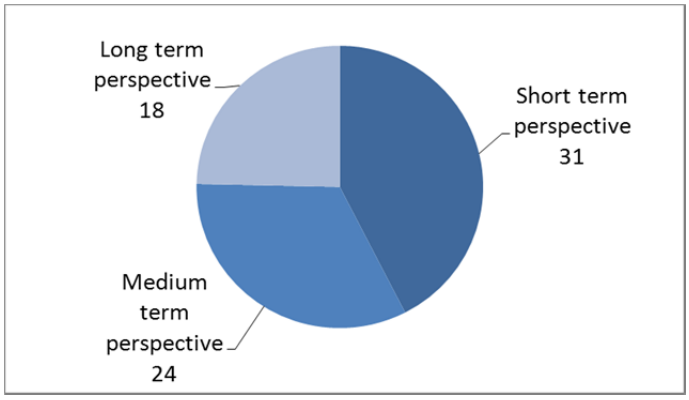


Figure 13 Time needed to see an effect of the measure – temporal scope (multiple nominations possible)

The **spatial scope** of the measures varies as for example, measures on tackling the urban heat island effect are focused on building, quarter and local level in urban areas (M24, Future Cities), whereas river restoration and widening works aiming at the reduction of flood risks are – mostly carried out in rural areas – often realised at a local level whilst also having an effect on regional and supra-regional level (e.g. the La Bassé, France (M1, ALFA) or the Lock of Ham, Belgium (M7, AMICE).

In general, measures in the built environment mostly focus on urban areas/city centres and the building and quarter level whereas measures in the water environment are mainly carried out in urban areas/city centres, rural areas and river catchments at local, regional and supra regional level. In the natural environment, the measures concentrate on rural areas, forests and river catchments primarily at local and regional level. However, measures in the social environment tend to cover all landscape types and all scales equally.

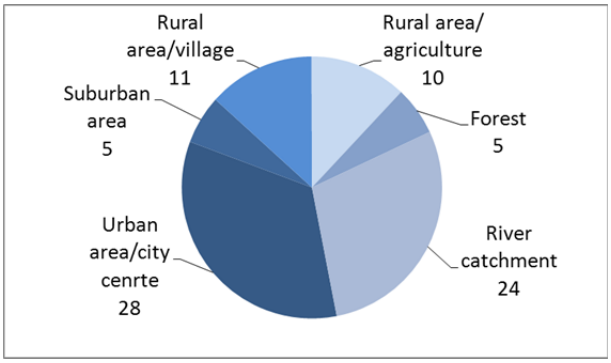


Figure 14 Spatial scope: Landscape type addressed (multiple nominations possible)

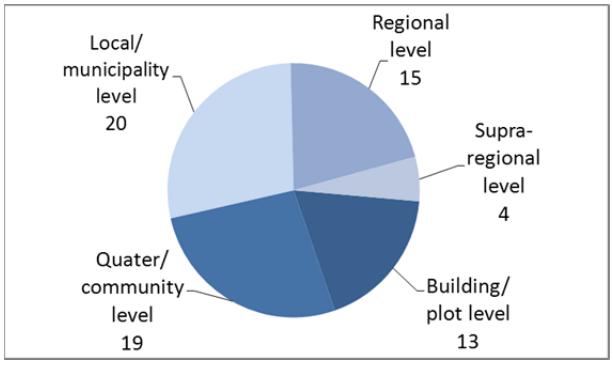


Figure 15 Spatial scope: Scale (multiple nominations possible)

Stakeholder involvement and responsibilities

Many activities are characterised by a broad **stakeholder involvement** whilst developing and realising the adaptation measures. Due to the nature of INTERREG projects the public sector is mainly responsible for the **implementation** of the measures.

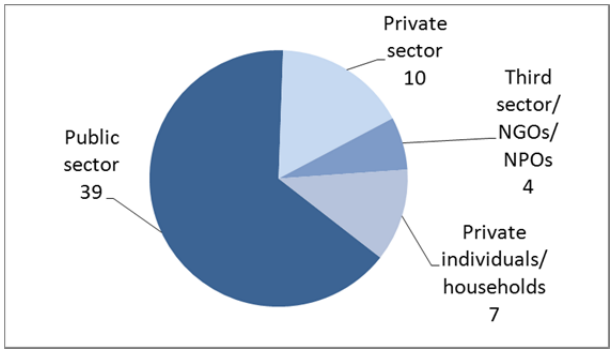


Figure 16 Responsibility for implementation of measure

Summary regarding the analysed adaptation measures

Most of the measures show an integrated approach either addressing different climate change impacts, aiming at adaptation and mitigation simultaneously or combining structural with non-structural solutions. Similar as for the tools, the main focus of the measures is on water environment and on floods and heavy rainfall events. Distinct to the tools, the spatial scope addressed by the measures does not concentrate on the local and regional level but is spread over all spatial level from building / research plot level to supra-regional level. Responsible for implementation is as would be expected for INTERREG mainly the public sector.

3.4 Application of tools and measures

With regard to the **action fields** identified within *SIC adapt!* most of the tools and measures are focusing on the Water environment with Built environment second. For tools the minority of entries address Nature environment, whilst for measures the minority of entries was under Social environment. Especially with respect to the tools but also potentially valid for the measures, a coeval focus on more than one action field was noted. This indicates an integrated approach where a tool or a measure rarely focuses only on one action field.

Table 3 Tools corresponding with action fields (updated, status 21-06-2011)

	Purpose of tool*															
	To identify climate change				To identify and assess risks and opportunities				To identify adaptation measures and to foster implementation				To raise awareness and acceptance			
	Modelling				Assessment				Management				Stakeholder interaction			
Action field	Climate modelling	Hydrological modelling	Hydraulic modelling	Other	Impact assessment	Risk assessment	Vulnerability assessment	Other	Providing a pool of existing measures	Prioritisation and Decision support	Monitoring of effect and outcome of measures	Climate proofing spatial plans	Information	Exchange	Participation	Cooperation
Built environment	1	2	3	2	6	5	10	1	12	10	3	11	25	17	10	10
Water environment	3	4	4	4	10	7	11	1	14	14	5	8	35	19	11	14
Nature environment	2	1	-	4	7	3	3	2	3	7	6	6	23	10	8	5
Social environment	1	1	2	3	4	4	5	2	8	9	4	8	20	18	13	13

* multiple nominations possible

Table 4 Measures corresponding with action fields (updated, status 21-06-2011)

	Type of measure*					Approach		Temporal scope*		
Action field	Adaptation	Mitigation	Combined adaptation and mitigation	Structural (technical, engineering)	Non-structural (juridical, planning, communication)	Strategic approach	Single measure	Short term perspective	Medium term perspective	Long term perspective
Built environment	19	-	8	25	5	18	10	22	12	9
Water environment	29	-	6	29	12	24	12	23	23	17
Natural environment	16	-	4	17	6	15	6	12	14	13
Social environment	5	-	4	6	5	5	5	5	5	2

* multiple nominations possible

Measures as defined under the Cluster are orientated to a specific spatial location. They are therefore mainly not directly transferable. But the approach adopted may be transferable and transfer of experiences can lead to recommendations for subsequent application at additional locations. In contrast, tools if understood as instruments can in most cases be directly transferable. A general transferability applies to most of the communication tools, to some of the planning concepts or methodologies and the educational schemes. However for planning concepts and methodologies a direct transferability strongly depends on having the same or similar planning culture and legal context. In many further cases transferability may be possible – given that local data is fed in (e.g. Futures approach, T51, IMCORE; Toolbox Urban Heat Island, Water Game, T35-36, Future Cities). The column transferability in the matrix 'Tools' is intended to show if, and under what circumstances, a tool could be transferable.

Part II – Documentation and results of the first Cluster Expert Board (CEB1) meeting

The 1st Cluster Expert Board meeting was held over a two-day period in June 2011. It comprised two parallel sessions that considered four thematical action fields followed by a plenary session. The plenary was opened with a key note speech of the Cluster Leader's CEO, Dr. Jochen Stemplewski. In addition an optional excursion was organised by bus to some selected climate change adaptation measures in the Emscher-Lippe catchment area. The sections in Chapter 4 briefly describe the discussion processes and the results from the different action field sessions. Chapter 5 covers the plenary discussion and Chapter 6 provides a summary of the overall process and an overview of future allied Cluster activities.

4 Report from the action field sessions

Each action field session opened with a presentation on the results of the analysis of the Cluster projects' tools and measures specifically referring to the distinct action field under consideration (Built, Water, Natural, Social). Afterwards different experts from the Cluster and external projects gave their inputs by briefly presenting selected tools and measures. [All presentations can be downloaded in PDF-version from the internal section of the *SIC adapt!* webpage www.sic-adapt.eu].

This was used as the basis for the following discussion:

A. whether the analysed tools and measures are complete and everything was correctly formulated and understandable,
B. if and where are links / possible synergies between different tools and measures,
C. what tools and measures are directly applicable or transferable (subject to what modifications?) to which other context in
   - the same / a different action field,
   - the same / a different spatial scope and
   - the same / a different target group, and
D. what makes up an example of good practice.

The aim was to

- review the results of the analysis,
- identify links between the projects' approaches,
- discuss the direct applicability or transferability of the selected tools and measures,
- and finally, to derive conclusions regarding
  - completeness / gaps
  - overlaps
  - contradictions
  - consequences for regulations / funding schemes.

4.1 AF 1: Built environment

The analysis showed that modelling seems to be less important for this action field than in the other fields and that the main focus is on (vulnerability) assessment **tools** and management tools with; the latter centred on climate proofing (of spatial plans) and providing pools of specific adaptation measures. Similar to the results of the general analysis (cp. section 3) virtually all tools in the Built environment action field fulfill the purpose of raising the knowledge basis by providing information. Beyond that the exchange of experience and fostering participation and co-operation are also important functions of the tools in Built environment (see figure 17).

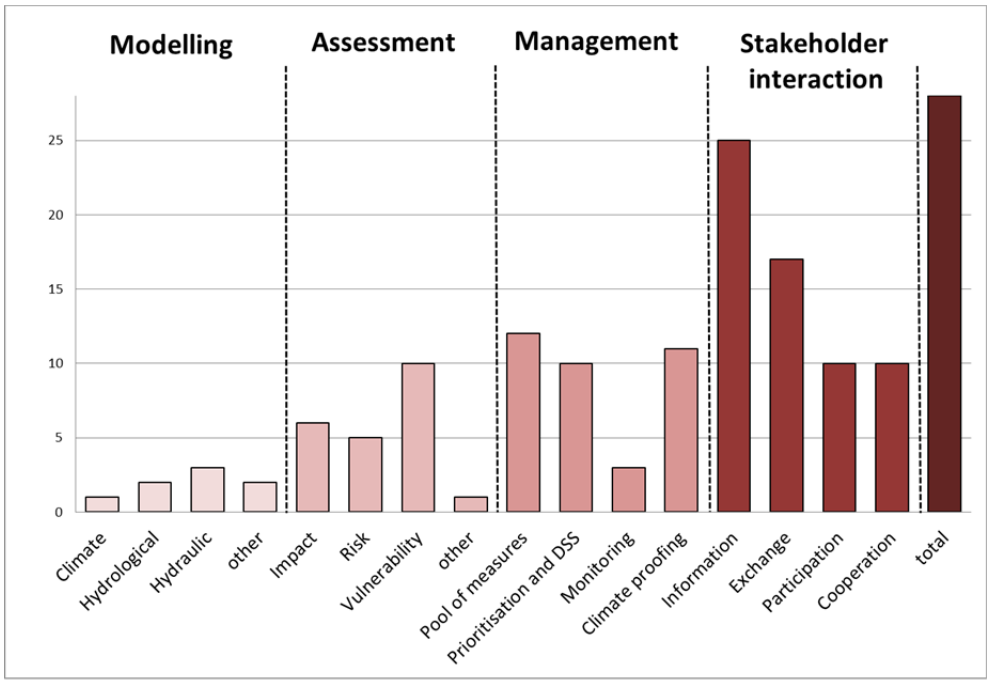


Figure 17: Purpose of tools in Built environment action field

The climate impacts most focused upon were flooding by river floods and flash floods and overheating of settlement areas respectively. Therefore it is unsurprising that more than half of the tools in Built environment are also included in the Water Environment action field.
These are mainly:

- tools on flood modelling and forecasting,
- guidelines on flood proofing new and existing buildings and infrastructure and
- guidelines on the use of spatial planning tools to reduce risk of flooding.

But there are also concepts for

- energetic town planning and for
- climate proofing spatial plans

which include aspects of prevention and protection against heat effects as a relatively new challenge to be tackled in the context of urban development.

With respect to the **measures** – similar to the tools – there is an emphasis on flood prevention, protection and event management. However compared with the other action fields, the measures in Built environment focus more on the climate change impact ‘heat’. This aspect seams to be especially relevant to this field – possibly because of a higher sensitivity and vulnerability against the effect of increasing heat events in densely populated areas. This fact is underlined by the large number of

measures concentrating on urban areas and city centres as well as on the building, quarter and local level (cp. figure 18).

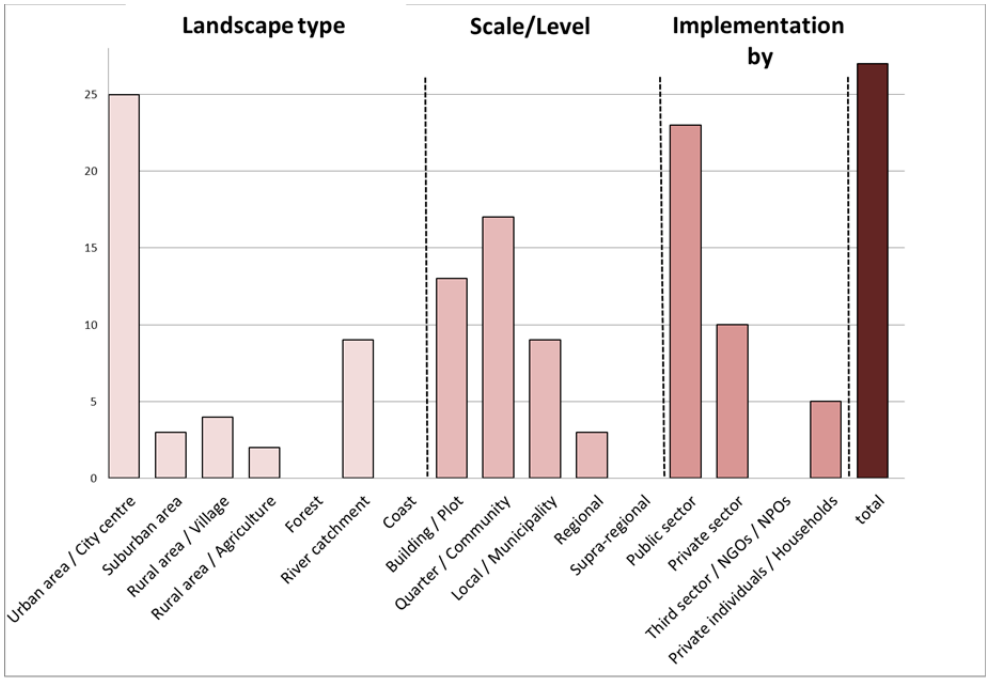


Figure 18: Spatial scope and responsibility for implementation of adaptation measures in Built environment action field

Thus, adaptation measures in the Built environment action field comprise the following aspects

- green structures (for cooling, ventilation, biodiversity),
- flood protection and prevention, water management measures including:
  - river restoration, redevelopment of water fronts and
  - rainwater harvesting, water storage,
- in general the issue 'water in the city',
- multifunctional land use and
- informational / educational measures.

Combining the insights from the Cluster analysis and the messages from the experts presentations (see table 5) a discussion on different topics arose.

In accordance with the results of the analysis the participants stated that the main thematical topics in Built environment are flooding and (over)heating of settlement areas. It was obvious from discussions that there is considerable knowledge concerning the issue of flooding from previous projects and initiatives . However, the topic of heat in the city is less well considered and the main challenge is to get this issue into peoples minds / on the agenda.

It was also discussed how the actual implementation of adaptation measures could be fostered and. participants agreed on two main approaches:

- combining measures for different purposes and / or
- using windows of opportunities (if a project / investment is already planned try to climate adapt it ⇨ add the climate aspect to it).

Table 5 Input from the experts in Built environment action field session

Project	Speaker	Contribution
C-Change	Andrea Hartz, DE	Climate proofing spatial plans at national and local level *Examples from Luxembourg, Saarland and Saarbrücken*
Future Cities	Hans van Ammers, NL	Tackling the Urban Heat Island Effect *Heat study in the City Region Arnhem Nijmegen: From heat map to heat attention map.*
ESPACE (INTERREG IIIB NWE)	Chitra Nadarajah, UK	'Organisational Change Tool' supporting organisations to respond to climate risks: *Qualitative, cyclic approach for identifying and improving the adaptive capacity of organisations*
Future Cities	Birgit Haupter, DE	The Future Cities Adaptation Compass (meta tool) *Guidance through the process of identifying, evaluating and discussing the need for adaptation and on how to find and choose feasible effective and efficient measures*
FRC	Nicolas Bauduceau, FR	Flood proofing of existing (and new) buildings and infrastructure *A methodological guide on diagnosing and reducing the impact of flood hazards on buildings*
CLISP (INTERREG IVB Alpine Space)	Wolfgang Lexer, AU	Assessing the climate change fitness of spatial planning: A Guidance for Planners *Step-by-step approach and user-friendly self-assessment tool for evaluating spatial planning policies and instuments*

With respect to tools it was concluded that it is always difficult to introduce new tools / approaches and that it is more important to try to integrate adaptation to climate change into existing (approved) processes than introducing totally new processes.

This was reflected in three presentations which covered cyclic approaches for climate proofing (spatial) planning processes (the Organisational Change Tool from ESPACE, the Future Cities Adaptation Compass and the CLISP Guidance for Planners).

It was agreed that approaches such as these are invaluable and an animated discussion ensued on how to ensure that the cycles are well linked with formal planning processes. Within this context also pros and contras of sectoral planning versus integrative spatial planning regarding adaptation to climate change were discussed and it was concluded that that the main challenges are

- generally communication, organisational change and capacity building and
- more specifically a better coordination and co-operation between a) the different (sectoral) planning disciplines and b) the distinct spatial scopes (especially between the regional, district and local level).

Additional debate focused on on semantics and terminology and concluded that:

- the term ‚climate proofing' has to be thoroughly defined,
- it may be better to use the term 'well adapting' instead of 'adapted' and
- a distinction between current and future vulnerability is important – the recommendation was to determine the current vulnerability first and then think of future vulnerability (this interpretation of the concept of vulnerability defines vulnerability as a condition rather than a dynamic process).

4.2 AF 2: Water environment

The interpretation of the findings regarding tools in Water environment action field was presented based on the discussion paper (see also figure 19). The action field discussion was lively and highlighted a number of areas of agreements but also some contradictions.

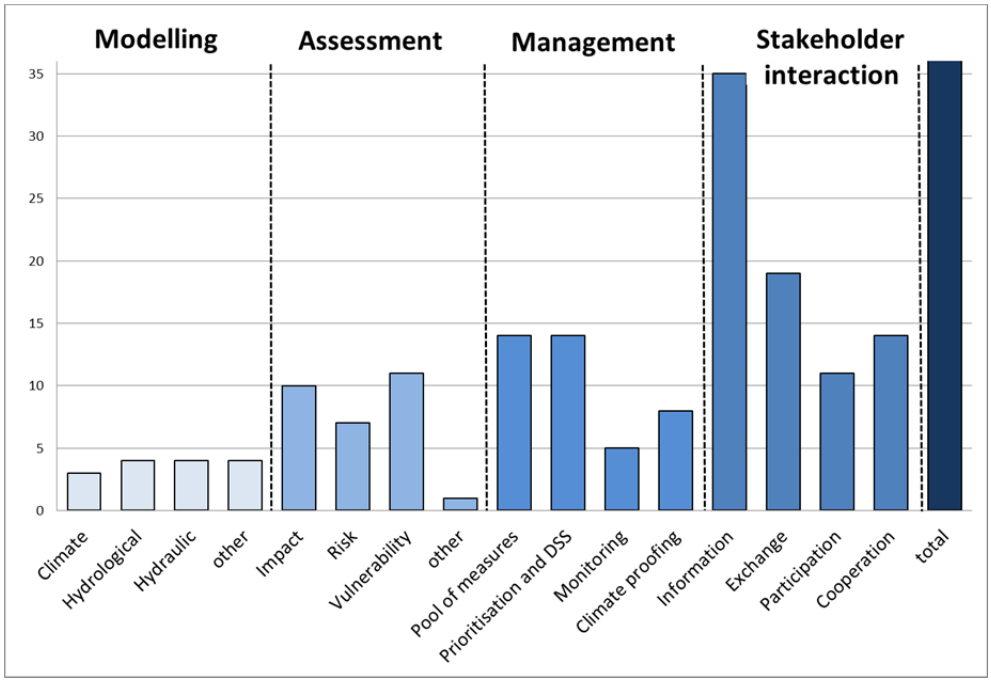


Figure 19: Purpose of tools in Water environment action field

The most important and most advanced tools in the water management sector are modelling tools. They are not primary developed for climate change research purposes, since they often pre-date the climate change adaptation discussion. However, they do now include factors of climate change in most cases – for example runoff modelling or hydraulic modelling for flood modelling purposes which include future climate change additions for precipitation or the resulting water levels as a percentage.

However, the *SIC adapt!* Cluster projects are aimed at developing new and innovative tools that originate from the individual projects and are in line with the funding programme. Consequently the 'classical water management tools' are not a primary concern of the Cluster projects (cp. figure 19) as they are 'state of the art': e.g. hydrology, hydraulics, DGM, mapping etc. are standards in which the climate change modules are developed under (scientific) project frameworks other than INTERREG.
One important aspect of modelling in the framework of INTERREG is the transnational coordination (coupled with a move towards harmonisation) in order to effectively model crossborder rivers. In this case all involved parties envisage substantial challenges not only for the development of models, but also how to model together and ensure harmonisation of differing national standards both during the modelling process and the subsequent use for flood prediction etc. These are definite tasks for the projects ALFA and AMICE and these projects will produce further results regarding the issue of modelling-cooperation.

Vulnerability assessment (based on multi criteria assessment or on other approaches) is perhaps the key issue in practical implementation of modern flood risk management. The implementation of the Directive on the Assessment and Management of Flood Risks (Directive 2007/60/EC) requires the production of risk assessments and risk maps. In this instance, the definitions of countries and regions

developing the maps are quite different, although the EU's Working Group F on floods is developing harmonisation papers (like the 'Reporting sheets' or further informal guidances for the different steps in the Flood Risk Management process). The question of climate change is not the central to their work, but is closely related given its influence on the factors assessed. A pending scientific discussion with different practical approaches is still to decide whether (and to what the level) economic values of receptors are integrated in the risk assessment process. Some Cluster projects are actively working on this issue and will produce potential solutions in the final stages of their respective programmes. Other Cluster projects are working on the development of catalogues of measures and on the prioritisation of measures as well as on multi criteria assessment.

Most tools of the Cluster projects focus on stakeholder involvement via provision of information and participation. The reasons for this focus were discussed and centred on whether these various tools were required most or whether the scope of tools developed reflected the difficulty of effective stakeholder engagement. – it was concluded that both reasons were important: All projects include participative modules due to the relevance for the planning processes and the necessity for transnational cooperation and it was noted that – although many tools for participation purposes already exist – stakeholder involvement is still difficult to attain. So, further development and improvement of the tools in a transnational context is indeed important.

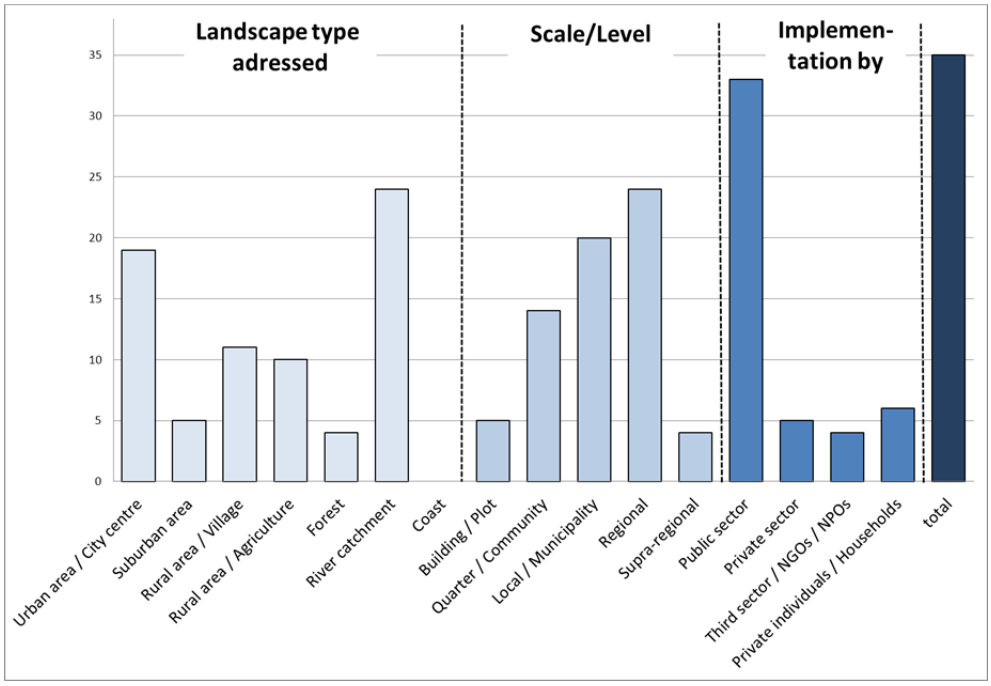


Figure 20: Spatial scope and responsibility for implementation of adaptation measures in Water environment action field

The discussion of the identified measures in this action field showed that apart from the sector oriented measures, integrated measures are the focus of the Cluster projects. Water management measures focus very much on the most vulnerable risk receptors, which are urban and industrial areas while rural areas are less in the focus of climate change driven risk adaptation measures. However the combination of measures and the impacts on multifunctional land use is especially important for future approaches.

The discussion on tools and measures was supported by presentations of examples from both Cluster projects and other – allied projects as follows:

Table 6 Input from the experts in Water environment action field session

Project	Participant	Contribution
AMICE	Benjamin Dewals, BE	Transnational harmonisation of hydrological models: *Examples from international cooperation on modelling and risk assessment in the Meuse catchment*
FRC	Tony Maguire, IE	Streets as Streams and Roads as Rivers *Urban flood risk management approaches as example for innovative measures and tools*
WAVE	Antje Goedeking, DE	Construction of Large deadwood middle course River Rur (CO2 –emisson-reduction) *Examples for rural flood risk management measures.*
Future Cities	Torsten Frehmann, DE	Green-blue transformation of 'Heerener Mühlbach' *The integrated strategy for adaptation to flood risk, nature development and urban needs in respect to climate change*
WAVE	Frank Fokkema, NL	'Dilemma Game'
BaltCICA (INTERREG IVB BSR)	Philipp Schmidt-Thomé, FI	Scenario Workshops and Citizen Summits
dynaklim (KLIMZUG, DE)	Jens Hasse, DE	Roadmap 2020 Regional Climate Adaptation

As result of the discussion in the action field it was concluded that the lists of Cluster tools and measures whilst comprehensive still need few additions. Modelling tools and mapping techniques ('classic tools') are fundamental and provide basic information. But these tools are mainly well developed and additional new modelling and mapping tools should not be of highest priority. It was decided that the focus of future discussions and developments should be on the harmonisation of modelling approaches. This is especially important in cross border regions and river catchments. Due to differing national standards and the disctinct national legislative framework in water management, coordinated approaches are still in the minority.

It was highlighted that there needed to be an agreement on the scenarios to be used in a single location by the different disciplines. Often each discipline was developing their own separate scenario (e.g. one for water management, one for forestry) which leads to multiple scenarios for a single region. This can prove confusing for stakeholders. Hence, agreements between the disciplines on the scenarios to be developed and applied are necessary.

Many tools focus on information and stakeholder involvement as this is essential for for successful implementation of adaptation measures. Good examples were presented from Dilemma Game (WAVE), the scenario workshops and 'Citizen summit' in the BaltCICA project; and Roadmapping developed under dynaklim (see table 6).

4.3 AF 3: Natural environment

The majority of tools in this action field focuses on involving stakeholders, often with educational themes (cp. figure 21). The major aims were to reach the public by various uses of the public space e.g. with informative trails or so-called 'climate routes' and to convey the topic of climate change into schools by developing and applying specificly tailored training programmes. The analysis revealed differences to the other action fields in that monitoring tools are more relevant in the Natural environment action field and that fewer tools are concerned with the improvement of the knowledge basis. Often, existing tools are linked, combined and adapted to improve their viability and to adjust them for specific applications.

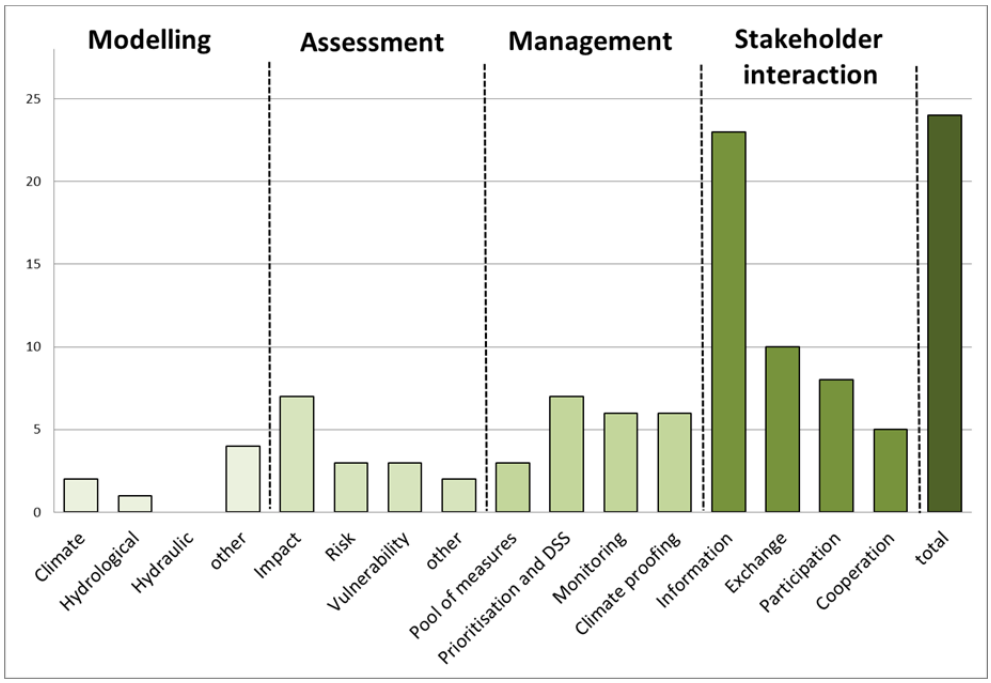


Figure 21: Purpose of tools in Natural environment action field

Looking at the correlation between the different action fields it became clear that the tools in the Natural environment action field mostly address synergies between the different action fields. At the intersection between the natural and the water environment the ecological quality (in the framework) of water bodies, wetlands and forests is addressed. Also, many tools are aimed at improving the ecological quality in the built environment. Concerning the educational tools the correlation with the Social environment action field is self- evident.

The analysis of the measures revealed that they are mainly implemented to combine river restoration with flood prevention. Consequently, many of the measures are implemented in river catchments (cp. figure 22) and they have a distinctive correlation with the Water environment action field – related to multi-functional landuse with topics in ecological quality, recreation, water retention, etc.. Besides, measures in rural and forestry areas measures for the development of the natural environment in urban areas and city centres are of importance in order to achieve a balanced urban development. Most measures are implemented by the public sector: Many measures imply issues of river restoration and flood management and the public sector mostly is responsible for the tasks of water management.

Complementary information material is provided, e.g. videos to inform and facilitate implementation and awareness.

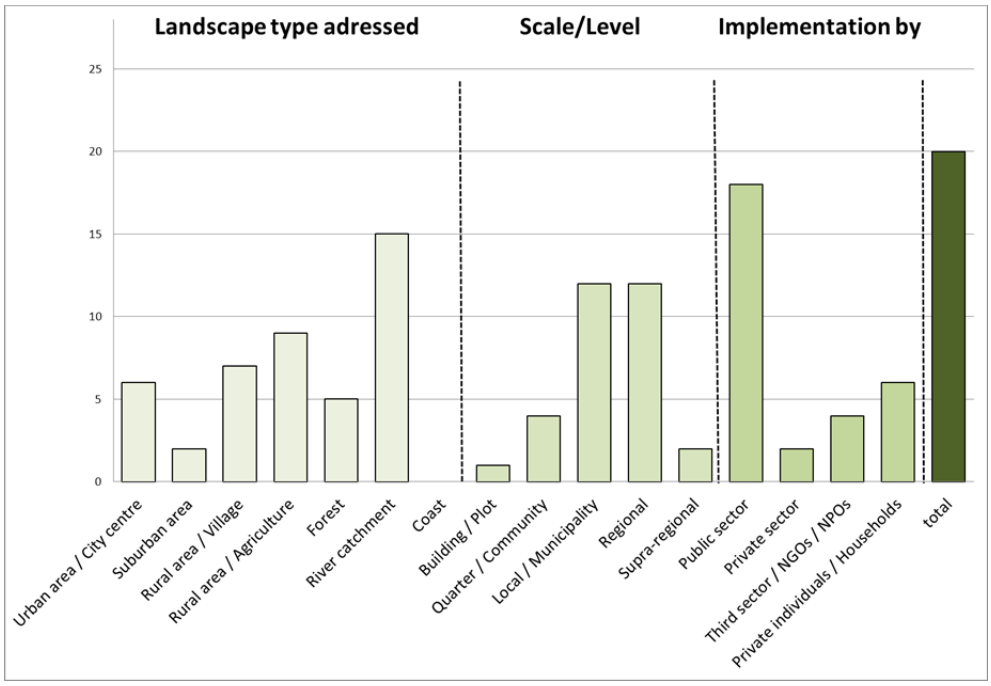


Figure 22: Spatial scope and responsibility for implementation of adaptation measures in Natural environment action field

The measures mostly address the climate impacts of flooding and heavy rainfall (and conversely, drought) and consider the the river catchment in terms of ecological quality against the range of impacts under differing conditions e.g. the range from being flooded to enduring drought. Furthermore, measures in forests address the impacts of storm and fire but heat problems are also relevant and are addressed with specific measures.

The following tools and measures were presented and discussed related to the findings of the general analysis:

Three examples for stakeholder involvement were presented and discussed. By applying an open planning process the AMICE project aims to demonstrate to stakeholders that they can profit from turning agricultural land into a natural landscape. The school material on climate change developed by the ALFA project for schools in the Emscher-Lippe region can be transferred to other countries after adjusting the language and taking into account the other educational curricula. The AMICE project is also developing educational material for a similar target group (a game on freshwater pearl mussels) and both projects aim to link more closer on this topic. In the discussion it became clear that viable tools which assess the success, effects and impacts of such educational tools are as yet not readily available.

The example of a climate trail was presented and introduced this interdisciplinary measure aimed at stakeholder involvement. The park itself includes a variety of measures combining nature, climate change, flood prevention, outdoor recreation for local people and a long-term and sustainable asset in an area of social deprivation etc. The topic ‘climate change’ was chosen as main label of the park, the *Mayesbrook Climate Change Park*.

Table 7 Input from the experts in the Natural environment action field session

Project	Participant	Contribution
AMICE	Piet van Iersel, NL	Natural water rentention by change of agricultural and forestry land into nature
ForeStClim	Philipp Vogt, DE	Spatial multicriteria evaluation (SMCE)
ALFA	Markus Lang, DE	Climate Change – global and local (educational material for secondary classes)
ALFA	Robert Oates, UK	Climate change park Mayesbrook
BE	Johan Bogaert, BE	Insights from the process of developing the Flanders and/or Belgium Adaptation Strategy
DE	Almut Nagel, DE	Insights from the process of developing the national adaptation strategy (DAS = Deutsche Anpassungsstrategie)

Using the example of a multi-criteria evaluation tool (developed by the ForeStClim-project) it became evident that climate change is one aspect among many other aspects when considering future development. The discussion also revealed that in the context of the natural environment qualitative aspects of benefits need to be integrated as part of the cost-benefit analysis. For the water environment the Water Framework Directive (Directive 2000/60/EC) already provides a multi-criteria tool, but no corresponding tool exists for forest environments

The representatives from the German and Flemish Ministries for the Environment gave an insight into their national adaptation strategies and the consequences for their natural environment. Contrary to the German adaptation strategy, the Belgium version was developed from bottom-up, based on projects, e.g. tree species were checked and the conditions for different species in the future. One topic which is on the agenda in Germany is the use of related European instruments such as the Habitats Directive (Council Directive 92/43/EEC) and its implementation in Natura 2000 sites as these instruments don't operate dynamically. Thus, they don't consider the changing conditions introduced by climate change.

The participants concluded that more monitoring actions are needed, but the project duration and funding are often too short especially for monitoring the results of measures undertaken in the natural environment. Many education and stakeholder information tools and measures are developed and/or are at hand. It is very important to actually use them to support the implementation of structural measures and to raise awareness. But there is a lack of tools to assess the success, effects and impacts of educational and involvement tools. An overview of all these tools and measures developed within the Cluster would support further dissemination but also the special scope, limits, success factors should be named.

Finally the participants of the workshop discussed and checked the links between the tools and measures of the Cluster projects. The main outcome was that not only the links between each of the tools and the measures but also are the relationship between tools and measures are important, e.g. some measures test the tools that were developed.

4.4 AF 4: Social environment

Unsurprisingly the main purpose of tools grouped in the Social environment action field is on stakeholder interaction (cp. figure 23).

These tools are designed for awareness raising, knowledge transfer and stakeholder- engagement – in some cases they are tailored for the specific involvement of 'weak' / hard to reach / or hard to engage social groups.

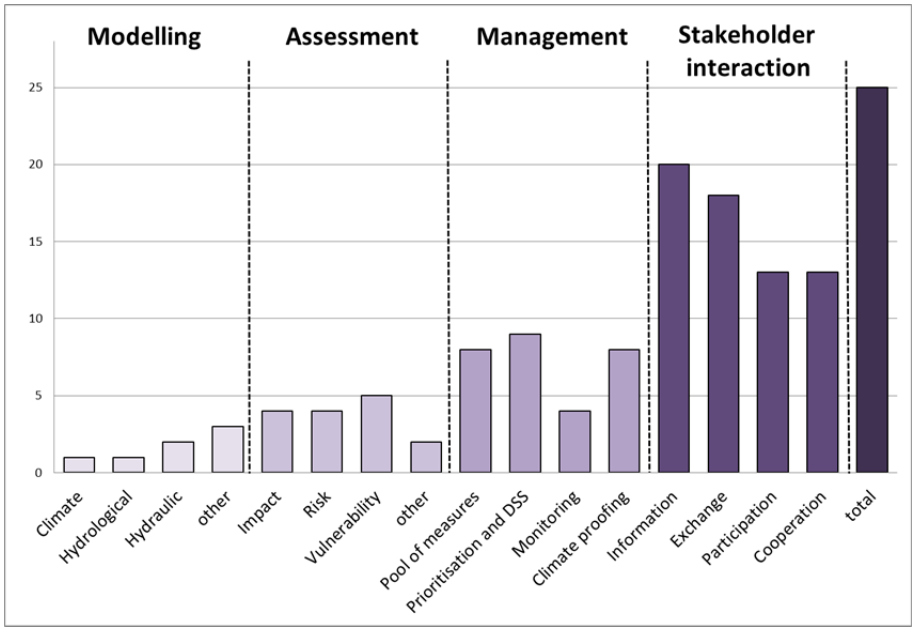


Figure 23: Purpose of tools in Social environment action field

In general it can be stated, that tools solely for Social environment do not exist as the social factor is always combined with issues in the built, water or natural environment (cp. figure 24). This fact was underlined by the examples presented by the action field participants (see table 8 next page).

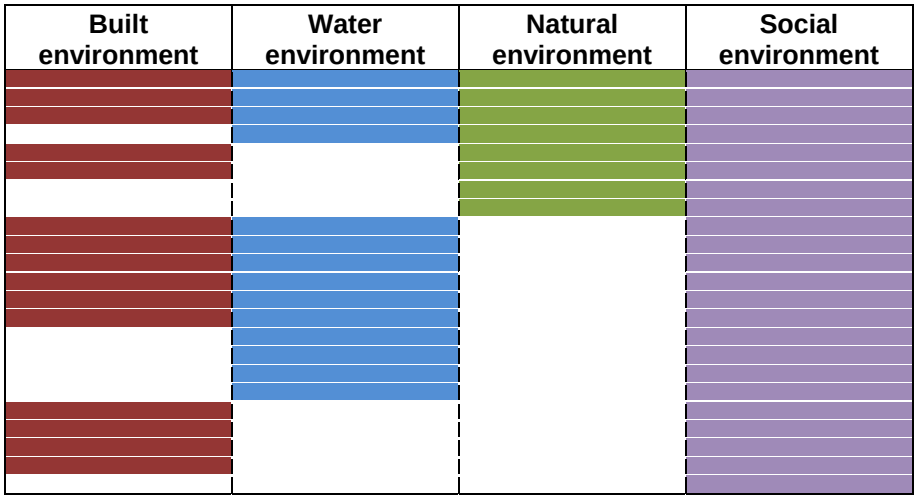


Figure 24: Correlation of tools in Social environment action field with the other action fields

The guidance tools, like the presented 'Trust guide' from IMCORE or the Adaptation Action Plan Guidance from GRaBS, are generic and applicable to many topics – not only climate change adaptation. They can be very helpful for creating the 'social platform' which is an important pre-condition for the success of other (rather technical) tools and measures and can assist the process of developing (local) adaptation strategies.

Table 8 Input from the experts in Social environment action field session

Project	Participant	Contribution
IMCORE	Jeremy Hills, UK	IMCORE Training of Trainers / Trust Guide *Training and step-by-step guide through the theory, process and practice of stakeholder engagement*
C-Change	Truke van Koeverden, NL	HealthyClimateWeZt *Neighbourhood approach engaging and empowering local young people in climate proof spatial planning*
AMICE	Maïté Fournier, FR	Improved anticipation and reaction to extreme events *Transnational comparison of flood crisis management software and flood crisis management organisations, transnational flood exercises*
GRaBs (INTERREG IVC)	Diane Smith, UK (was excused, instead Gerry Metcalf introduced GRaBS)	Adaptation Action Plan Guidance *Generic good practice principles; six-stage process for developing climate change adaptation strategies*
IMCORE	Gethin While, UK	Futures approach for use in the development of adaptation strategies *Scenario building for future coastal change including environmental, societal and economic factors*
BalticClimate (INTERREG IVB Baltic Sea region)	Hannu Koponen, FI	BalticClimate Approach *Toolkit for knowledge transfer and activation of stakeholders, focus: rural areas in the BSR, regional and local level, SMEs and business in general*

The HealthyClimateWeZt (Amsterdam) example showed an innovative way of developing climate proof and healthy spatial plans for a neighbourhood by engaging and empowering young people with diverse cultural and ethnic backgrounds. Whereas AMICE presented an example of how transnational flood crisis management could be improved by better sharing of knowledge and information in case of a flood.

How to communicate the complex matter of climate change was also discussed within the scope of the presentations on the IMCORE Futures approach and the BalticClimate Approach. Both are toolkits comprising different techniques and instructions. Their core aim is to enable different stakeholders to readily understand potential climate change impacts on their location or routine operations.

The group concluded that it is very important to develop and distribute tools like those presented in order to better communicate the complex matter of climate change, and to help stakeholders identify the impact climate change may have upon them. This is significant as although there is already extensive information available it is not necessarily provided in a user- friendly way – as a result this can lead to confusion,misunderstanding or misinterpretation amongst stakeholders.

It was also highlighted that the discussion on the uncertainties of climate change science could distract from the real need to develop adaptation strategies. It may be more productive to examine the potential economic, social and environmental impacts of a range of scenarios and plan accordingly rather than focussing on the uncertainiy associated with any climate change projections.

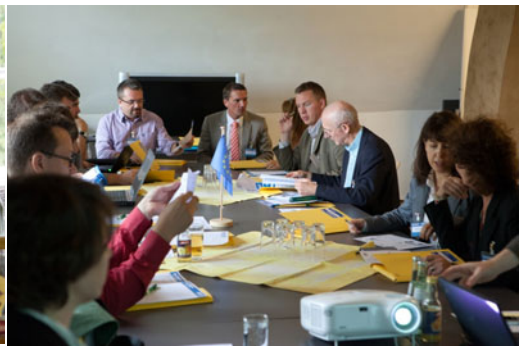
The participants agreed that climate change adaptation will not be successful when only concentrating on the technical side of adaptation tools and measures. Rather people (especially vulnerable groups) and processes need to be taken into account. Therefore

- organisational change,
- capacity building and
- strategy development

are extremely relevant and need to be supported.

It was also suggested that in the future special attention should be given to the local and neighbourhood dimension of climate change and the target groups including SME, smaller communities and children.





5 Discussion in the plenary

Related to the questions A-D (cp. page 16) the results of the discussions in the distinct action field sessions were presented to the plenary by the action field speakers:

- for Built environment: Hans v. Ammers (Future Cities) and Andrea Hartz (C-Change)
- for Water environment: Frank Fokkema (WAVE) and Tony Maguire (FloodResilienCity)
- for Natural environment: Philipp Vogt (ForeStClim) and Robert Oates (ALFA)
- for Social environment: Maïte Fournier (AMICE) and Gethin While (IMCORE)

A. Matrices tools and measures: Are the lists complete? Comments, insights, open questions

The first question whether the lists of the Cluster projects tools and measures are complete and comprehensive was answered positively by the action field speakers. Only a few minor changes in the description of the tools and measures in the matrices T and M and minimal new entries to the matrices themselves were recorded.

In all action field sessions the discussants had agreed that **modelling and mapping tools** whilst very important and necessary for providing fundamental information are not the focus of their interest. The development of new modelling tools is not necessary, rather the practical application of already existing and (partly approved) modelling tools. On this, the INTERREG trans-national programme can make significant contributions as

- harmonisation of modelling is needed e.g. within river catchments across borders / regions and
- agreements are needed which (climate) scenarios are used.

With respect to **assessment tools** it was stated that currently vulnerability assessments are the biggest challenge for practice. As different disciplines have developed distinct approaches and use different criteria an intensive exchange of knowledge and experience is needed and a clear definition-of the term 'vulnerable' is essential.

The analysed **management tools** show a broad range of application and are of significant relevance to the Cluster projects. This is in line with the diagnosis that modelling tools are not the key topics of the Cluster projects. Instead the projects use the INTERREG funding for further developing, applying and testing assessment and management tools with the aim of gaining practical experience and helping to implement effective adaptation measures. Especially for the Natural environment action field it was stated that additonal monitoring of effect and outcome is needed as normal project durations are too short to provide adequate data sets.

Regarding the **stakeholder interaction tools** all action field discussions came to the conclusion that tools improving information, exchange, participation and co-operation are the most important as the main challenges of climate change adaptation lie in raising adaptive capacity and facilitating institutional change, The rather technical tools in the Built, Water and Natural environment action fields should therefore always comprise elements suitable for

- awareness raising,
- creating knowledge,
- knowledge transfer,
- activation of stakeholders and
- reaching actors.

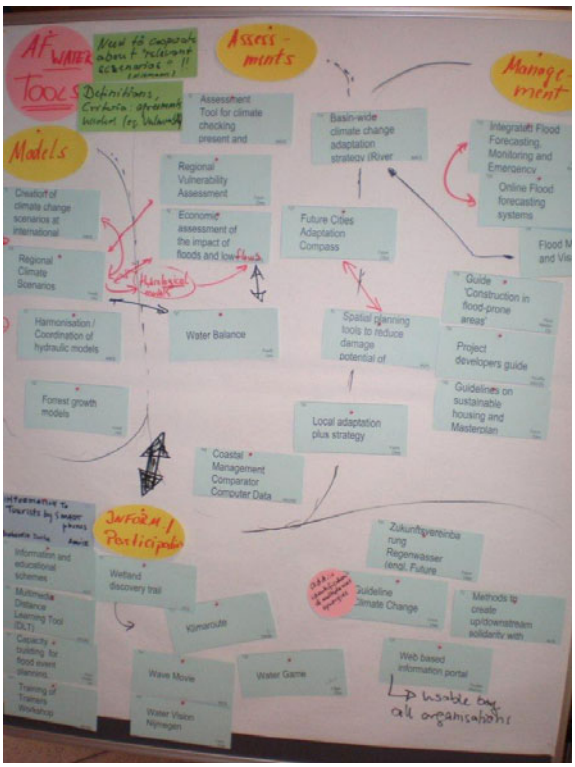
The plenary discussion was concentrated on tools. But also some conclusions regarding **adaptation measures** were formulated. First of all it was agreed that measures solely for the purpose of adapting to climate change effects will be scarce. Adaptation to climate change is most likely to succeed if linked to ongoing activities and fed into routine processes. In this context – especially referring to the built environment – it was stated that it is important to prove or highlight an added value of adaptation measures for urban / regional development. Furthermore it was discussed whether multidisciplinary

measures – although more difficult in planning, coordination and implementation – may be the better ones to include the issue of climate change adaptation

It was debated at length whether further catalogues of measures – additionally to the ones already existing – are really needed. It was finally agreed that the lists compiled as examples of good practice by the Cluster projects' measures was a sound and valuable basis for better exchange of experience.

B. Interaction between Cluster projects: Similarities, links and possible synergies between tools and measures

Based on the matrices and the presentations in the action field sessions and subsequent advice from the external projects' experts several similarities between the approaches in different tools and measures were identified. Existing linkages between different activities were shown and discussed and new linkages or possible new synergies were developed (cp. pictures below).



All CEB1 participants had ample opportunity to identify other projects activities as relevant for possible future cross-project exchanges. The plenary discussion revealed some topics of special mutual interest which should be investigated further. These are:

- heat and bio-climatic stress in urban areas,
- impacts of flash floods and possible counteractive measures,
- multifunctional land-use: approaches – examples / experiences – recommendations

and more general topics like:

- vulnerability assessment: procedures – examples / experiences – recommendations and
- climate proofing: procedures – examples / experiences – recommendations.

C. Further comments regarding applicability and transferability of the tools and measures in different contexts

In the previous section it was stated that the approach to some topics should be widened within the frame of increased project exchanges (bilateral, trilateral etc.). It was agreed that the question of applicability and transferability of tools and measures should be debated in this same context as well. To this end the following two assumptions out of the action field sessions could be further discussed:

- Most stakeholder interaction tools are transferable (after modification and taking the cultural context into account)

and

- Adaptation measures are generally not transferable because of their local focus, however they can stimulate 'good practice' (cp. discussion below) examples.

D. What makes up a 'good' or 'better practice example'? – Copy with pride!

Although this question was not discussed in-depth during the workshop a range of possible criteria for 'good' or 'better practice examples' could be collected. They match with the definition of best practice criteria to be found in literature (e.g. Keehley 1996).

In contrast to the common usage the Cluster has decided that it will not use the term 'best practice' because it is quite difficult to get 'the one and only' solution for any given problem and therefore will use the terms 'good practice' or 'better practice'.

A good/better practice within the *SIC adapt!* context might include:

- proving (inter regional, transnational, cross-border …) cooperation being beneficial
- being applicable across jurisdictional boundaries
- being applicable in multi-institutional settings
- building on existing software and procedures
- being simple, practical and workable with limited resources
  - following a no-regret strategy (measures mainly)
  - providing a low-cost solution (measures mainly)
- having a proven track record, outcome, output
- providing case study material
- leading to shared return of experience

Quotes from selected external experts taking part at CEB 1

'I received a lot of ideas to implement my own Cluster.'

'I am happy to see what all the projects are doing.'

'I gained new insights to projects not known before.'

'I am very happy to see a 'real' Cluster working.'

'CEB1 was an excellent exchange platform.'

'The Cluster will influence the next programme period.'

'My expecations are met – I am grateful to have been here.'

6 Summary and Outlook

The first part of this paper was primarily designed for the participants of the first *SIC adapt!* Cluster Expert Board (CEB1) meeting hold 20-21 June 2011 in Holzwickede nearby Dortmund, Germany. It presents the findings from analysing selected adaptation tools and measures developed and implemented by the eight Cluster projects. After the discussion in CEB1, the **initial version of the paper (Part I)** and the two matrices in the appendix have been revised. A **workshop documentation** describing the discussion in the different action field sessions and the plenary session has been added **(Part II)**.

The analysis revealed the broad range of tools in use, or in development, by the projects and that their scope is wide ranging – from different modelling tools to assessment, management and communication / engagement tools and various practical solutions on how to adapt to climate change at local and regional level (adaptation measures). Based on collated information the direct applicability or transferability after modification has been discussed with reference to the distinct action fields, the spatial scope and the target groups.

Core topics for further discussion

The discussion in CEB1 showed that there are some common topics which could be explored further by the Cluster. Those could be action field related topics like:

- Heat and bio-climatic stress in urban areas,
- Impacts of flash floods and possible counteractive measures,
- Multifunctional land-use: approaches – examples / experiences – recommendations

and more general topics like:

- vulnerability assessment: procedures – examples / experiences – recommendations and
- climate proofing: procedures – examples / experiences – recommendations.

However, the structure of the action fields themselves could be discussed again as the CEB1 revealed that most of the sectoral tools and measures imply a social effect. It could be discussed – against the background of the various interlinkages – if it is reasonable to have a social action field on its own.

Procedure

This revised, updated and amended version will be send out to all CEB1 participants in order to ensure that the results reach the Cluster projects' and could be included in their on-going work. Key messages will be also communicated to a wider target group, already preparing the second phase of the Cluster's activities which is on policy recommendations.

Based on the findings of the analysis, discussion on these findings and further development by the CEB1 experts the *SIC adapt!* knowledge platform will be produced. This will include the selected adaptation tools and measures that were analysed and compared and a list of the CEB1 experts.
In autumn 2011 the Cluster Partners will meet in order to

- reflect the results of the CEB1 meeting,
- discuss and decide on the further process of the Cluster activities as well as agree on the content of the outputs including the technical outline of the knowledge platform,
- start the preparation of the CEB2 meeting "Policy Recommendations" to be held in Brussels end of May 2012 (tbc) and
- reflect the first communication steps / outputs of *SIC adapt!*.

Due to the anticipated progress in the Cluster's projects an update of the analysis may be appropriate by the end of 2011 / beginning of 2012. In the interim the Management Authority of the NWE Programme has officially handed in the Cluster's application for DG Regio's 2012 Awards for innovative projects.

Acknowledgements

The Cluster Leader and the Scientific Cluster Coordination are grateful for the valuable contributions of the eight Cluster projects while compiling the tools and measures. We thank all CEB1 participants for the fruitful discussions during and after the June meeting. Last but not least special thanks go to Jeremy Gault from the IMCORE project for his invaluable proof reading.

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CEB 1 participants list

Name	First name	Organisation	Coun-try	AF 1 Built	AF 2 Water	AF 3 Nature	AF 4 Social	Plenary
Adamczak	Kirsten	Emschergenossenschaft / Lippeverband	DE		x			x
Ammers, van	Hans	Municipality of Arnhem	NL	x				x
Bauduceau	Nicolas	CEPRI, Orléans	FR	x				x
Bots	Wim	Waterschap Groot Salland	NL		x			x
Boucneau	Michel	Vlaamse Milieumaatschappij	BE	x	x			x
Bogaert	Johan	Flemish Government	BE			x	x	x
Coles	Ben	Groundwork London	UK				x	x
Desmond	Margaret	Environmental Protection Agency	IE		x			x
Detrembleur	Sylvain	University of Liège, Département ArGEnCo	BE		x			x
Dewals	Benjamin	University of Liège, Département ArGEnCo	BE		x			x
Dodson	Jane	Hastings Borough Council	UK				x	x
Erp, van	Piet	Waterschap Regge en Dinkel	NL		x	x		x
Fock	Thomas	Emschergenossenschaft / Lippeverband	DE					x
Fokkema	Frank	Waterschap Groot Salland	NL		x			x
Fournier	Maité	EPAMA	FR	x			x	x
Frehmann	Torsten	Emschergenossenschaft / Lippeverband	DE		x			x
Frommer	Birte	Infrastruktur & Umwelt Prof. Böhm & Partner	DE	x			x	x
Gault	Jeremy	Environm. Research Institute, University College Cork	IE				x	x
Goedeking	Antje	Wasserverband Eifel-Rur	DE		x			x
Green	David R.	Aberdeen University / School of Geosciences	UK		x			x
Grün	Emanuel	Emschergenossenschaft / Lippeverband	DE					x
Hartz	Andrea	agl | Saarbrücken	DE	x			x	x
Hasse	Jens	Forschungsinstitut für Wasser- und Abfallwirtschaft an der RWTH Aachen (FIW) e.V.	DE		x			x

Name	First name	Organisation	Country	AF 1 Built	AF 2 Water	AF 3 Nature	AF 4 Social	Plenary
Haupter	Birgit	Infrastruktur & Umwelt Prof. Böhm & Partner	DE	x	x	x		x
Heiland	Peter	Infrastruktur & Umwelt Prof. Böhm & Partner	DE		x	x		x
Hills	Jeremy	ctl consult	UK			x	x	x
Huber	Nils-Peter	Institute of Hydraulic Engineering and Water Resources Management/ RWTH Aachen	DE		x			x
Huyghe	Eveline	West - Vlaamse Intercommunale	BE	x			x	x
Iersel, van	Piet	Waterschap Brabantse Delta	NL		x	x		x
Koeverden, van	Truke	Physical Planning Department Amsterdam	NL				x	x
Koponen	Hannu	Regional Council of Central Finland	FI				x	x
Korte	Thomas	Emschergenossenschaft / Lippeverband	DE		x	x		x
Kupilas	Benjamin		DE		x	x		x
Lang	Markus	Emschergenossenschaft / Lippeverband	DE			x	x	x
Lejeune	Martine	Riou vzw	BE		x			x
Lexer	Wolfgang	Environment Agency Austria	AU	x	x			x
Maguire	Anthony	Dublin City Council	IE	x	x			x
Melville	Ron	Forestry Commission	UK			x	x	x
Mertel	Frank	Lippeverband	DE					x
Metcalf	Gerry	UK Climate Impacts Programme (UKCIP)	UK	x			x	x
Möllers	Anke	JTS Lille	FR	x	x			x
Nadarajah	Chitra	Hampshire County Council	UK	x	x			x
Nagel	Almut	Federal Ministery of the Environment, Germany	DE			x	x	x
Niemann	André	University of Duisburg-Essen	DE		x			x
Oates	Robert	Association of Rivers Trust	UK		x	x		x
Pater, de	Florrie	Institute for Environmental Studies, Free University Amsterdam	NL	x	x			x
Pfeiffer	Ekkehard	Emschergenossenschaft / Lippeverband	DE		x			x

Name	First name	Organisation	Country	AF 1 Built	AF 2 Water	AF 3 Nature	AF 4 Social	Plenary
Raasch	Ulrike	Emschergenossenschaft / Lippeverband	DE		x			x
Schmidt	Martin	Emschergenossenschaft / Lippeverband	DE					x
Schmidt-Thomé	Philipp	Geological survey of Finnland	FI		x			x
Schüler	Gebhard	Research Institute for Forest Ecology and Forestry, Rhineland Palatinate	DE		x			x
Sommer-häuser	Mario	Emschergenossenschaft / Lippeverband	DE		x			x
Stam	Jean-Marie	Rijkswaterstaat, Room for the River	NL	x	x			x
Stemplewski	Jochen	Emschergenossenschaft / Lippeverband	DE					x
Vogt	Philipp	Research Institute for Forest Ecology and Forestry, Rhineland Palatinate	DE			x	x	x
While	Gethin	School of Earth & Ocean Sciences, Cardiff University	UK				x	x

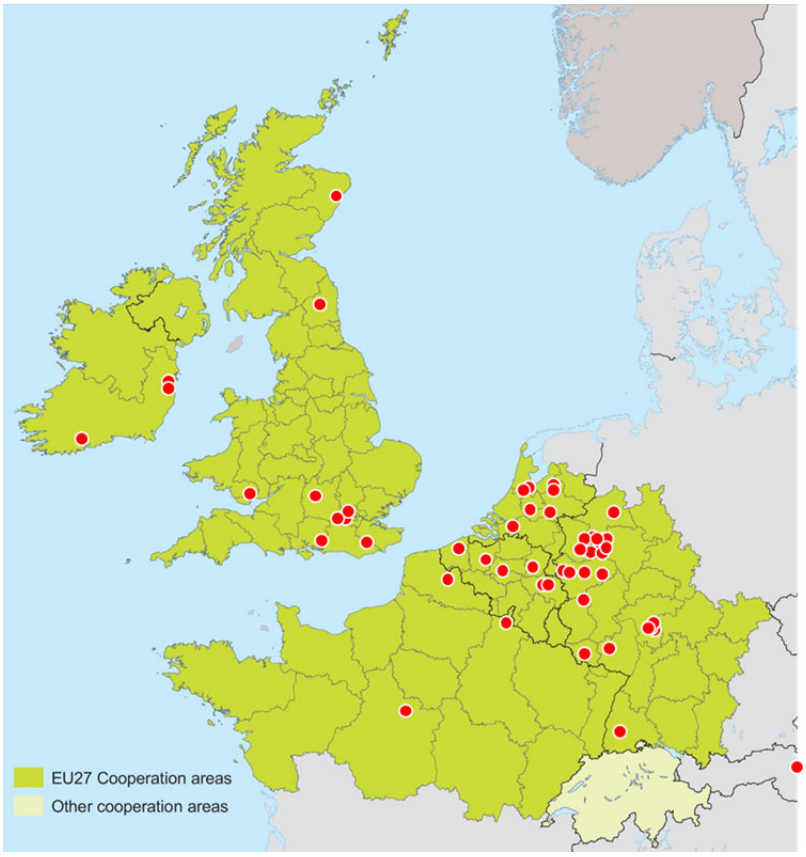

Figure 25: Map participants of Cluster Expert Board 1

APPENDICES

Revision notification –
Changes in matrices T and M compared to matrices status 2011-05-26
(cp. appendix of CEB 1 discussion paper version 1)

Project	Matrix tools		
	T No.	**Revision regarding**	**Sent in by**
ALFA	T1	Wording corrected	Markus Lang
ALFA	T 58	New entry of tool	Annelies Haesevoets
AMICE			
C-CHANGE	T14 -T16	Minor changes in spelling of description + assessment crosses	Andrea Hartz
ForeStClim			
FRC	T59, T 60	New entry of tools	Annelies Haesevoets
FutureCities	T 39	Wording corrected	Anke Althoff
IMCORE			
WAVE	T55	Minor changes in description + assessment crosses	Annelies Haesevoets

Project	Matrix measures		
	M No.	**Revision regarding**	**Sent in by**
ALFA	M3	Minor changes in description + assessment crosses	Annelies Haesevoets
AMICE	M45	New entry of Steenbergse Vliet project	Piet van Iersel
C-CHANGE			
ForeStClim			
FRC			
FutureCities			
IMCORE			
WAVE	M42	Minor changes in description + assessment crosses	Annelies Haesevoets

Analysis of the Cluster Projects' Tools (status 2011-08-25) - Appendix 'T'

Nr.	Name of tool	Originates from project	Organisation responsible	Contact	Short description of content and aim	Estimated transferability	Comments (e.g. linkages to other projects)
						to other sector, spatial level, target group etc.?	
T1	Information and educational schemes	ALFA	Eden Rivers Trust (UK); Emschergenossenschaft (DE); Rijkswaterstaat (NL) and Struktur und Genehmigungsdirektion (DE)	Becky Helm Eden River Trust, UK Astrid Keune Emschergenossenschaft, DE keune.astrid@eglv.de	Information and educational schemes are developed by many ALFA partners: Eden River Trust sets up schemes and programmes for children and for the public. Main aim of this is to relate to the parents through the children and to actively involve volunteers in the implementation of actions. Emschergenossenschaft has developed an educational package regarding the integration of climate change in school curricula. RWS and SGD are developing vsitors centres for the investment projects.		www.eglv.de/wasserportal/bildungsarbeit
T2	Methods to create up/downstream solidarity with stakeholders	ALFA	Rijkswaterstaat (NL), Eden Rivers Trust (UK), Les Grands Lacs de Seine (F)	Jean-Marie Stam Rijkswaterstaat, NL jean-marie.stam@rws.nl	The ALFA Partnership tests and compares new approaches for creating up/downstream solidarity in river catchments that go beyond 'traditional methods' (e.g. round table discussions with different stakeholders). Final results are expected for 2012.		
T3	Spatial planning tools to reduce damage potential of flooding	ALFA	Emschergenossenschaft (DE)	Kirsten Adamczak Emschergenossenschaft, DE Adamczak.Kirsten@eglv.de	A compilation of spatial planning tools to reduce damage potential of flooding is based on analysing and developing concepts for planning and commitment for regional partnerships.		Information of FRMD blended with spatial planning instruments, ready by 2013
T4	Compensation System Emscher	ALFA	Emschergenossenschaft (DE)	Kirsten Adamczak Emschergenossenschaft, DE Adamczak.Kirsten@eglv.de	In order to reduce and compensate the negative impacts of structural measures carried out in the context of the Emscher Restoration Process the Emschergenossenschaft agreed with the competent authorities on a compensation system: If something is constructed that has by its construction site or long lasting effects a negative environmental impact (e.g. a waste water sewer) this may be compensated by the ecological development of the water bodies that had a low ecological value before and become far better now. The system works as well the other way round: If green structures are optimised (e.g. by planting a forest or improving wetlands) the Emschergenossenschaft gains “eco points” on a kind of account. When later on construction sites with negative impacts are operated these “eco points” are deducted.		
T5	Wetland discovery trail	ALFA	Eden Rivers Trust (UK)	Becky Helm Eden River Trust, UK	The Wetland discovery trail is intented to encourage children to learn about the importance of wetlands. It is a wheelchair friendly boardwalk with wildlife footprints, circular pond dipping platform, brass rubbing posts and on-site classroom provide facilities for a variety of activities encouraging mainly children but also the wider community to explore and learn about the importance of wetland environments. The trail covers the topics: - why wetlands? - food chain and a food web - life cycles - pond plants - variation & adaptation - how to build a pond - wetland/pond facts		

Analysis of the Cluster Projects' Tools (status 2011-08-25) - Appendix 'T'

Nr.	Name of tool	Modelling				Assessment				Management				Stakeholder interaction				Action field				Grade of 'innovation'				Technical outline						Availability (status 05-2011)			Spatial scope					Target group						
		Climate modelling	Hydrological modelling	Hydraulic modelling	Other	Impact assessment	Risk assessment	Vulnerability assessment	Other	Providing a pool of existing measures	Prioritisation and Decision support	Monitoring of effect and outcome of measures	Climate proofing spatial plans	Information	Exchange	Participation	Cooperation	Built environment	Water environment	Natural environment	Social environment	New development of tool	Further development of exisiting tool	Adoption from other context	Application/implementation of existing tool	Checklist	Guidelines / guidance book	Report / maps	Computerised tool	Role play / game	Other	Idea / draft	Pilot / testversion	Ready to use	Building/plot level	Quarter/community level	Local / municipality level	Regional level	Supra-regional level	Experts / professionals	Laymen	Administration	Politics	Science	Economy	Civil society
T1	Information and educational schemes													x	x				x	x				x							x			x			x	x								x
T2	Methods to create up/downstream solidarity with stakeholders																x		x		x			x							x	x						x		x						x
T3	Spatial planning tools to reduce damage potential of flooding						x		x	x	x		x	x				x	x	x	x		x				x	x				x				x	x	x	x	x	x					x
T4	Compensation System Emscher								x			x	x			x				x	x		x								x		x				x		x							x
T5	Wetland discovery trail													x		x			x	x			x								x		x	x					x							x

Analysis of the Cluster Projects' Tools (status 2011-08-25) - Appendix 'T'

Nr.	Name of tool	Originates from project	Organisation responsible	Contact	Short description of content and aim	Estimated transferability	Comments (e.g. linkages to other projects)
						to other sector, spatial level, target group etc.?	
T6	Creation of climate change scenarios at international river basin scale	AMICE	University of Metz (F)	Gilles Drogue University of Metz, F drogue@univ-metz.fr.	This Action was dedicated to the study of downscaled climate simulations for 2021-2050 and 2071-2100 and their consequences in terms of floods and low-flows on the Meuse river basin. The following questions could be answered: - which discharges can be expected on the river Meuse and main tributaries? - how the return period, duration, extent of floods and low-flows will change from now to 2021-2050 and 2071-2100?		
T7	Harmonisation / Coordination of hydraulic models	AMICE	University of Liège (BE)	Benjamin Dewals University of Liège, BE B.Dewals@ulg.ac.be Sylvain Detrembleur University of Liège, BE sylvain.detrembleur@ulg.ac.be	The harmonisation/coordination of hydraulic models used in the different countries of the Meuse equates to a first common hydraulic simulation of the river and its associated risk maps. It led to to improved national/regional hydraulic models and helped to ensure the compatibility of the distinct models already in use.		
T8	Economic assessment of the impact of floods and low-flows on different economic sectors	AMICE	RWTH Aachen (DE)	Benjamin Sinaba RWTH Aachen, DE sinaba@iww.rwth-aachen.de	To quantify the impacts of future floods and low-flows on the economy in the transnational Meuse basin a methodology of quantitative monetary assessment is under development. Aim is the identification of hot spots, i.e. sectors and water uses threatened by future floods and drought. Economic sectors considered are: agriculture, energy, navigation, drinking water. Analysed are direct losses. Finaly, the cost of action shall be comparable with the cost of inaction.		
T9	Assessment Tool for climate checking present and planned projects	AMICE	Flanders Hydraulics Research (BE)	Wouter Vanneuville Flanders Hydraulics Research, BE wouter.vanneuville@mow.vlaanderen.be	tool to be developed yet, based on the ClimWatAdapt results		
T10	Basin-wide climate change adaptation strategy (River Meuse)	AMICE	Rijkswaterstaat (NL)	Hendrik Buiteveld Rijkswaterstaat, NL hendrik.buiteveld@rws.nl	tool to be developed yet		
T11	Web-based database on climate change adaptation in the Meuse catchment	AMICE	Université de Metz – CEGUM (F)		This is an online bibliografy (only frontend users have access) in order to share references relevant for climate change adaptation in the Meuse catchment. The search for references can be strucured along the categories: different parts of the Meuse basin , physiography, climatology, hydrology, trend analysis, water uses, water hazard mitigation and water management system.		http://www.amice-project.eu/biblio/

Analysis of the Cluster Projects' Tools (status 2011-08-25) - Appendix 'T'

Nr.	Name of tool	Modelling				Assessment				Management				Stakeholder interaction				Action field				Grade of 'innovation'				Technical outline						Availability (status 05-2011)			Spatial scope						Target group						
		Climate modelling	Hydrological modelling	Hydraulic modelling	Other	Impact assessment	Risk assessment	Vulnerability assessment	Other	Providing a pool of existing measures	Prioritisation and Decision support	Monitoring of effect and outcome of measures	Climate proofing spatial plans	Information	Exchange	Participation	Cooperation	Built environment	Water environment	Natural environment	Social environment	New development of tool	Further development of exisiting tool	Adoption from other context	Application/implementation of existing tool	Checklist	Guidelines / guidance book	Report / maps	Computerised tool	Role play / game	Other	Idea / draft	Pilot / testversion	Ready to use	Building/plot level	Quarter/community level	Local / municipality level	Regional level	Supra-regional level	Experts / professionals	Laymen	Administration	Politics	Science	Economy	Civil society
T6	Creation of climate change scenarios at international river basin scale	x	x			x								x			x		x				x					x						x				x	x		x	x	x			
T7	Harmonisation / Coordination of hydraulic models			x			x							x			x		x				x						x	x			x		x	x	x	x	x		x	x	x			
T8	Economic assessment of the impact of floods and low-flows on different economic sectors							x			x			x			x		x					x	x				x				x			x	x	x	x	x		x	x	x			
T9	Assessment Tool for climate checking present and planned projects										x	x	x	x			x		x				x						x				x						x			x	x	x	x		
T10	Basin-wide climate change adaptation strategy (River Meuse)									x				x			x		x										x				x				x	x	x			x	x				
T11	Web-based database on climate change adaptation in the Meuse catchment																																														

Analysis of the Cluster Projects' Tools (status 2011-08-25) - Appendix 'T'

Nr.	Name of tool	Originates from project	Organisation responsible	Contact	Short description of content and aim	Estimated transferability	Comments (e.g. linkages to other projects)
						to other sector, spatial level, target group etc.?	
T12	Healthy Climate WeZt	C-Change	City of Amsterdam (NL)	Truke van Koeverden City of Amsterdam, NL T.van.Koeverden@dro.amsterdam.nl	With Healthy Climate WeZt young people with diverse ethnic and cultural backgrounds have been engaged and empowered to champion climate change approaches in spatial planning. Integrated into their curriculum students from different schools in Amsterdam Nieuw-West are trained to develop climate proof spatial plans, buildings and open spaces for one of the most problematic (diverse population, low income, poor public space) neighborhoods in the city and the country. It is the first example of developing climate proof spatial plans in a co-creation process with young people.	A new project started and is still going on: to design a sustainable European Neighborhood. Engaging young representatives of ethnic minorities in sustainable townplanning can be done in every development and regeneration project.	The project lasted 9 months, participants spent every Sunday and Wednesday evening. They presented the results to professional jurys and the responsible politicians.
T13	Guide for energetic town planning	C-Change	City of Amsterdam (NL)	Truke van Koeverden City of Amsterdam, NL T.van.Koeverden@dro.amsterdam.nl	Conceptual guide for climate neutral town planning and urban development, not only for new sites but also for the existing city. Meant to be used as an instrument for spatial planning, urban development and urban regeneration. (To be finished in Spring 2011).	Can be used everywhere	Certain linkages to the GreEnergy Roofs methodology from Nijmegen (developed in the Future Cities project). The use of residual flows is innovative.
T14	Saarland C-Change climate path	C-Change	Saarland Ministry of the Environment (DE)	Andrea Hartz agl Saarbrücken, DE andreahartz@agl-online.de	C-Change is supposed to raise 'climate change awareness' among the local population and to unlock their own resources and creativity in order to face the challenges of climate change. The Saarland C-Change climate path in the Northern Landscape of Industrial Culture links two out of four landscape labs which are part of the first large-scale nature conservation project situated in an old-industrial region. The climate path comprises different stations and is supposed to showcase the implementation of renewable energies and the benefit of forest and landscape in terms of climate change mitigation and adaptation on a regional scale.	concept / general idea also useful for other regions	Twin project of the 'Klimaroute' (T17), also from C-Change
T15	Climate Proofing Spatial Plans	C-Change	Saarland Ministry of the Environment (DE)	Andrea Hartz agl Saarbrücken, DE andreahartz@agl-online.de	Existing spatial development strategies will be reviewed for mitigation and adaptation concepts with a particular focus on climate-proofing the development plans at state level and local level using vulnerability analysis (Saarland state development plan and Saarbrücken open space development programme). Results and experiences will be integrated into the transnational planning recommendations which are worked out by the C Change Expert Joint Planning Group (completion expected in 2012).	transferable - info / data base - tools - processes	
T16	Climate Proofing the Programme Directeur (development of Methodology)	C-Change	Ministry of Sustainable Development and Infrastructure Luxembourg (LUX)	Manon Poeckes Ministry of Sustainable Development and Infrastructure Luxembourg, LU Manon.Poeckes@mat.etat.lu	Steps of the climate proofing methodology are: 1. Understanding of climate change impacts on Luxembourg 2. Analysing the plannning system and identifying specific climate related planning options 3. Developing a methodological approach to climate-proof planning instruments 4. DICI area as a pilot: Feedback and Crosscheck the methodological approach 5. Recommendations to climate-proof spatial planning instruments.	transferable - info / data base - tools - processes	
T17	Klimaroute	C-Change	Regionalverband FrankfurtRheinMain (DE)	Reinhard Henke Regionalverband FrankfurtRheinMain henke@region-frankfurt.de	The 'Klimaroute' on the banks of the River Main consist of a series of stations, and all of them are attractive places inviting passes-by to stay for a while. They are related to a specific topic of climate change, pinpointing it to rivers worldwide. It is not teaching and preaching but inviting, and the message will be presented in a subtle way, based on designs of the well-known HfG, the Hochschule für Gestaltung in Offenbach, one of the leading academies of arts and design. The website www.klimaroute.de is the key to additional information and for details; with facts, interviews and deep links to a wealth of relevant sources, and it will be updated regularly. The 'Klimaroute' is a tool for communication. The specific and innovative aspect of this is that investments on the ground, with tangible results, are linked to the website with the objects and the website forming a unit. Building the stations may count as structural measures in the SIC adapt! terminology, as providing the website may count as non-structural measure.		Twin project of the 'Saarland C-Change climate path' (T14) www.klimaroute.de

Analysis of the Cluster Projects' Tools (status 2011-08-25) - Appendix 'T'

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		Climate modelling	Hydrological modelling	Hydraulic modelling	Other	Impact assessment	Risk assessment	Vulnerability assessment	Other	Providing a pool of existing measures	Prioritisation and Decision support	Monitoring of effect and outcome of measures	Climate proofing spatial plans	Information	Exchange	Participation	Cooperation	Built environment	Water environment	Natural environment	Social environment	New development of tool	Further development of exisiting tool	Adoption from other context	Application/implementation of existing tool	Checklist	Guidelines / guidance book	Report / maps	Computerised tool	Role play / game	Other	Idea / draft	Pilot / testversion	Ready to use	Building/plot level	Quarter/community level	Local / municipality level	Regional level	Supra-regional level	Experts / professionals	Laymen	Administration	Politics	Science	Economy	Civil society
T12	Healthy Climate WeZt												x			x	x	x			x	x						x						x	x					x	x		x				x
T13	Guide for energetic town planning									x			x	x				x				x					x						x		x	x	x				x		x				
T14	Saarland C-Change climate path													x	x			(x)		x	x		x								x			x			x	x			x						x
T15	Climate Proofing Spatial Plans												x	x	x	x	x	x	?	x	?		x		x		x	x				x					x	x	x	x		x					
T16	Climate Proofing the Programme Directeur (development of Methodology)												x	x	x			x	?	?	?		x				x	x				x					x	x	x	x		x					
T17	Klimaroute													x	x	x	x		x	x	x	x									x			x				x			x						x

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T18	Integrated Flood Forecasting, Monitoring and Emergency Management	FloodResilienCity	Dublin CC (IRL)	Tony Maguire City of Dublin, IRL tony.maguire@dublincity.ie	The City of Dublin is facing multi flood hazards due to extreme rainfall, river and stream flooding, coastal/tidal flooding, dam break, drainage and infrastructure failure (either separately or in combination). As it became apparent that the city's flood risks extend beyond urban drainage and 'simple' stream and river flooding the Dublin Flood Initiative (DFI) was developed . This has received welcome EU Interreg support in the past to address the coastal risk (SAFER project) and now, within the FloodResilienCity-Project, the DFI is focusing on the pluvial flood risk as this emerges as a missing element in the DFI strategies. The result will be an innovative modelling system (flood forecasting, 3D terrain exceedence model, etc.) with a special focus on pluvial (and fluvial) flooding for the Dublin area.	tool is generally transferable to other spatial planning levels	builds on experience and results from projects SAFER and NOAH (Interreg IIIB)
T19	Guide 'Construction in flood-prone areas'	FloodResilienCity	Depart. du Loiret (F)	Sandrine Gerard Conseil général du Loiret , F sandrine.gerard@cg45.fr Nicolas Bauduceau European Center for the Prevention of Flood Risk (CEPRI), F nicolas.bauduceau@cepri.net	Aim of this guide is to flood proof existing public infrastructure and buildings by vulnerability diagnostics, vulnerability reduction works and on the job-training. It incorporates a methodology to identify the damage potential of distinct building structures and proposes apropriate adaptation measures.		
T20	Project developers guide	FloodResilienCity	SW Mainz (DE)	Heinrich Webler icon Ing.-Büro Mainz, DE hwebler@mainz-online.de	Planning concept and action instructions for flood proofing new infrastructure and buildings		
T21	Capacity building for flood event planning, management and recovery	FloodResilienCity	Ecole des ingenieurs de la ville de Paris (F)	Damien Serre Ecole des Ingénieurs de la Ville de Paris (F) damien.serre@eivp-paris.fr	Aiming at students and professionals a curriculum on capacity building for flood event planning, management and recorvery has been developed. So far it was tested in Engineering schools (Master level). At EIVP the trainings will it be held regularly in the future. The teaching material comprises mainly presentations (for lecture) - exercises and 'student projects' still need further developments.		
T22	GIS for urban resilience	FloodResilienCity	Ecole des ingenieurs de la ville de Paris (F)	Damien Serre Ecole des Ingénieurs de la Ville de Paris (F) damien.serre@eivp-paris.fr	This GIS tool allows to integrate different spatial data in order to analyse how a city and its (infrastrucural) systems operate during a flood event. It also enables the user to produce disturbance scenarios of certain systems and the city as a whole entity. Further developed the tool will also implement resilience indicators.		
T23	Web based information portal	FloodResilienCity	University of Sheffield (UK)	John Blanksby University of Sheffield (UK) j.blanksby@sheffield.ac.uk	Web based information portal (with paper based equivalent) providing information and training materials. It will comprise information from FRC and other projects. So far, a framework is available. A first draft of the information portal is expected for April 2011.		meta tool comprising an amont of other tools
T24	Regional Climate Scenarios	ForeStClim	Centre de Recherche Public – Gabriel Lippmann (LUX)	Klaus Görgen Centre de Recherche Public - Gabriel Lippman (LUX) goergen@lippman.lu	Daily 150-year timeseries for the (ForeStClim Team D) impact community at (pseudo) -station forest locations are taken from an extensively postprocessed and benchmarked 23-member ensemble of bias-corrected regional climate change projections from a dynamical downscaling of SRES A1B-driven GCMs, mainly from the EU ENSEMBLES project.	Results of regional climate scenarios useful for all action fields/ sectors	http://www.chr-khr.org/en/projects/rheinblick2050
T25	Forrest growth models	ForeStClim	Technische Universität München (DE); Landesforsten RP (DE)	Thomas Rötzer / Enno Uhl Technische Universität München (DE) Thomas.roetzer@lrz.tu-muenchen.de Steffen Schobel Landesforsten RP (DE) schobel@forestclim.eu	Integrating BALANCE (impact assessment tool), SILVA (forest management tool) and SWAT (Soil and Water Assessment Tool) in order to optimize the predictions of forest growth under future climate conditions.	Results useful for estimation of carbon emission reduction contributions by forestry	All models used here are well approved in forestry management. Bringing them together in an integrated approach enables forestry management to improve the predictions of forest growth under future climate conditions.

Analysis of the Cluster Projects' Tools (status 2011-08-25) - Appendix 'T'

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		Climate modelling	Hydrological modelling	Hydraulic modelling	Other	Impact assessment	Risk assessment	Vulnerability assessment	Other	Providing a pool of existing measures	Prioritisation and Decision support	Monitoring of effect and outcome of measures	Climate proofing spatial plans	Information	Exchange	Participation	Cooperation	Built environment	Water environment	Natural environment	Social environment	New development of tool	Further development of exisiting tool	Adoption from other context	Application/implementation of existing tool	Checklist	Guidelines / guidance book	Report / maps	Computerised tool	Role play / game	Other	Idea / draft	Pilot / testversion	Ready to use	Building/plot level	Quarter/community level	Local / municipality level	Regional level	Supra-regional level	Experts / professionals	Laymen	Administration	Politics	Science	Economy	Civil society
T18	Integrated Flood Forecasting, Monitoring and Emergency Management		x	x		x	x	x						x				x	x			x		x				x					x						x						
T19	Guide 'Construction in flood-prone areas'							x		x	x			x				x	x			x				x	x						x			x				x					
T20	Project developers guide							x		x				x				x	x			(x)	x				x						x			x	x			x	x	x			x	x
T21	Capacity building for flood event planning, management and recovery									x				x	x			x	x			x									x			x	x	x	x		x						x
T22	GIS for urban resilience							x						x				x	x				x					x				x				x	x	x		x		x	x	x		
T23	Web based information portal					x	x	x						x				x	x			x								x		x							x	x		x				
T24	Regional Climate Scenarios	x												x	x				x	x			x					x	x				x					x	x		x		x		
T25	Forrest growth models					x					x	x		x					x	x			x					x					x					x	x		x		x		

Analysis of the Cluster Projects' Tools (status 2011-08-25) - Appendix 'T'

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						to other sector, spatial level, target group etc.?	
T26	Vulnerability assessment	ForeStClim	ONF Alsace (F)	Julien Prinet, Laurent Gautier ONF Alsace (F) julien.prinet@onf.fr, laurent.gautier@onf.fr	Integrating active storage maps with the climate data (cp. ForeStClim Regional Climate Scenarios) allows ONF to calculate the relative water deficiency index (D%) for over 750,000 polygons in Alsace (pitch size 50 m). This results allows to establish the ecological spectrum of dispersion of each population forming an functionnal type and thus determine the statistical thresholds of vulnerability per species. Methodologies applied are scenario development and vizualisation by GIS.	Vulnerability approach useful in other sectors too, like agriculture	
T27	Water Balance	ForeStClim	Newcastle University (UK); Landesforsten RP (DE); Centre of Hydrology Wallingford (UK)	James C. Bathurst Newcastle University (UK) j.c.bathurst@ncl.ac.uk Steffen Schobel Landesforsten RP (DE) schobel@forestclim.eu John Packman / Mark Robinson Centre of Hydrology Wallingford (UK) jcp@ceh.ac.uk / mr@ceh.ac.uk	Hydrological model (HYLUC) in combination with a visualization tool (EXCLAIM) for examining and visualizing the effects of different forest managements on runoff and water quality for present and future climates (Newcastel University). SWAT (Soil and Water Assessment Tool) in combination with APEX (Agricultural Policy/Environmental Extender Model) in order to adapt land use and best management practices to future climate conditions (Landesforsten RP). DAYMOD to assess the discharge from smaller catchments in response to climate change impacts (Cetre of Hydrology Wallingford).	Results useful for flood prevention	
T28	Digital site mapping	ForeStClim	Landesforsten RP (DE),	Jürgen Gauer Landesforsten RP (DE) juergen.gauer@wald-rlp.de	Dynamic digital forest site mapping for various parameters like, soil moisture, water balance, groundwater replenishment, soil erosion, flood generation, nutrient availability. Up to now, forest site mapping has only been performed once at a particular site and site factors have been assumed to be constant. For a larger part of the country's forested area, no data or coarse estimates only are available. This means that at a regional scale, site factors are determined repetitively. Within the framework of the ForeStClim project methods are being developed and tested to update existing data and fill respective gaps. Innovative geostatistical tools are being applied to transfer the current site factor description into a causally determined classification. In connection with a desktop GIS and digital climate gaps for actual and projected climate which enables to dynamically adapt the site maps to changing environmental conditions.	approach useful in other sectors too, like agriculture	Site maps for the next 100 years, could be used in agriculture, too
T29	Risk assessment to climate change	ForeStClim	Landesforsten RP (DE); Forestry Commission (UK)	Frank Thomas, Uni Trier (D) thomasf@uni-trier.de	Development of tools for surveying forest site and forest stand shifts, risk assessment, water regime assessment and assessment of goods and services		
T30	Free Air Carbon Dioxide Enrichment (FACE)	ForeStClim	Bangor University	Douglas Godbold Bangor University (UK) d.l.godbold@bangor.ac.uk	Objectives within the project are to study the effects of environmental change on the structure of forest ecosystem, and the effects of environmental change on the ecosystem services provided by the forests. At demonstration sites (large scale experiments, covering an area of ca. 2 ha) future atmospheric CO2 conditions were simulated. It could be shown that increased atmospheric carbon dioxide changes outcome of competition between different trees species. This suggests that under future atmospheric conditions new approaches to forest management may be needed.	approach useful in other sectors too, like agriculture	
T31	Satellite based forest mapping and assessment	ForeStClim	Uni Trier (D), SERTIT (F)	Joachim Hill; Johannes Stoffels; Stephan Seeling Uni Trier (D) stoffels@uni-trier.de; seelings@uni-trier.de Stephen Clandillon SERTIT (F) stephen@sertitx.u-strasbg.fr	Based on remote sensing data these tools support the analysis of forest dynamics and forest stand shifts, are tha base of predictive models of forest evolution and simplifiy forest inventories as well as forest sensitivity analysis.	Dynamic mapping is useful in all areas of landuse change	

Analysis of the Cluster Projects' Tools (status 2011-08-25) - Appendix 'T'

Nr.	Name of tool	Modelling				Assessment				Management				Stakeholder interaction				Action field				Grade of 'innovation'				Technical outline						Availability (status 05-2011)			Spatial scope					Target group						
		Climate modelling	Hydrological modelling	Hydraulic modelling	Other	Impact assessment	Risk assessment	Vulnerability assessment	Other	Providing a pool of existing measures	Prioritisation and Decision support	Monitoring of effect and outcome of measures	Climate proofing spatial plans	Information	Exchange	Participation	Cooperation	Built environment	Water environment	Natural environment	Social environment	New development of tool	Further development of exisiting tool	Adoption from other context	Application/implementation of existing tool	Checklist	Guidelines / guidance book	Report / maps	Computerised tool	Role play / game	Other	Idea / draft	Pilot / testversion	Ready to use	Building/plot level	Quarter/community level	Local / municipality level	Regional level	Supra-regional level	Experts / professionals	Laymen	Administration	Politics	Science	Economy	Civil society
T26	Vulnerability assessment							x						x						x			x					x	x				x			x	x	x		x		x	x	x	x	
T27	Water Balance		x			x					x	x		x					x	x			x		x			x	x				x				x		x			x				
T28	Digital site mapping				x	x						x		x						x			x					x					x			x	x		x			x				
T29	Risk assessment to climate change						x							x						x		x	x		x			x					x	x			x	x	x	x			x				
T30	Free Air Carbon Dioxide Enrichment (FACE)	x				x						x		x						x		x						x					x						x				x				
T31	Satellite based forest mapping and assessment					x						x		x						x			x					x					x	x			x	x	x		x			x			

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Nr.	Name of tool	Originates from project	Organisation responsible	Contact	Short description of content and aim	Estimated transferability	Comments (e.g. linkages to other projects)
						to other sector, spatial level, target group etc.?	
T32	Educational measures on the theme of tree and climate change	ForeStClim	Centre Permanent d'Initiatives à l'Environnement (CPIE) Val de Vilaine	Christophe Bidaud GIP Pays Redon et Vilaine (F) directeur@pays-redon-vilaine.fr	These educational measures comprise: 1. The creation of an educational garden on the theme of global warming and more particularly on the discovery of daily gestures that may contribute to reduce the personal impact on climate change. 2. Activities for pupils and conferences for the general public: Free activities for children aged from 9 to 11 years old (French primary school) and for children aged 12 and 13 year old (from secondary school) with a link with global warming and the forest. Additionally conferences, debates and workshops are organised by the CPIE for the general public on various themes, for example "the old jobs from the forest", "the agro-forestry", a workshop on grafting.	transferable to other stakeholders	
T33	Educational trunk	ForeStClim	GIP Pays Redon et Vilaine (F)	Christophe Bidaud GIP Pays Redon et Vilaine (F) directeur@pays-redon-vilaine.fr	Educational tool about trees and global warming. The trunk, which will be operational in 2011 is composed of four independent units: 1. evolution of the forest from prehistoric age to today and tomorrow 2. scientific experimentation of the impact of global warming on the ecosystem forest 3. the European forests 4. the possible gestures. The trunk is made of recycled cardboard boxes and takes the shape of a tree. It will also contain elements from the four units, an educational booklet and bibliographical references. It was developed by a working group made of salaried employees, voluntary workers from the CPIE, a primary school teacher and a scientist working in the Forestclim project.	transferable to other stakeholders	
T34	Web-based spatial multi-criteria evaluation (SMCE) (Software development)	ForeStClim	University of Twente (NL); Kontext U (DE)	Luc Boerboom University of Twente (NL) boerboom@itc.nl Philipp Vogt Kontext U (D) vogt@kontext-u.de	Web services for spatial multi-criteria evaluation based on open standards and free source software. Multi criteria analysis for assessment of the ecological and socio-economical consequences of forest strategies in different climate change scenarios (further development of existing MCDA tools like forest framework impact planning to make them sensitive on climate change).	useful in all areas of landuse management	
T35	Toolbox Urban Heat Islands	Future Cities	City of Arnhem (NL)	Hans van Ammers Municipality of Arnhem, NL hans.van.ammers@arnhem.nl	Toolbox on Urban Heat Islands for Arnhem, consisting: 1. Urban Climate Analysis (UCA) maps (= heat maps) (analogue concept of Urban Climate Map (UCMap), University of Kassel, DE, based on a GIS-modelling with a grid of 100 x 100 meter) 2. Urban Climate Recommendation (UCR) maps (recommendations regarding overheating and heat stress) 3. Measures on different urban scales related to different sectors, derived from bottom up practical tools and top down research, strategies and policies related to the urban heat island effects and the potential heat stress in the future.	principles transferable to other locations	strategic approach
T36	Water Game	Future Cities	City of Tiel (NL)	Annemieke de Kort Municipality of Tiel, NL adkort@tiel.nl	A Serious Game about water and urban planning. It shall increase the awareness between stakeholders in terms of their interests, roles and measures, thus increasing the change for a better (integral, durable and widely supported) urban planning.	generally transferable, but local data must be fed in	similar to the WAVE Water game?
T37	Future Cities Adaptation Compass	Future Cities	Lippeverband (DE)	Anke Althoff Lippeverband, DE althoff.anke@eglv.de	The Future Cities Adaptation Compass is meant to help planners and experts at cities and water boards to structure the working steps, give examples for best-practice and experiences of Future Cities partners and highlight possible barriers. The focus is on "guiding through the process". Based on a pre-structured vulnerability assessment and documentation layout, this Compass shall facilitate a well-structured and substantiated preparation of the stages to create climate proof cities.		strategic approach/meta tool (will be also available and useful for students) complementary tools on national level: www.ukcip.org.uk/wizard/ (UK); www.klimalotse.anpassung.net (DE); www.stadtklimalotse.net (DE)

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T32	Educational measures on the theme of tree and climate change													x	x	x		x		x	x		x		x					x	x			x						x						x
T33	Educational trunk													x	x					x		x									x										x						x
T34	Web-based spatial multi-criteria evaluation (SMCE) (Software development)										x			x	x	x	x			x	x	x	x						x			x					x	x			x		x	x	x	x	x
T35	Toolbox Urban Heat Islands					x		x		x		x	x	x	x	x	x	x	x		x		x		x		x	x				x				x	x	x			x		x	x			x
T36	Water Game														x	x		x	x		x	x							x	x	x			x			x	x			x		x	x			x
T37	Future Cities Adaptation Compass					x		x		x	x			x	x	x	x	x	x		x	x					x		x			x		(x)	x	x	x		x		x		(x)			x

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						to other sector, spatial level, target group etc.?	
T38	Guideline Climate Change	Future Cities	Emschergenossenschaft / Lippeverband (DE)	Anke Althoff Lippeverband, DE althoff.anke@eglv.de	The guideline explains the coherences of climate change, water cycle and activities regarding the Waterboard Emschergenossenschaft in a simple way to involve also non scientists. It focuses on - the main effects of climate change to a water board, - reflects on which of the present activities of a water board help to reduce the negative affects of climate change and - asks what else is to do to decrease these affects (mitigation) or to adapt to the consequences on the water cycle.		original intention: tool for the internal communication on the effects of climate change towards the waterboard EGLV, now a broader dissemination is planned, translation to English considered
T39	Zukunftsvereinbarung Regenwasser (engl. Storm Water Convention)	Future Cities	Emschergenossenschaft / Lippeverband (DE)	Anke Althoff Lippeverband, DE althoff.anke@eglv.de	The Storm Water Convention is an agreement between the Emschergenossenschaft, the Ministry of Environment NRW and all municipalities in the Emscher catchment to disconnect 15% of stormwater from the mixed sewer system in 15 years. The agreement was signed in October 2005. Both, the Emschergenossenschaft and the Ministry funds any square meter that is disconnected, so there is also a financial incentive that shall trigger the property owners to disconnect.	if other regions, wanting to change a mixed sewer system into a separate system, have also a split fee for waste water and storm water, transferability is given	www.emscher-regen.de
T40	Local adaptation plus strategy	Future Cities	Hastings Borough Council (UK)	Chantal Lass Hastings Borough Council, UK class@hastings.gov.uk.	Based on a questionnaire on severe weather events and their impacts on different sectors a Local Climate Impact Profile (a tool by UKCIP) was derived. This builds now - together with the results from a regional vulnerabilty assessment for South East England - the basis for the development of a local 'adaptation plus strategy' including a local adaptation action plan. By engaging relevant organisations and local authority departments within a Local Strategic Partnership ownership of the strategy shall be secured (to be finished in Autumn 2011).		contentwise links to the event management plan for the waste management service of L'AggIO (Orléans) (FloodResilientCities-Project)
T41	Regional Vulnerability Assessment	Future Cities	South East England Partnership Board (UK)		By overlaying different indicator maps (based on GIS) sectoral 'hotspots' of high vulnerability against the impacts of CC could be identified within the region. The results of the regional VA shall help to inform, in spatial planning terms, the future distribution of growth and prioritise adaptation measures. Guiding questions have been: - What affects current vulnerability? - What are consequences currently experienced? - What are the adaptation opportunities?		As the regional level in the UK does not longer exist, the results of the regional VA are integrated into the local VA of Hastings
T42	Guidelines on sustainable housing and Masterplan Ieper 'De Vloei'	Future Cities	West-Vlaamse Intercommunale (BE)	Eveline Huyghe West-Vlaamse Intercommunale, BE e.huyghe@wvi.be	WVI aims to build a sustainable quarter in Ieper. This new developed quarter will be sustainable in all aspects: energy, water, ecology but also regarding social sustainability and sustainable use of space, materials, dealing with waste, etc. Adaptation to the climate change is the key element of the strategy together with the mitigation aspect in order to prevent further damage to the climate. The development of a masterplan for the new quarter is based on guidelines on sustainability, containing a minimal standard and a plus-level for each topic (such as energy-use, mobility and rainwater drainage).		
T43	GreEnergy Roofs methodology	Future Cities	City of Nijmegen (NL)	Antal Zuurman Municipality of Nijmegen, NL a.zuurman@nijmegen.nl or Ton Verhoeven (for strategic, general questions) t.verhoeven@nijmegen.nl	Aim of the Nijmegen GreEnergy Roofs methodology is to promote green roofs as combined adaptation and mitigation measure. The approach helps to identify roofs suitable for greening based on an GIS and Cost Benefit Analysis based exploration of the following questions: 1. Where are green roofs possible ? (regarding roof type and insolation rates) 2. Where do green roofs have a positive effect ? 3. Where is succes available with what owners? 4. What are the costs/benefits ? By observation of the disconnection rate the succes of the tool can be monitored.		Guide For Energetic Town planning (Amsterdam) from C-Change project
T44	Campaign "Our green he(a)rt"	Future Cities	City of Nijmegen (NL)	Veroniek Bezemer Municipality of Nijmegen, NL v.bezemer@nijmegen.nl	The public campaign 'Ons Groene Hert' is a communication tool which aims at activating energy aware living which shall lead to 3% energy reduction per year. It is linked to the Nijmegen Actionplan Climate 2008-2012 which promotes smart transport solutions, green energy production and adaptation measures.	general idea transferable	

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		Climate modelling	Hydrological modelling	Hydraulic modelling	Other	Impact assessment	Risk assessment	Vulnerability assessment	Other	Providing a pool of existing measures	Prioritisation and Decision support	Monitoring of effect and outcome of measures	Climate proofing spatial plans	Information	Exchange	Participation	Cooperation	Built environment	Water environment	Natural environment	Social environment	New development of tool	Further development of exisiting tool	Adoption from other context	Application/implementation of existing tool	Checklist	Guidelines / guidance book	Report / maps	Computerised tool	Role play / game	Other	Idea / draft	Pilot / testversion	Ready to use	Building/plot level	Quarter/community level	Local / municipality level	Regional level	Supra-regional level	Experts / professionals	Laymen	Administration	Politics	Science	Economy	Civil society
T38	Guideline Climate Change									x				x	x				x			x					x						x			x	x			x		x				
T39	Zukunftsvereinbarung Regenwasser (engl. Storm Water Convention)									x	x			x	x	x	x	x	x			x									x		x	x	x	x	x		x	x			x	x
T40	Local adaptation plus strategy							x		x	x	x	x	x	x			x	x		x		x					x					x			x	x		x		x	x			
T41	Regional Vulnerability Assessment							x					x	x				x	x	x	x	x						x					x				x		x		x	x			
T42	Guidelines on sustainable housing and Masterplan Ieper 'De Vloei'									x	x		x	x	x		x	x	x		x	x					x	x					x		x				x	x	x	x			x
T43	GreEnergy Roofs methodology										x	x		x	x		x	x			x	x					x	x	(x)				x	x	x				x	x	x	x		x	x
T44	Campaign "Our green he(a)rt"													x	x		x	x			x	x									x		x		x	x				x					x

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						to other sector, spatial level, target group etc.?	
T45	Water Vision Nijmegen	Future Cities	Municipality of Nijmegen (NL)	Ton Verhoeven Municipality of Nijmegen, NL t.verhoeven@nijmegen.nl	The Water Vision is a report about the relation of the water systems and spatial planning. Part is also a management decision paper. The Water Vision is closely related to the Underground Vison which is made simultaneously. The water strategy ordens the different aspects of water management in a historical context. These aspects are: safety for high water (since 800), dry feet (since 1700), health and sanity (since 1900), clean and sufficient since 1950), combination of functions (since 1990) and spatial quality (since 2000). Future aspects are using (ground) water for energy/ cooling and a new synergy between different policy fields in the municipality to adapt to climate change. These aspects are based on the natural water system. The aspects are combined in ambition levels, which have the right abstraction for governmental decisions. Nijmegen decided to become a water sensitive city in 2030.	A second municipality in Holland (Renkum) has now a Watervision. There it is a Water, Nature and Landschap Vision, with the same structure combining spatial planning with ambition levels (Method Water Scales).	
T46	Coastal Management Comparator Computer Data Base Tool (Tagazan)	IMCORE	Centre for Maritime Law and Economy, University of Western Brittany (F)	Manuelle.Philippe University of Western Brittany, F Manuelle.Philippe@univ-brest.fr	The database is constituted by initiatives to manage coastal risks linked to climate change sent by IMCORE partners. Its consultation interface aims to allow the user to find the most interesting initiatives for him, i.e those which will be especially useful for him. This is possible through the exploration of experiences described in the initiatives following three modalities: by accessing all texts classified by categories; through a search by words in the texts; through tags which are linked to pieces of text selected (tag cloud).	general idea/functionality of database transferable to all other contexts	focus on coastal risks linked to climate change
T47	Coastal legal codex (database of coastal legislation)	IMCORE	Agentschap voor Maritieme Dienstverlening en Kust-afdeling Kust (BE)	Caroline Lootens Maritime Institute of the Ghent University, BE caroline.lootens@mow.vlaanderen.be	The Legal Codex gives a complete overview of the legislation that applies in Belgium. The online tool allows interactive searches for relevant articles and offers an integral and integrated state of legislation on both the seaside and the landside of the Belgian coast.		
T48	Assessment of partnership working	IMCORE	EUCC - The Coastal Union (NL)	Joana Mira Veiga Coastal & Marine Union (EUCC), NL Veigaj.veiga@eucc.net	to be added		
T49	Guidelines on Stakeholders Engagement for Driver and Issue Identification Workshops	IMCORE	Envision Management Ltd. (UK)	Hester Whyte Envision Management, UK h.whyte@envision.uk.com	Practical guide on the theory, process and practice of stakeholder engagement. Aim: to provide the user with clear information on engaging stakeholders, the importance of it and a practical hands on suggestion (based on experience) on how to go about it.	independent from the topic of CC adaptation this guideline can be used for all contexts where stakeholder engagement is of relevance	trust-guide.pdf, available under http://imcore.files.wordpress.com/2009/08/trust-guide.pdf
T50	Training of Trainers Workshop	IMCORE	Envision (UK) University of Ulster at Coleraine (IRL)	Jeremy Hills Envision Management, UK j.hills@envision.uk.com	The training of trainers workshop provides capacity to the user so they can train the approach of using scenarios to develop adaptation strategies. Aim is to embed knowledge of innovative adaptive management approaches amongst project participants, who will be empowered by the process to assist stakeholders in local areas to address coastal management problems in the future.		
T51	Futures Approach for use in the development of adaptation strategies	IMCORE	Cardiff University (IRL)	Rhoda Ballinger Cardiff University BallingerRC@Cardiff.ac.uk	The futures approach includes the development of an IMCORE model for exploratory scenario development. The scenario development documentation has been developed and informed by the IMCORE Expert Couplet Node experience. The workshop guide and module under development within the 'Distance Learning Tool' will provide a useful overview for pracitioners considering/intending to use exploratory scenarios to inform climate change adaptation. The supporting visualisation tools cover the following technological approaches: a) Geographic Information Systems b) Web based virtual reality c) Customised simulator suite	Such a model could be transferred to other, non-coastally specific locations across NW Europe.	Modifies conventional exploratory scenario development process including the use of PESTLE analysis. Other visualisation tools have been also developed which can support this process.

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T45	Water Vision Nijmegen										x		x	x				x	x	x		x					x	x					x			x	x			x		x				
T46	Coastal Management Comparator Computer Data Base Tool (Tagazan)									x				x					x		x	x								x				x			x	x	x	x	x	x	x	x		x
T47	Coastal legal codex (database of coastal legislation)													x									x							x				x			x	x	x		x		x			
T48	Assessment of partnership working																																														
T49	Guidelines on Stakeholders Engagement for Driver and Issue Identification Workshops													x	x	x	x				x				x		x						x			x	x	x	x	x		x		x		x
T50	Training of Trainers Workshop													x	x	x	x		x		x				x	x	x				x		x			x	x	x	x	x		x		x		x
T51	Futures Approach for use in the development of adaptation strategies				x		x				x				x	x			x		x		x				x		x				x				x	x		x		x		x		x

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T52	Multimedia Distance Learning Tool (DLT)	IMCORE	CoastNet (UK)	Manuela de los Rios, Alex Midlen CoastNet , UK manuela.delosrios@coastnet.org.uk alex.midlen@coastnet.org.uk	The DLT (Distance Learning Tool) is a learning portal for coastal and climate change professionals to plan to adapt to coastal change. It will include a Toolkit, a rapid e-learning course for developing adaptation strategies and the 9 experiences of IMCORE partners highlighting the most valuable lessons learned. It incorporates all other tools developed within IMCORE.		meta tool comprising other IMCORE tools
T53	Dilemma game	WAVE	Waterschap Groot Salland (NL)	Warry Meuleman Waterboard Groot Salland, NL wmeuleman@wgs.nl	The WAVE Dilemma game is a communication and decision support tool. The dilemma it deals with is on competing space demands in the Vecht delta. Here, on one hand more space for the river has to be created to prevent flooding and drought. On the other hand in the same spot new housing areas to accommodate a growing population has to be provided. The game is a role play which shall help to understand the different needs and competing claims on space in this delta area. Overall aim is to create a climate-proof delta with enough space to live with the water.	the basic principles are transferable, content should be adapted to specific local context	Similar to the Future Cities Water game of Tiel? Game material is only available in Dutch.
T54	Wave Movie	WAVE	Waterschap Groot Salland (NL)	Warry Meuleman Waterboard Groot Salland, NL wmeuleman@wgs.nl	The Wave Movie on floods and droughts is a communication tool displaying different news clips and pictures from recent flood and drought event in the Wave regions.		Movie available on DVD and online: www.waveproject.eu
T55	Online Flood forecasting systems	WAVE	Flemish Environment Agency (BE)	Annelies Haesevoets Flemish Environment Agency, BE a.haesevoets@vmm.be	The focus of this website is the map of Flanders with the 11 hydrographic basins, in which the colour of the forecast points and stage gauges show the current and forecast flood status per basin. The forecasting system makes calculations up to two days in advance. The colours green (basic mode, no flooding) - orange (non-critical floods) - red (critical floods) apply for a period up to 24 hours in the future. Precipitation forecasts up to ten days in advance are used by flood forecasters but can only be viewed by operators as part of the "early warning" system. Also detailed maps on which flood contours can be seen => people can see whether their house is threathened by flooding.	Depends on models that are used. The way you can present flood forecasting information and inform people is interesting and transferable.	www.overstromingsvoorspeller.be
T56	Flood Modelling and Visualisation	WAVE	Environment agency (UK)	Ken Moss Environment Agency, UK kenn.moss@environment-agency.gov.uk	Supporting existing flood mapping work this approach involves modelling to understand the effects of climate change on the river systems and coastal regions in Sommerset, UK. The project will produce climate change mapping (GIS based) and visualisation to include flooding, intense rainfall and drought scenarios. In a first step is is meant as tool for analysis and communication , in a second step it will potentially be used as a planning tool for future development and infrastructure.		A first website is available http://www.somersetwave.co.uk
T57	CBA in Risk Assessment	WAVE	Sommerset County Coucil (UK)		no activity yet (to be added 2nd half of 2011)		link to AMICE? In September 2011 during the next WAVE workshop further agreements will be made and more information will become available
T58	Niche eco-hydrological model	ALFA	Flemish Environment Agency (BE)	Maarten Van Aert Flemish Environment Agency, BE m.vanaert@vmm.be	Model to determine the impact of water mangament measures on the ecology. The model gives information on the nature type that can potentially develop.	Adjustment to available data: - soil data - ground water - vegetation types	
T59	Economical, social and ecological risk assessment in Leuven and Brussels	FloodResilienCity	Flemish Environment Agency (BE)	Annelies Haesevoets Flemish Environment Agency, BE a.haesevoets@vmm.be	Economical, ecological and social risk analysis of extreme flood events in the Woluwe and Dijle valley.	Generally transferable but local data should be fed in.	

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		Climate modelling	Hydrological modelling	Hydraulic modelling	Other	Impact assessment	Risk assessment	Vulnerability assessment	Other	Providing a pool of existing measures	Prioritisation and Decision support	Monitoring of effect and outcome of measures	Climate proofing spatial plans	Information	Exchange	Participation	Cooperation	Built environment	Water environment	Natural environment	Social environment	New development of tool	Further development of exisiting tool	Adoption from other context	Application/implementation of existing tool	Checklist	Guidelines / guidance book	Report / maps	Computerised tool	Role play / game	Other	Idea / draft	Pilot / testversion	Ready to use	Building/plot level	Quarter/community level	Local / municipality level	Regional level	Supra-regional level	Experts / professionals	Laymen	Administration	Politics	Science	Economy	Civil society
T52	Multimedia Distance Learning Tool (DLT)				x		x	x		x	x		x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x		x			x	x	x	x		x		x		x
T53	Dilemma game														x	x		x	x		x		x							x			x			x			x		x	x		(x)	x
T54	Wave Movie													x	x				x						x						x		x				x	x			x				x
T55	Online Flood forecasting systems		x	x		x								x	x			x	x		x		x						x			x					x	x	x	x	x	x	x	x
T56	Flood Modelling and Visualisation	x		x			x							x	x			x	x		x		x						x			x				x		x	x	x	x	x	x	x
T57	CBA in Risk Assessment																																													
T58	Niche eco-hydrological model				x	x								x					x	x			x						x			x				x	x			x		x			
T59	Economical, social and ecological risk assessment in Leuven and Brussels				x	x								x				x	x	x	x		x					x				x				x	x			x	x	x			

Analysis of the Cluster Projects' Tools (status 2011-08-25) - Appendix 'T'							
Nr.	**Name of tool**	**Originates from project**	**Organisation responsible**	**Contact**	**Short description of content and aim**	**Estimated transferability**	**Comments** (e.g. linkages to other projects)
						to other sector, spatial level, target group etc.?	
T60	MCA analysis and stakeholder involvement to make a masterplan	FloodResilienCity	Flemish Environment Agency (BE)	Annelies Haesevoets Flemish Environment Agency, BE a.haesevoets@vmm.be	The economical, ecological and social impact of different scenario's were compared to each other in a multicriteria analysis. This information was used as an input for discussion with stakeholders. This way we could come to the most wanted scenario.	Generally transferable but local data should be fed in.	

Analysis of the Cluster Projects' Tools (status 2011-08-25) - Appendix 'T'

Nr.	Name of tool	Modelling				Assessment				Management				Stakeholder interaction				Action field				Grade of 'innovation'				Technical outline						Availability (status 05-2011)			Spatial scope					Target group						
		Climate modelling	Hydrological modeling	Hydraulic modelling	Other	Impact assessment	Risk assessment	Vulnerability assessment	Other	Providing a pool of existing measures	Prioritisation and Decision support	Monitoring of effect and outcome of measures	Climate proofing spatial plans	Information	Exchange	Participation	Cooperation	Built environment	Water environment	Natural environment	Social environment	New development of tool	Further development of exisiting tool	Adoption from other context	Application/implementation of existing tool	Checklist	Guidelines / guidance book	Report / maps	Computerised tool	Role play / game	Other	Idea / draft	Pilot / testversion	Ready to use	Building/plot level	Quarter/community level	Local / municipality level	Regional level	Supra-regional level	Experts / professionals	Laymen	Administration	Politics	Science	Economy	Civil society
T60	MCA analysis and stakeholder involvement to make a masterplan									x	x			x	x	x	x	x	x	x	x	x						x					x						x		x	x			

Analysis of the Cluster Projects' Measures (status 2011-08-25) - Appendix 'M'

Nr.	Name of measure	Originates from project	Organisation responsible	Contact	Short description of content and aim	Costs / Budget	Comments (e.g. linkages to other projects)	Climate change impact addressed
								e.g. flood; drought; heat; heat wave; fire; wind/storm; sea level rise; heavy rainfall; other (describe)
M1	La Bassée ecological flooding project	ALFA	Grands Lacs de Seine, F	Amélie Manquillet Grands Lacs de Seine, F amelie.manquillet@iibrbs.fr	Flood retention, in combination with ecological flooding, is able to reduce the damage to natural habitats caused by extreme flood events, particularly in former floodplains that have been cut off from the river as a result of human activity. „La Bassée", the French ALFA-partner's project in the Seine catchment, was designed to pump water into former floodplains in the event of extreme flood events. Main aim is the upstream valorisation for downstream protection. This shall be reached by three integrated projects: 1) flood alleviation project on 11 municipalities 2) wetland restoration 3) land planning and local development (49 municipalities)			flood
M2	Ecological flooding in the Hördt floodplain area	ALFA	SGD Süd, DE	Heinz-Peter Wierig Struktur- und Genehmigungsdirektion Süd, DE	The Hördt reserve retention area covers an area of 870 ha. It will be able to store 36 Mio. m³ of Rhine water. The remaining front dyke will be overflown at floods higher than a 200 year event. Main measures are: - Reinforcement of the existing dyke - Construction of a new main dyke at some distance from the river Rhine - Construction of two new pumping stations and reinforcement of two existing ones - In case of polder operation mobile systems for pumping will be used too - Construction of three apertures in the existing dyke to allow ecological flooding - Construction of three spillways in the existing dyke to allow the inflow of water in case of operation			flood

Analysis of the Cluster Projects' Measures (status 2011-08-25) - Appendix 'M'

Nr.	Name of measure	Type of measure					Approach		Temporal scope			Focused action field (according to distinction in application form)				Spatial scope										Grade of 'innovation'				Implementation by				State of realisation (status 04-2011)		
																Landscape type addressed							Scale														
		adaptation	mitigation	combined adaptation and mitigation	structural (technical, engineering)	non-structural (juridical, planning, communication)	strategic approach	single measure	short term perspective	medium term perspective	long term perspective	built environment	water environment	natural environment	social environment	urban area / city centre	suburban area	rural area / village	rural area / agriculture	forest	river catchment	coast	building / plot level	quarter / community level	local / municipality level	regional level	supra-regional level	new development of measure	further development of existing measure	adoption from other context	application/implementation of existing measure	public sector	private sector	third sector / NGOs / NPOs	private individuals / households	idea / draft	partly realised	completed
M1	La Bassée ecological flooding project	x			x	x	x			x			x	x	x	x	x	x			x				x	x					x				x		
M2	Ecological flooding in the Hördt floodplain area	x			x			x		x			x	x	x				x	x	x				x	x					x	x				x	

Analysis of the Cluster Projects' Measures (status 2011-08-25) - Appendix 'M'

Nr.	Name of measure	Originates from project	Organisation responsible	Contact	Short description of content and aim	Costs / Budget	Comments (e.g. linkages to other projects)	Climate change impact addressed
								e.g. flood; drought; heat; heat wave; fire; wind/storm; sea level rise; heavy rainfall; other (describe)
M3	Ecological restoration of the River Kleine Nete	ALFA	Flemish Environment Agency, BE	Vlaamse Milieumaatschappij, BE Annelies Haesevoets a.haesevoets@vmm.be	Straightening and deepening of the river Kleine Nete in the seventies and the use of the area as a sand disposal caused major disturbance of the river system. The natural water storage capacity of this part in the river valley was lost. The enhanced drainage caused a decline in groundwater level. The Kleine Nete restoration process within the ALFA project has the following goals: - Reduction of the flood risk downstream and increased groundwater levels in the upstream valley to recover the alder swamp area of Olens Broek. - Excavation of the Hellekens area up to the winterbed level of the river, the storage capacity will be restored. - The upstream water level will raise 50 cm by a new meander (to be dug out). Modelling showed that the water storage capacity will increase by about 50,000 m3 and even 100,000 m3 during heavy storms. - Installation of recreational facilities for the nearby city of Herentals Measures carried out are: - Excavation of ca. 400,000 m3 of sands - Construction of new dikes on the right river bank of the Kleine Nete - Construction of a new meander with smaller dimensions than the current river - Raising the upstream water level by 50 cm to preserve the alder swamp woods - Construction of diverse recreational facilities to increase attractiveness	2,5 million EURO	Measure is part of River Basin Management Plan	flood; drought; heavy rainfall
M4	Remeandering Thacka Beck	ALFA	Eden Rivers Trust, UK	Lucy Dugdale Eden Rivers Trust, UK lucy@edenriverstrust.org.uk	The overall goal of the River Eden case is to implement catchment scale planning and land use change to help manage river flows - both floods and droughts - in an ecologically sustainable way. Sustainable land use change means that the solutions contribute to protecting the future ecological value of the river and that they are self-managing and do not require costly ongoing investments or long-term maintenance. Based on innovative modeling applied to the River Eden system the impact of land use changes on both extreme high river flows and low river flows will be explored. A coordinated catchment stakeholder approach will deliver land use changes for managing river flows while maintaining and balancing other important functions such as agriculture and nature. Associated education, skills training and awareness raising work will be carried out with the local community to enhance solidarity within the catchment and ensure public involvement in the project. As land use changes will be required in upstream areas on private agricultural land, it will be crucial develop effective compensation measures.			flood, drought / low flows
M5	Dyke relocation at the Overdiepse Polder	ALFA	Waterschap Brabantse Delta, NL	Maartje Thijssen Waterschap Brabantse Delta, NL	The National Programme 'Room for the River' includes 40 measures along the Dutch river area, of which the dyke-relocation at the Overdiepse Polder is one of them. Within ALFA the polder area will be turned into a floodplain, to be flooded every 25 years. A dyke relocation will reduce the flood level up to 30 cm locally and will have a significant effect further upstream. The area between the new dyke and the Oude Maasje will be turned into an attractive nature area.		Measure also relevant for the AMICE roject	flood

Analysis of the Cluster Projects' Measures (status 2011-08-25) - Appendix 'M'

Nr.	Name of measure	Type of measure					Approach		Temporal scope			Focused action field (according to distinction in application form)				Spatial scope											Grade of 'innovation'				Implementation by				State of realisation (status 04-2011)		
																Landscape type addressed							Scale														
		adaptation	mitigation	combined adaptation and mitigation	structural (technical, engineering)	non-structural (juridical, planning, communication)	strategic approach	single measure	short term perspective	medium term perspective	long term perspective	built environment	water environment	natural environment	social environment	urban area / city centre	suburban area	rural area / village	rural area / agriculture	forest	river catchment	coast	building / plot level	quarter / community level	local / municipality level	regional level	supra-regional level	new development of measure	further development of existing measure	adoption from other context	application/implementation of existing measure	public sector	private sector	third sector / NGOs / NPOs	private individuals / households	idea / draft	partly realised	completed
M3	Ecological restoration of the River Kleine Nete	x			x		x			x			x	x				x	x	x	x	x				x				x						x	
M4	Remeandering Thacka Beck	x			x			x		x			x	x				x	x		x				x						x						x	
M5	Dyke relocation at the Overdiepse Polder	x			x		x				x		x	x					x		x				x			x				x					x	

Analysis of the Cluster Projects' Measures (status 2011-08-25) - Appendix 'M'								
Nr.	**Name of measure**	**Originates from project**	**Organisation responsible**	**Contact**	**Short description of content and aim**	**Costs / Budget**	**Comments** (e.g. linkages to other projects)	**Climate change impact addressed**
								e.g. flood; drought; heat; heat wave; fire; wind/storm; sea level rise; heavy rainfall; other (describe)
M6	Rur reservoirs management rules	AMICE	Wasserverband Eifel Rur, DE	Gerd Demny Waterboard Eifel-Rur, DE gerd.demny@wver.de	The Rur reservoirs fulfills the objectives protection against floods, low-water enrichment, provision of water and power generation. In order handle the opponent tasks low-water enrichment and provision (which demands full reservoirs) and flood protection (which demands empty reservoirs) and in oder to adapt the Rur reservoirs management rules to the challenges of climate change a computer aided lamellae operation plan including a long-time simulation (100 years) of reservoir behaviour was introduced. This allows for different volumes for flood protection and storage in summer and winter time and is based on the TALSIM software (computer aided dimensioning of distribution of water between reservoirs).	553,800 EURO		flood; drought / low water
M7	Albert Canal, Lock of Ham	AMICE	nv De Scheepvaart, BE	Koen Maeghe, nv De Scheepvaart, k.maeghe@descheepvaart.be	The Albert Canal is fed with water from the river Meuse. The water from the Albert Canal serves different applications (shipping, drinking water, cooling water, process water, irrigation of farmland and nature reserves). In times of low flows it is possible that there is not enough water in the Meuse to feed all of the canals. The nv De Scheepvaart in its role as the water manager of the Albert Canal develops structural measures in order to cope with possible water shortages as the need for water in the canals increases whilst droughts will become more severe due to climate changes. Pumping stations on the Albert Canal are the most suitable solution. The Lock of Ham has the largest water consumption. A pump could reduce the discharge from 25 to 10m³/s. The pumping capacity will be based on the actual and future navigation intensity, climate change and water needs for other functions. The pump will be designed to work in reverse as a hydroelectric power station when water is plentiful. The large fall (10 m) can produce green electricity for about 2000 inhabitants and contribute to the production of renewable energy (Kyoto objectives). The impact of the pump/water power station has to be a fish-friendly type to avoid high mortality percentages. A monitoring will be set-up once the pump is functional (not within AMICE).	1,463,000 EURO		drought / low water
M8	HOWABO (Hoog Water 's-Hertogenbosch)	AMICE	Waterschap Aa en Maas, NL	Joop de Bijl, Waterboard Aa en Maas, jdebijl@aaenmaas.nl	Water storages in the Netherlands are tradionally developed in a multifunctional way: they act to store water but also to provide recreation, natural space, etc. The dimensioning of these storages is highly dependent on the measures taken by the upstream countries and is also influenced by climate change projections. In this case space for water retension is combined with recreational land close to the town center of s`Hertogenbosh. The design is discussed with stakeholders (inhabitants of 's-Hertogenbosch & Heusden, farmers of the region, the nature conservation society and recreational organisations).	1,017,000 EURO		flood

Analysis of the Cluster Projects' Measures (status 2011-08-25) - Appendix 'M'

Nr.	Name of measure	Type of measure					Approach		Temporal scope			Focused action field (according to distinction in application form)				Spatial scope: Landscape type addressed							Spatial scope: Scale					Grade of 'innovation'				Implementation by				State of realisation (status 04-2011)		
		adaptation	mitigation	combined adaptation and mitigation	structural (technical, engineering)	non-structural (juridical, planning, communication)	strategic approach	single measure	short term perspective	medium term perspective	long term perspective	built environment	water environment	natural environment	social environment	urban area / city centre	suburban area	rural area / village	rural area / agriculture	forest	river catchment	coast	building / plot level	quarter / community level	local / municipality level	regional level	supra-regional level	new development of measure	further development of existing measure	adoption from other context	application/implementation of existing measure	public sector	private sector	third sector / NGOs / NPOs	private individuals / households	idea / draft	partly realised	completed
M6	Rur reservoirs management rules	x			x	x	x		x	x	x		x	x							x				x	x	x		x				x					x	
M7	Albert Canal, Lock of Ham			x	x	x	x		x	x	x		x								x				x	x	x	x		x				x				x	
M8	HOWABO (Hoog Water 's-Hertogenbosch)	x			x		x	x	x	x	x	x	x	x	x	x	x	x	x		x				x	x					x	x						x	

Analysis of the Cluster Projects' Measures (status 2011-08-25) - Appendix 'M'

Nr.	Name of measure	Originates from project	Organisation responsible	Contact	Short description of content and aim	Costs / Budget	Comments (e.g. linkages to other projects)	Climate change impact addressed
								e.g. flood; drought; heat; heat wave; fire; wind/storm; sea level rise; heavy rainfall; other (describe)
M9	Natural Water retention in the Ardennes	AMICE	RIOU, BE	Martine Lejeune RIOU, BE m.lejeune@telenet.be	Objective of this project ist to build networks of wetlands in the Ardennes. In order to reach this spruce plantations on drained former wetlands will be renatured again. The idea is that sources areas and floodplains in the upper parts of the catchment basin can play an important role for the whole of the Meuse basin. Condition is they can function in a natural way. When the bog, moor and fen vegetation is well developed it acts as a sponge for the sky-water. This presents a double benefit. First, in case of high water the flood is slowed down because the water will saturate the natural sponges first. Only when the sponge is full will the extra water flow into the brooks and the rivers. Second, as the water is kept in the sponges it also has enough time to infiltrate the soil. The water thus kept in the system presents a welcome reserve in times of drought. To support the works hydrological and ecological studies analysing the influence of such networks of wetlands on the discharge of the brooks are carried out.	99,500 EURO		flood; drought / low water
M45	Steenbergse Vliet investment	AMICE	Waterboard Brabantse Delta, NL	Ron Lambregts, Piet van Iersel Water Board Brabantse Delta, Breda, NL r.lambregts@brabantsedelta.nl p.van.iersel@brabantsedelta.nl	The aim of the *Steenbergsche Vliet* project is to create new water retention areas for storage of surplus water in the Mark river. The retention will be combined with the development of river related nature. This means ecological corridors, more nature in combination with water retention. However also the problem of water shortage in the dry season has to be tackled. In summer with less discharges from the river in combination with high temperatures blue green algae develops (blooms) in the *Volkerak Zoommeer.*	731,708 EURO		flood, drought.
M10	Film on the river Meuse	AMICE	RIOU, BE	Martine Lejeune RIOU, BE m.lejeune@telenet.be	interactive,web-based film consisting of 15 one-minute clips featuring different aspects of the river Meuse. The Meuse is full of tales. They tell about the river and its tributaries, about the water and the diffferent ways it can be used, abour floods and droughts, nature and culture, and also about climate change and the AMICE project. Through the film you discover the Meuse and its tales.(http://amice-film.eu)	150,000 EURO		flood; drought / low water
M11	Improved anticipation and reaction to extreme events	AMICE	EPAMA, F; APS, BE; RWS, NL	Maïté Fournier EPAMA, FR maite.fournier@epama.fr Erik Bijwaard, Rijkswaterstaat, erik.bijwaard@rws.nl Michèle Booten, APS, michele.booten@aps-marche.be	Aim ofthis activity is the adjustment and improved application of existing flood crisis management software (OSIRIS, FLIWAS and PlanCom) by comparing methods and procedures and by carrying out international exercises and trainings on flood crisis management.	1,036,000 EURO	http://www.amice-project.eu/docs/pa1_pr4_1280248606_Symposium_Meuse_WP4_Fournier.pdf http://www.amice-project.eu/docs/pa1_pr4_1281286769__WP4_report_final.pdf	flood

Analysis of the Cluster Projects' Measures (status 2011-08-25) - Appendix 'M'

Nr.	Name of measure	Type of measure					Approach		Temporal scope			Focused action field (according to distinction in application form)				Spatial scope										Grade of 'innovation'				Implementation by				State of realisation (status 04-2011)		
																Landscape type addressed							Scale														
		adaptation	mitigation	combined adaptation and mitigation	structural (technical, engineering)	non-structural (juridical, planning, communication)	strategic approach	single measure	short term perspective	medium term perspective	long term perspective	built environment	water environment	natural environment	social environment	urban area / city centre	suburban area	rural area / village	rural area / agriculture	forest	river catchment	coast	building / plot level	quarter / community level	local / municipality level	regional level	supra-regional level	new development of measure	further development of existing measure	adoption from other context	application/implementation of existing measure	public sector	private sector	third sector / NGOs / NPOs	private individuals / households	idea / draft	partly realised	completed
M9	Natural Water retention in the Ardennes	x				x	x		x	x			x	x					x	x	x				x	x				x			x			x	
M45	Steenbergse Vliet investment			x	x			x			x		x	x					x		x				x	x			x	x			x			x	
M10	Film on the river Meuse	x				x		x	x				x	x							x							x			x	x			x			x
M11	Improved anticipation and reaction to extreme events	x				x	x		x	x			x			x	x	x			x			x	x	x	x		x			x			x			

Analysis of the Cluster Projects' Measures (status 2011-08-25) - Appendix 'M'

Nr.	Name of measure	Originates from project	Organisation responsible	Contact	Short description of content and aim	Costs / Budget	Comments (e.g. linkages to other projects)	Climate change impact addressed
								e.g. flood; drought; heat; heat wave; fire; wind/storm; sea level rise; heavy rainfall; other (describe)
M12	Natural Playground	C-Change	City of Amsterdam (NL)	Truke van Koeverden City of Amsterdam, NL T.van.Koeverden@dro.amsterdam.nl	The natural playground is an investment project. In the final design the themes energy, water and biodiversity are elaborated. The design was developed in a co creation process with children and parents. Story telling on climate change will be added to it. We will use new media for that. Educational material for it has also been developed. To use a playground to educate and engage children with climate change is new for the Netherlands.			climate change in general
M13	Room for the Waal	FloodResilienCity	Rijkswaterstaat, NL; Municipality of Nijmegen, NL	Pim Nijssen TwynstraGuddeManagement Consultants, NL p.nijssen@nijmegen.nl	The River Waal will be given more room by relocating the dike which protects the village of Lent (opposite of Nijmegen) approximately 350 metres land inwards. This will reduce the water level in the entire stretch of the river from Nijmegen to far upstream of the city by 35 cm. The relocation of the dike will be combined with the excavation of a new water channel in the floodplain on the side of Lent. The excavation of the channel will create a peninsula between the River Waal and the channel. The island will be linked to the mainland by two new bridges. A unique riverpark will arise with space for housing, nature and recreation.			flood
M14	Event management plan for waste management service	FloodResilienCity	L' AGGLO Orleans (F)	Marielle Chenessau Communauté d'Agglomération Orléans Val de Loire (l'agglO) MCHENESSEAU@agglo-orleans.fr (contact in french only)	An important issue for muinicipalities is to maintain their services during and after a crises such as a flood event. For AGGLO this concerns the waste management service. This means that plans have to be made so that the system (including location of waste management plants, the service of waste collection) becomes flood prone.			flood
M15	Flood risk management guide for inhabitants of Zollhafen (Mainz)	FloodResilienCity	SW Mainz (DE)	Heinrich Webler hwebler@mainz-online.de	Zollhafen Mainz is one of the largest container ports on the Upper Rhine. The harbor logistics are being moved and expanded on the site of the Industriehafen, directly adjoining the Zollhafen to the North. In the Zollhafen area, the development of a new city quarter with 4,000 future jobs and 2,500 future inhabitants is planned. The project site is situated in the flood plain of the River Rhine where no active flood defence measures are allowed (EU floods directive 2007). in order to raise awareness for the risk of flooding and to communicate certain private flood protection measures the Flood risk management guide for inhabitants as a brochure for the people who will live or work in the new Zollhafen quarter has been prepared. It answers 10 central questions about the flood risk and its management.			flood
M16	Streets as Streams - Roads as Rivers (SaS-RaR)	FloodResilienCity	Dublin City Council (IRE)	Tony Maguire City of Dublin, IRL tony.maguire@dublincity.ie	This measure is about the re-configuration of streets and other topographic features for managing surface waters away from critical areas at ground level. For Dublin City Council this is an important issue as the sewers were never sized to cope with either with extreme rainfall intensities nor intensive modern development. It would be impractical and prohibitively expensive to retrofit additional capacity now. The measure will create flows paths along streets; roads and other features in order to transport a substantial part of peak flows (known as the "exceedance") to less critical areas safely, avoiding the flooding adjoining homes. Suitable areas for SaS-RaR pilot sites are to be identified from a recently developed Dublin Overview Pluvial Flood Map.		Promotors of SaS-RaR also point to the potential for cabon sequestration capabilities of this approach.	flood

Analysis of the Cluster Projects' Measures (status 2011-08-25) - Appendix 'M'

Nr.	Name of measure	Type of measure					Approach		Temporal scope			Focused action field (according to distinction in application form)				Spatial scope										Grade of 'innovation'				Implementation by				State of realisation (status 04-2011)		
																Landscape type addressed							Scale														
		adaptation	mitigation	combined adaptation and mitigation	structural (technical, engineering)	non-structural (juridical, planning, communication)	strategic approach	single measure	short term perspective	medium term perspective	long term perspective	built environment	water environment	natural environment	social environment	urban area / city centre	suburban area	rural area / village	rural area / agriculture	forest	river catchment	coast	building / plot level	quarter / community level	local / municipality level	regional level	supra-regional level	new development of measure	further development of existing measure	adoption from other context	application/implementation of existing measure	public sector	private sector	third sector / NGOs / NPOs	private individuals / households	idea / draft	partly realised	completed
M12	Natural Playground			x	x	x		x							x	x								x					x							x	
M13	Room for the Waal	x			x		x				x	x	x			x					x				x				x							x	
M14	Event management plan for waste management service	x				x		x		x		x	x		x	x	x				x			x	x				x							x	
M15	Flood risk management guide for inhabitants of Zollhafen (Mainz)	x			x	x		x		x		x	x			x					x		x	x					x								x
M16	Streets as Streams - Roads as Rivers (SaS-RaR)			x	x		x		x	x		x	x			x	x						x	x	x			x	x				x			x	

Analysis of the Cluster Projects' Measures (status 2011-08-25) - Appendix 'M'

Nr.	Name of measure	Originates from project	Organisation responsible	Contact	Short description of content and aim	Costs / Budget	Comments (e.g. linkages to other projects)	Climate change impact addressed
								e.g. flood; drought; heat; heat wave; fire; wind/storm; sea level rise; heavy rainfall; other (describe)
M17	Redevelop water front and public space in Orleans	FloodResilien City	L' AGGLO Orleans (F)	Marielle Chenessau Communauté d'Agglomération Orléans Val de Loire (l'agglO) MCHENESSEAU@agglo-orleans.fr	Restoring the waterfront of the Loire in Orleans so that the inhabitants can walk on the riverbanks again. Also an old port will be restored. Public awareness of flood risks will be improved because of this measure.			flood
M18	Upgrading quay walls Leuven	FloodResilien City	Flemish Environment Agency, BE	Annelies Haesevoets Flemish Environment Agency, BE a.haesevoets@vmm.be +32 (0) 2 553 13 91	Upgrading the qay walls to protect the city of Leuven improves the flood protection level of the inner city. The work in itself enhances helps improve awareness as it must be carried out with other organisations and as the preparation for the work is carried out in the old city centre.			flood
M19	Holzbach demonstration site	ForeStClim	Landesforsten RP	Gebhard Schüler Landesforsten Rheinland-Pfalz schueler@forestclim.eu	With respect to landuse management ForeStClim runs certain demonstration sites for analyzing e.g. water retention potential at different scales with short to long term perspective. The demonstration sites are 3 headwater catchments in Rhineland-Palatinate with a total area of approx 1.500 ha (Frankelbach, Schwarzbach, Holzbach). It has its roots in the former INTERREG project WaReLa, in which Landesforsten had implemented water retention measures. The objective is to build a long-term "model area" in which best silvicultural management practices facing climate change can now already be implemented. Main motivation is to have exemplary forest districts where climate change-sensitive forestry is already happening today; cost balances will show possible opportunity costs caused by this management conversion.			drought; fire; wind/storm; heavy rainfall; increase of pests and diseases
M20	Green-blue transformation of Heerener Mühlbach	Future Cities	Lippeverband, DE	Anke Althoff Lippeverband, DE Althoff.Anke@eglv.de	Content: a) Ecological improvement of the water body Heerener Mühlbach (removement of concrete bed and change into natural banks). Length of water body ransformed: 2.14 km; area: 1,47 ha. b) Additional disconnection measures of private properties (roofs and paved area): approx. 80 households which should be disconnected. Aim: Reduce the load of rain water of the combined sewer system and improve the city micro climate within the "Green corridor strategy" in the city of Kamen. The measure is highly appreciated in local and regional politics and accepted by the public but intense communication with inhabitants is necessary to ensure this acceptance	In total 4,3 Mio. €: 3,5 Mio. € construction, 800.000 € planning and soil investigation; costs for disconnection: ca. 10 – 20 € per disconnected qm		heavy rainfall / flood; heat / heat wave
M21	Green walls city center of Nijmegen	Future Cities	Municipality of Nijmegen, NL	Veroniek Bezemer Municipality of Nijmegen, NL v.bezemer@nijmegen.nl"	Green wall systems will be placed on part of a building. Aim of the project is to provide more green in the city centre that will help to insulate the building, to cool the direct surroundings and to clean the air.		Measure is part of a green vision called 'Green Transformation City Centre'	heat / heat wave

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Nr.	Name of measure	Type of measure					Approach		Temporal scope			Focused action field (according to distinction in application form)				Spatial scope										Grade of 'innovation'				Implementation by				State of realisation (status 04-2011)		
																Landscape type addressed							Scale														
		adaptation	mitigation	combined adaptation and mitigation	structural (technical, engineering)	non-structural (juridical, planning, communication)	strategic approach	single measure	short term perspective	medium term perspective	long term perspective	built environment	water environment	natural environment	social environment	urban area / city centre	suburban area	rural area / village	rural area / agriculture	forest	river catchment	coast	building / plot level	quarter / community level	local / municipality level	regional level	supra-regional level	new development of measure	further development of existing measure	adoption from other context	application/implementation of existing measure	public sector	private sector	third sector / NGOs / NPOs	private individuals / households	idea / draft	partly realised	completed
M17	Redevelop water front and public space in Orleans	x			x	x		x		x		x	x			x					x			x							x	x				x	
M18	Upgrading quay walls Leuven	x			x			x	x			x	x			x					x			x							x	x				x	
M19	Holzbach demonstration site			x	x		x				x			x						x						x				x					x	
M20	Green-blue transformation of Heerener Mühlbach	x			x		x		x	x	x	x	x	x		x								x	x				x			x				x	
M21	Green walls city center of Nijmegen			x	x		x		x	x		x			x	x							x							x	x					x	

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Nr.	Name of measure	Originates from project	Organisation responsible	Contact	Short description of content and aim	Costs / Budget	Comments (e.g. linkages to other projects)	Climate change impact addressed
								e.g. flood; drought; heat; heat wave; fire; wind/storm; sea level rise; heavy rainfall; other (describe)
M22	Green Roof De Tweeling	Future Cities	Municipality of Nijmegen, NL	Ton Verhoeven Municipality of Nijmegen, NL t.verhoeven@nijmegen.nl	On this new building (an extension of the existing kindergarten) there is constructed a green roof together with all kind of other sustainable building design aspects (heating and ventilation). With the green roof a part of the storage of rain water is arranged, the rest of the rainwater will flow into the ground (disconnected building). A green roof is also a good insulation layer in times of heat.		Measure is part of a green vision called 'Green Transformation City Centre'	heat / heat wave; heavy rainfall / flood
M23	Green roofs – town hall	Future Cities	Municipality of Nijmegen, NL	Veroniek Bezemer Municipality of Nijmegen, NL v.bezemer@nijmegen.nl"	On part of the roof of city hall a green roof has been installed. This green roof consists of sedum plants in the middle and higher grasses around the edges. The aim of this project is to prevent the roof from extensive heating in summer and to capture rainwater. A green roof also captures fine dust and CO2 from the air.		Measure is part of a green vision called 'Green Transformation City Centre'	heat / heat wave; heavy rainfall / flood
M24	Green courtyards	Future Cities	Municipality of Nijmegen, NL	Veroniek Bezemer Municipality of Nijmegen, NL v.bezemer@nijmegen.nl"	Some courtyards in the city centre of Nijmegen consist mostly of brick and therfore they get very hot in summer. Turning these into green spaces will add both cooler and attractive places to the city centre. The aim of the project is to change hot, parking spaces into cool, green/blue places. Direct impact is less heat in summer in the direct surroundings. Also better storage of rainwater is a direct effect of more green in these courtyards.		Measure is part of a green vision called 'Green Transformation City Centre'	heat / heat wave; heavy rainfall / flood
M25	Green and brown roofs	Future Cities	SEA SPACE (Development Agency), UK	John Williams SEA SPACE, UK	Focused on the building level green and brown roofs in a business/industrial park are promoted and realised. Green roofs add to insulation and attenuate rain water run off. Brown roofs attenuate flows and enhance biodiversity.			heat / heat wave; heavy rainfall / flood
M26	Green roofs – industrial area of Latenstein	Future Cities	Municipality of Tiel, NL	Karin van Dorenmalen Municipality of Tiel, NL kvdorenmalen@tiel.nl	In the industrial area of Latenstein there are many businesses with large flat roofs that are suitable for transformation into green roofs. The green roofs contribute to water retention, energy efficiency, air quality and biodiversity		Measure is part of the integral waterscenario for Tiel East	heat / heat wave; heavy rainfall / flood; drought
M27	Water squares	Future Cities	Municipality of Tiel, NL	Ine van den Hurk Municipality of Tiel, NL ivdhurk@tiel.nl	The use of public space for waterstorage creates new opportunities. Making waterstorage visible creates more social acceptance and raises awareness about the effects of climate change on a local scale. Creating cool areas with water contributes to reducing the urban heat island effect. In the Vogelbuurt, a retention area in the shape of a watersquare is part of the integral waterscenario. The final design of this watersquare is being made (completion 2011). Aim is to achieve the best design for a watersquare in order to optimize the effect on waterstorage in combination with the use as public space and cooling area (urban heat island effect).		Measure is part of the integral waterscenario for Tiel East	heat / heat wave; heavy rainfall / flood

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																Landscape type addressed							Scale														
		adaptation	mitigation	combined adaptation and mitigation	structural (technical, engineering)	non-structural (juridical, planning, communication)	strategic approach	single measure	short term perspective	medium term perspective	long term perspective	built environment	water environment	natural environment	social environment	urban area / city centre	suburban area	rural area / village	rural area / agriculture	forest	river catchment	coast	building / plot level	quarter / community level	local / municipality level	regional level	supra-regional level	new development of measure	further development of existing measure	adoption from other context	application/implementation of existing measure	public sector	private sector	third sector / NGOs / NPOs	private individuals / households	idea / draft	partly realised	completed
M22	Green Roof De Tweeling			x	x			x	x			x				x							x								x	x				?	
M23	Green roofs – town hall			x	x			x	x			x				x							x								x	x				?	
M24	Green courtyards	x			x			x	x			x				x							x	x							x		x		x		?	
M25	Green and brown roofs			x	x		x		x			x				x							x								x		x				?	
M26	Green roofs – industrial area of Latenstein			x	x		x		x			x				x							x	x							x		x			x		
M27	Water squares	x			x		x		x			x	x		x	x							x					x				x				x		

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Nr.	Name of measure	Originates from project	Organisation responsible	Contact	Short description of content and aim	Costs / Budget	Comments (e.g. linkages to other projects)	Climate change impact addressed
								e.g. flood; drought; heat; heat wave; fire; wind/storm; sea level rise; heavy rainfall; other (describe)
M28	Slowed runoff of rainwater	Future Cities	West-Vlaamse Intercommunale, BE	Eveline Huyghe West-Vlaamse Intercommunale, BE e.huyghe@wvi.be	Construction of a rainwater system in the quarter at surface level, which is designed with natural elements (ditches, ponds,etc.). Depending on soil type, groundwater level, amount of pavements, use and other aspects there will be a surplus in rainwater on the scale of the quarter. Besides the surplus of the quarter there is also a surplus in the adjacent quarter. The goal is to keep the surplus as low as possible.	Study to design the rain water system and extra calculation costs for taking climate change into account; construction of wadi's and channels above ground (when taking climate change into account, the needed space becomes bigger, which means a bigger public domain and less domain to sell which is a difficult issue in project development); development cost is supposed to be lower than installing an underground pipe.		heavy rainfall / flood; drought
M29	Re-use of rainwater	Future Cities	West-Vlaamse Intercommunale, BE	Eveline Huyghe West-Vlaamse Intercommunale, BE e.huyghe@wvi.be	Focused at a new development area in Ieper ('De Vloei') this project aims at: 1. Buffering rainwater to prevent flooding during more severe rainwater events (impact on city quarter level and regional level) 2. Buffering rainwater as reserve for periods of drought and 3. Fostering sustainable water use In order to acheive this a catchment for rainwater per house/apartment (individual rainwater tanks) will be installed combined with a compulsory use of this rainwater which goes further than what is described in Flemish legislation (toilets, washing machine, outside faucet, faucet in garage etc.)	Costs for a rain water tank are for the individual builder. It is an obligatory measure for new to built houses in Flanders. Costs are: 1) construction of the tank, 2) seperate plumbing; 3) pump to get the rain water in the plumbing system		heavy rainfall / flood; drought
M30	Reduce water consumption	Future Cities	SEA SPACE (Development Agency), UK	John Williams SEA SPACE, UK	Aim is to lower water consumption through good specification combined with rainwater harvesting. Demonstration site is the nnovation exchange building ENVIRO 21 in Hastings, UK.			drought
M31	Adapted rain water infrastructure	Future Cities	Rouen Seine Aménagement (Development Agency), F	Ida Ricci Rouen Seine Aménagement, FR	The measure consists in the natural management of rain water in a densely urbanised area. The system includes 2 meters large ditches following the pedestrian paths, collecting the rain water from the roofs of private buildings and the paths. These small ditches converge in a large main ditch, called “le mail” of more than 4 000 sq. meters that collect also the water coming from the roads. “Le mail” has storage and regulation functions and is generously planted in order to create a green core for the new district and purify the waters before the release in the river Seine. Aim is also to reduce the temperature during the summer in this new district (direct impact). Possibility to increase the biodiversity thank the combination of vegetation (green structure- indirect impact).			heat / heat wave; heavy rainfall / flood

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		adaptation	mitigation	combined adaptation and mitigation	structural (technical, engineering)	non-structural (juridical, planning, communication)	strategic approach	single measure	short term perspective	medium term perspective	long term perspective	built environment	water environment	natural environment	social environment	urban area / city centre	suburban area	rural area / village	rural area / agriculture	forest	river catchment	coast	building / plot level	quarter / community level	local / municipality level	regional level	supra-regional level	new development of measure	further development of existing measure	adoption from other context	application/implementation of existing measure	public sector	private sector	third sector / NGOs / NPOs	private individuals / households	idea / draft	partly realised	completed
M28	Slowed runoff of rainwater	x			x		x		x	x	x	x	x	x		x								x	x						x	x	x			x		
M29	Re-use of rainwater	x			x		x		x	x	x	x	x			x							x	x						x		x	x		x	x		
M30	Reduce water consumption	x			x		x		x			x				x							x	x						x		x	x			?		
M31	Adapted rain water infrastructure	x			x		x		x			x	x			x								x							x		x				?		

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Nr.	Name of measure	Originates from project	Organisation responsible	Contact	Short description of content and aim	Costs / Budget	Comments (e.g. linkages to other projects)	Climate change impact addressed
								e.g. flood; drought; heat; heat wave; fire; wind/storm; sea level rise; heavy rainfall; other (describe)
M32	Business park Boytal	Future Cities	Municipality of Bottrop; DE	Matthias Stumpe Municipality of Bottrop, DE matthias.stumpe@bottrop.de	Disconnecting rainwater from the sewage channel and bring in into the nearby river "Boye". This will be connected to the ecological transformation of the "Boye", so a new blue-green corridor can be realised in this area.	In total. 425,000 €: Construction costs storm water canal 200,000 €; Storm water discharge into Liesenfeldbach 154,000 €; Construction planning 46,000 €; Soil investigations 25,000 €	Measure is part of the Emscher renewal: http://www.eglv.de/wasserportal/emscher-umbau.html	heat / heat wave; heavy rainfall / flood
M33	Infiltration of rainwater	Future Cities	West-Vlaamse Intercommunale, BE	Eveline Huyghe West – Vlaamse Intercommunale, BE e.huyghe@wvi.be	Aim of this project is to minimize runoff during and after rainwater events. On the building level this shall be achieved by: - allowing/obliging green roofs and green walls - restricting pavements of individual building plots - informing about pavement materials that are water-permeable - Overflow towards the surface water system (wadi), with possibility of infiltration. At city quarter level the following measures will be taken: - restricting pavements in the public area - use of pavement materials that are water-permeable - infiltration of the surplus of rainwater in 'wadi's' (ponds in the public & private domain only holding water during more severe rainwater events) also including the necessary space for the future impacts.	Study to design the rain water system and extra calculation costs for taking climate change into account; construction of green roofs/green walls; use of water-permeable pavements instead of non-permeable pavements; construction of wadi's and channels above ground (when taking climate change into account the needed area becomes bigger which means more space is needed for public domain and cannot be sold what is a difficult issue in project development); development cost is supposed to be lower than installing an underground pipe.		heavy rainfall / flood; drought
M34	Natural Ventilation	Future Cities	SEA SPACE (Development Agency), UK	John Williams SEA SPACE, UK	Aiming at reducing the need for active services the site exposure will be used to promote wind assisted natural ventilation including cowls. Demonstration site is the 'Innovation exchange building ENVIRO 21' in Hastings, UK.			heat / heat wave
M35	Creating new areas for surface water	Future Cities	Municipality of Tiel, NL	Ine van den Hurk Municipality of Tiel, NL ivdhurk@tiel.nl	New areas for surface water are created to reduce the peak flows of heavy rainfall and to store water and to drain off the water slowly out of Tiel East. It also stores extra seepage water due to high river levels.		Measure is part of the integral waterscenario for Tiel East	heavy rainfall / flood; drought
M36	Climate dike	Future Cities	Municipality of Tiel, NL	Ine van den Hurk Municipality of Tiel, NL ivdhurk@tiel.nl	A climate dike is a very wide dike that combines safety aspects, (flooding) and the reduction of waternuisance (seepage water) with multiple use of land. To protect Tiel East from flooding in the far future due to climate change, a strenghtening of the current dike is neccesary. Instead of hightening the dike, Tiel wants to create a dike that is very wide. This not only strenghtens the dike but it also creates possibilities for multiple use of land and it reduces the problems caused by seepage water.		Measure is part of the integral waterscenario for Tiel East	heavy rainfall / flood; storm

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		adaptation	mitigation	combined adaptation and mitigation	structural (technical, engineering)	non-structural (juridical, planning, communication)	strategic approach	single measure	short term perspective	medium term perspective	long term perspective	built environment	water environment	natural environment	social environment	urban area / city centre	suburban area	rural area / village	rural area / agriculture	forest	river catchment	coast	building / plot level	quarter / community level	local / municipality level	regional level	supra-regional level	new development of measure	further development of existing measure	adoption from other context	application/implementation of existing measure	public sector	private sector	third sector / NGOs / NPOs	private individuals / households	idea / draft	partly realised	completed
M32	Business park Boytal	x			x		x		x			x	x	x		x								x					x			x				x		
M33	Infiltration of rainwater	x			x	x	x		x	x	x	x	x	x		x							x	x	x					x	x	x		x	x		
M34	Natural Ventilation			x	x			x	x			x				x							x	x						x		x			?		
M35	Creating new areas for surface water	x			x		x		x			x	x			x								x						x	x	x			x		
M36	Climate dike	x			x		x				x	x	x			x								x	x				x			x	x			x		

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								e.g. flood; drought; heat; heat wave; fire; wind/storm; sea level rise; heavy rainfall; other (describe)
M37	Regge Measures	WAVE	Waterschap Regge en Dinkel, NL	Ben Ordelmans Waterschap Regge en Dinkel, NL +31-546832507 b.ordelmans@wrd.nl	To anticipate climate changes and to related changing security requirements more space for water needs to be arranged in the river basin of the Regge. On two locations along the Regge innovative measures to arrange a natural River are carried out. a) aim of the investment at the location 'Visschebelt' is to restore the original course of the Regge in order to create extra retention area and to reinforce the natural values. Also it contributes to the ecological main structure and to the recreational function as well. b) At the location 'De Groene Mal' an old meander will be restored and a side stream to the Regge will betransformed into a natural by pass for the Regge becoming the futer main stream. Here also new retention capacity along the river will be created.	1,5 million EURO		flood; drought; heavy rainfall
M38	Floodplain and catchment woodland Sommerset	WAVE	Somerset County Council, UK	Steve Dury Somerset County Council, UK SDury@somerset.gov.uk	The aim of the project is to create multifunctional wet to dry woodland, rich in wildlife in the catchment and on the floodplains of the Rivers Tone, Parrett, Yeo, Isle, Cary and their tributaries. As a part of this project, SCC wishes to explore the potential for creating off-site flood attenuation areas in association with new housing/industrial development. One of the purposes of these small woodland will be to provide public access and an education resource to raise public awareness of the role of woodland in adapting to climate change.	0,1 million EURO		flood; heavy rainfall; soil erosion
M39	Guerzenicher Bach	WAVE	Wasserverband Eifel Rur, DE	Dr. Antje Goedeking Wasserverband Eifel-Rur, DE Antje.Goedeking@wver.de	This project deals with the surplus of water locally aiming to solve the problems of flooding in the stream Gürzenicher Bach - a tributary of the river Rur in Germany. The strategy behind it is to enhance the acceptance for the necessity of adaptation measures by a mixture of projects with both abstract interregional and concrete local benefits. For the first time the WVER will add to the local planning an estimation about the safety with respect to climate change. The concrete actions planned are: • climate change aspect added to the planning; • construction activities for river restoration; • communication and awareness raising with regional population.	0,8 million EURO	relates to topic 'creating up and downstream solidarity' in the ALFA project	flood; heavy rainfall
M40	Construction of Large deadwood middle course River Rur	WAVE	Wasserverband Eifel Rur, DE	Dr. Antje Goedeking Wasserverband Eifel-Rur, DE Antje.Goedeking@wver.de	Instead of using CO2-emmitting machines for river restoration works the energy of the surface water itself will be used to restore the river: at the middle course of the Rur it is possible to carry out this innovative way of construction by 'hydro-energy' for the first time. By steering the hydro-energy with the input of large deadwood, the water of the river can create the restoration itself.	10,000 EURO		flood
M41	Emmertochtsloot / Beentjesgraven	WAVE	Waterschap Groot Salland, NL	Wim Bots Waterschap Groot Salland, NL wbots@wgs.nl	The aim of the pilot project is restore the authentic, natural landscape in which urban areas, surrounded by recreational land uses, are harmoniously situated in agricultural regions. Using the vision on the a new urban area and all its functions as a starting point, leads to the restoration of the disrupted water system and the natural connection between the canal system of the Emmertochtsloot and the Vecht. Activities relate to coordinating the process of implementing this pilot and linking it to activities undertaken within the WP for Planning and policy and Awareness.	1 million EURO		flood; drought

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M37	Regge Measures	x			x		x		x	x	x		x	x				x			x					x					x					x	
M38	Floodplain and catchment woodland Sommerset			x	x		x			x	x		x	x					x	x	x				x					x				x			x
M39	Guerzenicher Bach	x			x			x	x	x	x	x	x			x		x			x				x				x		x				x		
M40	Construction of Large deadwood middle course River Rur	x			x			x	x	x	x		x	x							x					x					x						x
M41	Emmertochtsloot / Beentjesgraven	x			x		x		x	x	x		x	x				x			x					x					x				x		

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								e.g. flood; drought; heat; heat wave; fire; wind/storm; sea level rise; heavy rainfall; other (describe)
M42	Dender Basin	WAVE	Flemish Environment Agency, BE	Annelies Haesevoets Flemish Environment Agency, BE a.haesevoets@vmm.be +32 (0) 2 553 13 91	Based on an innovative flood forecasting system for the Dender Basin areas threatened by flooding can be identified and bottlenecks in the discharge capacity can be detected and quantified. In one of these bottlenecks on the river Molenbeek a flooding area will be constructed where excess rainwater can be stored. Aim is to solve the danger of flooding caused by extreme rainfall events (that will become worse in future).	1,1 million EURO		flood; heavy rainfall
M43	Somerset Climate festival	WAVE	Somerset County Council, UK	Steve Dury Somerset County Council, UK SDury@somerset.gov.uk	River Festivals have been historically held in Somerset since 2003 with the first event attracting 2000 people. It is estimated the 2009 event attracted approximately 6-7000 people. It was intended to serve as an event that would bring together the communities of the Bridgwater areas and River Parrett catchment areas. As in past events it was agreed that a family focused fun day would be the best method of attracting a wide audience and greater numbers together with the fact that admission to the Festival would be free of charge. Aim of the festival was: • To educate the public about the impact of climate change and the effects on everyday life. • Raise awareness about flooding • Provide a family fun focused event • Promote awareness of SWMP partners	£17,000		climate change in general; flood
M44	Regge Exihibitions	WAVE	Waterschap Regge en Dinkel, NL	Ben Ordelmans Waterschap Regge en Dinkel, NL +31-546832507 b.ordelmans@wrd.nl	The interactive exhibition is organized in the period of the Waterboard elections. In this way awareness on climate change and the democratic process of election s will support and strengthen eachoter. IN this exhibition the small appealing meassages of the local initiatives (history, nature, relation with villages) can merge with bigger (inter)national maessage of climate change and the importance of water management. It is a powerful instrument to achieve public awareness for the subject.	0,1 million EURO		flood, prevention drought

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Nr.	Name of measure	Type of measure					Approach		Temporal scope			Focused action field (according to distinction in application form)				Spatial scope										Grade of 'innovation'				Implementation by				State of realisation (status 04-2011)		
																Landscape type addressed							Scale														
		adaptation	mitigation	combined adaptation and mitigation	structural (technical, engineering)	non-structural (juridical, planning, communication)	strategic approach	single measure	short term perspective	medium term perspective	long term perspective	built environment	water environment	natural environment	social environment	urban area / city centre	suburban area	rural area / village	rural area / agriculture	forest	river catchment	coast	building / plot level	quarter / community level	local / municipality level	regional level	supra-regional level	new development of measure	further development of existing measure	adoption from other context	application/implementation of existing measure	public sector	private sector	third sector / NGOs / NPOs	private individuals / households	idea / draft	partly realised	completed
M42	Dender Basin	x			x		x		x	x		x	x					x	x		x					x				x	x				x	
M43	Somerset Climate festival			x		x		x	x				x		x			x							x				x				x			x
M44	Regge Exihibitions			x		x	x		x		x	x	x	x	x			x			x				x			x			x					x

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