CLIPC workshop on user requirements 3 Feb 2015

Summary of findings

1. Introduction

In the context of the CLIPC project a user requirement workshop was organised on February 3rd 2015, in Amsterdam, The Netherlands. The workshop was organised for potential users of the CLIPC portal, including climate scientists, impacts researchers and intermediary organisations. Their feedback on preliminary ideas, components and mock-ups is considered essential to maximize the relevance of the CLIPC Portal for users across Europe. This report provides a summary of the users' feedback given during the workshop. The PPT presentations can be found at http://www.clipc.eu/user-requirements-workshop/content=0054_000000. The workshop results will be integrated with other CLIPC activities on user requirements and will be documented in a project deliverable which will be available by the end of February (2015) at http://www.clipc.eu/.

The objectives of the CLIPC user requirements workshop included:

- To test, discuss and receive feedback from potential users on preliminary ideas, components and mock-ups;
- To further specify and prioritise requirements for a data platform and climate impact toolkit;
- To manage expectations;
- To identify needs/opportunities for user consultation in the next 1.5 years.

The participants were divided into three subgroups: climate scientist, impact researchers and intermediary/boundary organisations. Each subgroups discussed ideas and mock-ups as to: 1) data format & access, and finding data[1]; 2) architecture and user interfaces and 3) impact data processing and exploration tools. The tables 1, 2 and 3 shows the results of the subgroup discussions in terms of user requirements and recommendations for the further development of a climate information portal having an asset comparing with existing portals.

2. Subgroup session 1 – Climate data format & access and finding data

Climate scientists	Requirements	- Offer high volume data transfer for climate scientists. - People working in specific sectors should be able to search via the sector to obtain the required data. - Use consistent approach to select input datasets which will be offered on the platform. - Indicate if data quality was assessed and if there is agreement between similar datasets. Some kind of validation behind the data, could be indicated by a colour code. - Important to enable "user feedback". Whatever strategy CLIPC will use to implement "user feedback" it requires quality control
	Added value/ recommendations	- Model projections, reanalysis data and observations should be used together in indicators.

[1] CLIPC will provide climate data including *tier 1 indicators* (climate system - climatological statistics), *tier 2 indicators* (impact of climate change on physical environment) and *tier 3 indicators* (impact of climate change on society).

		- Show a table of available data on the portal, so everyone can directly see the full set of data available and then choose what suits them best individually.
		- Describe data in a text and enable to search texts via keywords.
		- Include in data description potential uses of the data
		- Tag data to enable better finding from different points of access.
		- "Amazon" approach: combine search term with data downloaded in the end, "if you are looking for this you might also be interested in…", save and work with click, search and download history.
		- Combine well-structured access through topics/sectors and direct access through search.
		- Enable user feedback provide e.g. inform users on the use of similar indicators in other contexts or by other authors. Whatever strategy CLIPC will use to implement "user feedback" it would require some quality control
		- Bias correction both in user comments/valuation and in data as such.
		- Implement an identifier which can be followed back to user.
		- Added value of the CLIPC portal:
		  o Actual download offered
		  o Links/tools to download
		  o No movement or duplication of data
		  o Building some interlinking
		  o Transform and republish

	Additional remarks	- How to deal with indicators which are relevant in different sectors, overlapping? Tagging on various points, or make reference in annotations. - Answers to questions/comments of users should mainly come from CLIPC, contact of data providers only for very specific questions. - Be aware of updates, in case of links, make sure they are updated.
	Future actions/ involvement of users	- Workshops, forum, target users, literature Review (as a starter to get into specific topics), used vocabulary.
Impact researchers	Requirements	- Selection of output format - Need for reduced ensembles/ information - Tool for combining NetCDF files for generating long time series - Biased and non-biased data
	Added value/ recommendations	- A requirement is to have both biased and non-biased data. An added value would be the providing guidance on the use of bias vs non-biased data and the implications for particular uses. - Include performance aspects; everything included in IPCC is acceptable as a model. - Link the data to ESGF, in there are often broken up datasets. An added value would be to flexibly put together various data sets/steps (time and space). - Ask in a user consultation: provide list of indicators and find the gaps, what is missing in each users' perspective. - Data quality vs uncertainty, there is a need for clear terminology, definition and ethics.
	Remarks	- No general solution on bias correction, work together with different projects and approaches, data provided has to be chosen.
Intermediary organisations /boundary workers	Requirements	- It would be good to have an indicator spanning from observational data through seasonal to long-term projections. - Standardized data sets are needed; time consuming if data first has to be sorted by each variable.
	Added value/ recommendations	- Guidance, people really need it. - Being able to combine different sources of data. - We should make everything possible to make climate information accessible to everyone. - Give courses on how to process data.

		- Ensure traceability and very clear meta-data to describe changes which have been made to the data beforehand. - Maturity process indicator to show if data has already been valued. - Invest more in guidance, well-documented data and information and offer a more basic set to work with individually instead of correcting and changing too much. - Rather learn what people need than what tool they expect to use. - Provide some demonstrators for several topics. - Produce a matrix of indicators, data and target, to have a direct overview. - Storylines are nice, but why start with existing indicators, this is more a justification of why indicators are used, and rather start from what is needed to what indicator is suitable and then what is existing and what can be developed. - When presenting metadata also try to indicate the consequences of the methods/assumptions/etc. for the use or interpretation of the data/indicators.
	Remarks	- The assumption that intermediary people are only working with indicators is wrong, they also make use of datasets. - Clarify the term 'indicator' – some of the indicators presented would be better described as factors, parameters, indices etc. impact indicators are very specific and underpinned by robust criteria/protocols. - The term impact indicator can lead to confusion; vulnerability assessment is going to be more important than impact assessment for adaptation management. - Some people don't want to deal with bias correction or calendar issues. - CHARM can help link automatically attaching meta-data information to data.
	Future actions/involvement of users	- Present cases, best practices, papers on the use of datasets by the research community.

3. Subgroup session 2 – Architecture and user interfaces

Climate scientists (focus: Data discovery service, vocabulary service)	Requirements	- Select time frequency, e.g. daily, monthly, sub-daily.
	Added value/ recommendations	- Let the system choose your timeframe for you if it doesn't fit into the searched data. - Fill in two dates and show all datasets with the results, so not a timeframe, but two separate dates. - An added value can be that you can process the data to the format you want in your basket. - If you can cut down the data volume that would be great added value. - Text on the website should be short with keywords highlighted.
	Remarks	- You want to disregard the data that only has a part of the timeframe, you want to get a datasets that have your whole timeframe in there. - Wording can be difficult, take time for this.
	Future actions/ involvement of users	- Parameter vocabularies for different datasets. - Post-processing → user notification email.
Impact researchers (focus: Data set catalogue, MyCLIPC processing services, knowledge base)	Requirements	- Very often you want long time series with the best historical time series, if they are available for global datasets, you would like to go there. Might be interesting to consider if the global/ European datasets can be complementary. - Crucial to make a search difference available between observations and projections. - Check in the visualization tool to see what the data look like that you can download (not necessary to have to download it) and then download the data into your own models and you can compare it to the CLIPC visualisation.

	Added value/ recommendations	- From a user point of view it is a limitation if only European data is available. Added value of CLIPC is processing indicators that are relevant for Europe. - One sentence for every dataset, not a paragraph. Otherwise people won't read it. Keep descriptions of data short! - Why there is a separation between dataset catalogue and the raw data search: can we hide that from the user? You shouldn't have to worry about the different datasets. - It would be a big added value to be able to combine datasets that you can download in smaller pieces (time steps) to make a bigger dataset. - Good to filter on the data you can actually compare and process, and not show the data that you cannot compare. - Add simple search box on the homepage where you can quickly find data. - It would be very useful to have the possibility to choose a region in your downloaded data set. - Issue to consider is to ensure transparency, clear description of the procedures that are followed during processing of data. - User to user interaction should be provided into the tool. It is a very powerful way of building up the usage of the tool. Like a forum or message board which needs to be moderated. - Some sort of different levels showing simplified data versions that can be expanded to show more details. - Add "Google features" --> search function on the home page and give related data/indicators in search queries. - Room to implement functionalities/guidance to increase the added value for impact researchers.
	Remarks	- Wording should be clear, so that user groups will know where to go on the website. - Important to get feedback from the user, did your query work? - Would like real guidance, like, I want to do this and how do I do it? Give advice (climate date guide). Also a top down advice: you can use this data for that purpose. - Need to limit the need to go to external sites to complete task. - Searching/processing seems to start from input side, I'd rather like to start from output/end product side. Somehow from "needs" rather than from "availability".
Intermediary organisations /boundary workers (focus: Climate impact indication viewing services and toolbox)	Requirements	
	Added value/ recommendations	- Do not use the word "education": but guidance and use cases. Education gives teaching associations and suggests only students. Climate AND impact indicators. And not "raw data", but Access to data sources/sets. - Do not try to put people into experts or non-experts, because people don't see themselves as non-experts. - For some indicators time series are more important than spatial maps. Especially for observations. - If you want to assess trends it is difficult to use maps, it is more useful to have maps or graphs for comparison. - Pop-up windows with guidance would be great in the maps. - Be very explicit on methods. To know where the data that is being shown comes from. Very important to give the background /traceability information on all components/ functions (e.g. about how the scenarios have been constructed). - Would be nice to be able to tweak the data with a slider and see the influence of your actions on the data. - Suggestion of a storyline that takes you through the data which you can click on to go to that toolbox and play with that. - Make the uncertainties clear for correct interpretation of results.
	Remarks	- Sometimes better to use the wording instead of the tier 1,2,3 indicators. - Viewer only as a first step. It is more of a teaser for societal end-users. - You don't show the internal variability/uncertainty within the data of the maps. The information that is shown on a map should be the most robust.

4. Subgroup session 3 – Impact data processing and exploration tools

Climate scientists	Requirements	- Indicator aggregation tool: there is a need for both guided and free mode. - Needs for probability functions. - Click on a region and get the underlying data.
	Added value/ Recommendations	- Provide standardised/most useful spatial units for a particular dataset. A recommendation of an appropriate standard. But still allow users to choose something different. - Guide/warn user in regard to their choice. - Frame the terminology on hazard, exposure, sensitivity, vulnerability as in IPCC AR5 WGII. - Please don't use IIASA scenarios issues scale and reality scientific problems. - To be able to upload one's own date would be good.
	Remarks	- Free selection: run the risk of many "wrong" feedbacks. - Aggregation tool: you need maps to show uncertainties like 2 maps: worst case, best case. It is asked by impact researchers and stakeholders and we, as scientists must relay the info.
Impact researchers	Requirements	- A need for standardization, for example, CLIPC could propose standards for mapping, for colouring, etc. - Nuts areas and river basins and free polygon data selection would be necessary (and not "or"). - A need for a good documentation of combination methodology. And no black box calculations!
	Added value/recommendations	- Some would appreciate "on-the-fly" tools (e.g. for screening) but for specialised purposes use their own tools. - Use "potential impacts" rather than "impacts"! - Provide narrative to guide the interpretation of unexperienced users. - Interactions and feedbacks between users would be appreciated: to be able to use that kind of tools, be able to share quality results/maps created by users (perhaps for quality check), to build a community of users; to be able to share scripts. Need for user registration to allow interactions among users. - It could be more interesting to have a functionality to introduce your own national scenarios. - Make a link to other research projects using scenarios. - The use of "probability" is better than "uncertainty". - Indicators for policy-makers need a narrative to guide interpretation. - Introduce a "help tool" to provide advice on how to do certain activities/analysis. - Visual vs written explanation: both! But you should consider the latter complementary to maps. - CLIPC can and should be used by impact researchers to set up processes that allow end users to go there and get on-the-fly info they need.
	Remarks	- Hydrologists have no use of corrective bias- corrected data as. Only raw data. - It is useful and important to prevent users to make non consistent combinations. - Integrated scenario tools on some aspects too sensitive. - Specific tailor-made design for mobile platforms, e.g. tablets, smartphones? Would be good for future relevance. - In the information box could you include the original intention/use of dataset? This hopefully helps determining appropriate use. - Individual national scenarios do not sound useful. IIASA's SSPs developed globally and does not have the granularity.

		- Scatter-plot to show where in the uncertainty range a selected climate scenario is located as a simple visual device that could be shown next to a map of an impact map. - Socio-economic scenarios that give more details than the IIASA database for the SSPs from other projects, e.g. IMPRESSIONS. - Uncertainties visualization in addition to textual explanation e.g. dashboard Hasse, min and maxi and average next to each other. - Scenario tool provides access to as many available scenarios as possible and incorporate new ones as they become available. - Important to make sense of combination between indicators. Dimensionless must be clearly explained. - Color ramps should have pre-defined standardized suggestions but also possible to be user customizable.
Intermediary organisations /boundary workers	Requirements	- There is a need to go further than guided mode: a need to offer key issues/indicators from policy point of view. - A recurrent need to send "warning messages". - The portal should offer the possibility for users to define for example thresholds. - The portal should explain methods behind scenarios. - Guidance on interpretation of data.

	Added value/recommendations	- The interface presented ("Indices processing") seems not meet the expectations of the participants: this kind of presentation seems not to be useful, a wizard style would be more useful.
		- The portal could offer a warning / a guidance for users:
		  o guidance for resolution of the dataset, on use and interpretation of the data, within the interface for retrieve and select datasets, etc.;
		  o guidance what the selection is for;
		  o guidance/elements for justifications (e.g. how explain that model A is better than model B).
		- A guided mode for CLIPC is important. Two types of mode: a "ready-made" mode for less experienced / a "sandbox mode" for more experienced.
		- It could be good to suggest "sensible" combinations.
		- A need to clarify the terminology (e.g. "indicators").
		- Imagine three fictional characters to help to design the portal. Then offer the appropriate mode.
		- Three modes could be offered: a "scientifically robust", a guided mode (more free mode but presenting reasonable combinations) and a more experienced mode (CLIPC does not take the responsibility of what you create here, but this mode offers the possibility to test combinations to see if there is a new correlation, to permit exploration).
		- Vulnerability indicators: more useful in development of adaptation options than just impact indicators (which do not consider adaptive capacities).
		- Scenario tools: this should be an optional function (many adaptation strategies will not use it).
		- Also deal with uncertainty associated to socio-economic datasets in which impact indicators are based.
		- Provide guidance to avoid irrelevant combinations of indicators.
		- Refer to a common set of indicators referring to the EC strategy on CC adaptation.
		- Polishing the vocabulary, do not use many acronyms, use full indices, model names parameters names.
		- Add uncertainty in bias correction please.
		- Overview of available datasets that could be used for processing.
		- Guidance on advantages/possibilities and disadvantages of various datasets.

	Remarks	- The portal cannot be designed for everyone. Three groups of users are identified but maybe it is already too much! Maybe two modes: sandbox mode and guided mode. - Trust in the data is important, both guided and sandbox mode need info about uncertainties, from where do the datasets come from, etc. (Meta-data).

		- To define the set of indicators to be integrated in CLIPC, I think it is important to see which indicators are being used in policies. Select them and after survey their evolution based on future climatic and other projections. - Language/terminology is a key point. - The V - C - IAV can be dangerous if you take a fake value the change in exposure and adaptive capacity have no statistical significance. - Integrated scenario tool: what about national climate change scenario? Or for socio-economic and land use scenarios? Often important for policy makers at sub-national levels. - Indicator aggregation tool: Assumes more or less linear relation between indicators and sensitivity. Warning that this may regularly give a wrong impression. - Guiding the user choice: CHARME tools could help here, perhaps search on commentary types? E.g. availability of journal articles, quality assessments, etc. Particularly previous use of that data.

5. Concluding discussion

Summary session 1 Data format and access; finding the data

The three user categories recommended that there should be a better description of common terms that have different meanings in the different groups, such as for example, indicator, raw data, etc. Especially the intermediary organisations mentioned that the use of the term 'indicator' is confusing. Guidance, description and explanation were mentioned as being important for all users. Both on the data and on the impact indicators.

There were conflicting opinions between and within user groups on bias correction. Some opted to have bias corrected data already available, some opted for being able to do the bias correction themselves if needed. Agreement in the discussion can be found in providing guidance on what bias correction can be useful for and if it makes sense to do so. This was mainly suggested by impact researchers.

A recommendation given by the climate scientists and intermediary organisations is that it would be good to try and find out what users intend to do with the data and try to fit that purpose when providing them with information. By all users it is clear that guidance should be provided early on. A feedback system of users on data is also mentioned by climate scientists: how was the data used and how is the data valuated?

Summary session 2 CLIPC architecture and user interface

Climate scientists and impact researchers currently already know the way to finding data. The added value of CLIPC is in the availability of processing tools. All user categories are happy with the drilldown 'and-and' search function that is already implemented in the mockups of CLIPC. Although impact researchers do want to be able to distinct between observational and projected data and climate scientists would like to be able to select time frames in the data search.

The impact researchers mentioned that the data coverage should not only include global models, but also regional models (EU projects). The user-user interaction was seen as a real added value and guidance is very much appreciated.

Displaying information on maps was mostly discussed with the intermediary organizations. The maps where viewed as illustrative, but there is also a need for trends which are more easily presented in graphs. There was clear concern for uncertainties in visualizations which needs to be dealt with.

Recommendations for the future development are that the user interface for the indicator toolbox needs more involvement of end users. The search functionality for data should be checked with users and common terminology or glossary should be added to avoid different interpretations of terms.

Summary session 3 Impact data processing and exploration tools

A common finding among user groups was the keyword 'guidance': guidance on processing and guidance on what you are doing, including guidance for the less-experienced or end user. Standardizing is a preferred process to allow easy sharing with other projects.

There was some discussion between the balance between restricted use versus full freedom in use. Giving users limited freedom to work with indicators and tools can often lead to poor outcomes. For example, users need to know what combinations make sense.

Intermediary organisation recommended setting up personas for each user type to help with the portal design. The possibility to interact between users was mentioned by two user groups (impact researchers and intermediary organisations) as a real added value for CLIPC.

What can be an added value of CLIPC?

Provide interaction between different datasets and allow the use of the impact indicators in the visualisation. Bring in data through to the indicator toolbox and provide a sequence of steps leading a user through the whole process from data to indicator. Inclusion of socio-economic data would be an added value. Instead of calling it a CLIPC portal, it could rather be a platform. To avoid confusion of CLIPC being a new portal instead of a source of new data and data already available.

CLIPC can set the standard in comparison with other portals and provide information on how such a portal can work. It is important to moderate what users do, so that things don't go astray. Give good guidance to the different needs of the different users. The user to user interaction could be a real asset and is not used in other portals.

Wider user involvement/community

Users can get more involved in CLIPC through a LinkedIn page. By building a group and constantly feed in progress and news items keeps users involved and interested. On the downside, to feed in information via LinkedIn is ok, but it is sometimes better to use email if you want to make sure that users read important messages.

To allow a wider user involvement it is recommended to use other workshops where CLIPC can be presented or to have a session on CLIPC. This is also something IS-ENES has good experience with. It is also opted to participate in already set large scale events, e.g. COP, at least to inform people about the process of CLIPC and raise awareness. To involve users from different sectors it is recommended to search for sector specific events and try to present the work of CLIPC there. EUPORIAS has experience with using this method. EUPORIAS also has their report out on 80 interviews which can be partly used to learn from for CLIPC. A comparison to other Copernicus attached services in their prophase can also be made. They also need to have user involvement. Generally the problem of lacking user involvement was experienced with earlier projects.

Currently the regional distribution of participants in CLIPC is very unequal. In spite of the request to many potential users in East and South European countries, there is still limited participation from these parts of Europe. To resolve this, the participants in the workshop could be sent a list of sectors and countries CLIPC still wants to involve and the participant can provide names of people.

Future user interactions

A schedule for user interactions for the coming months has been discussed. In between the user requirement workshop (3 Feb 2014) and the final face to face workshop at the end of the project (Nov, 2016), regular feedback sessions will be planned (see Figure 1). These sessions will include focussed online questionnaires, web conferences, telephone calls and discussions during conferences organized by others.

April 2015: feedback will be asked on portal version 0.1 in which progress has been made on the MyCLIPC processing service, data set catalogue and the viewing services.

October 2015: feedback will be asked on portal version 0.2 in which progress has been made on user authentication, data discovery, annotation and the glossary. In addition an upgraded version of the viewing service will be ready.

January 2016: Portal version 1 including all components will be ready for user feedback.

May 2016: Feedback will be asked on portal version 1.1 in which the different components are further developed.

September 2016: A pre-prototype of the CLIPC portal will be shared amongst users for receiving feedback.

November 2016: Second face to face workshop during which user will evaluate the usefulness of the CLIPC climate information portal

In between the releases of different portal versions, user will be approached on a more ad hoc basis to discuss specifics issues.

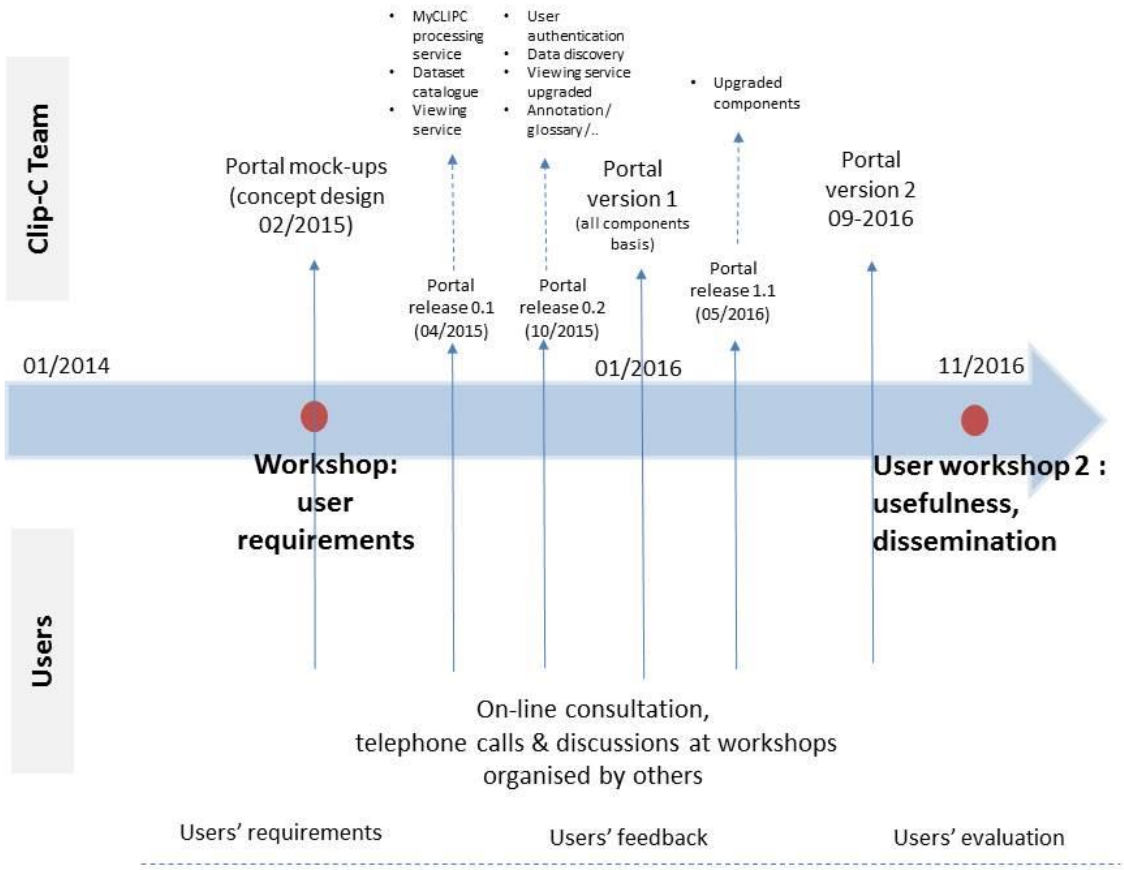

***Figure 1**: Schedule for future user interaction*

List of participants of CLIPC user requirements workshop

	Subgroup: Climate scientist (yellow) led by María Mañez			
	Name	**Organisation**	**Country**	**e-mail address**
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	Subgroup: Impact researchers (red) led by Rob Swart			
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	Subgroup: Intermediary organisations - societal end users (green) led by Ghislain Dubois			
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