

North Port, Port Autonome de Strasbourg. Containers on the quay, a key innovation in inland waterway logistics

Clim'Ability™

Rhin Supérieur - Oberrhein

www.clim-ability.eu



Die Murg, Murgtal – a river that connects...

Booklet 1.

The three phases of Clim'Ability



Textiles, an industry that has seen every colour! Let's take a leaf out of its book: lessons in adaptation...



KICK'OFF, SEPTEMBER 2016. *Adaptation pathways in perspective. During a World Café session on the consequences of climate disruption.*



KICK'OFF, SEPTEMBER 2016. *A multi-generational assembly at the CCIAE, place Gutenberg, Strasbourg*

BOOKLET 1.

Project after project, a commitment to a socially and climate-resilient economy across the Upper Rhine region.

Florence Rudolf,
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Research Director for the three projects:
Clim'Ability, Clim'Ability design, Clim'Ability Care.

In the long history of climate change, 2010 will be remembered for a major campaign by climate sceptics, launched in response to Al Gore's film An Inconvenient Truth, among other things. It was on this occasion that I first met the climatologists at IPSL during an event we had organised at the Alsace Inter-University House for the Social Sciences and Humanities (MISHA). At the time, I was a Senior Lecturer and had already gained experience in the field of climate change, though this was mainly in relation to households and urban planning. Following that event, I was contacted by Pascale Braconnot to contribute to the ANR[1] SECIF *(Climate Services for French Industry)* project, for which she was the lead researcher. Following this action research, I went on to undertake an Interreg project with the support of the organisations and companies present at the presentation I had organised in Alsace in 2014. It took a year to set up the Clim'Ability project before it was approved and launched in 2016. At the time, we did not suspect that this achievement marked the beginning of a success story.

1. Clim'Ability (2016-2019)

Although it built on the ANR SECIF project, which had provided an opportunity to meet SMEs and SMIs in the Upper Rhine, the first project – Clim'Ability – first had to create a shared culture within the consortium before pursuing its work of raising companies' awareness of climate change. This exploration is inseparable from an investment in researching methods and tools suited to companies. Clim'Ability carried out this exploration using existing survey approaches, notably the qualitative interviews typical of the social sciences, though not exclusively.

1. The ANR, or Agence Nationale de la Recherche (French National Research Agency), refers to calls for projects built around national research and innovation priorities. The Clim'Ability projects were built following an initial experience within the SECIF project (Climate Services for French Industry), led by climate scientists from the IPSL *(Institut Pierre-Simon Laplace)*.

Along the way, the consortium will draw on new ideas, which it will put to the test with varying degrees of diligence and enthusiasm depending on the circumstances. This exploration gives the Clim'Ability projects a strong methodological dimension, resulting in the delivery of a particularly comprehensive toolkit. (www.clim-ability.eu).

Although it was decided from the outset to conduct a broad-based study covering all sectors of activity represented across the region, the decision to use qualitative interviews sparked considerable debate at the start of the project. The main concerns raised regarding the widespread use of semi-structured interviews centred on the availability of businesses. The recurring arguments that the interviews would be 'too intrusive' or 'too time-consuming' nearly jeopardised the research approach. Fortunately, the use of counterexamples that had proved successful[1] and validated the relevance of the interview-based survey eventually convinced the consortium.

Having overcome this initial hurdle, we then had to get down to the practical work of conducting interviews and visiting companies, having first standardised our approaches and research methods (June 2016). This effort took some time, to which must be added the time spent recruiting companies, conducting and transcribing the interviews, not to mention analysing them and designing teaching materials for follow-up on the interviews (June 2017).

An initial sample, comprising around twenty companies, was the subject of intensive, cross-disciplinary discussions that helped to build a shared culture. This process engaged a large part of the consortium for at least a year, involving numerous meetings and discussions. This work resulted in the production of three main tutorials covering the conduct of interviews, the creation of a 'Checklist'[2] and a proposal for standardised feedback to companies, following which suggestions for adaptation pathways could be offered to them. In terms of the process of developing the survey framework, the approach has been more iterative than one of co-construction between the research team and the companies, as the latter did not contribute to the design of the materials. They contributed indirectly through their participation in the interviews.

This investigation, based on a small sample of businesses, has proved particularly valuable in terms of reflecting on the relationship between different forms of awareness of climate-related hazards, the associated vulnerabilities and types of risk, on the one hand, and the adoption of adaptation strategies, on the other. Consequently, looking back, it is necessary to review the entire process, including the stages that led to the production of the various summary documents. These documents continue to hold great potential for empowering businesses, even in retrospect, some ten years after this work was carried out.

Once these tutorials had been developed and finalised, the consortium turned its attention, from June 2017 onwards, to sectors particularly vulnerable to the effects of climate change in the Upper Rhine region. This approach was set out in the project roadmap, which provided for **the gradual integration of value chains**[3] and the forms of interdependence faced by businesses into the design of adaptation and resilience strategies. Identifying the sectors most affected by the effects of climate change enabled the consortium to differentiate its approach according to the specific priorities of the teams and regional challenges as well.



Interview at EBM (Elektra Birseck Münchenstein), Canton of Basel-Landschaft. Through its overall network, EBM supplies electricity to 60 municipalities in north-western Switzerland, the 11 municipalities of SIDEL and the town of Saint-Louis.



May 2022 – Bruche Valley (67).



Adaptation of forest massifs, presented by Julie Gobert during the seminar on climate change adaptation through socio-ecosystems. Villeurbanne, 2018.

[2] The comparison with a medical consultation or with calling on a coach.

[3] A value chain is the set of stages and activities a company carries out to design, produce, market, deliver or support its product *(source: Wikipedia).*

BOOKLET 1. Clim'Ability (2016-2019)

Differentiation of survey sectors

Following this work of mutual acculturation to survey methods and their analysis, the consortium divided up regional areas of focus. This organisation was intended to improve efficiency and cross-cutting work, particularly at cross-border level.

• The Forestry and Timber Sector (2017-2018)

This is how INSA Strasbourg joined forces with Professor Froer's team at the University of Landau to explore the vulnerabilities of the forestry and timber sector to climate change. This decision provided an opportunity to consider pathways for adaptation on a collective scale – that of an entire sector. This focus was driven by the renewal of the charter for the Northern Vosges Regional Natural Park, which proved very receptive to the Clim'Ability approach. Its support enabled the project to become part of an effective regional initiative.

This survey, which set out to examine vulnerabilities by focusing on the weak links in the forestry and timber sector and the options available to overcome these bottlenecks, was to be supplemented by a study covering the Pfälzerwald region, led by the University of Landau, in order to provide points of comparison between Germany and France. This challenge was met with varying degrees of success in terms of engaging stakeholders and regions, but multi-authored scientific articles were nevertheless published[4].

• The textile sector (2018-2019)

Another aspect of the research, carried out under the leadership of INSA Strasbourg, focused on the textile industry due to its resilience following its collapse in the 1960s. Indeed, the textile industry stood out for its ability to bounce back in the 2000s. The interviews conducted bear witness to this fascinating trajectory. Despite the significant loss of heritage during the dark years of the sector's collapse, the opening of the Textile Museum in Mulhouse helped to preserve certain aspects of this heritage... The sector has restructured itself around the development of new materials for industrial use, as well as bio-based materials and fibres that require less water and inputs (nettles, hemp, etc.). It is organised into a dynamic 'federation' and benefits from academic and professional support at the University of Haute-Alsace (UHA). It is heavily involved in industrial events such as 'The Industry of the Future' in Mulhouse.

• The energy sector (2017-2019)

Another strand, driven by the commitment of Cédric Duchêne-Lacroix *(University of Basel)* and Didier Kahn *(INSA Strasbourg)* to a PhD thesis, explored energy producers and suppliers. This exploration was intended to "measure" the impact of European policies on the sector's ability to gain autonomy and to support the climate transition at municipal and regional level. The interest of this strand also stemmed from the difference in political culture on energy between Germany and France. Russia's invasion of Ukraine would abruptly and radically change the situation and narrow the gap between the two countries.

Alongside these options, other fields were also the subject of in-depth surveys, including the agri-food sectors *(2017-2019)* and brewers in particular. Gaël Bohnert's PhD thesis on farmers' transition trajectories *(UHA, 21 May 2026)* bears witness to this broadening.

One common thread across all the sectors is the use of surveys to explore alternative models to the dominant economy *(carbon-based, globalised and growth-oriented, with no regard for the finite nature of resources and the planet, etc.)*. These investigations highlight the value of relocation, whether through reindustrialisation or through short and circular supply chains.

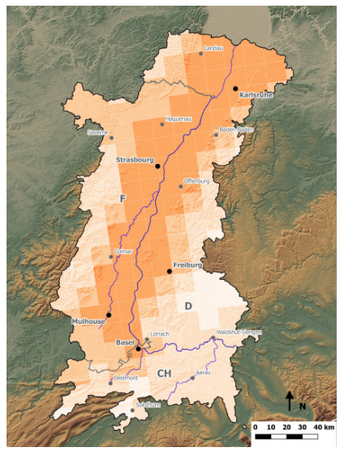
The hypotheses, scientifically grounded in the work of Anthony Giddens and in territorial metabolism, strongly influenced the adoption of our current territorial framework. This framework became all the more compelling as interest in the territorial scale was already on the agenda of the first project, as shown by the commitment of the consortium's geographers, meteorologists and climate scientists to a long process of harmonising climate data for the Upper Rhine region.

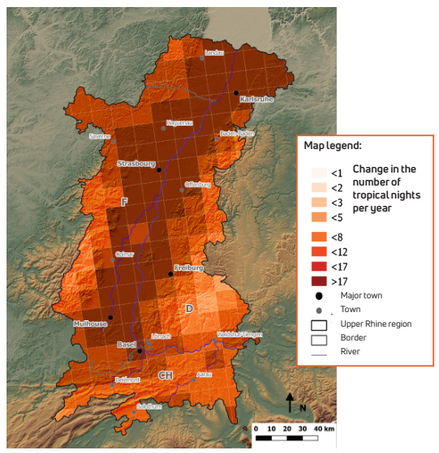
[4] Paul Averbeck, Florence Rudolf, Julie Gobert, «Natürlich natürlich ?! Wie natürlich sollten die Wälder der Biosphäre Reservat Pfälzerwald-Vosges du Nord in Zeiten des Klimawandels sein», in Aurélie Choné and Philippe Hamman (eds.), Humanités environnementales en France et en Allemagne : Circulations et renouvellement des savoirs sur la forêt, le jardin et le végétal / Environmental Humanities in Frankreich und Deutschland: Wälder, Gärten, Pflanzen: Wissenstransfer und Wissenserneuerung, Peter Lang, Series: Studien zu Literatur, Kultur und Umwelt / Studies in Literature, Culture, and the Environment, edited by Gabriele Dürbeck, Hannes Bergthaller, Robert S. Emmett, Serenella Iovino and Ulrike, Bern, Berlin, Frankfurt am Main, Oxford, New York, 2021

Harmonisation and provision of climate data

In addition to all these interview-based approaches with companies, aimed at identifying types of sensitivity and vulnerability according to the most relevant climate risks across the Upper Rhine, the qualified members of the consortium – mainly meteorologists and climate scientists – worked on harmonising climate data between Germany, France and Switzerland.

This pengthy harmonisation process has resulted in an interactive map that evolved into a sophisticated tool: **the Climate Inspector**. This tool allows users to visualise changing climate trends across the Upper Rhine region based on IPCC scenarios and to propose adaptation measures suited to the various associated risks *(heatwaves, drought, flooding, etc.)*.





Example of interactive maps. Maps presented in the "heatwaves" fact sheet published as part of Clim'Ability. See the thematic fact sheets available on the Clim'Ability website under: Publications & Editions.



Launch of Clim'Ability Design, Landau.



Klima Kommunikation Kongress,
September 2019, Karlsruhe.



From design to exploration of the Landing Game...
Finally in person at the Jardin des Sciences, University of Strasbourg.



The Landing Game in the spotlight at the Critical Zones exhibition, ZKM
Business Days, ZKM.

2. Clim'Ability Design (2020 - 2023)

The second project, Clim'Ability Design, reflects in its title a desire for greater integration of planning sciences, including architecture. The name also referred to Harald Welzer's essay Transformationsdesign, which had just been published. This essay argues in favour of project-based transition processes rather than strategies relying on shock tactics.

The "Design" approach, extended to business parks, offers several advantages: it brought Professor Daniel Fetzner's team from Hochschule Offenburg into the consortium. This expansion enriched the project with new forms of expression and made it possible to work on the link between science and art. As for grounding the project in business and industrial parks, it helped connect urbanisation and planning policies with economic resilience.

Business parks make up entire swathes of neglected metropolitan urban space, even though they have been caught up by urban sprawl and are used by thousands of workers who go there day and night. This situation is even more pronounced when, like the Port Autonome de Strasbourg, they also host residential activity.

From the launch of Clim'Ability Design, the project worked closely with the ZKM team on the design of the Critical Zones exhibition, led by Bruno Latour and Peter Weibel. The programme included several week-long seminars with artists from around the world, after which the exhibition format was to be refined before the opening. Daniel Fetzner and I took an active part in these seminars.

Unfortunately, the Covid-19 crisis reared its head just as the exhibition was being set up! As a result, we had to rush to organise a virtual opening. The online launch, featuring contributions from all over the world, was an incredible moment. We spent the whole night listening to one another and discussing. This opening was unprecedented in the history of the ZKM, with Bruno Latour and Peter Zeibel online together... shortly before they both passed away within a year of one another.

Initially, the Clim'Ability Design project (2019-2023, Interreg V) aimed to highlight the capacity of industrial sites to pursue ambitions that were not solely utilitarian, economic and commercial, but also ergonomic, recreational and ecological. This intention was thwarted by the outbreak of the Covid-19 pandemic.

Just as the project was hitting its stride, lockdown and the closure of the border between France and Germany put an end to the planned visits to business parks. The consortium, which had become accustomed to meeting regularly during the first project to work on adapting the business surveys and harmonising the analyses of these surveys, also had to quickly reorganise itself around remote meetings.

These greatly benefited the design of the Landing Game, a cooperative game paying tribute to Bruno Latour's essay Down to Earth ("Où atterrir"). Our commitment to this game was not arbitrary; it grew out of the experience we had just had designing the Critical Zones exhibition. The seminars had made it possible to explore new methodologies inspired by Bruno Latour's symmetrical anthropology. We were very excited about capturing these lessons in a playful format that could support a new awareness of climate issues and help build skills in climate transition. So we worked on it steadily and regularly, with the Jardin des Sciences as the main lead, and INSA Strasbourg, Météo-France and Lionel Charles of Fractal-Paris as the main contributors.

We had to urgently rethink the scope of the project by investigating how companies were adapting to an unprecedented crisis, which the pandemic gave us the opportunity to study. How were SMEs and SMIs coping with a situation of unprecedented scale? Without presuming any causal links between the health crisis and climate change, there was scope to project, from this experience, what a climate crisis could mean in terms of disruption for a territory. This situation made it possible to explore the forms of resilience of certain companies. Among the business parks likely to be suitable for this survey, the Samins (Société d'Aménagement du Marché d'Intérêt National) offered this potential. We therefore conducted online interviews with the food operators of the Marché Gare ahead of an investment on their work site.

Our involvement at this site is very comprehensive, having developed over time. In spring 2019, we had already begun a diagnostic study as part of an internship agreement between ADEUS and SAMINS[5]. Following this internship, the approval of the Clim'Ability Design project raised hopes for in-depth support work with regulatory authorities and operators. The onset of the crisis significantly slowed down this prospect. We replaced it with discussions focused on managing a crisis of unprecedented scale. As soon as things returned to normal, we re-engaged with these economic activity areas by installing sensors to continuously measure temperature, humidity and the albedo index at various points across the site. This data collection over two summers enabled us to provide a detailed debrief to the site management at the end of the project.

[5] Die SAMINS – Société d'Aménagement du Marché d'Intérêt National de Strasbourg – was founded in 1959 with the mission of building, developing and managing the MIN (property and outdoor spaces) and responding to local public policy issues. Through its role in supporting food supply and trade across the entire region, its influence extends well beyond the 15 hectares of its site.

These recordings were carried out by Professor Andreas Christen's team at the University of Freiburg and presented to SAMINS management.

Feedback on working with the companies, operators and the organising and regulatory authorities of this site is both very encouraging, given everyone's availability, and disappointing, given the inertia in actually transforming places and practices. After several offers of support through the Clim'Ability and Clim'Ability Design projects *(internship, installation of MobiMets, commented feedback on measurements, etc.)*, we have to acknowledge how difficult it is to turn these EU-funded resources into concrete developments.

A similar initiative was launched with the Autonomous Port of Strasbourg (PAS), as part of the Clim'Ability Design project, in response to the 2018 low-water crisis on the Rhine. Here again, the onset of an unprecedented crisis – this time directly linked to climate change – provided an opportunity for the consortium to support the site. This commitment centred on experimenting with the inventive design method borrowed from engineering sciences, specifically in partnership with researchers from the CSIP research team at ICube. **One of the key benefits of this approach is methodological in nature, as it enabled the exploration of a hybridisation between the social sciences and engineering sciences[6].**

Inventive design enables groups that share the use of the same resource or infrastructure to organise themselves as rationally as possible in the event of difficulties, breakdowns or crises. It is a method developed by engineers and generally used to improve products or production processes. It makes it possible to identify different possible solutions to a problem shared by all stakeholders. This issue is broken down into as many partial solutions as there are proposals from the various stakeholders involved in the process. The result is a tree of solutions, none of which is perfect (...)! No solution comes without a trade-off. Once this graphic representation is complete, computer-assisted work can begin, with each solution analysed in terms of its capacity to solve the problem as a whole.

From a comparative point of view, these two initiatives, both triggered by crises, have resulted in two types of proposal: a planning-based proposal and an organisational proposal.



Development proposals following the two-year measurement campaign on the Samins site.

Support for the Samins site in adapting to climate change was mainly landscape- and planning-based. Feedback from this site highlighted several issues, including energy consumption and comfort at work. The main climate-related threat to the company's activity is rising temperatures, which have a direct impact on the energy consumption of the entire site. During periods of intense heat, keeping the warehouse cooling systems running – essential for managing and preserving foodstuffs – inevitably leads to an increase in the buildings' energy consumption.

"The hotter it gets, the more energy the units have to supply to cool the cold rooms."
Heatwaves also have an impact on food production itself.

"On a larger scale, heatwaves lead to a drop in the production of fruit and vegetables in particular, and therefore a drop in the goods coming onto the site, and consequently a drop in transactions and sales of foodstuffs. It's an impact linked more to the wholesaler's activity as such, but with a direct knock-on effect on the overall economy of the Marché Gare. Less production means lower results for the MIN."

[6] Coulibaly, A., Rudolf, F., Ory, M., Cavallucci, D., Bastian, L., Gobert, J. (2022). Open Inventive Design Method (OIDM-Triz) Approach for the Modeling of Complex Systems and the Resolution of Multidisciplinary Contradictions. Application to the Exploration of Innovative Solutions to Deal with the Climate Change Impacts. In: Nowak, R., Chrząszcz, J., Brad, S. (eds) Systematic Innovation Partnerships with Artificial Intelligence and Information Technology. TFC 2022. IFIP Advances in Information and Communication Technology, vol 655. Springer, Cham. https://doi.org/10.1007/978-3-031-17288-5_11

Improving the production facilities and working conditions on the Marché Gare site inevitably involves adapting the buildings to new requirements in terms of thermal insulation, energy efficiency and landscape quality of outdoor spaces, if only to combat heat islands. This last point was supported by an architectural sketch highlighting the potential of the Marché Gare.

In the case of the consequences of the low-water crisis on Rhine navigation, the support process led to organisational proposals. Inventive design made it possible to explore different adaptation pathways based on input from the various groups of inland waterway logistics operators. The resulting tree highlighted three possible options relating to the fleet, the river infrastructure and intermodality.

- The fleet, having already been the subject of innovations in the past, proved the least promising in terms of resolving the blockages caused by the low-water crisis;
- The second, involving interventions on the river, appeared to be the one that attracted the most interest from operators, despite its ecologically unacceptable impacts; and finally
- The last, although very unappealing to operators at first, since it puts them in competition with other modes of transport, ultimately proved to be the "only" reasonable one.



Koblenz – October 2018 © S. Hess



Maxau gauge – October 2018 © G. Wendel



Auer Köpfle nature reserve near Au am Rhein © Thomas Nusche



Sandbanks on the bank of the Rhine, opposite the port of Lauterbourg in Alsace © Thomas Nusche

This conclusion is based on the feedback from the Multi-Modays event, organised by the PAS in September 2022, which was entirely devoted to promoting multipolar and multimodal governance across the Port. **This event shows how far things have come between the inventive design process and the PAS's choices.** The least popular hypothesis eventually gained ground within the institution. Without attributing this success solely to Clim'Ability Design, the influence of inventive design on the maturing of the PAS's strategic direction should not be underestimated.

As with all these interventions, the consortium is not responsible for implementing the choices resulting from the conclusions of its surveys. Its role is limited to equipping production communities with scenarios that can inform decision-making.

Alongside these investigations, an analysis of vulnerabilities based on company feedback carried out by the University of Freiburg drew attention to the risks of flooding associated with heavy rainfall, but also with droughts.

The deadly floods that struck the Ahr valley in 2021 sadly confirmed the fears expressed by the University of Freiburg and informed the design of the next project, Clim'Ability Care.

In terms of communication and the hybridisation of science and art, the leap between Clim'Ability and Clim'Ability Design was clear. The latter was complemented by numerous educational materials published between 2016 and 2019 and by artistic installations aimed at mobilising people through emotion on the website **www.clim-ability.eu**. Exhibitions were then held *(Critical Zones, ZKM; Klybeck in Basel, etc.)* between 2019 and 2023.

Alongside these events, we orchestrated large-scale transnational performances, such as the launch of a sensor-equipped balloon from the Aubure station.

Its atmospheric drift, carried by air masses, was meant to show that global risks know no borders. This performance echoes, as an artistic illustration, the lessons of Ulrich Beck in his essay Risikogesellschaft (Risk Society) (Beck, 1986).

Another highly symbolic initiative was staged at sunrise, at the autumn equinox, on the summits of the various "ballons" *(rounded peaks)* of the Upper Rhine. As an invitation to other ways of making the world, our consortium imagined and took part – through sound, dance and talks – in forms of communication and rituals on the summits of these mountains. These attempts were all key moments of acculturation between scientists and artists.

They show, on the one hand, the importance artistic performances took on in the second phase of Clim' Ability and, on the other, the consortium's commitment to artists and their recognition by scientists. The multiplication of formats serving a diversity of audiences is the main strength.



Mont Sainte-Odile, as restorative and inspiring as ever!
General assembly, January 2025.

3. Clim'Ability Care (2023 - 2026)

The third project, Clim'Ability Care, very nearly never saw the light of day, mainly because of our own scepticism about our chances of winning a third mandate... Despite the high probability of failure, we found the audacity to go for it again, around the notion of care. This notion - whose meaning covers a distinction between acts of care, attention and empathy - was compelling for several reasons as we emerged from the Covid-19 crisis.

The experience of widespread vulnerability in the face of uncertainty and ever-present danger led to the recognition of certain functions and professions in maintaining the normality of everydaylife. Frontline workers – all the professionals who did not stop working during lockdown, those whom citizens applauded every evening – came to be described as "essential", or systemrelevant in German. This experience of the most vulnerable mobilising in response to widespread vulnerability, sometimes at the expense of their own protection, intersected with calls for non-humans[7] to be taken into account in exploring climate resilience pathways, in line with the socio-anthropological work of, notably, *(Descola, Haraway, Latour, etc.).*

Building on this new collective awareness, forged through contact with the collective, its cause and its multipolar governance, **Clim'Ability added a further dimension by making care visible alongside the canonical pillars of environmental and climate policy: alert, mitigation and adaptation.**

This broadening helped firmly anchor the project in the tradition of risk research, limited in our case to supporting an entrepreneurial culture of risk. This choice ensures continuity with our preferred audience – companies and the industrial world – without being limited to this target alone. Entrepreneurship is not restricted to economic players! It also applies to everyone engaged with their times, and it concerns attempts to transform life in society by involving new audiences in concrete actions and projects. These commitments are rooted in values *(ecology, climate protection, civil rights, the quality and continuity of public services, etc.)* and in the mobilisation of multiple entities within renewed practices. Through their contribution to these transformations, these entities or "non-humans" gain the status of subject-objects or object-subjects. They show that humans can undertake nothing without them, and the interdependence to which we are bound, whether we like it or not. All these efforts involve new skills and contribute to strengthening them. So when we refer to entrepreneurial culture, we are not limiting ourselves to the economic and industrial world, as the issues relating to this culture go far beyond the business world. The academic and artistic worlds are no exception!

[7] The expression "non-human" rests on a long intellectual history... It is about rehabilitating the diversity of the living world – flora, fauna and ecosystems – but also of the non-living – stones, rocks, etc., technical devices, cultural artefacts... and even ideas in the representations of action. It is an offensive against the imposition of humanity as the only entity endowed with intention and, consequently, the only entity whose fate matters!

In the third phase of Clim'Ability, we built our new proposal around the vulnerability of territories, as evidenced by the presence of **critical infrastructure**. In the sociological tradition, the notion of infrastructure classically refers, notably according to Marx, to the foundation of societies – the base on which they can build themselves, that is, develop their specific features. According to this approach, culture is the expression of superstructures that both depend on infrastructure and, to a greater or lesser extent, break free from it.

Identifying all the critical infrastructure across the Upper Rhine region is beyond the scope of our last project. However, we are able to deploy reasoning methods to identify them and surveys to explore how they might adapt to new challenges. "Giving food for thought and something to see" is, in a way, our signature approach. It is the approach that best defines us. We do not see ourselves as regional observatories, but as providers of methods and tools that help economic players – and, more broadly, all decision-makers and people involved in their territory – build their skills. We propose to develop survey methods and approaches based on the partnerships we form with companies or industrial sites, so as to provide informed feedback that can be useful to others. This feedback takes the form of tools, information and best-practice sheets, video clips or scientific articles.

In this new phase of our commitment, we wanted to scale up even further in size and complexity. This ambitious outlook led us to identify territories that could illustrate the value of starting from critical infrastructure to develop resilience pathways. We planned to partner, throughout the last project, with sites described as pilots because of their three-year commitment.

In practical terms, their commitment meant defining a roadmap made up of studies and experiments, agreed collectively, around one or more critical infrastructures characteristic of their territory. Introducing experimentation is nothing new; we had already offered it through the installation of MobiMets or by involving certain sites such as the PAS *(Port Autonome de Strasbourg)* in inventive design. These proposals seek to test real-life situations, also known as *Großexperiment* in German. They draw on certain work in the sociology of science devoted to social transformation (van den Daele, 1991). Engaging in such experiments is justified by the fight against social mistrust. Experiments should allow everyone to form an idea of possible transformations based on feedback grounded in several months of everyday practice. For example, this could involve installing a cool island able to host different uses on an industrial site, or modifying traffic lanes before a new mobility plan is finally adopted, etc. It could involve altering a hiking trail to guarantee quiet zones for endangered species, or renovating a municipal building using local wood species and traditional craft techniques as a demonstrator, etc.[8]

The main argument in favour of experimentation lies in its reversibility! Experimentation should offer the opportunity to collectively verify the relevance of a project before adopting a territorial resilience strategy. These experiments aim to serve communities by involving them upstream, through their lived experience, beyond discussion circles that are certainly virtuous but can remain disconnected from reality.

The potential partners in this long-term endeavour – described as pilot sites due to their role as pioneers in climate resilience – needed to be emblematic of the region through their deep roots and their contribution to the regional economy. It seemed to us that the mid-mountain valleys on both sides of the Rhine, which demonstrate a marked diversification from upstream to downstream between residential and tourist economies – centred on quality of life – and industrial clusters further downstream, were particularly well-suited to this purpose. Through their integration into major regional ecosystems and their contribution to systemic services on the one hand, and their connection to metropolitan areas on the other, these territories tick many boxes in terms of vulnerabilities *(heat stress and the proliferation of pests in forest areas, the risk of flooding and mudslides and domino effects..., but also cascading industrial and logistical risks).*

Alongside these case studies specific to the Upper Rhine, the vulnerability of Rhine ports – an issue we had already encountered – has also emerged as a key concern, particularly as our partners at the PAS *(Autonomous Port of Strasbourg)* were also submitting a project on the climate-related vulnerabilities of Rhine ports under the Interreg VI programme *(CRANE, 2023–2026).*

It was with the latter that we brought this venture to a close on 27 April 2026 at the Ateliers éclairés in Strasbourg. This broadening of the field of investigation helped question the agency of different types of governance in solving problems of climate criticality.

[8] Note that all these examples are drawn from our feedback with companies, industrial sites and local authorities.

In addition to this general framework, which defines a new scale for action research—one that has been broadened and diversified by the growing number of stakeholders involved—there is also the increasing severity of flood risk.

This risk had gone relatively unnoticed, due on the one hand to the temporality of hundred-year floods and the resulting invisibility of the risk, and on the other hand to the recurrence of heatwaves and tropical nights and their consequences for how work is organised.

This framing serves to highlight the importance of the water network – which had been the focus of attention during the low-water crisis – from the perspective of changes to the river's flow regime caused by glacial melt. This focus, which was more a reflection of scarcity than of abundance – although the two are linked insofar as the alternation of periods of drought and heavy rainfall contributes to flooding – had, unwittingly, also served to overshadow the risk of flooding... By focusing on flood risks, the aim was to rectify this unintentional invisibility, notably by drawing attention to the risks associated with excessive artificialisation linked to land pressure and developments that show little respect for ecosystems. Addressing this long-standing and underestimated risk also involved drawing on the expertise of colleagues from the University of Haute-Alsace (UHA) and the University of Freiburg, in collaboration with Mayane.

Clim'Ability Care was approved in March 2023 by the expert/political committee, after several rounds with the technical committee, as is usually the case for Interreg projects. To our great honour, we were among the first to launch this new Interreg programme *(Interreg VI)*.

Among the flagship commitments of our mission were:

- **Organising a travelling campaign across the Upper Rhine;**
- **Exploring scenarios for sustaining the Clim'Ability approach;**
- **Updating the Clim'Ability toolbox and methodological tutorials; and**
- **Producing a tutorial for exploring entrepreneurial cultures within organisations.**

Overall, the project can claim to have met its requirements, thanks to various partnerships, including the one with the KIT team *(MobiLab)*, which enabled several travelling campaigns across the Upper Rhine, but also thanks to the commitment of the pilot sites, each of which, in its own way, illustrated the importance of governance models and local entrepreneurial cultures in building and maintaining cultures of risk and resilience.

These successes are also due to the commitment of the CCIAE teams, in collaboration with UHA and Freiburg, to designing a range of tools for raising awareness of floods and flooding, from alert to care, via mitigation and adaptation.

They are supported by the commitment of INSA Strasbourg and the Institut Éco-Conseil to exploring the future of the Col des Bagenelles at the level of the municipality of Sainte-Marie-aux-Mines and the Val d'Argent community of municipalities.

This work was widely supported by the commitment of Adeus and the Agence du Climat to supporting the living soils challenge within a highly intensive and technical industrial area such as the Rhine ports.

Finally, the sustainability scenarios cover several areas: participation in identifying relevant research areas within Eucor, and the extension of the website's domain name – *where the Clim'Ability Booklets will be published regularly* – **thanks to INSA Strasbourg's three-year commitment.**

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This is where we close the Adventure
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