Deliverable 4.4

Lessons learned from using art forms for the representation of local climate information

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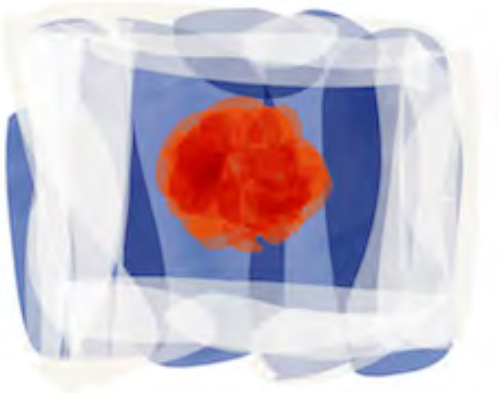

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1 Executive summary

We conducted 5 locally-based Arts and Sciences processes, working closely with local stakeholders, artists, scientists and inhabitants in order to propose for each site a conjoint art–science analysis through shared engagement in the interpretation and representations of the various steps conducted within WPs 1, 2 and 3. We present here the theoretical roots, local processes and shared learning, with the art forms as an integral part of the climate services co-construction.

2 Purposes of the document

The 3 main purposes of the D 4.4 document are:

- Remember CoCLiServ shared challenges related with art–science conjoint analysis and share our theoretical approach;
- Make explicit the site by site processes associated with the art–science conjoint analysis;
- Establish what we consider to be the key points for ongoing and upcoming art–science approaches in the context of climate services.

3 Relationship to the Description of Work (DOW)

As part of the WP4 “Local representations of a changing climate”, this deliverable 4.4 presents the processes and results for the Task 4.4 art–science conjoint analysis that is, as described in the DOW: the work of one or several artists embedded with scientists in each study site, to jointly engage in the analysis, interpretation and, more importantly, representations of the steps conducted within WPs 1, 2 and 3. The artist and art forms have been selected together with the communities, as an integral part of the co-construction process and linked with WP5 ones in the selected sites.

4 Art–science conjoint analysis common challenges and Co-CliServ theoretical approach

Part of the section 4 below have been published as a CoCliServ outcome in the paper "Facing Climate Injustices: Community Trust-Building for Climate Services through Arts and Sciences Narrative Co-Production." The paper is available in open access and its reference is in the bibliographic section from this Deliverable 4.4. Let's move forward with the theoretical approach:

It is now widely documented that climate change adaptation is dependent upon local contexts and there are no one-size-fits-all solutions (IPCC 2014). Culture (Adger et al. 2013), local knowledge (Naess 2013), local institutions (Berman et al. 2019), the intertwining of local and global political forces and history (Kennedy et al. 2018), are examples of dimensions that define the ability of a community to face climate change. The provision of meaningful and usable climate information at the local level, therefore, entails some sort of tailoring. There are now case studies illustrating the mismatch between climate science and local interests. Providing information does not necessarily mean local users will be able to make use of it. Climate science may need to be linked more directly to local communities, to their particular capacities and contexts of vulnerability (IPCC 2014 , Vaughan et al. 2016). As Bremer et al. (2019) put it, "scholars and practitioners have been ill-equipped to describe the contexts where climate services are introduced, or interpret how context can shape the way they develop".

Co-production has been proposed as one approach for addressing the challenge of turning climate science into a usable climate service. Not only does knowledge co-production allow for better usability and implementation, it has many increasingly documented benefits such as social learning, empowerment, and inter- and intra-community trust building.

4.1 climate service co-production

For the purpose of this research we used Vaughan and Dessai's (2014) definition of climate services: "The aim of climate services is to provide people and organizations with timely, tailored climate-related knowledge and information that they can use to reduce climate-related losses and enhance benefits, including the protection of lives, livelihoods, and property" (pg. 588). When considering this definition, we focus on providing people with climate tailored knowledge, "people" understood as members of local communities. The central challenge we wished to address was that of "tailoring" climate knowledge and information for communities at the margins or at the core, who might not be -or might be- aware of climate issues.

Such tailoring of climate knowledge is closely associated with the ability to establish iteration (Dilling and Lemos 2011) and dialogue (Vaughan and Dessai 2014) between scientists and non-scientists in the course of knowledge production and use. Climate knowledge co-production, the "deliberate collaboration of different people to achieve a common goal" (Bremer and Meisch 2017, pg. 2) has been proposed for quite some time (e.g., Lemos and Morehouse 2005) to address challenges of initiating and maintaining such reiterations and dialogues. But what if this dialogue needs to be established on grounds other than those of climate change?Bremer and Meisch (2017) conducted an extensive mapping of the literature on climate change research co-production. They identify a series of eight "conceptual lenses" and call for a "self-reflexive transparency when using co-production concepts" (pg. 1) to address the concepts' polysemy. Within their framework, CoCliServ work lies at the juncture of several objectives associated with these various lenses: we want to integrate non-scientists as co-investigators (extended lens); we wish to sustain interactions between climate science providers and users (iterative interaction lens); we pursue a goal of empowering local experience, and thus of local knowledge (empowerment lens); we recognize the need

to facilitate social learning about climate issues (social learning lens); and we are embedded in a culturally-rooted goal to improve public service through the joint engagement of government agencies and citizens in the production of new knowledge (public services lens).

All these objectives are associated with acknowledging the current uneven distribution of access to, and benefits from, climate services development (Vaughan and Dessai 2014). For instance, Harjanne (2017) surveyed institutions related to climate services to identify how they justify the need for climate services (as a departure from climate science), and identified the following: global and widespread nature of the climate challenge; specific industry needs; socio-economic value; technological potential; and deficient supply and demand. We envision co-production of climate services, not because we perceive co-production as a "value in itself" (Voorberg et al. 2015), but because we see co-production as a means to create and nurture sustained interaction with communities while contributing to their empowerment. We wish to explore means for correcting the inequitable distribution of climate change knowledge for action.

We hypothesized that part of this uneven distribution may reflect that not all communities are equal and some are facing such immediate challenges that climate change may be invisible to them. This hypothesis called for working to shift awareness to the actual or potential, current or future, connections between everyday non-climate concerns and climate issues. Such a shift called for a practical intervention, centred on local culture. We chose to work hand-in-hand with artists to conduct such an intervention, as art is well identified as an approach to make visible the "invisible or almost-visible" phenomenon of climate change (Knebusch 2008). Art is also identified as facilitating access to narratives in general, and climate narratives in particular (Roosen et al. 2018).

4.2 Art and science integration for climate intervention

Art-based intervention has been proposed in the context of climate change for quite some time (Lippard 2007, Volpe 2018). This is not without pitfalls such as instrumentalising art, and reproducing dominant categories and codes through art (Miles 2010). Experiments have shown that through public participation and activism, art may be empowering, and may shift attention to issues that question dominant paradigms (Sommer and Klockner 2019).

Several dimensions have been identified for collaborations between art and science: new understandings and capacities within and across the arts and sciences involved (Gabrys and Yussof 2012); catalysing explorations of the scientific context and critical re-imaginations of research practices (Rödder 2017); helping to engage multiple senses and emphasizing social interaction within research practices; aiding participating researchers in thinking creatively (Jacobson et al. 2016); redesigning social relations to natural systems (Armstrong and Leimbach 2019); rearticulating politics and knowledge (Latour 2011); offering more effective approaches to engaging multiple publics in climate-compatible behaviour change; and engaging explicitly with the under-researched issue of the role of place attachment and local, situated knowledge in mediating the influence of climate change communication (Burke et al. 2018).

Capitalizing on these observations, we developed the working hypothesis that iterative art and science approaches have the potential for instigating and sustaining community dialogue through efforts to co-produce climate services. We saw art as essential for making the concept of climate services more meaningful in a specific place, and focused on narratives as an entry point for co-construction.

Developing a strong connection between art and science enables the re-articulation of the scientific description of the world (Latour, 2011). The CoCliServ sites, in

their diversity, explored through their own local Arts and Sciences approaches polysemic concepts such as climate change and associated "services". Our investigation entailed examining the potential of art 'gestures' (Citton, 2012) and the 'practices of everyday life' (de Certeau, 1990) to facilitate cultural translation between different fields of knowledge and the associated diversity of priorities in bringing them to action.

5 Art-science conjoint analysis processes site by site

While the five CoCLiServ sites each have their own particularities to their approaches, all are rooted in the CoCLiServ vision. This section describes the unique art-sciences elements for each site along with the commons points in the sites' processes. By alphabetical order we are:

5.1 Bergen, Norway. The Primstav exercise: an engaging and creative way to talk, draw and think about local climate adaptation.

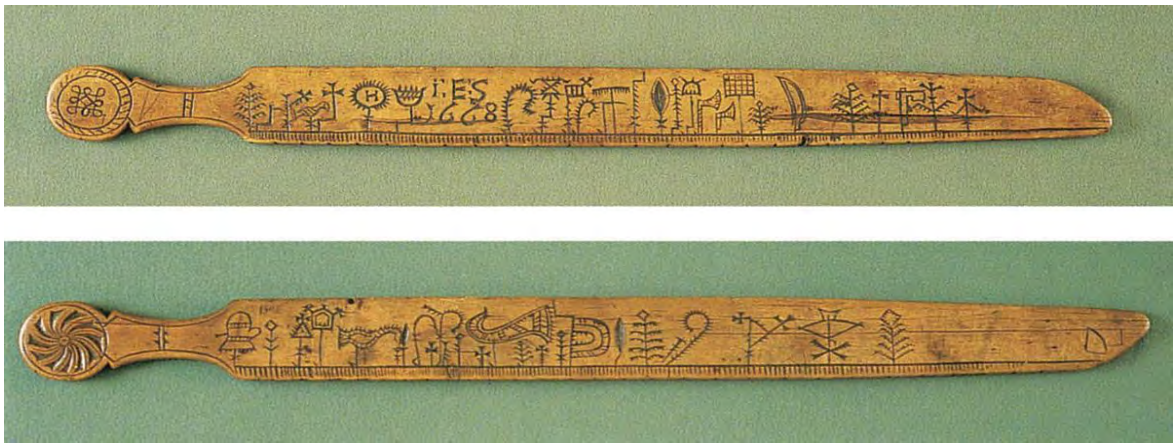
As part of our local communication and engagement work in the CoCliServ project, we have developed a creative exercise centered on the traditional Norwegian calendar stick, the primstav. We have on three different occasions introduced groups of children and adults to the historic Norwegian calendar and invited them to create their own primstav, for their own lives, and through this, engaged them in thinking and conversation about the rhythms of their year, seasonal adaptation, climate adaptation and climate change.

The primstav, interesting in itself as an expression of local cultural history and traditional handicraft, is also an object "good to think with" regarding climate adaptation, as it shows how activities varied through the year; how small village societies adapted to the different seasons, and how this permeated also cultural and religious life (Levi-Strauss 1962:89). It is like a filled-out almanac from another time, keeping track of religious days to be observant of, necessary preparations for the

more mundane necessities for food and shelter with seasonal variation, and rules of thumb predictions for the weather.

Conversations about the traditional primstav and about what a primstav of today might look like, can be an engaging and creative way to make climate adaptation and climate change more tangible on a personal and local level.

5.1.1 The Primstav



Primstav summer side (on top) and winter side (below) form a primstav from Agder, Norway. From the collection at Norsk Folkemuseum.[1]

The primstav is a type of perpetual calendar, based on the Julian calendar, that was in use in Norway up until the 19th century. The oldest specimen we have today is from 1457, but based on written sources it is assumed that the primstav was in use already in the 13th century (Alver 1981, Kismul 1979).

The primstav is made of wood and marked with one line for each day and normally a larger line every seventh day, and engraved with images and symbols. An oblong or sword like shape like in the photograph above was the most common shape. They would normally be about 80-90 cm long and 5-6 cm wide. The symbols depict the different nonmoving religious holidays mostly connected with the catholic cult

[1] Oslo/KF-arkiv. Photo from Store norske leksikon, Edition 2005-2007. https://snl.no/primstav

of saints. The primstav has a summer side, and a winter side. This division of the year into two seasons, summer starting April 14th and winter starting October 14th, goes back to heathen times in Norway, and traditionally there were celebrations with sacrifices and feast connected to the change of season or in mid-season. Some of these old traditions mixed in with the new Christian celebrations. For instance, St. Johns day, June 24th, fell on the traditional midsummer's day, which still to this day is celebrated with big bonfires on the eve before, as in heathen times.

To be observant of religious holidays was set in the state law of Magnus Lagabøter of 1274, but written calendars on parchment were rare and expensive, and in contrast to the calendars of the priests, the primstav was decodable for the illiterate as well. In a sense the primstav was a local, homemade and widespread solution to keeping track of dates, and this became more important with the Christianizing of Norway (Crosby 1997, Rassumsen and Elstad 2019).

While the main or overt purpose of the primstav was to keep track of the religious celebrations, in practical use and interpretation it was a tool giving note of seasonal shifts, expectations and preparations in connection with these, rules of thumb for predicting weather, when to start or end different types of work, especially in farming, and some older heathen and local celebrations and traditions.

The symbols used for the different days normally depicted something in connection with the saint to be celebrated. The original meaning of the symbols would sometimes get lost with time and everyday use, and then get reinterpreted in more mundane ways. For example, the fishhook symbolizing the Apostle Andrew for St. Andrews day the 30th November, was read as it being time to go fishing in preparation to the Christmas celebrations (Alver 1981:89, Kimsul 1979:7)

Though the greater part of the celebrations noted would be on primstavs throughout the country, at the end of the day, it would be up to the specific woodcarver which days to include and symbols to use, and there would be local variation in

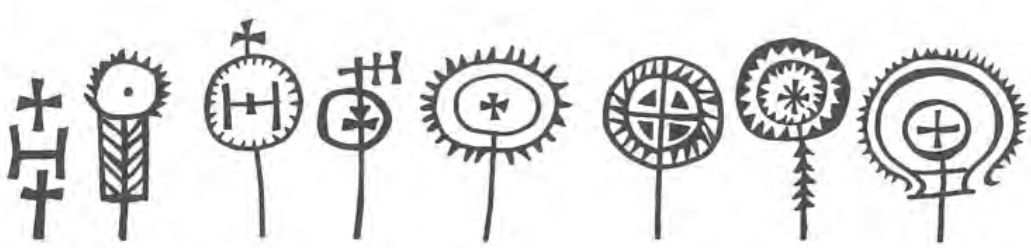
days marked and imagery used, and in proverbs and activities associated with the different celebrations (Alver 1981:65). One review of primstavs from seven different Norwegian cultural history museums counted on average 30 signs on the summer side and 32 on the winter side, the most crowded example had as many as 80 symbols in total (Kismul 1979). Another review found an average 55 in total (Dybdahl 2019). The proverbs, folklore and "rule of thumb" weather forecast connected with the different celebrations would vary throughout the country, depending on local climatic conditions. Two examples follow.

May 15th, St. Hallvards Mass.

This day is in memory of Hallvard Valbjørnsson, patron saint of the city of Oslo. According to legend, Hallvard died in 1043 while trying to save a persecuted woman accused of stealing. He was killed with bow and arrows while trying to row her over the Drammen river. Then the persecutors tossed his body in the river with a millstone around his neck, to hide their misdeeds. Miraculously, both Hallvard and the millstone floated up, was found and given a proper burial. He was considered a martyr for his deeds and later sanctified.

Part of mural by Alf Rolfsen (1950) in Oslo city hall depicting St. Hallvard with his distinctive tree arrows and millstone. At his feet to the left, the woman he tried to save, distinctively nameless and undressed, and to the right a banner with the city of Oslo's moto Unanimiter et constanter (United and constant). This is also the imagery on the City of Oslo's coat of arms.

The symbol for St. Hallvards day on the primstav is normally a millstone. St. Hallvards day was the time for sowing of seeds. In the southern part of the country this was peak day for sowing, while further north it was known as the earliest possible day for sowing seeds, "but only if there was no ice on the lakes" (Alver 1981139). Also, now farm animals could be let out in the outfields, it was said.



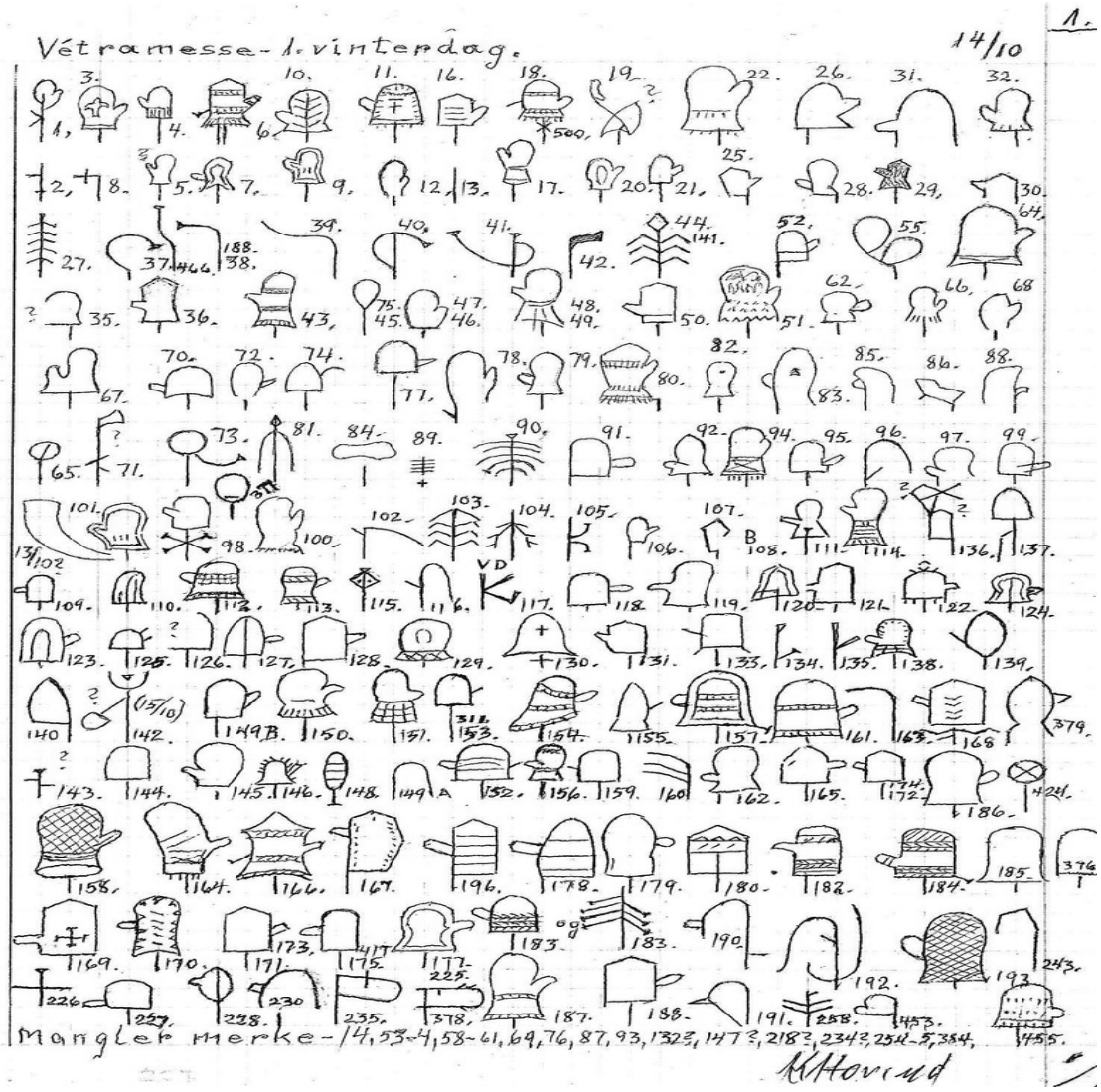
Examples of symbols for St. Hallvards day. Gathered and drawn by Harald Kismul. [2]

October 14th , St. Callixtus day or winters night, the first day of winter.

The symbol for this day is normally a mitten, sometimes, but rarely, a tree without leaves. One explanation for the mitten is that it is a representation of a papal glove or hat, as October 14th is the commemoration day of pope Callixtus, and gloves were part of his pontificals. Others assume it symbolizes a mitten as the cold winter is coming, or possibly that it might have started out as a papal glove, but that this meaning was forgotten and then with time the symbol was understood as the more mundane mitten (Alver 1981:91). Either way, in everyday interpretation, it was highly likely read as a mitten giving note that the cold winter is now here. In heathen times this was an important day, celebrated with sacrifices and feasts,

[2] Facsimile from Kismul 1979

and this is one explanation given for why this day was quite prominent in Norway, even if St. Callixtus does not seem to have been very well know here (Alver 1981: 92, Dybdahl 2019)



Examples of symbols found for St. Callixtus day or winters day on primstavs. Gathered and drawn by Kaare Hovind.[3]

From this day on, the horses should wear bells, it was said. With winter comes not only cold in Norway, but also darkness, so now the horses should be heard coming.

[3] Facsimile from https://snl.no/vinternatt

As the first day of winter this day gave notice of the winter weather to come and in some places the day was known as the “winter prophet” (Dybdahl 2019).

It is assumed that the primstav went out of use in the eightieth century for several reasons, mainly, the change into the Gregorian calendar (1700, in Norway) and printed paper almanacs becoming more widespread, made it obsolete. Also, formally Norway changed into Lutheranism in 1536 (the cult of saints and other catholic traditions were kept up long after the reformation). The sociologist might want to speculate that the gentle start of the overall societal modernization developments, like differentiation, specialization, centralization and secularization, might also have contributed to making the primstav, which developed in a more homogenous, religious, rural and agrarian society, less relevant. In museums and archives today, we find about 650 primstavs from when they were in use (i.e. dated from the 15th to the 18th century).

5.1.2 The primstav exercise

School children gathering around, listening and drawing. At the back from the right, cultural historian and Museum Educator Lena Eikeland Kutchera, who helped out on the event and kindly borrowed us two primstav replicas from her personal collection. In the middle CoCliServ research assistant Elisabeth Schøyen Jensen and to the right CoCliServ researcher Scott Bremer.

The primstav exercise was based on the original idea of CoCliServ researcher Scott Bremer and PhD. student Sissel Småland Aasheim (UiO/UiB), that the primstav could be a good object for thinking about climate adaptation. This was then further developed into the primstav exercise by the CoCliServ Bergen team, together with Sissel S. Aasheim and SVT research advisor Janne B. Bøe (UiB), in preparation for a two day stand at "Forskningstorget 2019", a research fair. The fair is part of "the Research days"[4], a big yearly event where the University of Bergen together with other research institutions in Bergen invite school children and the general public to visit and learn about our research. Our goal in the development of our stand was to find a way to communicate some core points of the CoCliServ project and a bit about the spirit of The Centre of the Studies of the Sciences and the Humanities (SVT) and the humanities faculty, with the target audience of hundreds of 11-12-year-old's passing from station to station at the fair. The second day the fair was open to the general public. It quickly became clear that doing something creative and interactive would be both a good way to communicate and engage, and would also give us an opportunity to learn something from our visitors, and to try out new ways to think about climate adaptation together with people in Bergen.

We repeated the same exercise as part of an art exhibition by artist Eamon O´Kane at the Norwegian Sculptors Society in Oslo in February 2020. O´Kane's exhibition, "The Fröbel Studio: Institute for creativity", was a visual and conceptual exploration

[4] https://www.forskningsdagene.no/

of the pedagogical objects and thinking of Fredrich Fröbel, the pioneer of educational philosophy of kindergartens[5]. The exhibition was made to be accessible for, and played with by children. We were invited to have our primstav workshop at the venue of the exhibition and spent two days in Oslo at the Norwegian Sculptors Society.

We also developed a primstav event for adults in collaboration with a local artist Magnhild Øen Nordahl[6] and Aldea - Center for Contemporary Art, Design and Technology[7]. This was a one-day workshop held June 27th 2020 at Aldea in Bergen, for seven participants. They first spent three hours jointly making a primstav design, and then spent the rest of the day making one copy each in wood from local trees in a well-equipped studio. The group was recruited by e-mail from different networks, and the seven participants made up a varied group with regards to age, sex and occupational background.

The exercise

In the primstav exercise we bring different examples of primstav replicas to show and pass around. They are real size replicas, and so about 80-90 cm long and beautifully crafted in wood. For the event at the Research fair we had with us cultural historian and museum educator Lene Eikeland Kutchera, who brought with her two primstav replicas from her own private collection. While showing and passing around the primstavs we talk a bit about what it is and how it was used, and give some examples of the days marked, noting that in those times they didn't have scientific weather forecasts like we do, and that the primstav was a tool for them to, based on experience, prepare for changing weather and seasons. We had also

[5] http://www.norskbilledhoggerforening.no/eamon-okane

[6] https://www.magnhildnordahl.com/

[7] http://www.aldea.art/

made a poster with a short description of the primstav and some examples. The stories of the saints or martyrs can be quite dramatic, exciting and a bit ghoulish, and there is a bit of a mythical and mystical atmosphere connected with the middle-ages, which goes down well with the older children.

Figure 5.1.1: To the right, the drawing table at Forskningstorget in Bergen, to the left show two participants at the session at the Norwegian Sculptors Society in Oslo.

For the science fair event Scott Bremer together with natural scientist at the Bjerknes Center for Climate Research[8] also prepared a "Bergen anno 2100" poster, summarizing the main scientific predictions for what climate change might mean locally in Bergen and Vestland, one hundred years from now. This, in addition to being science communication in itself, was also useful for explaining what climate adaptation is and what our project is about, and it gave a nice "past", "present" and (potential)"future" framing to our stand and conversations at the Research Fair.

[8] https://www.bjerknes.uib.no/en

Also, youth today are in general quite concerned about climate change and were keen to hear about local effects, so this also worked to draw their attention.

We then tell them that we are researchers working with climate adaptation and that we are trying to figure out what a primstav of today for Bergen might look like. We ask the participants to make their own primstav for their own life and year. With the children, they receive an empty paper primstav template and are asked to think of important days or activities in their year, what seasons they experience, days or events that mark the seasons or change of seasons for them, and to try to think of a symbol to draw, or to write keywords on the templates. Instructions were also presented on a poster headed “Make your own Primstav- be a citizen scientist!”. When we collect their drawings, we thank them for their contributions to our research, and it was quite moving to see how proud some of the children get when they hear this.

Figure 5.1.2: CoCliServ Research assistant Elisabeth Schøyen Jensen putting up the contributions from the children on the home made “fish rack” made for the occasion at the research fair,“Froskningstorget”.

We made two different primstav templates for the children. The most basic template is an oblong- or sword-shaped design, similar to the most classic primstav shape. Originally the primstav had a winter and a summer side, but we ask the participants to draw on only one side of the template for simplification, but also so not to force their division of the year into two parts. We started out the first day with a template having lines, so to mark up 12 months, but found that many then felt they had to fill out every line, and lost patience with the task. The next day we brought templates without lines as well, so people could choose.

We also developed a two-layered circular template. On the top layer and inner circle, we ask participants to illustrate the local seasons of the year. On the bottom layer and outer circle, we ask them to note down important days and activities throughout the year, inspired from the logic of the primstav. The two layers are attached so that they can be "swirled around". This design is intended to generate discussion on how different activities throughout the year is connected with the seasons, and how this might change with climate change. We used the simple oblong design for the stand at the research fair, as the children would have limited time at each station.

With the adults at the one-day workshop, after having introduced them to the traditional primstav, we spent two hours discussing and agreeing on things and days to mark on our modern primstav for Bergen and how to symbolize these. The participants drew the different things they agreed on including and then the drawings were digitalized. On the second half of the day the materials gathered from the city mountains were prepared and then the agreed upon design was cut out with an CNC- machine.

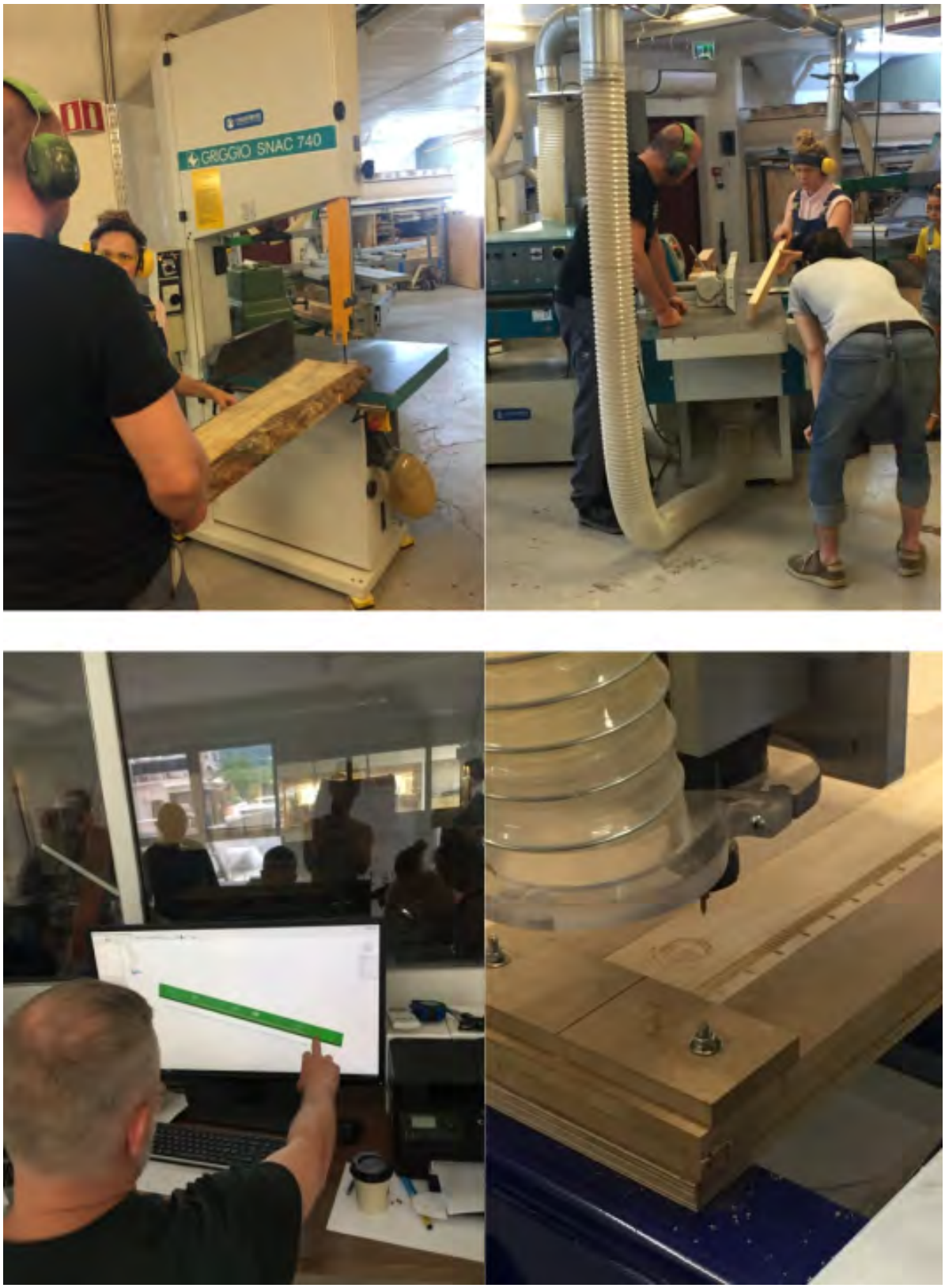


Figure 5.1.3: Above we see Magnhild Øen Nordahl explain some of the participants how to prepare the wood material for the CNC machine. Underneath we see the digitalization process and the CNC machine working.

5.1.3 Outcomes, reflections and lessons learned

Figure 5.1.4: The first from the left is from the Oslo session. On the right side it is written from the top, spring, summer, autumn, winter, and inside, from the top, it is written Easter, winter holiday, then “Oh how tanned you have become”, then “nice” pointing to the rain boot, then “Christmas” and “where did all the money go?” and the “10.5” refers to kilos added during Christmas. This was made by a 12-year-old. The one next to it is also made by a 12-year-old. The small repeated “Cheez Doodle”-shapes are depicting play station consoles, it was explained, and the bottom image is a slide. The next one is from a six-year-old (the second drawing represent his/her birthday) and the

final one from another 12-year-old. The final one from the top says birthday, summer holiday, autumn holiday, Easter holiday, Christmas eve, winter holiday, New Year's Eve, "autumn disco" and "spring disco"

Figure 5.1.5: Three of these have the 12 months of the year written on them, and the bottom one to the left and the top one to the right have also the word "birthday". The second one to the right was interesting as this 12-year-old looked out the window for knowing what to draw in February, the month we were in and the month she started on. Then she drew the rest of the year, and when

she had finished, said a bit surprised to her mother "oh, I ended up with only one snowy month?". Others during the same event also noted this that now they drew February as spring, as it was indeed green outside the window, but that they would normally have thought of February as a white and snowy month (this event was in Oslo). This led to some interesting discussions about habits and traditions regarding winter and snow, and how they might change.

At the science fair almost 150 paper primstavs were made, in addition, many stopped by our stand just to look and listen. We were very interested to see how the visitors would interpret and solve the task, and through this get some insight into the experienced yearly rhythms of school children in Bergen today. While the primstavs made are very interesting, the reflection that goes into the making of them is just as important. The objective of presenting the traditional primstav, with the backdrop of climate change and climate adaptation, and having them create their own primstav, is to start a chain of thoughts about how we do different things at different parts of the year and how activities might be (or maybe not) connected with the different seasons. With the traditional primstav the rhythm of the year is quite explicitly connected to the natural rhythms of seasonal climate and growing, what were the rhythms of the modern, urban 12-year old's?

Birthdays, holidays and special days.

Our repeated "please, do not write your name or birthday on the primstav, we don't want any personal information", was quite futile. The most important day in the year of a 12-year old is the birthday, so this was a recurrent day noted on the primstavs. Some would also list the birthday of their friends or parents. Christmas eve, New Year's Eve, 17th May (Norway's national day) and Halloween was also found throughout. Other days mentioned were "Saturdays", Valentine's day, Woman's day, Aprils fool's day, St. John's Eve, International Workers' Day, first day and last day of the School year , "Father and daughter" day, Saint Lucy's Day,

Mother's day, Father's day, and, a personal favorite, the Spring Disco and the Autumn Disco.

The School cycle and vacations

The school holidays were also found throughout, so summer-, winter-, autumn-, Easter- and Christmas- holiday were mentioned, and on quite a few primstavs this was the only important events noted. We had a few who drew or wrote "family" or a flag from another country in summer, or an airplane with a destination to a specific country. When asked about this, they elaborated that their parents were originally from another country, and that they would spend all summer there and so thought of summer as that country or as "family".

Hobbies

Quite a few would somehow note down the yearly cycle of their past time activities and hobbies, like "band camp", "swimming practice" or "finals", or the above-mentioned play station console.

Seasonal symbols

We also asked them about how they experienced the seasons and to draw what they thought symbolised the different seasons. Common here was iconographic seasonal representations like snowmen and snow crystals for winter, flowers and green grass for spring, sun and blue skies and waters for summer and brown and yellow leaves and bare trees for autumn. Food items representing seasons would be ice cream for summer and cocoa for winter. Recurrent activities would be bathing, boat rides, fishing or flying (airplanes) for summer , and skiing for winter. Seasons would also be marked by days and event, so winter is Christmas (symbols like Christmas trees, Santa Claus hats and presents), spring is Easter (eggs, bunnies and chickens) and 17th of May (the Flag), and autumn is Halloween (pumpkins, ghosts and witches).

Figure 5.1.6: On the first one from the right "The National Band Championship" is noted at the bottom. The next ones' year consisted of winter, swimming competitions, swimming practice, being on her phone, being out in summer, and then more swimming practice. On the third from the right we find "new year's", birthday, "Hordablæsten"(the county band festival/championship), Easter, National day (17.May), start of school, Halloween, December and Christmas. The last one notes the important things in her year to be birthday, Christmas, Norway, candy, best friends, sun, cheer-leading practice camp, Poland, family, May (the last word is illegible, but might be the part of town this girl was from, Minde)

Workshop for adults

In the one-day work shop for adults the group had to agree on the symbols to include, which created quite a lot of discussion within the group. This group setting and consensus-oriented process created a different dynamic than with the individual task among the children. The group finally agreed on 28 different icons that marked the passing of the year for them. As with the children we find holidays and special days (eg. National Day, Easter, Christmas eve, New Years, UN day, St. John's Day and Halloween), the School cycle and vacations. Among the adults, the seasonal symbols referring to weather and nature were a bit more specific than with the children, instead of a generic flower, we now had wild garlic and crocus for spring, blueberries for summer, and New year's storms in January, but also a snow crystal for February, a woolen sock in November and an ice cream in July. As this was a group endeavour, we find fewer specific hobbies and past times, but we still find lots of symbols related to past time activities like skiing in February and hiking in March, and a symbol for the springtime cultural festivals and another for the autumn cultural festivals. November was noted as "inside time", December as a time with candle lights and eating and drinking (sheep and beer). On a more practical note, in early April we find a bicycle wheel and a boat, this is the time to get the bike ready and get the boat back on water, and November 1st is time to change to winter tyre on your car.

Figure 5.1.7: On top we find the winter side starting October 14th and ending April 13th. Here we have, from left to right, a globe for the UN day, a woollen sock for colder weather, a witches hat for Halloween, a studded tyre for November 1st , a person being inside, a sheep for mutton season, a candle light for December 1st , a beer for the feast of Saint Thomas, a tree and present for Christmas Eve, fireworks for New Year's, a cloud and wind symbol for the New Year's storms, skis, a frost symbol in February, a person on a mountain symbolizing hiking, a crocus for spring in late March and a Kit Kat and orange symbolizing Easter in April (this is a traditional snack when skiing on Easter holiday at the cabin). Underneath we have the summer side, starting April 14th running to October 13th. It starts with a bicycle wheel, then a wild garlic leaf, a boat, a Ferris wheel and flags for the 17th of May (National Day), a sun with a musical note inside for the spring cultural festivals in late May /early June, a barrel on fire for St. Johns day, a school bell ringing for the end for the school year in mid-June, ice cream and sea for summer, blueberries, a book for the start of the school semester in mid-August, a film frame with an autumn leaf symbolizing the autumn cultural festivals and a bottle and a carrot for the autumn produce.

5.1.4 Lessons learned

At the research fair the children were passing through and so on average spent 15-20 minutes at our station. One might object that at this pace all we get through this exercise are seasonal clichés, well established from preschool's dexterity developing drawing exercises and word processor software's ` stock photos, and not actual representations of the rhythm of their year, and this is probably to some extent correct. Still, the main objective of the exercise is to get started some reflections on 1) how we do different things at different parts of the year, 2) that this has been different at different times in history, e.g. the time of the primstav and now, and 3), that this might change again in the future with for instance climate change. Based on the conversations we had with both the children and the adults during the exercises and the primstavs made, we think the exercises worked well. As noted we find the primstav to be a powerful image, a concrete object making concrete what living with seasonal rhythms' can be, suggestive in the context of climate change and climate adaptation; an object "good to think with" (Levi-Strauss 1962:89). We felt both the adults and the children were fascinated by the primstav

and excited about the task of making one for their own life, and that they found the suggested connection of this to climate change and climate adaptation to be interesting.

We found that, as the exercise is set up now, children younger than seven have some trouble responding to it, though of course, they also seemed to enjoy the drawing. On the other end, we found that most adults really enjoyed it and responded very well to the primstav and climate adaptation analogy, and to the drawing and woodwork.

5.2 Dordrecht, the Netherlands

5.2.1 The process

The Dutch team is coordinating Work Package 2 on new incremental scenario methods. Therefore, we decided to focus our art-science efforts on supporting the development of these new methods. We attracted Studio Lakmoes as a partner and subcontractor in the Dutch team to facilitate the visual/arts component. Studio Lakmoes is a knowledge communication bureau that works with both 'knowledge directors' and creatives, such as graphical designers, animation, web design and development and sound specialists. They also have considerable experience in applying this on climate change and adaptation specifically. Consequently, we felt that they were in an excellent position to get scientists, policymakers and residents to speak the same language and stimulate their creative collaboration.

At the very start of the process, we considered two different approaches for the art-science work. One option was to make 'graphical summaries' of the scenarios developed, for instance in the form of cartoons, by having an artist sit in and sketch along with a scenario group (focus of the art-science conjoint analysis: during and after the scenario development). Another option was to co-develop a visual work-

shop approach that might help participants in their vision and scenario design (focus: before and during the scenario development). We selected the second option. Designing future visions and scenarios for timescales up to 30 years can be very challenging, for both experts and non-experts, because it involves abstract thinking, an ability to imagine trends and issues playing out over several decades, as well as imagining moving beyond the current situation (Wardekker et al., 2020). Doing this in a creative way, with people from multiple fields and disciplines (natural science, social science, arts) and multiple walks of life (scientists, policymakers, residents) adds further challenges. The process of designing future visions and scenarios should also explicitly place the local community in the driver's seat: what do they want to achieve and how can they make it happen (Wardekker et al., 2018, 2020)? We aimed at developing a visual co-design, or social design, approach that would facilitate this 'imagining of the future' in a creative manner.

To develop the workshop format, Utrecht University, Studio Lakmoes and CAS Climate Adaptation Services (another Dutch CoCliServ partner) had several Skype and phone calls. The most challenging step in the scenario design seemed to be the translation of the 'narratives of change' that we collected in Work Package 1 (Krauß et al., 2018a,b, 2019; Marschütz et al., 2020), into more abstract future visions, and then back into concrete actions and timelines. Based on the narrative interview materials, we synthesised nine key narratives (Marschütz et al., 2020). Some of these focused on current and past problems, others were more future oriented, but taken together they "frame the future as conveyed through narratives: what is the problem, who's problem is it, what causes it, what morals apply, and what solutions are appropriate" (Wardekker & Marschütz, 2018). We also observed that the narratives of policymakers and of residents presented distinct stories, but that they all shared a vision of Dordrecht as a 'resilient island'. We then used this common metaphor to distill the narratives into three sub-visions that highlighted different aspects but all included elements of both policymakers' and

residents' narratives. Utrecht University developed a document with a verbal description of each scenario along with quotes from the interview. On the basis of these, Studio Lakmoes designed 'concept streets' (like they might be present in Dordrecht), one for each vision, with elements from the narratives. Supplemental materials and a timeline visualisation were also designed. These were discussed between Studio Lakmoes and Utrecht University, and revised two times to include a few more narrative elements. They were printed, delivered in Dordrecht, and used in the workshop. Two of these visions and concept streets were used by participants to co-design collages representing their future vision, which were then translated to concrete actions and placed on a timeline and further used in the scenario process (Wardekker et al., 2019, 2020). The graphics files and photos from the workshops were compiled into a final digital package.

5.2.2 Outcomes

5.2.2.1 Description of the art forms

The final artwork for the 'concept streets' showcased the three core visions: Close-knit Island Community, Innovative Connections, and Water Safe & Water Wise (Wardekker et al., 2019, 2020). See Figure 5.2.1-3.

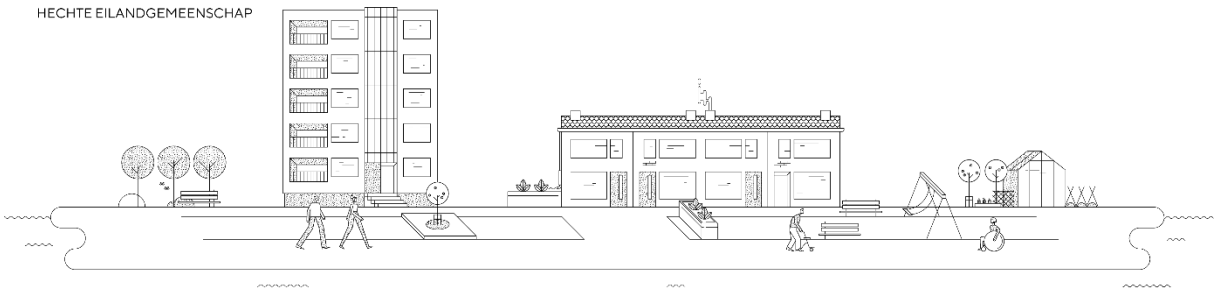


Figure 5.2.1: Concept street "Close-knit Island Community".

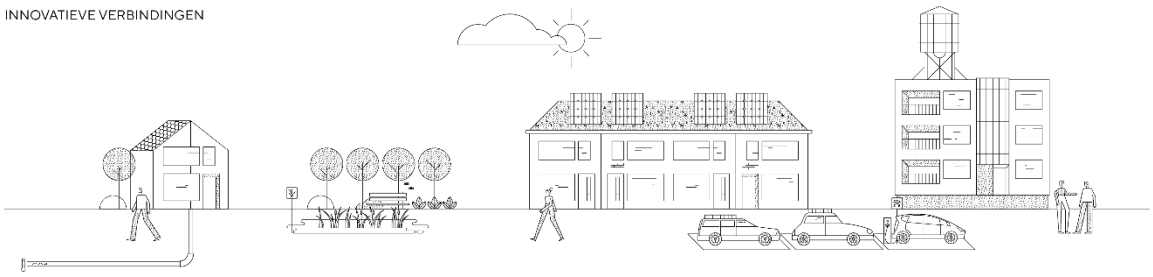


Figure 5.2.2: Concept street "Innovative Connections".

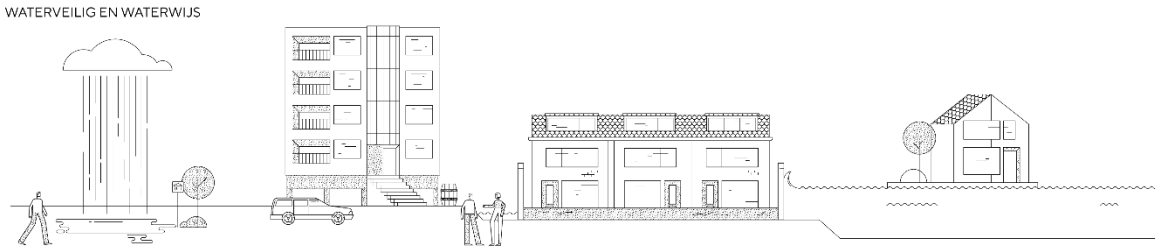


Figure 5.2.3: Concept street "Water Safe & Water Wise".

Each street contains some standard elements such as houses, flats, cars and people, as they might be present in the neighbourhood. They also depict some typical problems (e.g. heavy rain showers), vulnerable groups (e.g. elderly), and options (e.g. solar panels, rainwater storage). However, the designs are not too specific. They are intended to be used by workshop participants to design their own visions; how they imagine the future street. Consequently, they contain some elements to focus the attention, but leave much blank space to draw, write, or cut-and-paste new contributions. They were printed on large cardboard panels (1.5 by 0.4 m, so multiple people can work on them) that could be taped to a wall.

Several paper sheets with cut-and-paste materials were also provided, as shown in Figure 5.2.4-5, along with magazine clippings, spare paper, multi-coloured post its, and multi-coloured markers. Cut-and-paste elements included, for instance, people, buildings, vehicles, plants, benches, larger futuristic scenes, and some 'unconventional elements'. These could be used to flesh out the visions.

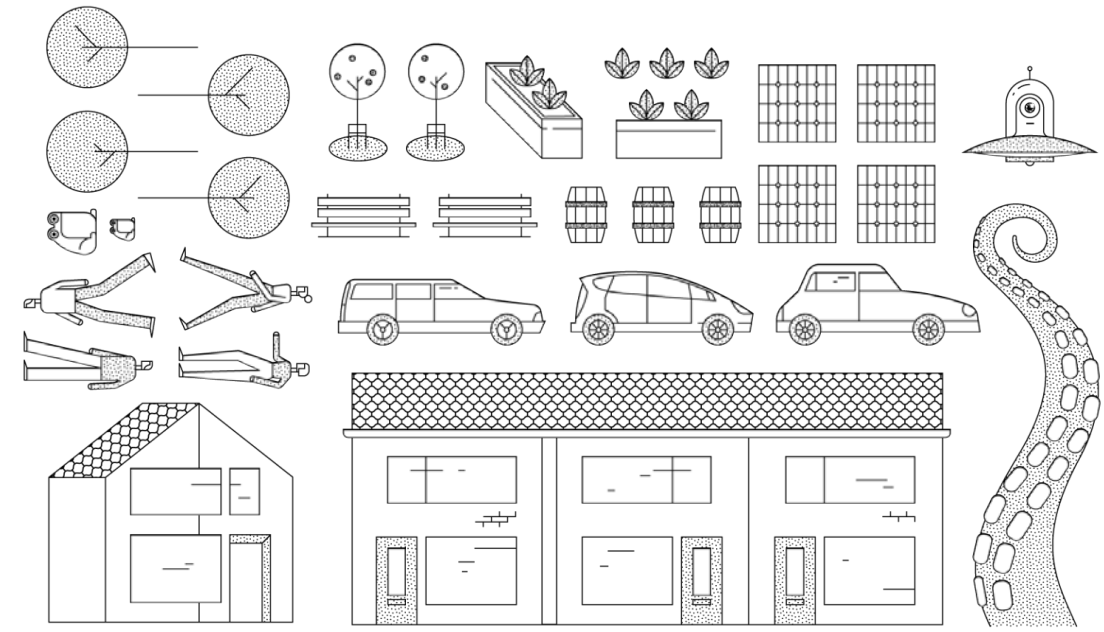


Figure 5.2.4: Cut-and-paste image designs for use on the concept streets.

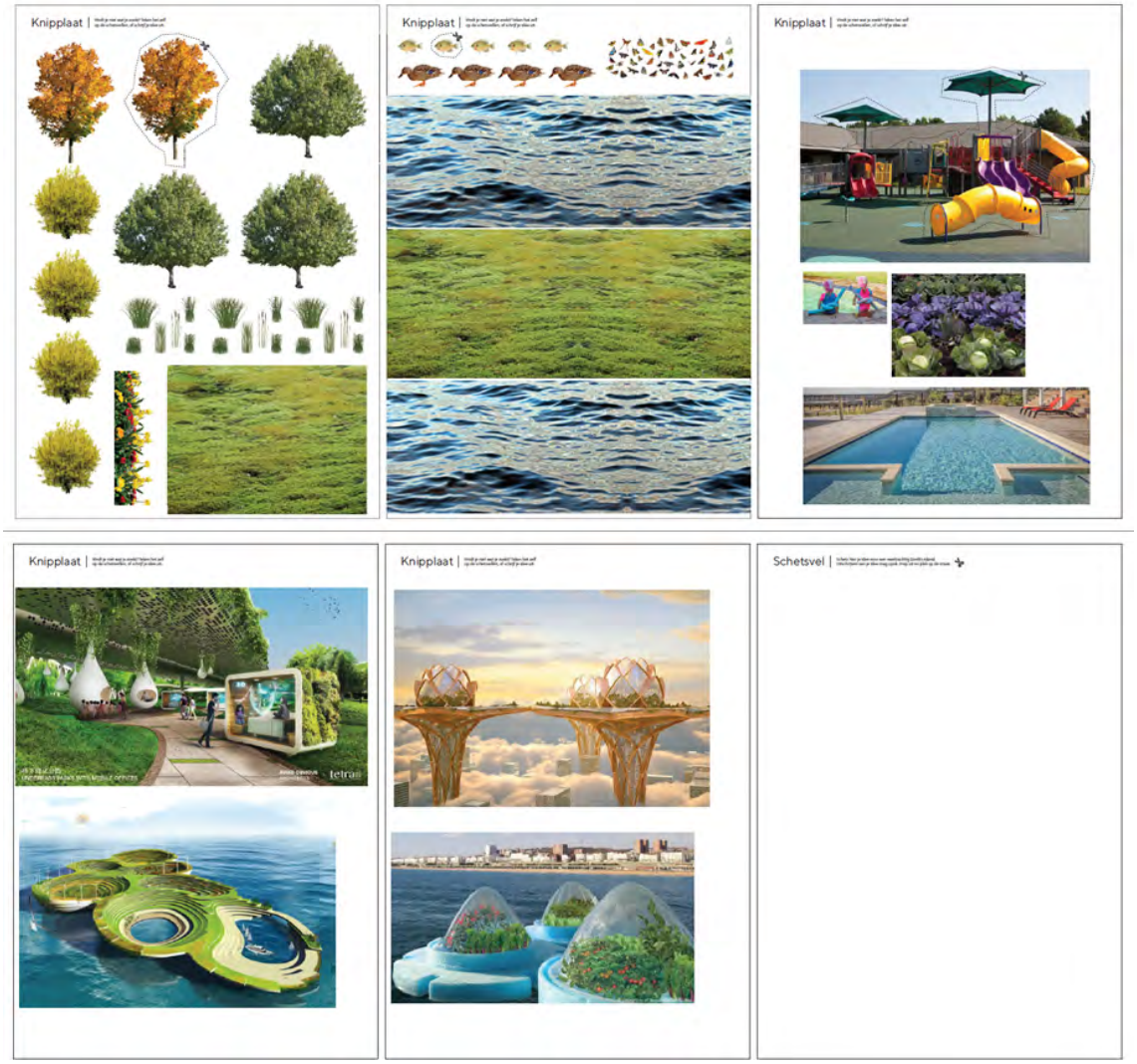


Figure 5.2.5: Assorted cut-and-paste and sketching pages for use on the concept streets.

A collage of photographs of the case study neighbourhood and surrounding streets (taken by Benedikt Marschütz and Arjan Wardekker) was placed on one window to provide context and inspiration. See Figure 5.2.6.

Figure 5.2.6: Photos of the neighbourhood, as displayed in the workshop.

5.2.2.2 Description of the interaction with researchers and local actors

In the co-design workshop, a group of twelve policymakers, residents and researchers designed final collages for two visions: Close-knit Island Community and Innovative Connections. The final collages are shown in Figure 5.2.7-8.

Figure 5.2.7: Photo of the final collage for 'Close-knit Island Community'.

Figure 5.2.8: Photo of the final collage for 'Innovative connections'.

Participants translated all the elements from the final collage into concrete options, wrote these on post-its, conducted a sticker-exercise to label options as short/medium/long term and essential/non-essential, and placed them on a timeline design that was also available as a large 'wall poster'. See Figure 5.2.9. The timeline runs from 2019-2050 and is divided into clear sections of short, medium, and long term. We chose this timeline because longer terms, which are quite common in climate science with horizons of up to 2100 or 2200, are even more abstract and less meaningful to local actors for this case study situation (cf. Wardekker et al., 2020). The short term (2020-2030) was deliberately wider than the other sections, because we expected that participants would present more options for that category. This was indeed the case.

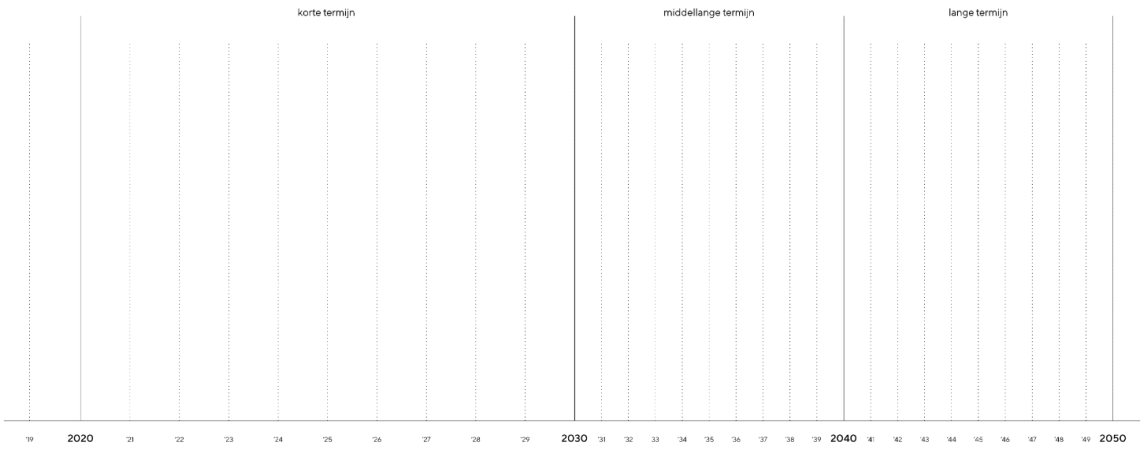


Figure 5.2.9: Timeline design for the scenario exercise.

5.2.2.3 Representation of climate information

The materials (concept streets, cut-and-paste elements, photos, final collages) included some climate elements. For instance, Figure 5.2.1 highlights the water that surrounds the city on all sides; Figure 5.2.2 shows the sun and clouds; and Figure 5.2.3 shows high water levels, clouds and heavy precipitation. However, most focus on depicting the local situation, including elements related to climate vulnerability (buildings, streets, people, vulnerable groups such as the elderly or the ill) and to climate adaptation (e.g. green spaces, floating houses, water storage). The Innovative Connections vision also intentionally addresses climate mitigation (e.g. green energy and other options for greenhouse gas emission reduction). This focus on local vulnerabilities and options, rather than mainly climate elements, can be seen in both the starting artwork and even more strongly in the final collages.

5.2.3 Reflection on the Dordrecht process and results

5.2.3.1 Advantages

The art-science conjoint analysis in the Dordrecht case study involved in particular graphic design and social co-design. A clear advantage of this approach is that it helped facilitate the research process and local design of climate adaptation visions, options, and scenarios. It helped bridge the disparate worlds of different scientific disciplines and different stakeholder groups, including policymakers, residents, and researchers. This type of art approach also involved a very tactile, physical mediation, which stimulated active discussion and creative work during the workshops and put all participants on an even playing field. The latter is particularly important, for instance if there are tensions, or perceived barriers or differences in expertise between participants. The line art also offered much, uncluttered white space, enticing people to add their own contributions. The streets and timeline were printed on large cardboard wall posters, which allowed multiple participants to work on them. The collaboration between the research team and the

graphic designers in developing the artwork also went very smoothly. One might speculate that graphic designers are used to working with a wide range of clients and purpose-driven assignments, compared to more art-driven processes such as painting or theatre. Of course, the specific situation in the case study and Dutch team also helped: the Dutch research team and project leader are very interdisciplinary, and Studio Lakmoes is specialised in knowledge visualisation. All in all, this led to a very useful and productive process.

5.2.3.2 Challenges

Several challenges and limitations can be observed as well. Graphic designs and line art worked well to represent physical elements that are easily visualised into recognizable objects, such as houses, people, clouds, etc. However, the narratives also involved more nebulous notions such as identity, history, sense of community and emotions such as hope and fear. Combination of the visual art with narrative handouts (short descriptions with quotes per vision) worked well to cover this. Combination with other art forms might be useful as well. The approach was also successful in combining the natural science and social science dimensions of adaptation, but in line with the previous point, might have more difficulty with humanities-related aspects, unless combined with other forms. Regarding the human dimensions of graphic design in art-science collaboration, while this approach worked very well, one could also argue that it is fairly goal-directed and instrumental. It helped elicit the 'insider perspective' of the local communities. Other art forms might be better at providing an 'outsider perspective'; e.g. an artist observing the proceedings and providing his or her own unique perspective on that.

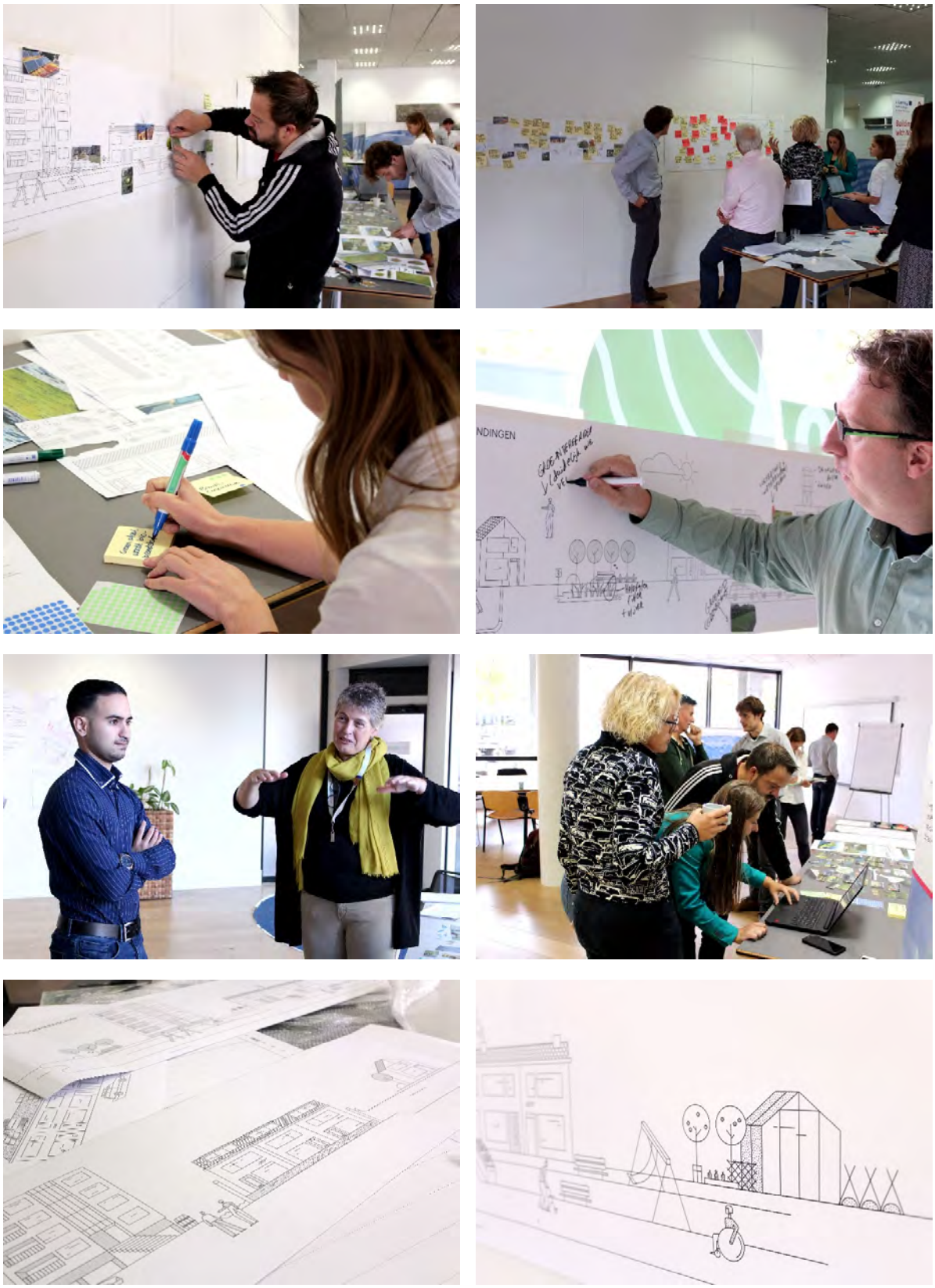


Figure 5.2.10: Photos from the workshop.

5.3 Jade Bay, Germany

5.3.1 Introduction

The idea of the art & anthropology project was to invite an artist for a photo- and/or video-documentation of the ethnographic project at the Jade Bay. In 2018, an attempt to work together with an artist specialised on video-documentation failed due to organizational and financial problems. In 2019, the photographer and journalist Werner Rudhart, agreed to join the project and to produce a photo-documentation of the ethnographic work. Together, we developed a concept and a working plan, followed by a four week stay in 2019 at the Jade Bay, with a special focus on the coastal village of Dangast, the most prominent tourist location and oldest sea bath at this North Sea coast. As one of the results, we currently work on an ethno-poetic photo documentation of the Jade Bay as a landscape of the Anthropocene. This photo documentation represents the local climate information processed through an intense art & anthropology collaboration. The lessons learned are identical with the step by step process of the fabrication of this art form.

5.3.2 Methodology and process

Werner Rudhart is a journalist and photographer, who lives mostly in Brazil. In the past decades, he has widely documented European and Brazilian landscapes and published in international journals. We had already previously worked together; for example, Werner Rudhart had documented my field research about Alpine herding cultures in Switzerland (Krauß 1987). In his journalistic work, he has an ethnographic approach to landscapes; this served as our common basis for the Jade Bay project. In many photo reports, Werner Rudhart documented natural catastrophes and the effects of climate change on indigenous populations in vulnerable surroundings. We both considered it as an interesting challenge to document

climate change as a process in a rich country like Germany with an engineered coastal landscape, the Jade Bay.

In our collaboration in 2019, we followed this time schedule as combined in the working contract with the university of Bremen, based on the deliverables of WP1 (Krauß 2019a,b,c):

- Design and presentation of an artistic concept, due September 2019
- Presentation of at least 15 photos on the CoCliServ meeting in Dangast, October 2019
- Delivery of another 15 photos until May 2020
- Presentation of final documentation 30.07.2020

The contract describes the tasks as follows:

"Artistic photo-documentation of (the effects of) climate change in the area of the Jade Bay, based on the ethnographic research and participant observation. The focus of the camera is on the construction of this extreme coastal landscape, on the interaction of coastal inhabitants with the climatic regime. The project is intended to follow the material, symbolic, semantic and metaphorical traces left by climate change, and it is open to the serendipities and emerging events in the everyday.

Conceptually, we follow these main topics:

- Climate as metaphor (i.e. FridaysforFuture demonstrations, symbolic activities, local climate activism and performances);
- Climate as work (i.e. dike maintenance, drainage, agriculture, tourism);
- Climate as weather, as hydro-, geo-, atmo- or biosphere:;
- Climate as global phenomenon, with the possibility of integrating work from comparable parts in the world.

In actual practice, the transitions are fluid between concrete activity and abstract concepts, between work and leisure, low and high tides, nature and construction

etc. The challenge is to make climate change explicit in merging the social and the physical climate."

5.3.2.1 The steps

Between August 2019 and April 2020, the art & science project executed the following steps:

August / September 2019: developing artistic concept

September / October 2019: joint field stay in the Jade Bay area

October 22nd – 26th 2019: presentation of photos at CoCliServ meeting in Dangast

March / April 2020: selection of representative sample of 100 photos / discussion of artistic concept

Forthcoming: planned field stay in May, delayed due to Corona pandemic

Current work: combining writing and pictures

5.3.3 Theoretical concept

In the center of CoCliServ is sense-making and bridging the gap between science and society, and turning matters of fact into matters of concern. In Deliverable 1.1, we wrote:

"The challenge of mapping narratives of change is to make facts about climate change locally meaningful and to reconnect climate information and everyday experience in the real world; for this purpose, CocliServ also experiments with art and other forms of collaboration. Instead of playing out facts against fiction, WP1 maps meaningful stories that address and make sense of changes of climate, the seasons, the weather, or the environment." (Krauß et al., 2019a, 17).

During the work process, we realized that we want to bring together ethnography and art in a literal way, that is, actually combining ethnographic description with

photos. As a source of inspiration and guidance, we relied on the combination of photo and text in Levi-Strauss' "Tristes tropiques" (1955); the work of the German ethnographer and writer Hubert Fichte and the photographer Eleonore Mau (Braun 2005), the ethno-poetic writings by Renato Rosaldo (2013) and the dramatic narrative photography of Sebastião Salgado in Brazil. In short, the cooperation between art and anthropology merged into an ethno-poetic project.

But where are exactly the meeting points, which are the boundary objects, and what does this "boundary work" (Rödder 2017) look like? How to link "sediments and sentiments", the material and the semiotic (Krauß 2017)? In CoCliServ, we assume that narratives bridge these conceptual gaps and make events or statistics meaningful. In the course of the first year of CoCliServ, we designed a methodological tool box for dealing effectively with narratives. In a first step, we were concerned with mapping iconic representations that define a landscape, with a specific focus on climate change. We identified different types of narratives, like geopolitical narratives, narratives of identity, or scientific narratives (Krauß et al., 2019a).

In the second step (Krauß et al., 2019b), we focused on the different time scales that make up a coastal landscape, and we applied the concept of "chronotope" as a framework. A Chronotope is "a specific configuration of time and space that generate stories through which a society examines itself" (Pratt 2017). In her contribution to an edited book entitled „The art of living on a damaged planet: ghosts and monsters of the Anthropocene" (Tsing, Swanson eds., 2017), Mary Pratt suggests that the Anthropocene is a chronotope, which is defined by the indistinguishability of nature and culture and gives rise to a myriad of stories (ibid). The challenge is to make these ghosts and monsters visible, which are usually a blind spot in our conception of reality.

In short, we have to deal with a blind spot when we want to link science and society, sediments and sentiments, the material and the semiotic, the written and the visual. This is how the blind spot became our central concept, our starting point and motif. In the introduction to the photo book of Teju Cole, "The blind spot", the writer Siri Hustvedt gives a precise definition of this phenomenon:

"Inside each human eye and the eyes of other vertebrates, there is a blind spot where the retina meets the optic nerve. This area, the optic disc, is insensitive to light and receives no visual information. Every person should therefore experience a significant blind spot in her or his visual field – about the size of an orange held at arm's length. And yet, normally sighted people do not walk around with holes in their vision. Somehow the absence is filled. The unanswered question is: How? The hypotheses vary, and they depend on a larger understanding of the human organism and its relation to what lies beyond its skin. There are ongoing arguments about whether we see the world directly or whether we see an internally generated representation of the world. The arguments on either side are complex, nuanced, unresolved, and, depending on how you frame the problem, not necessarily contradictory. "

This "blind spot" served as a working definition of the photo documentation of the ethnographic work at the Jade Bay. A photo documentation is a collaborative effort between us, but also between us and the field, the sea, the people, the environment. A documentation turned out to be more than simply an illustration of the ethnographic work; it means producing collaborative forms of representation of the coastal landscape.

Finally, there was a strong influence of the field concerning the methodological / theoretical approach, which is related to the painter Franz Radziwill, who lived in Dangast, where his former house is now a museum in honour of his work. After WWII, Franz Radziwill did not follow the so-called abstract turn in the art world. Instead, he painted in a style which is dubbed as New Objectivity, in combination

with Magic Realism. In many ways, this influenced our approach to the reality we wanted to depict, including all the ghosts and phantoms of the past, the present and the future.

Figure 5.3.1: The peninsula of the blissed (Franz Radziwill Gesellschaft, 2014)

5.3.4 Outcomes

The art form created through the CoCliServ collaboration is a photo documentation of representations of climate change and the atmosphere of the Jade Bay. The photos will be complemented by ethno-poetic texts.

5.3.4.1 The description of the art form

The core of the art project is a sample of several hundreds of photographs taken by Werner Rudhart at the coast of the Jade Bay, mainly in the area of the sea bath Dangast. From this sample, a set of 20 or 30 photos will be chosen for the creation of a photo-ethnographic documentation, mixing photography and ethno-poetic comments. Currently, we work together in creating a photo-book including an essay with the working title “Blind spot: The climate of the peninsula of the blissed”. Further ways of presentation are under discussion; some of the photos were presented already at the occasion of the CoCliServ meeting in Dangast. Here two examples from the combination of text / photo of the forthcoming ethno-poetic documentation (text translated by the author):

"Freedom / haunting: two sides of the same experience. Conjuring a future full of pasts, a ghost-ridden freedom is both a way to move on and a way to remember." (Tsing, A.L., The mushroom at the end of the world 2015, 79).

The coastal landscape is haunted by the dead souls of past flood catastrophes, of wars, the victims of forced labor and the machinery of modernity, while the tides come and go, relentlessly.

The ladies rest in the Empire of Dreams. On the horizon, the infrastructures might remind them of the industrial landscape where they fled from, for summer holidays. The tides come and go, they do not need their help. The manager of the resort says in an interview, when I asked him about the million Euro real estate investment in the middle of the village: If there are four men sitting at a table, and there is a piece of meat on the table, the strongest one will grab and eat it, sooner or later. This is the way it goes, Herr Krauß, there is no room for illusions.

When the flood comes, the phallus inseminates the sea, the artist says. I had thought, the phallus symbolizes the men who are afraid of the the soft and fluid waters, and that is why they build dams to contain the sea and chimneys like those of the coal plants on the other side of the Jade bay.

On a public hearing, I was surprised to hear that more birds are killed by cars than by wind turbines. In the *Umweltstation Iffens*, Wolfgang shows us a collection of embalmed birds, which he has saved from an old school building. Once, the teacher had encouraged the pupils to bring dead birds to school. He carefully embalmed the birds, labelled them correctly and put them on display in this cabinet.

Temple Grandin, the autistic animal professor, states that cows think in pictures. The coast is a grassland location. Without cows, there would be no pasture farming, no milk quota system, no manure regulation, no vanishing of small farms, and there would be less emission of methane. During the drought of summer 2018, farmers brought cattle to the slaughterhouse because they could not afford buying extra feed. Farmer Bruns says that the word capital originates from cattle. Coastal landscape in the Capitalocene: Cows look at us.

5.3.4.2 The way the art form interacts with the sciences and the public / society

The interaction of art with the public and (environmental) science is something that is already out there, in the field. The old sea-bath Dangast, which formerly was sustained by fishery and agriculture, has a long art tradition. In the 1920ies, members of “Die Brücke”, an expressionist collective of artists, spent holidays in Dangast and were inspired by its light and environment. In their footsteps, the painter Franz Radziwill came to Dangast, where he lived with his family. Still today, his house is a small museum run by his daughter. Dangast became a frequent topic of his paintings. In many of them, he mixed the typical sight of the Dangast peninsula with fragments of modernity and hints towards environmental pollution. One of his most famous paintings has the slightly ironic title “The peninsula of the blessed”. It displays both an idyllic scenery, shot with disturbing elements and supernatural phenomena. This painting can be easily read as anticipating Dangast in the Anthropocene, with its merging of nature and technology, individual freedom and mass tourism, natural beauty and environmental destruction. Studying this painting reveals a blind spot in the scientific endeavour to enlighten the public about climate change: since the 1950ies, the ills of modernity are plainly visible in the popular paintings of Franz Radziwill. The label of Dangast as a village of art is

directly linked to this line of thought as expressed by the artists living there. During my fieldwork, I followed some of the conflicts in this village, which exactly unfold along these lines: the emergence of mass tourism, the relentless success of neo-liberal ideology, the difficult balance between tourism and environmental awareness, and the omnipresence of climate change. Thus, the art form represents the entanglements of climate, politics and everyday life; it intends to open up a reality which is lived but hardly made explicit.

The photographer attended various events (including the CoCliServ meeting in Dangast) where scientists and environmentalists presented information about climate change and interacted with the local audience. During the four weeks in September / October 2019, we lived together on an organic farm close to Varel, which also served as base for my fieldwork. From there, Werner Rudhart practiced participant observation alongside my study; he established contacts with local actors while exploring the coastal landscape on his own terms. I introduced him to some of my informants and shared my knowledge gained in the previous months of fieldwork. Most of all, he shared the same landscape as those who inhabit, administer, research and shape it. He also shared the often-times rapid changes of weather, the light, the atmosphere. After a short time, he was recognized as the photographer connected to the research project; photographic documentation as well as artistic presentation are part of the local atmosphere people are proud of. Art and anthropology as a practice were visible, in the village of Dangast and the area of the Jade Bay, with the project of making climate change visible as a boundary object.

5.3.4.3 Particularities related to the representation of local information:

As presented in WP1, local climate information is a bag full of surprises. For example, at the public workshop in Dangast, climate scientists presented climate change as a series of facts, numbers and models. Local actors added a wide array of examples from communal life in the Jade Bay area (Krauß 2019). In doing so,

the boundaries between climate as a statistical phenomenon and general ecological or environmental problems were transcended, as well as the ones between science and lifeworld. Climate change as a matter of fact turned into a metaphor for many of the evils of modernity; plastic, intensive agriculture, mobility and other issues were linked to climate change. There were long lists on the whiteboard, which were hard to classify. Instead of a list which neatly separates concerns and puts them into little boxes, I felt reminded once again of Franz Radziwill's painting "the peninsula of the blissed" and the accurate mess it presents. It is the mixture of magic realism and New Objectivity which Radziwill presents in art history and which served as a palimpsest for our art & science project.

5.3.5 Challenges

5.3.5.1 the artistic media

The North Sea coast in general and the Jade Bay specifically are very popular motifs for tourists and artists alike. There are literally millions of photos of the sun rise, of the sun down, the fog, the tides, simply everything. The challenge was to find out what is missing or what could be added, what makes a difference, where is the blind spot of this totalizing visualization.

5.3.5.2 The human dimension

Taking pictures of people in public has frequently been a problem. In Germany, people are highly sensitive when it comes to privacy issues, while in Brazil people are generally happy to be photographed. This made taking pictures of camping sites, of beaches, of people walking in the mudflats etc a permanent problem. While for me as an ethnographer, privacy and personal sensibilities are integral part of my investigation, the photographer acted differently. These tensions turned out to be highly productive and highlighted a difference in the attitude towards the objects of interest.

Last but not least, there is the virus which impedes another field stay. It was planned to make a series of portraits of the main actors, but this involves close contact with people which currently is not possible. Consequently, the focus will be on the considerable body of photos that already exist, with a strong focus on climate as it materializes in the landscape.

5.3.6 Interdisciplinarity lessons learned

5.3.6.1 Lesson learned #1:

Artists live and work in a rhythm different from academics. “Hiring” an artist for a project involves complicated management of time and money. Furthermore, it is impossible to predict in advance if the collaboration will be successful. Art is a process which is dependent on intuition and serendipity, as is ethnography to a certain degree.

5.3.6.2 Lesson learned #2:

In practice, the photo documentation of the ethnographic fieldwork was an interdisciplinary and continuous dialog between art & anthropology. A documentary is not just a depiction of something that already exists, but it is an active process that produces something new. Photography did not only add something to the body of ethnographic work that already existed; instead it turned into a collaborative activity with its own dynamic and new insights.

5.3.6.3 Lesson learned #3:

The anthropology & art cooperation was different from the one with climate science. The communication between science and anthropology was exclusively about the production and exchange of data and information. As an anthropologist, I always felt uneasy about reducing complex field experiences and long conversations or interactions into “data” which were either “useful” or either “right” or “wrong”. The photographer-artist shared the same feeling and unease, from the beginning: what kind of data did he have to produce? What kind of product was he

expected to deliver? It is difficult to get rid of this kind of thinking, which is common in interdisciplinary projects. In the art & anthropology collaboration, we discussed this kind of pressure from the beginning and started to reset the default position. We both had already worked in and about various landscapes, and we compared our methods how we explored these landscapes, what it takes to understand, to see and to feel the specific atmosphere of a territory, understood as an amalgam of the physical, the geological, the social and political atmospheres. Our explorations were focused on the blind spot; we want to make explicit the phantoms and ghosts of the Anthropocene, as Tsing et al put it, in a specific combination of word and picture.

5.3.6.4 Lesson learned #4:

Art is guided by art. Dangast as a field site turned out to be instructive. The work of Franz Radziwill actually served as an inspiration. In his paintings, he linked different elements of reality in new ways which made explicit new aspects of the coastal landscape and the lifeworld of modernity with its environmental degradation. We intend to do the same for climate change.

5.3.6.5 Lesson learned #5

Photography is about light, and light is linked to weather and time. I did not know about the importance of light, even though the light of the Northern coast is one of the reasons why people love to spend their time in this area.

5.3.6.6 Lesson learned #6

We absorbed local climate information in many ways; as daily weather, in talks about the weather, in deciphering historical landmarks, in interviews etc. People were curious in our work and easily understood that we want to depict climate change beyond statistics and numbers. Our project served as an entry point for debating what it means to live in a coastal landscape with a changing climate. We

opened up new perspectives through our presence and work; both photography and anthropology are work in public.

5.4 Kerourien, Brest, France

5.4.1 Introduction

Part of this section 5.4 have been published as a CoCliServ outcome in the paper "Facing Climate Injustices: Community Trust-Building for Climate Services through Arts and Sciences Narrative Co-Production." The paper is available in open access and its reference in the bibliographic section from this Deliverable 4.4. Let's move forward with the Kerourien's introduction:

The peri-urban neighborhood of Kerourien is in the port city of Brest (Brittany, France). It is located in a coastal area with low population density on the western edge of France. Kerourien is a 30-minute walk from where the Bay of Brest connects to the Mer d'Iroise, part of the Atlantic ocean system. It is technically coastal, however its residents are not seafarers or fishers, they live in a suburban housing development similar to many found throughout France.

Climate change and its effects have been studied in the Brest area for decades. We know today, as shown for example in L'Hévéder et al. (2017), that temperature plays a fundamental role in ocean circulation; stratification; chemical and biogeochemical processes such as degradation, dissolution, precipitation; and in controlling the spatial distribution, metabolic rates and life cycles of marine flora and fauna (e. g. Bissinger et al. 2008, Chen 2015, Helmuth et al. 2006, Philippart et al 2011, Thomas et al. 2016 in L'Hévéder et al. 2017). Kerourien's context is that of an oceanic region with sea temperature sensitives to global change, this area is a biogeographic boundary zone and in recent years warm water species have become much more common (Southward et al. 1995). Ecological problems related to sea surface temperature change also include alterations in nutrient delivery from land

to sea; arrival of invasive species and changes in host–pathogen relationships and biological interactions (Poloczanska et al. 2008). These observations are combined with coastal erosion and extreme weather events such as droughts, exceptional storms, and heat waves, as experienced in 2003.

The 2019-2025 city climate plan for Brest pays particularly close attention to mitigation, and thus to energy production and consumption, concluding that: (i) housing (heating, hot water and all uses of electricity) is responsible for 36% of energy consumption in the Brest metropolitan area and 28% of greenhouse gas emissions. The energy used in the Brest metropolitan area is mainly of fossil origin (gas: 37% and oil: 35%), the net quantity stored annually in the Brest metropolitan area is estimated to be 8,633 tonnes of CO_2, i.e., around 1% of its annual emissions. While adaptation planning is a legal requirement, very little is publicized and the online public consultations did not mobilize many residents. Mitigation seems to remain higher on the city's list of priorities.

Kerourien has 1200 residents (2013 census), and the neighbourhood is mostly organized around post-war housing projects. It is a priority area for the city, which implies a well-identified social vulnerability including demographics such as: 24.4% single-parent families, with 40% of its residents under the age of 25, and more than 20 nationalities represented. Kerourien is one of the most diverse areas in the city and faces the most challenges in terms of urbanization, migration, and disempowerment (Fig 1). Thirty-two percent of its inhabitants are unemployed versus 12% in the rest of the city, with an apex of 46% for youth between the ages of 15-24 versus 21% for the city rate. The schooling rate for youth ages 18-24 is 35% versus 65% for the city. This is Kerourien's current context. From the neighbourhood's beginning there have been determined efforts for improvement conditioned by its unbalanced social structure. Currently five formal social work organizations conduct on-going efforts here, but with high unemployment and growing imbalances, the question often arises: "who helps whom".

5.4.2 Methodology and process

5.4.2.1 On the process of linking a local event and our climate services centered inquiry

The initial step of our co-production work focused on collecting narratives. This was an ad hoc process, which evolved along the way. We present our approach and associated observations as the first part of our results, describing the organisational stages and observations on procedures and substance (Table 3).

As a starting point, we formed a working group of four partners who had participated in preparing the project, including: The Maquis, the Centre social Couleurs quartier, the Theatre du Grain, and the CEARC research center.

The five initial meetings focused on identifying the means to simultaneously mobilize the neighbourhood around locally salient issues while giving access to potential conversations about climate-related concerns. The upcoming 50th anniversary of the neighbourhood was chosen as an opportunity to achieve this goal.

A list of stakeholders was established by the four core partners with the provision that snowballing was possible if a category had been overlooked. Accordingly, over the course of events we incorporated additional partners, but to a limited extent and very progressively. The initial stakeholder list comprised eight groups and institutions. After limited snowballing, it expanded to 14 members (Table 1).

Name	Structure	Role
Le théâtre du Grain	Theater company	Project partner
Le Maquis	Policy “factory” NGO	Project partner
Centre Social Couleur Quartier	Social center	Project partner
Mairie de Quartier de Saint-Pierre	City service	Local stakeholder
Association Don Bosco	Social inclusion NGO	Local stakeholder
Brest Métropole Habitat	City services	Local stakeholder

Confédération syndicale des familles (CSF)	Consumers NGO	Local stakeholder
Jardins partagés de la Fontaine Margot	Shared garden NGO	Local stakeholder
Les Lapinoux	Nursery assistants NGO	Local stakeholder
Groupe scolaire Jean de La Fontaine	School	Local stakeholder
Cinémathèque de Bretagne	Audio-visual NGO	Local stakeholder
Canal TiZef	Audio-visual NGO	Local stakeholder
City Hall	City service	Local stakeholder
Residents	Non-associated Residents	Local stakeholder

Table 5.4.1: Stakeholders involved in the local coordination committee.

These stakeholders were invited to a foundational meeting to identify shared objectives within the context of organizing Kerourien's 50th anniversary celebration. The goal that generated the most widespread support was to dispell the myth that "in Kerouien only bad things happen". The anniversary celebration was thus named les Belles histoires de Kerourien (Kerourien's beautiful stories). The group of 14 stakeholders formally became the local coordination committee for the 50th anniversary.

At that point, the aim of climate service co-production seemed remote. However the intention, climate-services wise, was to gather narratives in order to explore the linkages between explicit concerns and climate issues, which seemed mostly invisible in Kerourien. Working on les Belles histoires with and for Kerourien residents seemed to be a quite challenging and promising opportunity.

We held monthly meetings of the 14-member local coordinating committee. These occurred under the leadership of its rapidly established executive board, composed of four members of the initial core working group. In the course of these meetings, stories were progressively identified. Four important developments were observed:

1 Members of the group acknowledged the need to increase the involvement of community members;

2 Systematic archive research became necessary because, according to those around the table, the stories being told needed anchoring in dated, identifiable events that those present had not necessarily witnessed but that were still part of the memories of the neighbourhood;

3 An interview protocol was devised to simultaneously involve more members of the local community and gather stories in the words of those most affected;

4 Practical matters were delegated to implementation committees tasked with managing specific practical concerns for the 50th anniversary celebration, such as: welcoming/ticketing; hiking, cycling, scooters; canteen/kitchen organizing; reports, video editing, projections (17 in total). These were powerful recruitment tools, and many community members participated.

These developments were important on two levels. First, the local coordinating committee turned to the a priori climate-centred transdisciplinary team to mobilise their expertise in terms of public participation and research. Second, it allowed for a more systemised approach to recruitment and collecting local and non-local narratives.

A transdisciplinary research design was then adopted to prepare the 50th anniversary celebration and its associated art form. This included systematising the identification of archive materials, their sorting, key-wording, storage, and subsequent use. These archives contained materials such as: personal photographs, drawings, memorabilia, media excerpts, and recorded songs collected through on-site participant observation. Gathering the archive had two effects. First, it allowed us to put Kerourien's stigma in perspective both as the product of historical and political

processes, and as the product of the amplification of anecdotal events. Second, compiling the archive also lent a sense of materiality to the process.

A semi-structured interview protocol was designed and the associated interview framework was developed. Both were developed with input from the local coordination committee and members of the local community. The interview protocol contained the following questions:

- Where were you born?
- What was the path you took that brought you to Kerourien?
- Can you tell us about the first time you came to Kerourien? How did you feel?
- Tell us about three events in Kerourien that have been important to you (personally).
- How do you feel when you look at Kerourien today?
- Can you describe three dreams you have for Kerourien in 2050 (in 30 years)?
- What would it take to make them come true?
- Do you have anything you would like to add?

The interview process led to the collection of narratives that stressed the need for les Belles histoires. Interviewees were proud to be part of the neighbourhood and expressed a deep wish to shift the stigma and be seen by the city as the decent people they recognise themselves to be:

“What I like is the moments when you help people and they thank you. Help with a stroller, or the shopping bags of an elderly lady, hold a door. Small moments like that and people thank you. A thank you. Not much, but attention, a gesture, a coffee, a smile.”

“We have lots of things to do. And in Kerourien we think, we act, we do a lot of things for people to gather. Faced with the disorder of the world, here Kerourien is bubbling with ideas. How, in the face of global reality, we invent something here to rebuild, to find meaning, with the people of the neighbourhood. Many people do not give up. Continue tirelessly to fight, to resist. Day by day. Right here. Now.”

At that point, our experiment in climate service co-production had taken quite a turn. First, narratives were being collected with a level of robustness that would

make them usable in a science-centred process. Second, the team of climate social-scientists and artists were putting their skills to work to serve the local community in realms that may seem far removed from climate issues, but that allowed for a fascinating exercise in trust building and, as a result, quite extensive data collection.

Papers, objects, newspaper, bits and pieces of local narratives, were made physically available. This led to another important development: obtaining two rooms and toilets fully dedicated to those preparing the 50th anniversary celebration. This locally anchored what had otherwise been a "placeless" exercise. Stories, archives, drawings, timelines all could be pinned on the walls. Interviews were conducted in the les Belles histoires room. Involvement continued growing, with community members "just passing through" to "take a look," and thereafter staying around, becoming contributors to the anniversary celebration preparations and to the archive and narratives corpus we were compiling (Table 5.4.2).

For the climate service co-production work, it meant a wealth of stories were made available. Ongoing dialogue with and participation from the artists meant that a central art form was progressively taking shape. This acted as a filter, prioritizing local issues as they appeared in the stories being told. A script and a scenography emerged, encapsulating the stories being told in Kerourien.

Primary or Secondary Source	Type	Number of items	Reference Code
Primary	Audio interview	15	AI
Primary	Video interview	7	VI
Primary	Workshop	1	W
Primary	Art Form	3	AF
Primary	Meeting minutes	10	MN
Secondary	Unpublished papers, not peer-reviewed	3	UNPRP

Secondary	Published papers, not peer-reviewed	302	PNPRP
Secondary	Published peer-reviewed papers	2	PPRP
Secondary	Published reports and books	7	PR
Secondary	Selected press releases	25	SPR
Secondary	Films	2	F
Secondary	Songs	16	S
Secondary	Official photographs	5	OP
Secondary	Residents' selected photographs	25	ISP
Primary	Project selected photographs	25	PSP

Table 5.4.2: Summary description of the data collected through the joint process of preparing Kerourien's 50th anniversary and collecting narratives as part of the climate service co-production process.

This process (Table 5.4.3) led to substantive and procedural benefits. On the substantive front, robust data were collected. These were used both for creating an art form and for laying the foundations for the climate service co-production process. On the procedural front, the neighbourhood was highly involved and, more importantly, trust had been built and mobilised for collective action.

Event / Activity	Date	Key observation
Start of the project's implementation in Kerourien / Setting up the working group	09/17	These four partners have a well-established working relationship: trust between them is well established. Issues of symbolic hierarchies, associated with status (artist are not as regularly employed as social workers or scientists)

Initial meetings and identification of a modus operandi / Decision taken to contribute proactively the neighbourhood's 50th anniversary celebration.	6/10/17	The anniversary was to take place in June 2018, then delayed to October 2018. Content and program are still a total blank page
Identification and invitation of all potential stakeholders / Foundational meeting of the local coordination group. The initial working group is turned into the local coordination group executive board / Proactively implementing the local coordination groups' decisions.	26/10/17	Meeting facilitation was organized around the following aim: identifying a common goal for all present around which everyone could be mobilized. Of the 14 members, 10 are residents of the neighbourhood and act as initial proxies for the resident population.
Monthly meetings of the local coordination group / Discussing the planning and programming of the 50th anniversary.	From 11/17 to 11/ 18	All decisions taken collectively. When felt necessary votes were organized.
Leaflet for volunteers.	12/17	The first step to spread the word and be publicly explicit with the intentions and partnerships.
Tasking a specific group for conducting interviews.	10/2017-06/18	
Obtaining fully dedicated facilities (2 rooms and toilets).	11/17	Agreement with the City as landlord.
Moving the date of the anniversary form June to October.	12/17	Decision taken to more systematically document the process.

Establishing thematic working groups / 17 specialized working groups are created.	01/18	These working groups are open to anyone willing to contribute to organizing the 50th anniversary.
The "beautiful stories" process public presentation.	15/01/18	At 10h, 15h and 20h to be sure all residents have the chance to come if they wish.
Formal closure of the social center after arson.	22/02 to 8/03/18	The perpetrators are identified but the ongoing efforts of trust-building are damaged as well as the front door of the social centre itself.
Weekly meetings / Discussing the process and detailed programming of the 50th anniversary.	From 03/18 for some of the working groups.	Some meetings are working group focused, some are plenary with all partners.
Poster proposed by the graphic artist, discussion at the coordination level and final version available to spread the word.	06/18	A new iconic image for the neighbourhood.
Final programme available.	07/18	
Efforts increase progressively going from weekly to daily.	09-10/18	The number of people engaged grows day by day, the thematic working groups structure is key.
Kerourien's beautiful stories.	17-21/10/18	A popular success with an strong public and mass media impact.

"Beautiful stories" review meeting.	11/18	People express that Kerourien is whole again, community members have a renewed sense of sharing common narratives.

Table 5.4.3: Chronological summary of the process of jointly organizing Kerourien's 50th anniversary and collecting local narratives for Art forms.

What did the climate service co-production component of the process learn from the exercise up to now? First, we witnessed progressive involvement from community members. By embedding ourselves in a process focused on highly salient non-climate related issues we gained access to community members and to issues that would not have been accessible otherwise, including a diversity of narratives.

More importantly, and this came a bit as a surprise, the transdisciplinary abilities of the research team were called upon to help achieve non-science centered goals. An initially asymmetrical situation became a situation of more balanced cross-fertilization. Somehow our respective specialized lines of action became blurred and from this trust and capacity for action grew.

This situation created a central question: how do we manage the different natures of the various processes at hand – celebrating Kerourien, preparing an artform, and identifying how local issues relate to climate issues within the context of climate service co-production?

As stated above, our working hypothesis was that all issues are connected with climate issues, and these connections deserve to be made explicit. This hypothesis led us to commit to maintaining the blurring of the lines as artists working with and for social scientists when it comes to the climate dimension; and social scientists working with and for artists when it comes to preparing the art form, rooting

it in local issues and giving the identified and collected stories back to the community.

5.4.2.2 Central narratives identified and used for the art form and the climate-centered analysis

The process described here between artists, social scientists, and community members led to the joint identification of a series of three narratives seen as fundamental for the local community. These are available in detail, including interview quotes and the final script of the play, in the supplementary materials. We summarize these materials here, highlighting the most important characteristics. The narrative identification and explication process was conducted through a systematic analysis (iterative thematic analysis), conducted by the social scientists. The creative writing and scenography was conducted by the artists. These phases included on-going interaction with community members, and thus evolved under their constant scrutiny, including during the first and following days of the play.

5.4.3 Outcomes

5.4.3.1 The theater play and its script.

The final art form involved two actors, a musician, a video-artist, a graphic designer, and a scientist. It consisted of a 40-minute-long play, performed on an outside stage setup on-sight in Kerourien. It included a projection on one of Kerourien's largest buildings, used as an "interactive screen" (the actors sometimes performing through the windows of the building's apartments).

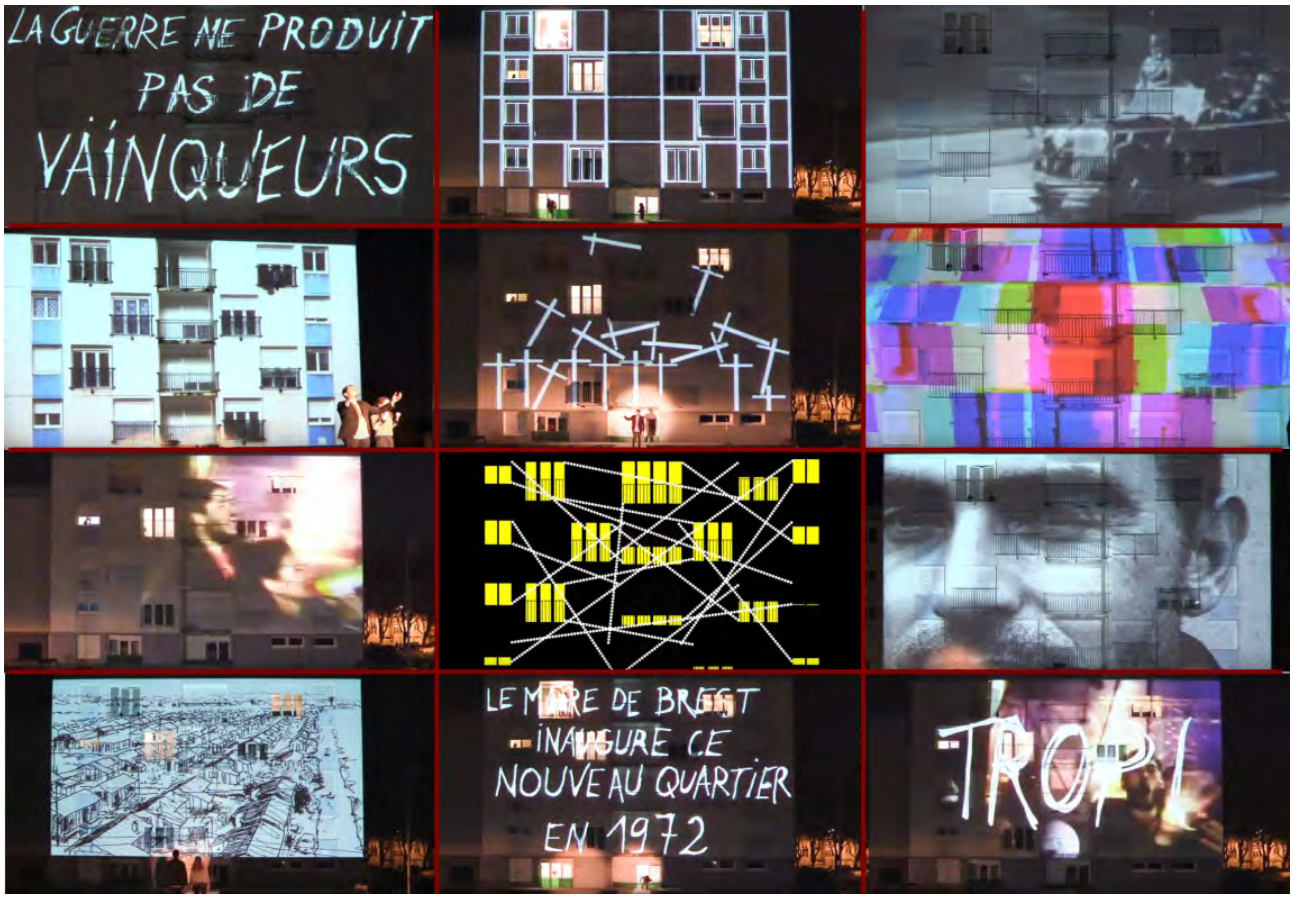


Figure 5.4.4: Photos taken during the first day of the play, showing the projection on one of Kerourien's central buildings and the two actors on the Kerourien theater set. The 58-minute video with captions is available through this link:

https://www.youtube.com/watch?v=QIUBACMW7pU

One of the transdiciplinary team members is a theatre director. He served as the main script writer, and began working on Kerourien's beautiful stories in early June 2018, once the raw materials were available (see Table 2 for details) and the shared framework was defined along with the final program. Drawing from the raw materials, he and one of the actors, who helped with the dramaturgy, created a first version of the script corresponding to the first pruning of the available corpora, identifying main emergent subjects. The script underwent several iterations of revision by the research team and community members.

Sample of the initial 15 minutes of the play's script, with the identification of the main narratives.

English version	Main narrative as defined in the text
Mikaël - What I like... What I like is when you help people and they thank you. Carrying a stroller or an old lady's shopping bags, holding a door. Little moments like that and people thank you. A thank you. Not much, but an attention, a gesture, a coffee, a smile. It touches me. It makes me want to go on. It happens every day. You have to pay attention to these little moments. In fact I don't understand when people say we don't talk to each other. Every day I say dozens and dozens of hello's. A lot of people shake my hand. People of all ages. Children, adults. Even teenagers making noise with their scooters. There's a respect. I have happy moments every day. Although it doesn't look like it's a very, very, very quiet neighborhood either. That's not what I said. Besides, if I said that, people wouldn't believe me... and I'm not here to lie. But since I've been here, I don't even know how many times I've said hello. What's sure is that there are lots of things to do to get people to talk to each other.	The first generation laid low. The second generation crashed. The third is restless.
Some things I can't stand. When people here are called “loosers”, that's the kind of stuff I can't stand. Or if you hear "you're not home here". Well, you don't feel at home, it's inevitable. And people who've been here for years end up not feeling at home. It's true that people come here from all over. That's what creates the richness of this neighborhood, I think. And when you listen to people, all they've been through to get here, I can tell you that you have a lot of respect for them. I mean, that's what it does to me. The fact is, you don't just happen to land in Kerourien.	The first generation laid low. The second generation crashed. The third is restless.

Mamm Goz - Again those kids who give us crap? Even my TV I can't hear it with all your faking. This is a building, not a movie screen. Mikaël - Madam, we apologize for disturbing you. We are in the middle of a show that retraces the 50 years of Kerouri-en's history.	Not applicable
Mamm Goz - I've lived here since '68. Since the beginning of the neighborhood. Isabelle - So you're going to be able to tell us things? Mamm Goz - I heard you talking earlier. I heard the tapes. Well, you know what? Even before the war we were called loosers. I didn't even live in Brest. I lived in Recouvrance. I knew the barracks at Polygon Butte. And there they still called us loosers. That's what the bourgeois downtown called us.	Girls don't dance with us when they know we're from the [...]
But we wouldn't let it happen. Oh, boy.	I have a say
	Girls don't dance with us when they know we're from the [...]

Isabelle - I don't know what's going on, but I feel a general unease. Something's not right. When I go out in the street I hear rumours, which gradually take shape. I hear gossip, dirty things being said. More and more. Misery has set in and the ground is shaking. As if it's going to crumble beneath our feet. Something's going to happen, something very important. I feel it, as if the air is getting heavier, more threatening. We need scapegoats, we need to find the culprits.	Not applicable
Mikael - I'm sick of it. Fed up with this. I can't take it anymore. They don't care about us. We know where all this trouble is coming from and they're not doing anything about it. Let them die. Let them kill the people responsible for the misery of unemployment and the exploitation of workers.	I have a say
And then these... these foreigners with their customs that aren't ours....	The first generation laid low. The second generation crashed. The third is restless.
Isabelle - These were unreasonable times The dead had been invited to the feast We were making sandcastles We mistook wolves for dogs (Aragon)	Not applicable
GO War is declared on Nazi Germany (written) Mikael - We have been, we are, overwhelmed by the mechanical, land and air power of the enemy. Infinitely more than their numbers, it is the tanks, the planes, the tactics of the Germans that are making us	Girls don't dance with us when they know we're from the [...]

retreat. It is the tanks, the planes, the tactics of the Germans that surprised our leaders to the point of bringing them to where they are today.	
But has the last word been said? Should hope disappear? Is defeat final? No!	I have a say
UP + GO On 19 June 1940, the Nazis are in Brest A Cut Date Isabelle - The Germans are in Brest! It took them 5 days to get here! What will become of us? We're a military port, an arsenal. They're cramming everywhere. They're forcing us to serve the Nazi war machine. They make us build submarine bases, bunkers, blockhouses.	Girls don't dance with us when they know we're from the [...]
We're Brest workers. There are also Spaniards with us. Refugees condemned to death by Franco's regime. Forced to flee their country and find themselves working for the Nazis. We must resist.	I have a say

GO 1944 A Cut Date Mikael - The Allied landing is imminent. The lines occupied by the Nazis must be bombed. The port of Brest is a priority target. Its destructive capacity must be destroyed. The bombing of the arsenal must be total, nothing must remain. Final victory is at stake. GO War does not produce winners. Only victims. (written) Isabelle - War does not produce victors. Only victims. GO fades in with music (Music stops and video stops) Barracks Mikael - Everything is in ruins. Everything has to be rebuilt. We're going to be rehoused in barracks built in emergency. They turn around -> GO + GO Polygon 1 The city of Polygon Butte was founded in 1946 on agricultural land. In the place of the present Carrefour and Arena. 65000 m2. 220 barracks. 327 dwellings. 1244 inhabitants. And inhabitants. A second housing estate is being built right next door. The City of the Daybreak. GO They turn around -> Polygon 2 Isabelle - Here in the barracks, it's not always very hot. We heat bricks to warm the beds. The kids sleep in threes: two at the head and one at the foot. We don't have any bad memories from that time, we're on top of each other, that's how it is. We all pass each other, all the time. It's a strange life. There's everything to do, everything to reinvent. Like small businesses. We buy coal, sugar, flour...	Girls don't dance with us when they know we're from the [...]

Mikael - We wash in the municipal showers. There's life in these neighborhoods! It's full of ideas. We've got toddlers in our paws, we talk to each other, we challenge each other, we lend each other enough money to get through the month, we stick together, we support each other. We plant endives in the cellar, we put some in a wheelbarrow and we give some to the others. Isabelle - There are fishermen who come and sell us cockles, brinics, shrimp. Three times a day. Mikael - We don't have much money. Isabelle - Not a lot of money Mikael - no kopek Isabelle – no wheat ... Cause we might be cash poor. Yeah. But we have Isabelle - Happiness in our whole body Mikael - Big love of life Isabelle - A lot of love in the shoes Mikael - Beautiful stories to make the sun blush Isabelle - Hot moments to make the puppies fall down Mikael - Fun and frolic Isabelle - Crazy Races Mikael - Starry nights Isabelle - Bonfires Mikael - Music under your skin Isabelle - Hugs in the wild herbs	I have a say

Mikael - Oceans of GO Explosion + Tremor Building kindness explosion Mikael - What's going on? (Silence) Is it happening again? Isabelle - The cargo ship Ocean Liberty explodes in the harbor. There is a din of Brest's thunder all over the city. Several dozen dead. Thousands injured. Nearly 5,000 buildings destroyed. Quick Synchro with music -> GO Image Ocean Liberty Music + courtyard and garden microphones ...	Intermeshing of Girls don't dance with us when they know we're from the [...] with I have a say.

Table 5.4.4: Sample of the initial 15 minutes of the play's script, with the identification of the main narratives.

What did we learn by reaching out to a community for whom climate issues were not central? We learned that things are not what they seem; at least when one is "co-producing place-based climate services for action." "Places" have multiple meanings, are not bounded, and depend very much on personal experience and mobility. The conceptualization of climate services, and the potential for co-production, depends on the reference discourse one mobilizes. Climate services may generate many things: from the reproduction of a dominant liberal narrative emphasizing individual responsibility to a unique opportunity to contribute to justice and redistribution of power. And "action" in this case entailed being mobilized to co-produce an anniversary celebration and the corresponding theater play, along with a stronger partner community as a result.

If we return to our original line of questioning, "how and with what results might place-based climate service co-production be enacted within a community for whom climate change is not a locally salient concern?", we have some answers.

5.4.3.2 How?

In order to engage with a community in a climate service Arts6Sciences co-production exercise despite the community's seeming lack of interest in climate issues, we took the long way around. We engaged in relationship-building and making our skills available for many purposes while progressively connecting with the community, its concerns, interests, and finding intersections with climate issues. We were transparent in terms of our interest in climate concerns, yet we kept that agenda on the back burner while accepting to mobilize ourselves around the community's more pressing issues.

5.4.3.3 Considering integrating climate service co-production into all community development activities

From the development of a trust-based relationship with the community to the building of a stronger community, this experiment allowed us to question the dominant paradigm that may be crippling for climate service co-production: the assumption that climate and weather are part of the fabric of everyday life; that it is not always necessary to be explicit about this.

These outcomes seem to indicate that it might be worth considering integrating climate service co-production into all community development activities. Preparing for a changing climate and preparing the requisite knowledge base should be part of the everyday routines of local development, especially in neighbourhoods with a long list of seemingly more urgent concerns, they might be the hardest hit by climate change.

5.4.4 Lessons learned

5.4.4.1 Beyond substance: empowerment

By engaging in the process of jointly creating an art form and gathering data while preparing an event with local significance, we managed to develop trust and establish mutually beneficial relationships between Kerourien community members and the transdisciplinary research team, even leading to the co-production of climate services.

Vincent et al. (2018) stress that climate services are more than information alone. They are about producing long-term relationships and trust. In Kerourien the situation was slightly different, as we were not in a position to engage in a relationship by talking about climate change (see Krauss 2020 for another instance of such a situation). We had to engage in a relationship, that's it. We were in a situation where we wanted to "prime the pump" of a co-production process. Trust-building in our case study was a condition for co-producing climate services, and a product of our process. This intervention primed not only the co-production of climate services, but also a desirable positive feedback loop.

Another important observation relates to mutual learning, in the sense of learning to do things together (see Chouinard and Perron 2002, Vincent et al. 2018). One key element that stood out in this experiment was the way in which the transdisciplinary and scientific skills of the research team were put to work for non-scientific purposes, namely the preparation of a neighbourhood's anniversary celebration. Learning and trust-building were deeply intertwined for this. As our case shows, those on the science-side of co-producing climate services may render other services to the communities with whom they engage. Through this observation we see that co-producing climate services may actually be more about transdisciplinary science than about climate science. This suggests climate service co-

production is following the example of sustainability science (see Mauser et al. 2013, Polk 2015) but with a narrower, and much more local focus.

Finally, we collectively identified a limited set of narratives encapsulating what Kerourien residents had to say about themselves. In the words of some of the participants, this process, and the associated les Belles histoires, did put the Kerourien community back on track to becoming whole again. These stories constitute what the residents all share, at least for the time being. Having this renewed common ground is making them stronger than before our co-production intervention. A stronger community will be able far better in the face of climate change. For our purpose of co-producing climate services, a stronger community will be a stronger partner, more reliable, and more aware of its actual needs. Not only did we develop trust with the Kerourien community, we all became stronger in the process, stronger for engaging in substantive work, stronger for taking stock of the substantive effects of our intervention.

Climate services are often assessed against their usability. Our research demonstrates this is not sufficient; the procedural benefits of co-producing climate services should be assessed as well. Context dependency will make such evaluation particularly challenging. This should not prevent climate service funders from taking stock of the wider social benefits the actions they support bring to co-producing partners.

5.4.4.2 Getting the priorities straight: adopting local values and contributing to justice.

The initial step of our co-production process allowed us to anchor our actions in local stories and relate directly to our partner community and its values. This allowed us to free the co-production team from dominant (and technocratic) climate change and adaptation discourses. Rather than adopting the pervading culture

represented in the climate literature available to the community, we adopted narratives associated with everyday life, hardships, the joys and pain of migration, and engagement for greater justice.

Through the lens of priority setting, climate service co-production has much to learn from participatory research and participatory planning. For instance, one aspect we did not address explicitly in this experiment in co-production was that of gender. In the realm of participatory research there are many analyses showing that one should be explicit about gender and other identity dynamics at play – the "Whose voices? Whose choices?" questions that need to be answered (Cornwall 2003). In the case of climate service co-production, the dominant discourse may totally blind co-producers with its technocratic, pseudo-neutral, scientific stance; it seems too often to consider gender, race, class, and other social categories, as not necessarily part of what deserves attention. Within the realm of climate change, our results point to "the importance of (re)politicizing co-production by allowing for pluralism and for the contestation of knowledge" (Turnhout et al 2020, pg. 15). As Krauss (2020) writes, "a focus on narratives shifts the attention from the impact of climate on society to the myriad of entanglements between human and non-human actors in a changing climate" (pg. 3). This shift in focus will allow us to ground further steps of climate service co-production in the priorities of those most vulnerable to the vagaries of the world.

5.4.4.3 Extending the geographical boundaries of empowerment and the fight for justice: revisiting the concept of place

Finally, paying attention to local stories and the role of weather and climate within these stories led us to the realization that locally place-based climate service co-production may actually entail working with multiple locations and associated issues. Co-production challenged our routines (Krauss 2020). It pushed us to reconceptualize "place" as extending beyond the circumscribed location where our co-production partners were living at the time. This opened up a rich perspective in

terms of climate service co-production. In the course of our work, place became a relational concept, the definition of which belonged to the members of the co-producing community – what mattered what their sense of place (see Stedman 2003). Sense of place is an integrative concept (Saarinen et al. 1982), and it carriesthe characteristics of both the environment and of the individual or group perceiving it. Sense of place connects with place attachment, and others have shown, as we observed, how memory is critical for migrant populations' relationships to places (Rishbeth and Powell 2013). By adopting this extended concept of place, the co-production team had to accept that knowledge transcends national boundaries, and that time scales may relate to individual trajectories of past, present, and hoped-for futures. Huot and Liberté-Rudman (2010), analyzing the interplay of occupation, place, and identity, propose that individuals perform their identity in relation to place and occupation. This resonates with our results and the dynamic nature of the judgement individuals expressed of the place where they live and of the (now imagined) place that they once left, and to which they long to return. The status of place shifts through time, as a manifestation of changes in context, occupation and identity. Place-based co-produced climate services in such situations need to be reinvented in order to offer information that is dynamic, reconfigurable, multi-layered. This is another central challenge for the climate service co-production research agenda.

5.5 Morbihan, France

5.5.1.0 Theory, Methodology & process

As exposed in the definition of the CoCliServ project: "Narratives play a crucial role in connecting private and public realms, as well as scientific and local perceptions of the 'weatherworlds' we commonly inhabit. Narratives give meaning to simple facts and scientific calculations. They turn 'matters of fact' into 'matters of concern".

The intermeshing of nature and culture, emotions and reason around weatherscapes implies that approaching local climate through science must be put into perspective by a more intuitive approach that seeks to represent the world as perceived by the senses." Those different objectives have been well reached and explored in the Morbihan field.

The aim of the artistic initiative was to engage local stakeholders by connecting art and science within the territory. The Morbihan artistic project has taken several forms and routes constantly aiming to a greater collective construction bringing its load of challenges and good surprises. The art and science integration was realized through a genuine co-construction process involving artists, designer and researchers working together along the way inside an artistic committee.

The intertwining of science and art has taken three main forms during the project, each of them valorizing knowledge produced within the other work packages. There was no beforehand established plan for the development of those three directions: they all three evolved and resulted from the continuous exchange within the aforementioned artistic committee.

The main outputs are: a collaboration with the designer to produce creative tools to support the animation of workshops, the project of a long term exhibition, the realization of a small itinerant exhibition with climate data vulgarization panels and a comprehensive storytelling exercise.

Methodology and process

In the Morbihan site, the research team could count on a strong network of actors mobilized by the local partners: Clim'actions Bretagne Sud and Natural Regional Park (PNR) of the Gulf of Morbihan. Clim'actions members, artists and scientists were rapidly seduced and motivated to interact, discuss and explore the objectives of the project as well as the whole Art & Science process. This warm welcome and

positive reaction to the project has to be underlined as a potential specific asset or condition for the development of such process to be crowned with success.

Artistic support for Prospective workshops

As described in the deliverables of the WP 2, the scientific team did take onboard a designer to accompany the whole artistic process. The designer is a young professional originally from Vannes and based there, called Marianne Cardon. Recommended by the local partner Clim'actions for her experience of linking art and science, her task was originally to coordinate the artistic process. Progressively however, and throughout multiple exchanges, the collaboration led to an integration of her graphic work for the prospective and scenario development workshop. Her skills were of great help to design creative tools (poker design) and maps (The Presqu'Île de Rhuys in 2200) illustrating the effects of climate change. The prospective exercise did benefit from this creative dimension: it enabled the participants to engage with different senses and a creative approach, to work on the futures of the Gulf. As apprehended by the project team, the use of drawings, playing cards and other creative forms helped the animation team (composed of the researchers) to gain access to elements that are generally excluded from scientific enquiry, in order to convey a more complete picture of the challenges at hand.[9]

5.5.1.1 Poker design, a creative exercise

The animation tool consists in a series of cards, combined in three categories, which visually represented key-elements of the narratives and the local context (See WP 1), as shown in Figure 5.5.1 and Table 5.5.1.

[9] Cocliserv_ERA4CS_Document Submitted presentation of the project.

Figure 5.5.1: "Imagine some projections" ppt support in the workshop (Left). Images of poker cards used during the workshop (Right)

Table 5.5.1: Categories of the cards of the poker design categories

Poker design categories	**Categories of narratives**			
	Geo-social	**Historical**	**Seasonal**	**Climatic effects**
Climatic changes and hazards	• Submersion • Flooding • Erosion	• Drying soils • Sea level rise • Ocean acidification	• Warmer summer and spring periods • Colder winters	• Storms • Heat waves • Droughts
Infrastructure & Territory	• First nautical mile • Subsidence • Beaches	• Oyster farms • Coastal pathway • Salt mines	• Second homes • Ports • Water treatment systems	• Historical sites • Urban areas • Routes
Resources & Actors	- Island owner - Intragulf nautical transport network	- Oyster farmers and farmers - Direct selling - Tourists	- Office of tourism - Retired population - Seasonal workers	- Measuring instruments - Scientific community

At some point of the workshop, the participants were grouped in teams of 4. By randomly combining cards from each category, the groups were encouraged to

imagine how these unlikely combinations could go together to describe future situations. They were then invited to gather all their views and ideas in a note taking support that lists the different information and questions:

Figure 5.5.2: Note taking support used during prospective workshop (March 2019). Produced by Marianne Cardon. Source: Ana Rocha, Master thesis, 2019.

The creative work and tools were used after a first introductory session which gathered a rich range of local information about future climatic events and trends for the Gulf and the Presqu'Île de Rhuys.

This tight collaboration has given the occasion to the designer to fully sink in the scenarii, prospective exercises and collected interviews that were to be the main material to be used for the artistic work.

5.5.1.2 The long-term project on the Coastal Path

As a first arrangement, the designer proposed "guidelines" for artistic interventions to raise awareness of the effects of climate change locally and the adaptation required to combat them, informed by the local narratives, chronotopes and, later, by the visions of desired future of the territory proposed during the foresight workshop. The form of presentation chosen for the artistic works - the "Pathway of possibles" – (see figures below) was proposed by the designer as an outcome of her

work with the academic consortium and it was to be organized on the coastal Path ("Sentier Côtier") emphasizing its function of chronotope (See Deliverable 1.2).

Within this exhibition, each five artists of the collective (and more to be determined) was supposed to develop a piece of art that would convey the climate change issue in its local dimension. In order to feed the imagination and creation process of the artist with the scientific work and results (social and local climate data), it was decided to carry out regular meetings between the artists, researchers and the designer. Those meetings were to be organized by and for three groups called "Triade". The meetings were planned to take place for 30 minutes every 15 days. During those triades, data from interviews and the foresight workshop were shared by the scientific team and used as a basis for reflection and exchange between the different disciplines. This collective process was supposed to enable a balanced input of art and science in the discussion and in the progressive creation process of the artists. Moreover, having the interviews and testimonies shared could serve the chronotope dimension of the "Sentier Côtier" reinforcing its mission of linking past, present and future narratives.

In the course of the exchanges organized in aforementioned triades (February-March 2020), questions started to emerge on the feasibility of such a great project within the time and financial boundaries of CoCliServ. It was soon acknowledged that the "Paths of the Possibles" exhibition required creation time for the artists, consequent budgets in order to support that creation process and sufficient guarantee for a permanent exhibition. All of which were not present within the CoCliServ reality and framework: the deadline for the exhibition is the deadline of the project (summer 2020) and the budget allocated to the Art & Science process is not sufficient to fund a multi-artist long term exhibition.

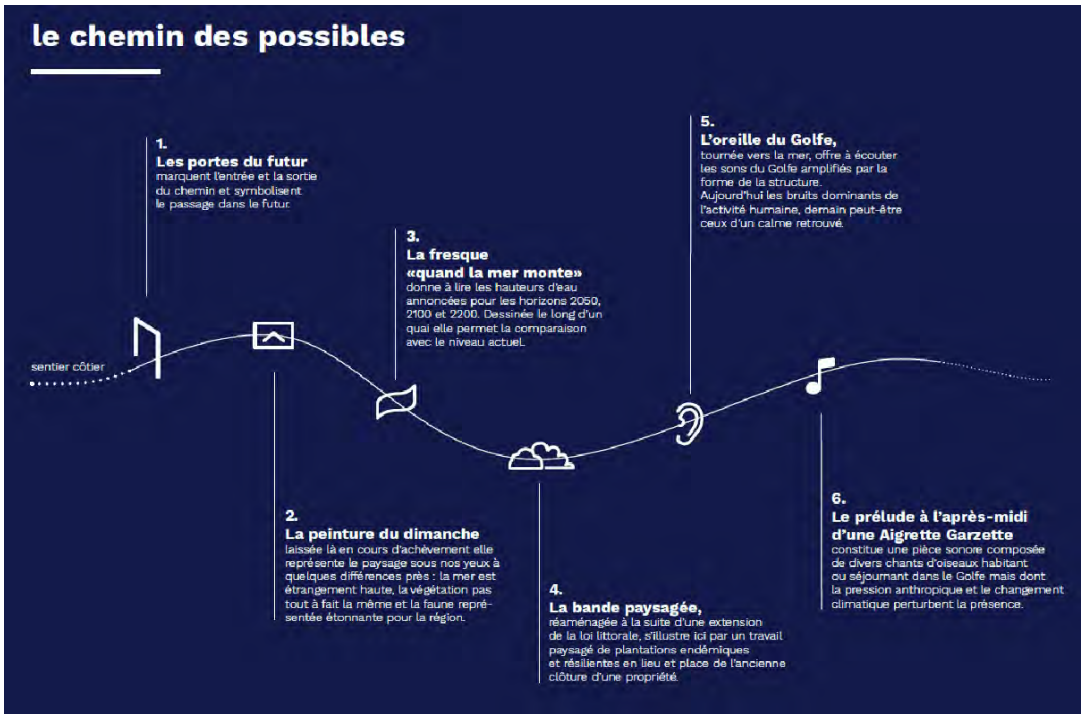


Figure 5.5.3: "The path of the possibles", design of the exhibition to be developed in the course of 2020-2021 by the collective of artists. Source: Marianne Cardon "P.L.U"

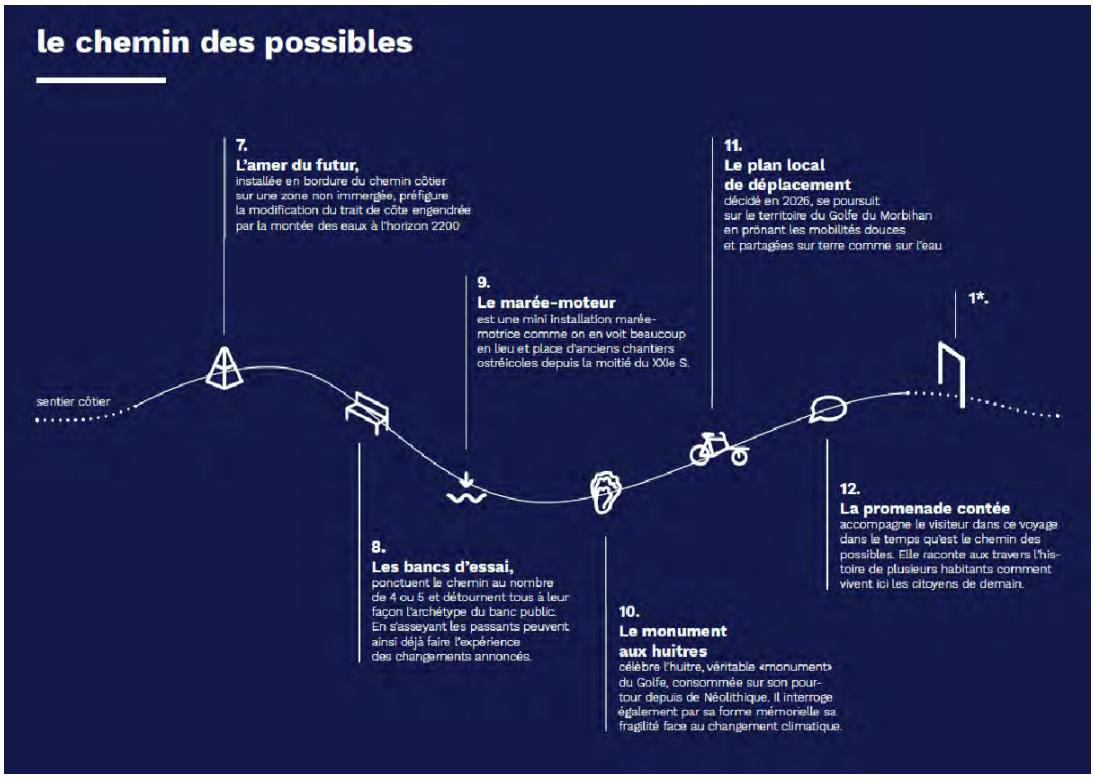


Figure 5.5.4: "The path of the possibles", part 2. Source: Marianne Cardon, "P.L.U"

This exciting common objective has however served as cement for the emerging collective of artists who are seduced and convinced by the project, the messages to-be- conveyed and the objectives. Most of the involved artists have already produced several "environment/climate" awareness rising creations (sculptures, mostly) and were selected for that reason as well.

5.5.1.3 The short-term exhibition: La Cataravane

Confronted with the mentioned constraints, the artistic committee remained nevertheless still eager to seize the favorable proposition and engagement of Clim'action towards the realization of an Art & Science exhibition. A solution that could combine the objectives of the project and the long-term objective of the collective of artists was found in the development of an itinerant and temporary exhibition to be presented as an announcement for the greater one to come. This mid-way solution was a source of debates and raised multiple questions (See lesson learned 4) on the governance and decision schemes of a collective process. Above the inherent discussions that are proper to a participative project, the extraordinary situation of the COVID19 pandemics brought its own lot of constraints: no more direct meeting (only virtual ones) to easily resolve potential tensions, no more possibility of organizing an itinerant exhibition and no possibility for an in-real collective creation of the artistic project to be produced. In that tricky situation, the designer did propose to take the lead on this short-term realization. The subtle balance between collective reflection, decision and action is at the core of the Morbihan experience and more lessons are still to be learned as the process is still ongoing. Until end of June, the different artists (5) have agreed to collaborate on the development of the "Cataravane" and the associated panels that are to accompany the artistic object. The panels will present each artist of the collective and the local climate data, a continuous thread of reflection will be developed to accompany the spectator in its experience in order to bring him towards questions and

possible participation through a suggestion box: proposition of work of arts, of climate services needed, of visions of the Gulf for 2050.

An important work of narration has also been done to explore the immersive feeling that the artists want to create. This narration is the result of a co-writing process bringing together the social scientists involved in the project as well the designer and an author, with help of collaborative plateforme. Besides the short-term exhibition, the short version of those narratives was submit to a "call for radio fiction".

5.5.1.3.1 The steps

Between November 2018 and Septembre 2020, the Art & Science project executed the following steps:

November 2018 - January 2019	Thinking and discussion about the artistic concepts
February /March 2019	Development of the poker design game /Workshop in Morbihan
October – December 2019	Informal exchange between artists from the region and the local partner
December 2019	A day of exchange and meetings to formalize the artistic process
January-March 2020:	Exchange between the artists and the research teams within smaller groups called Triades
March 2020	Development of the "Sentier côtier" (Coastal Path project) by the designer on the basis of collected data and exchanges with the artists. In parallel development of the project "La Cataravane" as first example or testimony of the larger project of the Sentier Côtier
March-May 2020	Debate, exchanges and collective construction of the agreed upon project of the "La Cataravane". It will be a combination of a piece of Art-Design, Panels for the presentation of Artistic and local climate data information and an auditive piece to complete and propose an immersive experience.

July-August 2020	Development of the first exhibition "La Cataravane" for potential installation in the course of July/August
August 2020	Feedback and reporting

5.5.1.3.2 Theoretical concepts

Creative tool for animation: The poker design

This type of ideation exercise, so-called "design thinking", prioritizes stakeholders' needs when elaborating a product or a concept and finds its origins in the work of Robert Mckim (1972) and Rolf Faste (1995). It has been widely publicized by Tim Brown (2008), founder of IDEO (American Design Studio).

Grounded theory

The choice of participation in the whole Art & Science projects could also bring to the research team a material of study concerning the collective creating process. By regular interaction and participation (participatory research), the team is the witness of the progressive construction of an artistic dynamic. Attending all subsequent creations may be difficult, but the participant observation of this first phase of short-term exhibition already allows us to put into words many results.

Art and science

Artists are ideally placed to challenge existing narratives and to provoke the exploration of pioneering narratives. Our process does not aim to use the arts to communicate scientific findings but, as established by Latour (2011), to develop a strong connection between art and science that enables the re-articulation of the scientific description of the world. That is the role of art as a distant early warning system, as proposed by the philosopher Marshall McLuhan, whereby art "can be relied on to tell the old culture what is beginning to happen to it" (Buckland, 2012).

The objective of both short and long-term exhibition, is to immerse the visitor in a feeling of "now" even though faced with views and interpretation of the future. As expressed by Olafur Eliasson, a danish artist known for several installations about climate change, "(...) artist and work blend at the time when the observer interacts with the work and enters it to create a common "now" between artist and spectator. Experiencing the "now" for visitors is therefore the result or remembering the past (the artist's conception, their own past experiences) and of anticipating the future (the meanings and projections suggested to them), thus becoming the "now" on the crossroads of both time dimensions."[10]

The will of Olafur Eliasson is generally "to educate the spectator to open to new forms of perception and understanding of the world through his participation and inclusion in the work of art". That is also what is being looked for through the two projects in progress. The visitor will walk around the pieces of art, collecting scientific data (climate data, social data and perception) while being challenged in his other senses, through the object of art, and all the other stimuli associated with the localization of the exhibition.

For instance, the "La Cataravane" as the object of art, combined with its narrative and setting will create a particular context for the visitor. Different movements and concepts try to theorize or organize the role of art in its interaction with society, we believe that the planned action can be considered as part of Useful Art (Arte Util): that draws on artistic thinking to imagine, create and implement tactics that change how we act in society.[11]

Initially, we plan to facilitate the circulation of the spectators and visitors on the site to contribute to the immersive experience and sensation of now, we may approach what can be called in art term the Social Term or Socially engaged practice : which describes art that is collaborative, often participatory and involves people

[10] Cué, E., (2015), The artist as a scientist, Huffington post
[11] Website Arte Utile

as the medium or material of the work. This will be especially relevant when at several animation activities, the visitors will be asked to contribute to the art work by representing their views on the future of the Gulf or their proposition of art work on a piece of fabric or paper that will be attached to the barriers surrounding the Cataravane (see figure 5.5.5). Unfortunately, the conditions, in particular resulting from the covid, led to a less interactive situation allowing neither the circulation of the visitors, nor the animations (cf outcomes)

5.5.2 Outcomes

5.5.2.1 The description of the art forms

Artistic support for Prospective workshops

The use of artistic support has generated another dynamic in the workshop and has been identified as a real success by the animation team. The poker design and use of creative tools has facilitated a collective reflection as well as an outside-the-box type of reflexion. The use of a very long-term scenario had also that objective, but the defiance and questions which were raised on that matter, enable us to believe that the artistic dimension of the projection exercise served well the objective.

The long-term “Path of Possibles”

As of today, the “Path of possibles” is supported by the sketches presented in the methods and process part. It is also supported by a Manifesto which will be supporting the short-term exhibition as well. This project and its development have to be led by the collective of artists after the finalization of the CoCliServ first phase.

The short-term La Cataravane

Two main artistic objects were considered during the collective process of reflection: a maritime buoy and a Cataravane (mix of a caravane and catamaran boat).

The difficulty of rapidly locating an official buoy evicted that possibility, the produced sketches have however helped the creative process (See figures below).

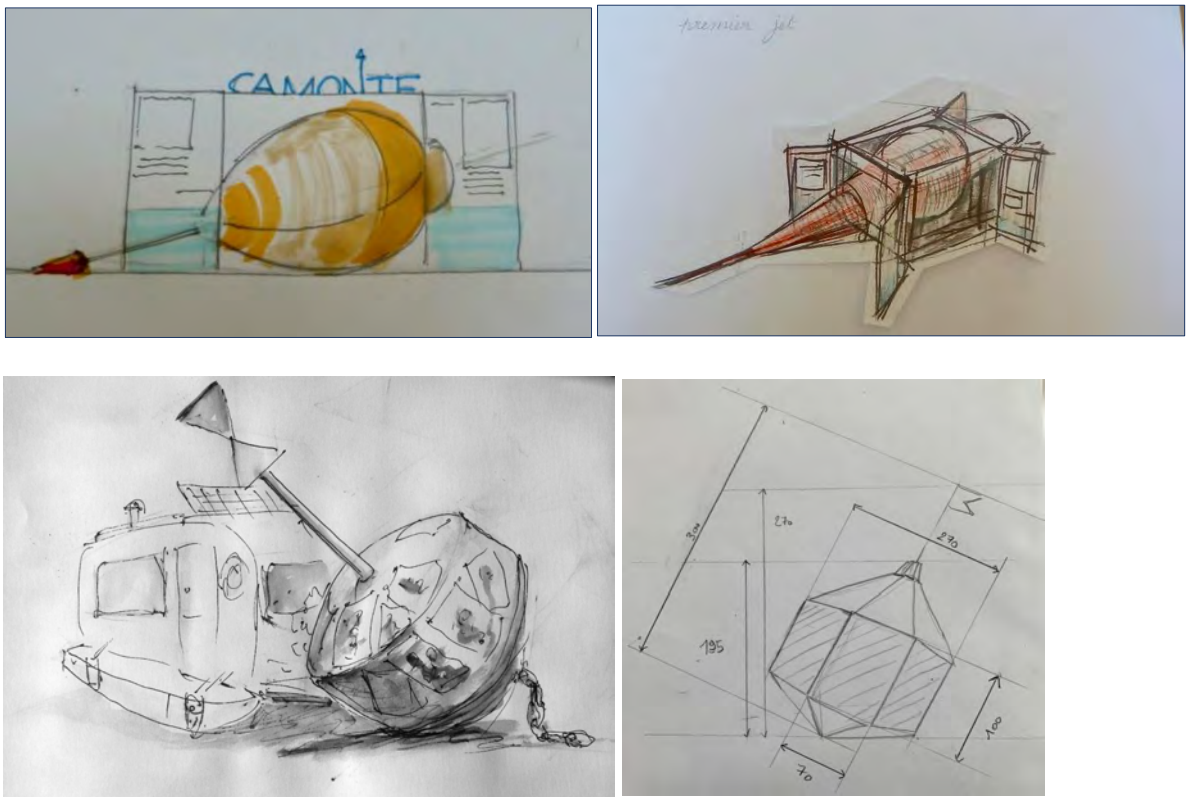


Figure 5.5.6: Different versions of the buoy_ Sketch done by (Regis and Sophie Prestigiacomo, (Top Left), Michel Leclerc (Top Right), Marie Hélène Richard (Bottom left) and Marianne Cardon (Bottom left).

The result is the ongoing production of "La Cataravane" by the designer on the basis of sketches produced by the different artists following multiple exchanges. Hereunder the figures show different steps of the project.

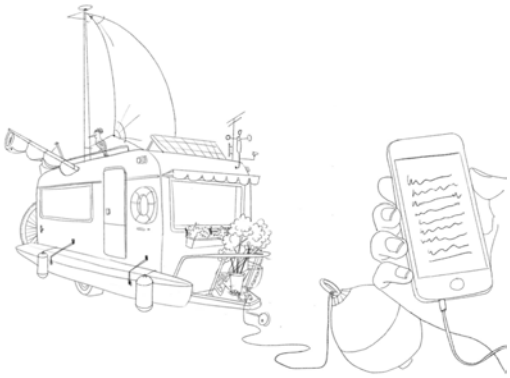


Figure 5.5.7: Step 1: First sketch submitted for financing to Clim'action and suggested to the interpretation of the artists_ By Marianne Cardon (left), Interpretation of La Cataravane by Marie Hélène Richard (right)

Figure 5.5.8: Interpretation of La Cataravane and surrounding barriers turned into panels by Michel Leclercq

As shown in Figure 5.5.9, the collective process of reflection imagine the cataravane surrounded by barriers of construction sites, decorated by multiple colors and messages. These barriers should have served as support for the different panels containing the artistic information and the climatic information. Our basic idea with construction grid failed as, finally, the site proposed by the city of Vannes (School of music) was already enclosed by outdoor grills. We used the latter for display panels (Figure 5.5.10). Twenty-five panels have been produced presenting the Manifesto, the scientific information, the future coastal path, artists former productions and each artist in a few words, the participation of the public.

Figure 5.5.9: Exhibition "Ca baigne?", Vannes, July 15th – August 24th

A strong storytelling exercise has been developed around “La Cataravane”. This exercise tries to capture most of the stakes, and objectives/actions that were developed in the Local Plan of Utopia being the action plan for the wanted scenario developed. 10 Stakes were identified in the workshop, multiple characters were created in order to cover, with their own narrative, the different stakes, ideas and action that were generated throughout the workshop and shared in the interviews (http://cocliserv.cearc.fr/journal-de-bord-de-job)

Table 5.5.1: Cross cutting stakes of the PLU with the characters created for the narration introducing La Cataravane

	Primary activities	Soft mobility	Habitats/ lodging	New economic logics	Demographic balance	Energy and food autonomy	Less polluted environment	Biodiversity conservation	Tourism	Landscape management
Job		x	x	x		x	x			x
Nimby	x	x	x	x	x	x			x	
Gaïa		x	x	x	x	x	x		x	x
Diogène	x		x	x	x		x	x		
Cresus	x			x		x	x	x		x
Diatomée	x	x	x				x	x		

5.5.2.2 The way the art form interacts with the sciences and the public / society

The whole artistic process is embedded in extracts of the multiple interviews led by the social research team and in the results of the prospective workshop. All the information shared during the workshop were nourished by the presentation of local climate data and services.

The exhibition La Cataravane, through its narrative and main artistic object, has the objective to gain access to the sensitivity of the spectators by illustrating several questions or visions the people have for 2050.

La Cataravane belongs to a young girl from the city of Vannes from 2050 who has travelled through time to raise awareness in the 20's about the importance of Art in the change of society that is needed to adapt to climate change. At her arrival in 2020, she contacted the artists of the city of Vannes to produce an artistic manifestation.

The panels produced for the exhibition will explore the scenario 4.5[12] at the 2050- and 2100-time horizons in order to illustrate the evolution of different phenomena in the Gulf. A map of the exposed economic activities will illustrate the interaction between climate data, society and art. Finally, the will of producing an immersive artistic and scientific experience will be covered through various medium:

- An Artistic playground will be developed to convey scientific messages and accompany the spectator in its path of reflection.
- A narration will be available at different spots of the exhibition sharing testimonies from individuals from 2050 exploring the results of the narratives of changes (prospective scenario) developed during the prospective workshop.
- A website will gather all this information and a specific section will enable continuous participation from spectators by inviting them to propose a sketch of artwork, a proposition of needed climate data and visions of the future of the Gulf.

[12] In the IPCC reports, 4 main Representative Concentration Pathways are detailed, the 2.6, 4.5, 6 and 8.5 corresponding to 4 scenarios of emission.

5.5.2.3 Particularities related to the representation of local information

As discussed in deliverables 3.2 and 3.3., a great range of data are available for the region of Brittany and sometimes for the Gulf of Morbihan itself. However the site is not, according to currently available data, concerned by extreme changes or events in the next 30 years or later. Therefore, the representation of the data at the time horizon 2050 were questioned as sufficiently “awareness rising”/”shock creation”. Moreover, in order to create a sense of urgency or need of action, the time horizon of 2050 is a tricky one since all four scenarios give similar results for the period 2020-2050. The time horizon 2100 was therefore chosen as well to present the evolution of climate and generate a need/possibility for action.

5.5.3 Challenges

5.5.3.1 The artistic media

Artistic media is the result of a complex combination of its creator perception, personal artistic interpretation or savoir faire and the message the artist wants to convey. Moreover, most of the artists engaged in the Morbihan project, produce in-situ creation. The uncertainty of the location for the long-term and short-term exhibition was perceived as a difficulty for the artists as well as, maybe, a misunderstanding or mismatch between the expectations of the project and the creative process of the artists.

5.5.3.2 The human dimension

The will of conducting a collective process on the artistic aspect of the project has enabled the team to be confronted with various difficulties with lessons learned that will be detailed in the next section.

The difficulty of entering in a horizontal management dynamic with individuals from different backgrounds and sensitivities has, at several occasions, risen the question of who is in charge of the final decision and how should those decisions be taken. The difficulty of that being reinforced by the constraints put by the

covid19 context of only virtual meetings. It is highly probable that the group dynamic would have taken another turn, if only physical meetings would have been possible to organize. In the Morbihan case, as five artists were gathered around the projects, several creative sensitivities were asked to work together with a designer and a scientific team on different projects and perspectives leading to some misunderstandings and possible frustrations.

A great impulse was given at the start, thanks to a great coordination work done by the designer and the local partner, Clim'action. The time would then expose to us that the will and expectations of some individuals in the dynamic had given contradictory information on the possibilities of the project (Lesson learned 4). Realigning everyone on a same understanding of the project's objective and constraints did take a long time but having a common long-term objective turned out to be a strong block to build on.

5.5.4 Interdisciplinary challenges

Lesson learned #1: Limits of the knowledge and data to be shared

As the main objective was to develop the artistic work on the basis of the material collected through the interviews and workshop, we got confronted with the weak presence of some high-stake subjects such as the loss of biodiversity, acidification of oceans or changes in the rain regimes. The question and debate were then raised on the mission of the art & science project: i) to only illustrate the concerns raised by the interviewed stakeholders considering those will be the main ones of interest for the population of Vannes, ii) to extend and inject subjects identified as key ones by the scientific or artistic teams to extend the horizons of the visitors.

Lesson learned #2: Art & Science is efficient to convey future narratives

The development of artistic works is found to be an effective way to convey messages of future narratives. The maps and creative tools helped the participants to

the workshop to apprehend the discussion with other approaches. The development of the Cataravane and the storytelling exercise has led to multiple exchanges and discussions among the artistic committee and created the possibility to discuss about our visions for the future. As expressed by Elliason, O., "The important thing is not that we agree about the experience that we share, but that we consider it worthwhile sharing an experience at all. In art and other forms of cultural expression, disagreement is accepted and embraced as an essential ingredient"[13]. In order to push those exchanges out of the boundaries of the committee, multiple animation activities were planned to accompany the art & science process. The objective would have been to organize animation at the end of the exhibition, seizing the potential benefits from the immersive experience to further discuss spectators' perception of climate change and will of action or decision. Unfortunately, the difficulties of setting up the exhibition both administrative (due to the covid) and human (see Challenge - The human dimension) did not allow us to carry out these animations, for lack of time and courage.

Lesson learned #3: Art as chronotopes

The coastal path turned out to have a fundamental role as an apt location for the artistic exhibition. Propositions such as the "Pathway of possibles"[14] allow us to argue that artistic work can also become chronotope themselves. These works result from interpretations of the collectively-built narratives of past, present and future change, that are converted into physical elements to allow people to follow the ongoing changes in the territory. Scientific researchers and artists analyze scientific information collectively to capture the spatial and temporal dimensions of current transformations, which are then communicated through artwork acting as markers, for instance, of expected sea level rise or estimated coastal erosion in the future. This "sneak-peak" into the future, as well as the ability to observe the speed

[13] Ellsion, O. (2016), Why art can change the world, Huffington post.

[14] As well as the "New Er Lannic" which was explored in the start of the project

of these changes through these new chronotopes, could inspire community-led transformative practices.

Lesson learned #4: Collective made difficult by virtuality

The COVID19 situation has banned any meetings on site and between artists whereas they have the habit to discuss creative projects around a table in a more intimate and favorable environment. The horizontal management that was implemented was still, in the end, constrained by the budget discussion, which was in the hands of the scientific team or under the responsibility of the local partner, changing the rule of that will of horizontal management. Those two elements are usually easily discussed through in-real interviews by formal and informal discussion. The distance created by the virtuality of the meetings has emphasized difficulties or weaknesses of the inclusive process, which could have been dealt better with in-real meetings. Moreover, the artistic process mobilizes individuals with different sensitivity and expectations on the project and its development. At various moments artists have felt excluded from the process, whereas again, in-real meetings would surely have helped to avoid this kind of situation.

Lesson learned #5: Existing network of artists: opportunity and threats

The project has benefited from the contacts and existing networks of artists of the site, involved in climate/environment awareness art performance. This dynamic was a real opportunity and has led to the multiple results detailed in this document. However, it is important to notice that in parallel of the official communication, happening within the artistic committee, alternative communication and dynamics, within the pre existent network, were creating other narratives to the project and its ambition. The official and unofficial communication did come in conflict at different occasions.

6 Key points for ongoing and upcoming art–science approaches in the context of climate services.

CoCLiServ's ongoing efforts are clearly expressed in the 5 case studies described above in their diversity and detailed richness; they represent challenges and opportunities for local consciousness-raising on climate related questions, along with forthcoming implementation of climate services at local, regional and international levels. Three papers have been published in the current year directly linked with the sites' described efforts (Krauß and Bremer 2020; da Cunha et al., 2020; Baztan et al., 2020.). These papers are the first Arts and Sciences papers published in the dedicated journal “Climate Risk Management”, and they illustrate the first key point for our consortium and the whole community: how important it is to validate experimental local approaches with mainstream dynamics such as peer-review publication.

The second key point is the room for improvement that appears once the peer review is validated for the experimental approaches linked with mainstream sciences. This room for improvement expands in three main directions: the processes and their methodologies; making social transformation intentions explicit; and linking local challenges with national and European Framework Directives related to climate services.

The third key point is the challenge we face going forward. Now we know the power of using art forms to represent local climate information; now we know how local stakeholders engage in the process and how important they are for climate services. From here, we need to link arts and sciences with the other modes of representation and overall CoCliServ lessons learned. This will be done through the WP4 final report, which will be shared by the end of the project under Deliverable 4.5.

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