'Bonkers but good!' – Using illustration-based interview methods to understand land management and conservation visions

Marc J. Metzger [a,*], Rose Keller [b], Veronica Lo [c,d], Anna Filyushkina [e], Franziska Komossa [e,f], Maria D. López-Rodríguez [g,h], Christiane Valluri [a,i], Aster De Vries Lentsch [a]

[a] *The University of Edinburgh, Centre for Sustainable Forests and Landscapes, Drummond Street, Edinburgh EH8 9XP, Scotland, UK*
[b] *Human Dimensions of Nature Department, Norwegian Institute for Nature Research, 40 Vormstuguvegen, 2624 Lillehammer, Norway*
[c] *Department of Forest & Conservation Sciences, Faculty of Forestry, University of British Columbia, 2424 Main Mall, Vancouver, BC, Canada*
[d] *Department of Landscape Architecture, Planning and Management, Swedish University of Agricultural Sciences, Alnarp, Sweden*
[e] *Environmental Geography, Institute for Environmental Studies, Vrije Universiteit Amsterdam, De Boelelaan 1111, 1081 HV Amsterdam, the Netherlands*
[f] *Department of Geography, University of Zurich, Winterthurstrasse 190, CH-8057 Zürich, Switzerland*
[g] *Internet Interdisciplinary Institute (IN3), Universitat Oberta de Catalunya (UOC), Barcelona, Spain*
[h] *Andalusian Centre for the Assessment and Monitoring of Global Change (CAESCG), Department of Biology and Geology, University of Almeria, Almería, Spain*
[i] *NatureScot, Battleby House, Redgorton, Perth PH1 3EW, Scotland*

HIGHLIGHTS

- Illustration-based interviews stimulate discussion about sensitive land use decisions.
- Illustration-based interviews are engaging and inclusive for diverse groups.
- Positive participant experience and mixed methods approach help to understand visions.
- Credibility and legitimacy depend on specific research design decisions and testing.
- Saliency can be high but depends on organisational barriers.

ARTICLE INFO

ABSTRACT

Visions help to understand common ground and tensions among citizens and stakeholders, supporting inclusive land management and conservation solutions to the climate emergency and biodiversity crisis. With careful design and sufficient resource, it is possible to bring together communities and other stakeholders to share perspectives and deliberate desired futures, identifying more acceptable alternatives and avoiding costly delays. We evaluated researcher and participant experiences of illustration-based interviews to understand land management visions using four studies in Scotland, The Netherlands and Spain. These studies used STREAMLINE, a visual mixed-method interview format using thematic illustrated canvases designed to provide an inclusive and creative framing for participants to contemplate their desired future. Participants enjoyed the informal visual format, which reduced pressure, increased comfort through the research process, and helped their thinking and reflection about complex topics. They also valued being listened to and having the opportunity to share their views. Researchers appreciated the ability to triangulate rich qualitative data with a variety of quantitative measure through the mixed-method format and the flexibility to adapt the canvases to suit their research aims. Positive participant experience made facilitation easier and was stimulating for the researchers. The credibility and legitimacy of illustration-based interviews will ultimately depend on specific research design-decisions and testing, which can make the approach more resource intensive than conventional interviews. While organisational barriers should be considered realistically, illustration-based interviews can have high saliency by providing useful and usable insights that strengthen land management policy and planning.

* Corresponding author.
E-mail address: marc.metzger@ed.ac.uk (M.J. Metzger).

1. Introduction

Land use is the defining cultural, spiritual and economic relationship to place (Meyfroidt et al., 2022; IPBES, 2022), striking at the core beliefs of different stakeholders. Land managers are therefore under enormous pressure when attempting to avoid negative impacts and contribute solutions to the climate emergency (IPCC, 2019) and biodiversity crisis (IPBES, 2019). Further greenhouse gas emissions and biodiversity loss must be prevented, and carbon storage and biodiversity increased, e.g. by ecosystem conservation and restoration, reforestation and improved agronomic and silvicultural practices (IPCC, 2019; IPBES, 2019). Nature-based solutions have been identified as synergistic opportunities (Cohen-Shacham et al., 2016), e.g. habitat restoration in floodplains can reduce flood risk, while increasing biodiversity and carbon storage (Jakubínský et al., 2021). Simultaneously, land needs to provide food, fibre, and energy for a growing and increasingly affluent global population that also requires space to fulfil recreational, cultural and religious needs (IPCC, 2019). To evaluate the pathways towards this future and chart a course of direct actions to reach desired goals, it is imperative to understand the diversity of alternative visions among land use stakeholders and society (Metzger et al., 2018a; Raymond et al., 2022).

When considering land use visions —i.e. descriptions of a desired future– that will meet these growing demands from land it is crucial that equity and fair representation of local inhabitants and stakeholder perspectives are considered (Raymond et al., 2022). There are normative, substantive, instrumental, and procedural arguments for public participation in land use decision-making. From a normative and distributional justice perspective, people have the right to be involved in decisions that directly affect their lives (Latulippe & Klenk, 2020). There are substantive arguments that broadening the knowledgebase with different viewpoints and experiences improves decision-making (Tengö et al., 2017; IPBES, 2022). Instrumentally, collaboration and participation help build trust and support for change (Levesque et al., 2017). And procedurally, consultation can be a legal obligation (e.g. as part of an environmental impact assessment) and collaboration between stakeholder groups a requirement to obtain funding or investment, or may be instituted as a program mandate (Monroe and Butler, 2016). Exploring what values, experiences and expectations underpin stakeholders' land use visions provides an important starting point when considering changes in land management and conservation (IPBES, 2022; Thorn et al., 2020; Burton et al., 2019), especially as the climate and biodiversity crisis place increasing pressure on land systems (Meyfroidt et al., 2022).

Nevertheless, large-scale land management change –including change for perceived environmental benefits to society such as rewilding, tree planting, and windfarm development– is often initiated and implemented with little understanding of stakeholders' relationships to local environments and socio-political contexts, resulting in eroded trust, costly delays, and missed opportunities for more acceptable alternatives (López-Rodríguez et al., 2020). With careful design and sufficient time and funding, it is possible to bring together communities and other stakeholders (e.g., landowners and industry leaders) to share perspectives and deliberate desired visions (Raymond et al., 2022). For example, design charettes stimulate an intensive creative process to develop visions to underpin city plans (Roggema, 2014). Participatory 3D modelling (e.g. Ramirez-Gomez et al., 2017), and role-playing games (Wesselow and Stoll-Kleemann, 2018) are other academic approaches to understand and include local knowledge and perspective in land use policy and planning. Unfortunately, the resources required for these participatory methods to land use planning means that these approaches are underutilised (Luyet et al., 2012).

Resource constraints often lead to compromises in comprehensive stakeholder participation, in both research and public consultation. Commonly used engagement methods to understand land use preferences and visions are self-administered questionnaires and semi-structured interviews. These methodologies have academic rigour

(Bryman, 2021) and are resource efficient, but participant experience is often subordinate and their formal nature risks alienating participants due to researcher-subject power relations (Deitch, 2020). Some scholars also point to the lack of creative visioning from participants due to stilted questions and limited time allotted to eliciting responses that lead to participants' reliance on heuristics to determine vision elements rather than participants reflecting on relationships with the land and community (Jacquet et al., 2021). Approaches that inspire openness, light-heartedness, or intimacy lead to deeper conversations about place because these approaches explicitly challenge the power dynamics of the researched and researcher (Roer-Strier & Sands 2015).

Arts-based, visual, or other sensory based methods have also been suggested for communicating insights in engaging and empowering ways (Heras et al., 2021), making visible a plurality of value systems (Brennan, 2018) and unearthing different landscape and sustainability narratives (Brown et al., 2017). Most disciplines within social science explore the social power of framing –the lens through which the world is seen – because methods function as the medium through which the world is bounded for participants and understood by researchers. Communication ecology teaches us that the medium is inseparable from this boundary setting process (Altheide, 2020). Visual methods –which range from free-form arts-based approaches to structured photo-elicitation– have been successfully used to understand local knowledge (McOmber et al., 2021), young people's identities, hopes and feelings (Barley and Russell, 2019), and have also been used to understand desired future landscapes (Schmidt et al., 2016) and their use (Perez-Soba et al., 2018).

We built on experience by Metzger et al. (2018b) from an online survey with pictorial multiple-choice questions that allowed participants to create a graphic novel of their imagined future lives while providing an academic understanding of the implications of their visions for European land use. Our intent was to create an affordable, easily customizable, replicable and scalable illustration-based approach for semi-structured interviews by adapting the online survey (Metzger et al., 2018b) to increase the participant experience when interviewed about their desired land use futures. In this paper we compare four studies that used this illustration-based interview approach in Scotland, The Netherlands and Spain to understand land use visions. The specific aim of this paper is to evaluate illustration-based interviews to understand land management visions from both participant and researcher perspective.

2. Methods

2.1. STREAMLINE: An illustration-based interview methodology

STREAMLINE is an illustration-based interview methodology using thematic graphic canvases to discuss what the participant cares about most in their life in the future (Fig. 1; De Vries Lentsch & Metzger, 2018). By breaking from the common medium of information technology and power asymmetries between interviewer and interviewee in traditional interviews, STREAMLINE was designed to allow framing to be both more inclusive and more individual, thereby encouraging creativity and deep reflection to be felt and communicated. A colourful appearance and tactile interface of the canvas, accompanied with skilful facilitation by the interviewer, aim to provide a light-hearted and accessible interactive format for a wide demography to express 'what' they want or think and 'why' they feel that way. Drawn illustrations are used to convey a level of abstraction and provide the participant a level of interpretation, which can be discussed during the interview. A user guide, catalogue and graphics files are available under a Creative Commons 4.0 licence (De Vries Lentsch & Metzger, 2018).

An accessible and flexible mixed-method format was deemed important when considering personal and complex topics such as future visions. STREAMLINE uses A3 size laminated canvases to structure the interview questions around a common theme (e.g. desired activities and
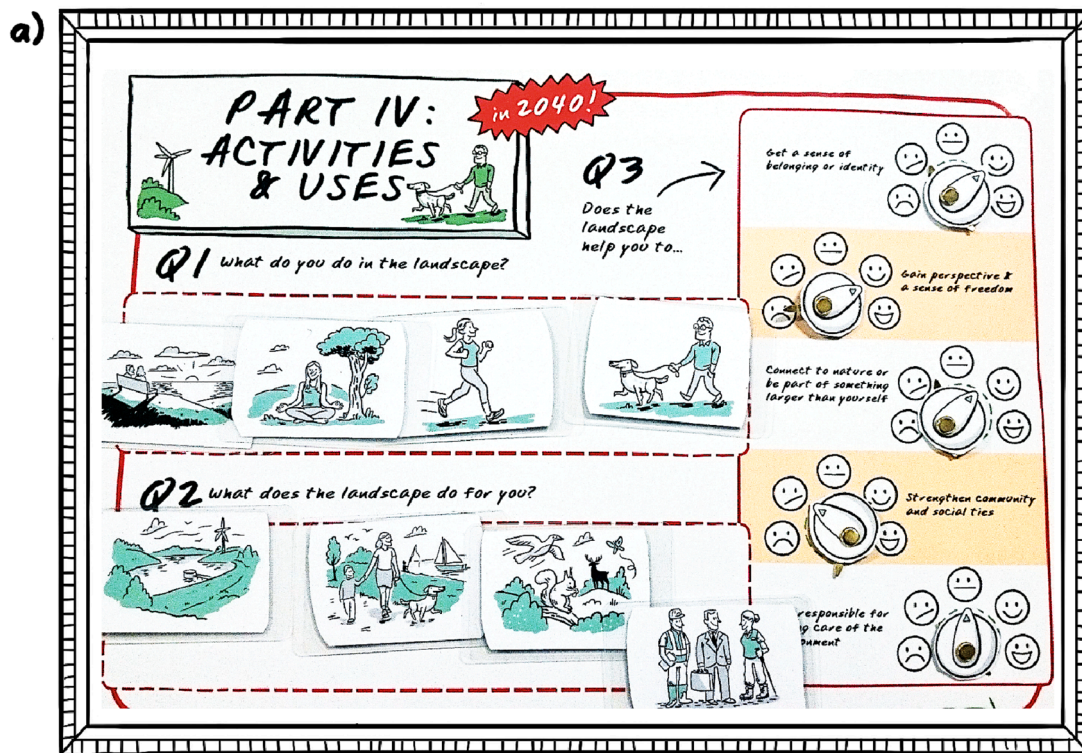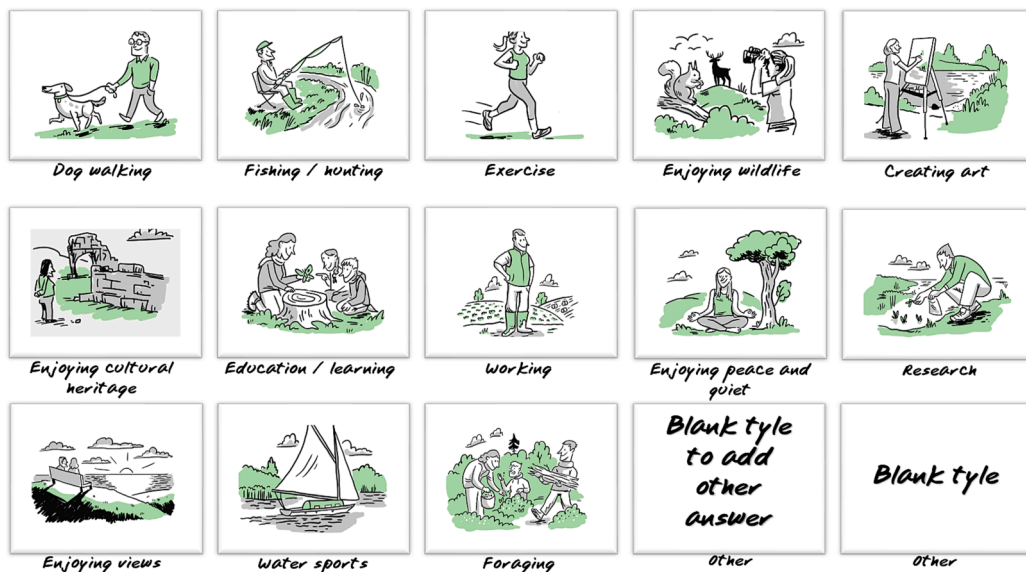
Fig. 1. (a) Example of a thematic canvas used in the perthshire study to understand the activities and uses the participant would like the landscape to provide in their future vision. (b) Example of tiles participants could choose to answer the question q1. The complete set of canvases used in each of the case-studies can be found in supplementary material 1.

uses of the landscape), while moveable pictorial tiles provide both contextual information and prompts for a wide range of possible responses (see Fig. 1). There is the flexibility for participants to choose multiple tiles, formulate their own answers, and express themselves by drawing and/or writing on the canvas and tiles. The qualitative interview is complimented by quantitative exercises such as ranking, free-listing, Likert scale questions and participatory mapping (see Supplementary Material 1).

The interviews can be audio-recorded and transcribed, and tile choices recorded. The canvases can be photographed, and the photos inserted into a digital template to present participants with their own pdf graphic novel to take home (cf Metzger et al., 2018b). Depending on research objectives, content analysis can be framed by the tile themes or open coding (Bryman, 2021). Answers to quantitative questions can be compiled in a spreadsheet for statistical analysis, and participatory maps can be digitised for spatial analysis.

STREAMLINE was developed for several studies in Scotland in 2016–2017 and has been recently used in The Netherlands and Spain in 2019, as described Section 3.2.

2.2. Case-studies

We compared the experiences of using STREAMLINE in four studies: (I) the Inner Forth estuary (Walz et al., 2017) and (P) Perthshire (Valluri-Nitsch, 2019), both in Scotland; (K) the Kromme Rijn region (Filyush-inka et al., 2022) in The Netherlands; and (S) the Sierra de Guadarama National Park in Spain (Lo et al., 2022). The four independent case-studies share the broad aim to understand visions for the future land use and management for a region with diverse and competing land uses but were not designed for comparative analysis. Table 1 provides a comparative description of the four case studies and Fig. 2 illustrates the diverse publics who were interviewed.

There were some differences in the way STREAMLINE was used in the four studies, which was initially developed for I and P. Using STREAMLINE outside Scotland meant the canvases had to be translated into Dutch (for K) and Spanish (for S) and some illustrations and canvases and tiles were adapted for the local context (e.g. including local maps and adding land management measures). Three additional canvases were created for specific research interests, e.g. multifunctional use (K) and drivers of change (S). These changes to the original STREAMLINE resources (De Vries Lentsch & Metzger, 2018) are described in Supplementary Material 2). Delivery and data needs differed among the case studies: I and P used STREAMLINE solely for dedicated semi-structured interviews, while in S, STREAMLINE was used as part of longer 3-hour interviews, and in K it was used as a comparatively short interception survey with a greater focus on obtaining quantitative result, rather than content analysis of recorded and transcribed interviews.

All studies followed the ethics procedures of the lead researcher's host institution and participants gave informed consent to take part in the research.

2.3. Analysis

To facilitate a systematic comparison between the case-studies, researchers leading the research (AdVL for I; CV for P; AF and FK for K; and VL and MLR for S) completed a questionnaire developed by MM & RK, with questions about participant experience and researcher reflection

(Table 2). Observations about participant experience are based on feedback provided as part of the final canvas 'Thank You' (in I, P, and K) and a follow-up survey in S, supplemented by the researchers' observations. Further questions were asked to understand differences between the four studies (Supplementary Material 2).

After compiling the completed questionnaires in a single table, MM & RK, who did not use STREAMLINE themselves in these studies, reviewed the responses to identify main themes and find illustrative examples and participant quotes. We also explicitly looked at divergent participant and researcher experience and reflection to improve the STREAMLINE approach. After identifying themes, the case-study researchers were asked to verify findings and provide additional examples illustrating the themes.

3. What are the researcher and participant experiences?

Supplementary Material 2 provides the completed questionnaires with reflections from the four studies. We found that STREAMLINE is enjoyable and engaging for participants, thereby facilitating their understanding and reflection of complex land use challenges. STREAMLINE requires thorough preparation with careful attention to local context, but the positive user experience benefits the delivery of rich research data that can be analysed flexibly and creatively. These common themes and insights are summarised below.

3.1. Participant experience

3.1.1. Participation is enjoyable and engaging

The overall participant response to their STREAMLINE interview was positive, if somewhat surprised and bemused. I, P and K explicitly asked participants to give feedback in the final canvas and S asked for feedback and user experience during a follow-up survey in 2020 (55% response rate). Recurring positive comments were made about the colourful illustration-based approach of the canvases (I, P), and how the unconventional approach stimulates engagement and participation, especially compared to conventional surveys (I, K). As one middle-aged resident from K expressed: '*I like it, it's really playful and not scientifically boring.*' A local resident (in I) succinctly summarised the general sentiment by

Table 1

Summary comparison of the four case-studies that used STREAMLINE.

|	Inner Forth (I) Scotland	Perthshire (P) Scotland	Kromme Rijn (K) The Netherlands	Sierra de Guadarama (S) Spain
Study area	Coastal area along 50 km of the tidal Forth river west of Edinburgh with industrial heritage, mixed land use.	Rural local authority (6550 km^2) with fertile lowlands, more marginal uplands and a number of towns.	Peri-urban rural region (220 km^2) near Utrecht with agriculture, a forested natural park and expanding villages.	National Park (340 km^2) with traditional farming landscape in mountain range 80 km outside Madrid
Land use challenges	Potential for managed realignment of the river on farmland to mitigate flooding and increase wetland habitat.	Balancing competing demands e.g. plantation forestry, tree planting, habitat restoration, tourism, and farming.	Balancing agricultural heritage and demands for nature and recreation from an increasingly urban population.	Balancing traditional uses, natural features and cultural heritage with increasing pressures from recreation and climate change impacts
Research aim	To understand local community willingness and desire for changes in land use in the region.	To understand what young people in Scotland want rural Scotland to look like in 2040	To understand residents' visions for multifunctional land use in *peri*-urban landscapes	To understand how visions for protected area management relate to values and understanding of landscape change
Societal aim	To support government agencies and NGO plans to improve natural and cultural heritage.	To inform the wider land use debate in Scotland and contrast findings with visions from professional stakeholders	To support regional planners and policy-makers and managers of the nature reserves and the national park	To support the national park managers and stakeholders in the surrounding communities
Research design	In 2016 22 diverse stakeholders completed 8 canvases taking 45–90 min.	In 2016 26 high school pupils completed 6 canvases taking 22–47 min.	In 2019 121 residents and 6 professional stakeholders completed 5 canvases taking 15–20 min.	In 2019 38 diverse stakeholders completed 7 canvases taking 30–90 min as part of longer interviews.
Analysis	Content analysis of transcriptions supplemented with descriptive statistics.	Content analysis of transcriptions supplemented with descriptive statistics.	Descriptive statistics supplemented with field notes.	Content analysis of transcriptions supplemented with descriptive statistics.
Findings	Three narrative visions, illustrating different levels in desired change to enhance nature and ecosystem services in the landscape.	Synergies, but nuanced differences between urban and rural teenagers, which could be described through several themes.	Four narrative visions, illustrating different preferences for ecosystem services among resident groups, especially for provisioning services.	Four common vison themes, with differences determined by perceptions of drivers of change landscape
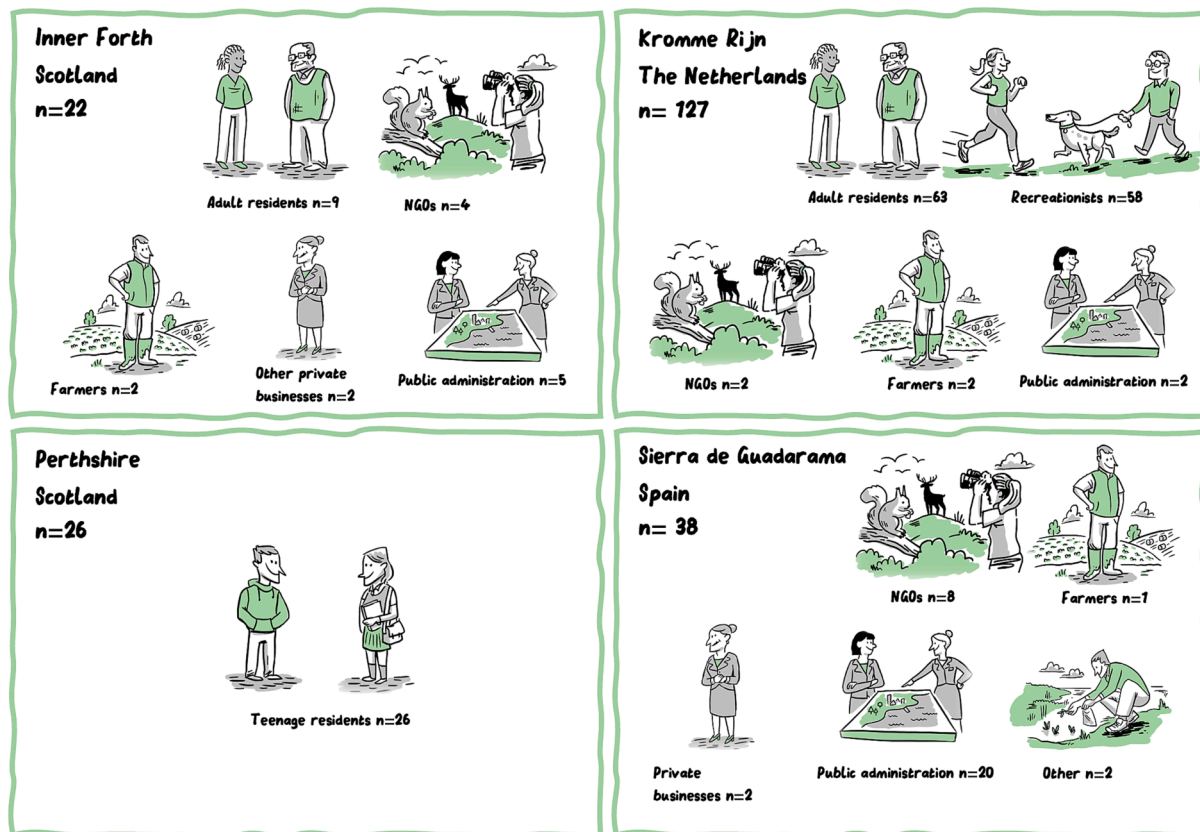
Fig. 2. Illustration of the diverse publics who were interviewed in the four studies.

Table 2
Questions asked researchers leading the case-studies to understand participant experience and compare reflections from researchers.

Participant experience
- Do you have any evidence how interviewees experienced the interviews?
- Are there things that stood out as positive for the participants?
- Are there things that stood out as negative for participants?
- Please provide any illustrative quotes of the participant experience.

Researcher reflection
- Did using STREAMLINE live up to your expectation?
- During the interviews, what do you feel went well/better than using conventional interviews?
- During the analysis, what do you feel went well/better than using conventional interviews?
- Was using STREAMLINE difficult or challenging in any way?

describing STREAMLINE as '*Bonkers but good*'. [Bonkers is an informal British adjective for going beyond what is normal or conventional in a way that is fun, impressive, exciting, etc. (Merriem-Webster, 2023)].

The playful nature helped create an informal atmosphere that made participants feel at ease and resulted in deep engagement (all), which is especially important for teenagers and vulnerable groups. Teenagers in P described their experiences as '*Very interesting.*' '*Challenging.*' '*Fun.*' '*Enjoyable.*' and '*Quirky*.' Participants welcomed the freedom of expression to talk, write, circle and draw (all). Having the canvases and tiles to focus on meant that direct eye contact with the interviewers was avoided, which helped participants feel at ease (P).

The interviews in I and P were designed to follow a narrative arc, covering different aspects of the interviewee's relationship with the landscape through successive canvases that started close to their own lives (e.g. the 'My work' and 'My food' canvases) and became increasingly abstract (e.g. the 'Making it work' and 'Legacy' canvases focusing on governance and values). This holistic approach, taking the

interviewee on a journey where they talk their way through their future lives worked well in I and P. A rural teenager in P commented '*This is cool – I never thought about it in that way!*' when asked to think about their own future in relation to sustainable land management. And a council planner in I found the approach '*Really well structured in a 'different' way*' and commented they would find it '*interesting to revisit*' their canvases in the future.

K and S did not follow a narrative arc, focusing explicitly on the main research interests to save time. K conducted interception interviews outside to get a large sample for statistical analysis, while S embedded the STREAMLINE canvases within longer interviews lasting up to 3 h. Despite the difference in delivery, participants were engaged and enjoyed walking through the canvases. In (K), participants liked the '*playfulness*' of the Likert scale dials (Fig. 1) and participants felt they could express their views. The STREAMLINE design helped hold people's attention in cold and wet weather (K). In S, participants notably perked up when the STREAMLINE canvases were introduced, following the preceding conventional interview. Participants were more engaged than before and ranked the more complex canvases focused on values and drivers as the most enjoyable in the follow-up survey.

There were surprisingly few negative experiences using STREAMLINE, and no-one dropped out once interviews started. However, professional stakeholders in I occasionally struggled with the more personal approach (e.g. the 'My life', 'My home' canvases). And an older participant perceived some canvases to be rather chaotic and full (K). These views were not universally shared among their demographics but raise important considerations for the research design and testing.

3.1.2. Improving understanding and broadening perspectives

Thinking about desired future land use is a complex exercise, especially for participants without direct experience in land management. P and K explicitly focused on the public, and I and S included non-professionals in their study. The canvases helped guide participants

through their own thought process, allowing participants to find their way through complex issues, and stimulating reflection (I, P, S). A council planner in I reflected how there are '*no easy answers, right or wrong)*' while several teenagers in P identified trade-offs, e.g. between imported organic or local non-organic produce.

The tiles provided visual prompts that helped to explain abstract, complex, and nuanced topics (all), for example by illustrating different ecosystem services. P noted that the tiles helped teenagers appreciate that many issues are not black and white or fit a single solution and picking multiple tiles allowed them to explain relationships. We found most participants retained focus on their desired vision (I, P, S), although it was challenging for some participants to keep their thoughts in the future and were drawn back often to the present (P).

The illustration-based approach also helped to foster an informal setting that allowed participants to reflect on important aspects of their local environment in an imaginary future removed from the constraints and potential conflicts of the here and now. For example, most professional stakeholders in I did not feel constrained in their responses by official positions, participants in S reflected on distributive justice considerations that would need to be addressed in relation to future ecosystem services provision, and a rural teenager in P commented: '*This made me think more about my future than I think I have ever done before and made me realise what my dreams are!*'.

We have some evidence that by improving understanding and stimulating reflections, STREAMLINE also helped broaden participants' perspectives. A rural teenager in P commented '*Wow, it is interesting that when you go into the detail of some things it is not as straight forward as you had initially thought*' when discussing the importance of planting the right tree in the right place for carbon benefits. The research aims for all case-studies included an aspect of framing debate and finding some common ground or shared understanding for future land use. Interestingly, participants in K suggested STREAMLINE could facilitate collaboration between stakeholders and citizens. STREAMLINE helped reveal visions that participants did not fully comprehend prior to the exercise (all), broadening perspectives on their relations to place. For example, the 'My Map' (Fig. 3) canvas highlighted for both participants and researchers the lived experience and projected experience of place. And a participant in I noted that the interview '*got me thinking in more creative ways about how the future could be*'. New research involving post-study sampling would be required to more fully understand STREAMLINE's abilities to stimulate social learning and local networking.

3.2. Researcher experience

3.2.1. Adapting STREAMLINE – Thorough preparation required

Available guidance and resources (De Vries Lentsch & Metzger, 2018) –developed following initial experience in I and P– made STREAMLINE relatively straightforward to adapt in K and S without prior experience (see Section 2.1 and Supplementary Material 2). The illustrations, originally created for use in Scotland, were deemed suitable for K. However, geographic and cultural differences required some new illustration in S (e.g. managing for wildfire risk). K and S added various quantitative tasks to the canvases (e.g. free listing, scoring and ranking). And while S followed the original format by creating a stylised map of the study area, K opted for a more detailed and accurate land cover map that could be digitised for spatial analysis in GIS (see also Fig. 3).

There was agreement across the four studies that compared to conventional interviews or surveys the preparation of the STREAMLINE canvases and tiles is more time consuming and that researchers should expect adapting the canvases to suit any new regional context. These include adapting canvas designs and possibly creating new tile illustrations; testing whether questions and tasks are clear; checking whether illustrations are understood and appropriate; and practicing facilitation. Adjustments made following test interviews include redesigning canvases to make them less cluttered (K), changing the order of canvases to start with more straightforward questions (S), and refining the interview scripts to improve explanations (I) and other examples.

3.2.2. Using STREAMLINE – Positive participant experience benefits the researcher

The positive participant experience, described above, was beneficial for the researchers (all). It was felt that STREAMLINE made it easier for some participants to tell their stories (P), revealing a strength of interest (P) and feeling (I) about the land that researchers had not expected from the public. Researchers were also surprised by participants' expressions of gratitude for being listened to (I, P, S). The illustration-based approach helped participants to explain their priorities by visually showing the researcher what they care about (I, P, S). For example, teenagers in P were excited about 'smart homes' and travelling. When discussing abstract and complex topics, researchers benefit from participants concentration and feeling of collaboration in the research as observed by S in discussing interactions between drivers of change, which was ranked as one of the most enjoyable parts of the interview.

The canvases gave participants something to focus on, reducing pressures of face-to-face interviews (I, P) and benefiting participants who lacked confidence (P). They also helped to break down complex topics and provide structure for creative conversation (all). Researchers in K were concerned the illustrations such as the smiley Likert scales (Fig. 1) may be considered childish, but participants enjoyed the ease in response. For researchers, visual scans of the completed canvases helped frame immediate follow-up questions about key dimensions of interest in the research, such as desired ecosystem services (S).

The interviews require strong facilitation skills (S) and managing the

Fig. 3. The stylised 'My Map' canvas used in the Inner Forth (I) for qualitative participatory mapping and the accurate map used in the Kromme Rijn (K) to digitise preferences for quantitative spatial analysis.

length of the interviews could be challenging, especially when participants are enthusiastic (I, S). The logistics of handling multiple canvases –each with large numbers of associated tiles– without mixing them up can be challenging (P, S) and using the canvases outside in poor weather is difficult (K). More abstract canvases and questions were more challenging for some participants (e.g. My Aims (I); What would you like your parents' generation to hand down to yours (P); ranking drivers (S)).

3.2.3. Analysing results – Flexibility due to mixed-method format

The researchers agreed that data collected is rich and can be analysed in greater or lesser depth, benefitting from enforced structure of the canvases and questions but also the flexibility and richness of the conversation (all). Compared to conventional interviews, there are extra steps in preparing the data for analysis (e.g. photographing and cataloguing the canvases), and a tablet-based version of STREAMLINE may save time. Nevertheless, the multiple or varied ways to analyse the rich data was appreciated by the researchers (all). A variety of methods were used including inductive thematic analysis (all), Likert scores (all), and descriptive statistics (all), participatory mapping (I,K,S), free listing (K), and free association (S).

All studies identified common vision themes, which I and K used to create illustrative narratives describing desired preferences for the landscape. Each study found substantial common ground among the diverse groups of participants, but tensions were also identified between the visions. Both cultural and natural heritage were important to participants in all studies, and differences between visions were often related to the relative importance of these themes. Policy, social structure, and the economy were emergent themes with important ramifications for shaping land use futures. Participants' personal values and their understanding of land management and land use change were factors that affected visions. Supplementary Material 2 provides further detail about the specific findings for each study.

4. Discussion

4.1. STREAMLINE as mixed-methods format

Interview-based methods have been used to understand the interweave of human and natural systems for a long time, including for the elicitation of land management visions (e.g. Valluri-Nitsch et al., 2018). Narrative interview approaches have improved understandings in the transformations of land use or environmental practice (Bixler 2013; Hards 2012) and illustration-based approaches have been used effectively to elicit rich descriptive data on place (Sheppard and Meitner, 2005). STREAMLINE is novel by combining established interview and survey approaches in a visually engaging mixed-methods format.

Combining qualitative and quantitative methods and data is crucial to understanding complex socio-ecological challenges and mixed-methods approaches are now firmly established in land-change science (Kinnebrew et al., 2021; Di Minin et al., 2021). STREAMLINE takes a 'simple parallel' approach (cf Kinnebrew et al., 2021) using complementary methodologies to allow triangulation (Nightingale, 2020) and deeper understanding of participants' views on desired land management. Taking an interpretive position, STREAMLINE, supplements qualitative semi-structured interviews with a suite of optional quantitative methods. While lacking the rich creativity of arts-based approaches (cf Hawkins, 2020), the interviews provide rich and nuanced qualitative understanding by guiding the participant through the narrative journey set out by illustrated canvases, while quantitative tasks provide reliable measures that can be easily computed and compared with qualitative analyses.

The 'My Map' canvas (Fig. 3) is a good example where a quantitative spatial aspect is included within the qualitative interview process without being on site. A common critique of standard interview formats is the lack of a spatial component in which to embed the interview (Pink 2021). Conversely, quantitative PPGIS where participants mark preferences on a map, has been critiqued for disembodying value or preference allotment by participants from the motivations and driving mechanisms behind these 'dropped pins' on a map (Johnson et al., 2022). The canvas is effectively a PPGIS exercise where mapped place values are an operational bridge between what is important to the individual (i.e. held values) and what is important about a place (i.e. assigned values; Brown et al., 2020). Mixed methods analysis of qualitative PPGIS improves understanding *why* a place is important (Garica et al., 2018). Depending on the study's objectives, the map can be stylised (I, S) with a greater focus on the interview or an accurate map (K) that can subsequentially be digitised for further spatial analysis (Fig. 3). The illustrations made the exercise playful and engaging for participants and stimulated conversation whilst capturing spatial information related to their preferences and values.

Our case-studies demonstrate how the mixed-method illustration-based format provides flexibility to support a variety of complimentary research aims and contexts. STREAMLINE could be adapted to suit the specific cultural and environmental contexts in Scotland, The Netherlands and Spain and was valued by researchers for its flexible mixed-method format that could be used to discuss complex land use questions and elicit land use futures. Positive user experience encouraged enthusiastic participation and resulted in deep engagement.

4.2. Merits of using illustration-based interview methods

Based on our experience, we reflect on the merits of using illustration-based interviews to support land management visions in general and STREAMLINE specifically. We focus on saliency, credibility and legitimacy which are often noted as three competing priorities in sustainability research in general (Cash et al., 2003), including visioning methods (Rounsevell & Metzger, 2010).

4.2.1. Credibility – Scientific adequacy of the methods

There is a wealth of visual methods to understand place, identities, hopes and feelings (e.g. McOmber et al., 2021; Barley & Russell, 2019). Visual images are commonly used as a springboard for discussion using both research-driven and participant driven pictures (Bryman, 2021). These methods work particularly well with less powerful groups in society, evoking new information, focusing on what is important to the participants, and encouraging personal conversations that ease rapport between researchers (Figoureux & van Gorp, 2021). While photographs are commonly used (i.e. photo-elicitation), drawn illustrations can more easily control semantic noise (e.g. influencing choices based on quality, perspective or weather conditions in the photograph) and therefore suited to discuss general phenomena. In a critical reflection of cartoon elicitation, Figoureux and van Gorp (2021) emphasise the importance of pre-testing to avoid negative stereotyping and participant understanding of the drawings, facilitation skills of the interviewer, and preparation, including preparing probing questions to stimulate reflection.

The visual nature of STREAMLINE sparked curiosity among participants and helped to make complex topics accessible. We found the illustration-based approach was effective in engaging participants and that the explicit consideration of participant experience in the research design avoided research fatigue. Most of our participants were from rural communities, who are disproportionately selected for research and consultations in land use decisions, potentially contributing to 'research fatigue' (Jacquet et al., 2021). The informal illustration-based nature of STREAMLINE sparked curiosity, and when STREAMLINE was introduced following traditional research format (in G) participants were energized and discussions reinvigorated. The power of illustration and graphic design to attract interest is well-established in advertising and the awareness benefits of illustrations in communication and outreach of complex scientific insights is growing (Day, 2019; Madhusoodanan, 2019). Our experience demonstrates how illustrations helped in attracting interest, explaining and communicating complex issues and supports the elicitation of land management visions.

Illustration-based interviews for land visions are an innovative method that could be used in a broad range of contexts to discuss difficult topics. Like Figoureux and van Gorp (2021) who used cartoons to discuss radicalisation in Muslim communities in Belgium in interviews and focus groups, we found the approach effective to discuss sensitive and complex topics with vulnerable groups whose voices are often ignored in land management discussions, including young people (P) and rural residents (all). And while the illustrations have a playful appearance, they facilitate reflection about difficult trade-offs and controversial land uses (e.g. recreation pressure (K,S) industrial agriculture (I,P) and forestry plantations (P). We do note STREAMLINE was developed and used in a rural western European context, which is reflected in the topics, landscapes and stereotyping (Fig. 4). Illustrations will need to be revisited and tested for environmental and cultural relevance in each application, especially in non-Western settings.

4.2.2. Legitimacy – Incorporation of divergent values

Achieving sustainable and just futures requires recognition and integrations of diverse values of nature and nature's contributions to people in decisions making (IPBES, 2022). Evidence suggests that environmental planning that includes more stakeholders at earlier stages increase trust and perceptions of legitimacy and fairness (Jentoft, 2017; Lecuyer et al., 2018) especially when elicitation methods are low-barrier and holistic (Fritsch & Newig, 2012). Low-cost, low-barrier and context appropriate participatory methods can produce actionable knowledge to support policy decisions (Jagnnathan et al., 2020). Furthermore, consolidated visions derived from participatory processes help to understand common ground and tensions and inform discussions and decisions about future land management (cf Burton et al., 2019). As noted above, we found that illustrations made STREAMLINE engaging and the interview process enjoyable, making the approach suitable for working with professional stakeholders, the public, and underrepresented or marginal groups.

STREAMLINE interviews are also inherently inclusive by designing the canvases around the participants' lives. This allows participants to control the conversation and shape the narrative about their desired future. Allowing participants to see beyond the black and white of environmental issues allows feelings of frustration are reduced (Rouillard et al., 2014) and opens a more collaborative discussion (Leavy 2017). Furthermore, by presenting participants with a digital booklet of their completed canvases following the interview, they receive a tangible reminder of the conversation. This provides a basis for continued stakeholder engagement and ownership of the research

process and outcomes, aiding trust (Lemos et al., 2018). Many participants expressed gratitude for the interest in their personal views, including a teenager in P who said: '*Thanks for taking young people's views into account!*'.

Of course, the ultimate legitimacy of the research depends on how, why and by whom the interviews are designed and conducted. Testing of the illustration has already been discussed but there are other design considerations that must be considered to ensure divergent values are indeed incorporated. Sample design and careful stakeholder mapping (Durham et al., 2014) should identify who to include, how to reach out, and how to build trust and overcome initial hesitation. Facilitation should consider the appropriateness of the interview setting (e.g. convenience and familiarity for the participants) and potentially the interviewer attributes (e.g. considering attributes such as gender (Deitch, 2020) or class (Bryman, 2021)). Our experience shows that with careful preparation STREAMLINE can incorporate, compare and contrast diverse perspectives about desired future land management and conservation.

4.2.3. Saliency – Relevance for decision makers' needs

There are great expectations of participatory practice, including generating shared understandings and building adaptive capacity (Jagnnathan et al., 2020). Land management organisations increasingly acknowledge the need for engaging diverse stakeholders to achieve equity and justice outcomes to achieve sustainability and conservation commitments (e.g. the United Nations Sustainability Development Goals). And the recent IPBES Values Assessment (IPBES, 2022) explicitly calls for better recognition and uptake of nature's diverse values in political, economic and socio-cultural decision-making to advance the complementary objectives of justice and sustainability. Land management and conservation visions can help decision makers to recognise and understand the multiple values of nature and land (Raymond et al., 2022; Lo et al., 2022; Burton et al., 2019; Perez-Soba et al., 2018).

Our studies aimed to understand land management and conservation to support policy and planning (Table 1), but as research projects they were not embedded within a planning cycle or designed to inform specific decisions. Decision-makers were participants in I, K and S, but we are not aware of any specific impact from our studies, partly because project funding ended preventing follow-through activities. Nevertheless, the follow-up survey in S, sent out a year after the interviews (55% response rate, n = 20), found that respondents thought STREAMLINE could support the monitoring and evaluation stages of the planning cycle and that it was a suitable communication tool (López-Rodríguez
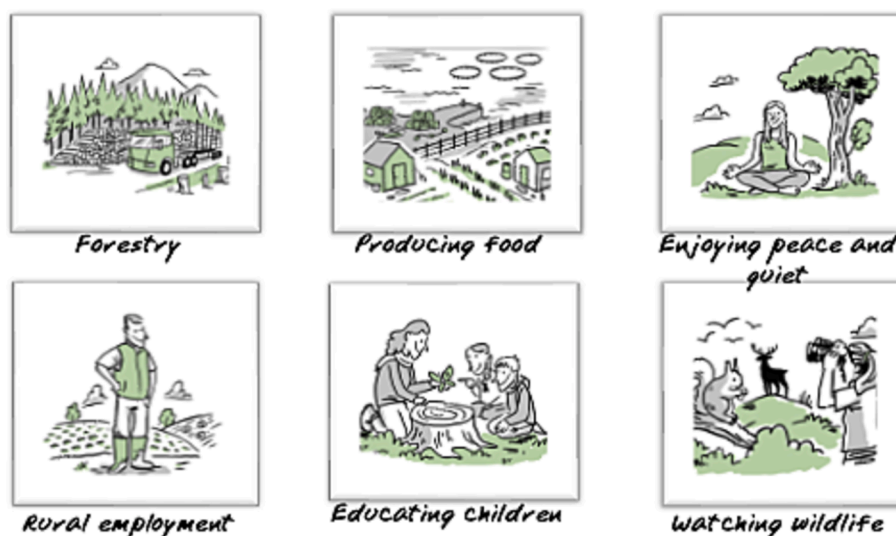

Fig. 4. Example illustrations of land uses and activities that worked well in our studies but may not appropriate in other contexts.

et al., 2021). And a project officer working for an NGO in I expressed that they were greatly encouraged by the public support for local nature and the potential managed realignment of the river Forth (personal communication, July 22, 2019). Our findings support evidence from a complementary choice experiment (Liski et al., 2019a), but complex land governance in the region illustrates the complexities of achieving change even when there is public support (Liski et al., 2019b). Our experience illustrates the challenges for academic research to influence land management due to nearly inevitable mismatches between project timing and resourcing and the planning cycle.

It has been more widely observed that insights from credible and legitimate participatory methods do not necessarily impact land use decisions. For example, Brown et al., (2020) found that after two decades of participatory mapping, mapped place values are shown to be predictive of the potential for land use conflict and resolution but there was little evidence to suggest this informed decision-making for a variety of systemic political and organisational barriers. Despite high-level commitment to public participation in decision-making (e.g. the Aarhus convention) and evidence-based decision-making (e.g. the ISO 9001 standard), even the best approaches will struggle to improve land management if organisational structure, capacity and resourcing are inadequate (Walsh et al., 2019). Despite these challenges, there is increased interest in inclusive conservation (Raymond et al., 2022) and integrated, adaptive and participatory planning (Nadin et al., 2020) requiring further development in participatory methods to support resource constrained planners.

We found that STREAMLINE has numerous desirable attributes to support decision-makers, including the positive participant experience and ability to address the complexities and nuance of land management and conservation. Eliciting commonalities as a starting point, rather than striking at conflict, could improve social acceptance of land use decisions (Chapman et al., 2019). The ability to stimulate social learning by improving understanding and broadening perspectives needs further testing but would be especially valuable where controversial or disruptive conservations strategies are being considered, e.g. rewilding (Butler et al., 2021). Based on our experience, we believe that STREAMLINE is a promising approach for stimulating engagement and gaining understanding of diverse values and could form a useful early-stage participatory tool to inform decision-making by anticipating levels of support or resistance for envisaged policy and plans.

5. Conclusions

Land management and conservation visions help to understand common ground and tensions among citizens and stakeholders. We found that illustration-based interviews were effective to stimulate discussion about these sensitive and complex topics and provide an engaging and inclusive way to understand visions and values of diverse groups of stakeholders, including hard to reach groups such as young people. By using illustrations within mixed-method semi-structured narrative interviews, STREAMLINE is a novel approach to understand desired future land use.

Our four studies demonstrate that STREAMLINE is a promising illustration-based interview methodology than can make semi-structured interviews about land use issue accessible and fun. Participants liked the informal visual format, which reduced pressure and increased comfort helping them think and reflect about complex topics. They also valued being listened to and having the opportunity to share their views. Researchers appreciated the ability to triangulate rich qualitative data with a variety of quantitative measure through the mixed-method format and the flexibility to adapt the canvases to suit their research aims. Positive participant experience made facilitation easier, and the strength of participant engagement was stimulating for the researchers. To fully understand and evaluate how STREAMLINE can support land management and conservation, the approach should be embedded in the early stages of regional planning with sufficient resource to evaluate its merits through the planning cycle.

The credibility and legitimacy of illustration-based interviews will ultimately depend on specific research design-decisions and testing, which can make the approach more resource intensive than conventional interviews. While organisational barriers should be considered realistically, illustration-based interviews could have high saliency by providing useful and usable insights that strengthen land management policy and planning.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

Appendix A. Supplementary material

Supplementary material to this article can be found online at https://doi.org/10.1016/j.landurbplan.2023.104862.

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