

# Revitalising Embodied Community Knowledges as Leverage for Climate Change Engagement

Laura Donkers (✉ [laura.donkers.art@googlemail.com](mailto:laura.donkers.art@googlemail.com))

University of Dundee <https://orcid.org/0000-0003-3730-8466>

---

## Research Article

**Keywords:** Performative research, local knowledge, participation, local food, climate change engagement, decarbonisation

**Posted Date:** June 22nd, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-606349/v1>

**License:**  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

# Abstract

Scientists inform us that the industrialised epoch has caused climate breakdown and ecological collapse that threaten human survival. These facts impose a sense of urgency on us to understand that our modern ways of living have created these problems and that we must find ways to resolve them. Communities need to come to terms with the damage that industrialisation has caused to ecology, adapt to the climatic consequences that have been unleashed, and adopt more sustainable ways of living. Yet, the scale of this crisis and lack of wisdom to act can be numbing, so how can communities become more informed and motivated to take action? This paper proposes a performative, practice-led approach to generate discrete engagement strategies that enliven public attention towards changing attitudes, developing more holistic behaviours and adopting mitigative actions. Such engagements are relatable, values-oriented and framed towards the priorities, knowledges, capacities, and lived experiences of rurally-based, intergenerational communities. This novel approach is exemplified in a case study on community food growing that successfully achieved decarbonisation targets. Public engagement was developed through the strategic promotion of *embodied community knowledges* (ECK) to engender and intensify a sense of ability to respond and act. A series of decarbonisation projects were designed to engage and mobilise local participation through the practical, adaptive capacities that lay within the community. Findings revealed that valuing a community's existing body of knowledge and revitalising that knowledge as a method of climate change engagement increased the potential for attentive, effective, and committed community-based actions.

## 1. Introduction

Human actions and activities have been changing the climate and ecology since industrialisation began causing unprecedented climate breakdown and ecological collapse, dubbed 'the sixth mass extinction' (1), or 'ecocide' (2). How society attends to these facts will determine whether humanity has a future. While a narrative of 'ecological disaster' can alert the public to the need for action (3), the scale and multi-dimensionality of the situation can leave them numb (4). An urgent response dictates that communities find ways to regulate their behaviours towards the long-term goals of carbon reduction and adopting more sustainable ways to live. To motivate proactivity, approaches are needed that make these urgent matters more tangible (5). Research shows that effective approaches are relatable, values-oriented and framed towards the priorities, knowledges, capacities, and lived experiences of the community (6; 7; 8).

At the macro social level, international governments work with their scientists and policy makers to develop top-down solutions (9), while at the micro social level, many communities already experience the impacts of ecological crisis on their environments, livelihoods and well-being (10). Navigating between these positions are the climate scientists, sustainability scientists, and non-governmental organisations, who are tasked with the critical issue of how best to prepare, inform and motivate citizens to engage with and adopt low carbon lifestyles (11; 12). Whitmarsh et al note that civic responses are partly guided by how policy-led initiatives are framed, and whether they promote 'active engagement' or merely 'passive compliance' (6). Their research established that low-carbon citizenship requires *social transitioning*: a

complex relationship between cognitive and emotive responses involving assessment of what can be done practically by citizens to actively reduce their carbon footprint. Their research concluded that proposed lifestyle changes that rely too heavily on education and awareness-building are not as effective as methods that also generate emotional investment towards collective moral responsibility (6).

Thus, science and politics alone cannot deliver the scalable transformative interventions needed to change societal ways towards more sustainable living practices (11; 12; 13). Adaptive approaches that challenge current structures, systems, mindsets, and cultures are also needed (14). Achieving success will hinge on how that change happens and is shaped (7; 15). Values-oriented and pragmatic approaches are understood to be more successful in motivating and engaging communities to take adaptive/mitigative action (16; 6; 7; 8; 17), as these are more likely to be ‘community-based, participatory, built on priorities, knowledge and capacities of local people’ (18); and ‘respect rights, support care and mutuality, strengthening communities and their knowledge systems’ (19). Therefore, effective solutions necessitate practical, adaptive forms of knowledge that build on embodied/lived experience, and hold meaning and significance ‘in the specific contexts of living communities’ (20). National and local initiatives exist to inform and support society to adjust to climatic challenges. Two examples in the UK are The Carbon Literacy Project: a transformative action programme that has embedded sustainability knowledge into the workplaces of over 15,000 citizens by teaching climate change and decarbonisation knowledge. And, the Scottish Government’s Climate Challenge Fund, which, in the period 2008–2020, has granted more than £111 million to 1,150 community-led projects to reduce carbon emissions locally.

Despite these indicators of progression, the author maintains that there remains a need to investigate whether public engagement with climate change can be further energised by drawing on existing *embodied community knowledges* (hereafter ECK) as a method to develop practical and emotional investment towards collective moral responsibility. To the best of the author’s knowledge this paper presents the first study to demonstrate an attempt to boost community engagement with climate change mitigation using a Performative Research methodology. The hypothesis is thus, while visions of ecocide and extinction may invoke paralysis, confusion and inaction, climate change knowledge that is framed in terms of its relatability to a local audience can help to enliven and intensify a community’s motivation, understanding and capacity to take up decarbonising actions. This paper sets out the rationale for ECK as an epistemological strategy. Then follows a case study on directing community engagement towards decarbonisation through the revitalisation of local ECK. This paper makes a novel contribution by: (a) advocating for emotive and pragmatic engagement approaches that draw from ECK; and (b) identifying which ECK supports best facilitate community transition towards adopting low carbon citizenship.

## 2. Community Embodied Knowledges As Epistemological Strategy

This study presented a way to get people to both engage with the impacts of climate change and understand the need for more sustainable living practices. It did this by introducing climate change and decarbonisation knowledge, in the form of *carbon literacy*, and proposed that learning would be more emotionally charged if this knowledge was framed towards the particular community’s existing body of

practical knowledges. Universal low-carbon citizenship might be urgently needed, but urbanised societies lack alternatives to consumerism (21) and have limited opportunities or the experiential capacity for undertaking place-based environmental stewardship (22). In rural locations, however, alternative approaches could draw from repositories of useful knowledges still held by collectives of people who depend[ed] on the environment for their livelihoods, for example, through the extraction of raw materials, cultivation of food and other life-sustaining stuffs, and as a location upon which to flourish. Such practical, adaptive forms of knowledge were the foundation of traditional, intergenerational communities whose livelihoods relied directly on the manipulation of ecological resources (23). Rural communities have intrinsic understanding of the finitude of bio-reserves (24); develop learning agilities towards changing conditions (25); and apply these learned experiences to new situations (26). In rural situations, livelihood generation and community resilience develop through lived experience and active community collaboration towards a mutually continued existence (20), and as such, the author posits, provide an exemplar for human adaptation at a time of existential threat imposed through climate and ecological crises.

This study took the view that embodied knowledge provides an epistemological strategy (27) based on 'knowing' as lived experience – 'the lived body is at the centre of individual experience' (28; 29); 'embodied knowledge situates intellectual and theoretical insights within the realm of the material world' (30); and identifies 'bodies as agents of knowledge production' (31). In 1991, Varela, Thompson and Rosch published their examination of 'lived experience' in *The Embodied Mind, Cognitive Science and Human Experience* (32). Their research recognised the interdependency between both the environment and human experience. They presented cognition as an *enacted* rather than a representational structure, where the mental processes of acquiring knowledge and understanding are physically linked to the experience of environment through bodily sensorimotor capacities that do not happen independently of that coupling: 'cognition and world are interdependently originated via the living body' (p xxvi). From this perspective, relevant knowledge acquisition is dependent upon the agency of the body to act.

Thus, the experienced body is an 'adaptive autonomous and sense-making system' (p xxvi) that consciously reacts and readjusts in 'continuous self-modification' according to the experienced conditions (33). In long established, intergenerational communities, individuals work collectively for the benefit of others who participate in an atmosphere of sharing and reciprocal learning (34). In this context, the accumulation of these forms of community-based experiences can be categorised as the embodiment of collective knowledge, or *embodied community knowledges* (ECK) as the author coins it. This phrase refers to knowledge created within intergenerational communities through the sharing of lived experiences and the transference of beneficial knowledges from preceding generations (35; 36). The plural form 'knowledges' is used to preserve and draw attention to the diverse and specific expertise held by different communities via their networks, relationships and connections to place. ECK, therefore, provides a descriptive term for the accumulation of shared human experiences in the common experiential ecology of situated communities.

### 3. Methodology

The aim for the research was to broaden understanding of the adaptive capacities that lie within ECK and to repurpose them into practical actions as revitalised forms of knowledge to leverage community engagement towards climate change. Summarised in the following table (Table 1), this approach aimed to develop constructive and meaningful activity in climate change mitigation in an island-based community, using their common linkages (intergenerational and societal bonds, rootedness in particular places, and broad adaptive capacities and skills base) as nodes of engagement.

#### 3.1 Case study

The community represented in this research, exists across a group of inhabited islands known as the Outer Hebrides, lying off the North-West coast of Scotland (Fig. 1). The total population currently stands at approximately 27,000 islanders living on a landmass of 3,071 km<sup>2</sup>. Of this, the people represented in the study live mainly in townships (networks of approx. 3–10 households) on the islands to the south of Lewis and Harris known as Uist: an area of 892 km<sup>2</sup>. This chain of islands, including Berneray, North Uist, Benbecula, South Uist, and Eriskay, has a population of approximately 5,000 residents (43). Climatically the area is dominated by the Gulf Stream, leaving the region comparatively mild, and predominantly wet. The poor soils comprise mainly of organic peat with shell sand on the coastal and western fringes. To create relatively fertile arable land the coastal plains were transformed over centuries through the human activated addition of seaweed (44). This land form is known as *Machair*. Scots Gaelic for fertile, low lying grassy plain. Its extensive agricultural management (using small inputs of labour, fertilisers, and capital, relative to the land area being farmed) affords a rare and distinct habitat for a large diversity of wildlife, and represents a long-standing symbiosis between humans and nature (45; 46; 47).

In Uist, climate change is evident in the form of sea level rise, coastal erosion, and rising temperatures causing more frequent/extreme weather events and increasingly flooded land (48). While major ecological changes are outside of the community's immediate capacity to address, tackling issues around food sovereignty and the benefits of eating seasonal home-grown food can help draw attention towards mitigating some of the carbon emissions linked to production and transport emissions of supermarket bought food (49). Growing food at the domestic scale for household use remains a habitual activity for islanders, and as such provided a suitable activity to base a decarbonisation project using ECK as a method of engagement.

Communities survived in challenging locations like the Uists because they developed a close, long-term engagement with the environment, working with and nurturing ecology rather than depleting it (50). The community's collective embodied knowledges encompass lived experience, heritable knowledges and shared lifeworld beliefs passed on intergenerationally (51; 35; 52). Such knowledges have developed through societal alliances (52) and in the microcosm of a geographically defined and contained community that is interconnected across several planes - the land, sea, seasons. This community's adaptive capacities (assets, skills, attitudes, behaviours, lived experiences, knowledges, agency) have

sustained human occupation on the islands for at least 4000 years (53). In more recent times, community rights to land governance (use and occupation but not ownership) were underwritten by the creation of crofting tenure in a complex process of legislation including the *Crofters' Holding (Scotland) Act 1886* (54) and the *Land Settlement (Scotland) Act 1919* (55). These parliamentary acts, and others, provided townships with the traction and agency to continue to self-organise and learn, validating the collective ethic in regards to a commons and resource-based economy (56; 57).

However, these small, geographically widespread communities were still vulnerable to changes wrought by population decline and the impacts of modernity. The evacuation of the neighbouring islands of St Kilda in 1930, due ultimately to an unsustainable decline in population (58) offered a blunt reminder to neighbouring islanders of the impact that depopulation can have in rendering a whole community's way of life defunct. And, from mid-1950 onwards, technological advancements drew communities towards a money-based economy through the introduction of domestic water and electricity supplies (59; 60). Further technological progression, seen as 'crucial to economic survival', came in the form of a north-south road network and the development of an internal market leading to more infrastructure and jobs, thereby accelerating islanders' capacity to supply their own individual/family needs (61). Consequently, common understanding of previously pooled assets and materials was altered as both the possibility and necessity to earn money constrained how people worked and lived together. This resulted in devolved livelihoods, no longer integrated in township collectives, which undermined place-community connectedness (62). Communities whose economic stability resides in a modernised context (63) have arguably suffered *decommonisation*, as the traditional common-pool resource management system loses its cooperative purpose (64). Nonetheless, despite crofting no longer being the economic driver of land use (62; 65), it continues to retain an enduring capacity to link people to place in a close, long-term socio-ecological engagement, and for the purposes of this research provided a meaningful platform from which to promote climate change engagement.

### 3.2 Approach | Method

A Performative Research method underpinned this study. According to Haseman (66), it is primarily used as an approach to develop 'meaning-making' (p2) and is mostly carried out by practice-led researchers in the fields of art, media and design. It presents an unconventional approach to designing, conducting and reporting research practice, as it often begins from an experiential starting point that informs the development and subsequent delivery of a plan or method. Here the questions, problems and challenges emerge from the complexity of practice as the research develops. It differs from quantitative methods that usually begin with the identification of a problem, formulation of questions, and a hypothesis, which are then tested in various ways to produce a set of generalised findings that eliminate individual perspectives. It is more akin to qualitative research methods that enable reflection from the perspective of the researcher and the participants through participant research, collaborative enquiry, and action research. Primarily though, it diverges from how findings are expressed - in quantitative research as numbers, graphs, formulas, and in qualitative research as text-based descriptions of observations, interpretations, behaviours, and responses. Even though Performative Research may still include some

traditional data collection and analytical approaches, the main purpose is: (a) to 'improve practice' in terms of its practical function; and (b) devise new methods of producing and communicating 'meaning-making' (66; 67).

The author began by taking up a Project Leader's role in a newly created local food-growing project, *Local Food for Local People CCF-3812*, funded by the Scottish Government's *Climate Challenge Fund*. This project had been designed by two local community organisations - Cothrom (a community learning provider) based on the Isle of South Uist, and Tagsa Uibhist (a social care provider) based on the Isle of Benbecula. The decarbonisation plan for *Local Food for Local People* had been designed with only limited public engagement, focusing more on the dissemination of carbon reduction methods via printed advice leaflets than through active engagements with the community. Rather than seeking to mobilise the community towards mitigative climate change action per se, the key outcomes of the project were: (a) to construct two large greenhouses to produce local food for public sale; (b) the introduction of an accredited horticultural skills training course; and (c) the expansion of volunteer recruitment to assist with developing food production.

To bridge what the author perceived to be a carbon literacy 'engagement gap', the research began by directing attention towards the community's environmental knowledge and growing skills through the design and implementation of an extensive baseline data survey. It was entitled *Reclaiming the Knowledge* (37) and aimed to discover details of historical and current growing capacity along with related 'how to' knowledges. The author saw the potential to engage outlying communities by proposing additional small, locally-based projects for marginal groups. This was initiated in a promotional campaign where community members were invited to step forward and self-nominate their township or district for consideration. This process hoped to facilitate a more personal, localised, and enlivened perspective towards decarbonisation.

### 3.3 The Projects

The series of projects addressed a range of issues including lack of availability of local vegetables; high food miles associated with existing food transportation; a poor public transport network that exacerbated social and geographical isolation from the proposed new greenhouses; and dwindling opportunities for daily social interaction and physical activity. The projects provided young families with communal growing facilities and provided collaborative learning opportunities to set up and run localised food-growing hubs. They also developed carbon literacy as a measure to generate wider knowledge and understanding of the impacts of carbon and promoted adaptation measures and low carbon behaviours by working with local organisations and businesses to create demand and capacity for locally produced food.

Two iterations of the project *Local Food for Local People CCF-3812* (40) and *Local Food for Local People CCF-4744* (41), set out to grow more food/deliver horticultural training/provide support to growers to reduce food miles, to reduce food waste, and raise awareness of their links to sustainability and climate

change, as well as create opportunities for skills development and work experience in horticultural food production, providing job opportunities as well as health and well-being benefits.

*Grow Your Own Community CCF-4968* (42) aimed to strengthen social cohesion for specific marginal groups by providing young families with community growing facilities (Fig. 2); and educating towards a low carbon future by introducing carbon literacy. It also promoted a method to reduce food miles through a campaign to supply crofters' traditionally grown 'Machair' potatoes to school catering outlets as part of *Better Eating Better Learning* (an initiative to encourage the development of local food supply).

*Reclaiming the Knowledge Data Gathering Project* (37) was a community survey that set out to accurately identify (as baseline data) the current area of land used for domestic food production, as well as gather knowledge of local food growing practices. Designed as an island wide, intergenerational research project, the survey collected data on current fruit and vegetable production across the islands; learned more about the people undertaking food-growing activities; the period of time that the land had been under cultivation; and how the produce was eventually used and by whom. Baseline data would also support the sensible targeting of areas for expansion and training development, but primarily, the survey was designed as part of the engagement strategy to acknowledge the symbolic and practical value of islanders' knowledge and capacity for self-sufficiency; domestic food growing capacity; and the current level of knowledge and skills. The data was eventually collated into the *Uist Growers Almanac* (38): a repository of local knowledge and techniques for growing fruit and vegetables successfully.

Accredited Carbon Literacy training (69) was delivered to project staff and support workers as part of an engagement programme to teach the community about carbon. It focussed on the most accessible principles of earth's climate, impacts of climate change, and approaches that can be taken towards adaptation or mitigation. The growers' groups had different structures according to the location or demographic: one mostly had young families, another was mostly male, another was mostly female, most had an intergenerational mix. Each group's support worker was tasked with developing carbon literacy in a way that aligned with the dynamics of their group, thus creating the circumstances to hold meaningful *climate conversations*.

Climate conversations have usually arisen spontaneously ... some were on a global level about ice caps melting and on political effects of changing weather patterns and food availability ... others were on a local level regarding changes to the coastline, increasing storms. Everyone feels a bit powerless in the face of the global situation but then it gets talked about and what we can do on a personal level. We talk about food miles and growing our own food instead but also about other small changes we can make, like walking ...rather than using the car and changing to LED bulbs.

Support Worker, *Grow Your Own Community CCF-4968* (42, p30)

### 3.4 Results | Main Themes

#### 3.4.1 ECK of food production as a mitigative medium to engage participants

Table 2 shows the practical method used to successfully mobilise the community towards climate change engagement through a focussed increase in food growing activities as a decarbonisation method. The amount of carbon reduction is recorded in relation to the increase in numbers of participants growing food. This production took place across all the project sites, but by the third year there is a marked increase where crofters have come on board to grow additional potatoes for local schools' catering.

### 3.4.2 Methods and supports based on ECK motivate and build confidence

Through a process of participative events/actions/carbon literacy and horticultural training, the projects visually and materially harnessed the community's embodied knowledge on sustainable living as the symbolic axis of engagement to connect them with an Enlivenment perspective (Fig 3). This approach produced cohesive domestic food-growing communities and was achieved through (a) **developing carbon literacy** in the community; (b) **a format of self-nomination** to provide an entry point and platform for participants to step forward and say what they wanted based on their lived experience; and (c) in **the creation of open space** to encourage the proactive input of participants towards shaping project outcomes that developed meaning-making towards climate change mitigation. Thus, involving the local community as cooperative managers ensured that their ECK was a strategic part of project development, and to this end established a change in dynamics in how the community's knowledge was perceived publicly and from within the community.

I have been involved to a greater or lesser degree over the past 15 years in advising and supporting initiatives which have been aimed at encouraging growing more local produce...this project – partly as a result of its learning from other past initiatives – has the potential to bring significant change in our communities' attitude, habits and cultures in relation to local produce, growing and consumption. It's significant successes to date have resulted from the connection it has made between a wide diversity of local communities, both geographically and across the generations, and links to learning, and the wider issues of sustainability and climate change.

Regeneration Officer, Comhairle nan Eilean Siar

### 3.4.3 A performative approach revitalised ECK to underpin engagement with climate literacy

A reinvigorated ECK helped to mobilise the community towards connecting carbon literacy with the undertaking of meaningful, and thus enlivened, societal action towards locally grown food. This approach caused the community to see that rather than lacking knowledge and wisdom about how to act towards climate change mitigation that they were in fact well equipped to undertake mitigative actions. These enlivened actions were **relevant to their knowledges** and within their **capacity to act** (Fig. 4). This approach helped to develop the following core messages (Table 3).

## 3.5 Analysis

The projects implemented a range of mitigative methods that were devised for communities to readily engage with through their existing adaptive capacities. Because such practical forms of knowledge were seen as valuable to the project, their value became elevated and thus contained a degree of motivational worth to the communities. Thus, the leverage potential of ECK was generated because people were encouraged to draw from known but under-valued practices rather than having to learn new practices, hence, reinvigorating the value of old knowledges. Revitalisation of ECK helped to highlight its societal value; identified it as transferrable to a new societal situation; transformed its relevance intergenerationally to younger members; its leverage potential became recognised by local institutions; and finally, it generated local solutions which were of communal benefit.

From a decarbonisation perspective, this approach produced more than just carbon emissions reductions data, it also had some important community benefits. Face-to-face methods of data gathering facilitated physical interactions between young and elder community members about lifestyles, behaviours, processes and histories that reinforced and upheld intergenerational knowledge distribution as a valuable system of reciprocal learning for all parties (70). The participants found motivation in keeping quantitative records, because as well as providing the evidence of volume grown (for project outcomes records), and they could also correlate monetary value to the produce. For the community organisations, the collection of reliable data enabled the project to stay on track with carbon emissions reductions targets. Furthermore, the deployment of young residents to harvest baseline data from their own communities, along with respondent's willingness to divulge accurate information, helped towards identifying the contribution already being made towards domestic food production that was not the work of the project but the community's own endeavours. Awareness that the argument for encouraging local food production was already established enabled the sensible targeting of areas for future project direction and training development in carbon literacy. It would also not ignore existing community practices when devising credible narratives for future projects and hence not alienate the very people who have the experience and credibility amongst their peers towards contributing to project development/delivery. In this way, this approach introduced a new dynamic for the community, who operated as co-managers in strategic development.

## 4. Discussion

The performative researcher seeks to make live cultural production visible by exposing the values, collective norms and invisible rules that guide behaviour and reflect the social and cultural positioning of the participatory activities that are produced (66: 67). Thus, in order to develop research that represents the 'spirit' of the research outcomes, performative researchers ground their ideas in live practice, cultivating skills of patience, awareness and sensitivity that assist them in navigating collective space (71). Researchers such as these understand that 'any observer is entangled within the system being observed' (72), and develop cognisance that the meetings and conversations they lead or take part in, social gatherings they attend, or communal activities they organise, are activated in a live, ephemeral communication (73). Therefore, in order to build on emerging relationships, the visibility of good motives,

the pursuit of genuine cooperation, and illustration of commonly-held trust are all vital aspects of effective engagement strategies.

To this end, the video and public exhibition *Meeting Ground* (39) presented a summative finale to the research process. This presentation disseminated the discrete, embodied knowledges of the micro-communities' who had taken part. This visual presentation in a public gallery, afforded a way for the public to learn about the projects, but also for the participants to see themselves and the performative acts they had instigated. *Meeting Ground 2019* (Fig. 5) presented a visual language that could communicate complexities of experience intrinsic to each micro-community, and how each had made sense of climate change mitigation through their own capacity to act. The interaction between an experienced moment, the memory of it, the actual video capture of it and its "potentiality" beyond its timeframe captured a sense of liberated agency. This was expressed in terms of how each group took action together, felt in charge of their own legacy, and within the context of their own territories: that is, through their own identities, community, dominion, control, land, knowledge, activity, and experience. Thereby opening up ways of addressing decarbonisation activities in a manner that can be understood as beneficial for the community.

## 5. Conclusion

This paper argued that the presented case study demonstrated 'how to' motivate a community to take part in local climate change mitigation via the transformative approach of using their own ECK as a lever for engagement. Paradigm shifts and societal transformation are possible if new knowledge is linked to existing practical knowledges, developing alternative approaches that invite multiple voices to be represented through different modes of expression and representative methods, thereby empowering communities to work together for their own prosperity.

It is beyond the scope of a performative research study to identify exactly what transformative changes have occurred in the community, as it would require a more quantitative approach to measure which aspects of engagement within the interconnected form of ECK have been most effective. However, it seems fair to record that the community has experienced a shift in some of their visible practices, with a renewed sense of the value and purpose around coming together to grow food on a communal basis as a decarbonisation measure. Since the project ended, several more food growing hubs have been erected at various locations across the islands, and existing facilities continue to be used with waiting lists for more growers being held at several sites.

Further research is required to establish the effectiveness of a performative research approach and whether it is possible that contemporary artists can help to unlock thinking by forging new perspectives that embrace uncertainty and act towards bringing about systemic cultural changes that are needed at this time. In addition, the development of practice-led approaches that engage with local knowledge perspectives could help to open up new practitioner roles through alternative methods of expression and creation of experiences that help to conceptualise human-nature relationships.

This research has shown that the revitalisation of residual embodied cultural knowledges, norms, values, practices and infrastructures, can provide a basis from which to develop understanding of the reality of climate and ecological breakdown currently facing society. Empirical findings from this study revealed that working with community, connection to place, and drawing from ECK perspectives, had the effect of motivating those communities to become attentive, vocal and active towards taking mitigative climate change actions.

## 6. Declarations

**Funding:** This research paper draws from the author's PhD research which received full funding from the Scottish Graduate School of Arts & Humanities/Arts & Humanities Research Council Doctoral Training Partnership in Creative Economies.

**Conflicts of interest/Competing interests:** The author declares no conflict of interest for this article.

**Availability of data and material:** A series of End of Project Reports for the Scottish Government's Climate Challenge Fund are available as online publications written by author. (Links in reference section).

**Code Availability:** Not Applicable

**Authors' Contributions:** This is a single-authored manuscript where the conception, design, data collection and writing were carried out by the author only.

**Ethics approval:** Research Project approval was provided by University of Dundee School of Art & Design Research Ethics Committee on 4 September 2018 (Application Number SAD\_18\_RPG0120).

**Consent to participate:** Consent was given by all research participants.

**Consent for publication:** All participants gave consent for this research to be published.

## 7. References

1 Kolbert, E. (2014). *The Sixth Extinction. An Unnatural History*. Henry Holt and Company

2 Vorster, J.M. (2005). Ecocide, the integrity of creation and the rights of the next generation. *Verbum et Ecclesia*. 26, (3). <https://doi.org/10.4102/ve.v26i3.255>

3 Lowe, T., Brown, K., Dessai, S., de Franca Doria, M., Haynes, K., Vincent, K. (2006) Does tomorrow ever come? Disaster narrative and public perceptions of climate change. *Public Understanding of Science*. 15(4): 435-457. <https://doi.org/10.1177%2F0963662506063796>

4 Norgaard, K.M. (2011) *Living in Denial: Climate Change, Emotions, and Everyday Life*. MIT Press

5 MacKay, C.M.L. and Schmitt, T. (2019) Do people who feel more connected to nature do more to protect it? A meta-analysis. *Journal of Environmental Psychology*. 65: 101323  
<https://doi.org/10.1016/j.jenvp.2019.101323>

6 Whitmarsh, L., O'Neill, S., Lorenzoni, I. (2013). Public engagement with climate change: What do we know and where do we go from here? *International Journal of Media & Cultural Politics*. 9, (1): 7-25(19)  
[https://doi.org/10.1386/macp.9.1.7\\_1](https://doi.org/10.1386/macp.9.1.7_1)

7 Corner, A. Markowitz, E. and Pidgeon, N. (2014) Public engagement with climate change: the role of human values. *WIRE's Climate Change*. 5(3): 411-422 <https://doi.org/10.1002/wcc.269>

8 Jones, O. (2020). Pragmatism, anti-representational theory, and local methods for critical-creative ecological action. Wills, J. and Lake, R. (Eds.) 2020. *The Power of Pragmatism: Knowledge Production and Social Enquiry*. Manchester University Press

9 Ripple, W.J., Wolf, C., Newsome, T.M., Barnard, P., Moomaw, W.R. (2020). World Scientists' Warning of a Climate Emergency. *BioScience*, 70 (1) 8-12 <https://doi.org/10.1093/biosci/biz088>

10 Adger, W.N. (2010). Climate Change, Human Well-being and Insecurity. *New Political Economy*. 15, (2): 275-292. <https://doi.org/10.1080/13563460903290912>

11 Dilling, L. and Moser, S.C. (2007) Introduction, In: Moser, S.C., Dilling, L. (Eds.), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge University Press, Cambridge, UK: 1-27

12 Moser, S. and Dilling, L. (2011) Communicating Climate Change: Closing the Science-Action Gap, In: Dryzek, J.S., Norgaard, R.B., Schlosberg, D. (2011) *The Oxford Handbook of Climate Change and Society*. Oxford University Press, Oxford UK

13 Abson, D.J., Fischer, J., Leventon, J. et al. (2017). Leverage points for sustainability transformation. *Ambio* 46: 30–39. <https://doi.org/10.1007/s13280-016-0800-y>

14 O'Brien, K. (2012). Global environmental change II: From adaptation to deliberate transformation. *Progress in Human Geography*. 3, (5): 667-676. <https://doi.org/10.1177/0309132511425767>

15 Fazey, I., Schäpke, N., Caniglia, G., Patterson, J., et al. (2018). Ten essentials for action-oriented and second order energy transitions, transformations, and climate change research. *Energy Research and Social Science*. 40: 54-70 <https://doi.org/10.1016/j.erss.2017.11.026>

16 O'Brien, K., and Wolf, J. (2010). A values-based approach to vulnerability and adaptation to climate change. *WIREs*. Vol. 1. March/April. Wiley Online <https://doi.org/10.1002/wcc.30>

17 Barnes, M.L., Wang, P., Cinner, J.E., Graham, N.A.J., Gurrero, A.M., Jasny, L., Lau, J., Sutcliffe, S. R., Zamborain-Mason, J. (2020). Social determinants of adaptive and transformative responses to climate

change. *Nature Climate Change* <https://doi.org/10.1038/s41558-020-0871-4>

18 Reid, H., Cannon, T., Berger, R., Alam, M., Huq, S., Milligan, A. (2009). Community-based Adaptation to Climate Change: an overview, pp 11-33, in Reid, H., Cannon, T., Berger, R., Alam, M., Ashley, H., Kenton, N., Milligan, A. (Eds.) *Community-based Adaptation to Climate Change Participatory Learning and Action*. International Institute for Environment and Development. Earthprint Ltd. Stevenage, UK.  
<https://pubs.iied.org/pdfs/G02608.pdf>

19 Hill, R., Admen, C., Alangui, W.V., Molnar, Z., Aumeeruddy-Thomas, Y., Bridgewater, P., et al. (2020). Working with indigenous, local and scientific knowledge in assessments of nature and nature's linkages with people. *Current Opinion in Environmental Sustainability*. 43: 8-20.  
<https://doi.org/10.1016/j.cosust.2019.12.006>

20 Guzman, G. (2009). What is practical knowledge? *Journal of Knowledge Management*. 13, (4): 86-98.  
<https://doi.org/10.1108/13673270910971851>

21 Zukin, S. (1998). Urban Lifestyles: Diversity and Standardisation in Spaces of Consumption. *Urban Studies*, 35(5/6): 825-839. <http://www.jstor.org/stable/43084034>

22 Flannagan, C., Gallay, E., Pykett, A., Smallwood, M. (2019) The Environmental Commons in Urban Communities: The Potential of Place-Based Education. *Frontiers in Psychology*. 10: 226.  
<https://doi.org/10.3389/fpsyg.2019.00226>

23 Berkes, F., Colding, J., Folke, C. (2020) Rediscovery of Traditional Ecological Knowledge as an Adaptive method. *Ecological Application* 5 (10): 1251-1252 [https://doi.org/10.1890/1051-0761\(2000\)010\[1251:ROTEKA\]2.0.CO;2](https://doi.org/10.1890/1051-0761(2000)010[1251:ROTEKA]2.0.CO;2)

24 Rossi, A. (2018). The Finitude of the World: Economy and Ecology. *Theory & Event* 21(4): 776-803.  
<https://www.muse.jhu.edu/article/707010>

25 Berkes, F. and Berkes, M.K. (2008). Ecological complexity, fuzzy logic, and holism in indigenous knowledge. *Futures* 41, (1): 6-12. <https://doi.org/10.1016/j.futures.2008.07.003>

26 De Meuse, K.P., Dai, G., Hallenbeck, G.S. (2010) The Many Faces of Learning Agility. Mid Winter Conference of Consulting Psychology. <https://studylib.net/doc/18031184/the-many-faces-of-learning-agility>

27 Whiteley, C.H. (1969). II Epistemological Strategies. *Mind* 18(309): 25-34.  
<https://doi.org/10.1093/mind/LXXVIII.309.25>

28 Merleau-Ponty, M. (1962). The phenomenology of perception. (Colin Smith, Trans.). London: Routledge & Kegan Paul. (Original work published 1962).

29 Merleau-Ponty, N. (1964). The primacy of perception. Evanston, IL: Northwestern University Press

- 30 Given, L. M. (2008). Embodied Knowledge in The SAGE Encyclopaedia of Qualitative Research Methods (Vols. 1-0). Thousand Oaks, CA: SAGE Publications, Inc.  
<https://dx.doi.org/10.4135/9781412963909.n127>
- 31 Wilcox, H.N. (2009) Embodied Ways of Knowing, Pedagogies, and Social Justice: Inclusive Science and Beyond. NWSA Journal. 21(2): 104-120. <https://www.jstor.org/stable/20628176>
- 32 Varela, F. J., Thompson, E., and Rosch, E. (1991). The Embodied Mind: Cognitive Science and Human Experience. MIT Press Cambridge, Mass.
- 33 Thompson, E. (2017). The Enactive Approach. The Brains Blog  
<https://philosophyofbrains.com/2017/01/27/the-enactive-approach.aspx>
- 34 Buffel, T., De Donder, L., Phillipson, C., De Witte, N., Dury S. and Verté, D. (2014). Place attachment among older adults living in four communities in Flanders, Belgium. Housing Studies, 29(6), 800-822  
<https://www.tandfonline.com/doi/abs/10.1080/02673037.2014.898741>
- 35 Te Kanawa, K. (2008). Mai I Te Ao Kohatu Weaving: An Art Form Derived from Mātauranga Māori as a Gift from the Ancestors. Te Kaharoa. 1 (1). <https://doi.org/10.24135/tekaharoa.v1i1.137>
- 36 Ó'Sabhairn, P. and McGrath, B. (2019). Traditional sailing boats, embodied knowledge(s) and dwelling in coastal rural communities: The case of the 'Galway Hooker' in South West Conamara, Ireland. Journal of Rural Studies 72: 228-239. <https://doi.org/10.1016/j.jrurstud.2019.10.029>
- 37 Donkers, L. (2017) b. Reclaiming the Knowledge Data Gathering Project Final Report to the Pebble Trust [https://issuu.com/localfoodforlocalpeople/docs/reclaiming\\_the\\_knowledge\\_pebble\\_tru](https://issuu.com/localfoodforlocalpeople/docs/reclaiming_the_knowledge_pebble_tru)
- 38 Donkers, L. (2016) b. Uist Growers Almanac: the natural way to grow. Elite Publishing Academy UK [https://issuu.com/localfoodforlocalpeople/docs/the\\_uist\\_growers\\_almanac\\_the\\_natura](https://issuu.com/localfoodforlocalpeople/docs/the_uist_growers_almanac_the_natura)
- 39 Donkers, L. (2019). Meeting Ground, 2019 (HDV; 16:15) available to view  
<https://www.lauradonkers.art/meeting-ground>
- 40 Donkers, L. (2016). Local Food for Local People CCF-3812 Final Report. Climate Challenge Fund [https://issuu.com/localfoodforlocalpeople/docs/final\\_project\\_report\\_ccf-3812](https://issuu.com/localfoodforlocalpeople/docs/final_project_report_ccf-3812)
- 41 Donkers, L. (2017). Final Report Local Food for Local People CCF-4744. Climate Challenge Fund [https://issuu.com/localfoodforlocalpeople/docs/local\\_food\\_for\\_local\\_people\\_ccf-474](https://issuu.com/localfoodforlocalpeople/docs/local_food_for_local_people_ccf-474)
- 42 Donkers, L. (2018). Final Report Grow Your Own Community CCF-4968. Climate Challenge Fund <https://issuu.com/growyourowncommunity>
- 43 Comhairle nan Eilean Siar. (2020). Island Populations. <https://www.cne-siar.gov.uk/strategy-performance-and-research/outer-hebrides-factfile/population/island-populations/>

44 Ritchie, W. (2011). Machair development and chronology in the Uists and adjacent islands. Proceedings of the Royal Society of Edinburgh. Section B. Biological Sciences, 77: 107-122.

<https://doi.org/10.1017/S0269727000012677>

45 Angus, S. (2009). Dé tha cearr air a'mhachaire? Biodiversity issues for Scottish machair: an initial appraisal. Glasgow Naturalist, Supplement. Machair Conservation: Successes and Challenges. 25: 53-62 [http://www.glasgownaturalhistory.org.uk/machair/de\\_tha\\_cearr.pdf](http://www.glasgownaturalhistory.org.uk/machair/de_tha_cearr.pdf)

46 Angus, S., and Dargie, T. (2009) The UK Machair Habitat Action Plan: Progress and problems. Botanical Journal of Scotland, 54 (1): 63-74 <https://doi.org/10.1080/03746600208685029>

47 Lewis, R.J., Pakeman, R.J., Angus, S., Marrs, R.H. (2014). Using compositional and functional indicators for biodiversity conservation monitoring of semi-natural grasslands in Scotland. Biological Conservation. 175: 82-93. <https://doi.org/10.1016/j.biocon.2014.04.018>

48 Angus, S., and Hansom, J. D. (2006). Tir a' Mhachair, Tir nan Loch? Climate change scenarios for Scottish Machair systems: a wetter future. In: Angus, S. and Ritchie, W. (eds.) Sand Dune Machair 4. Aberdeen Institute for Coastal Science and Management: Aberdeen: 29-36.

<https://www.semanticscholar.org/paper/Tir-a%E2%80%99-Mhachair%2C-Tir-nan-Loch-Climate-change-for-a-Angus-Hansom/f84bfc772fd68e87ed22807df3c769105b01dc6a?p2df>

49 Making Local Food Work. (2010). Local Food and Climate Change: The Role of Community Food Enterprises. [https://www.fcrn.org.uk/sites/default/files/Local\\_food\\_and\\_climate\\_change.pdf](https://www.fcrn.org.uk/sites/default/files/Local_food_and_climate_change.pdf)

50 Edwards, J.K., Whittington, G., Ritchie, W. (2005). The possible role of humans in the early stages of machair evolution: palaeoenvironmental investigations in the Outer Hebrides, Scotland. Journal of Archaeological Science. 32, (3): 435-449. <https://doi.org/10.1016/j.jas.2004.09.011>

51 Gieser, T. 2008. Embodiment, emotion and empathy: A phenomenological approach to apprenticeship learning. Anthropological Theory, SAGE Publications. <https://doi.org/10.1177/1463499608093816>

52 Goodwin, C. (2008). The co-operative, transformative organization of human action and knowledge. Journal of Pragmatics. 46, (1): 8-23. <https://doi.org/10.1016/j.pragma.2012.09.003>

53 Oram, R. and Adderley,W.P. (2011). Innse Gall:Culture and Environment on a Norse Frontier in the Scottish Western Isles. In: The Norwegian Domination and the Norse World, C. 1100-c.1400. Tapir Academic Press [https://dspace.stir.ac.uk/bitstream/1893/3258/1/Re%20Innse%20Gall%20\(Roros\).pdf](https://dspace.stir.ac.uk/bitstream/1893/3258/1/Re%20Innse%20Gall%20(Roros).pdf)

54 Crofters Holdings (Scotland) Act 1886 <https://www.legislation.gov.uk/ukpga/Vict/49-50/29/contents>

55 Land Settlement (Scotland) Act 1919 <https://www.legislation.gov.uk/ukpga/Geo5/9-10/97/contents>

56 Hunter, J. (1976). The Making of the Crofting Community. Edinburgh, John Donald

- 57 St. Martin, K. (2009). Towards a Cartography of the Commons: Constituting the Political and Economic Possibilities of Place. *Professional Geographer*, 61, (4): 493-507.  
<https://doi.org/10.1080/00330120903143482>
- 58 National Libraries of Scotland. (2020). Evacuation of St Kilda, 1930.  
<https://digital.nls.uk/scotlandspages/timeline/1930.html>
- 59 House of Commons Debates. (1956). Electricity Supply, Outer Hebrides Oral Answers to Questions – Scotland – in the House of Commons at 12:00 am on 20th November 1956.  
<https://www.theyworkforyou.com/debates/?id=1956-11-20a.1523.5>
- 60 Hansard. (1964). North Uist and Barra (Electricity Supply) <https://api.parliament.uk/historic-hansard/commons/1964/jan/22/north-uist-and-barra-electricity-supply>
- 61 Comhairle nan Eilean Siar. (2020). Bridges, Causeways, and Ferries. <https://www.cne-siar.gov.uk/roads-travel-and-parking/bridges-causeways-and-ferries/>
- 62 MacKinnon, I. (2018). 'Decommonising the mind': historical impacts of British imperialism on indigenous tenure systems and self-understanding in the Highlands and Islands of Scotland. *International Journal of the Commons*. 12, (1): 278–300. <http://doi.org/10.18352/ijc.814>
- 63 Mayumi, K. and Giampietro, M. (2018). Money as the Potential Cause of the Tragedy of the Commons. *Romanian Journal of Economic Forecasting*. 0(2): 151-156.  
[http://www.ipe.ro/rjef/rjef2\\_18/rjef2\\_2018p151-156.pdf](http://www.ipe.ro/rjef/rjef2_18/rjef2_2018p151-156.pdf)
- 64 Nayak, P.K, Berkes, F. (2011). Commonisation and decommonisation: Understanding the processes of change in the Chilika Lagoon, India. *Conservative Soc* 9: 132-45  
<http://www.conservationandsociety.org/text.asp?2011/9/2/132/83723>
- 65 Comhairle nan Eilean Siar. (2020). Agriculture and Crofting. <https://www.cne-siar.gov.uk/strategy-performance-and-research/outer-hebrides-factfile/economy/agriculture-and-crofting/>
- 66 Haseman, B. (2006). A Manifesto for Performative Research. *Media International Australia* incorporating Culture and Policy, theme issue "Practice-led Research". 118: 98-106.  
<https://eprints.qut.edu.au/3999/>
- 67 Haseman, B. and Mafe, D. (2009). Acquiring know-how: Research training for practice-led researchers. In Dean, R & Smith, H (Eds.) *Practice-led Research, Research-led Practice in the Creative Arts*: 211-228. Edinburgh University Press, United Kingdom
- 68 Brutschy S., Zachary D. (2014). Marginalized Communities. In: Michalos A.C. (eds) *Encyclopedia of Quality of Life and Well-Being Research*. Springer, Dordrecht: 3771-3776  
[https://link.springer.com/referenceworkentry/10.1007%2F978-94-007-0753-5\\_1725](https://link.springer.com/referenceworkentry/10.1007%2F978-94-007-0753-5_1725) in  
<https://doi.org/10.1007/978-94-007-0753-5>

- 69 The Carbon Literacy Project. (2020). <https://www.manchesterclimate.com/involved/the-carbon-literacy-project>
- 70 Comberti, C., Thornton, T.F., de Echeverria, V.W., Patterson, T. (2015). Ecosystem services or services to ecosystems? Valuing cultivation and reciprocal relationships between humans and ecosystems. *Global Environmental Change*. 34: 247-262. <https://doi.org/10.1016/j.gloenvcha.2015.07.007>
- 71 Askins, K., Pain, R. (2011). Contact zones: participation, materiality, and the messiness of interaction. *Environment and Planning D: Society and Space*. 29: 803-821. <https://doi.org/10.1068/d11109>
- 72 Weber, A., and Kurt, H. 2016. The Enlivenment Manifesto: Politics and Poetics in the Anthropocene. *Kosmos Journal for Global Transformation*. Spring | Summer.  
<https://www.kosmosjournal.org/article/the-enlivenment-manifesto-politics-and-poetics-in-the-anthropocene/>
- 73 Phelan, P. 1993. *Unmarked: The Politics of Performance*. Routledge

## 8. Tables

**Table 1****The Research Methodology**

Hypothesis	Climate change knowledge that is locally relatable enlivens and intensifies a community's sense of responsibility to act.
Research Aim	Mobilise a community towards climate change engagement through the practical, adaptive capacities that lie within their own ECK.
Framing	Researcher was a long-term resident of the community being studied, and thus is considered part of the system being studied.
Approach	Using a Performative Research approach to draw on communities' existing adaptive capacities to inform active engagement with climate change mitigation.
Questions	Q1: What mitigative methods can communities readily engage with? Q2: What motivates and supports communities to engage? Q3: Can ECK be used as leverage to engage communities with climate change knowledge and mitigative action?
Participants	Members of the resident community (incl. crofters, volunteers, young families, elders) and project stakeholders (Community Organisations, Trust Boards, Educators).
Material effects	Reclaiming the Knowledge Survey (37); Uist Growers Almanac (38); Meeting Ground, 2019 (HDV video: 16:15 mins) (39); Climate Challenge Fund Final Project Reports (40; 41; 42)
Analysis	Three main themes have emerged out of this process: 1: ECK of food production can be used as a method to engage participation; 2: identification of supports and approaches facilitate, motivate, and build confidence in communities towards sustainable behaviour; 3: a performative approach underpins mitigative climate change actions via a revitalised ECK.

**Table 2**

Carbon reductions and food production increase as a result of greater participant engagement

Year	Participants	Total Food Production (kg)	Community CO <sub>2</sub> e Reduction (kg)
2016	200	3,700	13,030
2017	227	4,070	14,350
2018	354	11,060	38,940

Table 3  
Core messages about how the project reinvigorated ECK

Message	Description	Link to revitalisation
Tapped into a need	Provision of protected growing facilities (polytunnels, greenhouses) addressed short growing season; provided learning opportunities for those without the necessary skills to learn 'how to' grow their own food; shared infrastructure supported opportunities to learn from the lived experience of growers, thereby contributing towards a socially supportive setting from which to address climate change mitigation.	Positions social communication, exchange and interaction as a vital integrative method
Initiated intergenerational communication	Reclaiming the Knowledge Survey, designed and developed by Geography High School pupils as assignment in land-use/crowd cartography. To facilitate widespread community participation, the responsibility of its distribution was given to all island pupils via a cross-schools project. Its printed paper format, ensured face-to-face intergenerational communication around the heritage and activity of food growing with family members, extended families, neighbours and other residents, and engendered reciprocal learning for all parties	Prioritises the value of lived experience and links it to rebuilding a sustainable society
Valuing islanders' knowledge	Uist Growers Almanac promoted a return to home-grown production through the sharing of practices on sustainability; improving the island community's diet; affording a healthy and productive activity for its growers; decreasing some reliance on supermarkets for fresh food. It acknowledged islanders' traditional competence at self-sufficiency; revealed the current growing capacity, knowledge and skills that are still evident within the population; had the potential to inform and encourage new growers/crofters/gardeners to grow food; promoted a more sustainable lifestyle for the community	Embodies subjective, connected and interdependent relationships linked to environment and place
'Self-nomination' format	Open Callouts/Expressions of Interest in Community Growing Facilities, was used in year 2 and 3 of the projects to notify the community that organisers wanted to identify new user-groups interested in accessing fully-funded protected facilities for their localities. Networks of family members, neighbours, and friends stepped forward to propose sites that met certain requirements, e.g., within walking distance; adjacent to a social housing scheme	Personal engagement develops through adaptation of societal knowledges and behaviours
Access to croft land helped meet project outcomes	Problem for project organisers to access land that they did not own/rent. Access to new sites was unlocked through underused croft land becoming accessible as local growers' groups got involved	Collective social engagement changes the cultural paradigm
Organisations undertook more indeterminate endeavours	The experimental nature of the collaborative project elements produced outcomes that relied on delicate but publicly visible processes of negotiation and trust-building. This had reciprocal benefits for the organisation and community in achieving successful project outcomes, and in providing what the community had stepped forward to say what they wanted and were willing to contribute towards	Defines what really matters to communities

Message	Description	Link to revitalisation
Clarity about responsibilities	<p>Supported mutual understanding between organisation and community in relation to 'what' and 'how' benefits were provided. Most visible in Year 3, where inter and intra connections between funding and community organisations, and the community at large, became more unified and effective. Association between outlying marginal groups were also bolstered through the new network of community growers' hubs who exchanged working practices and experiences of negotiating and navigating the collective growing spaces they had developed and now worked together in, affording meaningful conditions for the dissemination of newly acquired carbon literacy</p>	Transforms the narrative of individual rationality and competition into 'life-as-meaning'
Meaningful climate change engagement	<p>Delivered in various forms of material provision through horticultural education, facilities, and resources which facilitated how communities conceptualised/adopted carbon reduction activities; refocused the community towards mitigating climate change through experiential learning and carbon literacy</p>	Positioned within lived experience of participants, and upheld as valuable to younger generations

## Figures



**Figure 1**

View of Outer Hebrides: 15 Oct 2020 (Image credit: Western Isles Weather from NASA Worldview application (<https://worldview.earthdata.nasa.gov/>), part of the NASA Earth Observing System Data and Information System (EOSDIS)) Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.



**Figure 2**

Berneray Growers Group 'Bring a shovel and a wheelbarrow' Open Day (Dec 2016)



**Figure 3**

Sollas Growers Group Open Day



**Figure 4**

Growers groups promoted their facilities in regional TV series BBC Alba DIY Le Donnie  
<https://www.bbc.co.uk/programmes/b09vphhx>



**Figure 5**

Meeting Ground, 2019 (Video Still)