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DOI

[10.1016/j.ijdr.2020.101980](https://doi.org/10.1016/j.ijdr.2020.101980)

Publication date

2021

Document Version

Final published version

Published in

International Journal of Disaster Risk Reduction

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Citation for published version (APA):

Puzyreva, K., & de Vries, D. (2021). 'A low and watery place': A case study of flood history and sustainable community engagement in flood risk management in the County of Berkshire, England. *International Journal of Disaster Risk Reduction*, 52, 1-8. Article 101980. <https://doi.org/10.1016/j.ijdr.2020.101980>

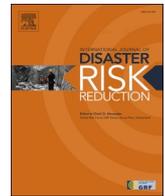
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'A low and watery place': A case study of flood history and sustainable community engagement in flood risk management in the County of Berkshire, England

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ARTICLE INFO

Keywords:

Flood risk management
Community engagement
Flood history
Cultural model
Temporality
Cultural constructivism

ABSTRACT

To address increasing flood risks and ensure flood management interventions are appropriate for local contexts, the English system of flood risk management strives for devolution of responsibilities to actors previously uninvolved in professional decision-making, and advocates for a comprehensive community engagement in flood management-related policy making and delivery. This paper explores the influence of local flood histories on community engagement in flood risk management and its sustainability over time, in England. Building on an ethnographic case-study of one community in the County of Berkshire, England, we examine how two local flood groups reproduce local flood history and identify how these reproductions affect the sustainability of their flood management initiatives. The data were collected using semi-structured interviews, field observations, and archival research. A constructivist strain of grounded theory was used for the data analysis. The findings showcase that different readings of the flood history of an area may coexist and compete within one flood-prone community. These different readings of flood history are representative of dynamic cultural models that pertain to the actors involved in flood risk management. We argue that the sustainability of the flood group's engagement in flood management depends on the extent to which the group's historical reading and its corresponding cultural model fits those of the institutional stakeholders. A mismatch of local and institutional cultural models is likely to lead to flood group's disempowerment and disengagement from flood risk management.

1. Introduction

Due to climate change, the number of flood hazards and communities at risk are expected to increase. Changing patterns of risk exposure induce a growing understanding that floods cannot be eliminated and structural measures of flood defence are insufficient to guarantee communities' resilience. With such an understanding, England has been experiencing a gradual shift in approaches from flood defence to flood risk management [1,2]. The new approach aims to share flood management responsibilities with new stakeholders, including local communities and to accommodate their more context-sensitive, knowledge in flood management decision-making and practice. The new responsibilities require local communities to make themselves more resilient to flood hazards with support from governmental programmes [3,4]. The new approach implies establishment of two-way consultative communication between local communities and flood risk management

professionals to enable better targeting and planning, as well as to ensure that flood management interventions correspond to the peculiarities and needs of the local contexts where they are executed. By allowing public input, adjustments can be made in the early stages of decision-making, promoting a compromise and ultimate acceptance of the redistribution of risks [5]. Yet, despite the strong calls for public and an allegedly favorable institutional environment, research reports limited involvement of local communities in flood risk management [1, 6,7]. Therefore, questions are raised as to what are the conditions that affect community engagement in flood risk management.

Research suggests that flood history is one of the core factors affecting community engagement in flood management [8–11]. A prolonged exposure to flood hazards, especially those adversely impacting local communities, leads to an increased awareness of flood risks and highlights the necessity to act in response. Often, however, such reasoning remains preoccupied with a rationalist risk-perception

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<https://doi.org/10.1016/j.ijdr.2020.101980>

Received 18 June 2020; Received in revised form 23 October 2020; Accepted 17 November 2020

Available online 20 November 2020

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understanding of flood history that pays less attention to the fact that the 'same' historical pattern of flood hazards can have different interpretations and meanings across and even *within* affected local communities. A historical series of floods recognized as meaningful by one social group may trigger community engagement. Meanwhile, these same series of floods may be discarded by another social group as irrelevant, prompting no or different action in response.

In this paper we propose a cultural-constructivist approach to examine the influence of flood history on community engagement in flood management. Based on a two-month ethnographic case study of one village in the County of Berkshire, England, we demonstrate how two local flood groups - groups of local residents aimed at flood risk alleviation in their local environments - produced different and competing readings of a local flood history. We counter the rationalist conceptualization of flood history prevalent in hazard management literature, and argue that rather than being one possible chronological sequence of events, flood histories should instead be regarded as cultural constructions that emerge from and are embedded in specific socio-environmental contexts [12,13] and historical ecologies [14–16]. We illustrate how these different readings correspond to the groups' cultural models [17] that inform their flood management practice and demonstrate to what extent these readings are accommodated in the institutional cultural models of flood management.

2. Conceptual framework

As a concept, flood history has long been referred to in flood risk management research. Largely informed by a rationalist risk-perception paradigm, this literature suggests that an enduring flood history of an area can be a predictor of protective behavior [18] and a condition for community engagement in flood management. Recurrent floods serve as a reminder of existing risks, increase flood risk perception, and raise public recognition that action in response is required [11,19,20]. It is argued that when the number of experienced floods is more than two or three, mitigation activities increase [18]. Brody and colleagues [59] suggest that the chronic nature of floods and associated losses highlights a necessity for long-term, non-structural flood risk management measures and creates a more favorable context for public involvement as opposed to sporadic floods that can be handled with quick-fix structural solutions. Where communities are not directly exposed to floods but are yet at risk, a vicarious engagement with historical flood events that took place in the area, for instance, through photography and video, is expected to lead people to think about the flood risks and act proactively [21,22]. A lack of recent floods in the community, in turn, may impede the emergence of community engagement [11] as it lessens people's awareness of flood risks and lowers their interest in flood management [23,24]. Not only temporal but also hydrological properties of flood hazards are reported to affect community engagement. The scale of a flood, can influence the form that public engagement takes [25]. Smaller floods are reported to trigger formation of local initiatives through activation of already-existing social networks, while major floods are likely to foster formation of new social entities dedicated to flood risk management, i.e. flood action groups (Ibid).

Although frequently referred to in academic research, flood history, however, rarely constitutes the focus of study [26,27]. Serving as a backdrop, it is often approached as a time series of flood events, chronological and linear, embedded in mathematical time, external and independent of social life. Such an approach undervalues the influence that the relativity of flood history – its situatedness in social-ecological contexts - may have on people's understanding of flood hazards and actions they deem necessary for risk alleviation. Consequently, it impedes a nuanced account of the relationship between the flood history and community engagement in flood risk management. As tempting and straightforward as it may be to demonstrate correlation between the flood history and community engagement in flood management, the relationship between these 'variables' appears to be more complex.

Parallel to the realist approach, some researchers have been calling for a more cultural-constructivist thinking around flood risk [26,28–31]. Taking a cultural-constructivist approach to study the influence of flood history on community engagement in flood management, we suggest that a flood history relies on interpretations and subjective meanings, and as such is inevitably relative. People's understandings of the local flood history are built in their interaction with the local environments as well as in their interpersonal interactions [32]. Through objectivation [12] individual experiences and meanings transform into intersubjective understandings of 'a' flood history that is consensual for a particular social group and firmly linked to a social-ecological context where the group performs [33]. The resulting understandings of this flood history are developed to a level necessary for people to make sense of their physical environments [12,13,34,35]; their utility is contingent upon the context where they are created [36]. For example, a flood history may take form as a positivistic scientific protocol [37,38] if the framework where it is reproduced and applied strives for scientific objectivity [39,40]. At the same time, alternative readings of the local flood history may give priority to locally meaningful events rather than factual representations of past ecological realities [41]. Therefore, what is meaningful and relevant for one social group may be considered irrelevant by another [42,43]. Groups may refer to similar flood events in their readings of flood history, but they can use them to see things in different ways; 'they will look at the same phenomena but will see different problems' [44]; p. 355). From a cultural-constructivist perspective, flood history is an activity of deriving meaningful patterns from particular meaningful pasts [26]. It requires looking at history as being situated in a social time - qualitative and heterogeneous, as opposed to objective, quantitative, and chronological [16], for it derives its qualities from meanings common to a particular social group. The quality or meaning of certain flood events make them the referents on the social time scale. From this perspective, historical reading is a temporal selection of events highlighted as benchmarks and a baseline by a social group. A group's historical reading is a constituent element of its cultural model – a dynamic explanatory system that frames experience and guides action in response to that experience [17]. Hence, cultural flood model (henceforth, cultural model) is the basis for the interpretation and calibration of flood risks by the group who holds it, guiding this group's action with regards to future adversities [17,26].

Various readings of flood history and corresponding cultural models interact with each other as different social groups engage in flood risk management. In a field strongly regulated by professional expertise, a cultural model of institutional actors, such as flood management agencies and authorities, serves as a golden standard, defining what is to be considered as a flood risk and an appropriate flood risk management. Local cultural flood models can match or mismatch the institutional one. This paper illustrates how local historical reading and a corresponding cultural model that matched the institutional model paved the way for one local group becoming engaged in flood risk management and how a mismatch led to another local group disengagement from the local flood management practice.

3. Method

To examine the influence of a flood history on community engagement in flood risk management we conducted a two-month ethnographic case-study of one village located in the County of Berkshire, England. Recurrent exposure to flood risk and presence of local flood groups were the two main criteria that informed the choice of the research site. The risk of flooding for the village was identified using U. K. Environment Agency maps and reports.

Qualitative research design of the study relied on semi-structured interviews, archival research, and observations. Such a combination of methods proves useful in studying local historical readings as it allows capturing meaning in a way it is reported by the informants, avoiding pre-conceived concepts and categories. For example, McEwen et al. [45]

use semi-structured interviews and observations to examine the ways local communities make sense of their ecological pasts. The authors outline how local flood memories and associated lay knowledge can be a valuable instrument in transforming flood resilience if effectively communicated among various stakeholders. Seebauer et al. [46] use semi-structured interviews together with document analysis to study sustainable involvement of bottom-up local initiatives in flood management in England and Germany. The authors conclude that the sustainability of the local initiatives depends on their embeddedness in institutional partnerships, which require local actors and official agencies to align their understandings of flood management thinking and practice. In combination with archival research semi-structured interviews allow examining temporal referencing of flood hazards [47]. The author highlights how reference-making practices and people's understandings of the past influence their ecological expectations and consequent resilience to flood adversities.

In accordance with the aims of the research, a purposive criterion sampling strategy [48] was used to recruit informants for the interview. The criterion for sampling was related to an individual's role. We specifically sampled local community members involved in flood risk management in the village, and representatives of official flood risk management authorities responsible for working with the local community, i.e. representatives of the regional office of the Environment Agency and the County Council. Local community members were first approached through the website of the local flood group – the Parish Council Flood Team. All successive participants were recruited with a snowballing technique by asking informants to suggest other local residents involved in flood management who might be available for a conversation. Representatives of the Environment Agency were contacted directly using the contact information provided on the Agency's website. Representatives of the County Council were approached through a contact form provided on the website, but no response was given.

In total, 14 interviews were conducted with the members of the two local flood groups and a local community resilience advisor from the regional office of the Environment Agency. The informants were mainly elderly people, aged 60 and above. All the informants, except of the flood resilience officer, have been residing in the area under study for at least five years. The informants possessed profound knowledge of the local flood history and ecological conditions, although only two of them were personally flooded. The members of the local flood groups who agreed to participate in the research were local volunteers, who joined the groups on their own volition either by invitation from fellow group members or independently.

The interviews were organized with a guide, discussing three core topics:

1. Flood history of the area and recent flood events, asking such questions as where does the flood risk for the area come from? How frequent are floods? What are the major flood events and what made them different to the other? etc.;
2. The emergence, development, and activities of a flood group. The questions included but were not limited to: How did the group emerge? What was the initial aim of the group? What are the main activities of the group? What are the main flood management-related problems the group is trying to deal with? etc.;
3. Flood group communication with other stakeholders. We asked: How does the group communicate and collaborate with official flood risk management agencies and authorities? How does the group work with other flood groups? How does the group communicate with the local community? etc.

In total, up to 30 open-ended questions were asked to elicit a rich and nuanced narrative on the three topics. The interviews lasted from one to three and a half hours, depending on time available at informants' disposal. Some informants were interviewed twice, if a follow up

conversation was deemed necessary, for instance, in cases when conversation could be continued but an interview was already too long and tiresome for an informant. Despite the sensitivity of the flood topic, none of the questions discussed at the interviews with members of the two local flood groups were left unanswered. The observations registered how flood risk was reflected in the local landscape and material practices of the local flood groups. Archival data included pertinent documents related to floods and flood risk management in the area, such as copies of the rural district council meeting minutes, historical books, locally produced flood maps, photographs, official flood reports, flood risk management documents. The archival data were obtained from the local libraries, Borough archives, local historical societies and official websites providing open-access data published by governmental bodies.

Data collection resulted in a corpus of textual and visual materials. The textual data were processed with the qualitative data analysis software ATLAS.ti, and analysed within the constructivist strain of grounded theory [49]. Such an approach was used as it allows for core issues and concepts to emerge naturally from the data and helps in deconstruction of concepts that are often taken for granted [50]. The data analysis involved two phases of coding. At the first phase, texts were coded paragraph by paragraph with the initial coding technique to allow for the core topics and themes to appear naturally. A mixture of descriptive, process and in-vivo coding was applied [51]. The analytic level of codes ranged from descriptive codes (e.g., 'describing spatial coverage of the 2013 flood') to potential analytic categories (e.g. 'community-preparedness'). At the second phase, focused coding was applied to allow for assessing the codes with the best interpretive and explanatory capacities. This involved comparison of codes to codes, codes to categories and categories to categories. As a result of reorganization and merging higher-order analytical categories were developed for further qualitative analysis.

Ethical review was conducted through the University of Amsterdam. The interviews were collected and recorded with an informed oral consent of the informants.

4. Results

4.1. Historical exposure to flooding

A foreword to a local historical record of the village reads: 'Described in 1724 as a low and watery place, water is a dominant theme [in the village] with disastrous floods, both within and beyond living memory' [52]; p. 7). Oral histories and local historical accounts suggest that minor floods were common in the past, and until the late 1800s dwellings were not built in the areas susceptible for flooding. In the 1800s, the village experienced a series of floods, and fifty-three years later, in 1947, it was affected by 'the greatest flood of the century'.

The archival research showed that the socio-ecological features of the 1947 flood qualitatively stood out from its predecessors. Water was rising at an extremely high speed and reached the top of the riverbank in the village with a further threat of breaking the bank. The floodwater inundated houses and businesses and led to partial relocation of premises. The railway line was disrupted, and trees obstructed the roads. The flood management activities were described as a 'war with floods' [53]. Despite a huge collective effort, local organizations were insufficient to handle the emergency and the military became involved. The military 'ducks' (amphibious vehicles) were used to transport people, food, and other supplies. The post-flood recovery was complicated by the end of wartime and associated lack of resources as well as by unexpected weather patterns that resulted in one of the coldest winters in the U.K [54]. When the flood occurred, the rivers were bloated with snow and frozen soil was unable to absorb the water.

The 1947 flood effected a qualitative transformation of reality and solidly fixed new knowledge and experience within the landscape. It introduced new arrangements into people's daily lives which can, among other things, be traced forward to today's requirements in village

development and planning for all buildings to be built nine inches above the 1947 flood event. The 1947 flood created a baseline in the flood history of the village – a point where local and institutional readings of a flood history usually depart from.

According to the official Recorded Historical Flood Outlines and Historic Flood Maps the village was flooded at least four times after 1947 – in 1990, 2000, 2002 and 2013. The Flood Outlines and Historical maps are issued by the Environment Agency and represent an official institutional reading of flood history. This reading is based on a hydrological evidence – the data on flood levels and flows, flood extents and conveyance roots – obtained at a time of the actual flood event from rivers, groundwater, and surface water. Its chronological continuity makes it an essential tool in the technical flood risk assessment, validation of predictive flood models for flood prevention, flood risk mapping, strategic planning, and emergency management by various institutional stakeholders involved in flood risk management [55].

Meanwhile, if the 1947 flood became a firm baseline in the local residents' and flood management agencies' written and oral accounts, the readings of flood events that followed the 'Great Flood' appear much less consensual.

4.2. Hydrological reading of the local flood history

Although registered in the official data sources, the floods of 1990 and 2000 are rarely noted in the local historical accounts. According to the oral histories and the local record, the period from 1947 to 2002 was a lull with minor floods sporadically affecting some parts of the village. A lack of relatively meaningful flood events formed a pool of experience and knowledge where floods, less impactful than the 1947 event, became something of a cultural normalcy. The experience of minor floods accompanied with an attitude of indifference to flood risk was, however, breached in 2002, when the village experienced a 'second major flood' after 1947. A persistent rainfall at the end of 2002 produced flood conditions in the Thames catchment and caused flooding that had a different pattern compared to those of 1990 and 2000. The railway lines were disrupted, 128 properties were affected, the school was flooded, altogether causing disruption to the daily life of the village.

Because the 2002 flood features did not correspond to past flood experiences, the local community's attention became focused on identifying the root causes. The anxiety focused on a new flood alleviation channel – The Jubilee River – introduced by the Environment Agency two years before the flood. The Channel was considered an attempt to save economically important areas downstream sacrificing the village; its structural design was blamed for bringing more risk than protection. The Environment Agency, meanwhile, denied any problems associated with the design of the Channel. Aiming to initiate a comprehensive assessment of the causes of the 2002 flood, a local flood team was formed as a branch of the local Parish Council.

The interview data shows that the Parish Flood Team (henceforth, PFT) knowledge of the local flood history goes as far back as the 16th century and is rich in detail about historical flood defenses and their interplay with modern water infrastructure. A member of the PFT recalls: 'That side bank, an ancient flood bank is still in place and going towards, probably the 1635-38. There was a realization that water could flow around the back of the village, in other words you had flood defence upstream'.

Recent flood events are protocolled in the PFT's written historical record - a compilation of textual and visual materials collected by the members of the team. A decision to include a flood in the record is functional - worthy of protocoling is information about those floods that can contribute to the team's understanding of infrastructural flood mitigation. Hence, although considered an important part of the local history, some flood events have not been included in the report because the environmental and infrastructural properties of the landscape had changed too dramatically, i.e. floods that affected what was previously a rural village would have a much different impact on a modern, flood-

mitigated and built-up area.

The meaningful floods are also charted on the hand-made maps. The maps portray conveyance roots of the floods with arrows, indicating areas where the flood originated and followed, picture permanent and demountable flood defences, and depict local watercourses. Showing the maps, a member of the PFT was giving a detailed explanation of how each of these elements of infrastructure affects the behaviour of water: "This culvert here was letting water in but what was happening - the river was coming down here, sharp corner and then you have got super elevation coming in, super elevation gives you pressure, the pressure comes down here in that culvert."

The historical record of the PFT portrays the 2002 as the first benchmark after the 1947 flood. Investigating the causes of the 2002 flood, the PFT considered the Jubilee River as a major contributor to the local flood risk, despite the local authorities and a commissioned flood assessment contractor attributing at most 10% of the flood effect to the channel. To test and challenge the flood assessments issued by the official agencies, the PFT started collection of hydrological data on the 2002 flood, re-calculating volumes of water in cubic meters per hour, protocoling the water levels, and gathering information about the construction features of the alleviation channel. A member of the PFT noted:

I have been able to analyse some things that the [Environment Agency] haven't done ... how flooding works, from things on the ground. They can theorize so that they can come up with modelling and other things, but they haven't got 'knowles', it is an English word for common sense knowledge, thinking on the ground level, not the calculation. We have calculation but we can also put things how they form, how water performs, on what levels, all this have been recorded, I have been doing a recording, lots of figures. (Member of the PFT)

After conducting a local assessment of the causes of the 2003 flood, the PFT reported the data to the Environment Agency. With the data acquired, the team started to act as a pressure group demanding the release of the data by the Environment Agency and challenging the results of the assessment with the 'real-time data'. Feeding the data and the photographic evidence that pointed to the miscalculations and misoperation of the Jubilee River by the officials caused aggravation between the flood team and the Agency. As a result, the chairman of the PFT was banned from the meetings and the local data provided by the team was dismissed by the officials.

Next to the 2002 event, the 2013 flood became the second benchmark in the PFT' reading of the local flood history. The unusual combination of hydrological factors such as a heavy downpour together with an increased groundwater table, and backpressure caused in the local watercourses led to flood damage in houses and inundation of parts of the village that have never been flooded before. Following the strategy developed during the 2002 flood, the PFT continued collecting as much real-time evidence as possible. To secure that water levels were measured accurately in case telemetry boards failed during the flood, the team used their own water level measurement system calibrating the height of the bricks at one point along the river and monitored the point on a regular basis keeping photographic evidence. Through daily observations, monitoring and calculating, the PFT collected hydrological data on the antecedent conditions of the flood, registered its spatial distribution, and recorded the flow and velocity of the flood water.

It was only after the 2013 flood that the relationships between the flood team and the Environment Agency started to improve. Understanding that advocacy and political pressuring impedes communication with the Agency, the PFT started to probe a consultancy role, aiming to contribute their hydrological knowledge of past and present flood conditions to improve the design of prospective flood alleviation measures. The PFT's hydrological reading where floods were considered as sources of data for quantitative risk assessment was readily complementing the Environment Agency vision of the ecological past and its flood mapping

and modelling activities. Such a fit of the local historical knowledge to the institutional cultural model and corresponding practice was recognized by a newly appointed Environment Agency community resilience advisor. The advisor was responsible for working with community groups and residents, preparing them for future flooding and sharing information about the new flood alleviation scheme designed by the Agency – the Thames Scheme – aimed at reducing flood risk for 11 communities along the river Thames. The appointment of the community resilience advisor reflects broader organizational changes in the Agency’s approach to working with communities from ‘design - announce - defend’ to ‘discuss-design - implement’ [7]. The new approach involves “working with communities early on to understand their concerns, interests and priorities” [4] as to promote mutual trust, reduce the conflicts, increase the accountability of decision-making, allow communities to influence the design of the projects and encourage them to own the problem. Through public drop in sessions and private walk-arounds with the PFT the community resilience advisor became a point of contact for the team - an intermediary between the governmental body and the community that was missing in the early days of communicating with the Agency. The advisory role of the PFT in co-designing flood prevention measures fit the Agency’s strive to make the decision-making regarding the Thames Scheme more accountable, involving the local community in meaningful discussion regarding flood risk management interventions and sharing responsibilities [4].

Proven as an entry point for reciprocal collaboration with the Environment Agency, the hydrological reading of the local flood history reinforced the attentiveness of the PFT to the hydrological properties of flood hazards and informed the team’s flood risk management activities. In ‘peace time’, the group continued monitoring water levels and inspecting the local flood infrastructure. A member of the PFT recalled: “They [Environment Agency] are using our guidance in what they are putting in place. We went all way through from being nothing, but now we are working with them, we are all one team”. The fit of the PFT’s historical knowledge and its practical application to the Agency’s vision of flood risk management brought support and a sense of acknowledgement to the PFT, bolstering their engagement in local flood management.

4.3. Community-preparedness reading of the local flood history

Hydrology was not the only angle through which the local history of flood hazards was interpreted in the community. Interviews suggest that for a group of village residents, the 2013 flood was remarkable not only for its hydrological properties but also because of the institutional response to the emergency. With the flood water limiting access to certain parts of the village, inundating houses and restricting people’s access to essential resources, the local perception was that flood authorities proved incapable of managing the emergency themselves. Just like the 1947 baseline event, authorities had to call in military forces to assist in installing water pumps, arranging the delivery of sandbags, and monitoring the areas under threat. Recognized as an example of a successful vertical cooperation between the local community and local and federal emergency managers by the PFT, the situation was interpreted differently by the members of a spontaneously gathered group of local volunteers, that later evolved into a second local flood group - a Community Flood Group (henceforth CFG). One member of the CFG explained:

It is not about calling in a force. When the army came, they have been here for about 36 hours when they said, ‘we can’t help the community’, so the army called the community meeting, saying ‘if you don’t come together, we cannot help’. So, that was a lesson. (Member of the CFG)

Providing information and assistance during the flood, the group set

its aim at increasing people’s awareness of the local flood risks and preparing the community for future floods. The capacity of village residents to overcome the distress and to return to normality became the prism of preparedness through which the group interpreted the local flood history, and which informed the group’s flood management efforts.

Assigning different meaning to the 2013 flood, the CFG’s oral accounts of the local flood history differed from those of the PFT. The 2002 flood that instigated formation of the PFT was hardly addressed in the CFG’s narratives. The following quote from an interview with a group member is exemplary:

I live here for 31 years. We have had one minor flood, not in a sense that we had in 2013, I cannot remember ... in 1990 something, it was on a village greens, no properties damaged, lasted for 44 no 48 hours ... if we go back, there were floods in 1940s, have you seen all this? All these photos about 1947? (Member of the CFG)

Although ‘nowhere near as the Great Flood’ of 1947, for the CFG it was only the 2013 flood that was benchmarked as significant in the local flood history. It was not the dramatic hydrological properties of this flood that motivated this anchoring in historical awareness, but the unpreparedness of the community it unveiled that made it a new reference point in the CFG’s historical reading. For the group members, the flood revealed a demand for a more community-oriented approach towards flood risk management that would ensure that most vulnerable people in the village are provided with essentials, such as medicine and sandbags; that remote areas of the village difficult to access during inundation are equipped with groups of volunteers providing assistance and information; and that the dialogue between the flood authorities and the local community goes beyond the discussions concerning flood prevention measures, instead addressing issues of community preparedness. The CFG focused their flood management activities on running a website and producing leaflets that offer advice ranging from preparation of a household flood plan to dealing with increased insurance premiums after the flood.

The communication between the CFG and the PFT was neither stable nor successful. The need for community preparedness was acknowledged in the local flood plan produced by the PFT as part of a series of documents to contribute to ‘Community Resilience’ in compliance with the National, Regional and Local planning framework. The plan, however, represented somewhat of a ‘dead document’ – nicely composed but not updated. Information on the volunteers ready to assist in case of the next flood event was outdated; previous arrangements with the vicar to use a local church as a shelter were not confirmed; the flood exercise meant to simulate communication and collaboration between the different stakeholders and the local residents was not executed. The abundance of technical details in the flood plan made it too difficult to comprehend by those not immersed in technical aspects of risk assessment and flood prevention, thus limiting its capacity to increase people’s resilience to future hazards. The member of the CFG recalls: “I think that most of the people outside of the group feel the same way, that there is a huge gap between the technical flood plan and the people.”

The PFT supported the CFG in words but not in deeds, with their primary focus remaining on the hydrological properties of flood hazards and technical risk alleviation. The PFT informally claimed ownership over flood management in the community. Hydrology remained the lens through which new and past flood events were interpreted, creating a clash between the two historical readings and, consequently, between the two local flood groups.

The informal monopoly of the PFT in the local flood management was partially reinforced by the partnership between the team and the Environment Agency, leaving the CFG unnoticed. Utilizing the existing community structures, the advisor reckoned the PFT as a credible and sufficient basis for the network of the local community volunteers aiding in flood risk management in the village. As he noted in an interview:

I think it is important to recognize that the local Parish Council provides that good community resource and support, and also maintains that awareness. I told you about how to maintain that, keep that continuity, [chairman of the PFT] has sector areas in the village where they have flood wardens who have a recognition of the local area, and they can report the changes in flooding and flood risk, that can be reported to the flood hub ... so that informs that intelligence of people in relation to what is flooding. If you have got a Parish Council that set up with volunteers, they may provide support whilst the other partners are out. (Community resilience advisor)

The reliance on the Parish Council eventually limited the new local resilience advisor's understanding of the heterogeneity of local community engagement in flood management.

The PFT's involvement in co-designing flood prevention measures was recognized as a comprehensive level of community engagement in flood risk management, aiding the Environment Agency in executing its primary responsibilities in the village. Another level of community engagement that came out of a reading of historical flood events as dealing with preparedness rather than prevention, was, however, left unnoticed. Unattended by both the PFT and the Environment Agency, the resilience focused CFG was unable to claim its niche in the local flood risk management, lost enthusiasm and ceased its flood management activities.

5. Discussion

Examining historical readings of the PFT and CFG from a cultural-constructivist perspective, we studied how flood history of an area influences community engagement in flood risk management and its sustainability over time. We argue that the influence local historical readings exert on flood groups involvement and its sustainability stems from the extent to which the meaning of local historical readings of flood events corresponds to knowledge and practices accommodated by the flood management authorities. We suggested that these readings are reflected in "cultural models", or dynamic explanatory systems that frame experience and guide action in response to that experience [17].

The case study allowed to distinguish two types of historical readings - the hydrological, cultivated by the PFT, and the community-preparedness reading, produced by the CFG. These historical readings reflect two different cultural models that pertain to the groups, calibrate their risk projections and inform two levels of community engagement in flood risk management. The first level is coupling with the Environment Agency approach to flood risk management through technical assessment of flood risk and development of flood prevention measures. The second level of community engagement looks into the societal aspects of flood resilience aiming at improving community preparedness. Both levels of community engagement corresponded to the institutional rhetoric requiring communities to take responsibility for becoming more resilient to flood adversities. In practice, however, only the first received institutional support and acknowledgement.

The PFT's cultural model encompassed the historical reading where the 2002 and 2013 temporal flood referents served to inform the team's activities of technical flood risk assessment. A timely collection of flood risk data to be used to inform flood prevention interventions by flood authorities became the main objective of the flood team. Considering time series of flood events as a source of data for technical flood risk assessment, the PFT's cultural model matched that of the Environment Agency ready to accommodate local knowledge and practice that fit the remit of its responsibilities.

The CFG's cultural model, however, mismatched the institutional one. In the group's cultural model, the 2013 flood was the only benchmark, after the 1947 baseline flood event. Benchmarking the 2013 flood first and foremost for its negative social impact and distress, the group's main objective was to increase community awareness of existing risks and prepare local residents for future floods. Although matching the

institutional rhetoric for communities taking on new responsibilities for local flood preparedness, the CFG was left unseen. Getting recognized by the Environment Agency community resilience advisor could be one option the CFG might use to get institutional support. However, considering the PFT as a by default representative of the local community voice the resilience officer was unable to discover another level of community engagement and a contribution it could potentially make to flood resilience. An alternative partnership arrangement that might induce CFG sustainable involvement, could be between the group and the County Council, as a local lead flood authority (LLFA). As a Category I emergency planner and responder LLFAs are advised to establish collaborative arrangements with general public and voluntary organizations when planning for flood emergencies [56]. Regardless of this advice, the case study reported no collaboration between the Council and the CFG. The analysis of flood risk management documents issued by the Council showed no reference to flood preparedness and working in partnership with the local community.

Such a rupture between the institutional rhetoric on community engagement and its application in practice pointed to the ambivalence of the current state of the English flood risk management. There is evidence of institutional restructuring that is supposed to enhance communities and agencies working in partnerships for increasing communities resilience to flood hazards. The emergence of a role of community resilience advisor and new frameworks for working with communities are the examples of such restructuring. In practice, however, collaborating with communities, authorities can favour those local initiatives that fit an old technocratic mandate [57]. Therefore, there is an institutional structure able to support local communities in becoming flood risk management stakeholders. However, its functioning is bounded by an institutional cultural model prioritising prevention over preparedness.

6. Conclusion

This ethnographic case study examined how history and temporality of flood events of one village in the County of Berkshire, England, affected community engagement in flood risk management. Flood experience has long been acknowledged as a driver for community engagement in flood management. This case study illustrates how specific flood events served as catalysts for two local groups' bottom-up involvement in flood risk management in the village. Both the Parish Flood Team and the Community Flood Group were set up as a response to flood events that were considered 'meaningful' by the local community. What this case study also shows is the difference in flood groups' perceptions and interpretations of the same, shared flood time-series, and the impact of this culturally selective time-series on corresponding group knowledge, practice, and the sustainability of their initiatives. The historical readings of the two flood groups illustrate their cultural models, that inform the group members' risk management perception and practice. The case-study shows that the match between a cultural model of a flood group and an institutional cultural model contributes to the group engagement in partnership arrangements with institutionalized stakeholders and supports its sustained involvement. The mismatch of local and institutional cultural models, in turn, leaves the local group with little support and resources to take on new responsibilities. Despite an institutional call for community engagement and acknowledgement of various voices and concerns in flood risk management, the second corresponding cultural model was disempowered and eventually dissipated.

To become institutionally acknowledged, community groups are expected to develop into 'local professionals' mimicking agencies' approaches and understandings of floods and flood management. This leaves gaps in dealing with residual risks that cannot be eliminated by infrastructural flood risk alleviation. To overcome this issue, tackling a common misconception of 'the community' as a homogenous entity is required. Flood risk management agencies and authorities work on community engagement under the presumption that no two

communities are the same [4]. Yet, as this case study showed, true understanding of the very heterogeneity of communities may go as deep as uncovering that even within an apparently singular historical timeline of events, different meanings can be extracted leading to different social practices. Therefore, strategies of community engagement should include not only engagement with existing social groups but also with inter-group differences [58]. It further requires an open attitude seeing the community as a real partner capable of bringing creative solutions to various stages of flood risk management circle. A broad stakeholder mapping of all voices concerned and chartering local knowledge would further aid in identifying approaches to complement professional flood risk management knowledge and practice with local expertise. Finally, the case study demonstrates that establishing partnerships with some local community groups authorities may leave certain voices unnoticed. Hence, the assessment of the social impact of organizational restructuring (e.g. emergence of new organizational roles such as a community resilience advisor), that aims at supporting communities in taking new responsibilities in flood risk management, is advised.

The individual case study that informs the results of this research hinders further generalization of the findings across contexts. For this a comparative study of multiple locations is needed. Still, the results highlight the importance of using a cultural-constructivist approach in studying flood hazards as it allows depicting understanding and meanings of local hazard-prone communities that are alternative to those usually assumed in professional flood risk assessment and management settings. Studying the influence of flood history on community engagement in flood risk management also invokes the question as to how engagement can be achieved in communities that have small or no shared flood experience. Additionally, considering the importance of an effective interplay between local and institutional cultural models for sustainable community engagement in flood risk management, further research is required to untangle the very principles and mechanisms of this interplay. This would allow developing more informed practical recommendations for reaching mutual understanding between the stakeholders so that they can establish effective partnerships fostering community resilience to flood hazards.

Funding

The research was supported by the Russian Science Foundation, project No. 19-18-00394, 'Creation of knowledge on ecological hazards in Russian and European local communities'.

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.

Acknowledgments

The authors strongly appreciate the time and effort of the members of the flood action groups and representatives of the Environment Agency who participated in this research. The authors also express their gratitude to Dr. Sue Tapsell and Dr. Simon McCarthy for their assistance during the fieldwork, and to Dr. Rob van Ginkel and Dr. Nikita Basov for conceptual discussions.

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