# Forest, Flood and Farmer:

## The impact of lived experience and expertise when exploring Trees for Natural Flood Management

Jenny Knight - Forest Edge Doctoral Scholar, Leverhulme Trust

Supervisors – Dr Julian Clarke, Dr Steven Emery; Dr Simon J. Dixon

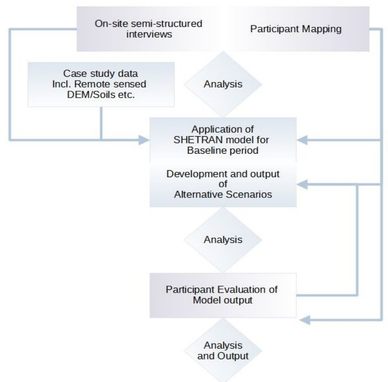
Email: jxk850@bham.ac.uk
@missjsknight
www.fieldforestandflood.org

## Introduction

Tree planting for Natural Flood Management (NFM) is prominent in UK practice and policy strategy, despite a lack of empirical evidence[1]. Furthermore its implementation is recognised as a 'wicked' environmental challenge[2] where solutions are complex and require new approaches[3], in particular the inclusion of relevant knowledges of peer communities. Yet Natural Flood Management approaches have remained traditionally technocratic[4] despite decades of work demonstrating the impacts of the neglect of expertise beyond that of the elite, for example place-based knowledges and lived experience.[5,6]

This research aimed to understand farmer/land managers knowledge and expertise in landscapes, how it informed their decision making and how relevant their knowledge was to science and policy design.

## Interdisciplinary Methods




Stage 1

Stage 2

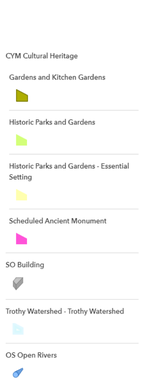
Stage 3

An interdisciplinary and participatory methodology was designed to explore the impact of land managers lived experience and expertise

Stage One: Fieldwork including social and physical scientific methods within a case study catchment

Stage Two: Development of computational modelling of the catchment hydrology applying SHETRAN[8] to develop a baseline model and alternative scenarios of the catchment

Stage three: Evaluation and analysis took the model outputs and provisional findings back to participants. In addition researcher participation an experience enabled a reflexive critique of the extent and limitations of the different knowledge 'types', relevance and compatibility




**Case study: River Trothy Catchment, Monmouthshire, Wales**
*ArcGIS_Online 3D map scene*

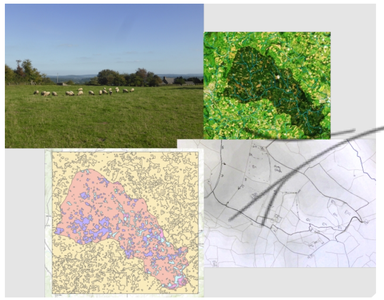
***Sample of Catchment data:***

- Approx 140km$^2$
- Tributary of the River Wye
- Soils: deep clay loam in the south east, shallower silty clay loam in the north west. Riverbed is a free draining sandy silt loam.
- Underlying bedrock: Raglan mudstone
- Catchment geomorphology dominated by Skirrid Fawr in the north west.

Map on the left can be explored further here:

## Findings

### Fieldwork

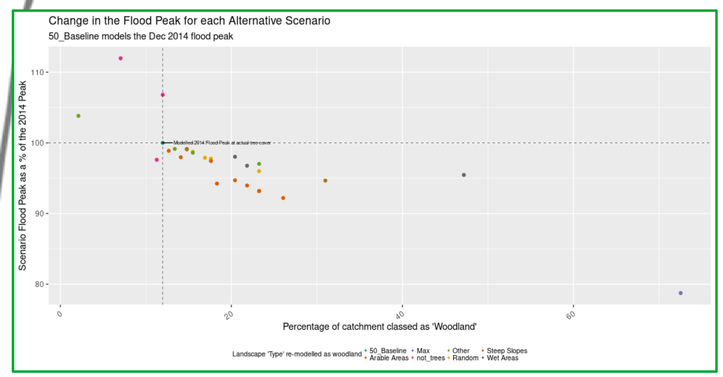


- Land Managers are 'Experts in their F/fields' who held complex knowledges including and informed by their lived experience
- Land Managers demonstrated relevant scientific knowledge specific and highly applicable to place and 'scientisable' knowledge that could (and did) directly inform scientific practice
- Land Managers hold knowledge that could not be scientisted or obtained by scientific method yet could still inform intervention and policy design
- Further findings demonstrated the importance of non-human agency, attribution of expertise, the complexity of decision making and the importance of relationships and time...

### Model Outputs

- Increased tree cover decreased flood peaks
- No tree planting intervention entirely prevented flooding
- Lag time was only significant in the scenario with the greatest tree cover and models that focused on other management interventions (such as an increase in bare ground)

  Random planting followed a general trend whilst targeted planting followed identifiable patterns affecting the magnitude of decrease in flood peak
- Loss of trees and other management interventions risked a greater negative impact than an increase in tree cover




## Synthesis

The final conclusions of the thesis are being developed and will be based on the following evaluation and analysis:

- Findings from workshops held with participants analysing the provisional findings and model output
- Researcher analysis and synthesis of the findings from all three stages of the research
- Reflexive approach as exemplified in critical physical geography and ethnographic environmental science situating the findings within the wider Welsh, UK and world context

## Impacts

- The research engaged farmers and land managers within the catchment area providing access to academic research throughout the projects timeline.
- The researcher now advises and provides support at both ends of the farmer/policy spectrum, advising on the Welsh Government Trees Deep Dive delivery panel and working with the farmer led charity 'Stump Up for Trees'
- Research methods focusing on the participatory element have been requested by and shared with practitioner bodies including Dwr Cymru, Natural Resources Wales
- In addition this research will add to the literature on agricultural / rural decision making; identify and acknowledge wider fields of expertise than that within academic/policy environments including lived experience, rural scientific and situated knowledges; challenge and inform the process by which land use change is currently designed

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