

Case Study

Effects of severe flooding on a lowland farm:

What is the role of tree planting?

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Harper Adams University
Case Study 013



Summary

- The increased severity and frequency of flooding is causing concern throughout the world. This study aimed to examine the operational and economic effects of flooding on a lowland farm in Shropshire, and evaluate the farmer's management response to it, including extensive tree planting.
- The cost of flooding in 2012 to a crop of spring barley on this farm was calculated as £9,000 (£453/ha), and the cost of flood damage to grassland, estimated from an example for one year, was approximately £16,000.
- Many benefits were perceived by the farmer from the planting of 4,500 mixed species of native trees, including maximising land use on this challenging site and acting as a 'custodian of farmland', conserving the social benefits for future generations.

The increased severity and frequency of flooding

Postgraduate student, Rachel Glover, has been investigating the impact, including the cost, of severe annual river flooding on a mixed lowland farm in Shropshire, and the farmer's management response, including extensive tree planting.

The increasing frequency and severity of flooding throughout the world is causing concern. The response to flooding in Europe and the UK is to examine and manage river catchments including natural processes to slow the water flow. This can include tree planting on flood plains but, until now, little research has investigated the economic and day to day operational effects of flooding on UK farms, and the possible benefits or constraints of tree planting.

Study aims

This study aimed to investigate two research questions.

- What is the effect of the flooding, including the economic impact, on the selected farm?
- What is the farmer's management response to the flooding, including tree planting, and how do trees fit into the whole farm system?

Methodology

As well as a comprehensive literature review, Rachel used a case study approach, visiting the farm several times and interviewing the farmer. This included a 'mobile interviewing' technique whilst walking around the farm with the interviewee to gain a greater understanding of the effects of the flooding, such as observing some of the debris remaining on pasture land after a flooding event. The costings associated with flooding and a two-year tree planting programme of 4,500 mixed species, native, deciduous trees were calculated.

Authors

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Project partners and acknowledgements

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Flooding effects on the selected farm

• Physical

Typically, 50 ha of the 324 ha farm was flooded by the River Severn every year between October and March, some of it remaining flooded throughout this time period (see photo of flooded land, right). Arable, beef and sheep were the main enterprises and flooding could involve the evacuation of livestock to another farm as well as damage to grassland. Before livestock could be returned, the debris, such as bottles, cans and glass needed to be cleared up.



• Decision-making

As well as the physical effects of flooding on this farm, the unpredictable nature and timing of the flooding had a direct impact on daily and long-term decision-making.

• Economics

Partial budget figures, based on the severe flooding in 2012, highlighted that, despite some compensation which was available in that instance, the farmer lost £9,000 (£453/ha) on a **flooded crop of spring barley**. This included loss of yield, loss of sale of the remainder of the crop and loss of straw. Additional drying and cleaning costs and associated labour costs were incurred.

Under severe **flooding of grassland**, involving re-housing of livestock, and cleaning of debris, a loss of approximately £16,000 could be expected.

Tree planting by the farmer

This third generation farmer planted 4,500 native, mixed species trees, over two years (2014/2015), with associated costs of over £10,500, and would like to plant more. He aimed to manage the woodland, wildlife and farming together and farm in a responsible way.

The benefits which the farmer perceived from tree planting included the following.

- Maximising land use on a challenging site – for example, the planting of trees in flood-prone dips of land.
- Flood risk mitigation and reducing soil erosion.
- Enhancing the landscape, including the aesthetics of the farm and for recreation such as walking, particularly for family and others to enjoy.
- Timber production, and possibly wood fuel for domestic use.
- Provision of livestock shelter and shade.
- Improving the biodiversity of species.

Conclusion

The farmer in this case study of a flood-prone farm, typical of many other lowland farms on UK floodplains, perceived many benefits of trees on his land. Despite the cost of tree planting and the recognition that it would not provide an overall solution to the flooding issues, he was aware that trees enabled the maximum use of land on this challenging site. Ultimately, the greatest motivation for tree planting on this farm was the desire to act as a 'custodian of the farmland' and conserve the social benefits for future generations.

Tree management

An interview by Rachel with an Environment Agency Advisor to discuss the benefits of woodlands to reduce flood risk, emphasised the importance of appropriate woodland management. This includes encouraging the growth of plenty of woodland ground cover plants to slow the flow of surface water. Management to allow light and nutrients to reach this lower layer of plants is essential.

Further information

Glover, R. 2016. *The economic and operational impacts of farm-level flooding and tree planting interventions A case study: Hilley Farm, Pentre, Shropshire*. Unpublished report available for reference from Jim Waterson, Harper Adams University, email jwaterson@harper-adams.ac.uk

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