

Further evaluation of partnership funding Final report

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Further evaluation of partnership funding
Final report FD2702

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Executive Summary

Overview of method

The Partnership Funding approach was introduced for Flood and Coastal Erosion Risk Management (FCERM) projects in 2011¹. This approach aimed to deliver more benefits and protect more areas by:

1. Encouraging total investment in flood and coastal erosion risk management by operating authorities to increase beyond levels provided by central Government alone;
2. Enabling more local choice within the system, and encourage innovative, cost-effective options to come forward in which civil society may play a greater role; and
3. Enhancing transparency and certainty in relation to funding of projects.

An initial evaluation of the approach was undertaken in 2014². The evaluation identified that there had been an overall rise in the amount of resources put towards capital projects, and that Grant in Aid (GiA) was being obtained by projects that previously would not have received any funding. The opinions of those interviewed also suggested that there had been a change in views towards FCERM, with individuals recognising that central government could not necessarily fully fund all projects. Whilst working practices seemed to be changing with greater collaboration occurring between organisations, it was also acknowledged that partnership working required significant time inputs.

The evaluation concluded that a full evaluation should be carried out in 2017 according to Defra's procedures. This would enable further analysis of issues such as value for money, the allocation of funding to deprived communities and community involvement. This report presents the findings of that evaluation, which aimed to:

- Conduct further evaluation of Partnership Funding (PF) to provide the evidence base to confirm or refine funding policy for the post-2021 period.

¹ Defra (2011): Flood and coastal resilience Partnership Funding, Defra policy statement on an outcome focused, partnership approach to funding flood and coastal erosion risk management, 23 May 2011, accessed at: <https://www.gov.uk/government/publications/flood-and-coastal-resilience-partnership-funding> on 10th October 2017.

² Defra (2014): Flood and coastal erosion resilience Partnership Funding evaluation, Final Report, April 2014.

This objective was to be achieved through considering a set of 22 research questions. Whilst the study was to focus on assembling quantitative data, qualitative information was also required to provide context and explain the findings.

Approach

This study has involved the following key tasks:

- Development of the conceptual model (the intervention logic and evaluation matrix);
- Review of data sets from 2009/10 to 2014/15 and 2015/16 to 2020/21 on schemes proposed for funding to develop a counterfactual based on funding being allocated through continued use of the priority score system (the previous method for allocating funding);
- Analysis of the Partnership Funding policy scenario and comparison with the counterfactual to provide the basis for the quantitative analysis of the effectiveness, efficiency, and value added of the Partnership Funding policy;
- Collection of evidence using desk-based review, an Internet-based survey, interviews and case studies;
- Analysis of evidence against the research questions (see Box 1) and comparison of differences from funding allocations under the Partnership Funding policy scenario to those projected under the counterfactual scenario;
- Synthesis of findings and suggestions for changes that could be made to the policy.

Box 1: Research questions (RQs)

RQ1	To what extent has the Partnership Funding policy met its objectives in terms of increasing total worthwhile FCERM investment beyond Exchequer sums, enabling local choice and engagement, promoting cost-effective solutions, and directing government funding to high risk and other target groups?
RQ2	How has the Exchequer's Grant in Aid (GiA) contribution to Partnership Funding, and the outcomes it has "bought" been distributed, taking account of the following groups or categories: deprived communities, high flood risk communities, rural versus urban areas, households versus non-households, residential properties built before 2009 versus those built thereafter, coastal versus fluvial and surface water risk settings, locations in different regions (north, south, east, west), type of Risk Management Authority (Environment Agency, Local Authorities, Internal Drainage Boards), type of technical solution (e.g. conventional civil engineered approaches versus more "natural" solutions)
RQ3	How effective has the "equity weighting" of GiA payment rates towards deprived communities been in practice?
RQ4	What has payment for environmental outcomes achieved (e.g. in terms of hectares of improved or replacement habitat), and how are these distributed across space and between rural, urban, deprived and non-deprived communities?
RQ5	Overall, what does the data reveal about quantifiable trade-offs between supporting different groups and outcomes?

Box 1: Research questions (RQs)	
RQ6	How do non-GiA contributions to schemes break down according to: Local Authority sums provided through other central government grants; new Local Authority funding (such as new council tax precepts or special expenses); private contributions from non-households; private contributions from households; other. What proportion of non-GiA contributions pledged to schemes has been secured by year?
RQ7	To what extent are notionally fully-GiA funded schemes successful in attracting voluntary Partnership Funding contributions, especially given they can be retained by Regional Flood and Coastal Committees to help with priorities elsewhere? Is there evidence that this kind of transfer has happened?
RQ8	A policy expectation was that Partnership Funding should not result in increased future liabilities on the Exchequer. How effective has the approach to securing contributions been in avoiding an increase in future liabilities on the Exchequer as a consequence of contribution-enabled capital investment today?
RQ9	What are the risks surrounding securing non-GiA contributions?
RQ10	To what extent have the “low hanging fruit” been taken in terms of external contributions, meaning that further contributions may be harder to attract and secure?
RQ11	Has the number of projects which seek to integrate FCERM and wider objectives (e.g. regeneration) increased or decreased under Partnership Funding? What is the role of project design or particular technical approaches in securing funding agreements from third parties?
RQ12	Have the assumptions and parameters used to derive GiA payment rates under Partnership Funding (for example, average assumed per-household damages, and the factors affecting contributions in support of wider economic benefits) turned out to be reflective of actual conditions? Has the choice of parameters led to any under- or over-payment for outcomes, and in what circumstances? (For example, has the actual mean damage reduced per property been greater than or less than the assumed damage embodied in the Partnership Funding formula?)
RQ13	What is the average length of time from receiving a pledge and securing a contribution? Do the data suggest a more limited time window to secure GiA would increase the amount of external contributions raised or shorten the time needed to secure them?
RQ14	What effect is full Exchequer funding of some FCERM schemes having in terms of additionality and value for money? Has full funding been important in ensuring a pipeline of work to maximise procurement efficiencies, as originally thought?
RQ15	Has the reduced funding rate for IDB schemes outside of a wider local strategy incentivised more strategic planning?
RQ16	Has the FCERM programme Net Present Value (and NPV per £ of Exchequer GiA) been increased under Partnership Funding compared with a continuation of the Priority Score system? If not, why not?
RQ17	What is the trend in unit costs of flood schemes, e.g. in terms of properties protected?
RQ18	What effect is Partnership Funding having on the time taken for FCERM schemes progressing from initial appraisal to delivery? Are there particular stages of the process where delays are experienced, and why?
RQ19	What is the impact of different GiA approaches for Environment Agency, Local Authority and Internal Drainage Board schemes, in terms of the types of scheme funded and longer-term funding availability (e.g. for maintenance)?
RQ20	Does data analysis reveal any other issues with Partnership Funding which might suggest refinement or modification of the policy should be considered, based on what it is trying to achieve, and in what areas? This could include whether there are any impacts seen so far that may suggest something about future performance, in particular where any identified trends may cause issues if they continue

Box 1: Research questions (RQs)	
RQ21	Do investigations reveal any other issues with Partnership Funding which might suggest refinement or modification of the policy should be considered, based on what it is trying to achieve, and in what areas? This could include whether there are any impacts seen so far that may suggest something about future performance, in particular where any identified trends may cause issues if they continue
RQ22	Is there evidence that communities are having a greater say in design choices about flood schemes in their areas?

The conceptual model

The conceptual model comprises the intervention logic and the evaluation matrix. The intervention logic is used to help focus the evaluation and to underpin the rationale for the Partnership Funding approach. It links the inputs, resources and activities that make up the Partnership Funding approach to the outputs, outcomes and impacts that describe the intended results.

The evaluation matrix sets out the research questions and links them to sub-questions and/or indicators, the specific data requirements that were needed to answer each research question and the likely sources of those data. There are 22 research questions that have been set for this study.

The counterfactual scenario

The counterfactual scenario reflects the situation where the Partnership Funding policy is not in place. The aim of the counterfactual is to set a baseline from which the impacts (both positive and negative) of the Partnership Funding policy can be measured. It is developed using detailed scheme data that allow the priority score system that was in place before Partnership Funding policy to be applied. The counterfactual aims to replicate which schemes would have been selected for funding using the approach that was in place before the Partnership Funding policy was introduced.

The counterfactual scenario includes a number of assumptions and analytical adjustments to enable it to provide a useful baseline from which to compare the impacts of the Partnership Funding policy. These include:

- Capturing all investment for any one particular scheme in the first year in which it occurs. This enables consistency with the 2014 evaluation and ensures that all schemes within the 2015-2021 six-year plan are considered (even if they are not funded under the counterfactual scenario);
- Adjusting the amount of annual investment that is available so it is weighted in line with the investment demand that occurs as a result of assuming all investment occurs in the first year. This ensures that funding is exhausted each year; without this adjustment some funding would be left unspent in some years and over-subscribed in others; and

- Assuming that schemes are funded based on their priority score, starting from the highest priority score and reducing until all the funding has been spent. The only exception is where there are insufficient data to enable a priority score to be calculated; these schemes are allocated funding first otherwise there is no mechanism that can be used to determine which of these schemes are to be funded.

The Partnership Funding policy scenario

The Partnership Funding policy scenario selects schemes for funding based on the adjusted Partnership Funding score, with schemes with the highest adjusted Partnership Funding score funded first. Schemes are funded on reducing adjusted Partnership Funding scores until the total GiA available across each of the two six-year periods (2009/10 to 2014/15 and 2015/16 and 2020/21) has been allocated. Schemes are allocated to a specific funding year by assuming that they are funded in the first year in which they require investment. This ensures consistency with the counterfactual.

The extent to which the Partnership Funding policy has been successful (or otherwise) is assessed by comparing the results under the counterfactual scenario with the results under the Partnership Funding policy scenario. The Partnership Funding policy scenario takes into account the likelihood that the gap between contributions required and contributions secured can be filled. This is based on research undertaken by the Environment Agency that models the likely success in obtaining contributions and assigns a probability of success. The assumption used here is that any scheme with a probability equal to or greater than 0.77³ would be successful in securing all the contributions required and so would be funded.

Given the impacts of four very large schemes associated with the Thames Tidal Defences, these are generally excluded from the main analysis for both the counterfactual and Partnership Funding policy scenario. This avoids these very large schemes masking the results across the remaining 2,485 schemes that are funded under the Partnership Funding policy scenario.

Evidence gathering

Opinions and views on Partnership Funding were gathered through an internet based survey of stakeholders including risk management authorities (RMAs) and non-RMA organisations such as NGOs. Follow-up telephone interviews were used to obtain additional information on specific points raised during the survey. Case study schemes,

³ The modelling was carried out as a separate piece of Environment Agency led work with the results being provided for use by this study. Initially a probability of 0.75 was selected as a reasonable assumption, but this had to be adjusted to 0.77 to ensure GiA was the same under both the counterfactual and Partnership Funding policy scenarios.

which illustrated particular aspects of Partnership Funding, were identified through the survey with further details obtained during the interviews.

Analysis of evidence

Spreadsheets have been used to analyse the quantitative data from the survey and the two scenarios (the counterfactual and the Partnership Funding policy). Qualitative evidence, including the case studies and comments from the survey, has been collated and analysed in relation to each research question. Comparisons have been drawn between the quantitative and qualitative analyses to identify where perceptions are supported or challenged by quantitative data.

Synthesis of findings

The full evidence base (quantitative data from the scenarios and survey, and qualitative data from the survey, interviews and case studies) has been used to answer the research questions. The evidence from the quantitative analysis comes from the comparison of the modelled counterfactual and Partnership Funding policy scenario and is based on what would be funded under those scenarios using the information contained in the 2015/16 to 2020/21 dataset. The qualitative analysis is based on the views and opinions of stakeholders through the survey and interviews, and from analysis of case studies, generally using business cases. Therefore, the analysis combines forward looking analysis of what could happen under the scenarios with what has happened through scheme experience. The synthesis has been organised to present the data in as accessible way as possible, as follows:

- Overview of the key findings in terms of the use of investment and how this varies between the counterfactual and Partnership Funding policy scenario;
- Breakdown of the overall findings to provide more details in terms of location (Regional Flood and Coastal Committee (RFCC) region), type of RMA, and risk source;
- Benefits of the Partnership Funding policy to communities, focusing on number and type of households better protected under the policy compared with the counterfactual scenario;
- Benefits to the environment that have been additionally delivered as a result of the Partnership Funding policy when compared with the counterfactual scenario;
- Contributions that have been obtained as a result of the Partnership Funding policy, based on the 2015/16 to 2020/21 dataset. This includes disaggregation by source and links to the types of communities and schemes that are associated with contributions and where further contributions might still be required;

- How, where and why local choices have been facilitated or otherwise under the Partnership Funding policy scenario, drawing on views and opinions of stakeholders; and
- The results of the quantitative analysis and investigations underlying the qualitative analysis that reveal issues with Partnership Funding that might suggest refinement or modification of the policy should be considered.

The role of Partnership Funding policy in increasing investment

The quantitative analysis, comparing the modelled Partnership Funding policy scenario with the counterfactual scenario, suggests that for the period for 2015/16 to 2020/21:

- Assuming that contributions are secured for all those schemes where the probability exceeds 0.77, total modelled investment has increased by £763 million of contributions to 2020/21 and by £1,124 million of contributions by 2027/28⁴. This includes £2.2 million of contributions that still need to be secured to 2020/21 and £71 million further contributions required to 2027/28;
- A further 421 schemes are funded to 2020/21 under the Partnership Funding policy scenario (which assumes that all contributions would be secured for those schemes where the probability is 0.77 or greater), or 2,485 in total. This increases to 512 schemes when the period from 2009/10 to 2014/15 is included⁵. As well as an increase in the number of schemes, the number of RMAs involved in promoting schemes also increases under the Partnership Funding policy scenario;
- In total, 73% of schemes under the Partnership Funding policy scenario obtained some contributions, while 327 (42%) of the 784 schemes that have a raw

⁴ Note this varies from the £600 million estimated by the Environment Agency as contributions required to lead to better protection of households within the six year programme. This reflects the assumptions used when modelling the Partnership Funding programme including the assumption that all funding is allocated to the first year in which it is required, which brings contributions forward in time compared with the six year programme. In addition, the Partnership Funding policy scenario includes all schemes where the probability of securing contributions exceeds 0.77, not just those that deliver benefits to households.

⁵ The 2009/10 to 2014/15 data set has a number of gaps and the quantitative analysis suggests that some of the estimates may be highly uncertain, hence, data are generally provided for the 2015/16 to 2020/21 period only where there are fewer data gaps and the quantitative analysis is considered to be more robust.

Partnership Funding score >100%⁶ (and so are assumed to be nominally fully funded) also obtained contributions;

- Total contributions across those schemes that are nominally fully funded were £150 million (to 2020/21) and £184 million (to 2027/28) under the Partnership Funding policy scenario, allowing £150 million or £184 million of GiA to be allocated to other schemes;
- The Net Present Value (NPV) of schemes increases under the Partnership Funding policy scenario by £1.8 billion (from £43.7 billion under the counterfactual to £45.5 under the Partnership Funding policy scenario)⁷. If the Thames Tidal Defences (TTD) schemes are included, the NPV decreases under the Partnership Funding policy scenario compared with the counterfactual. This is because three TTD schemes would be funded under the Partnership Funding policy scenario but four under the counterfactual⁸. The size of the schemes is such that they mask the impacts seen by the other 2,485 schemes; and
- Economic performance can also be expressed as effective return to Exchequer GiA, calculated as NPV divided by GiA. The effective return to the Exchequer under the counterfactual scenario is 18.9. Under the Partnership Funding policy scenario, the effective return to the Exchequer is 19.7. Thus, the effective return to the Exchequer has increased under the Partnership Funding policy scenario.

The quantitative analysis suggests that total investment has increased by £763 million to £1,124 million through contributions. Perceptions from the qualitative analysis appear to contradict the results of the quantitative analysis in that only 47% of survey respondents believe that Partnership Funding policy has been successful in encouraging total investment to increase beyond levels affordable by central government alone. These

⁶ This assumes that the risk of cost under-estimation or benefit over-estimation has been adequately taken into account. In practice, contributions may have been obtained for these schemes to “buy” a margin in the funding score and hence increased certainty of delivery.

⁷ There are uncertainties within this analysis with data gaps in the data sets used for the two scenarios. There are 834 funded schemes under the Partnership Funding policy scenario that have no data for whole-life benefits compared with 806 schemes with gaps for whole-life costs. The gaps in the counterfactual scenario show 743 schemes without whole-life cost data and 788 schemes without whole-life benefit data. Under the Partnership Funding policy scenario, 28 schemes will contribute whole-life costs but no whole-life benefits such that the NPV will be under-estimated. In comparison there are 45 schemes under the counterfactual scenario that are captured in whole-life costs but have no whole-life benefits, hence the under-estimation for the Partnership Funding scenario will be lower.

⁸ Although described as “schemes”, the TTD investments are actually large groups of distinct individual projects each with their own funding score. In reality the funding picture for the group modelled as “unfunded” under Partnership Funding is currently a mix of some fully-funded projects and some for which discussions about external contributions are continuing. The way these particular projects have been grouped in the analysis, however, means that one project not securing funding results in the whole “scheme” or group not being funded, which is an artificially negative position.

perceptions may arise because the respondents are associated with schemes that still require further contributions to be secured for a scheme to go ahead. Some of these schemes may not be funded under the Partnership Funding policy scenario used in this assessment because it assumes that schemes are only implemented where they have a probability of 0.77 or greater of securing the required contributions.

Even where schemes have a raw Partnership Funding score $>100\%$ ⁹ and so can be fully funded with GiA, stakeholders identified that contributions were still sought. The quantitative analysis identifies that 784 schemes (42% of all schemes with data on the Partnership Funding score) were notionally fully funded under the Partnership Funding policy scenario. Of these, 327 schemes (19% of schemes for which a Partnership Funding score is provided in the dataset) that had a raw Partnership Funding score greater than 100% under the Partnership Funding policy scenario also obtained contributions.

To assess sensitivity to assumptions, an assessment has also been made of the impact on effectiveness of the Partnership Funding policy scenario if those schemes with a probability of 0.50 or greater manage to secure all their contributions. Under this assumption, a total of 2,576 schemes would be funded (91 more schemes than under the 0.77 assumption) and contributions of £823 million would be collected to 2020/21 and £1,277 million to 2027/28. With more schemes being funded, the NPV of the Partnership Funding policy scenario using a probability of 0.5 increases to £46.9 billion and the effective return to the Exchequer increases very slightly to 19.6.

Regional variations and RMAs

Table 1 provides a summary of the breakdown of number of schemes, total investment (as £ millions), and total number of households protected (Outcome Measure 2¹⁰ plus Outcome Measure 3¹¹) for each RFCC region under the counterfactual scenario and the Partnership Funding policy scenario. It also presents the difference between the two scenarios.

⁹ The Partnership Funding policy scenario allocates funding based on raw and adjusted Partnership Funding scores, which are calculated in the Partnership Funding calculator using performance against each Outcome Measure. A raw Partnership Funding score $\geq 100\%$ means the scheme could have been fully funded through GiA (although contributions are also encouraged). A raw partnership Funding score of $<100\%$ means contributions are required to increase the adjusted Partnership Funding score to $\geq 100\%$.

¹⁰ Outcome measure 2: Households at flood risk: number of households moved out of any flood probability category to a lower category.

¹¹ Outcome measure 3: Households at erosion risk: number of households better protected from coastal erosion.

RFCC region	Counterfactual			Scenario			Change		
	No.	£ m	No. hh	PF policy			No.	£ m	No. hh
				No.	£ m	No. hh			
Anglian Central	66	£35	7,131	74	£57	6,435	+8	+£22	-696*
Anglian Eastern	134	£178	14,488	126	£155	12,106	-8	-£23	-2,382
Anglian Northern	137	£198	63,960	142	£248	61,327	+5	+£50	-2,633*
English Severn and Wye	116	£45	3,762	137	£63	3,803	+21	+£18	+41
North West	271	£233	47,842	306	£340	47,969	+35	+£106	+127
Northumbria	149	£90	7,530	180	£124	7,827	+31	+£34	+297
South West	186	£149	15,354	213	£172	18,899	+27	+£23	+3,545
Southern	198	£344	94,148	251	£526	105,416	+53	+£182	+11,268
Thames	276	£409	80,618	338	£415	70,701	+62	+£6	-9,917*
Trent	152	£224	21,199	183	£184	20,740	+31	-£40	-459
Wessex	144	£104	12,079	183	£272	27,682	+39	+£168	+15,603
Yorkshire	234	£302	32,547	351	£708	81,539	+117	+£406	+48,992

Key: PF policy = Partnership Funding policy; No. hh = number of households

** Although there are more schemes and more investment in these RFCCs there are fewer properties being protected; this reflects a difference in the actual schemes that are delivered under the Partnership Funding policy scenario and the counterfactual scenario. An analysis of the schemes for Anglian Central shows that areas of water dependent habitat (Outcome Measure 4a) increase by around 370ha for the Partnership Funding policy scenario compared with the counterfactual suggesting that schemes delivering environmental improvements are more likely to be funded under the Partnership Funding policy scenario. These schemes protect fewer properties, hence, the reduction of 696 properties protected from flood and erosion risk. For Anglian Northern and Thames, the additional environmental habitat protected is small (0 ha in Anglian Northern and 6.5 ha in Thames across water dependent and intertidal habitat) so here the reason for the reduction in properties protected is not associated with greater investment in delivering environmental outcomes. For Anglian Northern, the additional schemes funded under the Partnership Funding policy scenario do not protect any additional properties. In Thames, one large scheme that is funded under the counterfactual protects 12,790 properties against flood risk. This scheme is not funded under the Partnership Funding policy scenario. Since the total number of properties protected in Thames reduces by 9,917 (which is lower than 12,790) it can be assumed that the remaining schemes do protect more properties, but this is being masked by the one scheme that is not funded.*

The table shows that investment under the Partnership Funding policy scenario increases in all but two of the RFCC regions and that additional households are protected in seven (of the 12) regions. Anglian Eastern and Trent see a reduction in funding under the Partnership Funding policy scenario but only Anglian Eastern shows a reduction in number of schemes funded (8). Anglian Central, Anglian Northern and Thames see a reduction in number of properties protected, even though overall funding increases. The largest increases in number of schemes funded under the Partnership Funding policy scenario compared with the counterfactual scenario are in Yorkshire (117) and Thames (62). The increase for Yorkshire corresponds with the biggest increase in investment (£406 million). The lowest increase in funding is in Thames (£6 million) with the largest increases seen in Southern (£182 million), Wessex (£168 million) and North West (£106 million). Yorkshire

shows the greatest increases in terms of numbers of households protected, followed by Wessex and Southern.

Table 2 provides a breakdown of number of schemes funded, total investment and number of households protected under both scenarios by Risk Management Authority (RMA) from the quantitative analysis. The table shows that number of schemes and total investment increase under the Partnership Funding policy scenario across all RMAs, except water companies where investment reduces under the Partnership Funding policy scenario by £0.4 million and number of schemes obtaining funding reduces by three. The Environment Agency sees the largest increase in number of schemes (226) and investment (£542 million). Local Authorities see the largest change in number of households protected (27,683). This is linked to the additional schemes that could be funded due to the contributions that have been identified (bearing in mind that the quantitative analysis assumes a scheme is funded if the probability of contributions being secured is 0.77 or greater).

RMA	Counterfactual			Scenario PF policy			Change		
	No.	£ m	No. hh	No.	£ m	No. hh	No.	£ m	No. hh
	Highways Authority	0	£0	0	0	£0	0	0	£0
Internal Drainage Boards	110	£47	11,211	138	£63	11,547	+28	+£16	+336
Environment Agency	1,186	£1,462	260,920	1,412	£2,004	299,371	+226	+£542	+38,451
Water companies	4	£1.0	35	1	£0.6	5	-3	-£0.4	-30
Local Authorities	764	£802	125,838	934	£1,195	153,521	+170	+£394	+27,683

Notes: number of households varies from the total number of households protected given in 'delivering for communities' due to gaps in the 2015/16 to 2020/21 six-year plan which means not all households protected can always be aligned with an RMA

Key: PF policy = Partnership Funding policy; No. hh = number of households

Key qualitative issues associated with RMAs include perceptions from interviewees that:

- There appears to be inconsistency across the country in understanding of the extent to which Local Authority staff costs can be covered by GiA funding;
- This can mean that Local Authorities have used their own resources to develop the business case, with the evidence required often being expensive and difficult to obtain; and
- If the business case is not developed well in the early stages, this could make getting Partnership Funding contributions much more difficult later on.

Table 3 provides the breakdown of investment as number of schemes, total investment and number of households protected under the counterfactual and Partnership Funding policy scenario by risk setting. The table shows that number of schemes and total investment have increased across all risk sources, with the biggest increases seen in terms of number of schemes for fluvial (210) and surface water flooding (112), and in terms of investments for fluvial flooding (£359 million) and coastal flooding (£342 million). Coastal flooding schemes show the largest increase in number of households that benefit (52,254). The number of households protected against fluvial flooding decreases under the Partnership Funding policy scenario by 3,295, although the overall number of households protected across all risk sources has increased.

Table 3: Number of schemes funded by risk setting									
Risk setting	Counterfactual						Scenario		
	PF policy			Change					
	No.	£ m	No. hh	No.	£ m	No. hh	No.	£ m	No. hh
Fluvial flooding	832	£1,339	173,043	1,042	£1,698	169,748	+210	+£359	-3,295
Surface water flooding	405	£161	44,206	517	£303	56,905	+112	+£142	+12,699
Coastal flooding	134	£544	157,583	170	£887	209,837	+36	+£342	+52,254
Reservoir flooding	3	£0.2	8	6	£23	11	+3	+£23	+3
Groundwater flooding	17	£9.6	1,221	21	£12	1,672	+4	+£2	+451
Coastal erosion	95	£174	21,803	109	£228	26,131	+14	+£54	+4,328

Notes: number of households varies from the total number of households protected given in 'delivering for communities' due to gaps in the 2015/16 to 2020/21 six-year plan which means not all households protected can always be aligned with a risk source

Key: PF policy = Partnership Funding policy; No. hh = number of households

The interviews also raised issues in relation to risk setting and location, with perceptions that the Partnership Funding calculator does not work well for:

- Coastal erosion adaptation, since it is not possible to use property level protection/resilience for adaptation hence there is no alternative to a wider scheme; and
- Urban boroughs, given the complexity of the modelling required for the interlinked river and sewerage systems. This situation was leading to reluctance of LLFAs to commit money to projects when there was uncertainty about the projects' likely success at the national level.

Delivering for communities

Table 4 provides a breakdown of number of households and total investment (i.e. including contributions under the Partnership Funding policy scenario)¹². The table shows that the number of households protected increases significantly under the Partnership Funding policy scenario compared with the counterfactual scenario, especially for flood risk reduction.

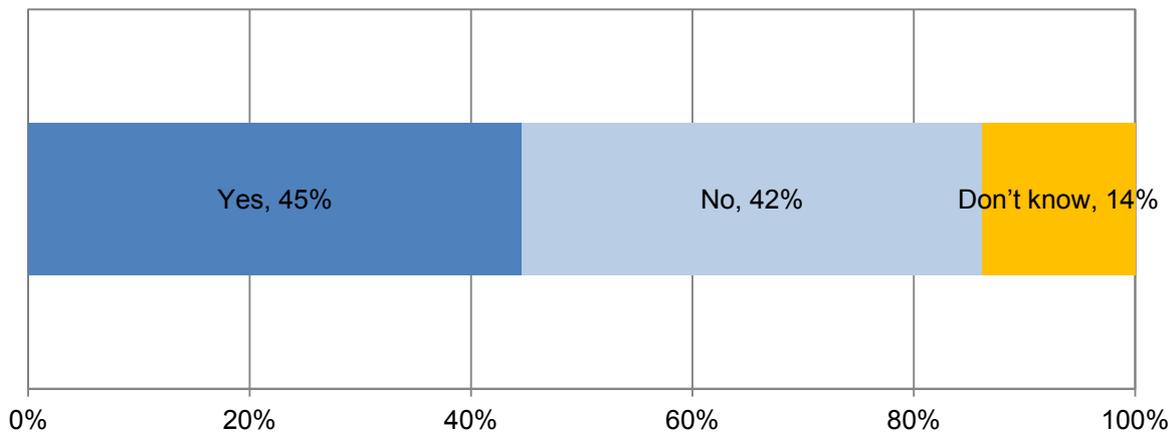
Table 4: Total investment by Outcome Measure (2015/16 to 2020/21)						
Factor	Scenario					
	Counterfactual		PF policy		Increase	
	No. hh	Total investment (£m)	No. hh	Total investment (£m)	No. hh	Total investment (£m)
Outcome Measure 2	375,772	£1,916	440,866	£2,625	65,094	£709
Outcome Measure 2b	187,058	£1,408	222,331	£1,857	35,273	£449
Outcome Measure 2c	46,466	£684	51,937	£851	5,471	£167
Outcome Measure 3	22,232	£215	23,578	£301	1,346	£86
Outcome Measure 3b	2,595	£112	2,607	£169	12	£57
Outcome Measure 3c	551	£59	658	£84	107	£25

Key: PF policy = Partnership Funding policy; No. hh = number of households

The survey asked respondents whether they thought that local communities were sufficiently involved in the design choices of FCERM schemes. Figure 1 provides a summary of the results, with responses divided and similar numbers of respondents indicating “yes” and “no”. Differing opinions were also expressed in the interviews with one interviewee feeling that the Partnership Funding policy had not changed the way public engagement was carried out but it may have helped the public’s understanding of the RMAs responsibilities. In contrast, another interviewee felt that the public does not have a general national awareness of the policy so each project has to educate the specific community as the project begins, with implications for project timescales.

¹² The number of properties shown as being protected under Outcome Measure 3 (Table 4) is not the same as the number of properties shown as being protected against coastal erosion (Table 3). This is due to differences in the way the data have been analysed. Some properties captured under ‘coastal erosion’ may include properties that are also benefiting from reduced risks from other risk settings so the total for coastal erosion is greater than the number of properties shown under Outcome Measure 3.

Figure 1: In your opinion, do you think that local communities are sufficiently involved in design choices of FCERM schemes? (n = 65)



The survey also asked whether respondents felt that Partnership Funding had been successful in better protecting more communities and delivering more benefits by enabling greater civil society involvement and more local choice in the selection of FCERM options. Of the 70 respondents, 30% thought it had been very or somewhat successful, while 31% thought it had been not very or not at all successful. A further 26% of respondents answered 'neither successful nor unsuccessful', while the remaining 13% answered 'don't know'.

Delivering environmental outcomes

The number of hectares (for Outcome Measure 4a: area of water dependent habitat created or improved and Outcome Measure 4b: area of intertidal habitat created or improved) and number of km protected (for Outcome Measure 4c: length of rivers protected) under the counterfactual and Partnership Funding policies are provided in Table 5.

Table 5: Environmental benefits by Outcome Measure (2015/16 to 2020/21)								
Factor	Scenario							
	Counterfactual			PF policy			Change	
	Ha or km	Investment (£m)	£ per ha or km	Ha or km	Investment (£m)	£ per ha or km	Ha or km	Investment (£m)
<i>In all locations</i>								
Outcome Measure 4a	3,776	£315	£83,000	11,596	£399	£34,000	+7,820	+£84
Outcome Measure 4b	894	£52	£58,000	2,277	£116	£51,000	+1,383	+£64
Outcome Measure 4c	1,067	£54	£50,000	3,536	£90	£26,000	+2,469	+£36
Key: PF policy = Partnership Funding policy; No. hh = number of households								

The table indicates that significant additional areas of all three habitat types are provided under the Partnership Funding policy scenario.

Overall, cost to the Exchequer per hectare or per km is lower under the Partnership Funding policy scenario.

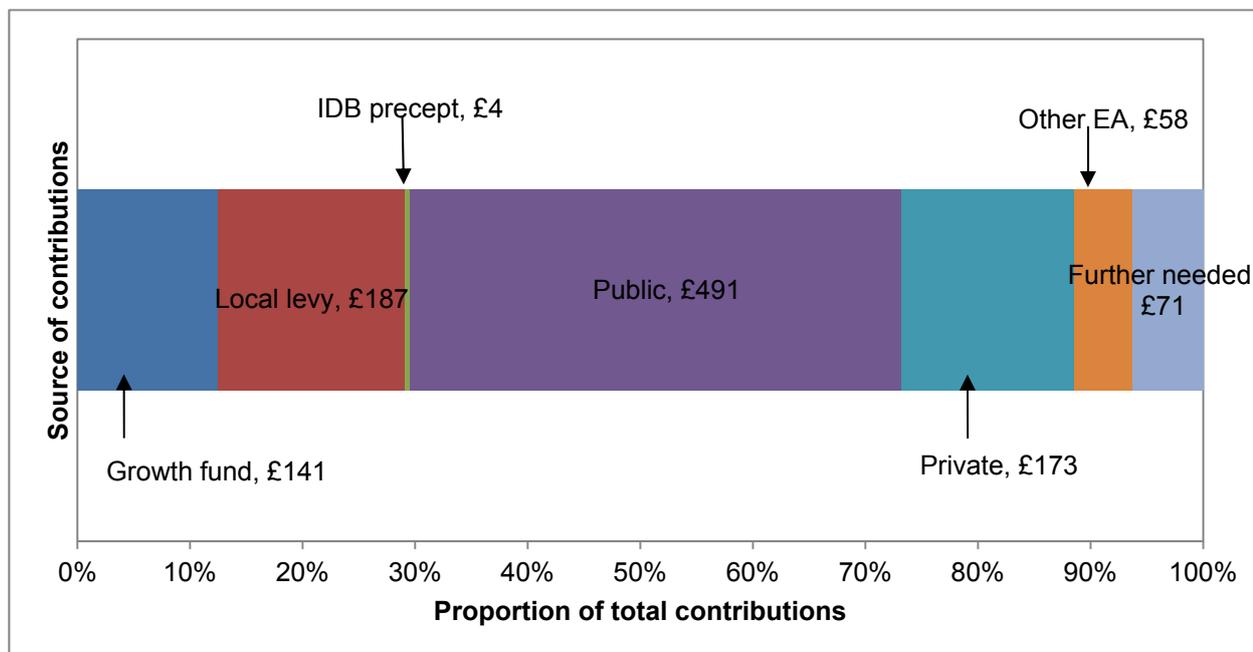
The qualitative analysis provided a number of perceptions over the usefulness of Outcome Measure 4:

- Outcome Measure 4 only appeared to be used retrospectively, i.e. after the initial benefit-cost ratio had been determined to try and increase the benefits. They felt that this was resulting in the creation of small areas of habitat, rather than larger areas of habitat being designed into schemes from the beginning;
- Natural or green schemes often require more time to develop the business case since the evidence required is often expensive and difficult to obtain. This can mean that these types of schemes can lose out on funding that is limited to a financial year, with issues in terms of developing partnerships with some departments in Local Authorities, e.g. Highways; and
- Natural flood management (NFM) options were more difficult to model, and a standard of protection (SoP) could not be guaranteed in such instances. Designing a traditional/grey defence is much simpler as there are usually defined plans, costs and there is more evidence available to show how many houses will be protected.

Sources of contributions

The £1.1 billion of contributions defined as having a probability of being secured of 0.77 or greater under the Partnership Funding policy scenario up to 2027/28 can be broken down by source, as shown in Figure 2.

Figure 2: Proportion of and total contributions by source (£ millions)



This shows that the largest individual proportion is associated with public sources (other than Growth Fund and local levy) at 44%, followed by local levy (17%) and private sources (15%).

The largest proportion of contributions secured is from other public sources (i.e. excluding Growth Fund and local levy) at 44% (£491 million, up to and including all contributions agreed on schemes that would be funded to 2020/21, but which may involve contributions being collected up to and including 2027/28 and beyond). The perception from the qualitative analysis was that the vast majority of contributions across the country were coming from public sector sources. This viewpoint is supported by the analysis undertaken above.

The contributions can also be disaggregated in terms of contributions by type per household for those schemes that would be funded under the Partnership Funding policy scenario. The results are presented in Table 6 enabling a comparison to be made of contributions secured in the 20% most deprived and 80% least deprived areas.

The table shows that public sources are the largest individual contributions (excluding further contributions required) for both the 20% most and 80% least deprived households for those at flood risk. For erosion risk (Outcome Measure 3), private sources are the largest individual contributions for the 20% most deprived whereas public sources are the

largest for the 80% least deprived. The table also shows total contributions needed by the 20% most deprived versus the 80% least deprived for Outcome Measure 2 and Outcome Measure 3. In total, households categorised as being the 20% most deprived and at risk of flooding (Outcome Measure 2c) needed to raise 29% of contributions, which is more than the 20% that would be expected if the most and least deprived areas were equal.

Table 6: Breakdown of contributions by source and level of deprivation (£ millions)

Source	20% most deprived (Outcome Measure 2c)		80% least deprived (Outcome Measure 2) ¹³		20% most deprived (Outcome Measure 3c)		80% least deprived (Outcome Measure 3) ¹⁴	
	Total	%	Total	%	Total	%	Total	%
Growth fund	£19	6.8%	£122	18%	£0	0%	£0	0%
Local levy	£31	12%	£133	20%	£4.3	4.9%	£3.7	13%
IDB precept	£0.24	0.09%	£2.9	0.4%	£0	0%	£0.04	0.1%
Other Public ¹⁵	£141	52%	£291	44%	£23	26%	£22	75%
Private	£74	27%	£47	7.1%	£61	69%	£3.6	12%
Other EA	£0.20	0.07%	£14	2.0%	£0	0%	£0	0%
Further needed	£7.8	2.8%	£57	8.5%	£0	0%	£1	2%
Total	£273	29%	£667	71%	£89	75%	£30	25%

For coastal erosion, the 20% most deprived communities required 75% of funding for schemes to be sourced from contributions. This is much higher than the 20% that might be expected if the proportion of contributions raised was equal to the proportion of deprived households.

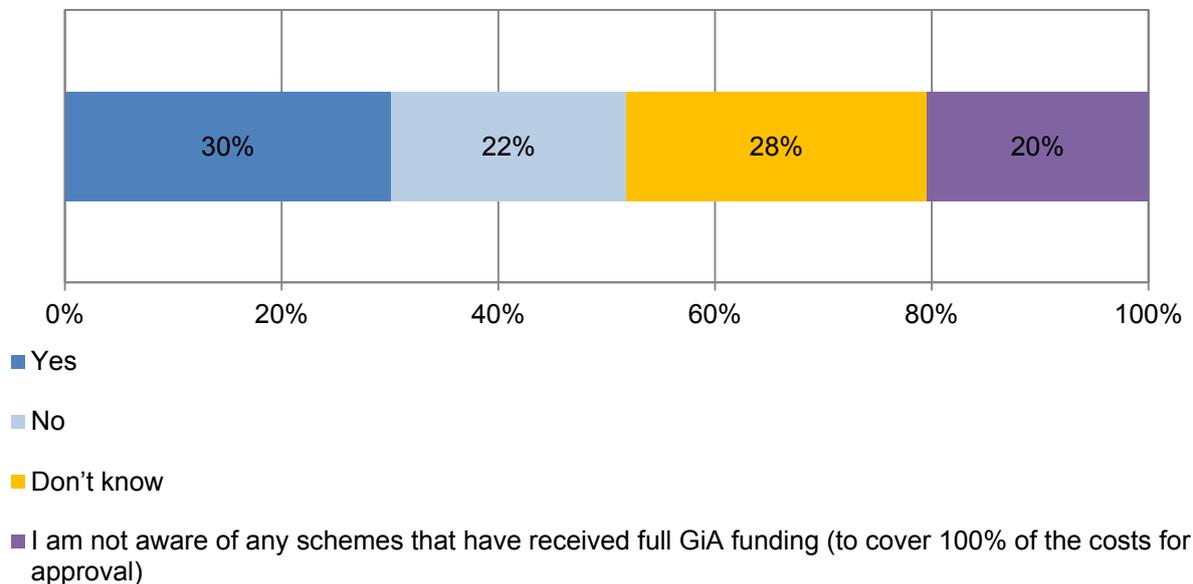
Participants to the online survey were asked if schemes notionally approved for full GiA funding had been successful in attracting additional voluntary Partnership Funding. Half of the respondents indicated that they were not aware (responding either “No” or “Don’t know”) of schemes in their area attracting additional funding (Figure 3). Several interviewees indicated that, in their experience, the situation whereby voluntary contributions have also been made once full (100%) GiA funding has been awarded has not occurred, though the quantitative analysis suggests otherwise.

¹³ Excludes households counted as part of Outcome Measure 2c.

¹⁴ Excludes households counted as part of Outcome Measure 3c.

¹⁵ Assumed to include EU funding such as ERDF and ESIF.

Figure 3: Responses to survey question: Have any of the FCERM schemes implemented in your organisation’s area that were notionally approved for full Grant-in-Aid funding (covering 100% of the costs for approval for a scheme) also been successful in attracting voluntary Partnership Funding contributions? (n=83)

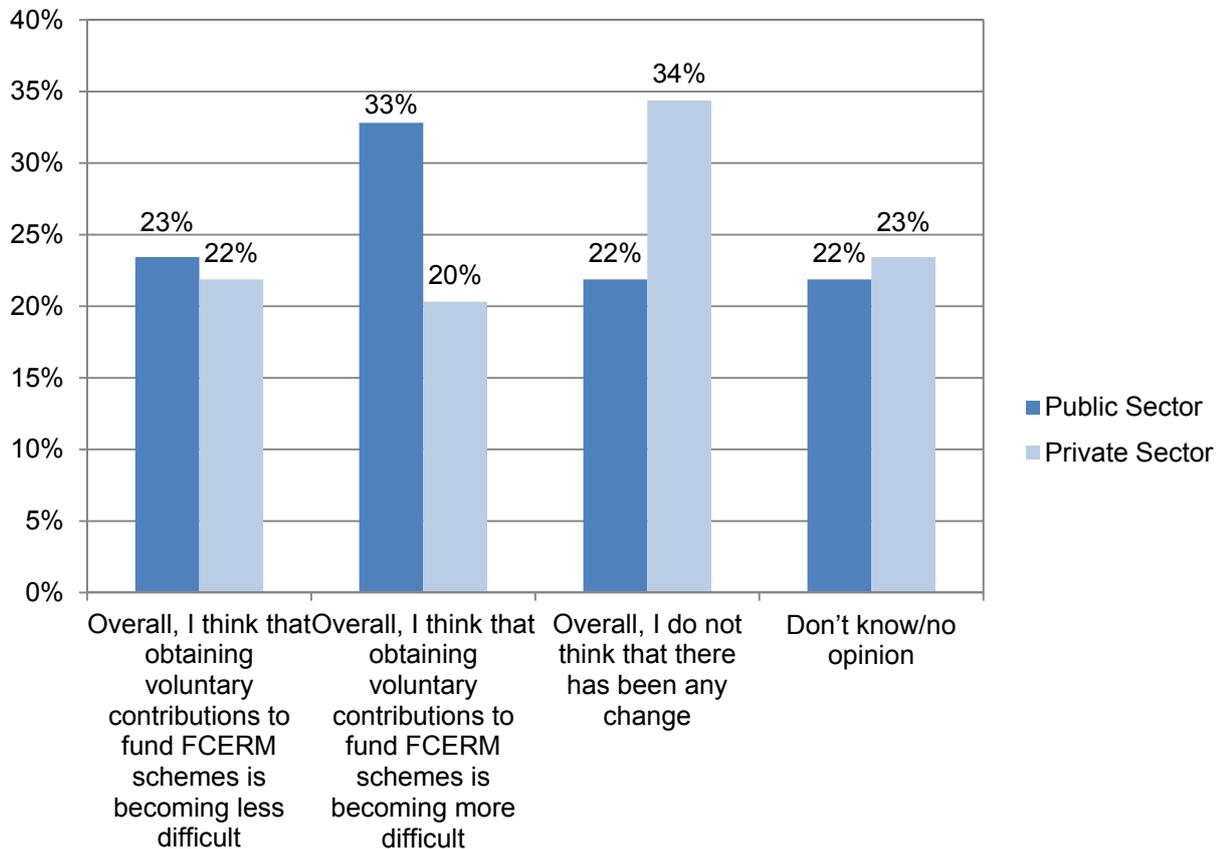


In total, 22% of respondents to the survey stated that their schemes had received a transfer of GiA through the RFCC from schemes that had attracted a greater amount of contributions than were needed¹⁶. A further 44% said that they had not received such a transfer. The analysis of fully funded schemes showed that 327 schemes that are notionally fully funded under the Partnership Funding policy scenario did also collect contributions. The £150 million (to 2020/21) or £184 million (to 2027/28) of GiA saved is likely to have been reallocated to schemes that have not been able to secure sufficient contributions.

The qualitative analysis found perceptions that securing non-GiA contributions to enable schemes to progress is not always a straightforward process; indeed, the risks and difficulties associated with securing contributions can cause projects to stall or fail if the risks are too great or cannot be overcome. Participants in the online survey were asked if they thought there had been a change in how easy/difficult it is to obtain voluntary contributions from the public and private sectors (Figure 4). One-third of respondents felt that obtaining contributions from the public sector had become more difficult but there had been no change in difficulty in obtaining contributions from the private sector. Just under a quarter of respondents felt that obtaining voluntary contributions from both the private and public sectors had become less difficult.

¹⁶ It is important to note that it is GiA that is transferred, not contributions.

Figure 4: Responses to survey question: Overall, in your view has there been a change in how easy/difficult it is to obtain voluntary (non Grant-in-Aid) contributions from the public or private sector to fund FCERM schemes since the introduction of Partnership Funding in 2011? (n=64)



Through the consultation, stakeholders highlighted several key risks and difficulties in obtaining non-GiA contributions for FCERM schemes from both public and private sectors:

- Public sector:
 - Difficulties arise from being asked to contribute to several schemes, austerity measures/cuts, staff and resource shortages, potential liabilities for public sector bodies where they are the lead organisation and available resources; and
 - Having a process in place to enable discussions and awareness of the policy was highlighted by almost half (53% and 45%, respectively) of the respondents as being a factor in making the process of obtaining voluntary contributions from the public sector less difficult.
- Private sector:

- Difficulties arise from being asked to contribute to several schemes, the potential liabilities, and because those benefiting from a scheme do not necessarily have to contribute therefore risks can arise from not having a mechanism to make beneficiaries pay. Also, engagement can be time and resource intensive, often requiring specialist skills, especially when there is an undefined funding gap; and
- Having a process in place to enable discussions and an awareness of the policy was a factor in making the process of obtaining voluntary contributions from the private sector less difficult.

Summary of findings

Overall, the evaluation of the Partnership Funding policy has found that the aims of the policy are, in general, being delivered. The quantitative data analysis has shown that a modelled comparison of the Partnership Funding policy scenario with a counterfactual scenario, based on use of the priority score system, does result in total FCERM investment being increased above what Government could fund itself. However, the perception from stakeholders does not always reflect the results of the quantitative analysis with only 47% of respondents to the survey stating that they felt that more schemes had gone ahead under the Partnership Funding policy.

The qualitative analysis found that 70% of survey respondents agreed that there is local involvement in FCERM. However, respondents also felt that those who provide funding have more opportunity to influence scheme design than those who are not providing a financial contribution.

Both survey respondents and interviewees identified difficulties associated with raising contributions. While 25% of public sector and 22% of private sector respondents thought contributions were becoming less difficult to obtain, 33% of private sector and 20% of public sector respondents thought they were becoming more difficult. A key reason was austerity measures. A number of respondents thought that obtaining voluntary contributions was becoming less difficult, including because beneficiaries know that if they do not contribute then a scheme will not go ahead. In total, 36% of survey respondents thought that the Partnership Funding policy had been very or somewhat successful in enhancing certainty in relation to funding of projects. There were concerns over the extent to which contributors understood risk allowances where the Partnership Funding score was only just greater than 100% and what would happen if project costs increased.

A summary of the overall key positive and negative attributes of the Partnership Funding approach identified through the quantitative analysis is provided in Figure 5 and from the qualitative analysis (surveys, interviews and case studies) in Figure 6. It is important to note that there are uncertainties associated with the quantitative analysis, including uncertainties of an estimated 6% due to duplications within the counterfactual dataset, and data gaps that affect calculation of the NPV and effective return on investment.

A large proportion (82%) of survey respondents indicated that the Partnership Funding process could be improved in the future; only 2% of respondents indicated that the process did not need to be improved (Figure 7).

Figure 5: Positive and negative attributes of the Partnership Funding approach from the quantitative analysis



Figure 5: Positive and negative attributes of the Partnership Funding approach from the qualitative analysis

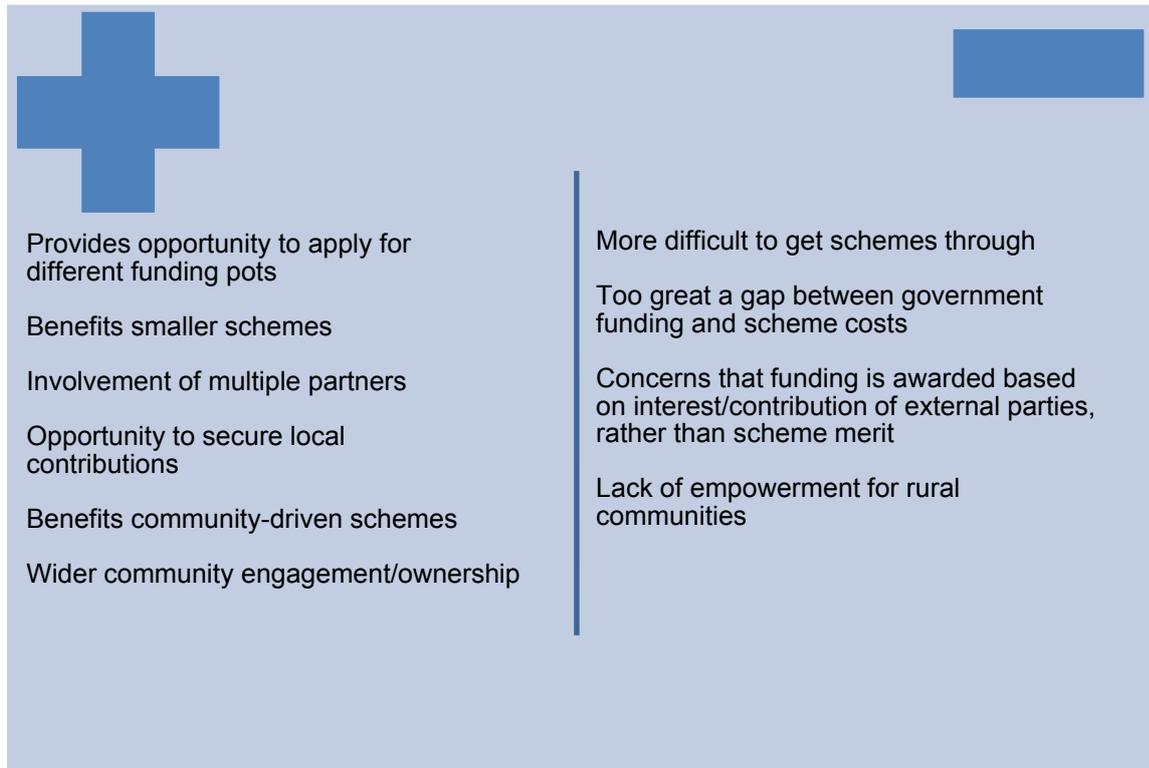
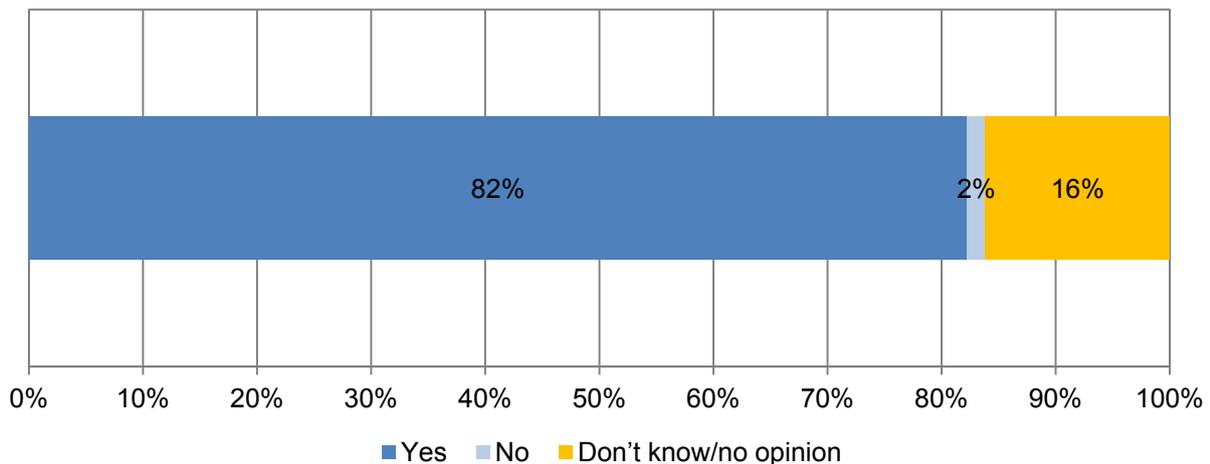


Figure 7: Responses to survey question: In your view are there ways in which the Partnership Funding process could be improved? (n=62)



Suggestions from stakeholders for changes to the Partnership Funding policy cover a wide range of different issues, including:

- **Refinements to the Partnership Funding calculator:** there is a perceived need to revise the calculator so it better reflects the requirements of different types of schemes. This includes the need to promote green schemes, such as natural flood management (NFM), sustainable drainage systems (SUDS) and green infrastructure. Other schemes such as coastal adaptation and surface water flooding schemes are currently having difficulties with application of the calculator. Stakeholders also consider that specific issues such as agricultural land, critical infrastructure and businesses also need to be better reflected in the calculator in terms of how they are weighted within Outcome Measure 1¹⁷.
- **Need for better understanding of how the partnership funding formulas are applied and which data are allowed to be used:** there is a need for better guidance and sharing of best practice (e.g. on identification and quantification of expected benefits) to help address this issue. There were also suggestions for revisiting training programmes and the need for more capacity building, especially on engagement approaches with communities and with private investors.
- **Need for consistency across RMAs:** there are concerns that approaches vary between the Environment Agency and other RMAs in terms of what is required at different stages of appraisal, including when contributions need to be confirmed. There are also issues in terms of how wider benefits are estimated, with those RMAs undertaking schemes more regularly having greater knowledge of tools and approaches that enable them to better capture more of the benefits.
- **There is a need for a proportionate approach:** there are concerns that the costs associated with developing small schemes to the point where they can get approval for funding can be disproportionate to the amount of funding required. It can also raise expectations which may not then be met where property level protection is provided rather than a community-wide scheme, for example.
- **Legal agreements:** legal agreements needed for Partnership Funding are identified as one of the main causes of long timescales for securing contributions. A suggestion was made for a mechanism for legally agreeing contributions through projects being able to accept a letter of intent whilst a full collaborative agreement is finalised. Another suggestion was for a streamlined sign-off process for agreeing variations to the standard clauses in the Environment Agency's legal agreement for contributions, in particular with regards to the clauses relating to maintenance.
- **Outcome Measure 1:** it was recognised that Outcome Measures are needed in order to apportion benefits and weight scores within the calculator. However, it was highlighted that in some cases businesses can view the outcome measures

¹⁷ Outcome measure based on the economic benefits that are delivered by a scheme.

(Outcome Measure 1 in particular) as being unfriendly towards businesses in comparison to residential properties. Concerns were raised that this was affecting the way that businesses perceived schemes and hence their attitudes towards making a contribution. It was suggested that the outcome measures need to be reviewed to better account for businesses and critical infrastructure.

For a summary of how the assembled evidence answers the specific research questions posed by this study, refer to Section 12 of the main report.

Glossary and acronyms

ABI	Association of British Insurers
ADA	Association of Drainage Authorities
ADEPT	Association of Directors of Environment, Economy, Planning and Transport
BCR	Benefit-cost ratio: calculated as benefits divided by costs
CC	County Council
CIWEM	Chartered Institute of Water and Environmental Management
DCLG	Department for Communities and Local Government
EA	Environment Agency
ERDF	European Rural Development Fund
FCERM	Flood and Coastal Erosion Risk Management
FWMA	Flood and Water Management Act
GiA	Grant in Aid
GIS	Geographic Information Systems
GW	Groundwater
HH	Households
IDB	Internal Drainage Board
LA	Local Authority
LEP	Local Enterprise Partnership
LLFA	Lead Local Flood Authority
LTP	Long-Term Plan
MTP	Medium-Term Plan
Natural schemes	Schemes that include environmental benefits and environmental objectives, including use of natural flood management approaches, to help manage flood and erosion risk

NFM	Natural	Flood Management
NFU	National	Farmers' Union
NPAS	National Project Assurance Service	
NPV	Net Present Value: calculated as benefits minus costs	
NPV per £ GiA	Net Present Value to the Exchequer: calculated as Net present Value divided by GiA	
NRP	Non-residential	property
OBC	Outline	Business Case
OM	Outcome	measure
OM1	Economic	benefits
OM2	Households at flood risk: number of households moved out of any flood probability category to a lower category	
OM2b	Number of households for which the probability of flooding is reduced from the very significant or significant category to the moderate or low category	
OM2c	Number of households in the 20% most deprived areas moved from the very significant or significant flood probability category to the moderate or low category	
OM3	Households at erosion risk: number of households better protected from coastal erosion	
OM3b	Number of households protected against loss from coastal erosion in a 20-year period	
OM3c	Number of households in the 20% most deprived areas protected against loss from coastal erosion in a 20-year period	
OM4a	Water dependent habitat: area (in hectares) of water-dependent habitat created or improved to help meet the objectives of the Water Framework Directive, Section 28 of the Wildlife & Countryside Act 1981, and the England Biodiversity Strategy	
OM4b	Intertidal habitat: Area (in hectares) of intertidal habitat created to help meet the objectives of the EU Habitat/Birds Directives, Section 28 of the Wildlife & Countryside Act 1981, and the England Biodiversity Strategy	

OM4c	Protected rivers: length (in kilometres) of rivers protected under the EU Habitat/Birds Directives or Section 28 of the Wildlife & Countryside Act 1981 improved to meet the objectives of the Water Framework Directive.
PA	Priority Area
PAR	Project Appraisal Reports
PF	Partnership Funding
PLR	Property Level Resilience
RFCC	Regional Flood and Coastal Committee
RMA	Risk Management Authority
RQ	Research Question
SoP	Standard of Protection
SUDS	Sustainable Drainage Systems
SW	Surface Water
WLB	Whole-life Benefits
WLC	Whole-life Costs

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9-8	Community engagement in coastal erosion schemes	Partnership funding by local residents at Thorpeness (Suffolk coast)

1. Introduction

1.1 Rationale for the study

In 2011, the Partnership Funding approach was introduced for Flood and Coastal Erosion Risk Management (FCERM) projects. This approach aimed to deliver more benefits and protect more areas through encouraging total investment in flood and coastal erosion risk management by operating authorities to increase beyond levels provided by central Government alone. Partnership Funding additionally aimed to enable more local choice within the system, and encourage innovative, cost-effective options to come forward in which civil society may play a greater role. Under the previous approach, schemes either received full Grant-in-Aid (GiA) or did not receive any funding (and therefore did not progress). With Partnership Funding, the intention is that more schemes receive some funding according to the benefits that they are expected to provide, but the remaining funding required has to be sourced from local contributions^{Error! Bookmark not defined.}. The amount of GiA provided relates to the benefits expected under four categories including overall benefits (Outcome Measure 1), households moved from one flood risk category to a lower one (Outcome Measure 2), households better protected from coastal erosion (Outcome Measure 3) and environmental obligations (Outcome Measure 4)¹⁸.

An initial evaluation of the Partnership Funding approach was undertaken in 2014¹⁹. This evaluation determined that there had been an overall rise in the amount of resources put towards capital projects, and that GiA was being obtained by projects that previously would not have obtained any funding¹⁹. The opinions of those interviewed also suggested that there had been a change in views towards FCERM, with individuals recognising that central government could not necessarily fully fund all projects. In addition, working practices seemed to be changing, with organisations collaborating more closely. However, it was also acknowledged that partnership working required significant time inputs¹⁹.

One of the evaluation's conclusions was that a full evaluation should be carried out in 2017 according to Defra's procedures¹⁹. This would enable further analysis of issues such as value for money, the allocation of funding to deprived communities and community involvement.

¹⁸ Defra (2011): Flood and coastal resilience partnership funding, Defra policy statement on an outcome-focused, partnership approach to funding flood and coastal erosion risk management, 23rd May 2011.

¹⁹ Defra (2014): Flood and coastal erosion resilience partnership funding evaluation, Final Report, April 2014.

1.2 Aims and objectives

The overall objective of the study is to conduct further evaluation of Partnership Funding (PF).

The study is primarily concerned with assembling quantitative data on FCERM performance under Partnership Funding, though there is also a more qualitative element.

1.3 Overview of approach to the study

This study has involved the following key tasks:

- Development of the conceptual model including the intervention logic and a series of research questions;
- Review of medium-term plans to develop a counterfactual based on funding being allocated through continued use of the priority score system;
- Collection of evidence using desk-based review, an Internet-based survey, interviews and case studies;
- Analysis of evidence against the research questions and comparison of differences from funding allocations under the Partnership Funding policy scenario to those projected under the counterfactual scenario;
- Synthesis of findings covering the effectiveness, efficiency, relevance, coherence and value added of the partnership funding policy; and
- Summary of key conclusions and suggestions for changes that could be made to the policy.

Further details on the approaches used are set out in Section 2 of this report.

1.4 Organisation of this report

The remainder of this report is organised as follows:

- Section 2 provides an overview of the approach to the study, describing the methods that have been applied to collect and analyse the evidence that underlies the evaluation;
- Section 3 presents the conceptual model, including the research questions used as the basis for interrogating the partnership funding policy;

- Sections 4 to 10 present the findings of the evaluation:
- Section 4 provides the overall outcomes
 - Section 5 describes the results disaggregated by location (RFCC region), by RMA, by risk sources and by technical solution
 - Section 6 assesses benefits to communities
 - Section 7 covers benefits to the environment
 - Section 8 discusses the results in terms of disaggregation of contributions by source
 - Section 9 presents the extent to which local choices and wider objectives are being delivered
 - Section 10 identifies areas where the partnership funding policy could be modified
- Section 11 discusses other issues that have been raised during the evaluation that are not directly linked to the partnership funding policy; and
- Section 12 provides the conclusion of the evaluation and presents suggestions as to how the policy could be revised to maximise benefits and minimise negative issues.

2. Approach to the study

2.1 Overview

This section describes the processes and methods that have been applied during this study. It explains the approaches used and findings from those approaches in terms of how they have informed the evidence base.

2.2 The conceptual model

The conceptual model comprises the intervention logic and the evaluation matrix. The intervention logic is used to help focus the evaluation and to underpin the rationale for the Partnership Funding approach. In doing this, it links the inputs, resources and activities that describe the planned work to the outputs, outcomes and impacts that describe the intended results.

The evaluation matrix sets out the research questions and links them to sub-questions and/or indicators, the specific data requirements that will be needed to answer each research question and the likely sources of those data. There are 22 research questions that have been set for this study.

Full details on the intervention logic, the 22 research questions and the associated evaluation matrix can be found in Section 3 of this report.

2.3 The counterfactual scenario

The counterfactual is intended to reflect the situation where the Partnership Funding policy is not in place. The aim of the counterfactual is to set a baseline from which the impacts (both positive and negative) of the Partnership Funding policy can be measured. As such, it is developed as a scenario identifying which schemes would have been selected for funding using the approach that was in place before the Partnership Funding policy was introduced. Full details on the approach used to develop the counterfactual are provided in Section 3.4 of this report.

2.4 The Partnership Funding policy scenario

The Partnership Funding policy scenario selects schemes for funding based on the adjusted Partnership Funding score, with schemes with the highest adjusted Partnership Funding score funded first. Schemes are funded on reducing adjusted Partnership Funding scores until the total GiA available across each of the two six-year periods (2009/10 to 2014/15 and 2015/16 and 2020/21) has been allocated.

Schemes are allocated to a specific funding year by assuming that they are funded in the first year in which they require investment. This ensures consistency with the counterfactual.

The extent to which the Partnership Funding policy has been successful (or otherwise) in meeting its aims is assessed by comparing the results under the counterfactual scenario with the results under the Partnership Funding policy scenario. When considering the conclusions presented here it is important to remember that the analysis is based on the comparison of these two scenarios. Consideration needs to be given to the assumptions that have had to be made in developing these scenarios.

Four large schemes associated with the Thames Tidal Defences (TTD) were seen to be significantly affecting the overall results. The size of the schemes meant they masked the differences between the counterfactual and the Partnership Funding policy scenario. Although described as “schemes”, the TTD investments are actually large groups of distinct individual projects each with their own funding score. In reality, the funding picture for the group modelled as “unfunded” under Partnership Funding is currently a mix of some fully-funded projects and some for which discussions about external contributions are continuing. The way these particular projects have been grouped in the analysis, however, means that one project not securing funding results in the whole “scheme” or group not being funded, which is an artificially negative position.

In order to better understand how the Partnership Funding policy scenario varies from the counterfactual they have been removed from the main analysis for both the counterfactual and Partnership Funding policy scenario. This helps provide a more coherent assessment, although results including the TTD schemes are also given for some of the overall measures.

One particular assumption of importance for the Partnership Funding policy scenario is the treatment of contributions that have been identified as being needed to give an adjusted Partnership Funding Score greater than 100% but where those contributions have not yet been secured (termed ‘further contributions required’). In the analysis, it is assumed that schemes will be funded where the probability of securing further contributions has been modelled at 0.77 or greater by the Environment Agency²⁰. This means that the conclusions presented here represent the funded reasonable case for the likely effectiveness of the Partnership Funding

²⁰ The modelling was carried out as a separate piece of Environment Agency led work with the results being provided for use by this study. Initially a probability of 0.75 was selected as a reasonable assumption given the levels of further contributions still required and the modelling results in terms of which schemes were realistically likely to secure those contributions. This had to be adjusted to 0.77 to ensure GiA was the same under both the counterfactual and Partnership Funding scenarios.

policy scenario, allowing for some schemes that have not yet secured all the required contributions to still be captured within the evaluation. It avoids being overly optimistic by assuming that those schemes with a probability of less than 0.77 of securing all the contributions needed would not be funded. Using a probability of 0.77 also ensures that the level of GiA is the same across both the scenarios.

This avoids any differences seen in benefits under each scenario being attributed to a different level of GiA that is being spent, rather than to the impact of contributions under the Partnership Funding scenario. The GiA under both the counterfactual and Partnership Funding scenario is then £2,311 million in both cases.

2.5 Evidence gathering

2.5.1 Desk-based review

Members of the Steering Group were contacted to obtain key documents, reports and other data sources. Information (both quantitative and qualitative) for inclusion in the desk-based review also included publicly available information.

2.5.2 Online survey

As well as obtaining quantitative data that can be used to assess the Partnership Funding policy against the evaluation criteria, an important aspect of the data gathering process is obtaining qualitative information to answer some of the evaluation questions and to explore the ‘why’ behind the data used and analysed. An engagement plan was developed and linked to the conceptual framework, to help identify which evaluation questions are likely to be relevant to the different stakeholders. The engagement plan indicates who will be engaged, the method of engagement and the types of information to be obtained. An engagement log was used to record the organisations and individuals approached in both the survey and interviews. This meant that reminder emails could be sent just to those who had not responded.

An internet-based survey was developed (using SurveyMonkey) consisting of relevant questions. The survey questions were shared with the Defra Steering Group in advance of being sent out to stakeholders. Invitations to the survey were sent to named individuals using our network of contacts and through assistance from the Steering Group. Over 350 initial emails were sent out by the consultants in June 2017 to individuals from selected stakeholder groups, including:

- Lead Local Flood Authorities;
- District Councils;
- Regional Flood and Coastal Committees (RFCCs);

- Water and sewerage companies;
- Highway authorities;
- Internal Drainage Boards;
- Consultants;
- Professional organisations; and
- Universities.

These emails were followed up by reminder emails in July 2017 to individuals that had not yet completed the online survey. Further emails were sent out internally by the Environment Agency directly to relevant staff and via coastal groups to their members.

In addition to the above stakeholders, desk-based research was undertaken to identify Local Flood Action Groups; over 20 groups were contacted about the online survey by email. The survey was also publicised using tools such as LinkedIn, Twitter and discussion forums such as the Local Authorities' Knowledge Hub.

Figure 2-1 (overleaf) provides an overview of the types of stakeholder responding to the survey. It indicates that a considerable proportion of the responses were received from the Environment Agency and Lead Local Flood Authorities.

Figure 2-2 (also overleaf) indicates that the majority of the respondents have had first-hand involvement in FCERM schemes that have been submitted for approval under the Partnership Funding process. Therefore, they are likely to be able to highlight the benefits of the approach, as well as any issues that may need refinement.

Figure 2-1: Percentage of online survey respondents by organisation/organisation type (n=123)

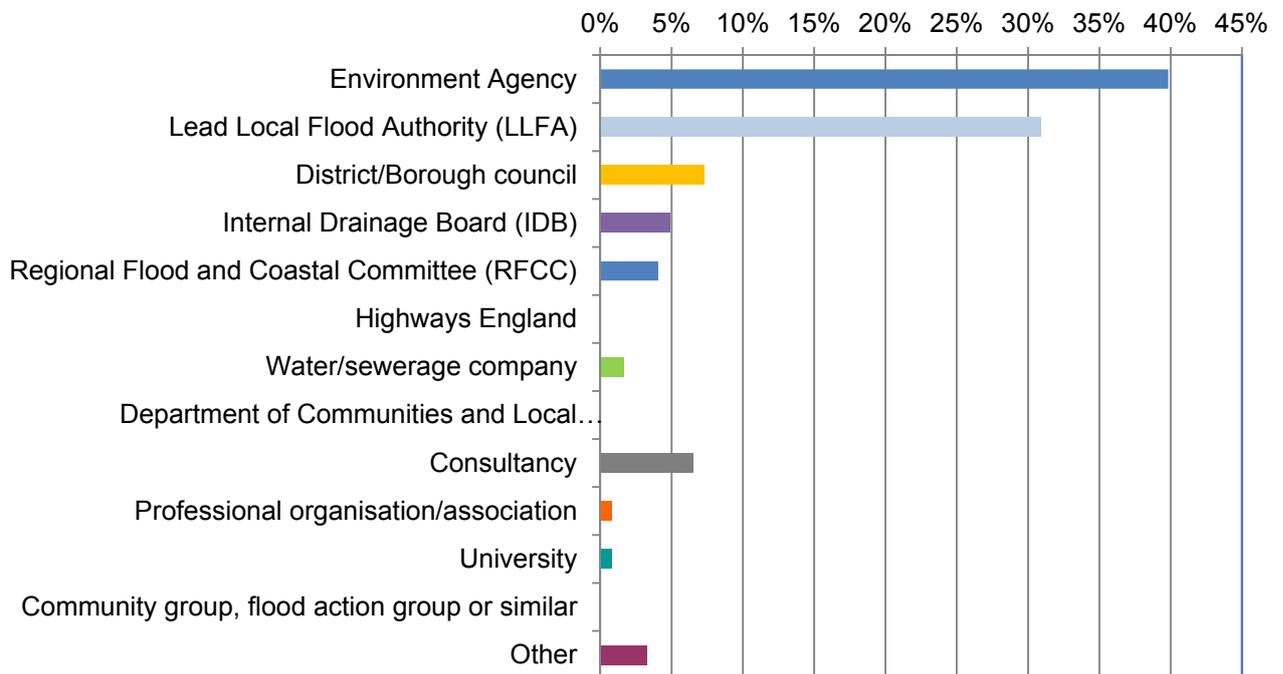
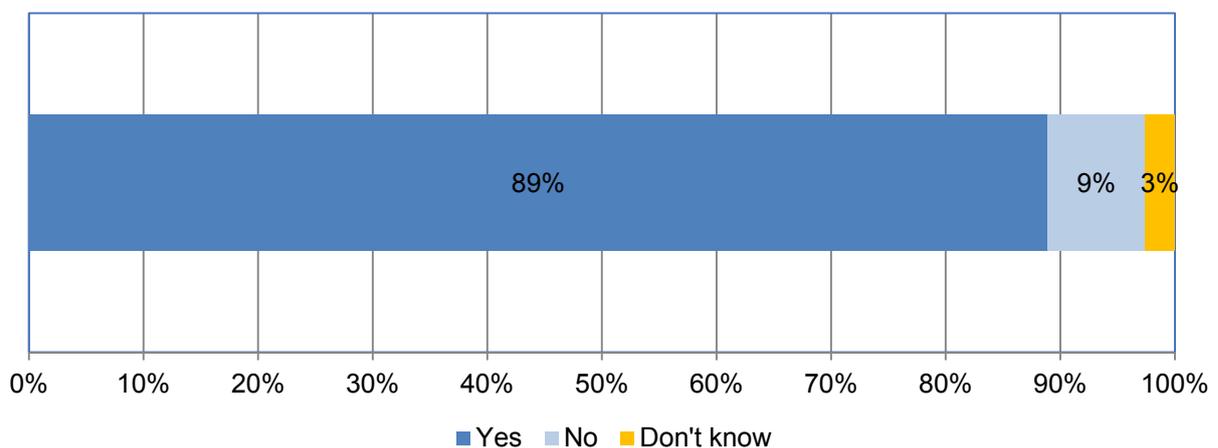


Figure 2-2: Percentage of online survey respondents that have developed, contributed to or been involved in FCERM schemes that have been submitted for approval since the Partnership Funding policy was put in place (n=117)



2.5.3 Interviews

Once responses were received from the survey, follow-up discussions were held with some respondents to further discuss the responses given and drill-down to determine whether and how the policy could be refined or improved. The stakeholders invited to interview were determined based on their responses, the issues they raised with a specific focus on filling gaps in the evidence base following

the desk-based review and survey, especially in relation to some of the more qualitative research questions. In addition, a presentation was made to the Association of Directors of Environment, Economy, Planning and Transport (ADEPT) Flood & Water Management Group²¹ with the subsequent discussion providing further input to the evidence base underlying the evaluation.

2.5.4 Case studies

Case study schemes that illustrated particular issues were identified from the internet survey. Additional details were obtained during the telephone interviews and through the provision of documents and papers by stakeholders. Case study criteria were identified as given in Table 2-1. The suggested case studies were then considered against these criteria to ensure that the case studies included within the evaluation were representative of different regions, risk settings (flooding or erosion), types of scheme, etc.

Table 2-1: Criteria against which case studies were considered	
Category	Criteria
Location	RFCC region Urban versus rural
Community	Level of deprivation Village, town, city (density of housing) Residential, non-residential, agricultural
Risk Management Authority	Environment Agency Lead Local Flood Authorities (LLFAs) District/borough councils Internal Drainage Boards (IDBs) Regional Flood and Coastal Committees (RFCCs) Highways authorities (Highways England and unitary county councils) Water and sewerage companies
Risk setting	Coastal, fluvial, surface water flooding Coastal erosion
Technical solution	Conventional, green Outcome Measure 4 delivery Strategic, non-strategic
Contributions	Source: Local Levy, public, private, other EA functions Extent: Level of GiA contributions Number: simple (e.g. single contributor) to complex (multiple contributors)
Capital versus maintenance costs	Up-front costs, ongoing costs Who would maintain (EA, LA, NGO, community)

²¹ This group represents Place Directors from county, unitary and metropolitan authorities, along with Local Enterprise Partnerships and corporate partners drawn from key service sectors (from: <https://www.adeptnet.org.uk/>).

2.6 Analysis of evidence

2.6.1 Data analysis

Analysis of quantitative data, such as from the medium-term and long-term plans, has been undertaken using Excel. Data were available as follows:

- Counterfactual for 2009/10 to 2014/15
- Counterfactual for 2015/16 to 2020/21
- Full scheme data for 2009/10 to 2014/15
- Full scheme data for 2015/16 to 2020/21

The data sets for 2009/10 to 2014/15 and for 2015/16 to 2020/21 provided slightly different information. That for 2015/16 to 2020/21 is more closely related to the Partnership Funding calculator and the outcome measures. The earlier dataset (2009/10 to 2014/15) includes some similar information, such as on households protected, but does not include the same information on environmental outcomes or enable disaggregation to the same level of detail. Where differences in data occur, the analysis focused on providing comparable data first and then supporting this with non-comparable data where these were still thought to be providing useful information to support the evaluation.

2.6.2 Data matrix

The information collected and analysed on the counterfactual and the information from the survey have been linked to the research questions. This facilitates recording of evidence and then assessment against the research questions. Tables showing the links made between the data gathered and the research questions are provided in Annex 1.

2.7 Synthesis of findings

The quantitative evidence from the data analysis has been combined with the qualitative evidence from the survey, interviews and case studies to provide the full evidence base. All of the information has been analysed to enable critical assessment of the evidence used to answer each research question. The synthesis has been organised to present the data in as accessible way as possible, as follows:

- Section 4 provides an overview of the key findings in terms of the use of investment and how this varies between the counterfactual scenario and the Partnership Funding policy scenario. Key findings are considered in light of the qualitative analysis where appropriate;

- Section 5 breaks down the overall findings to provide more details in terms of location (by RFCC region), by type of RMA, and by risk source. Again, qualitative findings from the survey, interviews and case studies are used to critique the finding from the quantitative analysis. A discussion is also provided on type of technical solution. There are no quantitative data available to support this analysis, so the findings are based on the qualitative results;
- Section 6 sets out the benefits of the partnership funding policy to communities, focusing on number and type of households better protected under the Partnership Funding policy scenario compared with the counterfactual scenario. Again, the analysis focuses initially on the quantitative assessment and then identifies associated issues that have been raised through the qualitative analysis;
- Section 7 focuses on benefits to the environment that have been additionally delivered as a result of the Partnership Funding policy when compared with the counterfactual scenario. As with Section 6, this draws firstly on the quantitative analysis, with different approaches used for the 2009/10 to 2014/15 period and 2015/16 to 2020/21 period reflecting the different ways that environmental benefits have been recorded. Evidence from the qualitative analysis that supports or challenges the quantitative analysis is then also included;
- Section 8 looks in more detail at contributions that have been obtained as a result of the Partnership Funding policy. This includes disaggregation by source and links to the types of communities and schemes that are associated with contributions and where further contributions might still be required. Again, the analysis combines the quantitative and qualitative evidence to enable a fuller assessment of the reasons why contributions may be easier or more difficult to collect in some cases;
- Section 9 is based mainly on qualitative evidence and discusses how, where and why local choices have been facilitated or otherwise under the Partnership Funding policy; and
- Section 10 discusses suggestions for modifications to the Partnership Funding policy, drawing largely on the qualitative analysis but also supported by the findings of the quantitative analysis.

2.8 Key findings and suggestions

The findings and suggestions are based on the weight of evidence that has been collected and analysed, including the views of stakeholders on how the Partnership

Funding policy could be revised to enable more benefits and fewer negative impacts to occur.

3. The conceptual model and counterfactual scenario

3.1 Overview

The conceptual model includes both the intervention logic and evaluation matrix. These elements are discussed in greater detail in the following sections. The counterfactual provides the baseline from which the benefits or dis-benefits of the Partnership Funding policy can be measured.

3.2 Intervention logic

The intervention logic links the anticipated outcomes from a policy to the inputs, activities, processes and assumptions²². In order to ensure that the evaluation was properly focussed, an intervention logic underpinning the rationale for the Partnership Funding approach has been developed. Drawing on the Magenta Book, Figure 3-1 provides this intervention logic.

The intervention logic is accompanied by an evaluation matrix that provides the research questions, sub-questions and indicators, and data sources. The evaluation matrix is provided in Section 3.3.

The evaluation also includes the development of a counterfactual. This simulates the likely funding patterns, schemes implemented and outcomes achieved had the previous Priority Score Approach continued beyond 2011. The counterfactual is used as a baseline against which the Partnership Funding approach is assessed. The approach to developing the counterfactual scenario is described in Section 3.4.

²² HM Treasury (2011): The Magenta Book, Guidance for evaluation, accessed at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220542/magenta_book_combined.pdf on 23rd February 2017.

Figure 3-1: Intervention Logic

Step	Planned Work			Intended Results	
	Resources/ Input	Activities	Outputs	Intermediate Outcomes	Impacts
Definition	Certain resources are needed to operate a program	If resources are available, then they can be used to accomplish planned activities	If planned activities are accomplished, then hopefully the amount of products and/or services are delivered as intended	If planned activities are accomplished as intended, then participants will benefit in certain ways	If benefits to participants are achieved, then certain changes in communities or systems might be expected to occur
Programme Logic	£ funding from the government and other contributors (beneficiaries); Staff resources to support implementation	Schemes implemented to reduce the impact of flooding and/or coastal erosion	No./type/distribution of FCERM schemes implemented. Reduction in overall risk (based on number of assets moved to a lower flood risk category)	Changes in no. of assets protected and no. of people and businesses benefitting from increased protection (and increased funding certainty). Communities having greater input to FCERM solutions	Social, environmental and physical (asset) benefits. More communities better protected against flooding and coastal erosion

3.3 Evaluation matrix

The tender specifications provide a list of research questions for consideration in the evaluation. In order to facilitate evaluation of the research questions the questions have been organised according to the evaluation criteria provided in the European Commission’s Better Regulation Toolbox²³. Use of these evaluation criteria will help provide a rational, systematic framework for the evaluation as required by the Magenta Book²². These criteria are as follows:

²³ See European Commission (2015): Better Regulation “Toolbox”, accessed at: http://ec.europa.eu/smart-regulation/guidelines/toc_tool_en.htm on 23rd February 2017.

- **Effectiveness:** according to the Better Regulation Methodology, the aim of the effectiveness analysis is to consider how successful an action has been in achieving or progressing towards its objectives. The evaluation will therefore form an evidence base on the progress made to date in achieving the objectives of the Partnership Funding approach (to provide improved protection to more communities and deliver greater benefits through encouraging total investment in FCERM to increase beyond levels affordable to central government, enabling civil society to play a greater role in option/scheme development and increasing levels of certainty and transparency over the national funding for individual projects whilst prioritising actions for those most at risk), what factors have influenced the ability of the approach to achieve its objectives and what effect this is likely to have moving forwards.
- **Efficiency:** evaluation of the efficiency of the approach will consider the procedures and processes involved and ascertain whether these can be justified by the outcomes. This will also consider whether there may be more efficient (i.e. less costly and/or burdensome) ways of achieving the objectives of Partnership Funding, or whether the effectiveness could be improved for the same level of costs.
- **Coherence:** evaluation of the coherence of the Partnership Funding approach will consider whether it is consistently implemented / used by different Risk Management Authorities (coherence with other government policies is considered beyond the scope of this evaluation).
- **Relevance:** evaluation of the relevance of the Partnership Funding approach will consider whether the policy currently meets its objectives (and societal needs) and whether it will continue to meet its objectives moving forwards. This will include whether there are any refinements that need to be made to the policy to ensure it remains relevant for the post-2021 period.
- **Added value:** evaluation of the added value of policy will consider the additional value resulting from the Partnership Funding approach compared to what is likely to have been achieved under the previous 'priority score' system.

Table 3-1 provides an evaluation matrix which includes the research questions and sub-questions/indicators grouped by evaluation criteria. The sources of information are also outlined.

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria				
No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
Effectiveness				
RQ1	To what extent has the Partnership Funding policy met its objectives in terms of increasing total worthwhile FCERM investment beyond Exchequer sums, enabling local choice and engagement, promoting cost-effective solutions, and directing government funding to high risk and other target groups? (general research question)	<p>Number of households benefiting from schemes using Partnership Funding (including breakdown by level of deprivation) (comparison of Partnership Funding policy scenario with the counterfactual scenario).</p> <p>Comparison of FCERM investment (beyond Exchequer sums) before and after introduction of the Partnership Funding policy (comparison of Partnership Funding policy scenario with the counterfactual scenario).</p> <p>Description of engagement with local communities and stakeholder groups regarding FCERM investment; impact of outcomes</p>	<p>Number of schemes funded and total scheme costs (broken down by GiA and other contributions) each year since the introduction of the Partnership Funding policy by:</p> <ul style="list-style-type: none"> • Location (RFCC region, rural vs. urban areas) • Type of community (number of households in each deprivation category, number of households in each flood/coastal risk category) • Type of Risk Management Authority • Type of risk setting (coastal, fluvial, surface water) • Type of technical solution (e.g. conventional engineering vs. 'natural' solutions) <p>Total annual investment in FCERM schemes before and after the introduction of Partnership Funding (broken down by GiA and other contributions).</p> <p>Change in aggregate NPV over time</p> <p>Scheme costs per household protected</p> <p>Number/percentage of projects where the economic optimum has progressed as the preferred scheme in comparison to those where local choice and/or wider benefits have resulted in the delivery of a different type of project of</p>	<p>Environment Agency</p> <p>District councils</p> <p>Internal Drainage Boards</p> <p>Water and sewerage companies</p> <p>Regional Flood and Coastal Committees</p>

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
			greater value to the local community [Information from the internet survey likely to be used to extrapolate/estimate breakdown in scheme type]	
<i>Distribution of exchequer funding</i>				
RQ2	How has the Exchequer's Grant in Aid (GiA) contribution to Partnership Funding, and the outcomes it has "bought" been distributed, taking account of the following groups or categories: deprived communities*, high flood risk communities*, rural versus urban areas*, households versus non-households, residential properties built before 2009 versus those built thereafter, coastal versus fluvial and surface water risk settings*, locations in different regions (north, south, east, west)*, type of Risk Management Authority (Environment Agency, Local Authorities, Internal Drainage Boards)*, type of technical solution (e.g. conventional civil engineered approaches versus more "natural" solutions) (quantitative analysis)	* Information/data held by the Environment Agency (although further manipulation may be required, e.g. use of GIS). Number of schemes funded based on group/category (e.g. number of schemes funded that impact (benefit) deprived communities vs. non-deprived communities, number of schemes funded in different regions etc.). The amount of GiA provided to projects based on group/category	Number of schemes funded and total scheme costs (broken down by GiA and other contributions) each year since the introduction of the Partnership Funding policy by: <ul style="list-style-type: none"> • Location (region, rural vs. urban areas) • Type of community (number of households in each deprivation category, number of households in each flood/coastal risk category) • Type of Risk Management Authority • Type of risk setting (coastal, fluvial, surface water) • Type of technical solution (e.g. conventional engineering vs. 'natural' solutions) [Information from a sample of individual schemes likely to be used to extrapolate/estimate breakdown in scheme type] Number of properties protected by each scheme by: <ul style="list-style-type: none"> • Location (region, rural vs. urban areas) • Type of property (households vs. non-households, with split of benefits between households and non-households as well as number of each type), • Type of property (residential properties built 	Environment Agency County and district councils Other Local Authorities

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
			before 2009 vs. those built thereafter) [to be based on information from a sample of schemes] <ul style="list-style-type: none"> • Type of community (number of households in each deprivation category, number of households in each flood/coastal risk category) • Type of risk setting (coastal, fluvial, surface water) 	
RQ3	How effective has the “equity weighting” of GiA payment rates towards deprived communities been in practice? (quantitative analysis)	Number of schemes funded that impact (benefit) deprived communities vs. non-deprived communities (comparison of Partnership funding policy scenario with the counterfactual scenario) Number of schemes for deprived communities funded under Partnership Funding and whether these schemes would have gone ahead if there was no equity weighting (i.e. assume that all properties fall into the 60% least deprived category)	Number of schemes funded and total scheme costs (broken down by GiA and other contributions) each year since the introduction of the Partnership Funding policy with breakdown of: <ul style="list-style-type: none"> • Number of households benefiting at each level of deprivation Number of schemes funded and total scheme costs (broken down by GiA and other contributions) prior to the introduction of Partnership Funding with breakdown by: <ul style="list-style-type: none"> • Number of households benefiting at each level of deprivation Number of deprived community schemes funded under Partnership Funding policy scenario (with calculation to determine whether these would have gone ahead in the absence of additional weighting for deprived communities)	Environment Agency

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
RQ4	What has payment for environmental outcomes achieved (e.g. in terms of hectares of improved or replacement habitat), and how are these distributed across space and between rural, urban, deprived and non-deprived communities? (quantitative analysis)	<p>The number of schemes and payments made that specifically relate to environmental improvements.</p> <p>The area of habitat protected (or improved) by these schemes. Information regarding where these schemes were implemented (so that links can be made to the location and types of communities that were affected)</p> <p>Who benefits and overall who has benefited (e.g. compared with pattern of population at risk)</p>	<p>Number of schemes funded and total scheme costs (broken down by GiA and other contributions) each year since the introduction of the Partnership Funding policy with a detailed breakdown of outcomes achieved under Outcome Measure 4:</p> <ul style="list-style-type: none"> • Area (ha) of habitat/km of river protected by each of these schemes • Location of the schemes/habitat protected (region, rural vs. urban areas) (to be matched to community type in terms of level of deprivation) 	<p>Environment Agency County and district councils Other Local Authorities</p>
RQ5	Overall, what does the data reveal about quantifiable trade-offs between supporting different groups and outcomes? (quantitative analysis)	Based on the data obtained for RQ1 to RQ4 (with comparison between the Partnership Funding policy scenario outcomes and the counterfactual scenario)	Based on the data obtained for RQ1 to RQ4	<p>Environment Agency County and district councils Other Local Authorities</p>
<i>Non-Exchequer contributions to partnership funding</i>				
RQ6	How do non-GiA contributions to schemes break down according to: Local Authority sums provided through other central government grants; new Local Authority funding (such as new council tax precepts or special expenses); private contributions from non-households;	<p>The types of contributions made to FCERM schemes in addition to GiA.</p> <p>The number of households benefiting from schemes implemented using Partnership Funding and the amount</p>	<p>Number of schemes funded and total scheme costs (broken down by GiA and other contributions) each year since the introduction of the Partnership Funding policy.</p> <p>Also, information on the:</p> <ul style="list-style-type: none"> • Non-GiA contributions to schemes (by contributor, e.g. Local Authority sums 	<p>Environment Agency County and district councils Internal Drainage Boards Water and sewerage companies Regional Flood and Coastal Committees</p>

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
	<p>private contributions from households; other.</p> <p>What proportion of non-GiA contributions pledged to schemes has been secured by year? (quantitative analysis)</p>	<p>contributed in addition to GiA (on an annual basis since the introduction of Partnership Funding).</p>	<p>provided through other central government grants, new Local Authority funding (such as new council tax precepts or special expenses), private contributions from non-households, private contributions from households, local levy, ERDF/other European funding, LEPs, environmental/heritage grants, other contributions) [likely to be based on information from a sample of schemes]</p> <p>Contributions made in addition to GiA (as above) by year compared to total scheme costs (to calculate proportion of non-GiA contributions)</p>	<p>LEPs</p>
<i>Value for money and incentives</i>				
RQ7	<p>To what extent are notionally fully-GiA funded schemes successful in attracting voluntary Partnership Funding contributions, especially given they can be retained by Regional Flood and Coastal Committees to help with priorities elsewhere? Is there evidence that this kind of transfer has happened? (quantitative analysis)</p>	<p>The number of fully GiA-funded schemes that have successfully attracted voluntary Partnership Funding contributions.</p> <p>The number of cases where there has been a transfer of voluntary Partnership Funding contributions from one scheme to another</p>	<p>Total number of fully GiA-funded schemes each year since the introduction of the Partnership Funding policy.</p> <p>Number of fully GiA-funded schemes (including total scheme costs broken down by GiA and other contributions) that have successfully attracted voluntary Partnership Funding contributions each year since the introduction of the Partnership Funding policy.</p> <p>Number of schemes receiving a transfer of voluntary Partnership Funding contributions from another scheme (and amount of funding transferred)</p>	<p>Environment Agency District councils Internal Drainage Boards Water and sewerage companies Regional Flood and Coastal Committees</p>

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
RQ8	A policy expectation was that Partnership Funding should not result in increased future liabilities on the Exchequer. How effective has the approach to securing contributions been in avoiding an increase in future liabilities on the Exchequer as a consequence of contribution-enabled capital investment today? (quantitative analysis)	<p>The degree to which Partnership Funding is based on capital costs or includes an annual (maintenance) element (e.g. the number/percentage of schemes that have received funding for capital and maintenance works and the level of contribution).</p> <p>Extent to which partners have continued to make contributions to meet revenue (maintenance) costs</p>	<p>Number of schemes funded and total scheme costs (broken down by capital and maintenance costs) each year since the introduction of the Partnership Funding policy.</p> <p>Number/value of schemes funded with breakdown by Risk Management Authority that submitted each scheme (i.e. number/proportion submitted by the Environment Agency compared with other Risk Management Authorities)</p>	<p>Environment Agency County and district councils Other Local Authorities Internal Drainage Boards</p>
<i>Qualitative analysis</i>				
RQ9	What are the risks surrounding securing non-GiA contributions? (qualitative analysis)	Are there specific risks associated with securing non-GiA contributions? If so, what do these risks relate to? (This could be investigated at scheme level, through use of case studies)	Determine what the specific risks are in securing non-GiA contributions through stakeholder consultation (scheme level examples to be used to highlight specific risks/issues identified)	<p>Environment Agency District councils Internal Drainage Boards Water and sewerage companies Regional Flood and Coastal Committees</p>
RQ10	To what extent have the “low hanging fruit” been taken in terms of external contributions, meaning that further contributions may be harder to attract and secure? (qualitative analysis)	<p>Has there been a change in obtaining external contributions to FCERM schemes since the introduction of Partnership Funding?</p> <p>Is it becoming more difficult to obtain external contributions compared to when Partnership Funding was first introduced?</p>	<p>Number of schemes funded and total scheme costs (broken down by GiA and other contributions) each year since the introduction of the Partnership Funding policy.</p> <p>Opinions from Risk Management Authorities on whether obtaining contributions is becoming more difficult</p>	<p>Environment Agency District councils Internal Drainage Boards Water and sewerage companies Regional Flood and Coastal Committees</p>

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
RQ11	<p>Has the number of projects which seek to integrate FCERM and wider objectives (e.g. regeneration) increased or decreased under Partnership Funding? What is the role of project design or particular technical approaches in securing funding agreements from third parties? (qualitative analysis)</p>	<p>Have the number of projects which integrate FCERM with wider objectives increased since the introduction of Partnership Funding? Does project design influence funding agreements with external contributors? If so, what approaches are adopted (or are most successful) in obtaining external contributions? (This may vary depending on the type of contributor)</p>	<p>Number of schemes funded and total scheme costs (broken down by GiA and other contributions) each year before and after the introduction of the Partnership Funding policy that have integrated wider objectives in addition to flood/coastal erosion protection. Stakeholder views on whether project design influences funding obtained from external contributors (and which technical approaches are most successful in obtaining non-GiA contributions)</p>	<p>Environment Agency District councils Internal Drainage Boards Water and sewerage companies Regional Flood and Coastal Committees Highway authorities Department of Communities and Local Government ABI Association of Drainage Authorities (ADA) CIWEM Defra National Farmers' Union (NFU) National Flood Forum Natural Resources Wales Network Rail</p>
Efficiency				
<i>Impacts of parameters in the formula</i>				
RQ12	<p>Have the assumptions and parameters used to derive GiA payment rates under Partnership Funding (for example, average assumed per-household damages, and the factors affecting contributions in support of wider economic</p>	<p>The assumptions and parameters used to derive GiA payment rates under PA (Priority Area) funding. The actual impacts (and associated costs) of flooding and coastal erosion (based on national and (if</p>	<p>The assumptions and parameters used to derive GiA payment rates under PA (Priority Area) funding. Average actual damages (e.g. per property) due to flooding and coastal erosion (based on studies from recent events e.g. The costs and</p>	<p>Environment Agency County and district councils Other Local Authorities Desk-based research</p>

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
	<p>benefits) turned out to be reflective of actual conditions? Has the choice of parameters led to any under- or over-payment for outcomes, and in what circumstances? (For example, has the actual mean damage reduced per property been greater than or less than the assumed damage embodied in the Partnership Funding formula?) (quantitative analysis)</p>	<p>available) local event data). Comparison of actual impacts (benefits) with those assumed when deriving GiA payment rates (and identification of any under- or over-payments that have occurred).</p>	<p>impacts of the winter 2013/14 floods in England and Wales, which provides estimates of the average damages caused by flooding to residential properties and businesses) [enables determination of whether under- or over-payment is occurring at the scheme level]</p> <p>PARs for a sample of schemes: comparison of benefits in PAR Appendix A for households (based on project specific economic assessment) with standard rate assumed in the Partnership Funding calculator</p> <p>Comparison of number of schemes funded through Partnership Funding approach with those assumed to have been funded should the previous Priority Scoring approach still have been in place (i.e. the Partnership Funding policy scenario compared with counterfactual scenario) [enables determination of whether there may be under- or over- payment at the policy level]</p> <p>Number of schemes where other benefits (in addition to those directly linked to reduced flood risk) have been realised.</p>	
<i>Non-Exchequer contributions to partnership funding</i>				
RQ13	<p>What is the average length of time from receiving a pledge and securing a contribution?</p>	<p>The length of time taken (minimum and maximum range as well as average) to receive a contribution</p>	<p>The length of time required (minimum and maximum range as well as average) to secure GiA funding for schemes led by different types of</p>	<p>Environment Agency County and district councils</p>

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
	Do the data suggest a more limited time window to secure GiA would increase the amount of external contributions raised or shorten the time needed to secure them? (quantitative analysis)	after it has been pledged (potentially by type of contributor). Determine whether this is influenced by the length of time required to secure GiA (e.g. whether a shorter time period results in a greater or lesser amount of external contributions/other funding sources)	RMA. The length of time taken (minimum and maximum range as well as average) to receive a contribution after it has been pledged by type of contributor (for schemes led by different types of RMA)	Internal Drainage Boards Water and sewerage companies Regional Flood and Coastal Committees LEPs
<i>Value for money and incentives</i>				
RQ14	What effect is full Exchequer funding of some FCERM schemes having in terms of additionality and value for money? Has full funding been important in ensuring a pipeline of work to maximise procurement efficiencies, as originally thought? (quantitative analysis)	Number of schemes receiving full funding versus number of schemes with Partnership Funding (including geographical spread of schemes). Have there been cases where full funding has been required to ensure additional work is undertaken (funding security)? Pipeline of schemes in each year of Partnership Funding policy scenario	Number of fully GiA-funded schemes and number of part GiA-funded schemes with amount of any contributions for each year since the introduction of the Partnership Funding policy. Distribution of fully funded schemes over time. Total costs and benefits of individual schemes implemented since the introduction of Partnership Funding broken down by those receiving full GiA funding and those receiving only partial GiA funding (with NPV/£ of GiA ratios for individual schemes where available). Stakeholder views on whether there are cases where full funding has been important to ensure additional work is undertaken	Environment Agency District councils Internal Drainage Boards Water and sewerage companies Regional Flood and Coastal Committees

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
			Number of schemes in the pipeline for each year of the Partnership Funding approach	
RQ15	Has the reduced funding rate for IDB schemes outside of a wider local strategy incentivised more strategic planning? (qualitative analysis)	Discussions with Internal Drainage Boards to determine whether the reduced funding rate has resulted in more strategic planning	Number of funded schemes receiving reduced funding because they are occurring outside of a local strategy (with numbers for each year of Partnership Funding) Stakeholder views on whether reduced funding encourages more strategic planning	Internal Drainage Boards Association of Drainage Authorities (ADA) Environment Agency (overview of all IDB applications)
RQ16	Has the FCERM programme Net Present Value (and NPV per £ of Exchequer GiA) been increased under Partnership Funding compared with a continuation of the Priority Score system? If not, why not? (quantitative analysis)	Information regarding the NPV of the FCERM programme compared to the Priority Scoring system. Overall indicative NPV achieved each year (benefits less costs) comparing before and after the introduction of Partnership Funding (also comparing the Partnership Funding policy scenario figures with those of the counterfactual scenario). Average NPV and NPV/£ GiA at scheme level to assess value for money	The indicative NPV achieved each year (benefits less costs) since the introduction of Partnership Funding. The indicative NPV achieved in the years before the introduction of Partnership Funding (benefits less costs). NPV and NPV/£ GiA for individual schemes before and after the introduction of Partnership Funding (comparisons between Partnership Funding policy scenario and the counterfactual scenario)	Environment Agency (medium term plans, Partnership Funding calculations)
RQ17	What is the trend in unit costs of flood schemes, e.g. in terms of properties protected? (quantitative analysis)	The cost of flood schemes since the introduction of Partnership Funding. The number of: 1) properties protected; 2) area of habitat protected by the flood schemes (comparison between Partnership funding policy scenario	Number of schemes funded and total scheme costs each year since the introduction of the Partnership Funding policy. The number of properties and area of habitat protected by each scheme (can be used to provide an estimate of the unit costs per	Environment Agency (medium terms plans, Partnership Funding calculations)

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
		and the counterfactual scenario)	property and per hectare of land protected and indicate whether/how this has changed over time)	
<i>Qualitative analysis</i>				
RQ18	What effect is Partnership Funding having on the time taken for FCERM schemes progressing from initial appraisal to delivery? Are there particular stages of the process where delays are experienced, and why? (qualitative analysis)	Is Partnership Funding causing delays with regards to the time taken for FCERM schemes to progress from initial appraisal to final delivery? If so, what are the main causes of these delays? Has this changed over time? (e.g. were there initial delays when the policy was introduced, which have now reduced as familiarity with the approach has increased?) Are there any stages/aspects of the process that could be modified to ensure a more streamlined process?	Views of stakeholders on whether the time taken for FCERM schemes to progress from initial appraisal to delivery has increased or decreased since the introduction of the Partnership Funding Policy (compared to the previous Priority Score system). Has Partnership Funding caused delays with regard to the time taken for FCERM schemes to progress from initial appraisal to final delivery? If so at what stages do these delays occur? What are the main causes? Has the length of any delay changed over time? Are any stages/aspects of the process that could be modified to ensure a more streamlined process?	Environment Agency District councils Internal Drainage Boards Water and sewerage companies Regional Flood and Coastal Committees Highway authorities Defra DCLG ABI Association of Drainage Authorities (ADA) CIWEM National Farmers' Union National Flood Forum Natural Resources Wales Network Rail
Coherence				
<i>Value for money and incentives</i>				
RQ19	What is the impact of different GiA approaches for Environment Agency, Local Authority and Internal Drainage Board schemes, in terms of the types of scheme funded and longer-term	The different types of schemes funded using different GiA approaches (the different formulas) (by the Environment Agency, Local Authority and Internal Drainage	Number of schemes funded and total scheme costs (broken down by GiA and other contributions) each year since the introduction of the Partnership Funding policy by: <ul style="list-style-type: none"> Type of Risk Management Authority 	Environment Agency, Local Authority and Internal Drainage Boards

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
	funding availability (e.g. for maintenance)? (quantitative analysis)	Boards)	submitting the scheme <ul style="list-style-type: none"> • Whether contributions have been secured to fund long term maintenance • Type of technical solution (e.g. conventional engineering vs. 'natural' solutions) 	
Relevance				
<i>Value for money and incentives</i>				
RQ20	Does data analysis reveal any other issues with Partnership Funding which might suggest refinement or modification of the policy should be considered, based on what it is trying to achieve, and in what areas? This could include whether there are any impacts seen so far that may suggest something about future performance, in particular where any identified trends may cause issues if they continue (quantitative analysis)	Funding trends (in terms of number/types/location of schemes implemented) since the introduction of Partnership Funding to provide an indication of future trends/performance	Number of schemes funded and total scheme costs (broken down by GiA and other contributions) each year since the introduction of the Partnership Funding policy by: <ul style="list-style-type: none"> • Location (region, rural vs. urban areas) • Type of community (by deprivation category, communities at high flood risk vs. other communities) • Type of Risk Management Authority • Type of risk setting (coastal, fluvial, surface water) • Type of technical solution (e.g. conventional engineering vs. 'natural' solutions) • Trend in unit cost of schemes (from RQ17) Number of properties protected by each scheme by: <ul style="list-style-type: none"> • Location (region, rural vs. urban areas) • Type of property (households vs. non-households, residential properties built before 2009 vs. those built thereafter) • Type of community (by deprivation category, communities at high flood risk vs. other communities) • Type of risk setting (coastal, fluvial, surface water (surface water)) 	Environment Agency District councils Internal Drainage Boards Water and sewerage companies Regional Flood and Coastal Committees Desk-based research

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
			Above data can be used to determine funding trends since the introduction of Partnership Funding and give an indication of future performance	
<i>Qualitative analysis</i>				
RQ21	Do investigations reveal any other issues with Partnership Funding which might suggest refinement or modification of the policy should be considered, based on what it is trying to achieve, and in what areas? This could include whether there are any impacts seen so far that may suggest something about future performance, in particular where any identified trends may cause issues if they continue (qualitative analysis)	Are there any aspects of the Partnership Funding policy that could be refined / modified? Are there any changes that could be made to ensure that the policy remains relevant and continues to meet its objectives?	Consultation with stakeholders to determine whether there are any aspects of the Partnership Funding policy that could be refined / modified to ensure that the policy remains relevant and continues to meet its objectives. Identification of any trends that may cause issues in the future (with regards to performance of the policy)	Environment Agency District councils Internal Drainage Boards Water and sewerage companies Regional Flood and Coastal Committees Highway authorities DCLG ABI Association of Drainage Authorities (ADA) CIWEM Defra National Farmers' Union National Flood Forum Natural Resources Wales Network Rail
Added value				
<i>Qualitative analysis</i>				
RQ22	Is there evidence that communities are having a greater say in design choices about flood schemes in their areas? (qualitative analysis)	Evidence of engagement activities with local communities (comparison of activities before and after the introduction of Partnership Funding if information is available). The	Percentage of projects where the economic optimum has progressed as the preferred scheme in comparison to those where local choice and/or wider benefits have resulted in the delivery of a different type of project of greater	Environment Agency District councils Internal Drainage Boards Water and sewerage companies

Table 3-1: Evaluation matrix including research questions, sub-questions and indicators with information sources grouped by evaluation criteria

No.	Research questions (type of analysis)	Sub-questions/indicators	Specific data requirements	Source of information/approach
		extent to which local communities have a say in the FCERM options considered/selected (e.g. are they more able to influence the preferred option if they are contributing to funding it?)	value to the local community. Information from stakeholder consultation on engagement activities related to scheme design (including whether those contributing are more able to influence scheme design compared to those that are not contributing)	Natural Resources Wales Regional Flood and Coastal Committees National Flood Forum

3.4 The counterfactual scenario

3.4.1 Overview

The counterfactual sets the baseline from which the impacts (both positive and negative) of the Partnership Funding policy can be measured. It is developed as a scenario identifying which schemes may have been funded had the priority score system that was used previously continued.

The counterfactual is described for each of the years from 2009/10 to 2020/21. A supporting spreadsheet has been developed that records the information used when assessing the quantitative impacts of the Partnership Funding policy. The calculations of funding allocation are made between 2009/10 and 2020/21; a period of 12 years. For the 2015/16 to 2020/21 time period, investment, contributions and benefits (e.g. to households) are also calculated to 2027/28 and beyond where those schemes would be funded between 2015/16 and 2020/21.

A number of assumptions have had to be made to enable the scenario to be developed; these are described below.

3.4.2 Use of the priority score

The counterfactual is based on the assumption that there is no Partnership Funding policy and that Grant-in-Aid (GiA) funding is allocated based on the priority score system that was used to determine allocation of funds prior to the move to partnership funding scores. The process used to calculate the priority score is the approach as applied in 2010, i.e. a combination of the economics, people and environmental scores. The application of the priority score approach to data from the data set for 2015/16 to 2020/21 is described in Table 3-2, reflecting data gaps.

Table 3-2: Approach to calculating the priority score based on data available from the data set for 2015/16 to 2020/21

Score category	Description of approach and data used
Economic	<p>Based on the benefit-cost ratio with a maximum score of 20</p> <p>Score calculated as: Whole-life benefits divided by whole-life costs x 2 -1</p> <p>Approach is the same as the original approach to estimating priority score</p>
People	<p>Properties benefiting based on total number of properties recorded across all years for Outcome Measure 2 or Outcome Measure 3. Property score calculated as: number of properties benefiting divided by whole life cost (£k) multiplied by 75, i.e. the same as in original approach</p> <p>Risk score is based on there being some properties recorded as benefiting under Outcome Measure 2b (number of households for which the probability of flooding is reduced from the very significant or significant category to the moderate or low category) or under Outcome Measure 3b (the number of households protected against loss from coastal erosion in a 20-year period). A score of +1 is added where the properties are identified as moving from very significant or significant to moderate or low. <i>This varies from the approach used in the original priority score as that allocated +2 to properties at very high flood risk and +1 to properties at high flood risk as there is no equivalent measure within the partnership funding policy outcome measure data²⁴.</i></p> <p>Vulnerability score is based on deprivation rank, identified using the National Grid Reference where available for each scheme in the 2015/16 to 2020/2021 dataset. The deprivation ranks range from 1 to 32,825 so the deprivation scores have been adjusted from those originally applied to priority score to respect the same proportion within each band, i.e. those ranked:</p> <ul style="list-style-type: none"> • rank 1-1170 score of +2 • rank 1171-5852 score of +1 • rank of 5823-27171 score of 0 • rank of 27172-31658 score of -1 • rank of 31658-32825 score of -2 <p>The maximum score achievable for people is therefore 11 (reduced from 12 in the original priority score due to lack of disaggregated information on risk)</p>

²⁴ **Very high flood risk** was defined as: situations of very fast onset of flooding, where there is little chance of any effective warning, or where deep (>2m) or high velocity flows will be experienced. Without the proposed project there is a high risk of loss of life if an event occurs. There was no score of high risk for **coastal erosion** as it was assumed that buildings should have been abandoned on the grounds of public safety.

High flood risk was defined as: situations where without the project there would be fairly fast rising floodwater with practical warning times generally less than two hours and for **coastal erosion** situations where there is a recognised probability of failure causing risk to public safety that would require evacuation based on storm forecasts but property abandonment is not considered necessary.

Table 3-2: Approach to calculating the priority score based on data available from the data set for 2015/16 to 2020/21

Score category	Description of approach and data used
Environment	<p>'Hectares of habitat (including SSSI) protected or improved' is used as the basis for the score for 'SSSI' type habitat. 'Hectares of habitat created' is used as the basis for the score for 'other designated habitat'. There are no data on BAP habitats in the 2015/16 to 2020/21 dataset. The score is calculated using the same approach as in the original priority score for these two types of habitat (up to a maximum of 10):</p> <ul style="list-style-type: none"> • SSSI: 25 multiplied by area (ha) divided by whole life costs (£k) x 1.5 • Other: 25 multiplied by area (ha) divided by whole life costs (£k) x 1.0 <p>The heritage score is based on the inclusion of details of any listed buildings or scheduled monuments in the descriptive details in the 2015/16 to 2020/2 dataset (environmental). Any schemes that benefit a Grade I or II* building or a scheduled monument are assigned a score of +2. Any schemes that benefit a Grade II building are assigned a score of +1. This is the same as in the approach to the original priority score although the data may not be complete for all schemes</p> <p>The maximum score achievable for environment is 12, as with the original approach</p>

The priority score has been calculated for those schemes that included the relevant data within the data set for 2015/16 to 2020/21. Data have also been provided for the Long Term Plan (LTP) 2004/5 with expenditure for 2004/5 to 2014/15 and for 2006/7 with expenditure for 2006/7 to 2009/10. These data sets include the calculation of the priority score. This means that prioritisation of expenditure can be carried out for the whole appraisal period.

3.4.3 Identifying year of investment

It is assumed that investment is allocated to a scheme to cover the full expenditure required, where this is allocated to the first year in which it requires funding. For example, if a scheme requires funding in 2016/17, then it is assumed that all expenditure required for that scheme is allocated to 2016/17. This is a simplification that ensures that schemes whose priority score exceeds the threshold are allocated the total funding needed. Without this assumption, there is a risk that some schemes could fall below the priority score threshold in future years when expenditure is planned and may not then be allocated funding for that year. Adjusting for such situations would make the counterfactual very complex so the simplifying assumption that all expenditure is allocated to the earliest year in which it is expected to occur is applied. This approach is also consistent with that used by JBA in the previous evaluation.

3.4.4 Allocating funding

The amount of annual investment (GiA) available needs to be weighted in line with the investment demand that occurs as a result of assuming that all investment occurs in the first year. This ensures that funding is exhausted each year. Without this adjustment some funding would be left unspent in some years and grossly over-subscribed in other years.

Schemes are funded based on their priority score, with a priority score threshold set that ensures that all of the available investment is allocated. However, not all schemes within the data sets include sufficient information for a priority score to be allocated to all schemes. Those schemes without a priority score are allocated funding first. Without this adjustment there would be no mechanism that could be used to determine which of these schemes would be funded.

3.4.5 Impact of data limitations and assumptions on uncertainty within the counterfactual

Duplication across data sets

Schemes from all three data sets are combined into one list. However, there may also be some schemes where the scheme name is similar but not exactly the same in the data sets. Exact duplicates have been removed using the Excel 'remove duplicates' function. Approximate duplicates would have to be removed by hand; since there are 11,661 schemes within the full data set, this has not been undertaken.

The impact of this uncertainty can be estimated by considering schemes beginning with A. There are 75 entries (rows in the spreadsheet) that appear to be approximate duplicates covering what should be 28 schemes (out of a total of 362 schemes beginning with A). This suggests that there should be 315 not 362 schemes, an over-estimation of around 15% for this sample.

Funding allocated to year 1

The expenditure planned for each scheme is summed and recorded as a total in the earliest year in which it occurs, for example, where a scheme is included in 2009/10 as requiring funding then the full funding requirement for that scheme is recorded in 2009/10. That scheme is then considered to be fully funded and is not recorded in any future years. Each scheme therefore appears once in the first year for which it is assigned funding. Table 3-3 presents the total funding that would be required each year if schemes were to be allocated their total expenditure in year 0 (the year in which funding is applied for).

Table 3-3: Comparison of funding required with expenditure all allocated to the first year in which funding is sought (counterfactual)

Year	Total funding required (£000s)	Funding available per year (£000s)	% by which funding required exceeds funding allocation	Number of schemes funded each year	Priority score threshold
2009/10	£2,132,786	£1,887,421	13%	437	15
2010/11	£279,896	£247,696	13%	60	5
2011/12	£278,352	£246,329	13%	54	9
2012/13	£54,803	£48,498	13%	54	3
2013/14	£64,722	£57,276	13%	42	4
2014/15	£28,451	£25,178	13%	23	5
2015/16	£2,728,898	£2,218,616	23%	899	29
2016/17	£760,498	£618,291	23%	561	14
2017/18	£180,354	£146,629	23%	593	29
2018/19	£69,835	£56,776	23%	221	29
2019/20	£36,417	£29,607	23%	135	44
2020/21	£37,210	£30,254	23%	202	25

Implication of weighting available investment

Total funding requirement is based on total expenditure for each scheme as allocated to the first year in which expenditure is identified in the data sets. The amount of funding available in each year is weighted according to funding demand. This means that more funding is allocated to those years where there is greater demand. Table 3-3 (above) presents the amount of funding that is available each year in response to demand based on a total budget of £4.97 billion over 12 years (with £2.51 billion GiA in 2009/10 to 2014/15 and £2.46 billion in 2015/16 to 2020/21)²⁵.

²⁵ Demand for funding from 2004/5 to 2008/9 averages around £366,000 per year. This compares with average demand from 2009/10 to 2027/28 of around £619,000 per year. As a result, the weighted allocation of the £10 billion is greater for the appraisal period than would be the case if an unweighted allocation was used and each year was allocated the same level of funding.

Weighting funding by years means that there is a more even spread of funding across the 12 year period. An unweighted approach would result in expenditure for all schemes being available in some years but for a much smaller proportion in other years. However, some uncertainty may be introduced where there are some approximate duplicates contained within the list. As a result, there may be double counting of funding requirements.

The implications of potential double counting of funding need can be identified by estimating the level of expenditure proposed using schemes beginning with the letter A. Comparison of the funding needs across the approximate duplicates shows that there are very few where expenditure data have been entered for both. Only two of the 28 schemes identified as being potential duplicates above may be double counted with the other 47 schemes showing expenditure for a maximum of one entry only. The possible double counted expenditure amounts to £820,000 for one scheme and £12.6 million for the other. This is out of a total proposed expenditure across all schemes beginning with A of £242 million. The total double counted expenditure amounts to £13.42 million and represents 5.5% of total expenditure, giving a potential error of 5.5%. This may therefore result in 5.5% of funding being allocated to schemes that have already been funded, resulting in fewer schemes being identified as being funded and, hence, under-estimating the number of schemes that may be funded under the counterfactual.

Extent to which there is greater demand for funding than available investment

Since the amount of funding available has been weighted to reflect the expenditure across all schemes for each year from the data sets, the percentage of funding required over and above that available is constant for all years. The percentage of funding required over and above that available is 13% for 2009/10 to 2014/15 and 23% from 2015/16 to 2020/21, as shown in Table 3-3. This means that there is a shortfall in terms of the scheme expenditure that can be funded in any year.

Data gaps in calculation of priority score

A threshold priority score is set based on ensuring that up to 100% of the funding available is allocated. Any schemes with a priority score above this threshold receive funding; those schemes with a priority score below the threshold are not funded. Priority scores are available for 4,722 schemes. Those schemes without a priority score are allocated funding on the assumption that they have been pre-approved such that these schemes are allocated funding before the priority score threshold is calculated. Table 3-3 shows the number of schemes that receive

funding each year; since each scheme is only counted once the total number of schemes allocated funding is the sum of the totals for each year: 3,281²⁶.

Data gaps mean that priority scores cannot be calculated for the remaining schemes. As a result, these schemes are allocated funding first as there is otherwise no means by which to select which schemes should be funded. This may result in a different allocation of funding than would have occurred where sufficient data were available across all schemes. As a result, the comparison of the distribution of schemes that are funded between the counterfactual scenario and the partnership funding policy scenario may be affected.

Overall implications of uncertainties

Changes to some of the assumptions within the counterfactual may affect the number of schemes that have been identified as being funded, or the distribution of schemes. Thus, the counterfactual is identified as a scenario reflecting the best efforts that underlie the quantitative assessment. The assessment of uncertainties relating to duplications within the data sets suggests that the errors should be quite small, potentially less than 6%, but this should be borne in mind when reviewing the findings from the comparison of the counterfactual scenario with the partnership funding policy scenario.

Due to the size of the dataset and complexities of the analysis, the 6% possible difference in the counterfactual has not been modelled since this would represent a scenario in itself. Both the counterfactual and Partnership Funding policy scenarios are calculated independently prior to any comparisons being carried out, thus any changes to the assumptions underlying the counterfactual would not directly impact the results of the Partnership Funding policy scenario. The comparison between the scenarios might well change, but the key statistics for the Partnership Funding policy scenario (e.g. NPV, number of schemes funded) would remain the same²⁷.

²⁶ If a scheme does not receive funding in the year to which it has been allocated, it is not carried forward for consideration in the next year. Carrying non-funded schemes forward to a subsequent year could help to smooth out the priority score thresholds but would add significant complication to the assessment spreadsheet.

²⁷ Note that four TTD schemes were removed from the dataset and not included in either the counterfactual or the Partnership Funding policy scenario. The schemes were removed because their large size could have masked the impacts seen from the other (typically much smaller) schemes.

4. Use of investment

4.1 Research questions covered

This section provides responses to research questions 1, 12, 14, 15, 16 and 17.

- RQ1: To what extent has the Partnership Funding policy met its objectives in terms of increasing total worthwhile FCERM investment beyond Exchequer sums, enabling local choice and engagement, promoting cost-effective solutions, and directing government funding to high risk and other target groups?
- RQ12: Have the assumptions and parameters used to derive GiA payment rates under PA Partnership Funding (for example, average assumed per-household damages, and the factors affecting contributions in support of wider economic benefits) turned out to be reflective of actual conditions? Has the choice of parameters led to any under- or over-payment for outcomes, and in what circumstances?
- RQ14: What effect is full Exchequer funding of some FCERM schemes having in terms of additionality and value for money? Has full funding been important in ensuring a pipeline of work to maximise procurement efficiencies, as originally thought?
- RQ15: Has the reduced funding rate for IDB schemes outside of a wider local strategy incentivised more strategic planning?
- RQ16: Has the FCERM programme Net Present Value (and NPV per £ of Exchequer GiA) been increased under Partnership Funding compared with a continuation of the Priority Score system? If not, why not?
- RQ17: What is the trend in unit costs of flood schemes?

The section discusses overall findings in terms of total investment and number of schemes funded under the Partnership Funding policy scenario compared with the counterfactual. Note that the Partnership Funding policy scenario assumes that only those schemes with a probability of 0.77 or greater of securing contributions will actually collect those contributions and so be funded. It also presents the number of fully funded versus part funded schemes and assesses the Net Present Value (NPV) and effective return on investment for both the counterfactual and with the Partnership Funding policy scenario. Additional discussion is included from the qualitative analysis, considering how the views and opinions of stakeholders either supports or challenges the results from the counterfactual analysis.

4.2 Total investment in FCERM schemes

Total investment in FCERM schemes for the counterfactual and Partnership Funding policy scenarios is estimated at (to two significant figures):

- Period between 2009/10 and 2014/15:
 - Counterfactual scenario: £2.2 billion
 - Partnership Funding policy scenario²⁸: £2.5 billion (no data on contributions are available for this period, so total investment is assumed to equal GiA).
- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: £2.3 billion
 - Partnership Funding policy scenario (this assumes that all schemes where the probability of obtaining the necessary contributions is 0.77 or greater are funded): £3.1 billion to 2020/21 and £3.4 billion, including contributions to 2027/28:
 - GiA: £2.3 billion
 - Contributions: £763 million to 2020/21 (this includes £2.1 million identified as further contributions that would need to be secured). In total, £1,124 million is identified as total contributions to 2027/28^{Error! Bookmark not defined.} (including £71 million identified as further contributions needing to be secured by funded schemes but assumed to be collected under this Partnership Funding policy scenario).

The data indicate that under the Partnership Funding policy scenario, total investment has increased beyond that of GiA alone, with contributions assumed to be bringing in an additional £763 million of investment for the six year period of 2015/16 to 2020/21. This varies from the £600 million identified by the Environment Agency as being required to lead to homes being better protected within the six year programme. The reasons for this difference include the assumption within the Partnership Funding policy scenario that all funding for a scheme is obtained in the first year in which expenditure is required. In reality, some of the schemes delivering

²⁸ There is a difference between GiA under the counterfactual and the Partnership Funding scenario due to the way that GiA has been allocated across the two scenarios. In theory, both scenarios should have the same level of GiA. Note this earlier time period does not include information on contributions, hence, the two levels of investment should be equal.

benefits for households in the Environment Agency’s six year programme will require Partnership Funding after 2021. In addition, there will be some schemes that will not be completed until after 2021. The assumption that all schemes receive funding (and secure contributions) in the first year of expenditure within the Partnership Funding policy scenario will therefore skew the figures such that contributions appear to be required earlier. Furthermore, the contributions estimated under the Partnership Funding scenario relate to all funded schemes, not just those that will deliver benefits to households. Again, this will result in a higher level of contributions than is identified by the Environment Agency in the six year programme.

Figures 4-1 and 4-2 (overleaf) show the annual pattern of investment based on the approach used for the counterfactual scenario, described in Section 3.4, also being applied to the Partnership Funding policy scenario. The pattern reflects the allocation of funding where full scheme costs are allocated to the first year that they are required rather than the actual annual allocation of investment. This assumption was made under the counterfactual scenario to ensure that the scheme is funded for its entire expenditure requirement (see also Section 3.4.3). For the six year period from 2009/10 to 2014/15, total investment under the Partnership Funding policy scenario is greater than the counterfactual scenario for all but one year (2011/12). For the second programming period (2015/16 to 2020/21), investment under the Partnership Funding scenario is greater than that under the counterfactual scenario for all years.

Figure 4-3 (also overleaf) shows the breakdown of investment under the Partnership Funding policy scenario for 2015/16 to 2020/21 into GiA and contributions. Contributions currently classed within the dataset as “further contributions required” are included within total contributions since the scenario only includes the schemes that have a probability of 0.77 or greater of obtaining contributions and all such contributions are assumed to be collected.

Figure 4-1: Chart showing annual expenditure for the 2009/10 to 2014/15 period

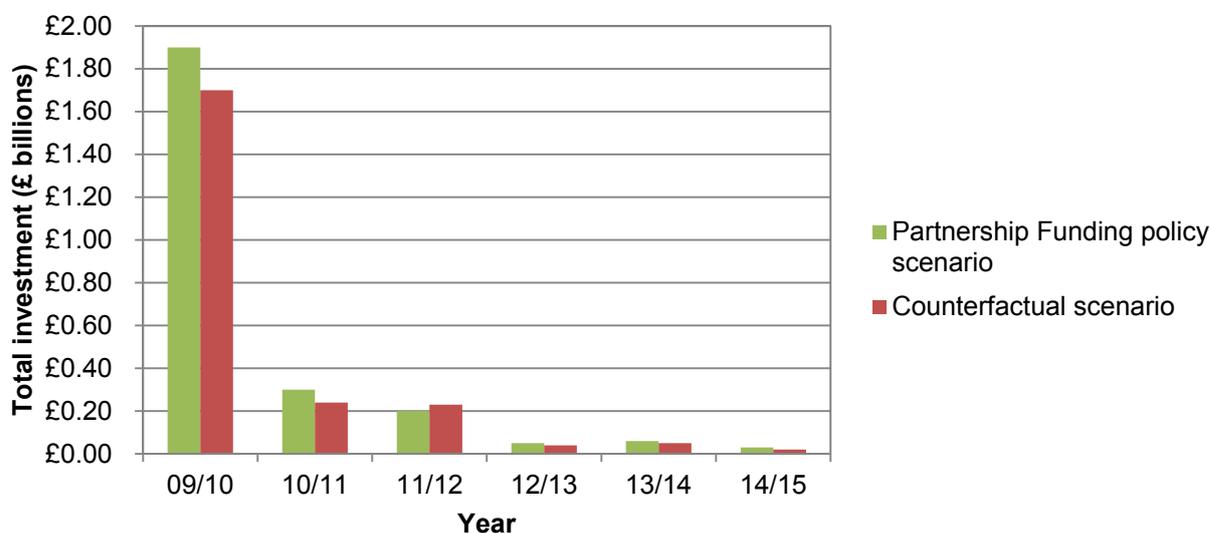


Figure 4-2: Chart showing annual expenditure for the 2015/16 to 2020/21 period

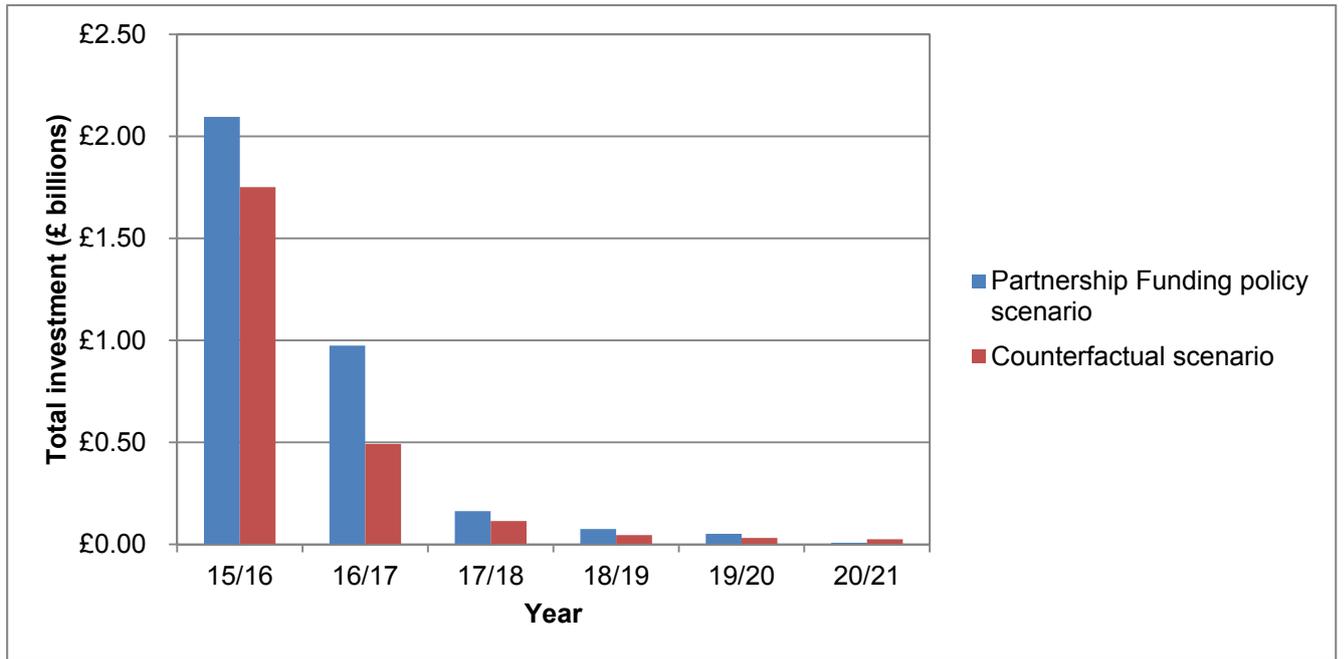
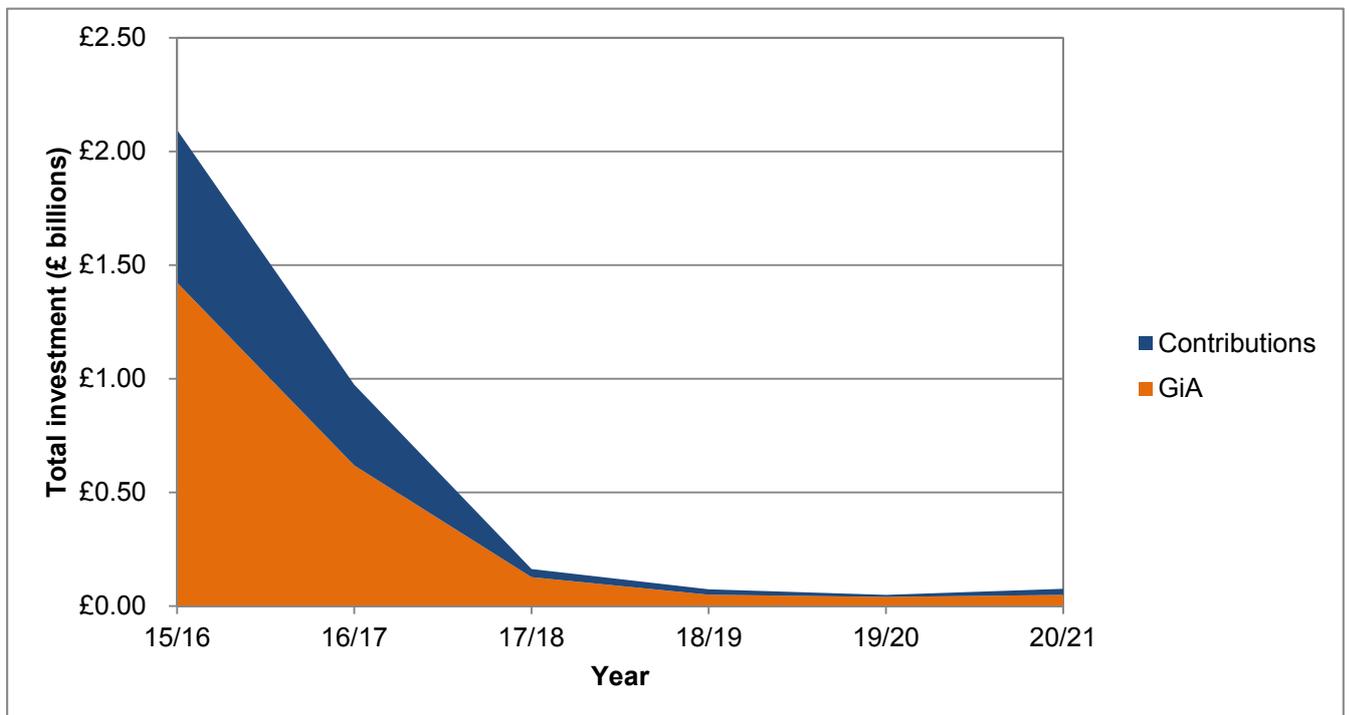


Figure 4-3: Chart showing breakdown of investment into GiA and contributions for the 2015/16 to 2020/21 period



4.3 Total GiA by capital and maintenance costs

Available data provide expenditure figures by year (as presented in Section 4.2 above), but do not indicate the breakdown between capital and maintenance costs.

It is of note that the Partnership Funding calculator requires the different treatment of maintenance costs and funding dependent on the RMA. Schemes submitted by the Environment Agency have to consider the costs of and funding for maintenance within the calculator.

For schemes submitted by RMAs other than the Environment Agency (e.g. Local Authorities and IDBs), maintenance costs and any contributions towards these are not included within the calculation of GiA. This was felt to be an issue by some respondents to the online survey, with one respondent stating that there was a mismatch between different government funding rules with regard to contributions towards future maintenance and that there was a need for a common policy across departments. However, the Partnership Funding calculator determines the grant available on grant eligible costs. Maintenance is not eligible for GiA because these costs are captured within the rate support from government.

Several other respondents highlighted that Partnership Funding fails to provide funding for managing and maintaining assets to ensure they operate efficiently. Comments made by Local Authorities in particular suggested that they saw responsibility for maintenance as a big issue. They felt that not being able to include maintenance costs within the total funds required for schemes meant that schemes could not progress. Concerns were additionally raised that the long-term liability for maintenance of schemes could be a limiting factor in terms of trying to secure initial scheme funding. Respondents also mentioned in-kind contributions, and how it would be useful to be able to account for these. In-kind contributions are recognised within Partnership Funding policy as an important source of contribution, e.g. where responsibility for maintenance can be undertaken by a third party²⁹.

Other differences across organisations include the reduced funding rate for IDB schemes carried out outside of a local strategy. It is important to note that the reduced funding rate applies to all RMAs that do not demonstrate a strategic approach, not just IDBs. An IDB interviewee felt that IDBs would always tick yes to indicate that they were operating within a wider strategy (and so avoid the reduced funding rate), because all of their activities are consistent with the relevant LLFA's

²⁹ Defra & Environment Agency (2012): Principles for implementing flood and coastal resilience funding partnerships, available from: http://webarchive.nationalarchives.gov.uk/20140328162959/http://cdn.environment-agency.gov.uk/LIT_6696_f143f7.pdf

flood risk management strategy. The interviewee did, however, acknowledge that smaller authorities lacking experience in applying for GiA might not understand this particular aspect. This may illustrate that there could potentially be some confusion as to what constitutes a 'strategy', with this identified as being an approach that reduces flood or coastal erosion risks across several connected areas within FCERM³⁰.

4.4 Number of schemes funded

4.4.1 Quantitative analysis based on 2015/16 to 2020/21 data

The number of schemes funded under the counterfactual and Partnership Funding policy scenarios for each period is as follows:

- Period between 2009/10 and 2014/15:
 - Counterfactual scenario: 579 schemes
 - Partnership Funding policy scenario: 670 schemes
 - **Additional schemes funded: 91**
- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: 2,064 schemes
 - Partnership Funding policy scenario: 2,485 schemes
 - **Additional schemes funded: 421**

For both periods, the total number of schemes funded increases under the Partnership Funding policy scenario when compared with the counterfactual scenario (see Figures 4-4 and 4-5 overleaf). The number of schemes funded under the Partnership Funding policy scenario varies according to the probability used to account for the likelihood that further contributions would be secured. Table 4-1 shows how the number of schemes varies as the probability is changed to illustrate the sensitivity of the number of schemes funded to the selected probability. The table shows that, if it is assumed that all schemes still requiring further contributions manage to secure the funds necessary then 2,608 schemes would be funded. This is an extra 123 schemes compared with the Partnership Funding policy scenario

³⁰ From guidance on the gov.uk website: Submit your flood or coastal erosion risk management project proposal for 'eligible strategies', available from: <https://www.gov.uk/guidance/flood-and-coastal-defence-funding-submit-a-project>

based on a probability of 0.77. If it is assumed that no further contributions would be forthcoming (i.e. only those schemes that had secured contributions were able to go ahead), there would be a reduction in the number of schemes funded from the scenario considered throughout this report to 2,438 (47 fewer schemes). The difference from 0% to 100% is actually quite small (170 schemes) with this because most schemes in the programme had secured sufficient contributions already.

Table 4-1: Number of schemes funded if the Partnership Funding policy scenario is varied to consider different probabilities are used for when further contributions will be secured

Probability	Number of schemes	
	No. funded	Difference from 0.77 probability
0% (assumes all further contributions required will be secured)	2,608	+123
10%	2,586	+101
20%	2,584	+99
33%	2,584	+99
50%	2,576	+91
66%	2,555	+70
75%	2,513	+28
77% (probability used for the main Partnership funding policy scenario))	2,485	-
90%	2,439	-46
100% (assumes only those schemes that have already secured contributions would be funded)	2,438	-47

Note: each scheme requiring further contributions has been given a modelled probability by the Environment Agency. These probabilities range from close to 0 (i.e. the scheme is not expected to obtain the required contributions) to 1 (i.e. the scheme already has the required contributions). This table illustrates how the number of schemes funded varies according to the probability level selected. Assuming a probability of, for example, 20% means that those schemes that have a modelled probability of 20% or greater of obtaining the required contributions will be included

For 2009/10 to 2014/15, there are no data on contributions under the Partnership Funding policy scenario. The counterfactual scenario allocates funds based on the priority score whereas the Partnership Funding policy scenario is based on raw and adjusted Partnership Funding scores. Application of priority scores under the counterfactual scenario results in fewer schemes being allocated funding, potentially suggesting that the counterfactual scenario results in more larger schemes attracting funding such that fewer schemes are funded overall.

For 2015/16 to 2020/21 the increase in schemes funded under the Partnership Funding policy scenario is due to the additional funding that is available taking account of the contributions that have been identified through partnership funding.

Figure 4-4: Chart showing the number of schemes funded under the counterfactual and the Partnership Funding policy scenarios for the 2009/10 to 2014/15 period

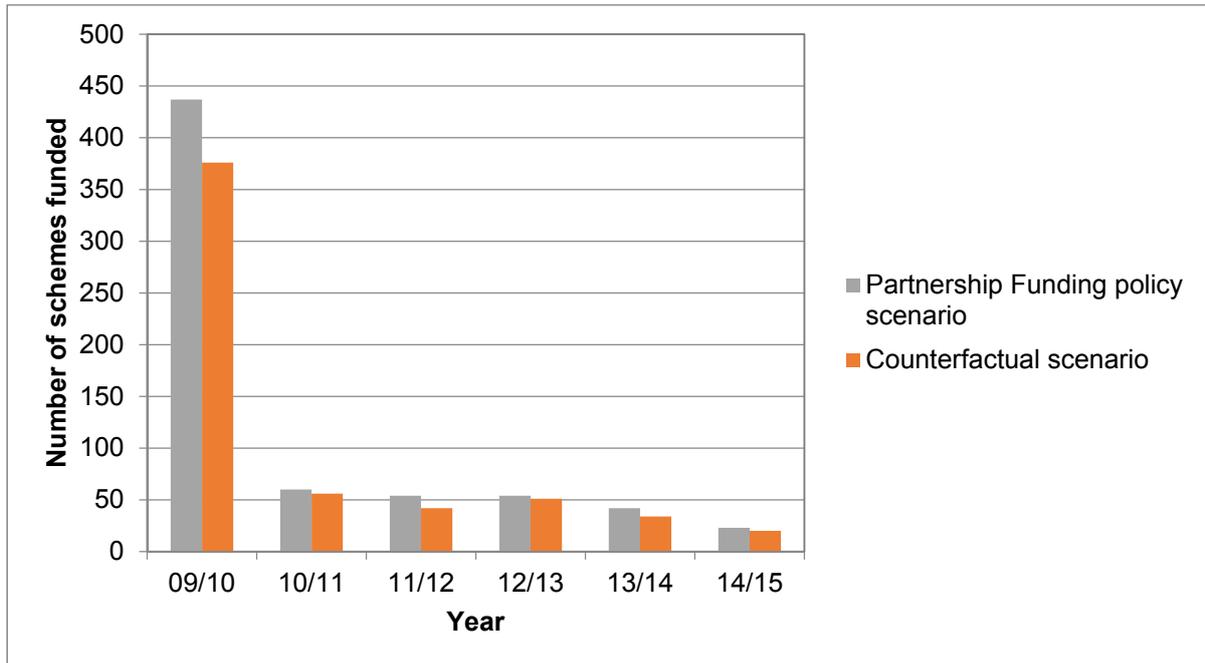
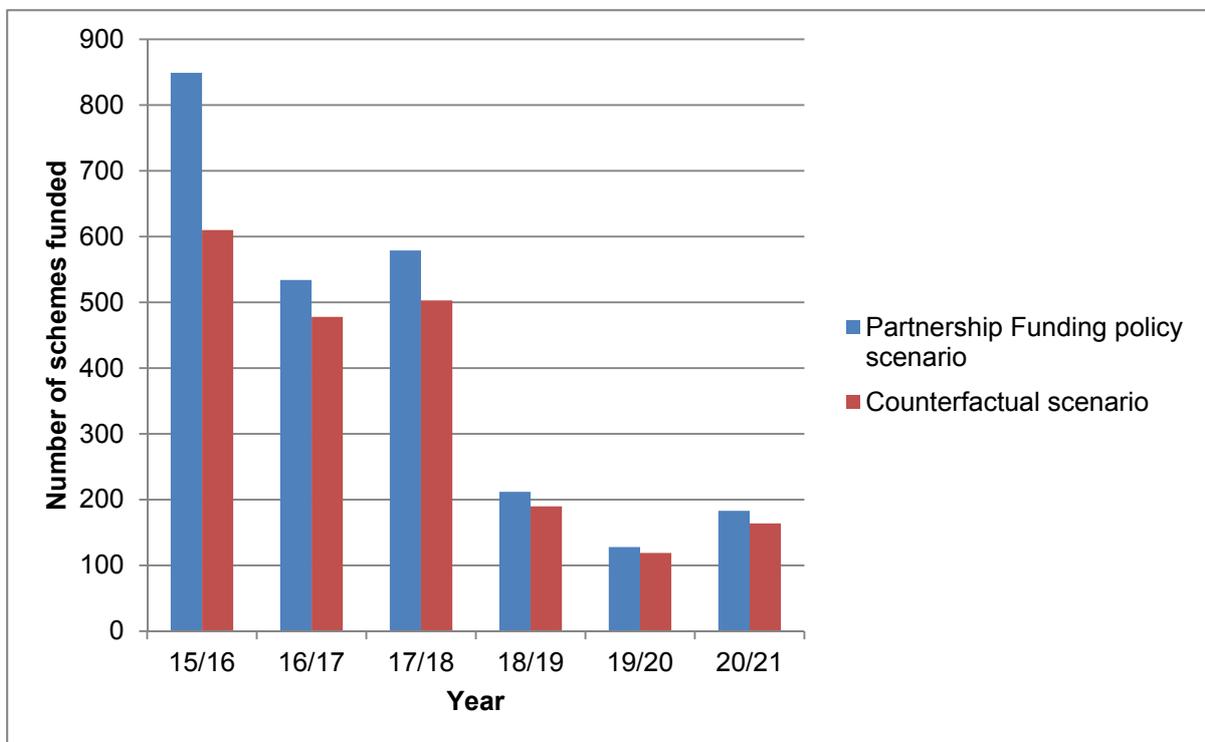


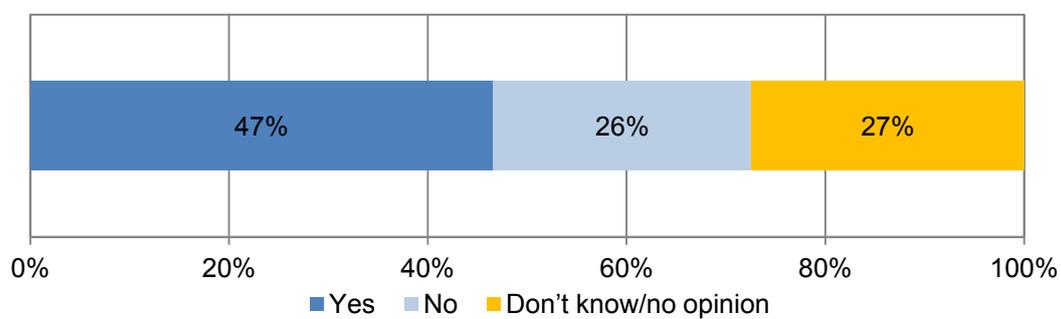
Figure 4-5: Chart showing the number of schemes funded under the counterfactual and the Partnership funding policy scenarios for the 2015/16 to 2020/21 period



4.4.2 Views on whether Partnership Funding has enabled more schemes to be funded

The quantitative analysis suggests that more schemes have been funded under the Partnership Funding policy scenario than would have been funded under the priority score system that was used previously (the counterfactual scenario). However, considering the survey responses, only 47% of respondents felt that the Partnership Funding approach had resulted in schemes going ahead that would not have done so under the previous priority score system (see Figure 4-6).

Figure 4-6: Responses to survey question: In your view has the Partnership Funding approach resulted in FCERM schemes going ahead that would not have done so under the previous priority score system? (n=73)



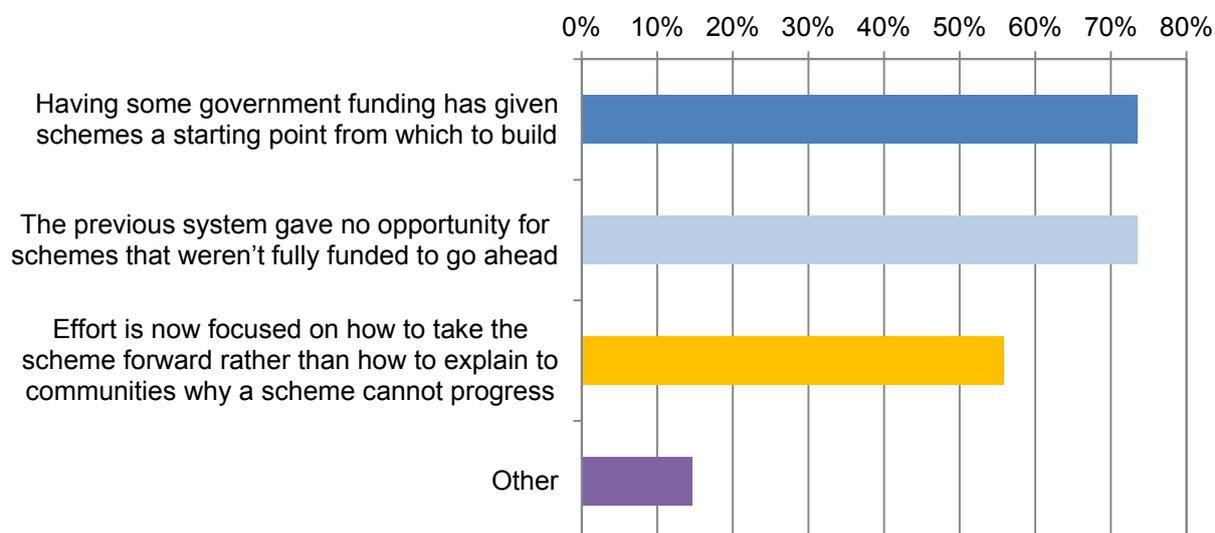
Just over one quarter of respondents expressed the opposite view, with a further 27% answering “don’t know/no opinion”. Indeed, one interviewee noted that it was difficult to say whether more schemes had progressed under the Partnership Funding policy than previously in some areas, as in many places the LLFA were not previously progressing schemes. When LLFAs were established they did not have a programme of schemes in place; instead they worked more on a yearly cycle. The interviewee therefore felt that it had taken time to get resources in place and trained to generate the six-year programme. This could be linked to the fact that the Flood and Water Management Act, which provides for LLFAs and their responsibilities, only entered into force in 2010.

A further interviewee felt that there was not a direct correlation between the introduction of the Partnership Funding policy and the number of schemes being developed. They thought that there were various reasons why other schemes were coming forward now, and these reasons were not necessarily related to the GiA process. More specifically, surface water schemes were being developed due to the flexibility of being able to use local levy and water companies’ funding. The interviewee mentioned that the existence of LLFAs meant that there was now another body that could bring funding into schemes. They were of the opinion that whilst Partnership Funding is part of the landscape, by encouraging as many partners as possible to be involved, it was not the only cause of more schemes being

promoted. The quantitative data from the analysis of the scenarios do show that schemes are being promoted by a range of RMA types with an increase in the number of schemes funded by IDBs, the Environment Agency and local authorities under the Partnership Funding policy scenario compared with the counterfactual scenario. In contrast, there is a decrease in the number of schemes promoted by water companies (from four to one), and no change in the number of schemes funded by highways authorities (zero under both the Partnership Funding policy scenario and counterfactual).

Survey respondents who answered positively to the question about whether Partnership Funding had resulted in more schemes going ahead were probed for why they thought this was the case. The majority agreed with statements suggesting that having some government funding provided schemes with a starting point, and that the previous system did not provide any opportunity for schemes that were not fully funded to go ahead (see Figure 4-7). Respondents who indicated 'other' provided further details. They noted that Partnership Funding had made more money available for FCERM schemes since it provided an opportunity to apply for funding from different funding pots or gain local contributions towards schemes. In their opinion, this has inevitably meant that more schemes are carried forward, whilst also encouraging wider community engagement and community 'ownership' of a scheme. It was, however, noted that a proportion of the funding was coming from Local Authorities and RFCC local levy (i.e. money raised through taxation) which was seen by some as government grant by another name. This viewpoint is backed up by the data from analysis of the Partnership Funding policy scenario (presented in Section 8.2), which show that at 44%, public contributions currently make up the greatest proportion of all contributions over the 2015/16 to 2020/21 time period (bearing in mind that 6% of the required total is still needed, i.e. no contributor agreement has been secured).

Figure 4-7: Responses to survey question: If you answered ‘yes’ to the previous question please indicate why you think that the Partnership Funding approach has resulted in more schemes going ahead? (n=34)



Further details were obtained from the interviews. One interviewee indicated that there had been many schemes that would not have received the full amount of funding required for them to progress without Partnership Funding. Thus, in their view, Partnership Funding had allowed more schemes to progress. It was also noted that smaller schemes (those under £1 million) are benefiting from Partnership Funding as the funding gap is easier for partners to meet. It was mentioned that there are several small schemes that are community driven and have a mixed funding stream (money is coming from local levy, the community, the district council and GiA) with this considered as a positive aspect of Partnership Funding. Analysis of contributions by size of scheme under the Partnership Funding policy scenario can be used to determine whether the situation reflects the viewpoint that Partnership Funding is benefiting smaller schemes rather than larger ones. Considering schemes where further contributions are required, the percentage of contributions still required is larger for small schemes (8%) than for large schemes (3%); the proportion of contributions that remain to be secured is highest for medium-sized schemes at 10% (see Section 8.2.2. for further information).

Another interviewee indicated that under the previous priority score system, FCERM schemes either received funding and were implemented or did not receive funding and could therefore not progress. It was noted that it would have taken many years to be able to fund schemes that had not qualified under the priority score system (e.g. in the case of Godmanchester). When Partnership Funding was introduced this provided a different route for such schemes to be delivered (i.e. through local levy and other contributions).

Box 4-1: Case Study: Partnership Funding allowing local levy to act as an 'enabler'

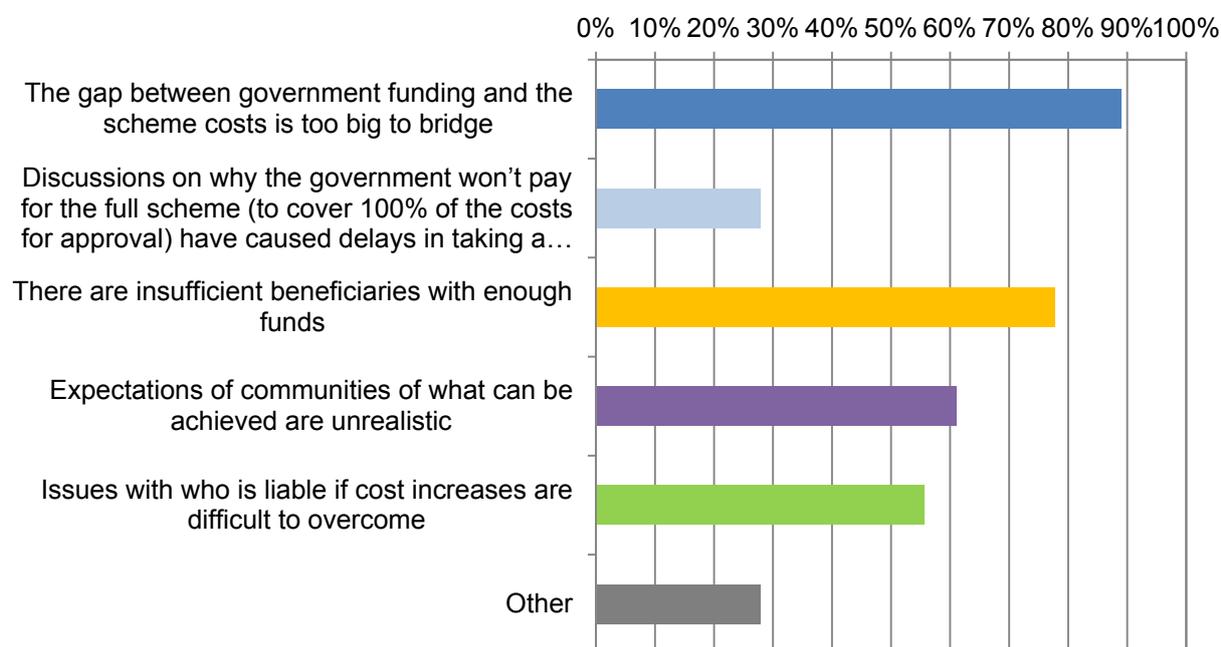
The Godmanchester scheme was completed approximately four years ago and a strategic approach was taken by the RFCC to enable the local levy to be used as effectively as possible. Local levy is used as an enabler for the programme, to pull as many projects into the six-year programme as possible. It is also used to attract other contributions. Although the local levy is used to bring schemes into the programme, it is a 'catch 22' situation because the RFCC does not want the use of the local levy to detract other potential contributors from providing funding. An example of the use of the local levy is in the case of a third-party asset at risk of failure in Essex. Local levy has been used to make the scheme viable, but the RFCC is also working with others to bring in contributions (for maintenance, etc.)

One interviewee felt that although more schemes were progressing under Partnership Funding policy, it had been harder to get schemes through and it was not the same schemes that would have been progressed under the priority score system. This point appears to be corroborated from the analysis for 2009/10 to 2014/15 where the number of schemes differs depending on whether the priority score system is used to allocate funds (under the counterfactual scenario) or the Partnership Funding score is used (under the Partnership Funding policy scenario). The interviewee felt that historically it had been the 'best/most deserving' schemes which had been allocated funding, but under Partnership Funding there was an opportunity to 'buy your way to the top of the pile' for schemes which might not be addressing areas most at risk, but did have enough external interest to force them up the list (commonly known as "buying a scheme"). A contrasting view was provided by another interviewee. They thought that in some areas because of the nature of the area and the schemes being progressed, all of the schemes which have progressed under the Partnership Funding policy would have also all gone ahead under the previous Priority Score system, since they had achieved 100% Partnership Funding score and not required any contributions. The small difference in number of schemes funded between 2009/10 and 2014/15 under the counterfactual and Partnership Funding policy scenarios may also suggest that this point could also be correct 'in some areas'.

Where respondents did not think that the Partnership Funding approach had led to more schemes going ahead, they were provided with a number of statements to agree or disagree with.

Most of the respondents (89%) agreed with the statement that the gap between government funding and scheme costs was just too big (see Figure 4-8).

Figure 4-8: Responses to survey question: If you answered ‘no’ to the previous question please indicate why you think that the Partnership Funding approach has not resulted in more schemes going ahead? (n=18)



4.5 Number of fully and part funded schemes

4.5.1 Quantitative analysis for the Partnership Funding policy scenario

Data on contributions are only available for 2015/16 to 2020/21. In total, 75% of schemes in the Partnership Funding policy scenario obtained contributions. An estimated 54% of the schemes needed Partnership Funding to ensure that the scheme could go ahead, while 19% of schemes obtained contributions even though they had a raw Partnership Funding score $\geq 100\%$ and so could have been fully funded through GiA. The remaining 27% had a sufficiently high Partnership Funding score and were fully funded through GiA.

Considering the detail, analysis of schemes shows that under the Partnership Funding policy scenario:

- There were 1,285 schemes that obtained a contribution and so could be considered to be part funded. This is 75% of all schemes with a Partnership Funding score³¹;
- There were 457 schemes that had a raw Partnership Funding score $\geq 100\%$ that did not obtain any contributions³². This is 27% of all schemes with a Partnership Funding score;
- There were 327 schemes that had a raw Partnership Funding score $\geq 100\%$ that did obtain contributions. This is 19% of all schemes with a Partnership Funding score; and
- There were 932 schemes that had a raw Partnership Funding score $< 100\%$ and therefore needed to obtain contributions. This is 54% of all schemes with a Partnership Funding score.

The figures above suggest that 784 schemes could have been fully funded by GiA but that 42% of these schemes also obtained additional contributions. The total contributions across those schemes that would have been fully funded amounted to £150 million (to 2020/21) and £184 million (to 2027/28) or 13% and 16% of total contributions across all schemes. The level of contributions obtained for those schemes that could have been fully funded accounts for 23% of the total investment allocated to those schemes with a Partnership Funding score $> 100\%$ that also obtained contributions to 2027/28. Where schemes collected contributions even though they scored $> 100\%$, GiA allocated to these schemes on the basis of the score could instead be put towards other schemes. Based on the numbers above, this means that £150 to £184 million of GiA could be reallocated to other schemes.

Figure 4-9 provides a summary of these figures and shows that the majority of the contributions are sourced from those schemes that have a raw partnership funding score of $< 100\%$. Across all of these schemes, contributions make up 19% of total investment under the Partnership Funding policy scenario to 2020/21.

³¹ The 2015/16 to 2020/21 dataset gives a total of 1,716 schemes for which raw Partnership Funding scores are included. Raw PF scores are not available for the other 769 schemes. In addition, PF scores are not available for 26 of the schemes that obtained contributions. These account for the 2% of schemes missing when those with a PF score $\geq 100\%$ or $< 100\%$ are summed.

³² Taking a raw Partnership Funding score of 100% assumes that the risk of cost under-estimation or benefit over-estimation has been adequately taken into account. If a raw Partnership Funding score of 110% is used instead to reflect these risks, the number of fully funded schemes (i.e. those with a raw PF score $> 110\%$ which did not also obtain contributions) reduces to 393, or 24% of all schemes.

Figure 4-9: Source of contributions by fully and part funded schemes

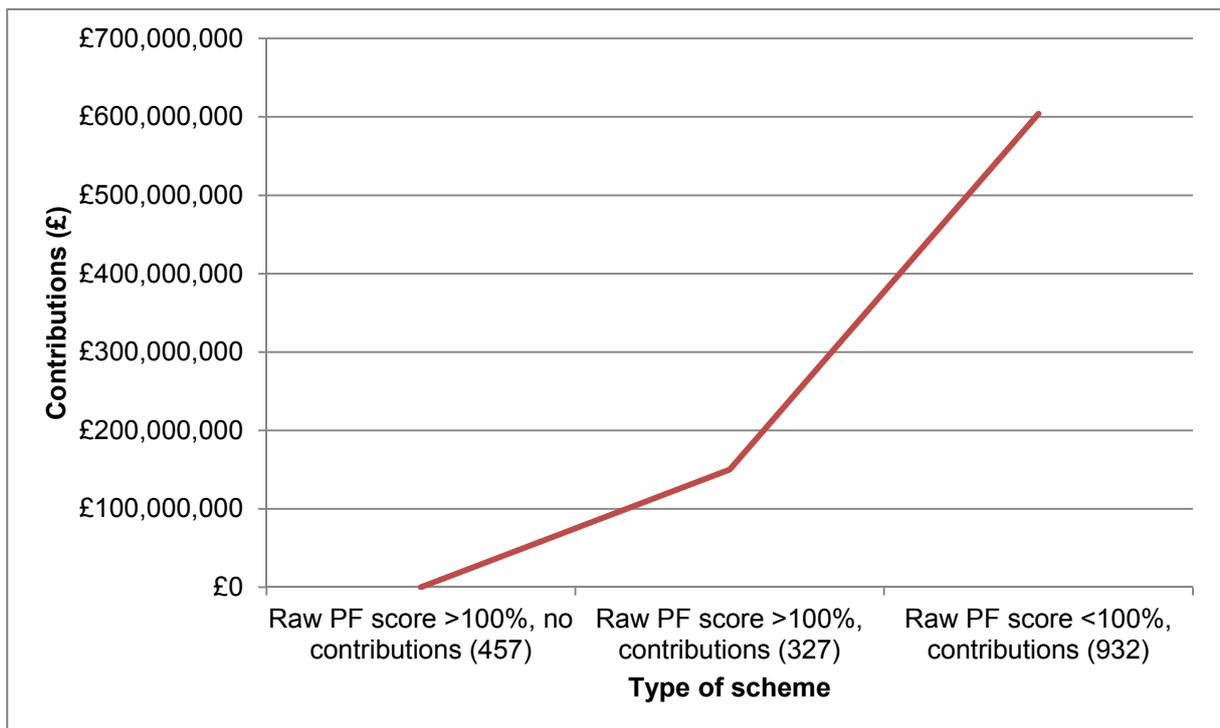
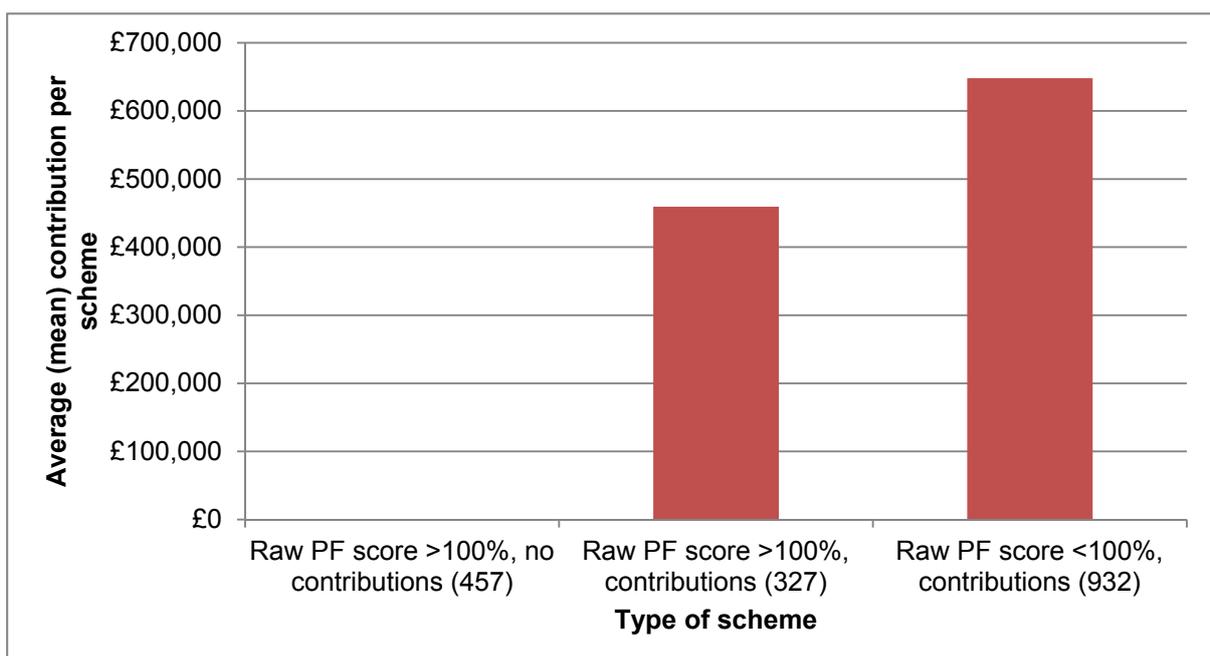


Figure 4-10 provides the contributions per scheme by type of scheme, where these include contributions that are secured (agreed in principle but not necessarily paid) and further contributions required. Further discussion on the sources of contributions and their distributions is provided in Section 8.2.

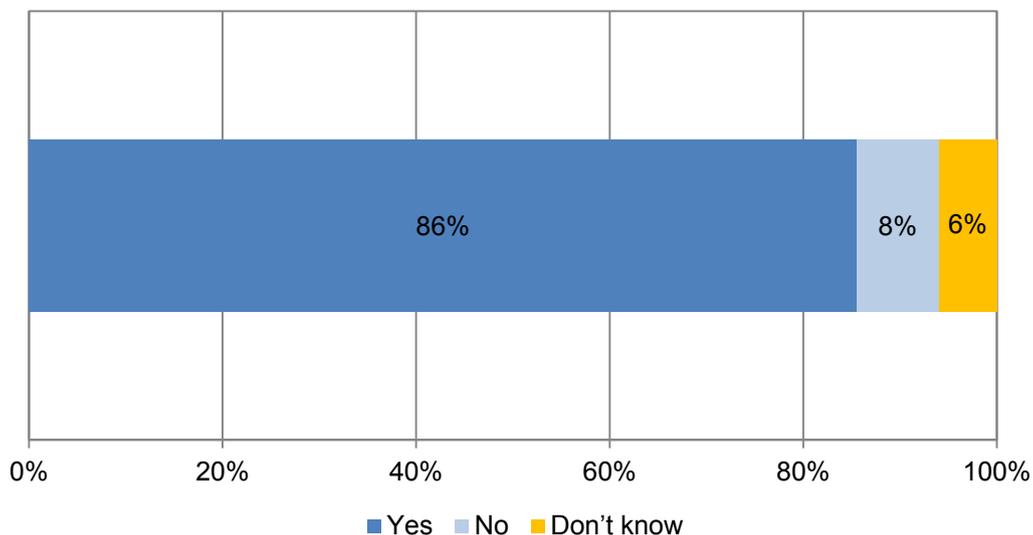
Figure 4-10: Average (mean) contributions by fully and part funded schemes



4.5.2 Views on fully and part funded schemes

Respondents to the survey were asked whether voluntary contributions were required to enable the adjusted Partnership Funding score to exceed 100%. Figure 4-11 shows that the number of respondents who said yes (86%) is significantly greater than the 54% of schemes that required voluntary contributions to increase the adjusted Partnership Funding to greater than 100% under the Partnership Funding policy scenario. Only 8% of respondents said no, which compares with 46% of schemes that already had a raw Partnership Funding score greater than 100%.

Figure 4-11: Responses to survey question: Have these FCERM schemes required voluntary contributions to enable the adjusted Partnership Funding score to exceed 100%? (n=83)



Regarding the threshold Partnership Funding score, one interviewee noted that the threshold has remained at 100% since the policy was launched; this has not changed to reflect the proportion of funding which has been spent or underspent each year. Another interviewee noted that in their area a lot of the schemes achieved Partnership Funding scores of over 100% and therefore should not require contributions. However, as the assurance process realised this early on, there has been an insistence that contributions should be obtained anyway. This type of scheme would fall into the 19% of schemes that had a raw Partnership Funding score exceeding 100% but also obtained contributions.

In terms of schemes receiving 100% GiA funding, interviewees were asked whether this was important for ensuring a pipeline of work. One RFCC interviewee noted that it had been important to have full funding in some instances to enable other work to be carried out. However, they felt that this was a situation that was becoming less frequent. Other interviewees did not have any recollection of schemes receiving

100%, but one respondent was keen to point out that schemes in their area were designed to deliver wider benefits to bring in funding from other stakeholders. They highlighted how there would be talks with specialist colleagues during scheme development to work out if there were any other environmental benefits that could be included. These wider and environmental benefits could potentially be seen as additional benefits arising from the Partnership Funding policy since the need to attract contributions is leading to schemes being designed to deliver more than just flood and coastal erosion risk management.

4.6 Net Present Value of schemes

Net Present Value (NPV) is equal to whole life benefits minus whole life costs (both expressed as present values, i.e. after discounting). The overall NPVs for the counterfactual and Partnership Funding policy scenarios are as follows:

- Period between 2009/10 and 2014/15:
 - Counterfactual scenario: £10.6 billion
 - Partnership Funding policy scenario: £11.1 billion.
- Period between 2015/16 and 2020/21:
 - Counterfactual scenario:
 - Excluding TTD: £43.7 billion
 - All schemes: £160 billion³³
 - Partnership Funding policy scenario:
 - Excluding TTD: £45.5 billion
 - All schemes: £153 billion

³³ This includes the four TTD schemes excluded from the counterfactual and the three TTD schemes excluded from the Partnership Funding policy scenario. These schemes were identified as outliers that had a significant effect on the outcomes under the two scenarios. The results with these schemes are included here to demonstrate the effects on the NPV of their inclusion. Note that the probability under the Partnership Funding policy scenario for schemes that would secure contributions has been reduced to 0.77 to ensure that GiA is equal to £2.5 billion under both the counterfactual and Partnership Funding policy scenarios. This means any differences are due to the outcomes under each scenario rather than being due to a difference in grant funding that is spent.

The analysis shows that the selection of schemes under the Partnership Funding policy scenario has resulted in an increase in the NPV by £1.8 billion compared with the counterfactual for the 2015/16 to 2020/21 period. When the TTD schemes are included, however, the NPV is greater under the counterfactual (£160 billion) than under the Partnership Funding policy scenario (£153 billion). This difference is driven by the inclusion of one additional TTD scheme under the counterfactual (where four TTD schemes are funded) than under the Partnership Funding policy scenario (where three TTD schemes are funded). Each large TTD scheme is actually a group of schemes. The analysis works on the basis that where one scheme within a group does not secure funding, the whole group of schemes is treated as not being funded. As this is an artificially negative position, all four schemes have been excluded from the analysis moving forwards.

There are uncertainties within this analysis with gaps in the data sets used for the two scenarios. Under the counterfactual, there are £66 million of whole-life costs for schemes with no information provided on whole-life benefits. Hence, the spreadsheet assumes that these schemes provide £0 whole-life benefits. Total expenditure across these schemes is £260 million. For the Partnership Funding policy scenario, there are £60 million of whole-life costs for schemes with no information provided on whole-life benefits (i.e. assumed to be £0). Total expenditure across these schemes is £425 million. Hence, the data gaps will result in greater under-estimation of the NPV for the Partnership Funding policy scenario. The difference between the NPV under the counterfactual and the Partnership Funding policy scenario is therefore expected to be greater than £1.8 billion.

There is also an overall reduction in the average benefit-cost ratio across all schemes that are funded under the Partnership Funding policy scenario compared with the counterfactual scenario. The average benefit-cost ratio across all funded schemes under the counterfactual scenario is 10.8 (or 25.3 when TTD schemes are included). Under the Partnership Funding policy scenario, the average benefit-cost ratio is 9.8 (or 23.9 when TTD schemes are included). This suggests that schemes with a lower benefit-cost ratio have a greater chance of being funded under the Partnership Funding policy scenario than they did when the priority score was used as the basis for scheme selection (the counterfactual scenario). However, falling benefit-cost ratios (BCRs) are to be expected as a programme gets larger and more schemes are able to be funded. Although with Partnership Funding the relationship between funding score and BCR is not straightforward, additional schemes benefitting from greater funding will *tend* to have lower BCRs as they are naturally lower down the priority list than schemes funded before them. As long as the benefit-cost ratio of the last scheme funded is greater than 1:1, then the aggregate Net Present Value of the programme as a whole is increasing (i.e. more worthwhile investment is taking place). For this reason, NPV is a better measure of value for money than BCR at the programme level.

That said, one useful ratio for assessing programme value for money is effective return on Exchequer GiA, calculated as NPV divided by GiA. These calculations can only be done for the Partnership Funding policy scenario for 2015/16 to 2020/21 due to data limitations. The effective return on contributions for the 2015/16 to 2020/21 period is estimated as:

- Period between 2015/16 and 2020/21:
 - Counterfactual scenario:
 - Excluding TTD: 18.9
 - All schemes: 65.0
 - Partnership Funding policy scenario:
 - Excluding TTD: 19.7
 - All schemes: 61.2

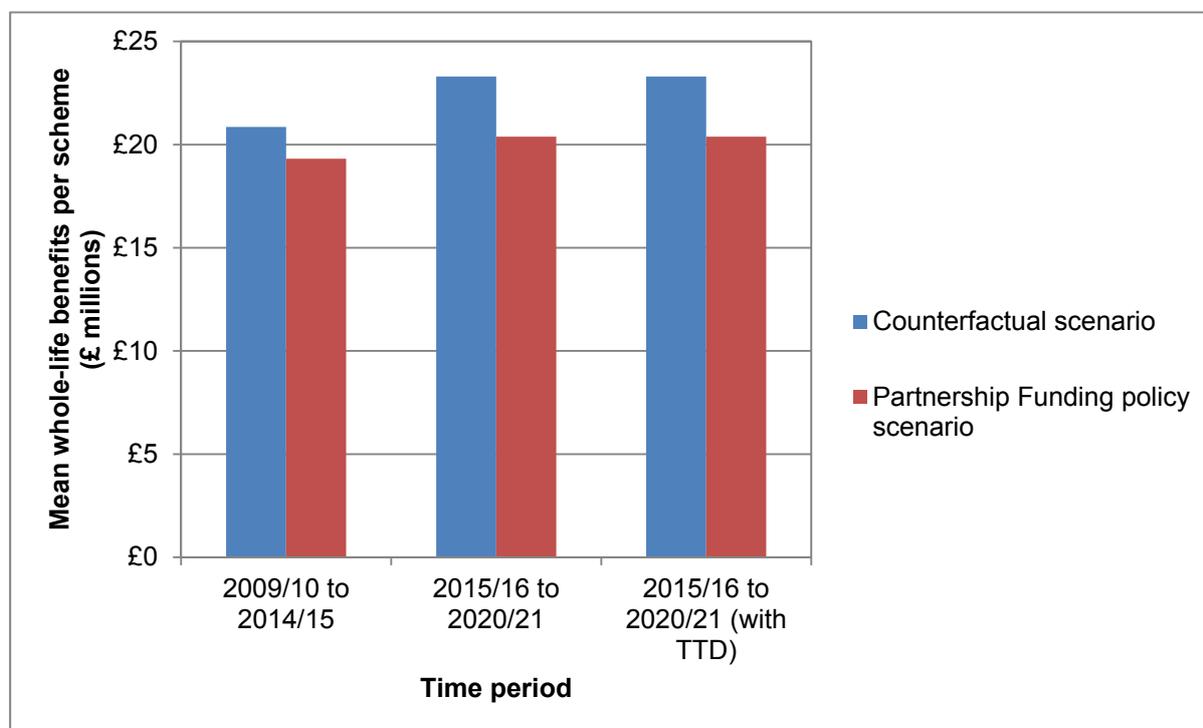
The analysis shows that the Partnership Funding policy scenario has resulted in an increase in the effective return from 18.9 under the counterfactual to 19.7. When the TTD schemes are included in the analysis the effective return on Exchequer GiA decreases under the Partnership Funding policy scenario compared with the counterfactual, from 65.0 to 61.2. Again, this demonstrates the influence that one large scheme that is additionally funded under the counterfactual can have on the overall results. As noted previously, the TTD investments are actually large groups of distinct individual projects each with their own funding score. If it is assumed that one project does not secure funding then it is assumed that the whole “scheme” or group is not funded. This is an overly negative position that is likely to underestimate the effective return to the Exchequer.

4.7 Average actual damages due to flooding and erosion

There are no data on average annual damages within the available data sets, although the whole-life benefits (WLB) can be used as an indication of the damages that could be avoided from implementation of schemes. Total WLB are £50.7 billion under the Partnership Funding policy scenario and £48.1 billion under the counterfactual scenario. Therefore, the Partnership Funding scenario results in an additional £2.6 billion more in whole-life benefits. Figure 4-12 shows how the whole-life benefits vary across the time periods. The mean whole-life benefits per scheme are greater under the counterfactual scenario as this approach selects the schemes to be funded using the priority score system, which gives a high weight to benefit-

cost ratio. As such, the larger number of schemes under the Partnership Funding policy scenario results in fewer WLB per scheme than the counterfactual scenario.

Figure 4-12: Whole-life benefits across the time periods (excludes and includes TTD for 2015/16 to 2020/21)



4.8 Number of schemes outside a strategy

Information on whether a strategic approach has been taken is only available for 2015/16 to 2020/21. In total, 1,684 of the 2,485 schemes funded under the Partnership Funding policy scenario (68%) did include evidence that a strategic approach has been taken and that double counting of benefits has been avoided. A further 59 schemes (2%) did not provide evidence that a strategic approach had been taken, with 742 schemes not providing a response (cell was blank in the data set for 2015/16 to 2020/21 or recorded as '0' or '-').

Table 4-2 shows the breakdown by RMA by response for yes and no answers only. The table also shows the percentage of all schemes proposed by each RMA that have been assigned a yes or no answer. The totals do not add to 100% in all cases due to blank, '0' and '-' responses included in the data set for 2015/16 to 2020/21. The table shows that the vast majority of funded schemes do show evidence that a strategic approach has been taken. Only 52% of Environment Agency schemes give either a yes or no answer with 678 schemes (48%) giving a blank response.

Table 4-2: Breakdown of responses related to strategic approaches by RMA

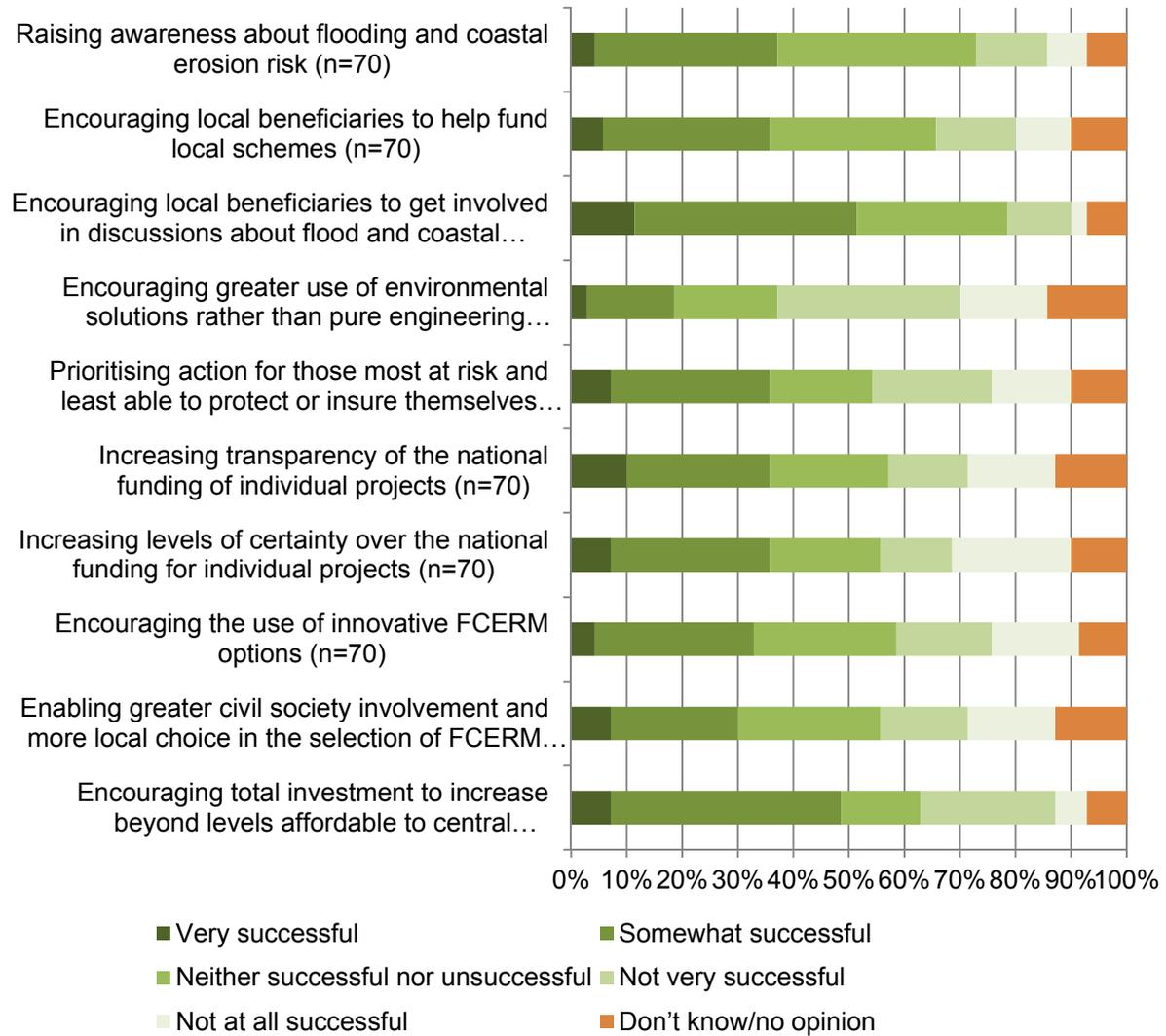
RMA	Yes		No	
	No.	% of all	No.	% of all
Highways Agency	0	0%	0	0%
Internal Drainage Boards	121	88%	5	4%
Environment Agency	702	50%	32	2%
Water companies	1	100%	0	0%
Local authorities	860	92%	22	2%

The variation across RMAs may reflect the differing needs for a strategic approach. There may be a number of schemes that are addressing local issues within boundaries that can be easily understood. As such, a strategic approach may not be warranted.

4.9 Summary of overall views on partnership funding policy

The survey asked respondents whether they thought Partnership Funding had been successful in better protecting more communities and delivering more benefits. Figure 4-13 summarises the results.

Figure 4-13: Responses to survey question: in your view has Partnership Funding been successful in better protecting more communities and delivering more benefits by..... (n = 70)



Key points include:

- 48% of respondents to the survey agreed that the Partnership Funding policy has been very successful or somewhat successful in encouraging total investment to increase beyond levels affordable by central government alone. The quantitative analysis found that total investment to 2020/21 under the Partnership Funding policy scenario is estimated to increase by £0.76 billion compared with the counterfactual scenario and £1.1 billion by 2027/28. This has resulted in the funding of 2,485 schemes in total compared with 2,064 schemes under the counterfactual scenario; an increase of 421 schemes.
- 37% of respondents to the survey agreed that the Partnership Funding policy has been very or somewhat successful in raising awareness about flooding and coastal erosion risk.
- 36% of respondents to the survey agreed that the Partnership Funding policy has been very or somewhat successful in increasing transparency of the national funding of individual projects. The quantitative analysis found that 27% of all schemes under the Partnership Funding policy scenario were fully funded. Of the remaining 73%, 54% needed to raise contributions to enable the adjusted Partnership Funding score to exceed 100%. The other 19% had a raw Partnership Funding score greater than 100% but also collected contributions, enabling some GiA to be made available for other schemes.
- 36% of respondents to the survey agreed that the Partnership Funding policy has been very or somewhat successful in increasing levels of certainty over the national funding of individual projects. The quantitative analysis of Partnership Funding policy scenario shows that 457 schemes were fully funded through GiA. The 327 schemes that had a raw partnership funding scheme greater than 100% but which also collected contributions attracted an average of £460,000 contributions per scheme. The 932 schemes that had a raw partnership funding score of less than 100% attracted contributions of around £650,000 on average.

Figure 4-14 brings together some of the positive and negative attributes of Partnership Funding from the quantitative analysis and Figure 4-15 provides a summary of key positive and negative aspects highlighted from the qualitative analysis (surveys, interviewees, and case studies). It is important to note that there are uncertainties associated with the quantitative analysis, including uncertainties of an estimated 6% due to duplications within the counterfactual dataset, and data gaps that affect calculation of the NPV and effective return on investment. This is an important consideration when comparing the NPV of the counterfactual with the NPV for the Partnership Funding policy scenario, since the difference is less than 6% uncertainty (at around 4%) (counterfactual NPV of £43.7 billion and Partnership Funding policy scenario NPV of £45.5 billion).

Figure 4-14: Positive and negative attributes of the Partnership Funding approach from the quantitative analysis

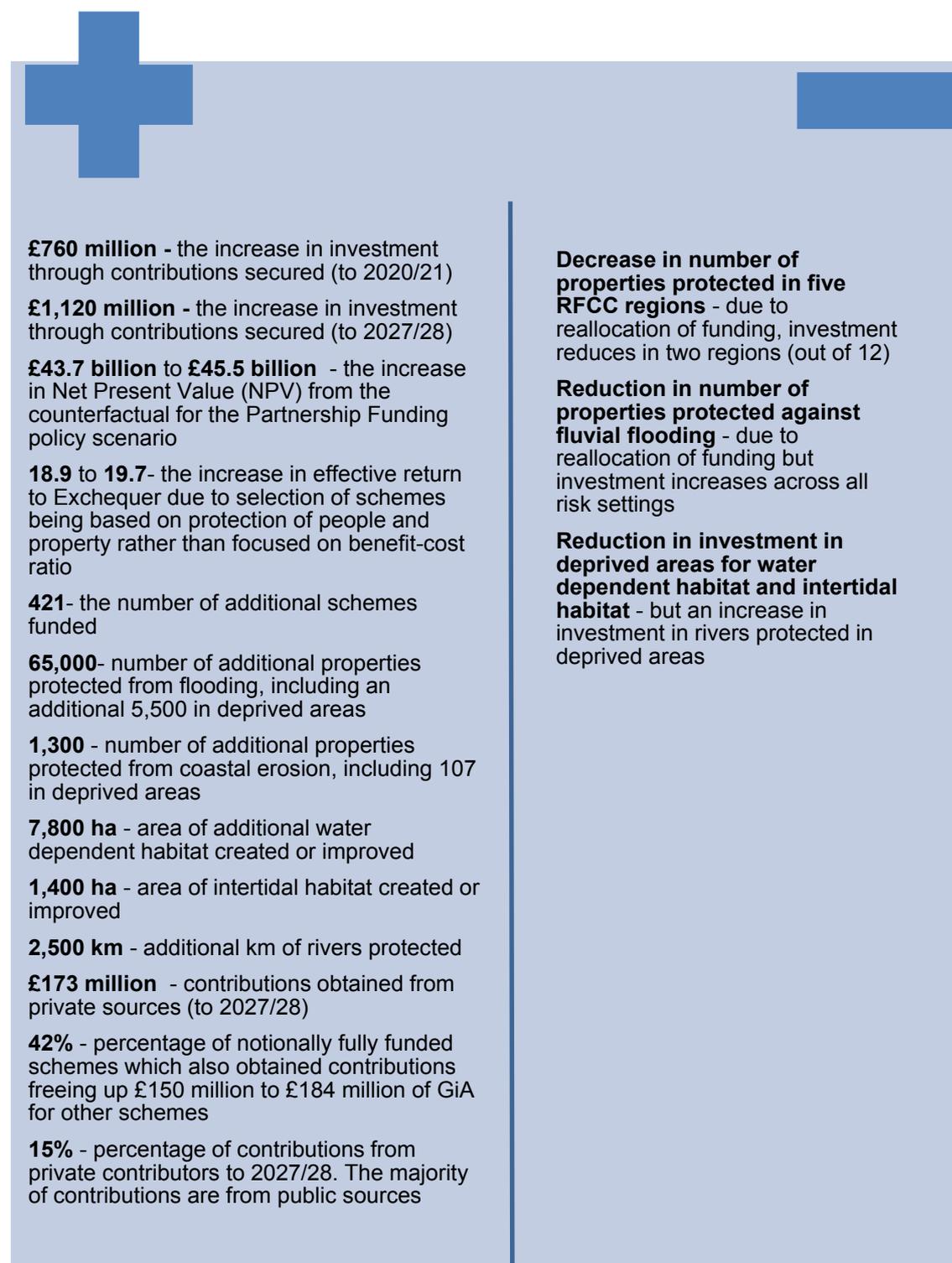
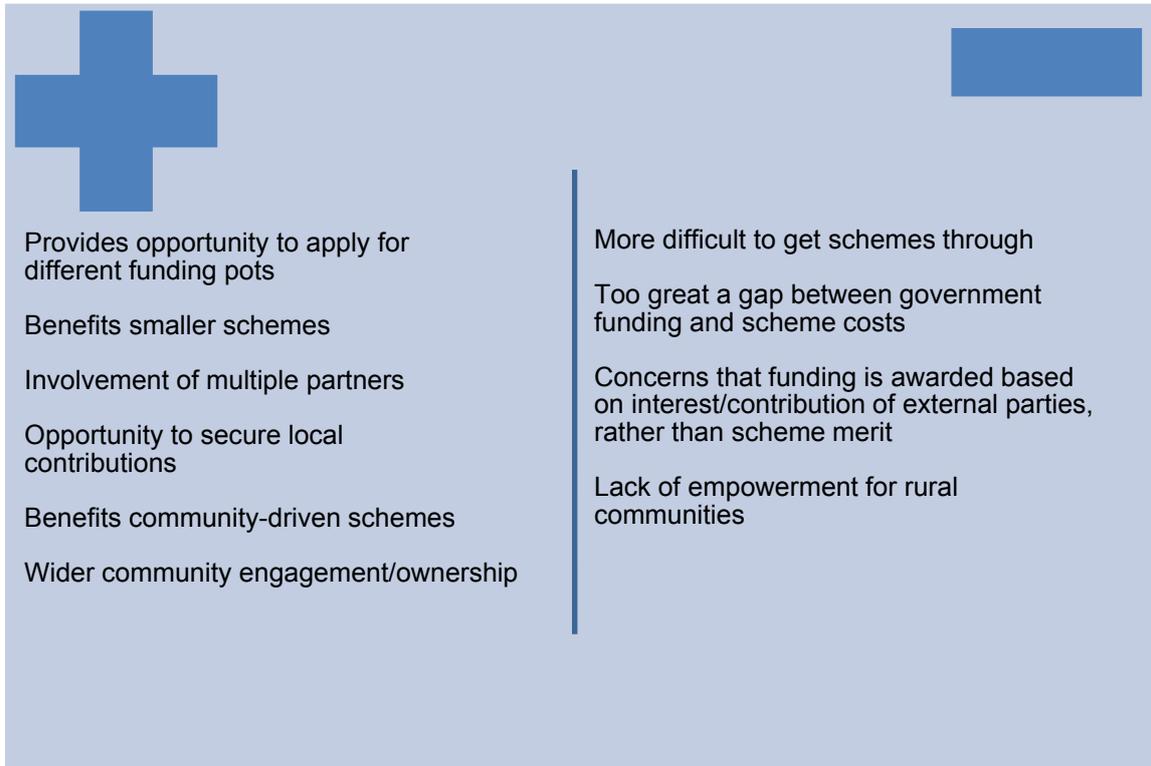


Figure 4-9: Positive and negative attributes of the Partnership Funding approach highlighted during interview discussions



5. Distribution of schemes

5.1 Research questions covered

This section focuses on answers to research questions 2 and 19 and covers the distribution of schemes, investment and contributions by RFCC, RMA, risk setting and technical solution:

- RQ2: How has the Exchequer's Grant in Aid (GiA) contribution to Partnership Funding, and the outcomes it has "bought" been distributed, taking account of the following groups or categories: deprived communities, high flood risk communities, rural versus urban areas, households versus non-households, residential properties built before 2009 versus those built thereafter, coastal versus fluvial and surface water risk settings, locations in different regions (north, south, east, west), type of Risk Management Authority (Environment Agency, Local Authorities, Internal Drainage Boards), type of technical solution?
- RQ19: What is the impact of different GiA approaches for Environment Agency, Local Authority and Internal Drainage Board schemes, in terms of the types of scheme funded and longer-term funding availability (e.g. for maintenance)?

It compares the quantitative analysis of the counterfactual scenario with the results from the assessment of Partnership Funding policy scenario, and then describes how the qualitative assessment supports or challenges the findings from the quantitative assessment.

5.2 Distribution by RFCC

5.2.1 Number of schemes

Data for 2015/16 to 2020/21 include a reference to RFCC regions. This allows the distribution of schemes by RFCC region to be assessed under both the counterfactual and Partnership Funding policy scenarios for that time period. Figure 5-1 provides a map showing the distribution of number of schemes, with Table 5-1 presenting the detailed breakdown.

Figure 5-1 and Table 5-1 both show that the largest of number of schemes funded are:

- Counterfactual scenario: North West and Thames both with 13% of all schemes; and
- Partnership Funding policy scenario: Thames and Yorkshire both with 14% of schemes.

The RFCC regions with the fewest schemes are:

- Counterfactual scenario: Anglian Central with 3% of all schemes; and
- Partnership Funding policy scenario: Anglian Central again with 3% of schemes.

The total number of schemes funded increases under the Partnership Funding policy scenario across all RFCC regions with the exception of Anglian Eastern (reduction of eight schemes). The largest increases are seen in Yorkshire (an additional 117 schemes), Thames (an additional 62), and Southern (an additional 53 schemes). The regions seeing the smallest increases are Anglian Northern (an additional five schemes) and Anglian Central (an additional eight schemes).

5.2.2 Total investment

Data are available for 2015/16 to 2020/21 for both the counterfactual and Partnership Funding policy scenarios. Figure 5-2 provides a map illustrating the distribution of investment by RFCC region with Table 5-2 providing the full details of the levels of investment (in £ millions). Investment includes GiA for the counterfactual scenario and GiA plus contributions for the Partnership Funding policy scenario.

The RFCC regions with the highest levels of investment are:

- Counterfactual scenario: Thames (18%) and Southern (15%); and
- Partnership Funding policy scenario: Yorkshire (22%) and Southern (16%).

The RFCC regions with the lowest levels of investment are:

- Counterfactual scenario: Anglian Central (2%) and English Severn and Wye (2%); and
- Partnership Funding policy scenario: Anglian Central (2%) and English Severn and Wye (2%).

Figure 0-1: Map showing distributions of schemes funded by RFCC region

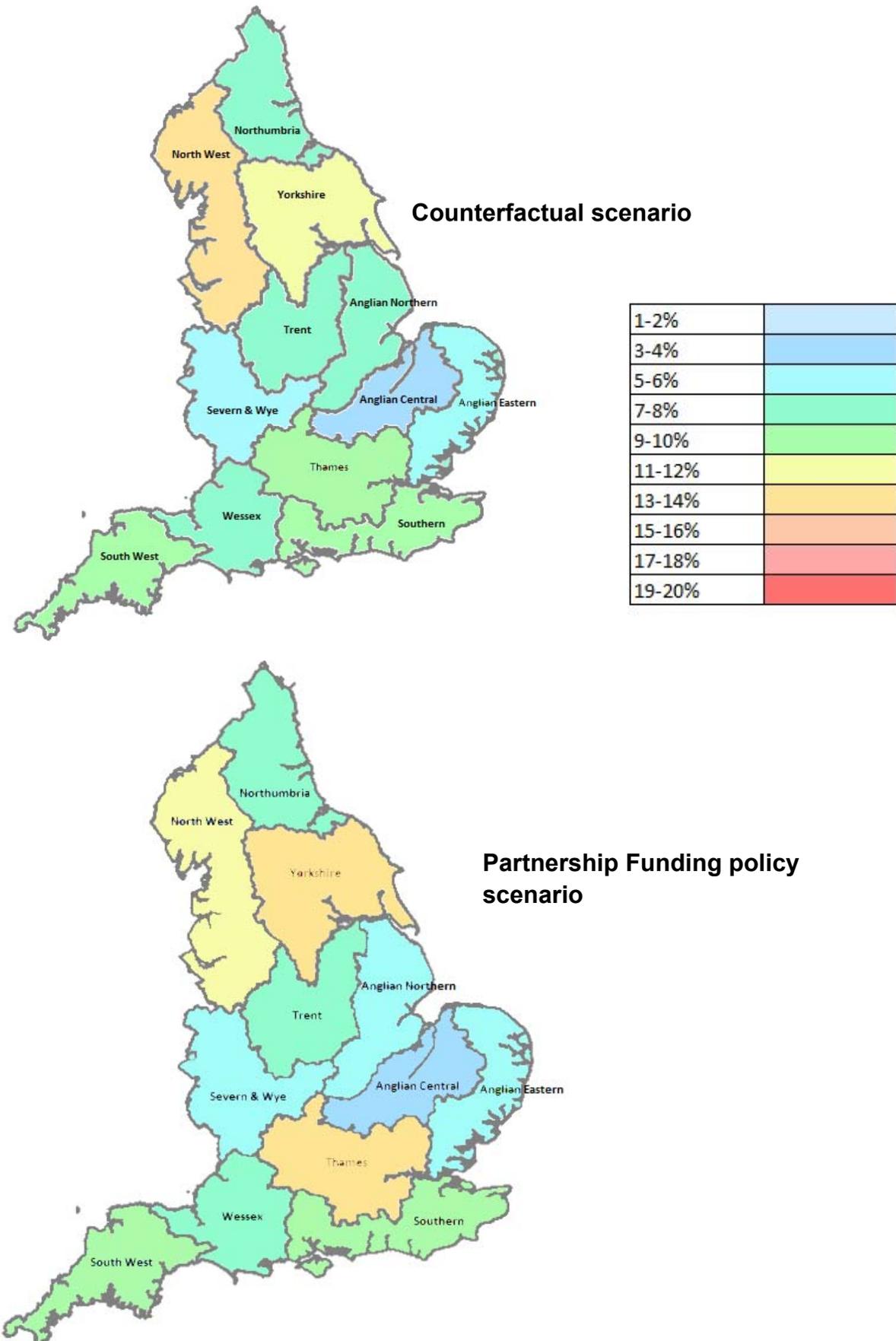


Table 5-1: Number of schemes funded by year by RFCC region

RFCC region	Year(s)						Total
	15/16	16/17	17/18	18/19	19/20	20/21	
Counterfactual scenario							
Anglian Central	19	13	21	5	6	2	66 (3%)
Anglian Eastern	17	18	38	12	8	41	134 (6%)
Anglian Northern	52	31	22	13	10	9	137 (7%)
English Severn and Wye	50	27	30	5	2	2	116 (6%)
North West	45	62	97	34	16	17	271 (13%)
Northumbria	64	30	12	14	13	16	149 (7%)
South West	36	42	54	35	10	9	186 (9%)
Southern	66	38	41	22	17	14	198 (10%)
Thames	108	86	49	9	7	17	276 (13%)
Trent	57	39	28	7	6	15	152 (7%)
Wessex	33	13	62	17	13	6	144 (7%)
Yorkshire	63	78	49	17	11	16	234 (11%)
Partnership Funding policy scenario							
Anglian Central	27	14	19	5	7	2	74 (3%)
Anglian Eastern	29	15	37	9	7	29	126 (5%)
Anglian Northern	54	31	23	13	12	9	142 (6%)
English Severn and Wye	64	27	35	6	0	5	137 (6%)
North West	53	71	104	35	18	25	306 (12%)
Northumbria	82	36	14	13	15	20	180 (7%)
South West	51	41	59	41	11	10	213 (9%)
Southern	90	48	53	26	18	16	251 (10%)
Thames	141	96	63	11	6	21	338 (14%)
Trent	73	40	30	11	6	23	183 (7%)
Wessex	62	15	68	19	13	6	183 (7%)
Yorkshire	123	99	74	23	15	17	351 (14%)

Figure 0-2: Map showing distributions of investment by RFCC region

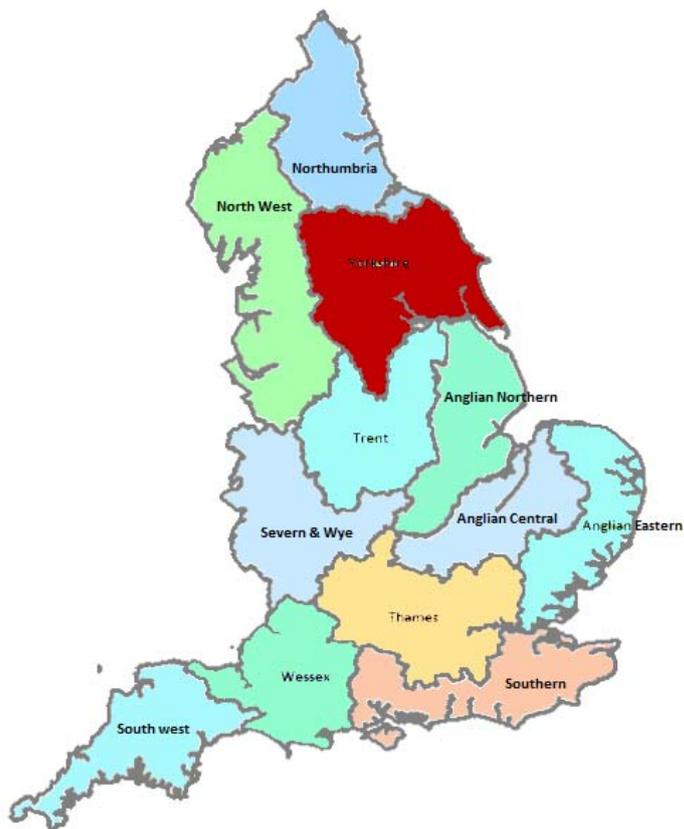


Table 5-2: Investment by year by RFCC region (£ millions)							
RFCC region	Year(s)						
	15/16	16/17	17/18	18/19	19/20	20/21	Total
<i>Counterfactual scenario</i>							
Anglian Central	£26	£3.9	£4.4	£0.26	£0.30	£0.54	£35 (2%)
Anglian Eastern	£128	£31	£6.2	£11	£0.39	£1.3	£178 (8%)
Anglian Northern	£162	£29	£5.6	£1.4	£1.0	£0.16	£198 (9%)
English Severn and Wye	£36	£3.6	£4.8	£0.67	£0.09	£0.12	£45 (2%)
North West	£118	£71	£26	£11	£5.2	£3.2	£233 (10%)
Northumbria	£62	£19	£0.79	£1.3	£5.1	£2.0	£90 (4%)
South West	£82	£48	£9.7	£6.3	£0.69	£2.6	£149 (6%)
Southern	£282	£28	£13	£7.7	£11	£2.1	£344 (15%)
Thames	£315	£76	£8.9	£1.6	£6.2	£1.2	£409 (18%)
Trent	£174	£44	£3.1	£1.2	£0.26	£1.5	£224 (10%)
Wessex	£65	£8.3	£20	£0.70	£0.94	£8.2	£104 (4%)
Yorkshire	£154	£131	£12	£2.3	£1.0	£2.1	£302 (13%)
<i>Partnership Funding policy scenario</i>							
Anglian Central	£43	£4.7	£4.6	£0.3	£0.7	£3.5	£57 (2%)
Anglian Eastern	£121	£10	£7.4	£11	£0.2	£6	£155 (5%)
Anglian Northern	£206	£28	£6	£6.3	£1.3	£1.0	£248 (8%)
English Severn and Wye	£49	£4.0	£6.7	£1.3	£0.0	£1.8	£63 (2%)
North West	£170	£104	£30	£20	£6	£10	£340 (10%)
Northumbria	£80	£28	£1.1	£1.5	£5	£8	£124 (4%)
South West	£103	£44	£12	£7.9	£2.0	£2.8	£172 (5%)
Southern	£403	£64	£20	£13	£20	£4.8	£526 (16%)
Thames	£164	£206	£22	£5.3	£4.1	£13	£415 (13%)
Trent	£125	£48	£4.0	£2.1	£0.6	£4.2	£184 (6%)
Wessex	£228	£14	£16	£0.9	£1.3	£11	£272 (8%)
Yorkshire	£384	£276	£32	£4.5	£7.7	£3.7	£708 (22%)

Table 5-3 compares the total level of investment with the number of households protected against flooding (Outcome Measure 2) or erosion (Outcome Measure 3), highlighting investment per household for each RFCC region. The table shows that the highest level of investment under the counterfactual is in Thames (£409 million) with this protecting around 81,000 properties. Under the Partnership Funding policy scenario, the highest level of investment is in Yorkshire RFCC (£708 million). The largest number of properties protected is in Southern RFCC (105,000) with investment of £526 million.

Table 5-3: Investment and properties protected by RFCC region (£ millions)

RFCC region	Total investment (£ millions)		Number of households better protected (OM2 and OM3)
Anglian Central	£35		7,131
Anglian Eastern	£178		14,488
Anglian Northern	£198		63,960
English Severn and Wye	£45		3,762
North West	£233		47,842
Northumbria	£90		7,530
South West	£149		15,354
Southern	£344		94,148
Thames	£409		80,618
Trent	£224		21,199
Wessex	£104		12,079
Yorkshire	£302		32,547

RFCC region	Total investment (£ millions)	GiA (£ millions)	Number of households better protected (OM2 and OM3)
Anglian Central	£57	£35	6,435
Anglian Eastern	£155	£94	12,106
Anglian Northern	£248	£193	61,327
English Severn and Wye	£63	£30	3,803
North West	£340	£297	47,969
Northumbria	£124	£67	7,827
South West	£172	£122	18,899
Southern	£526	£408	105,416
Thames	£415	£354	70,701
Trent	£184	£151	20,740
Wessex	£272	£144	27,682
Yorkshire	£708	£415	81,539

5.2.3 Fully versus part funded schemes

Data on contributions are available for the 2015/16 to 2020/21 time period. The counterfactual scenario assumes that there are no contributions and hence that all schemes are fully funded. Data on contributions per scheme allow an assessment to be made under the Partnership Funding policy scenario of which schemes would be

fully funded, with this assumed to be those with a raw Partnership Funding score that exceeds 100%³⁴.

As seen in Section 4.5, some schemes that have a raw Partnership Funding score greater than 100% did also obtain some contributions. These schemes are assumed to be part funded. Those schemes that have a raw Partnership Funding score of less than 100% and additionally include contributions are also assumed to be part funded.

Table 5-4 presents the distribution of fully and part funded schemes by RFCC region. The table shows that under the Partnership Funding policy scenario, the majority of schemes are part funded across all RFCC regions but there is considerable variation:

- Highest proportion of fully funded schemes: North West (30%) and Southern (29%); and
- Highest proportion of part funded schemes: English Severn and Wye (95%) followed by Anglian Eastern (94%) and Northumbria (also 94%).

³⁴ This assumes that the risk of cost under-estimation or benefit over-estimation has been adequately taken into account. In practice, contributions may have been obtained for these schemes to “buy” a margin in the funding score and hence increased certainty of delivery.

Table 5-4: Number of fully and part funded schemes by RFCC region				
RFCC region	Total number of schemes		Number (and %) of fully funded schemes	Number of part funded schemes
<i>Counterfactual scenario</i>				
Anglian Central	66		66 (100%)	-
Anglian Eastern	134		134 (100%)	-
Anglian Northern	137		137 (100%)	-
English Severn and Wye	116		116 (100%)	-
North West	271		271 (100%)	-
Northumbria	149		149 (100%)	-
South West	186		186 (100%)	-
Southern	198		198 (100%)	-
Thames	276		276 (100%)	-
Trent	152		152 (100%)	-
Wessex	144		144 (100%)	-
Yorkshire	234		234 (100%)	-
RFCC region	Total number of schemes	Total number of schemes with sufficient data to assess full or part funding	Number (and %) of fully funded schemes	Number (and %) of part funded schemes
<i>Partnership Funding policy scenario</i>				
Anglian Central	74	74 (100%)	7 (9%)	67 (91%)
Anglian Eastern	126	126 (100%)	7 (6%)	119 (94%)
Anglian Northern	142	142 (100%)	28 (20%)	114 (80%)
English Severn and Wye	137	130 (95%)	6 (5%)	124 (95%)
North West	306	301 (98%)	91 (30%)	210 (70%)
Northumbria	180	176 (98%)	10 (6%)	166 (94%)
South West	213	213 (100%)	54 (25%)	159 (75%)
Southern	251	233 (93%)	67 (29%)	166 (71%)
Thames	338	307 (91%)	61 (20%)	246 (80%)
Trent	183	182 (99%)	31 (17%)	151 (83%)
Wessex	183	160 (87%)	15 (9%)	145 (91%)
Yorkshire	351	351 (100%)	80 (23%)	271 (77%)

Figure 5-3 presents the proportion of GiA allocated to each RFCC region under the Partnership Funding policy scenario for 2015/16 to 2020/21. The figure also shows the proportion of the total contributions collected by RFCC region.

Figure 5-3: GiA and contributions under the Partnership Funding policy scenario

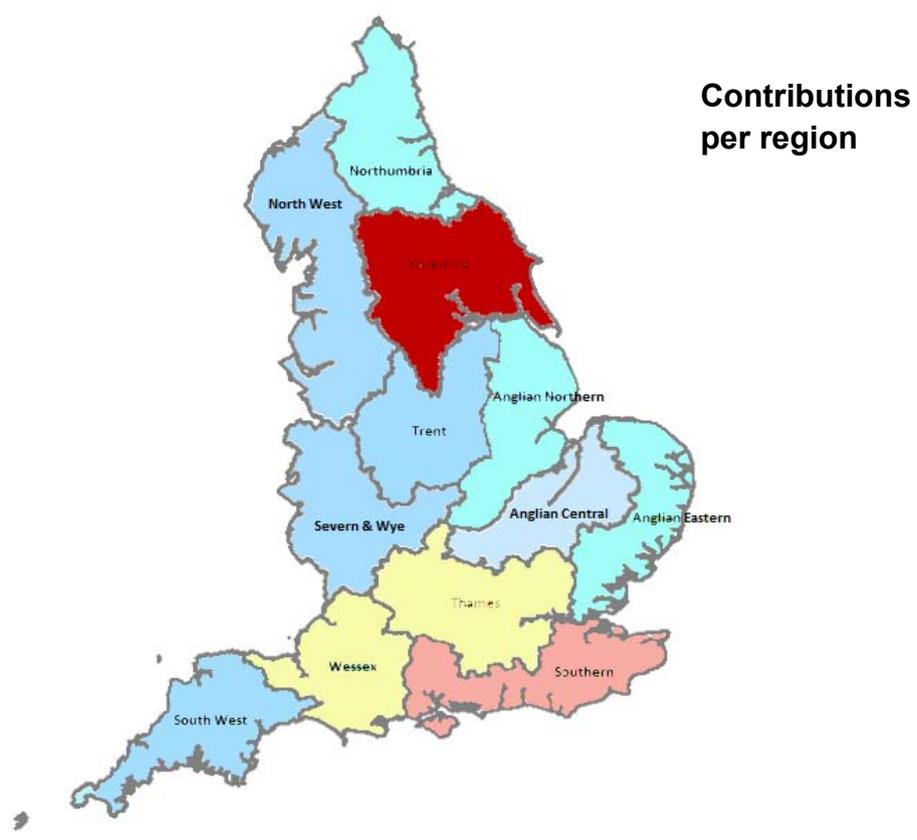
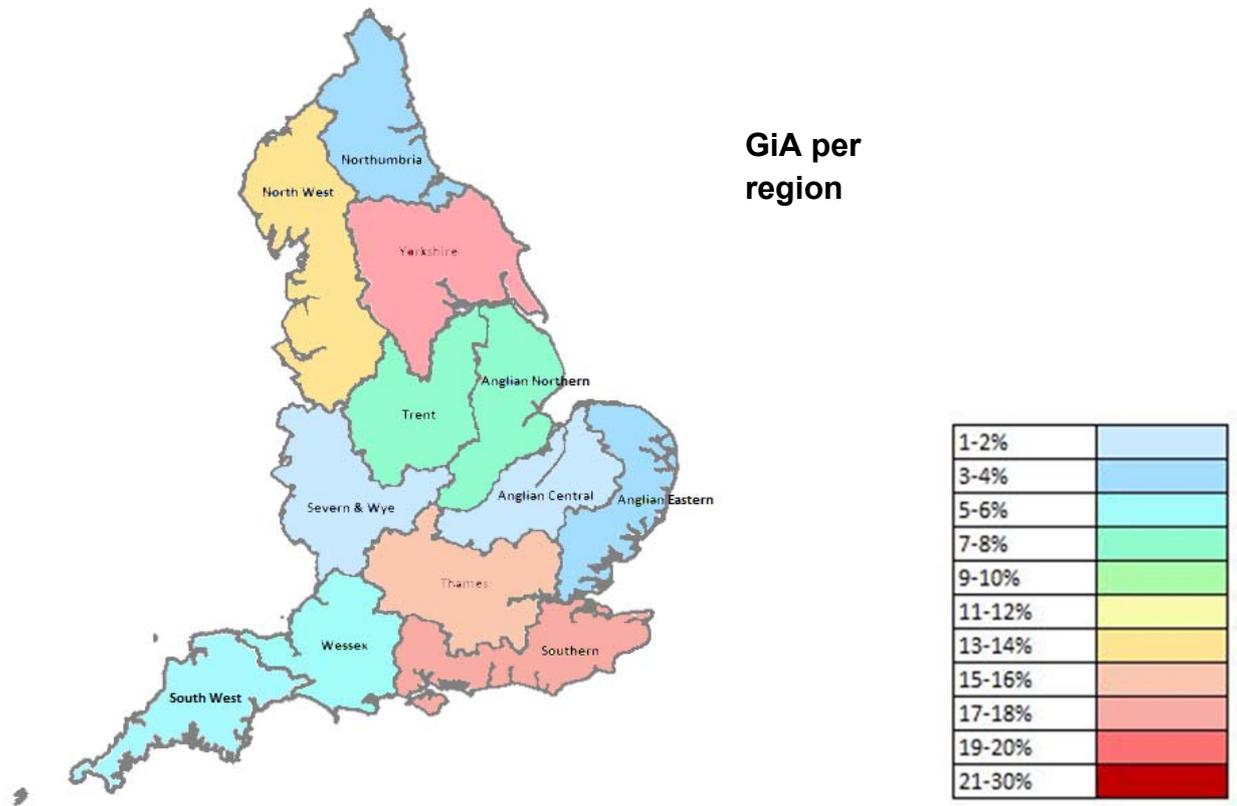
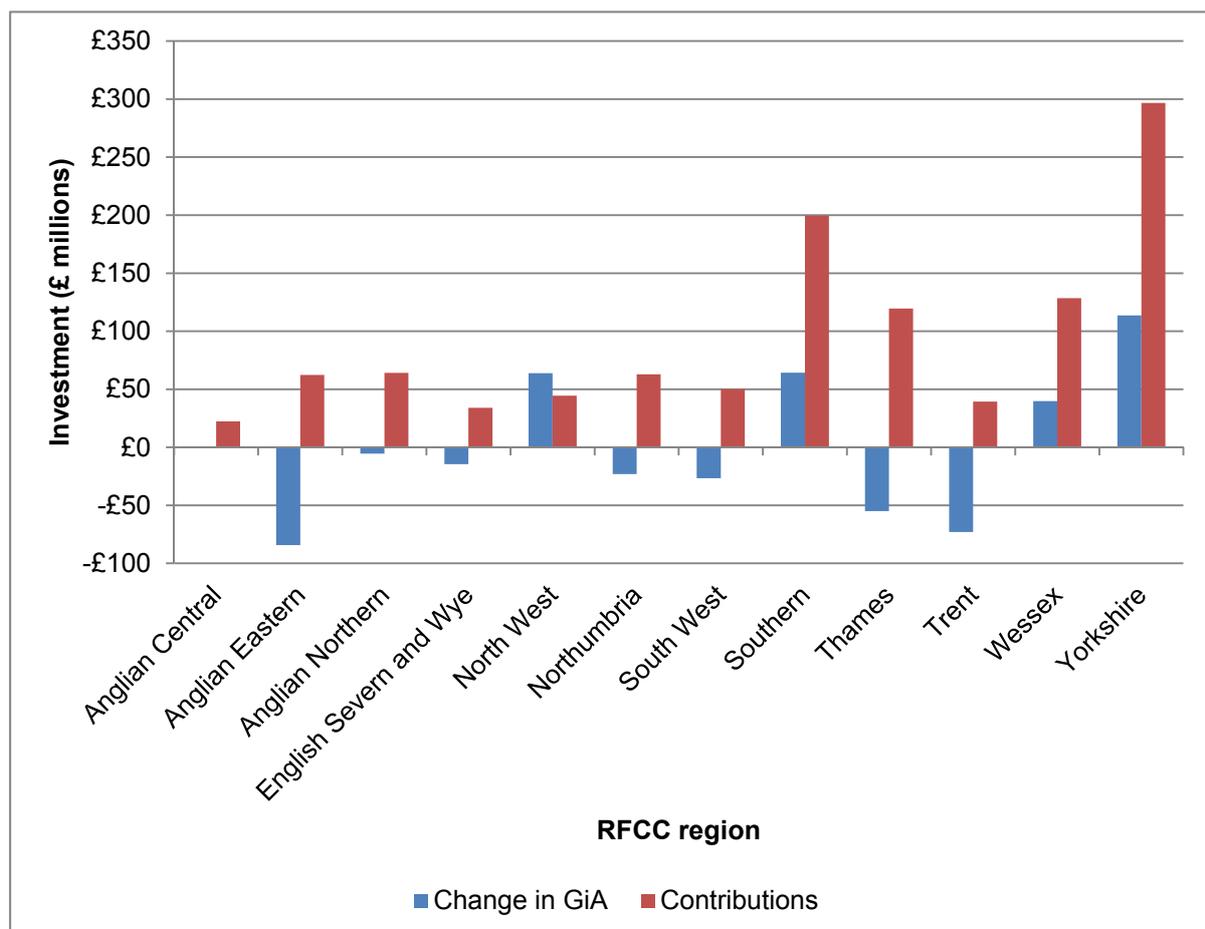


Figure 5-4 shows the change in GiA allocated and contributions made to each RFCC region under the Partnership Funding policy scenario compared with the counterfactual scenario. Whilst the figure shows that some RFCC regions do see a reallocation of GiA to other RFCCs under the Partnership Funding policy scenario compared with the counterfactual scenario, total investment has increased across all RFCC regions except Anglian Eastern, Thames and Trent. Under the Partnership Funding policy scenario, Yorkshire RFCC sees the largest increase in GiA allocated (£406 million) while Anglian Eastern shows a reduction of £66 million, Thames a reduction of £58 million and Trent a reduction of £40 million. This suggests that the Partnership Funding policy scenario results in different schemes being funded in different areas of the country than under the counterfactual scenario. It is important to note that even with this reallocation of GiA under the Partnership Funding policy scenario, all RFCC regions except Anglian Eastern see an increase in the number of schemes that are funded (see also Table 5-4).

Figure 0-4: Chart showing the change in GiA allocated to each region under the Partnership Funding policy scenario compared with the counterfactual



5.3 Distribution by RMA

5.3.1 Number of schemes

Data for 2015/16 to 2020/21 provide a breakdown by five types of RMA:

- Highways Authority
- Internal Drainage Boards (IDBs)
- Environment Agency
- Water companies
- Local Authorities

The data for 2009/10 to 2014/15 distinguish between Environment Agency and 'other'³⁵. Table 5-5 provides the breakdown of number of schemes by led RMA by year.

Most schemes are led by the Environment Agency across both time periods. Local Authorities account for 764 schemes under the counterfactual scenario for 2015/16 to 2020/21 and 934 schemes under the Partnership Funding policy scenario. The proportion of schemes led by each type of RMA does not vary significantly under the counterfactual compared with the Partnership Funding policy scenario. This suggests that each type of RMA is as likely to go ahead with a scheme under the Partnership Funding policy scenario as under the priority scoring system that was used to identify schemes under the counterfactual scenario.

³⁵ Others are identified in the data set by leaving the cell blank, hence, the reliability of the data may be questionable.

Table 5-5: Number of schemes funded by year by RMA

RMA	Year(s)						Total
	09/10	10/11	11/12	12/13	13/14	14/15	
Counterfactual scenario							
Environment Agency	368	56	42	51	34	20	571 (99%)
Others	8	0	0	0	0	0	8 (1%)
Partnership funding policy scenario							
Environment Agency	429	60	54	54	42	23	662 (99%)
Others	8	0	0	0	0	0	8 (1%)
RMA	Year(s)						Total
	15/16	16/17	17/18	18/19	19/20	20/21	
Counterfactual scenario							
Highways Authority	0	0	0	0	0	0	0 (1 scheme funded pre-2015)
Internal Drainage Boards	25	35	18	12	3	17	110 (5%)
Environment Agency	330	188	388	113	77	90	1,186 (57%)
Water companies	1	0	0	0	2	1	4 (0.2%)
Local Authorities	254	255	97	65	37	56	764 (37%)
Partnership funding policy scenario							
Highways Authority	0	0	0	0	0	0	0 (0%)
Internal Drainage Boards	40	36	28	13	4	17	138 (6%)
Environment Agency	487	213	418	123	80	91	1,412 (57%)
Water companies	1	0	0	0	0	0	1 (0.04%)
Local Authorities	321	285	133	76	44	75	934 (38%)

One interviewee felt that the issue of other RMAs having a different process to follow than the Environment Agency needs to be challenged. Local Authorities as risk management authorities only go through outline design and develop an outline business case, and at that point get funding for detailed design and construction. Environment Agency schemes have a different gateway where they do a fully detailed design, go back with a full business case, and then unlock the money for construction. When a Local Authority submits their outline business case they are expected to have their contributions confirmed, but the Environment Agency do not;

if the PF score of an Environment Agency scheme is below 100%, they can still go ahead with detailed design and it is not until they submit their full business case that they need to have the contributions secured. This leaves the Local Authority in a chicken and egg situation for their projects; they struggle to confirm contributions at Outline Business Case stage but they cannot get approval to progress to detailed design without it.

5.3.2 Total investment

The total investment per RMA can also be identified for the Environment Agency and others for 2009/10 to 2014/15 and for the five RMA types in the 2015/16 to 2020/21 data set. Total investment under the counterfactual scenario covers just GiA while under the Partnership Funding policy scenario this includes both GiA and all contributions. Table 5-6 presents the investment figures in £ millions by RMA by year.

Table 5-6 shows that the pattern of investment is similar to the pattern of number of schemes. For 2015/16 to 2020/21, the amount of money invested in schemes led by the Environment Agency is higher as a percentage than the number of schemes (under the counterfactual scenario: 57% of schemes and 63% of investment; and under the Partnership Funding policy scenario: 57% of schemes and 61% of investment). This suggests that Environment Agency schemes tend, on average, to require a higher level of investment. Local Authority schemes make up 37% by number under the counterfactual and 38% under the Partnership Funding policy scenario but 35% (under the counterfactual scenario) and 37% by investment (under the Partnership Funding policy scenario). This suggests that these are typically smaller schemes in terms of level of investment required. This could be explained by the strategic nature of Environment Agency versus the more local nature of Local Authority schemes.

Table 5-6: Total investment in schemes funded by year by RMA (£ millions)

RMA	Year(s)						
	09/10	10/11	11/12	12/13	13/14	14/15	Total
Counterfactual scenario							
Environment Agency	£1.6	£0.24	£0.23	£0.04	£0.05	£0.02	£2.2 (99%)
Others	£0.02	£0.00	£0.00	£0.00	£0.00	£0.00	£0.02 (1%)
Partnership Funding policy scenario							
Environment Agency	£1.9	£0.25	£0.25	£0.05	£0.06	£0.03	£2.5 (99%)
Others	£0.02	£0.00	£0.00	£0.00	£0.00	£0.00	£0.02 (1%)
RMA	Year(s)						
	15/16	16/17	17/18	18/19	19/20	20/21	Total
Counterfactual scenario							
Highways Authority	£0	£0	£0	£0	£0	£0	£0 (0%)
Internal Drainage Boards	£26	£14	£4	£1	£0	£2	£47 (2%)
Environment Agency	£1,050	£304	£61	£26	£14	£7	£1,462 (63%)
Water companies	£1	£0	£0	£0	£0	£0	£1.0 (0.04%)
Local Authorities	£525	£174	£50	£19	£17	£16	£802 (35%)
Partnership Funding policy scenario							
Highways Authority	£0	£0	£0	£0	£0	£0	£0 (0%)
Internal Drainage Boards	£35	£16	£4	£1	£0	£7	£63 (2%)
Environment Agency	£1,358	£485	£86	£41	£16	£19	£2,004 (61%)
Water companies	£1	£0	£0	£0	£0	£0	£0.6 (0.02%)
Local Authorities	£682	£332	£71	£32	£34	£45	£1,195 (37%)

5.3.3 Fully versus part funded schemes

Data are only available on contributions for the 2015/16 to 2020/21 time period. It is assumed that all schemes are fully funded under the counterfactual scenario. Data on contributions per scheme allow an assessment to be made under the Partnership Funding policy scenario of which schemes would be fully funded, with this assumed

to be those with a raw Partnership Funding score that exceeds 100%³⁶; all other schemes are assumed to be part funded. Table 5-7 provides data on fully and part funded schemes by RMA for the Partnership Funding policy scenario.

Table 5-7 shows that water company schemes are all part funded. Although there is only one scheme funded under the Partnership Funding policy scenario, this would be expected given the nature of those schemes. In total, 84% of Environment Agency schemes, 78% of Local Authority schemes and 68% of IDB schemes are part funded.

Table 5-7: Number of fully and part funded schemes by RMA				
RFCC region	Total number of schemes		Number (and %) of fully funded schemes	Number of part funded schemes
<i>Counterfactual</i>				
Highways Authority	0		0 (100%)	-
Internal Drainage Boards	110		110 (100%)	-
Environment Agency	1,186		1,186 (100%)	-
Water companies	4		4 (100%)	-
Local Authorities	764		764 (100%)	-
RFCC region	Total number of schemes	Total number of schemes with sufficient data to assess full or part funding	Number (and %) of fully funded schemes	Number (and %) of part funded schemes
<i>Partnership Funding policy scenario</i>				
Highways Authority	0	0	0	0
Internal Drainage Boards	138	135 (98%)	43 (32%)	92 (68%)
Environment Agency	1,412	1,343 (95%)	215 (16%)	1,128 (84%)
Water companies	1	1 (100%)	0 (0%)	1 (100%)
Local Authorities	934	917 (98%)	199 (22%)	718 (78%)

Considering information obtained from consultees, one interviewee noted that having some GiA did make it easier for other organisations (such as water and sewerage companies) to contribute to schemes. A further interviewee commented that having some GiA for a scheme provided a head start and indicated to other funders that the project was viable and credible.

³⁶ This assumes that the risk of cost under-estimation or benefit over-estimation has been adequately taken into account. In practice, contributions may have been obtained for these schemes to “buy” a margin in the funding score and hence increased certainty of delivery.

Another interviewee reported being encouraged by the Environment Agency to look at alternative sources of funding but they are finding that they are not really applicable for rural schemes, for instance:

- LEPs distribute the growth funds but their focus is on businesses not rural communities;
- S106 is not applicable unless the development plan is going to directly contribute to the flood risk;
- CIL is not working for rural areas. The scheme would really have to protect new development; and
- More obscure sources i.e. Landfill Tax or environmental are available in some cases, but the challenge is that their objectives are completely different to flood objectives so trying to utilise these funding sources often increases scheme costs meaning more contributions are needed, so this is counter-productive.

Potential changes in costs were also highlighted as a concern. One interviewee noted that on more marginal projects where the Partnership Funding score is only just at 100% there is often an issue with getting contributors to understand the risk allowances, and what will happen if project costs increase. The Environment Agency's legal contract for contributions includes a clause that says the Environment Agency will accommodate any cost increases up to the maximum GiA available for the project, but any increases above that will have to be met by the contributors. This generally is not acceptable for contributors as they want cost certainty over how much they will be liable for.

Another interviewee noted that although they are encouraged to find as many different revenue streams as possible it is extremely difficult due to them having to meet different objectives. This then impacts on timescales for project delivery; the contributions need to be confirmed before the Outline Business Case (OBC) can be submitted to National Project Assurance Service (NPAS) for approval, but that is delayed by having to fill out all different kinds of business cases for each of the revenue streams. The interviewee felt that RMAs have to second guess whether they will be able to get the extra funding needed before they start to progress a project. There are cost implications for RMAs starting projects that do not then get past OBC due to being unable to secure the contributions needed.

They also felt that the onus of evidence required to justify schemes was unfairly biased away from Local Authorities. The amount of evidence required to justify schemes makes it less cost-beneficial to develop schemes, having to spend more on the preparatory works than proportionally should be compared with the capital costs of small schemes.

One interviewee remarked that Local Authorities have to dip into their own bank accounts to develop the business case, with the evidence required often being expensive and difficult to obtain. The interviewee highlighted the importance of the role of the local levy in such cases in terms of providing funding for the development of the business case. It was additionally noted that if the business case was not developed well in the early stages, this could make getting Partnership Funding contributions much more difficult later on.

Several interviewees raised the issue over consistency of how the policy is applied to different RMAs with respect to which costs can be claimed under GiA. The sunk costs for the appraisal of a scheme can be significant and take away from the capital budget for actually delivering the scheme. This impacts on the overall affordability of schemes and the ability of Local Authorities to develop schemes. There appears to be inconsistency across the country as to whether Local Authority staff costs can be covered by GiA funding; it appears illogical that if a consultant is hired to carry out certain roles on behalf of the Local Authority then that can be covered but, in some cases, Local Authority staff costs for the same role cannot be covered. There is also a perceived inconsistency as Environment Agency staff costs are covered by GiA for a scheme.

Statutory bodies such as Local Authorities and Water Companies are becoming more familiar with the Partnership Funding process. However, there has not been any timescale reduction for projects as each project deals with a new community. One interviewee felt that as the public do not have a general national awareness of the policy then each project has to educate the specific community as the project begins, and therefore the timescales for projects are quite often driven by community awareness raising.

5.4 Distribution by risk setting

5.4.1 Number of schemes

Data for 2015/16 to 2020/21 can be divided into six risk sources, five linked to flooding and one linked to coastal erosion³⁷:

- Flooding:
 - Fluvial
 - Surface water
 - Coastal flooding
 - Reservoir
 - Groundwater
- Coastal erosion

Table 5-8 presents the number of schemes funded under the counterfactual and the Partnership funding policy scenarios for 2015/16 to 2020/21 for these six categories. The table shows that:

- The proportion of schemes for each risk source is relatively consistent across the counterfactual and Partnership Funding policy scenarios;
- 56% of schemes under both the counterfactual and Partnership Funding policy scenarios were for fluvial flooding;
- Surface water flooding accounted for 27% of schemes under the counterfactual scenario and 28% under the Partnership Funding policy scenarios;
- Coastal flooding accounted for 9% of schemes under both the counterfactual and Partnership Funding policy scenarios;
- 6% of schemes under both the counterfactual and Partnership Funding policy scenarios were for coastal erosion; and

³⁷ The database includes 16 different categories, some of which are variations in the name, e.g. River flooding (non-tidal), River Flooding (Non Tidal), River Flooding (non-tidal). These have been grouped into six categories here to facilitate the analysis. There are records for 1,490 schemes in the counterfactual and 1,992 funded schemes in the full 2015/16 to 2020/21 data set.

- There were just a small number of schemes associated with reservoir and groundwater flooding.

Table 5-8: Number of schemes funded by year by risk source							
Risk source	Year(s)						Total
	15/16	16/17	17/18	18/19	19/20	20/21	
Counterfactual scenario							
Fluvial flooding	351	262	81	50	17	71	832 (56%)
Surface water flooding	123	141	58	29	21	33	405 (27%)
Coastal flooding	61	31	16	9	7	10	134 (9%)
Reservoir flooding	0	1	1	1	0	0	3 (0.2%)
Groundwater flooding	7	4	4	2	0	0	17 (1.1%)
Coastal erosion	29	18	12	12	11	13	95 (6%)
Partnership Funding policy scenario							
Fluvial flooding	486	285	113	62	19	77	1,042 (56%)
Surface water flooding	161	159	89	37	25	46	517 (28%)
Coastal flooding	95	31	15	11	8	10	170 (9%)
Reservoir flooding	2	2	1	1	0	0	6 (0.3%)
Groundwater flooding	9	5	5	2	0	0	21 (1.1%)
Coastal erosion	39	22	15	10	10	13	109 (6%)

5.4.2 Total investment

Total investment by risk source under the counterfactual and Partnership Funding policy scenarios for 2015/16 to 2020/21 is provided in Table 5-9. The table shows that the percentage investment for coastal flooding is significantly higher than the percentage by number of schemes (9% of schemes but 24% of investment under the counterfactual scenario and 9% of schemes and 28% of investment under the Partnership Funding policy scenario). This could suggest that these schemes are investment heavy, or alternatively it could be an indication of their larger scale. The opposite is seen for surface water flooding, where this accounts for 27% of schemes but just 7% of investment (counterfactual scenario) and 28% of schemes and 10% of investment (Partnership Funding policy scenario).

Table 5-9: Investment by risk source (£ millions)							
Risk source	Year(s)						Total
	15/16	16/17	17/18	18/19	19/20	20/21	

Table 5-9: Investment by risk source (£ millions)

Risk source	Year(s)						Total
	15/16	16/17	17/18	18/19	19/20	20/21	
Counterfactual scenario							
Fluvial flooding	£964	£301	£31	£24	£11	£7.6	£1,339 (60%)
Surface water flooding	£61	£72	£15	£5.3	£3.7	£3.1	£161 (7%)
Coastal flooding	£444	£63	£25	£7.6	£2.4	£2.6	£544 (24%)
Reservoir flooding	£0	£0.08	£0.03	£0.10	£0	£0	£0.20 (0.01%)
Groundwater flooding	£6.0	£2.8	£0.41	£0.35	£0	£0	£9.6 (0.4%)
Coastal erosion	£97	£43	£8.8	£3.8	£12	£11	£174 (8%)
Partnership Funding policy scenario							
Fluvial flooding	£975	£587	£63	£35	£15	£23	£1,698 (54%)
Surface water flooding	£140	£98	£31	£11	£7.9	£16	£303 (10%)
Coastal flooding	£794	£45	£18	£18	£4.1	£6.7	£887 (28%)
Reservoir flooding	£12	£10	£0.03	£0.1	£0	£0	£23 (0.7%)
Groundwater flooding	£7.7	£3.2	£0.5	£0.4	£0	£0	£12 (0.4%)
Coastal erosion	£96	£74	£10	£5.3	£19	£24	£228 (7%)

5.4.3 Fully versus part funded schemes

It is assumed that all schemes are fully funded under the counterfactual scenario. Under the Partnership Funding policy scenario, those schemes with a raw Partnership Funding score of 100%³⁸ or greater and which have not included any contributions are assumed to be fully funded. All other schemes (i.e. those with a raw Partnership Funding score of less than 100% or with a raw Partnership Funding score of greater than 100% but which also collected contributions) are assumed to be part funded. The results are shown in Table 5-10.

³⁸ This assumes that the risk of cost under-estimation or benefit over-estimation has been adequately taken into account. In practice, contributions may have been obtained for these schemes to “buy” a margin in the funding score and hence increased certainty of delivery.

Table 5-10: Number of fully and part funded schemes by risk source				
RFCC region	Total number of schemes		Number of fully funded schemes	Number of part funded schemes
<i>Counterfactual scenario</i>				
Fluvial flooding	832		832 (100%)	-
Surface water flooding	405		405 (100%)	-
Coastal flooding	134		134 (100%)	-
Reservoir flooding	3		3 (100%)	-
Groundwater flooding	17		17 (100%)	-
Coastal erosion	95		95 (100%)	-
RFCC region	Total number of schemes	Total number of schemes with sufficient data to assess full or part funding	Number of fully funded schemes	Number of part funded schemes
<i>Partnership Funding policy scenario</i>				
Fluvial flooding	1,042	977 (94%)	234 (24%)	743 (76%)
Surface water flooding	517	507 (98%)	118 (23%)	389 (77%)
Coastal flooding	170	161 (95%)	65 (40%)	96 (60%)
Reservoir flooding	6	5 (83%)	2 (40%)	3 (60%)
Groundwater flooding	21	21 (100%)	4 (19%)	17 (81%)
Coastal erosion	109	108 (99%)	29 (27%)	79 (73%)

Table 5-10 shows that under the Partnership Funding policy scenario:

- Risk source with highest percentage of fully funded schemes: reservoir flooding (40%), but only across a small sample of six schemes and coastal flooding (40%); and
- Risk source with lowest percentage of fully funded schemes: groundwater flooding (19%). Surface water flooding has 23% of fully funded schemes with fluvial flooding at 24% and coastal erosion at 27%.

One interviewee from a coastal area remarked that whilst they were aware of low value projects (i.e. around £200,000) that had been fully GiA funded, they had not worked on any fully funded projects themselves. They felt that this was because the nature of schemes put forward in their area meant that they tended to either score relatively low on Outcome Measure 2 or have high costs, with the result that funding gaps occurred.

Another interviewee suggested that the Partnership Funding calculator has much more flexibility when it comes to flood risk in comparison to erosion risk. In their view the Partnership Funding calculator does not work particularly well for coastal erosion adaptation, whereas with flooding it can look at property level

protection/resilience. This creates a situation where for coastal erosion, RMAs either provide a traditional defence scheme or do nothing. As there are increasingly more areas that will be affected by climate change, the interviewee indicated that there is a need to further consider adaption and how this fits with the Partnership Funding calculator. This will be important for areas where there is about to be a policy change to 'managed realignment' or 'no active intervention' and where funding is required to bring about the adaptation measures needed.

5.4.5 Urban versus rural areas

One interviewee (based in an urban area) felt that the Partnership Funding calculator might work better in a rural situation than in an urban one where the river and sewerage systems interlink and any modelling is very complex. The interviewee thought that the existing calculator did not work for the needs of urban boroughs, and this was leading to reluctance on the behalf of LLFAs to commit money to projects when there was uncertainty about the project's likely success at the national level. They expressed concern that this issue was compounded by a lack of resources (at the Local Authority level) for scoping work and feasibility studies, leading to projects being delayed or falling off the programme altogether. Another interviewee raised a different issue, highlighting that in rural areas the businesses affected tend to be small independent businesses with little capacity for raising contributions.

5.5 Distribution by type of technical solution

5.5.1 Smaller versus larger schemes

One interviewee has found it very difficult to justify engineered solutions for smaller schemes, as generally they are only protecting a small number of properties (due to the rural nature of the area) and have low benefit-cost ratios. The communities and Local Authority would prefer to do an engineered scheme to tackle the underlying problem but are finding that the Partnership Funding calculator leads to them taking a property level resilience (PLR) route which only deals with the resulting consequences and not the cause. This also creates problems with community buy-in as residents generally question whether PLR is worth the investment.

When considering the type of technical solution to use, one interviewee noted that it was very difficult to model the impacts of lots of small interventions. They felt that there was a need to move away from highly modelled flood risk and instead start thinking about total risk rather than individual risk.

5.5.2 Grey versus green solutions

One interviewee made the point that natural flood management (NFM) options were more difficult to model, and a standard of protection (SoP) could not be guaranteed

in such instances. This meant that there was sometimes less willingness for these options to be taken forwards. Another interviewee reinforced this point, stating that Environment Agency staff members know what the basic design and standard of protection (SoP) should be for grey or traditional infrastructure, and the limited resources available mean that they do not necessarily investigate including NFM in schemes. It was thought that designing a traditional/grey defence is much simpler as there are usually defined plans with costs and there is more evidence available to show how many houses will be protected.

One interviewee felt that the Partnership Funding process can be a hindrance to community engagement when the scheme is being forced down the route of PLR. Communities would prefer to see engineering works on the ground rather than a survey of their property for PLR to find out how much it is going to cost them. The interviewee thought that communities tend to have numerous ideas of what could be done but the Partnership Funding calculator does not support the funding for them.

6. Benefits to communities

6.1 Research questions covered

Section 6 focuses on responses to research questions 3 and 5:

- RQ3: How effective has the “equity weighting” of GiA payment rates towards deprived communities been in practice?
- RQ5: Overall, what does the data reveal about quantifiable trade-offs between supporting different groups and outcomes?

This includes analysis of the number of households better protected from flooding or coastal erosion between the counterfactual and Partnership Funding policy scenarios, and a breakdown of households by level of flood risk or timing of erosion risk, and by level of deprivation. The location of household benefits is also described.

6.2 Number of households at flood risk

6.2.1 Number of households moved to a lower flood probability (OM2)

Data are available on the number of households moved to a lower flood probability (OM2) through schemes under the counterfactual and the Partnership Funding policy scenarios for the 2015/16 to 2020/21 time periods. For 2009/10 to 2014/15, data are only available on the total number of residences benefiting with this not differentiated into flood or erosion risk, hence, all figures for 2009/10 to 2014/15 cover both flooding and erosion risk. Note that the Partnership Funding policy scenario includes all households benefiting from schemes funded in any year between 2015/16 and 2020/21 even if those benefits are not claimed in the 2015/16 to 2020/21 data set until after 2021.

The total number of households benefiting under Outcome Measure 2 is:

- Period between 2009/10 and 2014/15³⁹:
 - Counterfactual scenario: 3,745,700

³⁹ Based on number of residences benefiting, so covers all flood risk and erosion risk schemes.

- Partnership Funding policy scenario: 3,812,800
- *Additional properties protected under the Partnership Funding policy scenario: 67,100 or an additional 1.8%*
- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: 375,772
 - Partnership Funding policy scenario: 440,866 (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional properties protected under the Partnership Funding policy scenario: 65,094 or an additional 17%*

6.2.2 Number of households whose probability of flooding is reduced (OM2b)

The number of households moved from very significant risk to significant risk to moderate or low risk under OM2b is:

- Period between 2009/10 and 2014/15⁴⁰:
 - Counterfactual scenario: 3,152,140
 - Partnership Funding policy scenario: 3,304,200
 - *Additional properties protected: 152,060 or an additional 4.8 under the Partnership Funding policy scenario*
- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: 187,058
 - Partnership Funding policy scenario: 222,331 (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional properties protected: 35,273 or an additional 19% under the Partnership Funding policy scenario*

⁴⁰ Based on number of residences assigned a risk factor of 1 (high risk area) or 2 (very high risk area).

6.2.3 Number of households in 20% most deprived areas whose probability of flooding is reduced (OM2c)

The number of households within the 20% most deprived areas that are moved from very significant risk to significant risk to moderate or low risk under OM2c is:

- Period between 2009/10 and 2014/15⁴¹:
 - Counterfactual scenario: 2,450
 - Partnership Funding policy scenario: 3,230
 - *Additional properties protected: 780 or an additional 32% under the Partnership Funding policy scenario*
- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: 46,466
 - Partnership Funding policy scenario: 51,937 (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional properties protected: 5,471 or an additional 12% under the Partnership Funding policy scenario*

6.3 Investment in households at flood risk

6.3.1 Investment to move households to a lower flood probability (OM2)

Total investment is calculated as expenditure (GiA under the counterfactual scenario and GiA plus contributions for the Partnership Funding policy scenario) across all schemes that would result in benefits to households. Since the total investment only covers those schemes that result in benefits to households, the figures are lower than those reported across all schemes in Section 4.2.

The total investment associated with delivering Outcome Measure 2 is:

- Period between 2009/10 and 2014/15⁴²:

⁴¹ Based on number of residences assigned a social affluence rank of -1 or -2 (based on rank of deprivation of ward).

- Counterfactual scenario: £630 million
- Partnership Funding policy scenario: £840 million
- *Additional investment to protect properties at risk of flooding: £210 million or an additional 34% under the Partnership Funding policy scenario* (this seems a very large increase in investment to protect what is only a small increase in number of households hence there is some uncertainty over the reliability of these figures)
- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: £1,900 million
 - Partnership Funding policy scenario: £2,600 million (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional investment to protect properties at risk of flooding: £710 million (to two significant figures) or an additional 37% under the Partnership Funding policy scenario*

One interviewee noted that there is a discrepancy between the size of community and the ability of that community to raise the contributions needed. Small communities at risk from surface water or ordinary watercourses appear to be at a disadvantage compared with communities at risk from main rivers, where generally there is a large number of properties at risk and therefore the magnitude of individual contributions is much less.

6.3.2 Investment to move households to moderate or low risk (OM2b)

Investment associated with schemes that result in households moving from very significant risk to significant risk to moderate or low risk under OM2b is:

- Period between 2009/10 and 2015/15⁴³:

⁴² Only including those schemes where at least one residence is shown as benefiting. The large difference between total investment of £2.2 billion under the counterfactual scenario and £2.5 billion under the Partnership Funding policy scenario identified in Section 4.2 and the investment in properties estimated here suggests that there may be a lot of data gaps in the 2009/10 to 2014/15 dataset and, as such, there may be considerable uncertainty in these figures.

⁴³ Based on number of residences assigned a risk factor of 1 (high risk area) or 2 (very high risk area) and only including those schemes where at least one residence is shown as benefiting.

- Counterfactual scenario: £440 million
- Partnership Funding policy scenario: £540 million
- *Additional investment to protect properties at very significant or significant risk of flooding: £100 million or an additional 23% under the Partnership Funding policy scenario (again this is a very large increase in investment to protect what is only a small increase in number of households, hence there is some uncertainty over the reliability of these figures)*
- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: £1,400 million
 - Partnership Funding policy scenario: £1,900 million (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional investment to protect properties at very significant or significant risk of flooding: £450 million (to two significant figures) or an additional 32% under the Partnership Funding policy scenario*

6.3.3 Investment to move households in 20% most deprived to moderate or low risk (OM2c)

Investment associated with schemes that move households within the 20% most deprived from very significant risk to significant risk to moderate or low risk under OM2c is:

- Period between 2009/10 and 2014/15⁴⁴
 - Counterfactual scenario: £27 million
 - Partnership Funding policy scenario: £41 million
 - *Additional investment to protect properties at risk of flooding in the 20% most deprived areas: £14 million or an additional 50% under the Partnership Funding policy scenario (as above, this seems a very large increase in investment to protect what is only a small increase in*

⁴⁴ Based on number of residences assigned a social affluence rank of -1 or -2 (based on rank of deprivation of ward) and only including those schemes where at least one residence is shown as benefiting.

number of households hence there is some uncertainty over the reliability of these figures)

- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: £684 million
 - Partnership Funding policy scenario: £851 million (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional investment to protect properties at risk of flooding in the 20% most deprived areas: £170 million (to two significant figures) or an additional 24% under the Partnership Funding policy scenario*

6.4 Location of expenditure on flood risk

Data for 2015/16 to 2020/21 can be used to identify the location of household benefits, by RFCC region. Table 6-1 presents the number of households protected under Outcome Measure 2, Outcome Measure 2b and Outcome Measure 2c by RFCC region. Table 6-2 then identifies the difference between the counterfactual and the Partnership Funding policy scenarios by outcome measure. Tables 6-1 and 6-2 show that:

- Outcome Measure 2: Households at flood risk: number of households moved out of any flood probability category to a lower category.
 - The RFCC region where the greatest number of households is better protected is Southern for both scenarios. Under the Partnership Funding policy scenario, around 93,000 households are better protected in Southern Region; for the counterfactual this figure is lower at around 82,000.
 - The RFCC region where the lowest number of households is better protected is English Severn and Wye. Both scenarios provide better protection for around 3,800 households.
 - The region showing the greatest difference between the scenarios in terms of number of households better protected is Yorkshire, with around 50,000 more households better protected under the Partnership Funding policy scenario than the counterfactual.
 - The region showing the smallest difference between the scenarios in terms of number of households better protected is English Severn and Wye (44 more households are better protected under the Partnership Funding policy scenario).

- Five RFCC regions show a decrease in the number of properties protected under the Partnership Funding policy scenario compared with the counterfactual, even though the overall number protected across England increases by 65,000:
 - Thames: reduction of 9,091 properties protected
 - Anglian Northern: reduction of 2,633
 - Anglian Eastern: reduction of 2,039
 - Anglian Central: reduction of 613
 - Trent: reduction of 459
- Outcome Measure 2b: Households at flood risk: investment to move households to moderate or low risk.
 - The RFCC region where the greatest number of households is moved to moderate or low risk is Southern for both the Partnership Funding policy scenario (around 41,000 households) and the counterfactual (around 39,000 households).
 - The RFCC region with the lowest number of households moved to moderate or low risk is English Severn and Wye for both the Partnership Funding policy scenario (around 2,300 households) and the counterfactual (around 2,600 households). Wessex region shows just 1,800 properties protected under the counterfactual, although this increases to more than 10,000 under the Partnership Funding policy scenario.
 - The RFCC region where there is the greatest difference between the scenarios is Yorkshire, where around 29,000 more households were moved to moderate or low risk under the Partnership Funding policy scenario than under the counterfactual.
 - The RFCC region showing the smallest difference between the scenarios is Trent, where 108 fewer households were moved to moderate or low risk under the Partnership Funding policy scenario than under the counterfactual. The smallest increase in properties protected is in Northumbria, where an additional 609 properties are protected under the Partnership Funding policy scenario compared with the counterfactual.
 - Seven RFCC regions (out of 12) show a reduction in number of households protected (Thames, North West, Anglian Eastern, Anglian Central, Anglian Northern, English Severn and Wye and Trent) even

though the overall number protected across England increases by 35,300.

- Outcome Measure 2c: Households at flood risk: number of households in 20% most deprived areas whose probability of flooding is reduced.
 - The RFCC region where the greatest number of deprived households is moved to moderate or low risk is North West region under both the Partnership Funding policy scenario and the counterfactual. Both scenarios move around 16,000 households.
 - The RFCC region with the lowest number (zero) of deprived households moved to moderate or low risk is English Severn and Wye for both the Partnership Funding policy scenario and the counterfactual.
 - The RFCC region showing the greatest difference between the scenarios in terms of number of households better protected is Yorkshire, where around 5,100 more households are moved to moderate or low risk under the Partnership Funding policy scenario than the counterfactual.

Three RFCC regions show no difference between the counterfactual scenario and Partnership Funding policy scenario in terms of number of properties better protected (Anglian Northern, English Severn and Wye, and Wessex). Four RFCC regions (Anglian Eastern, Northumbria, Trent and Anglian Central), show a decrease in the number of properties protected, although the total protected across England as a whole does increase by 5,471.

Table 6-1: Number of households better protected from flood risk by RFCC region (2015/16 to 2020/21)

RFCC region	Outcome Measure 2		Outcome Measure 2b		Outcome Measure 2c	
	Counter-factual scenario	PF policy scenario	Counter-factual scenario	PF policy scenario	Counter-factual scenario	PF policy scenario
Anglian Central	7,048	6,435	3,028	2,307	23	0
Anglian Eastern	11,629	9,590	6,710	5,623	3,720	3,128
Anglian Northern	63,960	61,327	34,991	34,469	14,095	14,095
English Severn and Wye	3,759	3,803	2,601	2,329	0	0
North West	45,291	46,020	35,219	33,987	16,110	16,339
Northumbria	6,394	6,683	3,052	3,661	1,496	1,422
South West	15,193	18,748	7,086	10,284	684	704
Southern	81,580	92,588	38,537	40,945	1,464	1,933
Thames	79,792	70,701	18,392	14,013	2,476	2,842
Trent	21,199	20,740	16,646	16,538	3,409	3,355
Wessex	8,916	23,345	1,754	10,372	141	141
Yorkshire	31,011	80,886	19,042	47,803	2,848	7,978

Table 6-2: Difference in number of households better protected under the PF policy scenario than the counterfactual scenario

RFCC region	Outcome Measure 2	Outcome Measure 2b	Outcome Measure 2c
Anglian Central	-613	-721	-23
Anglian Eastern	-2,039	-1,087	-592
Anglian Northern	-2,633	-522	0
English Severn and Wye	44	-272	0
North West	729	-1,232	229
Northumbria	289	609	-74
South West	3,555	3,198	20
Southern	11,008	2,408	469
Thames	-9,091	-4,379	366
Trent	-459	-108	-54
Wessex	14,429	8,618	0
Yorkshire	49,875	28,761	5,130

6.5 Number of households at erosion risk

6.5.1 Number of households better protected against coastal erosion (OM3)

Data are available on the number of households better protected against coastal erosion (OM3) through schemes under the counterfactual scenario and the Partnership Funding policy scenario for the 2015/16 to 2020/21 time periods. Note that the Partnership funding policy scenario includes all households benefiting from schemes funded in any particular year even if those benefits are not claimed until after 2021.

The total number of households benefiting under Outcome Measure 3 is:

- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: 22,232
 - Partnership Funding policy scenario: 23,578 (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional properties protected: 1,346 or an additional 6% under the Partnership Funding policy scenario*

6.5.2 Number of households better protected against coastal erosion in a 20 year period (OM3b)

The number of households protected from loss due to coastal erosion in a 20-year period under OM3b is:

- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: 2,595
 - Partnership Funding policy scenario: 2,607 (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional properties protected: 12 or an additional 0.5% under the Partnership Funding policy scenario⁴⁵*

⁴⁵ The dataset for 2015/16 to 2020/21 includes properties under OM3c but not always under OM3b, and some under OM3b that are not also included under OM3c. As a result, the number of properties additionally benefiting under OM3b is likely to be under-estimated as it would be

6.5.3 Number of households in 20% most deprived areas better protected against coastal erosion in a 20 year period (OM3c)

The number of households within the 20% most deprived areas protected from loss due to coastal erosion in a 20-year period under OM3c is:

- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: 551
 - Partnership Funding policy scenario: 658 (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional properties protected: 107 or an additional 19% under the Partnership Funding policy scenario*

6.6 Investment in households at erosion risk

6.6.1 Investment to better protect households against coastal erosion (OM3)

Total investment is calculated as expenditure (GiA under the counterfactual and GiA plus contributions for the Partnership Funding policy scenario) across all schemes that would result in benefits to households. Total investment shown here just relates to those schemes that provide benefits to better protect households against erosion risk.

The total investment associated with delivering Outcome Measure 3 is:

- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: £215 million
 - Partnership Funding policy scenario: £301 million (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional investment to protect properties at risk of erosion: £86 million or an additional 40% under the Partnership Funding policy scenario*

expected that this would be a sub-set of the properties protected under OM3, and likewise that the number of properties affected under OM3c would be a subset of those protected under OM3b.

6.6.2 Investment to better protect households against coastal erosion in a 20 year period (OM3b)

Investment associated with schemes that result in households being protected from loss due to coastal erosion in a 20-year period under Outcome Measure 3b is:

- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: £112 million
 - Partnership Funding policy scenario: £169 million (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional investment to protect properties at risk of erosion in a 20 year period: £57 million or an additional 51% under the Partnership Funding policy scenario*

It is worth noting that one respondent to the online survey felt that coastal erosion schemes did not score well under the present Partnership Funding calculator and there were no low cost alternatives to coastal erosion as there were with flooding (i.e. property level protection in place of a large scheme). An interviewee also queried whether coastal schemes were high enough on the agendas of the RFCCs, given that 80% of RFCC funding goes on fluvial and inland schemes.

6.6.3 Investment to better protect households in 20% most deprived areas better protected against coastal erosion in a 20 year period (OM3c)

Investment associated with schemes that protect households within the 20% most deprived areas from loss due to coastal erosion in a 20-year period under Outcome Measure 3c is:

- Period between 2015/16 and 2020/21:
 - Counterfactual scenario: £59 million
 - Partnership Funding policy scenario: £84 million (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional investment to protect properties at risk of erosion in the 20% most deprived areas: £24 million or an additional 42% under the Partnership Funding policy scenario*

6.7 Location of expenditure on erosion risk

Data for 2015/16 to 2020/21 can be used to identify the location of household benefits, by RFCC region. Table 6-3 presents the number of households protected under Outcome Measure 3, Outcome Measure 3b and Outcome Measure 3c by RFCC region. Table 6-4 then identifies the difference between the counterfactual and the Partnership Funding policy scenarios by outcome measure.

Table 6-3: Number of households better protected from erosion risk by RFCC region (2015/16 to 2020/21)

RFCC region	Outcome Measure 3		Outcome Measure 3b		Outcome Measure 3c	
	Counter-factual scenario	PF policy scenario	Counter-factual scenario	PF policy scenario	Counter-factual scenario	PF policy scenario
Anglian Central*	0	0	0	0	0	0
Anglian Eastern	2,700	2,516	317	402	51	156
Anglian Northern	0	0	0	0	0	0
English Severn and Wye*	0	0	0	0	0	0
North West	1,949	1,949	91	91	114	114
Northumbria	1,120	1,144	285	199	130	130
South West	141	151	76	76	0	0
Southern	12,568	12,828	1,445	1,445	148	148
Thames*	0	0	0	0	0	0
Trent*	0	0	0	0	0	0
Wessex	2,740	4,337	86	121	2	4
Yorkshire	1,014	653	295	273	106	106

Notes:
* Anglian Central, English Severn and Wye, Thames and Trent have no or very little coastline

Table 6-4: Difference in number of households better protected under the Partnership Funding policy scenario than the counterfactual scenario

RFCC region	Outcome Measure 3	Outcome Measure 3b	Outcome Measure 3c
Anglian Central	0	0	0
Anglian Eastern	-184	85	105
Anglian Northern	0	0	0
English Severn and Wye	0	0	0
North West	0	0	0
Northumbria	24	-86	0
South West	10	0	0
Southern	260	0	0
Thames	0	0	0
Trent	0	0	0
Wessex	1,597	35	2
Yorkshire	-361	-22	0

Tables 6-3 and 6-4 show that:

- Outcome Measure 3: Number of households better protected against coastal erosion.
 - The RFCC region where the greatest number of households is better protected against coastal erosion under the Partnership Funding policy scenario is Southern (13,000).
 - The RFCC region with the greatest difference between the counterfactual scenario and the Partnership Funding policy scenario is Wessex, with around 1,600 more households better protected under the Partnership Funding policy scenario.
 - The RFCC region with the lowest number of households better protected against coastal erosion under the Partnership Funding policy is South West (151).
 - Two RFCC regions show a reduction in the number of properties protected against coastal erosion under the Partnership Funding policy scenario compared with the counterfactual in two regions (Yorkshire and Anglian East).

- Outcome Measure 3b: number of households better protected against coastal erosion in a 20 year period.
 - The RFCC region where the greatest number of households is protected in a 20 year period under the Partnership Funding policy is again Southern (1,400).
 - The RFCC regions showing the greatest difference between the counterfactual scenario and the Partnership Funding policy scenario are Anglian Eastern (85 more households protected under the Partnership Funding scenario) and Northumbria (86 fewer properties protected under the Partnership Funding scenario).
 - Only four RFCC regions show a change in number of properties protected between the Partnership Funding policy and counterfactual scenarios. Of those RFCCs where some properties are protected under Outcome Measure 3b, the RFCC region with the lowest number of households protected in a 20 year period under the Partnership Funding policy is South West (76). North West, Southern and South West show no difference in the number of properties better protected between the counterfactual scenario and Partnership Funding policy scenarios⁴⁶.
 - Two RFCC regions show a decrease in the number of properties protected: Northumbria and Yorkshire.
- Outcome Measure 3c: number of households in 20% most deprived areas better protected against coastal erosion in a 20 year period.
 - The RFCC region where the greatest number of deprived households is protected in a 20 year period under the Partnership Funding policy is Anglian Eastern (156).
 - The RFCC region with the greatest difference between the counterfactual scenario and the Partnership Funding policy scenario is also Anglian Eastern (105).
 - The RFCC region with the lowest number of deprived households protected in a 20 year period under the Partnership Funding policy is Wessex (4 properties protected) (excluding regions with no properties protected). Only Anglian Eastern and Wessex show any difference

⁴⁶ Anglian Central, English Severn and Wye, Thames and Trent have no or very little coastline.

between the counterfactual scenario and the Partnership Funding policy scenarios for Outcome Measure 3c.

6.8 Number of non-residential properties moved to a lower flood probability

Data on number of non-residential properties moved to a lower flood probability are only available for the 2009/10 to 2014/15 time period. The analysis shows that there are 3,230 non-residential properties protected under the counterfactual scenario and 4,679 non-residential properties protected under the Partnership Funding policy scenario. Table 6-5 provides the breakdown of non-residential properties protected by year. This is equal to an additional 1,449 non-residential properties being better protected under the Partnership Funding policy scenario.

Table 6-5: Number of non-residential properties moved to a lower flood probability (number)

Data	Year(s)						Total
	09/10	10/11	11/12	12/13	13/14	14/15	
<i>Counterfactual scenario</i>							
All non-res props	2,807	271	6	71	75	0	3,230
Manuf. Props	130	84	0	23	12	0	249
Agric. Props	1,203	1	0	1	2	0	1,207
Leisure Props	84	10	0	11	13	0	118
Office Props	230	76	0	11	11	0	328
Dist. Props	1	8	0	4	11	0	24
Retail Props	1,159	92	6	21	26	0	1,304
<i>Partnership Funding policy scenario</i>							
All non-res props	4,137	317	76	71	78	0	4,679
Manuf. Props	154	84	11	23	14	0	286
Agric. Props	1,212	1	0	1	2	0	1,216
Leisure Props	124	10	1	11	14	0	160
Office Props	1,146	98	28	11	11	0	1,294
Dist. Props	6	8	0	4	11	0	29
Retail Props	1,495	116	36	21	26	0	1,694

6.9 Number of households built before and after 2009 moved to a lower flood probability by location

There are no data on the number of households built before and after 2009, so it has not been possible to undertake this analysis.

7. Benefits for the environment

7.1 Research questions covered

This section focuses on the response to research question 4, covering benefits to the environment:

- RQ4: What has payment for environmental outcomes achieved (e.g. in terms of hectares of improved or replacement habitat), and how are these distributed across space and between rural, urban, deprived and non-deprived communities?

This includes discussion on the areas (and km) of different habitats delivered under the Partnership Funding policy scenario. The section also discusses the extent to which benefits to the environment are delivered in the most deprived 20% areas and by RFCC region more generally.

Data for habitats covered by Outcome Measure 4 are directly available from the 2015/16 to 2020/21 data set. Data for 2009/10 to 2014/15 relate to different definitions of environmental benefits and so are analysed separately.

7.2 Benefits under OM4

7.2.1 Area of water dependent habitat created or improved (OM4a)

For the period between 2015/16 and 2020/21, the total amount of water dependent habitat created or improved is:

- Counterfactual scenario: 3,776 ha
- Partnership Funding policy scenario: 11,596 ha (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
- *Additional ha: 7,819 or an increase of 207% under the Partnership Funding policy scenario*

Total investment in water dependent habitat created or improved is (note this includes the total costs for the scheme and not specifically the costs associated with delivery of Outcome Measure 4a):

- Counterfactual scenario: £315 million
- Partnership Funding policy scenario: £399 million (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
- *Additional investment: £84 million or 27% increase under the Partnership Funding policy scenario*

Cost per ha of delivering water dependent habitat can therefore be estimated at:

- Counterfactual scenario: £83,000 per ha
- Partnership Funding policy scenario: £34,000 per ha
- *Costs per additional ha: £11,000 per ha under the Partnership Funding policy scenario*

7.2.2 Area of intertidal habitat created (OM4b)

For the period between 2015/16 and 2020/21, the total area of intertidal habitat created is:

- Counterfactual scenario: 894 ha
- Partnership Funding policy scenario: 2,277 ha (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
- *Additional ha: 1,383 or an increase of 155% under the Partnership Funding policy scenario*

Total investment in intertidal habitat created or improved is (note this includes the total costs for the scheme and not specifically the costs associated with delivery of Outcome Measure 4b):

- Counterfactual scenario: £52 million
- Partnership Funding policy scenario: £116 million (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
- *Additional investment: £64 million or an increase of 125% under the Partnership Funding policy scenario*

Cost per ha of delivering intertidal habitat can therefore be estimated at:

- Counterfactual scenario: £58,000 per ha
- Partnership Funding policy scenario: £51,000 per ha
- *Costs per additional ha: £47,000 per ha under the Partnership Funding policy scenario*

7.2.3 Length of rivers protected (OM4c)

For the period between 2015/16 and 2020/21, the total km of river protected is:

- Counterfactual scenario: 1,067 km
- Partnership Funding policy scenario: 3,536 km (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
- *Additional km: 2,469 or an increase of 231% under the Partnership Funding policy scenario*

Total investment in terms of protecting rivers is (note this includes the total costs for the scheme and not specifically the costs associated with delivery of Outcome Measure 4c):

- Counterfactual scenario: £54 million
- Partnership Funding policy scenario: £90 million (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
- *Additional investment: £37 million or an increase of 68% under the Partnership Funding policy scenario*

Cost per km of protecting rivers can therefore be estimated at:

- Counterfactual scenario: £50,000 per km
- Partnership Funding policy scenario: £26,000 per km
- *Costs per additional km: £15,000 per km under the Partnership Funding policy scenario*

7.2.4 Comments on environmental benefits

One interviewee felt that it is difficult to get anything meaningful out of Outcome Measure 4 due to the requirements being so specific. They consider that Outcome Measure 4 should have been an opportunity to bring in wider benefits but it has not

lived up to expectations. This reflects the aim of Outcome Measure 4 which was to deliver statutory requirements. Wider benefits are picked up under Outcome Measure 1, however, the lower funding rate of Outcome Measure 1 and the difficulty of monetising some of the environmental benefits may be having an impact on the extent to which environmental benefits can be delivered as part of a scheme.

Another interviewee expressed the view that Outcome Measure 4 only appeared to be used retrospectively, i.e. after the initial benefit-cost ratio had been determined to try and increase the benefits. They felt that this was resulting in the creation of small areas of habitat, rather than larger areas of habitat being designed into schemes from the beginning. They felt that there was a need for a driver to encourage scheme designers to be innovative. Currently, this did not seem to be occurring because designers were focusing on obtaining as high a benefit-cost ratio as possible in order to stay in the programme.

7.2.5 Benefits by level of deprivation

The distribution of environmental benefits can be compared against the deprivation markers associated with property protection under Outcome Measure 2c or Outcome Measure 3c. Identifying Outcome Measure 4 benefits as being associated with Outcome Measure 2c and Outcome Measure 3c benefits gives the following areas/lengths of environmental benefits in deprived areas:

- For water dependent habitat created or improved:
 - Counterfactual scenario: 127 ha, or 3% of total area
 - Partnership Funding policy scenario: 164 ha, or 1.4% of total area (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional ha: 38 ha or an increase of 30% under the Partnership Funding policy scenario*
- For intertidal habitat created:
 - Counterfactual scenario: 47 ha, or 5% of total area
 - Partnership Funding policy scenario: 17 ha, or 0.7% of total area (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Change in ha: 30ha or a decrease of 0.7% under the Partnership Funding policy scenario*

- For km of rivers protected:
 - Counterfactual scenario: 22 km, or 2% of total area
 - Partnership Funding policy scenario: 24 km, or 0.7% of total area (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Additional km: 2 km or an increase of 9% under the Partnership Funding policy scenario*

Total investment in deprived areas is identified as (note this includes the total costs for the scheme and not specifically the costs associated with delivery of Outcome Measure 4):

- For water dependent habitat created or improved:
 - Counterfactual scenario: £128 million, or 41% of total investment
 - Partnership Funding policy scenario: £112 million, or 28% of total investment (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Change in investment: reduction of £16 million or 13% under the Partnership Funding policy scenario*
- For intertidal habitat created:
 - Counterfactual scenario: £17 million, or 34% of total investment
 - Partnership Funding policy scenario: £1.4 million, or 1.29% of total investment (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)
 - *Change in investment: reduction of £16 million or 92% under the Partnership Funding policy scenario*
- For km of rivers protected:
 - Counterfactual scenario: £1.7 million, or 3% of total investment
 - Partnership Funding policy scenario: £5.9 million, or 7% of total investment (this assumes that any scheme with a modelled probability of 0.77 or greater would secure the required contributions and so would be implemented)

- *Additional investment: £4.2 million or an increase of 249% under the Partnership Funding policy scenario*

This enables the costs of providing environmental benefits in deprived areas to be estimated as follows⁴⁷:

- For water dependent habitat created or improved (Outcome Measure 4a):
 - Counterfactual scenario: £1.0 million per ha; £920,000 more per ha than in areas outside the 20% most deprived.
 - Partnership Funding policy scenario: £680,000 per ha; £650,000 more per ha than in areas outside the 20% most deprived.
- For intertidal habitat created (Outcome Measure 4b):
 - Counterfactual scenario: £380,000 per ha; £320,000 more per ha than in areas outside the 20% most deprived.
 - Partnership Funding policy scenario: £87,000 per ha; £36,000 more per ha than in areas outside the 20% most deprived.
- For km of rivers protected (Outcome Measure 4c):
 - Counterfactual scenario: £76,000 per km; £25,000 more per km than in areas outside the 20% most deprived.
 - Partnership Funding policy scenario: £240,000 per km; £220,000 more per km than in areas outside the 20% most deprived.

The percentage of investment targeted at deprived areas is higher than 20% for water dependent habitat (Outcome Measure 4a), suggesting more money is being invested in deprived areas than the percentage of land occupied by deprived areas even though the total area being created or improved in deprived areas is much less than 20%. The proportion of investment in Outcome Measure 4b (intertidal habitat) is significantly lower than 20% (at 1.2%) with just 0.7% of intertidal areas being delivered in deprived areas. For Outcome Measure 4c (rivers protected) in deprived areas, both km protected and investment are significantly less than 20%, although

⁴⁷ These calculations are based on total investment across schemes that provide benefits to habitats or rivers in the 20% most deprived communities. The costs are divided across just the areas or lengths counted in OM4 and do not take account of other assets that are also likely to be protected within the schemes. Thus, it is expected that these are an over-estimate of the actual costs. It is not possible to determine which element of the total investment is allocated to just those properties in OM2c and OM3C; hence a more refined estimate cannot be made.

investment in OM4c in deprived areas is more than three times greater under the Partnership Funding policy scenario than under the counterfactual scenario.

The above analysis shows that delivery of environmental benefits under Outcome Measure 4 in deprived areas is considerably more expensive than in the 80% of least deprived areas. The variation in costs is shown in Table 7-1. The table shows that investment per hectare or per km is lower under the Partnership Funding policy scenario in the 80% least deprived areas and the 20% most deprived areas for Outcome Measure 4a even though additional areas or lengths of habitat are being provided. This shows, therefore, that the costs to the Exchequer have reduced under the Partnership Funding policy scenario while at the same time more area/length of the habitats is being delivered.

Table 7-1: Variation on costs between the 20% most deprived and 80% least deprived areas for Outcome Measure 4

Habitat type	Outcome Measure 4a		Outcome Measure 4b		Outcome Measure 4c	
	20% most deprived	80% least deprived	20% most deprived	80% least deprived	20% most deprived	80% least deprived
Counterfactual scenario	£1,000,000 per ha	£83,000 per ha	£380,000 per ha	£58,000 per ha	£76,000 per km	£50,000 per km
Partnership Funding policy scenario	£680,000 per ha	£34,000 per ha	£87,000 per ha	£51,000 per ha	£240,000 per km	£26,000 per km

7.2.6 Benefits by location

The distribution of Outcome Measure 4 benefits by RFCC region is summarised in Table 7-2. The difference in ha/km delivered under Outcome Measure 4 between the counterfactual and the Partnership Funding policy scenarios by RFCC region is presented in Table 7-3. The tables show that:

- Water dependent habitat created or improved (Outcome Measure 4a):
 - Counterfactual scenario: Southern (789 ha) and North West (716 ha) have the largest areas. Anglian Eastern is lowest at 3 ha, followed by English Severn and Wye at 50 ha.
 - Partnership Funding policy scenario: Southern (4,027 ha) and Anglian Eastern (3,570 ha) have the largest areas. Anglian Northern (49 ha) and English Severn and Wye (70 ha) have the smallest areas.
 - The largest difference between the counterfactual scenario and Partnership Funding policy scenario is in Anglian Eastern where an additional 3,567 ha delivered. The second largest is in Southern with an additional 3,238 ha. North West (-71 ha) and Anglian Northern (-8 ha) show a decrease in area under the Partnership Funding policy scenario compared with the counterfactual.

- Intertidal habitat created (Outcome Measure 4b):
 - Counterfactual scenario: Thames (232 ha) and Southern (224 ha) have the largest areas. Six regions (Anglian Central, Anglian Eastern, Anglian Northern, English Severn and Wye, Trent and Yorkshire) have no hectares of intertidal habitat.
 - Partnership Funding policy scenario: Anglian Eastern has the highest area (997 ha), followed by Southern (345 ha). Only Anglian Central, English Severn and Wye and Trent have no hectares of intertidal habitat under the Partnership Funding policy scenario.
 - The largest increases between the counterfactual and Partnership Funding policy scenario are in Anglian Eastern (997 ha) and Yorkshire (125 ha). Only Northumbria (-30 ha) shows a decrease under the Partnership Funding policy scenario compared with the counterfactual.

- Length of rivers protected (Outcome Measure 4c):
 - Counterfactual scenario: the longest length of km of rivers benefiting is in the North West (493 km) followed by English Severn and Wye (286 km). There are three RFCC regions where no km of rivers benefit: Anglian Central, Anglian Eastern and Anglian Northern.
 - Partnership Funding policy scenario: the longest area of km benefiting is Anglian Eastern (2,251 km). Only one RFCC region (Anglian Northern) has no km of rivers protected.
 - Anglian Eastern also shows the largest difference between the counterfactual and Partnership Funding policy scenario (2,251 km). Next longest is English Severn and Wye (160 km). Five RFCC regions show no change between the counterfactual and the Partnership Funding policy scenario: Anglian Northern, North West, Northumbria, Wessex and Yorkshire. There are no regions that show a reduction in length of rivers protected under the Partnership Funding policy scenario compared with the counterfactual.

Table 7-2: Distribution of Outcome Measure 4 benefits by RFCC region

RFCC region	Outcome Measure 4a (ha)		Outcome Measure 4b (ha)		Outcome Measure 4c (km)	
	Counter-factual scenario ⁴⁸	PF policy scenario	Counter-factual scenario	PF policy scenario	Counter-factual scenario	PF policy scenario
Anglian Central*	100	513	0	0	0	6
Anglian Eastern	3	3,570	0	997	0	2,251
Anglian Northern	57	49	0	79	0	0
English Severn and Wye*	50	70	0	0	286	445
North West	716	645	171	171	493	493
Northumbria	233	370	62	32	18	18
South West	114	372	112	191	38	40
Southern	789	4,027	224	345	25	42
Thames*	368	372	232	234	27	32
Trent*	133	167	0	0	53	83
Wessex	699	802	93	104	88	88
Yorkshire	460	584	0	125	39	39

Notes:

* Anglian Central, English Severn and Wye, Thames and Trent have no or very little coastline hence OM4b would be expected to be low or zero

Table 7-3: Difference in ha/km delivered for Outcome Measure 4 under the Partnership Funding policy scenario than the counterfactual scenario

RFCC region	Outcome Measure 4a (ha)	Outcome Measure 4b (ha)	Outcome Measure 4c (km)
Anglian Central	413	0	6
Anglian Eastern	3,567	997	2,251
Anglian Northern	-8	79	0
English Severn and Wye	20	0	160
North West	-71	0	0
Northumbria	137	-30	0
South West	258	79	2
Southern	3,238	121	17
Thames	4	2	6
Trent	34	0	30
Wessex	103	11	0
Yorkshire	124	125	0

⁴⁸ The total area when allocated to RFCCs amounts to 3,721 ha whereas the total OM4a delivered is 3,776 ha. The cause of this difference is not clear from the data set for 2015/16 to 2020/21.

7.3 Benefits for 2009/10 to 2014/15

7.3.1 Area of SSSI

For the period of 2009/10 to 2014/15, environmental benefits are reported as area of SSSI, other designated areas, and national BAP. These cannot be directly compared with the Outcome Measure 4 benefits so they are reported separately here.

For the period between 2009/10 and 2014/15, the total area of SSSI benefiting is:

- Counterfactual scenario: 12,114 ha
- Partnership Funding policy scenario: 13,874 ha
- *Additional ha: 1,760 ha or an increase of 15% under the Partnership Funding policy scenario*

Investment in SSSI habitat between 2009/10 and 2014/15 is as follows (note this includes the total costs for the scheme and not specifically the costs associated with delivery of SSSI):

- Counterfactual scenario: £212 million
- Partnership Funding policy scenario: £234 million
- *Additional investment: £22 million or an increase of 10% under the Partnership Funding policy scenario*

Cost per ha of delivering SSSI habitat can therefore be estimated at:

- Counterfactual scenario: £18,000 per ha
- Partnership Funding policy scenario: £17,000 per ha
- *Costs of additional ha: £13,000 per ha under the Partnership Funding policy scenario*

7.3.2 Area of other designated habitats

For the period between 2009/10 and 2014/15, the total area of designated habitats benefiting is:

- Counterfactual scenario: 1,352 ha
- Partnership Funding policy scenario: 1,974 ha

- *Additional ha: 622 or an increase of 46% under the Partnership Funding policy scenario*

Investment in other designated habitats between 2009/10 and 2014/15 is as follows (note this includes the total costs for the scheme and not specifically the costs associated with delivery of other designated habitats):

- Counterfactual scenario: £41 million
- Partnership Funding policy scenario: £76 million
- *Additional investment: £34 million or an increase of 84% under the Partnership Funding policy scenario*

Cost per ha of delivering other designated habitats can therefore be estimated at:

- Counterfactual scenario: £30,000 per ha
- Partnership Funding policy scenario: £38,000 per ha
- *Costs of additional ha: £55,000 per ha under the Partnership Funding policy scenario*

7.3.3 Area of national BAP

For the period between 2009/10 and 2014/15, the total area of national BAP benefiting is:

- Counterfactual scenario: 515 ha
- Partnership Funding policy scenario: 1,780 ha
- *Additional km: 1,265 or an increase of 246% under the Partnership Funding policy scenario*

Investment in national BAP between 2009/10 and 2014/15 is as follows (note this includes the total costs for the scheme and not specifically the costs associated with delivery of national BAP):

- Counterfactual scenario: £21 million
- Partnership Funding policy scenario: £37 million
- *Additional investment: £16 million or an increase of 75% under the Partnership Funding policy scenario*

Cost per ha of delivering other national BAP habitat can therefore be estimated at:

- Counterfactual scenario: £41,000 per ha
- Partnership Funding policy scenario: £21,000 per ha
- *Costs of additional ha: £12,000 per ha under the Partnership Funding policy scenario*

7.3.4 Benefits by level of deprivation

The analysis of the 2009/10 to 2014/15 dataset shows that only £1.25 million was spent in deprived areas⁴⁹, delivering 1 ha of SSSI. No other habitats were delivered alongside schemes identified as being in deprived areas.

7.4 Issues with development of schemes delivering environmental benefits

Comments from the survey and interviews suggest that natural or green schemes often require more time to develop the business case, since the evidence required to support the appraisal can often be expensive and difficult to obtain. This can mean that these types of schemes can lose out on funding that is limited to a financial year. This point was demonstrated by an interviewee who commented that the highways/transport teams at the Local Authority had money to improve the highway network, but they felt that none of this money went into innovative designs that could manage surface water runoff. In their opinion, this was partly because the department had less than a year to spend the available money and so did not have the time to design e.g. SUD schemes. The interviewee thought that there was insufficient time within the budgeting period to change drawings and designs to include green infrastructure elements. This may reflect pressures on the highways team rather than an issue with Partnership Funding, although any activities that speed up the development of partnerships and approval of business cases may help encourage highways teams to engage in FDGiA schemes. There may also be issues in terms of matching timescales associated with developing and submitting FDGiA schemes with timescales that other departments or teams are used to working to (in particular, timescales associated with spending budgets).

⁴⁹ Those assigned a social affluence rank of -1 or -2.

8. Contributions

8.1 Research questions covered

This section focuses on answers to research questions 6, 7, 8, 9, 10, 13 and 18 and covers sources of contributions, Partnership Funding scores (100% GiA, etc.), and issues with contributions such as liabilities and timescales:

- RQ6: How do non-GiA contributions to schemes break down according to: Local Authority sums provided through other central government grants; new Local Authority funding (such as new council tax precepts or special expenses); private contributions from non-households; private contributions from households; other. What proportion of non-GiA contributions pledged to schemes has been secured by year?
- RQ7: To what extent are notionally fully-GiA funded schemes successful in attracting voluntary Partnership Funding contributions, especially given they can be retained by Regional Flood and Coastal Committees to help with priorities elsewhere? Is there evidence that this kind of transfer has happened?
- RQ8: A policy expectation was that Partnership Funding should not result in increased future liabilities on the Exchequer. How effective has the approach to securing contributions been in avoiding an increase in future liabilities on the Exchequer as a consequence of contribution-enabled capital investment today?
- RQ9: What are the risks surrounding securing non-GiA contributions?
- RQ10: To what extent have the “low hanging fruit” been taken in terms of external contributions, meaning that further contributions may be harder to attract and secure?
- RQ13: What is the average length of time from receiving a pledge and securing a contribution? Do the data suggest a more limited time window to secure GiA would increase the amount of external contributions raised or shorten the time needed to secure them?
- RQ18: What effect is Partnership Funding having on the time taken for FCERM schemes progressing from initial appraisal to delivery? Are there particular stages of the process where delays are experienced, and why?

The quantitative analysis is based on the 2015/16 to 2020/21 data set for the Partnership Funding policy scenario, and assumes that those schemes with a

probability of 0.75 or more of securing the further contributions required would collect their contributions and be funded. Those with a probability of less than 0.75 would not obtain their contributions and so would not be funded

8.2 Disaggregation of contributions

8.2.1 Contributions by source

The 2015/16 to 2020/21 data set identifies six possible sources of contributions. These are:

- Growth Fund
- Local levy secured
- IDB precept secured
- Publicly funded contributions secured
- Privately funded contributions secured
- Funding contributions from other Environment Agency function/sources
- Further contributions required (i.e. where sufficient contributions have not yet been agreed to enable the scheme to be funded)

Table 8-1 presents a breakdown of the contributions identified under each of these sources by both year and an overall total. Figure 8-1 shows each source as a proportion of the overall total contributions. The figures shown include contributions identified as being required up to and including 2027/28 where the scheme needs initial funding between 2015/16 and 2020/21.

Source	Year(s)						Total
	15/16	16/17	17/18	18/19	19/20	20/21	
Growth fund	£33	£104	£3.5	£0	£0	£0	£141 (13%)
Local levy	£95	£53	£13	£10	£3.2	£12	£187 (17%)
IDB precept	£3.6	£0.5	£0	£0	£0	£0	£4.2 (0.4%)
Public	£369	£88	£8.8	£12	£3.3	£9.3	£491 (44%)
Private	£84	£81	£4.0	£2.3	£0.1	£2.1	£173 (15%)
Other EA	£26	£27	£4.4	£0.1	£0.3	£0	£58 (5%)
Further needed	£62	£1.4	£1.9	£0	£2.5	£3.4	£71 (6%)

Figure 8-1: Proportion and total of contributions by source (£ millions)

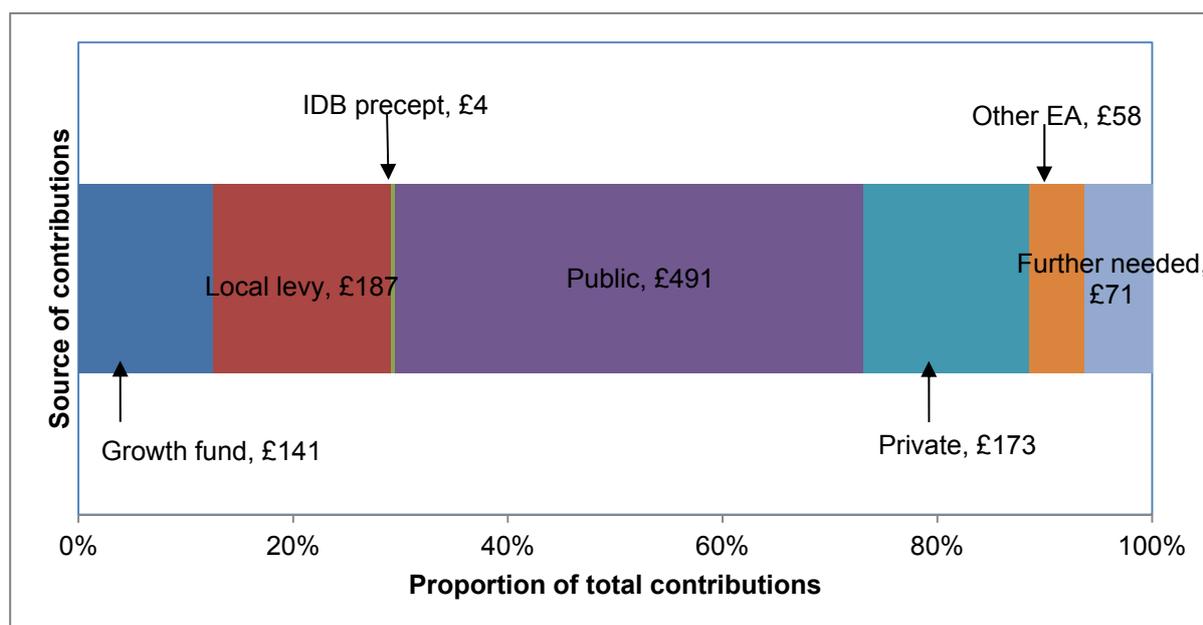


Table 8-1 and Figure 8-1 show that the largest individual proportion is associated with public sources at 44% (£491 million, up to and including all contributions agreed on schemes that would be funded to 2020/21 but which may involve contributions being collected up to and including 2027/28 and beyond).

Box 8-1: Case Study: Further contributions required

River Roch, Rochdale & Littleborough scheme in North West RFCC region is led by the Environment Agency. The scheme aims to protect 1,063 households, including 518 households in the most deprived 20%. Total investment required is £27.1 million, of which £0.8 million had been secured from local levy and £2.15 million from the Local Authority (both public sources). The 2015/16 to 2020/21 data set showed that the scheme had further contributions required totalling £6.3 million.

8.2.2 Contributions by source by size of project

Average (mean) expenditure across all funded schemes to 2020/21 is £0.7 million per scheme. On this basis it is assumed that:

- Schemes requiring investment of £0.7 million and below are **small**
- Schemes requiring investment of more than £0.7 million and up to £7 million are **medium**
- Schemes requiring investment of greater than £7 million are **large**

Table 8-2 presents the total number of schemes and total investment that falls into each of these categories. The table shows that small schemes make up 77% of schemes funded by number but account for just 10% of total investment. Conversely the 89 large schemes make up 4% of the total number of schemes but 59% of total investment.

Table 8-2: Breakdown of schemes in small, medium and large by number of schemes funded and total investment

Scheme size	No. schemes	% of all schemes	Total investment	% of total investment
Small	1,914	77%	£327,402,757	10%
Medium	482	19%	£1,006,199,291	31%
Large	89	4%	£1,929,176,982	59%

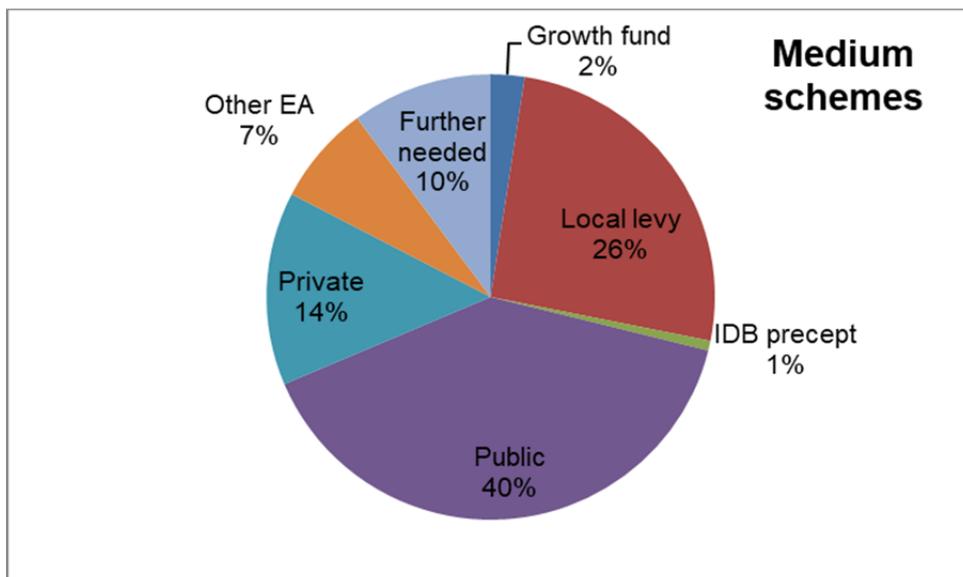
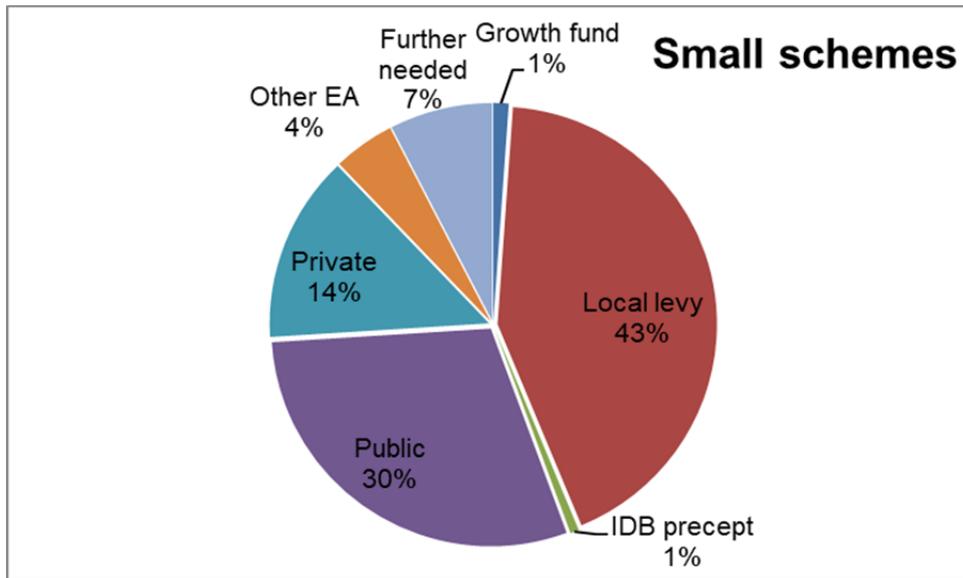
Table 8-3 shows the whole-life benefits, whole-life costs and NPV of schemes by size. As expected, the highest NPV is associated with the large schemes (almost £25 billion), making up 54% of the total NPV across all schemes compared with 4% of schemes and 59% of investment. Small schemes make up 19% of the total NPV across all schemes, compared with 77% of schemes and 10% of total investment. Medium-sized schemes make up 27% of the total NPV across all schemes from 19% of schemes by number and 31% by level of investment.

Table 8-3: Breakdown of schemes in small, medium and large by number of schemes funded, whole-life costs and benefits and NPV by size of schemes

Scheme size	No. schemes	Whole-life benefits	Whole-life costs	NPV
Small	1,914	£9,945 million	£1,446 million	£8,499 million
Medium	482	£13,799 million	£1,332 million	£12,467 million
Large	89	£26,919 million	£2,405 million	£24,514 million

Table 8-4 presents the breakdown of contribution sources by scheme size. Values are presented for total contributions for schemes funded over the full 2015/16 to 2020/21 period. The table shows the proportion of contributions by scheme size and by type of contributor. Figure 8-2 presents the results using pie-charts to highlight differences between contribution sources by scheme size. Note that where contributions are classed as “further needed”, for the purposes of the Partnership Funding policy scenario, all these contributions are assumed to be collected since the scenario only includes schemes that have a probability of 0.77 or greater of securing the required contributions).

Figure 0-2: Breakdown of contributions by type by scheme size



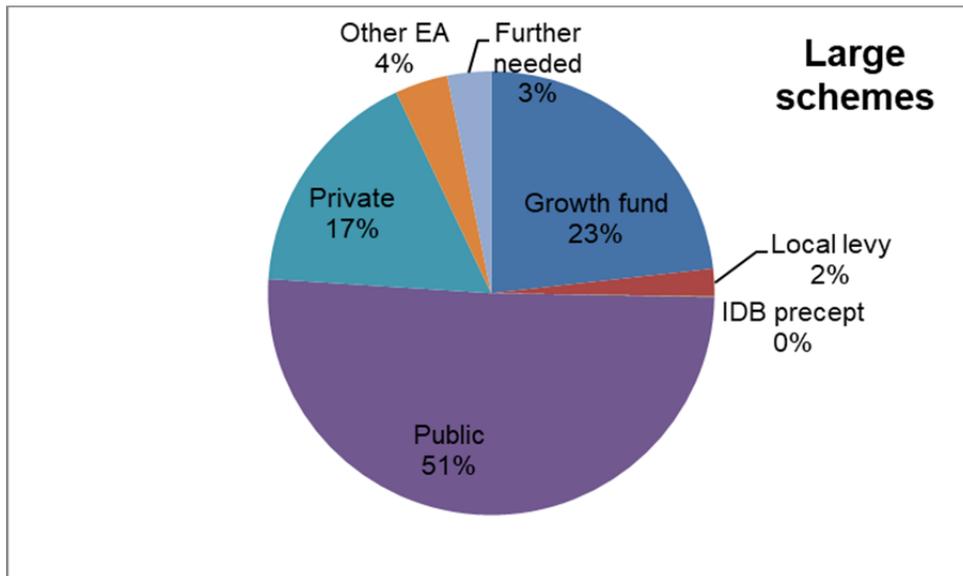


Table 8-4: Breakdown of contributions by source by year (£)

Source	Small		Medium		Large	
	Total	%	Total	%	Total	%
Growth fund	£2,000,000	1%	£9,550,000	2%	£129,239,935	23%
Local levy	£74,924,054	43%	£100,714,209	26%	£11,206,258	2%
IDB precept	£1,121,294	0.64%	£2,782,900	0.71%	£250,000	0.04%
Public	£52,603,279	30%	£155,624,499	40%	£282,304,077	51%
Private	£23,877,408	14%	£54,940,097	14%	£94,460,997	17%
Other EA	£8,076,625	5%	£28,225,233	7%	£21,332,000	4%
Further needed	£13,454,391	8%	£39,784,296	10%	£17,621,000	3%
Total	£176,057,050	16%	£391,621,233	35%	£556,414,266	49%

Table 8-4 and Figure 8-2 show that:

- Sources of contributions:
 - Small schemes: these require 16% of total contributions across all schemes although they only make up 10% of all investment suggesting that small schemes typically obtain less GiA than medium-sized schemes. The largest individual source of contributions is local levy at 43% followed by public at 30%;
 - Medium schemes: these require 35% of total contributions across all schemes and make up 31% of total investment, suggesting that they obtain more GiA than small schemes. Public sources make up 40% of all contributions, followed by local levy at 26%. Private sources account for 14% of contributions; and

- Large schemes: these require 49% of total contributions across all schemes but make up 59% of total investment, also suggesting that they obtain more GiA than medium-sized schemes. Public sources are the largest individual contributor at 51% followed by the Growth Fund at 23% and private at 17%. Local levy accounts for just 2% of total contributions for large schemes.

By source of contribution, Table 8-4 and Figure 8-2 show that:

- Growth fund: this is most significant for large schemes, this is to be expected given the requirements for schemes to bring economic and business resilience which may be easier to demonstrate on larger schemes;
- Local levy: this appears most significant for small and medium-sized schemes. The total contribution to large schemes is £11 million but this is significantly lower than for both small (£75 million) and medium-sized schemes (£101 million);
- IDB precept: this makes up a small contribution (less than 1%) across all scheme sizes;
- Public contributions: these are significant across all scheme sizes but are the highest individual contributor to large schemes (£282 million or 51%);
- Private contributions: these are most significant for large schemes (17%) and it is also large schemes that have the highest total of private contributions (£94 million compared with £55 million for medium-sized schemes and £24 million for small schemes); and
- Other Environment Agency functions: this source makes up 5% of small scheme contributions (£8.1 million), 7% of medium-sized schemes (£28 million) and 4% of large scheme contributions (£21 million).

Box 8-2: Case Study: Contributions by size of scheme

Braunton Flood Improvements

This is a small scheme with total costs of £540,000. The scheme is in South West RFCC and is being led by Devon CC. FDGiA of £57,000 was secured with a further £30,000 from Local Levy.

Braunton Parish Council committed to take on future ownership and maintenance costs associated with a new pumping station. This left a shortfall of £220,000 which was funded from the Place flood prevention budget of Devon County Council.

Source: Devon County Council (2016): Minutes of Cabinet meeting, 9 November 2016, from: <http://democracy.devon.gov.uk/mgConvert2PDF.aspx?ID=5058>

Badsey Brook (Broadway, Childswickham and Murcot) Flood Alleviation Scheme

Box 8-2: Case Study: Contributions by size of scheme

This is a medium sized scheme with total costs of £4 million, of which around £2 million was from Grant-in-Aid. The scheme is in English Severn and Wye RFCC region and is being led by the Environment Agency. Different sources of contributions have been secured:

- Local levy: £1 million
- Public contributions: £862,000 (£550,000 from Worcestershire County Council and Wychavon District Council, plus £312,000 Childswickham and Broadway Parish Councils)

Sources: Badsey Brook flood risk management scheme, updated 15 September 2017, from: <https://www.gov.uk/government/publications/badsey-brook-flood-risk-management-scheme/badsey-brook-flood-risk-management-scheme>

Environment Agency (2017): Flood relief for villages in Worcestershire, from: <https://www.gov.uk/government/news/flood-relief-for-villages-in-worcestershire>

Middle Tame - Perry Barr and Witton

This is a large scheme with total investment recorded in the 2015/16 data set of £23.6 million. Of this, £22.1 million was available through GiA. The scheme is in Trent RFCC and is led by the Environment Agency. Contributions secured recorded in the 2015/16 to 2020/21 data set are:

- Local levy: £1 million
- Public contributions: £1 million

The raw Partnership Funding score for this scheme was 120% suggesting it could have been fully funded through GiA, but additional contributions were also secured.

This scheme included contributions raised through crowdfunding by MADE to raise funds for artworks to encourage people to think about what the River Tame means to them through the Tame partner project. MADE artists have led on the design of cladding for the Brookvale Road wall in Witton and a viewing platform. The crowdfunding appeal raised £25,510.

Source: Perry Barr and Witton flood risk management scheme, updated 14 February 2017, from: <https://www.gov.uk/government/publications/perry-barr-and-witton-flood-risk-management-scheme/perry-barr-and-witton-flood-risk-management-scheme>

Crowdfunder: Tamed – turn flood defences into works of art!, from: <http://www.crowdfunder.co.uk/tamed-an-urban-arts-project-1/>

8.2.3 Contributions by source by RFCC region

Contributions by source can also be disaggregated by RFCC region. Table 8-5 presents the contributions by source for each RFCC region, as well as the proportion by source and the total contributions identified for each RFCC region. The table shows significant variation across RFCC regions:

- Largest contributions: these are coloured green in Table 8-5 in terms of largest proportion by source for each RFCC region (excluding further contributions required):
 - Public sources: these make up the largest individual source in nine of the twelve RFCC regions: Anglian Central (76%), Anglian Eastern (47%), Anglian Northern (34%), North West (31%), Northumbria (36%), South West (57%), Southern (53%), Trent (44%) and Wessex (83%);

- Private sources: these account for the highest individual sources of contributions in one RFCC region: English Severn and Wye (59%). Private sources also account for 12% of contributions in Anglian Eastern, 15% in Anglian Northern, 13% in North West, 25% In Northumbria, 19% in South West and 39% in Southern;
- Local levy: this is the largest individual source in Thames RFCC region (75%) but is the second largest individual contributor by proportion in Anglian Central (18%), English Severn and Wye (21%), North West (23%), Trent (24%), and Wessex (13%). Local levy also accounts for 24% of contributions in Northumbria, which is the third highest behind public (36%) and private sources (25%); and
- Growth fund: this is the largest individual contributor in Yorkshire RFCC (39%). This source also provides 26% of contributions in Anglian Eastern and 16% in North West.
- Further contributions needed within the schemes that have a modelled probability of 0.77 or greater of securing the contributions: these are greatest in Anglian Northern (42%) and Trent (23%).

Table 8-5: Breakdown of contributions by source and RFCC region (£ millions)

Source	Anglian Central		Anglian Eastern		Anglian Northern		English Severn and Wye	
	Total	%	Total	%	Total	%	Total	%
Growth fund	£0	0%	£16	26%	£0	0%	£0	0%
Local levy	£4.1	18%	£8	13%	£2.6	4%	£7.1	21%
IDB precept	£0	0%	£0	0%	£3.0	4.7%	£0	0%
Public	£17	76%	£29	47%	£22	34%	£3.2	9%
Private	£0.8	3%	£7.4	12%	£9.6	15%	£20	59%
Other EA	£0.05	0.2%	£0.3	0.4%	£0.2	0.3%	£0.5	1.6%
Further needed	£0.5	2%	£1.2	2%	£27	42%	£4.0	9%
Total	£22	2%	£64	6%	£64	6%	£35	3%
Source	North West		Northumbria		South West		Southern	
	Total	%	Total	%	Total	%	Total	%
Growth fund	£7.1	16%	£0	0%	£2.4	5%	£0	0%
Local levy	£10	23%	£15	24%	£5.7	11%	£7.0	3%
IDB precept	£0.09	0%	£0	0%	£0	0%	£0	0%
Public	£14	31%	£23	36%	£29	57%	£107	53%
Private	£5.8	13%	£16	25%	£9.3	19%	£77	39%
Other EA	£1.0	2%	£1.3	2%	£3.7	7%	£1.7	1%
Further needed	£6.4	14%	£8.0	13%	£0	0%	£6.7	3%
Total	£44	4%	£63	6%	£51	4%	£200	18%

Table 8-5: Breakdown of contributions by source and RFCC region (£ millions)

Source	Thames		Trent		Wessex		Yorkshire	
	Total	%	Total	%	Total	%	Total	%
Growth fund	£0	0%	£0	0%	£0	0%	£115	39%
Local levy	£90	75%	£10	24%	£17	13%	£11	4%
IDB precept	£0	0%	£0	0%	£0.5	0.4%	£0	0%
Public	£17	14%	£17	44%	£106	83%	£106	36%
Private	£2.6	2.2%	£3.1	8%	£4.2	3%	£18	6%
Other EA	£1.8	1.5%	£0.4	1.0%	£0.5	0.4%	£46	16%
Further needed	£8.3	7%	£9.0	23%	£0	0%	£0.7	0%
Total	£120	11%	£39	3%	£129	11%	£297	26%

Box 8-3: Case Study: Contributions by RFCC region**Withybrook, Warwickshire Flood Alleviation Scheme**

This scheme is located in the English Severn and Wye RFCC area and is being led by Severn Trent Water. The scheme had a raw Partnership Funding score of 10% but through contribution increased the adjusted Partnership Funding score to 112%. Grant-in-Aid funding was £40,000 with contributions of:

- Local levy: £100,000
- Public: £5,000
- Private: £464,000

Source: 2015/16 to 2020/21 data set

Leeds Flood Alleviation Scheme Phase 2

This scheme attracted multiple sources of contributions including:

- £35 million from Grant-in-Aid
- £10 million from Leeds City Council and Leeds City Region Enterprise Partnership

Leeds City Region Enterprise Partnership funding came through the local Growth Deal 3, a £109 million submission to Government to embed economic and business resilience through targeted investments in flood, road, green and digital infrastructure. Leeds was one of three projects that was allocated funding. It received £3.8 million of a total £7.8 million invested in flood risk management (the other schemes proposed for funding were Mytholmroyd, Calderdale, £2.5 million and Skipton, Craven, £1.5 million).

Source: West Yorkshire Combined Authority (2016): Leeds City Region Flood Alleviation for Growth and Economic Resilience Programme, 9 November 2016, from:

www.westyorks-ca.gov.uk/WorkArea/DownloadAsset.aspx?id=4294970451

8.2.4 Contributions by source by RMA

Contributions by source have also been disaggregated by type of RMA, as shown in Table 8-6. The table shows total contributions from each individual source for each RMA, as well as percentage of each source by RMA. The total row shows the

contributions secured by each RMA as a percentage of the overall total contributions up to 2027/28 and beyond.

The table shows that there is much more consistency across RMAs in terms of the largest individual source (excluding further contributions required) than with RFCCs. Here, three of the five RMAs all show publicly funded contributions secured as the highest individual contributor:

- Publicly funded contributions account for 44% overall and by RMA are:
 - 84% of contributions to IDBs
 - 41% of contributions to the Environment Agency
 - 0.9% of contributions to water companies, where privately funded contributions account for 82%
 - 45% of contributions to Local Authorities
- Local levy: this makes up 18% of contributions to water companies, 17% to the Environment Agency, 16% to Local Authorities, and 10% to IDBs
- IDB precept account for 2% of contributions to IDB led schemes, 0.5% to the Environment Agency and 0.1% to Local Authorities
- Growth Fund is of most importance to Local Authorities and the Environment Agency at 12% each
- Privately funded contributions: these make up 15% of all contributions including 82% for water companies, 22% for Local Authorities, 11% for the Environment Agency and 3.5% for IDBs.
- Other Environment Agency functions/sources: this contributes 8.8% toward Environment Agency schemes and 0.9% towards Local Authority schemes.

Table 8-6: Breakdown of contributions by source and RMA (£ millions)

Source	Highways Agency		IDB		Environment Agency	
	Total	%	Total	%	Total	%
Growth fund			£0	0%	£81	13%
Local levy			£2.9	10%	£105	17%
IDB precept			£0.6	2.0%	£3.2	0.5%
Public	No schemes funded under the Partnership funding policy scenario		£24	84%	£247	41%
Private			£1.0	3.5%	£65	11%
Other EA			£0	0%	£53	8.8%
Further needed			£0.0	0%	£50	8.4%
Total			£28	3%	£603	54%

Table 8-6: Breakdown of contributions by source and RMA (£ millions)

Source	Water Company		Local Authority		Totals	
	Total	%	Total	%	Total	%
Growth fund	£0	0%	£60	12%	£141	13%
Local levy	£0.10	18%	£79	16%	£187	17%
IDB precept	£0	0%	£0.41	0.1%	£4.2	0%
Public	£0.01	0.9%	£220	45%	£491	44%
Private	£0.5	82%	£107	22%	£173	15%
Other EA	£0	0%	£4.6	0.9%	£58	5.1%
Further needed	£0	0%	£20	4.1%	£71	6.3%
Total	£0.6	0%	£492	44%	£1,124	100%

Box 8-4: Case Study: Contributions by RMA**Wolferton Catchment Flood Risk Management Scheme**

This scheme is being led by the IDB in Anglian Central region of the RFCC. Total Grant-in-Aid was £356,000 with contributions secured from public sources of £3,873,800 and a further £50,000 from local levy. The scheme was required to refurbish an ageing asset to ensure it would continue to protect the catchment. The work included approaches to address screening to comply with the Eel Regulations.

Source: 2015/16 to 2020/21 data set

8.2.5 Contributions by source by risk setting

Contributions can also be disaggregated by risk setting, as shown in Table 8-7. The largest individual contributor (excluding further contributions) is public for three of the six risk settings (or three of five since no contributions are identified for reservoir flooding):

- Publicly funded contribution secured: this is the largest individual source for coastal flooding (74%), groundwater flooding (73%) and fluvial flooding (37%). It is the second highest source for surface water flooding (39%) and coastal erosion (32%);
- Local levy: this is the highest individual source for surface water flooding (45%), and also accounts for 24% of contributions for groundwater flooding, 18% for fluvial flooding, 8% for coastal erosion, and 4.5% for coastal flooding;
- Privately funded contributions secured: this is the highest individual source for coastal erosion (58%) at £72 million. It also accounts for 10% of contributions for fluvial flooding, 10% for coastal flooding, 8.3% for surface water flooding and 2.1% for groundwater flooding;

- Growth fund: this only provides contributions towards fluvial flooding (22%); and
- Other Environment Agency functions/sources: this provides 7.5% of contributions towards reducing the risk of fluvial flooding.

Table 8-7: Breakdown of contributions by source and risk setting (£ millions)

Source	Fluvial		Surface water		Coastal flooding	
	Total	%	Total	%	Total	%
Growth fund	£141	22%	£0	0%	£0	0%
Local levy	£110	18%	£56	45%	£10	4.5%
IDB precept	£3.1	0.5%	£0.3	0.2%	£0.8	0.3%
Public	£230	37%	£47	39%	£166	74%
Private	£63	10%	£10	8.3%	£22	10%
Other EA	£47	7.5%	£0	0%	£0	0%
Further needed	£34	5.4%	£8.4	7.0%	£26	11%
Total	£628	57%	£121	11%	£224	20%

Source	Reservoir flooding		Groundwater flooding		Coastal erosion	
	Total	%	Total	%	Total	%
Growth fund	£0	-	£0	0%	£0	0%
Local levy	£0	-	£1.2	24%	£10	8.0%
IDB precept	£0	-	£0	0%	£0	0%
Public	£0	-	£3.8	73%	£40	32%
Private	£0	-	£0.1	2.1%	£72	58%
Other EA	£0	-	£0	0%	£0	0%
Further needed	£0	-	£0	0.8%	£3.1	2.5%
Total	£0	-	£5.2	0.5%	£126	11%

Private contributions have been secured for seventeen coastal erosion schemes. A case study example is drawn from the data set for 2015/16 to 2020/21 and described in Box 8-5 below.

Box 8-5: Case Study: Private contributions to coastal erosion schemes

Brighton Marina to River Adur Flood and Coastal Erosion Risk Management Strategy

Significant partner contributions have been secured, with private contributions recorded as £60.8 million in the 2015/16 to 2020/21 data set. Public contributions amount to £16.4 million with a further £35,000 from local levy. Total GiA from the 2015/16 to 2020/21 data set is £81.6 million. The Strategy Appraisal Report shows the breakdown of contributions as:

- Shoreham Port Authority Contributions: £6.1 million (whole life costs, WLC) or £21.5 million (present value, PV costs)
- Western Esplanade Management Company Contributions: £200,000 (WLC) or £60,000 (PV)
- Brighton Marina contributions: £22.4 million (WLC) or £6.4 million (PV)
- Brighton and Hove CC contributions: £16.4 million (WLC) or £4.9 million (PV)

Source: https://www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/Marina%20Adur%20exec%20summary%20v3%20final_0.pdf

8.2.6 Contributions by source by level of deprivation

Sources of contributions are disaggregated by level of deprivation based on schemes that provide protection to households included within Outcome Measure 2c and Outcome Measure 3c, compared with households only counted in Outcome Measure 2 and Outcome Measure 3.

In terms of reducing flood risk, Table 8-8 shows that public sources are the largest individual contributions for both the 20% most and 80% least deprived households. The 20% most deprived households are shown as requiring 29% of contributions, which is greater than 20% suggesting deprived communities are having to find more contributions than might be expected if the distribution was equal.

For coastal erosion, the proportion of modelled contributions raised from the 20% most deprived communities is 75%. This is much higher than the 20% that might be expected if proportion of contributions raised was equal to the proportion of deprived households.

Source	20% most deprived (OM2c)		80% least deprived (OM2) ⁵⁰		20% most deprived (OM3c)		80% least deprived (OM3) ⁵¹	
	Total	%	Total	%	Total	%	Total	%
Growth fund	£19	6.8%	£122	18%	£0	0%	£0	0%
Local levy	£31	12%	£133	20%	£4.3	4.9%	£3.7	13%
IDB precept	£0.24	0.09%	£2.9	0.4%	£0	0%	£0.04	0.1%
Public	£141	52%	£291	44%	£23	26%	£22	73%
Private	£74	27%	£47	7.1%	£61	69%	£3.6	12%
Other EA	£0.20	0.07%	£14	2.0%	£0	0%	£0	0%
Further needed	£8	2.8%	£57	8.5%	£0	0%	£0	0%
Total	£273	29%	£667	71%	£89	75%	£30	25%

Table 8-8 shows that for coastal erosion risk, public sources account for 73% of contributions in the 80% least deprived areas and 26% in the 20% most deprived areas. Public sources of contributions are the largest individual contributor for the 80% least deprived households. The largest individual contributor for protection

⁵⁰ Excludes households counted as part of Outcome Measure 2c.

⁵¹ Excludes households counted as part of Outcome Measure 3c.

against coastal erosion risk in the 20% most deprived areas is privately secured contributions (69%).

One interviewee stated that they understood that the vast majority of contributions across the country were coming from public sector sources. This viewpoint is supported by the above analysis undertaken for flood risk schemes. They felt that there was a major issue with this since councils across the country have shortfalls in their budgets, and they have so many other demands on their resources (i.e. adult social care) which are only increasing. The interviewee felt that flood risk management was a relatively new service for many councils and this meant that it could be difficult to secure a portion of the limited funding available when all other departments are already stretched.

Box 8-6: Case Study: Private contributions to coastal erosion schemes in 20% most deprived areas

Bacton Gas Terminal to Ostend Coastal Management Scheme

This scheme in Anglian Eastern requires total expenditure of £27.4 million and results in benefits to 51 households allocated to Outcome Measure 3c and a total of 239 households in Outcome Measure 3. The raw Partnership Funding score is 17% with Grant-in-Aid of £1.8 million available meaning that contributions of £25.6 million were required. A total of £500,000 contributions were obtained through local levy with a further £22.4 million secured from private sources (the owners and operators of the Bacton Gas Terminal, which include Shell and Perenco). There are still £2.7 million further contributions required. The proposed scheme involves 'landscaping' the shoreline, in front of the gas terminal and down the coast using high volumes of sand to protect the coast. A small element of contributions is being sought through crowdfunding, with this aiming to raise £25,000.

8.2.7 Analysis of private contributions

There are 247 schemes under the Partnership Funding policy scenario that have secured contributions from private sources. The total amount of private contributions secured is £173 million, with these schemes (i.e. those that have received contributions from private sources) also securing a further £223 million from other sources (including £161 million from public sources, £24 million from local levy, £19 million from the Growth Fund, £4 million from other Environment Agency functions, £1 million from IDB precepts and £3 million identified as further contributions required⁵²).

The NPV of schemes that have obtained private contributions is £7.4 billion with effective return to the Exchequer on GiA of 19.1. This is slightly lower than the effective return to the Exchequer for the Partnership Funding policy scenario as a

⁵² Under the Partnership Funding policy scenario it is assumed that all of the further contributions would be obtained as the analysis only includes those schemes where the probability of securing the required contributions is 0.77 or greater.

whole (19.7). The average benefit-cost ratio of schemes attracting private contributions is 9.5, which is also slightly lower than the average benefit-cost ratio for the Partnership Finding policy scenario as a whole (9.8).

Table 8-9 shows the breakdown of contributions across RFCCs for those 247 schemes that have attracted some private contributions. The table shows that the highest level of private contributions has been secured in Southern RFCC (£77 million) while private contributions are also the most important source in English Severn and Wye (£20 million or 92% of all contributions for schemes that attracted some private contributions). The table also shows how important other sources of contributions are. It is not possible to identify whether collection of private sources helps to secure public sources, or vice versa from the dataset, but the majority of schemes (81% or 200 of 247) have secured contributions from more than one source.

Table 8-9: Breakdown of contributions by source and RFCC region (£ millions, across schemes that have secured private contributions)								
Source	Anglian Central		Anglian Eastern		Anglian Northern		English Severn and Wye	
	Total	%	Total	%	Total	%	Total	%
Growth fund	£0	0%	£16	34%	£0	0%	£0	0%
Local levy	£0.9	30%	£3.4	7%	£0.9	4%	£0.6	3%
IDB precept	£0	0%	£0	0%	£0.5	2.1%	£0	0%
Public	£1.4	44%	£21	43%	£12	53%	£0.9	4%
Private	£0.8	25%	£7.4	16%	£9.6	41%	£20	92%
Other EA	£0	0%	£0.1	0.1%	£0	0%	£0.2	0.9%
Further needed	£0	0%	£0	0%	£0	0%	£0	0%
Total	£3.1	1%	£48	12%	£23	6%	£22	6%
Source	North West		Northumbria		South West		Southern	
	Total	%	Total	%	Total	%	Total	%
Growth fund	£0	0%	£0	0%	£2.4	11%	£0	0%
Local levy	£2.2	20%	£4.0	12%	£1.2	5%	£0.9	1%
IDB precept	£0	0%	£0	0%	£0	0%	£0	0%
Public	£2.8	25%	£10	31%	£8.8	39%	£55	41%
Private	£5.8	51%	£16	46%	£9.3	41%	£77	58%
Other EA	£0.5	4%	£0.7	2%	£0.7	3%	£0	0%
Further needed	£0	0%	£3.0	9%	£0	0%	£0	0%
Total	£11	3%	£34	9%	£22	6%	£133	35%
Source	Thames		Trent		Wessex		Yorkshire	
	Total	%	Total	%	Total	%	Total	%
Growth fund	£0	0%	£0	0%	£0	0%	£0	0%
Local levy	£3.2	46%	£1.8	24%	£3.1	36%	£2.2	3%
IDB precept	£0	0%	£0	0%	£0	0%	£0	0%
Public	£0	2%	£2.8	36%	£0.9	12%	£45	68%

Table 8-9: Breakdown of contributions by source and RFCC region (£ millions, across schemes that have secured private contributions)

Private	£2.6	37%	£3.1	40%	£4.2	52%	£18	27%
Other EA	£1.1	15%	£0	0%	£0	0%	£0.5	1%
Further needed	£0	0%	£0	0%	£0	0%	£0	0%
Total	£7.0	2%	£7.8	2%	£8.1	2%	£65	17%

Table 8-10 shows the breakdown of contributions by RMA. The table shows that Local Authorities have attracted the highest level of private contributions (£107 million) with this making up 45% of total contributions secured. Public sources make up the highest individual contributor to schemes led by Local Authorities at 48% (£114 million). The highest proportion of private contributions is for water companies (82%) but over a very small sample size. Schemes led by the Environment Agency attracted £65 million in private contributions.

Table 8-10: Breakdown of contributions by source and RMA (£ millions, across schemes that have secured private contributions)

Source	HA		IDB		EA	
	Total	%	Total	%	Total	%
Growth fund	£0	-	£0	0%	£19	13%
Local levy	£0	-	£0	2.0%	£12	8.1%
IDB precept	£0	-	£0	1.7%	£0.5	0.3%
Public	£0	-	£0.7	39%	£47	32%
Private	£0	-	£1.0	56%	£65	45%
Other EA	£0	-	£0	0%	£3.2	2.2%
Further needed	£0	-	£0	1.1%	£0	0%
Total	£0	-	£1.8	0.5%	£145	38%
Source	WC		LA		Totals	
	Total	%	Total	%	Total	%
Growth fund	£0	0%	£0	0%	£19	4.8%
Local levy	£0.1	18%	£12	5.2%	£24	6.3%
IDB precept	£0	0%	£0	0%	£0.5	0%
Public	£0.01	0.9%	£114	48%	£161	42%
Private	£0.5	82%	£107	45%	£173	45%
Other EA	£0	0%	£0.5	0.2%	£3.7	1.0%
Further needed	£0	0%	£3.0	1.3%	£3.0	0.8%
Total	£0.6	0.1%	£237	62%	£385	100%

A comparison of the relative importance of private contributions can also be made across risk settings. Table 8-11 shows that coastal erosion schemes have attracted the highest level of private contributions (£72 million) followed by fluvial flooding (£63 million). Private contributions are the main source of contributions for coastal erosion schemes (72%) and for surface water flooding schemes (49%). Public sources remain the highest contributors to coastal flooding schemes (58%) and

fluvial flooding schemes (50%). Local levy makes up 52% of contributions towards groundwater flooding schemes followed by private sources at 48% (although this is over a small sample of just two schemes).

Table 8-11: Breakdown of contributions by source and risk setting (£ millions, across schemes that have secured private contributions)

Source	Fluvial flooding		Surface water flooding		Coastal flooding	
	Total	%	Total	%	Total	%
Growth fund	£19	10%	£0	0% £0		0%
Local levy	£12	6.2%	£5.7	28% £3.9		6.5%
IDB precept	£0	0.2% £0		0%	£0	0%
Public	£96	50%	£4.6	22%	£35	58%
Private	£63	33%	£10	49%	£22	36%
Other EA	£2.2	1.1% £0.1		0.7%	£0	0%
Further needed	£0	0%	£0	0% £0		0%
Total	£193	51%	£21	5.5%	£61	16%
Source	Reservoir flooding		Groundwater flooding		Coastal erosion	
	Total	%	Total	%	Total	%
Growth fund	£0	-	£0	0%	£0	0%
Local levy	£0	-	£0.1	52%	£2.3	2.3%
IDB precept	£0	-	£0	0%	£0	0%
Public	£0	-	£0	0%	£23	23%
Private	£0	-	£0.1	48%	£72	72%
Other EA	£0	-	£0	0% £0		0%
Further needed	£0	-	£0	0%	£3.0	3%
Total	£0	-	£0.2	0%	£100	27%

Table 8-12 compares sources of contributions across those schemes that have secured private contributions. The table shows that private sources are highest for the 20% most deprived communities for schemes protecting against coastal erosion (Outcome Measure 3c), with these accounting for 77% (£61 million) of all contributions. For deprived communities at flood risk (Outcome Measure 2c), public sources are the most significant source of contributions at 48%, with private contributions providing 38%.

Table 8-12: Breakdown of contributions by source and level of deprivation (£ millions, across schemes that have secured private contributions)

Source	20% most deprived (Outcome Measure 2c)		80% least deprived (Outcome Measure 2)		20% most deprived (Outcome Measure 3c)		80% least deprived (Outcome Measure 3)	
	Total	%	Total	%	Total	%	Total	%
Growth fund	£19	10%	£0	0%	£0	0%	£0	0%
Local levy	£10	5%	£11	10%	£0.3	0%	£1.6	16%
IDB precept	£0	0%	£0.5	0.5%	£0	0%	£0	0%
Public	£93	48%	£50	45%	£18	23%	£4.8	48%
Private	£74	38%	£47	43%	£61	77%	£3.6	36%
Other EA	£0.2	0.1%	£0.9	0.8%	£0	0%	£0	0%
Further needed	£0	0%	£0	0%	£0	0%	£0	0%
Total	£195	64%	£110	36%	£80	89%	£10	11%

8.3 Number of schemes receiving a transfer of GiA from another scheme through the RFCC

Participants to the online survey were asked if schemes notionally approved for full GiA funding had been successful in attracting additional voluntary Partnership Funding. Half of the respondents indicated that they were not aware (responding either “No” or “Don’t know”) of schemes in their area attracting additional funding (Figure 8-3). Several interviewees indicated that, in their experience, the situation whereby voluntary contributions have also been made once full (100%) GiA funding has been awarded has not occurred, though the quantitative analysis suggests otherwise. They noted that if a scheme had received 100% GiA funding, voluntary contributions could be encouraged through wider benefits. However, it is unlikely that this would occur as staff resources are already limited and it would not make sense to pursue further contributions.

Figure 8-3: Responses to survey question: Have any of the FCERM schemes implemented in your organisation’s area that were notionally approved for full Grant-in-Aid funding (covering 100% of the costs for approval for a scheme) also been successful in attracting voluntary Partnership Funding contributions? (n=83)

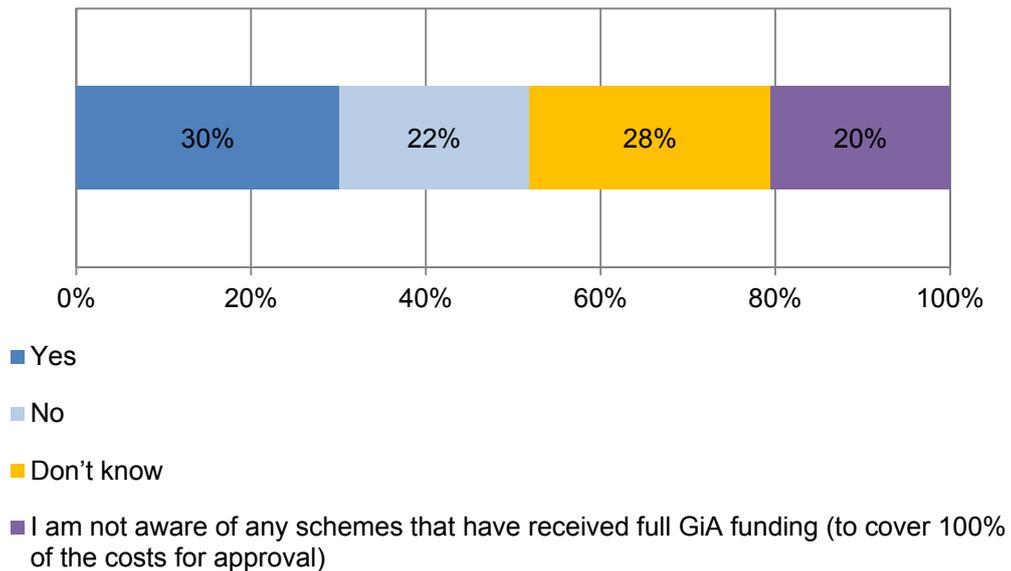


Figure 8-4: Responses to survey question: Have any of the FCERM schemes implemented in the geographical area covered by your organisation received a transfer of Grant-in-Aid (GiA) through the RFCC from schemes that attracted a greater amount of contributions than were needed to meet the costs for approval? (n=79)

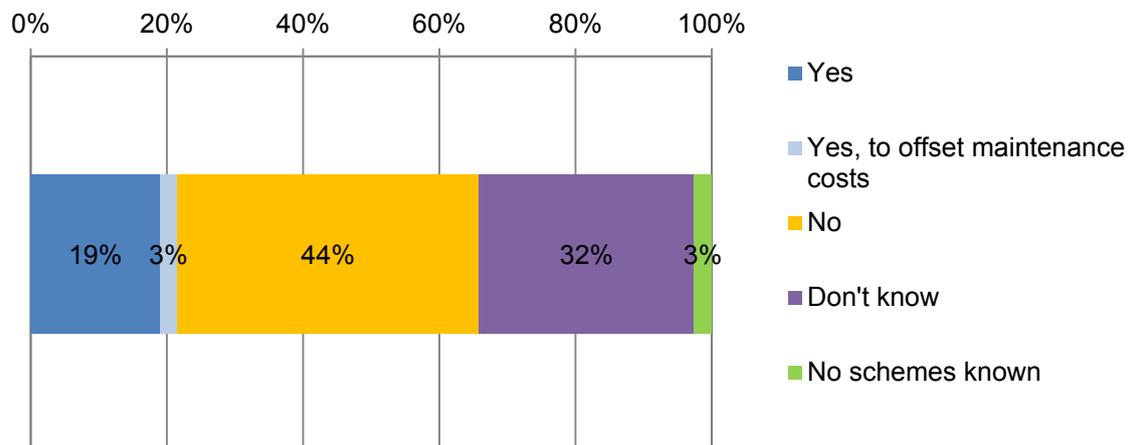


Figure 8-4 shows that 22% of respondents to the survey had received a transfer of GiA through the RFCC from schemes that had attracted a greater amount of contributions than were needed. A further 44% said that they had not received such a transfer.

The analysis of fully funded schemes showed that 327 schemes that are notionally fully funded under the Partnership Funding policy scenario did also collect

contributions. The £150 million (to 2020/21) or £184 million (to 2027/28) of GiA saved is likely to have been reallocated to the 22% of other schemes identified by survey respondents as having received a transfer.

Discussion of this issue during the interviews did not highlight any example schemes where transfer of GiA has actually occurred⁵³. However, one interviewee noted that GiA can be used to fill the gap that is plugged by RFCC levy. This has happened when the business case is fully developed and more GiA can be drawn down than originally thought. The levy is effectively plugging the risk gap while the business case is developed and once GiA is awarded the levy can be moved on or put back in the RFCC pot. Another interviewee identified that their Local Authority is trying to secure all available funding and using it to offset GiA.

An interviewee from an RFCC indicated that priorities within the RFCC to allocate local levy were traditionally set on an annual basis. However, when RFCCs received their first six year settlement, this changed the way of thinking with committees moving to a more strategic approach. The same interviewee indicated that they were not aware of any schemes that had received a transfer of GiA (from another scheme). Indeed, they were not aware that there was a mechanism to facilitate this even though it had been put forward as one of the selling points of the Partnership Funding approach. Given the evidence from the survey and the analysis of the Partnership Funding policy scenario, it is assumed that transfers have taken place but this may not be commonplace amongst all RFCCs.

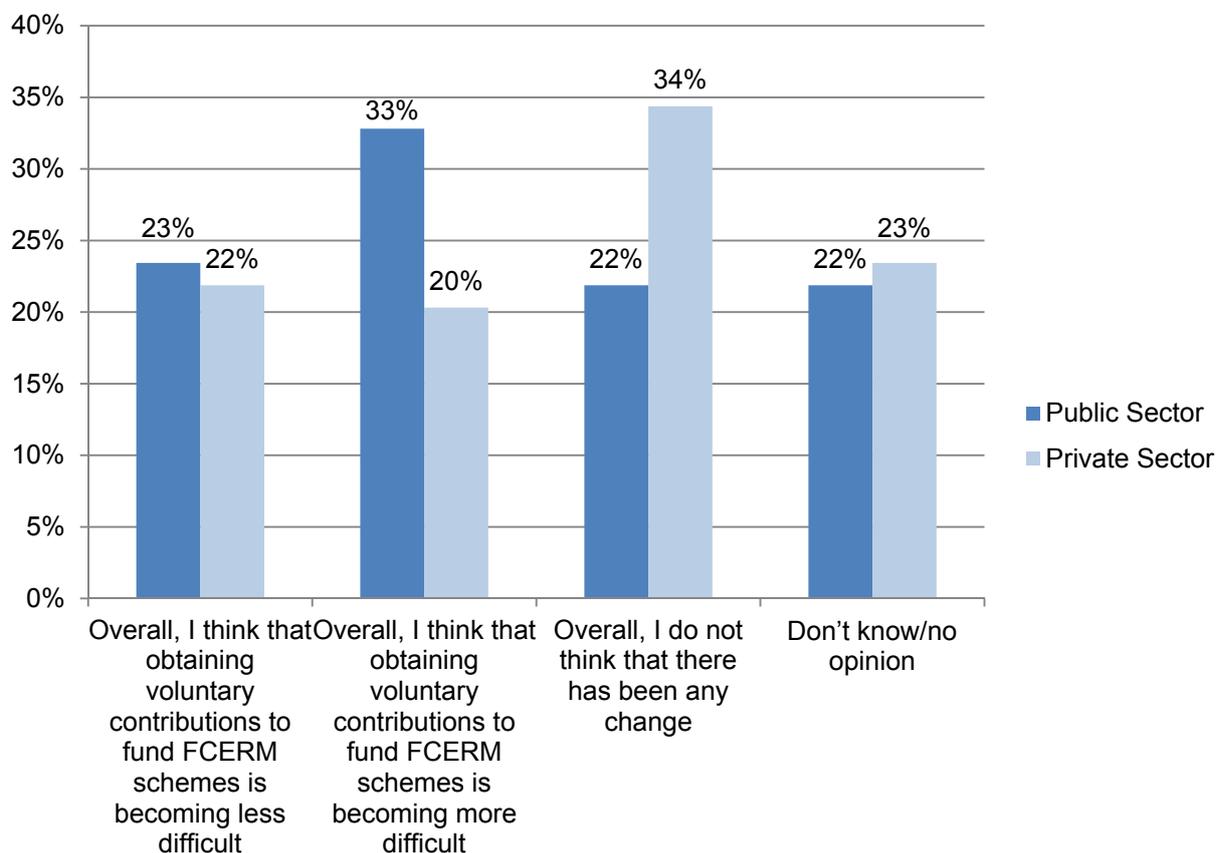
8.4 Risks and difficulties associated with securing contributions

8.4.1 Changes in ease of obtaining contributions

Participants in the online survey were asked if they thought there had been a change in how easy/difficult it is to obtain voluntary contributions from the public and private sectors since 2011. Notably a third of respondents felt that obtaining contributions from the public sector had become more difficult and there had been no change in difficulty in obtaining contributions from the private sector. Just under a quarter of respondents felt that obtaining voluntary contributions from both the private and public sectors had become less difficult (Figure 8-5).

⁵³ It is important to note that it is GiA that is transferred, not contributions.

Figure 8-5: Responses to survey question: Overall, in your view has there been a change in how easy/difficult it is to obtain voluntary (non Grant-in-Aid) contributions from the public sector to fund FCERM schemes since the introduction of Partnership Funding in 2011? (n=64) AND Overall, in your view has there been a change in how easy/difficult it is to obtain voluntary (non Grant-in-Aid) contributions from the private sector to fund FCERM schemes since the introduction of Partnership Funding in 2011? (n=64)

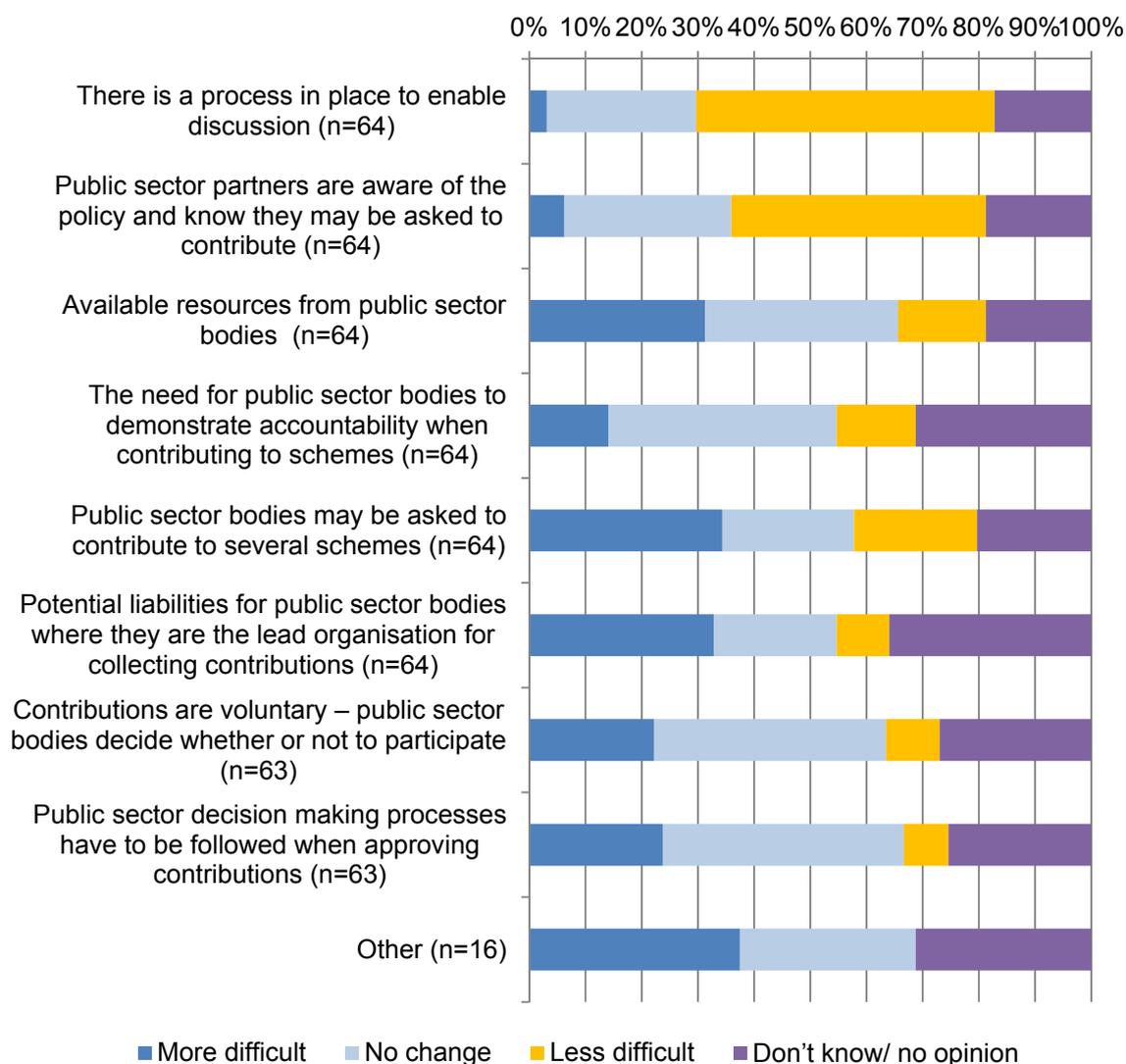


Comments from survey respondents suggested that there is a perception that securing non-GiA contributions to enable schemes to progress is not always a straightforward process; indeed, the risks and difficulties associated with securing contributions can cause projects to stall or fail if the risks are too great or cannot be overcome.

Through the survey, stakeholders highlighted several key risks and difficulties in obtaining non-GiA contributions for FCERM schemes from both public and private sectors. With regard to obtaining voluntary contributions from the public sector, respondents felt that being asked to contribute to several schemes, potential liabilities for public sector bodies where they are the lead organisation and available resources were key issues in making obtaining contributions more difficult (Figure 8-6). Having a process in place to enable discussions and awareness of the policy was highlighted by almost half (53% and 45%, respectively) of the respondents as

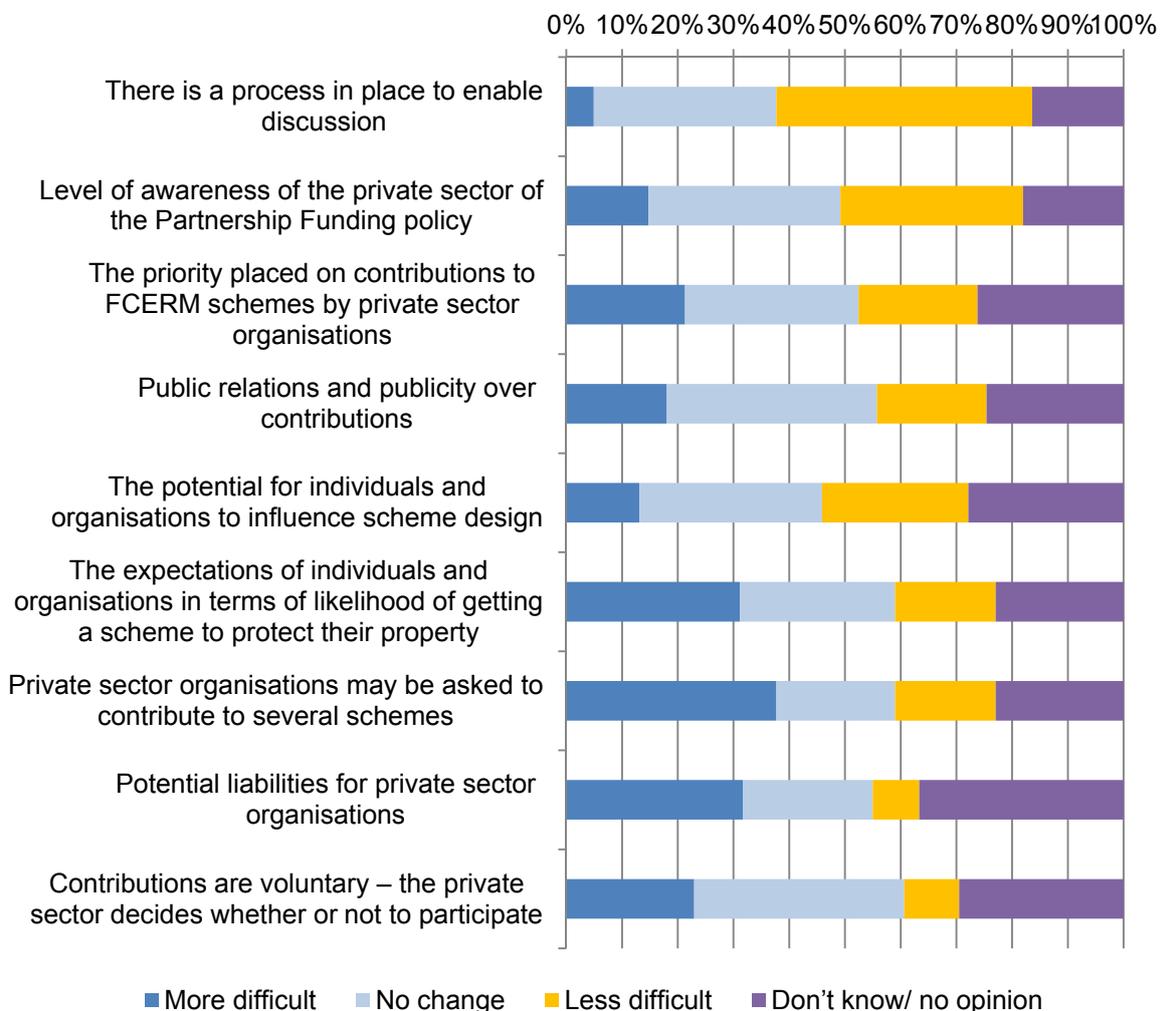
being a factor in making the process of obtaining voluntary contributions from the public sector less difficult.

Figure 8-6: Responses to survey question: Please indicate whether you think they have made the process of obtaining voluntary contributions from the public sector more or less difficult (n=64)



Being asked to contribute to several schemes and the potential liabilities were also key issues in making obtaining contributions from private sector more difficult (Figure 8-7). Similarly to the public sector, it was felt that having a process in place to enable discussions and an awareness of the policy was a factor in making the process of obtaining voluntary contributions from the private sector less difficult.

Figure 8-7: Responses to survey question: The following statements relate to Partnership Funding and obtaining contributions from the private sector (organisations and individuals). Please indicate whether you think they have made the process of obtaining voluntary contributions from the private sector more or less difficult (n=61)



One RFCC interviewee indicated that, in their view, Partnership Funding had a significant impact in terms of increasing overall investment in FCERM. This is considered to be one of the main successes of Partnership Funding as it has allowed a large amount of money to be invested into the development of schemes across the country. However, they perceived that most of the Partnership Funding contributions received come from the public sector, and such contributions are becoming more difficult to obtain. In the RFCC area represented by the interviewee there are two specific people that are focussing entirely on partnership contributions and liaising with those in the local area who would benefit from a flood risk management scheme. The process of engaging with local people and organisations with the aim of encouraging them to invest takes place before a scheme is developed and in the initial stages of scheme development (thus preparing potential contributors for a potential scheme and requests for contributions).

Another interviewee noted that it can take time to obtain Partnership Funding from contributors and with austerity measures it is likely that money will be harder to come by in the future. During the discussion it was noted that in the Anglian region many schemes are put forward by IDBs. Partnership Funding has opened up the opportunity for IDBs to obtain funding from others. It also enabled Defra and the Environment Agency to grant more money to IDBs, thereby decreasing their rate demands and the special levy on district authorities. However, in the opinion of the interviewee IDBs are still in the mind-set of the previous model (i.e. GiA and local levy) and they should explore other sources of funding more routinely.

8.4.2 Time limited spending

Interviewees identified that certain sources of non-GiA funding can be time limited, meaning that contributions are available to schemes but they have to be spent within a certain timeframe. This may be within a financial year or within a scheduled agreement so as to ensure outcomes are delivered to meet non-GiA funding criteria (such as grant funding). If a scheme cannot be finalised or delivered within the funding timeframes, the non-GiA funding can be lost causing the project to stall as new contributions are sourced or fail completely due to no alternative funding sources. This was highlighted as a particular risk for natural or green schemes as well as very large and complicated engineering schemes.

Responses to both the survey and interviews suggested that natural or green schemes often require more time to develop the business case, with the perception that the evidence required is often expensive and difficult to obtain. Respondents considered that this can mean that these types of schemes lose out on funding that is limited to a financial year. This point was highlighted by an interviewee that commented that the highways/transport teams at the Local Authority had money to improve the highway network, but they felt that none of this money went into innovative designs that could manage surface water runoff. In their opinion, this was partly because the department had less than a year to spend a huge amount of money and so did not have the time to design e.g. SUD schemes. The interviewee thought that there was insufficient time within the budgeting period to change drawings and designs to include green infrastructure elements. This raises a question as to whether there is an issue with the Partnership Funding approach and the time needed to complete the business case, or whether the issue is more associated with alignment of funding streams and opportunities to draw on funding if partnerships with highways teams could be developed.

Large or complicated engineering schemes can face risks relating to time limitations when non-GiA contributions feature a claw-back clause within the contract requiring the projects to be delivered to the set timescales. Delays can occur due to engineering difficulties or regulatory issues and schemes can lose funding (see Box 8-7).

Box 8-7: Case study: Willerby and Derringham scheme

The Willerby and Derringham scheme was designed to control the surface water run-off and reduce the risk of flooding to over 8,000 households in Hull. The scheme was estimated to deliver a total FCERM economic benefit of £539,859,000 through the protection of these residential properties. The scheme secured £7.7 million in GiA funding and a further £6.6 million Partnership Funding through European Regional Development Funding (ERDF).

As a result of Partnership Funding (i.e. from the ERDF) there was a risk of not delivering the scheme because the contract contained a claw-back clause requiring the project to be delivered to the set time scales. This posed a risk to the scheme as delays could have occurred due to engineering difficulties or regulatory issues. If delays had occurred then the ERDF funding would have been lost. To mitigate this issue, the Environment Agency underwrote the risk, although this was reported to have been a lengthy and difficult process.

Sources:

Environment Agency (2013): Willerby and Derringham – Hull. Profiling Partnership Funding. Available at: http://www.eacg.org.uk/Docs/PF/Hull_PF_Profile_final.pdf

Pers. comm., August 2017

One interviewee felt that there was a need for ready-to-go small projects that can be picked up and implemented quickly if funding (from any source, i.e. due to end of year underspends) suddenly becomes available at short notice but needs spending quickly. This would help with timescales for contributions from other organisations, such as LEPs, who typically have funds available and need spending quicker than FCERM projects can progress.

8.4.3 Lack of a mechanism to make beneficiaries pay

A number of respondents suggested that the nature of Partnership Funding means that those benefiting from a scheme do not necessarily have to contribute and risks can arise from not having a mechanism to make beneficiaries pay. It was stated that private organisations may refuse to contribute as they believe others will and they can still be protected by the schemes. One respondent felt this put them at a disadvantage during discussions with businesses. However it was also noted that where organisations have been flooded, and the contribution is less than the damages incurred, then the decision is usually simple, especially if the scheme will not go ahead without additional contributions.

8.4.4 Obtaining contributions from the private sector

Several respondents stated the Partnership Funding approach has provided them with a platform on which to start conversations with private organisations. However, this engagement can be time and resource intensive, often requiring specialist skills, especially when there is an undefined funding gap. With the austerity measures facing Local Authorities these resources are often limited, thus obtaining contributions from private sector is more difficult. In addition to this, the timescales of the Partnership Funding process are perceived to result in people losing interest

and confidence that the scheme can be delivered. Potentially contributions can be lost because FCERM projects do not progress at the same rate as private sector contributors are used to.

It was also highlighted that if private contributions can be secured, contributor's expectations often increase in terms of what can be delivered by a scheme. The more private contributors provided for a scheme, the more expectations increased even if this is not always the most sustainable option making negotiations difficult.

An interviewee noted that Partnership Funding can result in engineers having to present the case to private organisations to convince them to provide funding. The interviewee commented that such cases have to focus on how the scheme will add value to the business, identify the financial incentives that the businesses may have to invest, and the benefits they personally derive from the scheme. There also may be a need to consider whether the benefits can be proven and the businesses can afford to contribute. The interviewee additionally mentioned that financial planning had to be taken into account; businesses may be able to contribute but only when the scheme is delivered, or over a period of several years. This highlights the importance of having the right people with the right skills available to build partnerships and provide the information that potential contributors need.

8.4.5 Risk allowances and responsibility

Respondents also highlighted that difficulties also arise when trying to bring together the contributions from different organisations such as Local Authorities and the Department for Communities and Local Government (DCLG) (for the European Regional Development Funds). In particular, the need for legal agreements to be secured for the contributions can become an issue as organisations may challenge the terms of the contribution agreement if it does not meet their needs. It was also noted that having a mix of funders can make strategic decision making more difficult.

One interviewee noted that on more marginal projects where the Partnership Funding score is only just at 100% there is often an issue with getting contributors to understand the risk allowances, and what will happen if project costs increase. The Environment Agency's legal contract for contributions includes a clause that says the Environment Agency will meet any cost increases up to the maximum GiA available for the project, but any increases above that will have to be met by the contributors. Interviewees noted that it is extremely difficult negotiating for contributors to contribute an extra percentage to a risk budget on top of the scheme costs, particularly when those scheme costs are not confirmed. Generally this is not acceptable for contributors as they want cost certainty over how much they will be liable for.

Another interviewee highlighted that acquiring additional contributions that the Environment Agency cannot bid for (such as European Regional Development Fund)

leads to other RMAs such as a Local Authority becoming the lead partner. This then places the risk (e.g. such as the ERDF 15 year claw back clause) on that partner and requires clarity over who is responsible for the project risks. Legal agreements with the Environment Agency are often necessary to manage this risk but this can be a slow and difficult process.

8.4.6 Obtaining contributions from communities

Where contributions are needed from the community itself, one interviewee acknowledged that there can be difficulties in how to approach the issue. The willingness for the community to make contributions needs to be driven by the community themselves, either through a community group or project champion. This was echoed by another interviewee who noted that the right person needs to head up the project team and consultation works much better when led by someone local, especially when engaging with businesses. Several interviewees also noted that it is easier to get involvement and support from the community where there is an obvious problem and they have been directly affected; it is important to gain acceptance of the problem first before introducing the funding process and potential need for contributions.

One interviewee commented that those least able to protect themselves are unlikely to have the funds available to contribute to a Partnership Funding scheme. Even where there is a willingness to pay (generally associated with communities which have directly experienced flooding in recent memory) there may not be an ability to pay. This could either be due to the level of disposable income available to the community or because the community is spending so much time and resource on dealing with frequent flooding that they are in perpetual recovery mode, with no money left over for contributing to a scheme. The inverse of this may also be seen in wealthy areas where relatively small numbers of properties at risk can raise significant contributions. In addition to personal contributions from community members, more affluent areas may also have an increased ability to raise voluntary contributions through large fundraising events. One such example of this is the Alde and Ore “save our Suffolk estuary” campaign, which launched at the Suffolk show in May 2017; the campaign aims to raise £10 million to strengthen the estuary defence walls of the Alde, Ore and Butley rivers in Suffolk.

In addition to a community’s ability to contribute to a scheme, one interviewee highlighted that in some areas it is difficult to identify a defined community. In urban areas where households are more transient and therefore communities are less cohesive, it is more of a challenge to know who to approach for potential contributions.

Another issue identified is the perception by communities that innovative flood defences in the Netherlands can be implemented in the UK. There is a statutory right to defence in the Netherlands and the government can compensate the public

for flooding, however, this is not the case in the UK where compensation is not given which is considered to result in less innovation.

8.4.7 Obtaining contributions from the public sector

Comments provided through the online survey highlighted several difficulties associated with obtaining contributions from the public sector. Austerity measures/cuts were mentioned by several respondents as a key difficulty in securing funding. These measures mean Local Authorities often have less funding available to contribute towards multiple schemes; this is a particular issue where local government budgets are directed to other statutory obligations that are of a higher priority.

In addition to financial restraints, interviewees noted that some public sectors are facing increasingly limited resources within legal, economic regeneration and finance teams; these teams are noted as being key in many schemes to overcome issues (such as legal and contractual issues) and develop business cases. Staff and resource shortages can mean that engagement with organisations and groups that is necessary to gain voluntary contributions is limited, putting pressure on Local Authorities to fund schemes.

One interviewee found that the timeframes for securing public sector contributions can be problematic as it can take two to three years to access some funds as these need to be forecast ahead to get onto spend programmes. Over this timeframe the Partnership Funding score will be changing as the project moves from strategy level figures through outline design, and detailed design, before the figures are finalised. The interviewee stated that when the amount being asked for from contributors changes, it becomes very difficult as funds are being drawn from planned programmes of works. Contributors want cost certainty early on when agreeing how much they will contribute, but this does not fit in with the timescales of many projects as cost certainty is not available until detailed design at the end of the project development.

8.4.8 Changing opportunities for contributions over time

Some respondents stated that they are now seeing a situation whereby FCERM projects with strong economic business cases have already been delivered and the remaining schemes are those which are seen to be more difficult and complex to deliver. These complexities can result from a range of factors such as multiple sources of flooding, low household densities or multiple landowners. These schemes can often be resource intensive to develop, with further resources needed to obtain voluntary contributions.

Furthermore, interviewees identified that austerity measures within the public sector mean that these resources are often limited (e.g. staff are not available to undertake

engagement to raise contributions or funds are not available to collect evidence for the business cases) and the ability to obtain public sector contributions is problematic. One interviewee stated that Local Authorities have either already contributed to schemes earlier in the programme therefore have little or no money remaining, or are in a difficult financial position and are unwilling or unable to put money in. The interviewee therefore felt it was becoming increasingly difficult to fill the funding gap. As a further point, the interviewee held the view that Local Authorities are rather fragmented and do not have a single voice on the subject (as, for example, the Environment Agency might). This meant that there were inefficiencies since each Local Authority team had to have a different engagement process and different discussions.

One interviewee expressed the opinion that obtaining voluntary contributions is becoming easier because potential beneficiaries know that if they do not contribute then the scheme will not go ahead. Another interviewee found that the ease of securing contributions can depend on the political appetite for the area. In areas where the need for a scheme is based on mapping there has been no support for it on the ground as communities are unaware of risks, and they become concerned about house prices and their ability to sell their property. At the other end of the scale, areas affected by recent flooding or where people perceive the risk of flooding, local engagement is increased, making it easier to secure funding, for example from the parish council. Even a token contribution from the parish council is deemed useful as they then become an active partner, demonstrating their support for the scheme and its local importance. This helps encourage support from other sources, particularly other public bodies such as district and county councils.

8.5 Time needed to progress schemes

8.5.1 Length of time required to secure GiA funding for schemes

The 2015/16 to 2020/21 data set includes dates between three gateway points:

- Time between gateway 1 (business case/justification) and gateway 3 (contract award/investment decision)
- Time between gateway 1 (business case/justification) and the start of construction
- Time between gateway 1 (business case/justification) and gateway 4 (readiness for service)

Table 8-13 presents the average (mean, mode and median) time between the gateway dates under the counterfactual and Partnership Funding policy scenarios for 2015/16 to 2020/21. The table also shows the difference in number of days between the counterfactual and Partnership Funding policy scenarios.

Table 8-13: Average time between gateway dates

Measure	Gateway 1 to Gateway 3	Gateway 1 to start of construction	Gateway 1 to Gateway 4
Counterfactual scenario			
Mean	240 days	350 days	698 days
Mode	44 days (90 schemes)	110 days (56 schemes)	239 days (30 schemes)
Median	110 days	219 days	522 days
Partnership Funding policy scenario			
Mean	225 days	332 days	668 days
Mode	44 days (119 schemes)	110 days (71 schemes)	239 days (39 schemes)
Median	109 days	197 days	520 days
Difference between counterfactual and Partnership Funding policy scenarios			
Mean	-15	-18 days	-31 days
Mode	Same	Same	Same
Median	-1 day	-22 days	-2 days

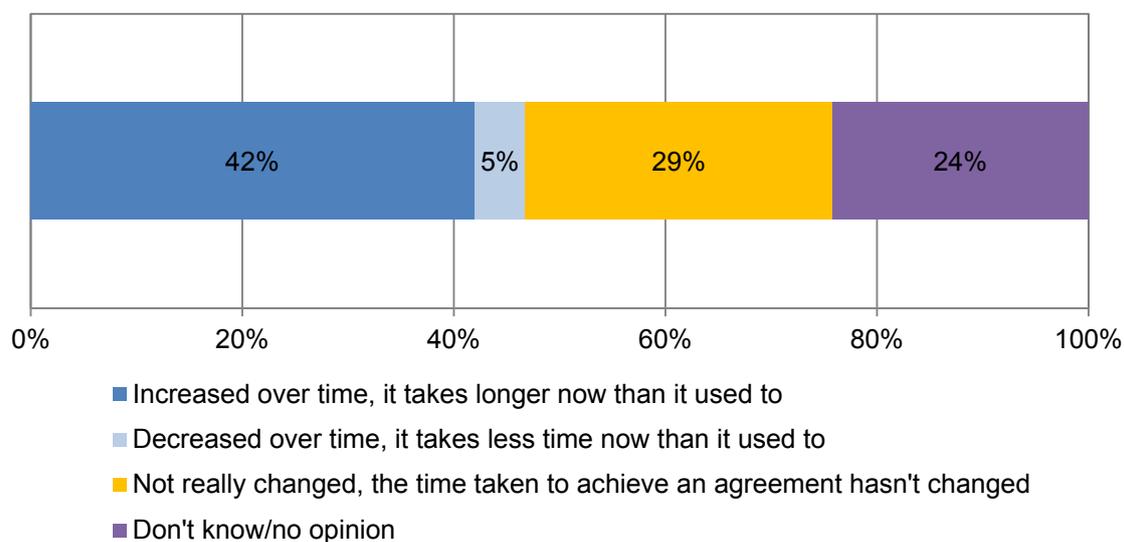
Table 8-13 shows that the mean length of time decreases across all Gateways under the Partnership Funding policy scenario compared with the counterfactual scenario. The median also shows a decrease under the Partnership Funding policy scenario (although this is only a decrease of 1 day for Gateway 1 to Gateway 3 and 2 days for Gateway 1 to Gateway 4). The average time using the mode suggests no change. It is likely that there is too much variation within the data entered into the 2015/16 to 2020/21 data set to draw any firm conclusions on the length of time that is required to proceed from one gateway to the next.

Several interviewees have noted that the length of time taken for a project to progress from appraisal to construction has not changed significantly since the introduction of the Partnership Funding policy. Even though organisations and professionals are becoming more efficient as familiarity with the process increases, the length of time is not reducing. One interviewee noted that at first there was not as much awareness of how much time the process would take, so not enough time was planned upfront; however now, everyone is becoming more accustomed with the procedure and knows how much time to plan in advance.

8.5.2 Length of time taken to receive contributions

The survey asked respondents whether the amount of time taken to obtain contribution agreements to fund FCERM schemes had changed since the introduction of Partnership Funding in 2011. Almost half of the respondents (42%) stated that the time taken to obtain contribution agreements had increased and only a small number (5%) indicated that the time had reduced (Figure 8-8).

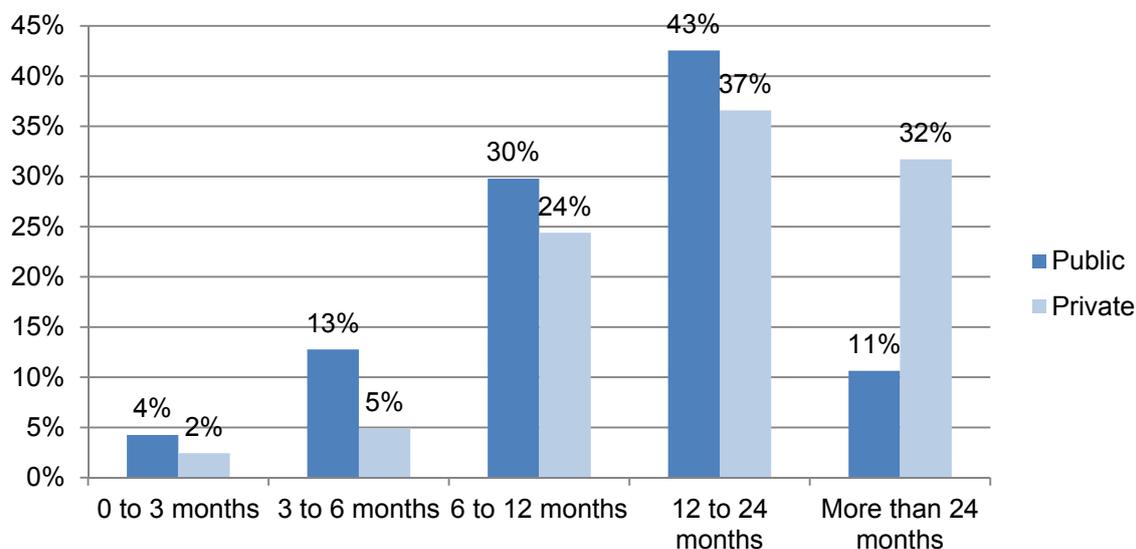
Figure 8-8: Responses to survey question: In your experience has the amount of time taken to obtain contribution agreements to fund FCERM schemes changed since the introduction of Partnership Funding in 2011? (n=62)



Responses to the online survey indicated that contribution agreements generally take six months or longer to obtain, with the majority of respondents (73%) stating that public sector agreements take between six and 24 months to agree. Timings for private sector contributions were slightly longer with 69% of respondents stating that these agreements took 12 months or more to obtain (Figure 8-9). The average time across all respondents is 15 months for agreements with the public sector and 20 months for agreements with the private sector (based on Figure 8-9, using mid-points within each range).

Interviewees stated that long timeframes for obtaining contribution agreements were due to legal agreements. Often the contributions are agreed but partner organisations are not prepared to sign the legal agreements due to certain clauses placing liabilities on them. This process often requires additional legal resource and senior management sign off which can slow the process down. Additional reasons for lengthy timescales included a lack of flooding knowledge in partner organisations (e.g. different terminology), having to meet additional requirements requested by partner organisations (i.e. the schemes need to deliver additional benefits such as jobs, regeneration), and additional levels of decision making in partner organisations.

Figure 8-9: Responses to survey question: In your experience how long in months does it take to obtain contribution agreements from the public sector and private sector (as a range, e.g. 3 to 6 months)? (n=41)



Examples of very short timescales for obtaining contribution agreements from the public sector are often in cases where partner organisations are well informed and knowledgeable about flooding and the Partnership Funding process. End of year spending was also mentioned as helping to accelerate normal procedures, but also reduces multi-functional working.

Responses from respondents to both the survey and interviews in regard to obtaining contribution agreements from private organisations were mixed, with the timescales changing from scheme to scheme. Some respondents stated that the timescales can be quite short if the amount required is relatively small or the contributor is motivated to get the scheme built. One interviewee provided the example of a business that was flooded in 2013 and was asked for a £15,000 contribution for a temporary defence; these negotiations only lasted for a couple of months. Another interviewee commented that there are examples of schemes where contribution agreements can take up to five years. They noted that the greater the funding gap, the longer the time period required obtaining the contribution agreement.

It was also noted that if engagement and/or Partnership Funding had taken place in the area previously, the process was much quicker. Other respondents stated that the process can take several years, with legal agreements becoming an issue and a significant amount of time being needed to find the right contributors and set up meetings. Some respondents did note however, that once discussions had taken place and agreements had been finalised, contributions were received quickly. One example of an innovative approach to raising community contributions was the Pagham scheme, where the Parish Council took on the leadership for securing the contribution and used a precept on the community council tax as a mechanism. This

was popularly supported amongst the community. It is a fairly small community and the problem was well known, so the mechanism worked really well. Council tax precept was recognised as a useful mechanism as it allows the public to contribute little and often building up a contribution in advance of the works.

One interviewee highlighted that water companies require funding to tie in with their five year funding periods. This leads to some projects that could have been brought forward, being delayed by a few years in order to fit the contributors funding schedule.

8.5.3 Securing of contributions for funding of long-term maintenance

Respondents highlighted the involvement of local communities in scheme development can be beneficial as they can also assist in maintenance and contributions "in-kind". It was also highlighted that schemes in rural and coastal areas are generally expensive and may only protect a few properties. Whilst contributions for the capital costs of the schemes may be available, the small nature of the communities means it is unlikely that they will be able to contribute enough to maintain the schemes.

Several interviewees reported that there is a lack of awareness over maintenance with private land owners. In some areas where there are a lot of riparian owners (who are therefore asset owners with maintenance responsibilities) there is a perception that there has been no enforcement of their responsibilities resulting in assets being neglected. Where there is a long history of neglect and current condition of assets, the amount of time and effort needed to enforce legal responsibilities on all riparian owners means it can be more cost effective to renew the assets through public funds.

One interviewee felt that contributors are generally happy to give to the upfront costs of a scheme but not for the maintenance. Contributors generally feel that maintenance should be the Environment Agency's responsibility. The Environment Agency legal contract for contributions includes a clause on maintenance which states an amount of the contribution will be allocated to maintenance, and that the Environment Agency will endeavour to carry out the planned maintenance but if for some reason that is not possible the maintenance contribution will be returned to the contributor. According to the interviewee, this is nearly always a stumbling block with getting contributors to sign the legal agreements; they do not understand why they should be paying for the maintenance. In addition there is also unease amongst contributors about putting money into a scheme when there is no guarantee that it will be maintained in the future.

9. Delivering local choices and wider objectives

9.1 Research questions covered

This section covers research questions 11 and 22, focusing specifically on issues associated with delivery of local choices and wider objectives, and the additional opportunities and challenges identified through the evaluation of the partnership funding policy:

- RQ11: Has the number of projects which seek to integrate FCERM and wider objectives (e.g. regeneration) increased or decreased under Partnership Funding? What is the role of project design or particular technical approaches in securing funding agreements from third parties?
- RQ22: Is there evidence that communities are having a greater say in design choices about flood schemes in their areas?

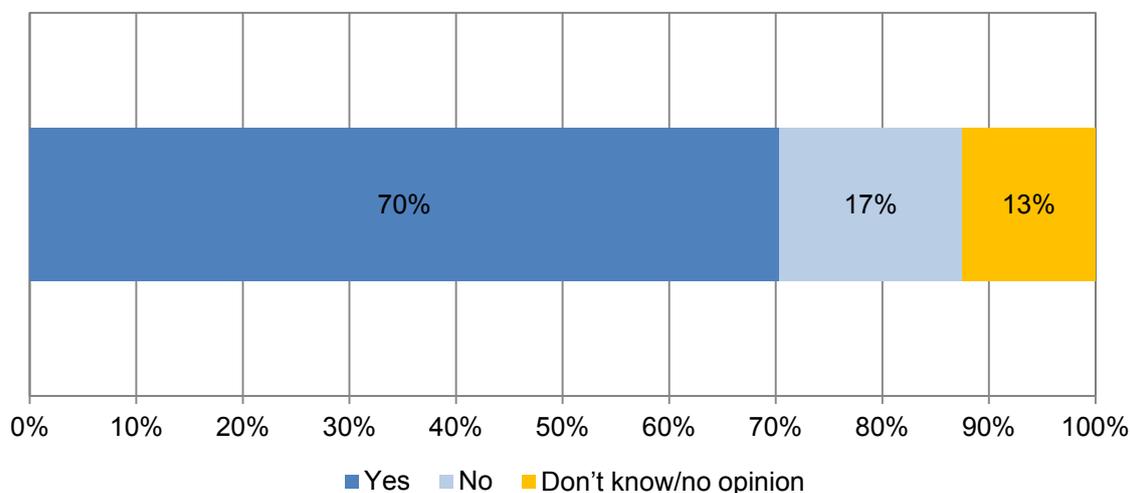
9.2 Number of schemes where local choices have affected the choice of preferred option

The survey asked whether local communities are involved in FCERM schemes. In total, 70% of respondents agreed that they were involved, with 17% saying that they were not and 13% stating that they did not know or had no opinion. The responses to the survey are summarised in Figure 9-1.

When asked about local community involvement in FCERM schemes, some respondents to the online survey highlighted instances where local choice led to options other than the most cost efficient being selected. It was noted that the establishment of local volunteer groups was useful to allow communities to take on ownership of elements of a project. However, it was also commented that different elements or groups within a community can have different interests and their level of influence is often limited by what is practically possible and affordable.

One interviewee felt that the type of scheme implemented was dependent on the views of the project manager and designer. It was suggested that the project manager would design the scheme that they thought would work, and then try and get contributions for this scheme.

Figure 9-1: Responses to survey question: In your experience, are local communities involved in FCERM schemes (e.g. do they provide input in terms of views/opinions on the preferred design of FCERM schemes and other aspects of the process)? (n=64)



Box 9-1: Case Study: North Portsea Island Scheme

The North Portsea Island Scheme is an example of where contributions have affected the choice of preferred option. Following the FCERM appraisal guidance, the standard of protection justifiable for the scheme was 1 in 200 year. However, Portsmouth City Council was willing to contribute the extra needed to allow a 1 in 500 year standard of protection scheme to be built. Although it cannot be said that this was possible solely due to the PF policy, it certainly helped the process of negotiating the contributions required.

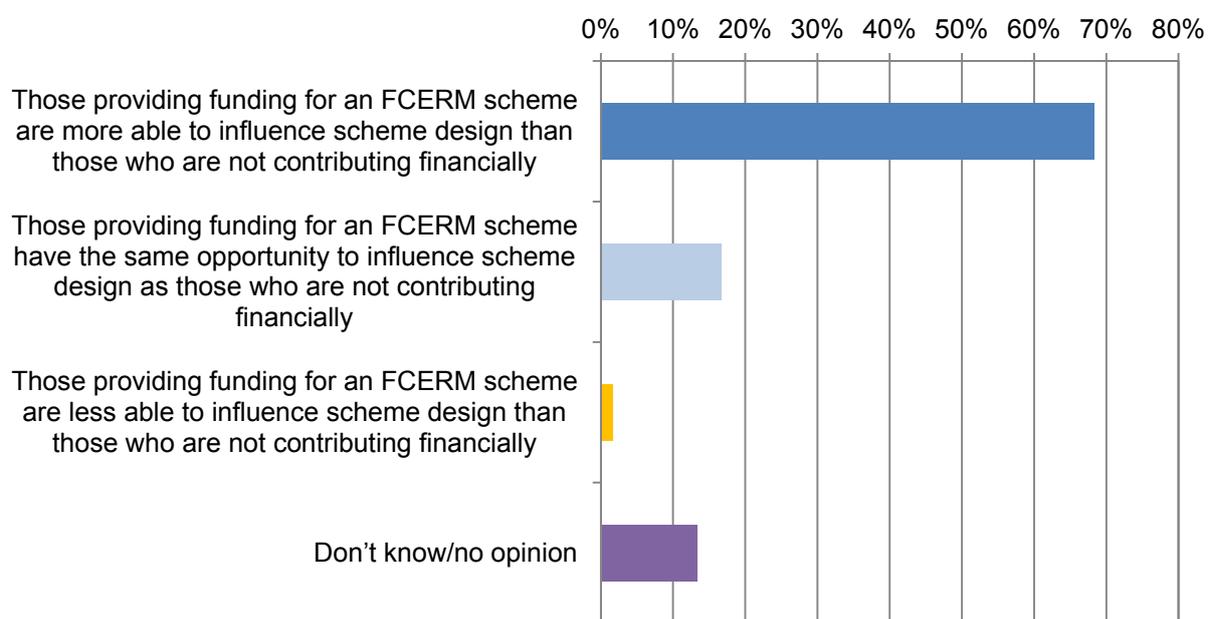
9.3 Views on influence of contributors on project design

The survey specifically asked respondents whether they felt that Partnership Funding had been successful in better protecting more communities and delivering more benefits by enabling greater civil society involvement and more local choice in the selection of FCERM options. The 70 respondents had fairly mixed views, with similar percentages answering “very successful”/“somewhat successful” (30%) and “not very successful”/“not at all successful” (31%). The most common response (26% of respondents) was “neither successful nor unsuccessful”.

The range of responses to this question indicates that there is no clear view on whether communities are having a greater say in design choices. Based on comments from the interviews, the mixed responses could reflect the different perspectives of the wide range of organisations that have responded to the survey.

The Internet survey also asked respondents whether those who are providing funding for an FCERM scheme have more or less of a say in scheme design than those who are not providing a financial contribution. Figure 9-2 presents the results and show that almost 70% of respondents agreed that those providing funding are more able to influence scheme design than those not providing a financial contribution. The proportion of respondents who thought that the opportunities were the same for those contributing financially and not contributing financially was 17%.

Figure 9-2: Responses to survey question: In your experience, do those providing funding for an FCERM scheme have more or less of a say in scheme design than those who are not contributing financially? (n=60)



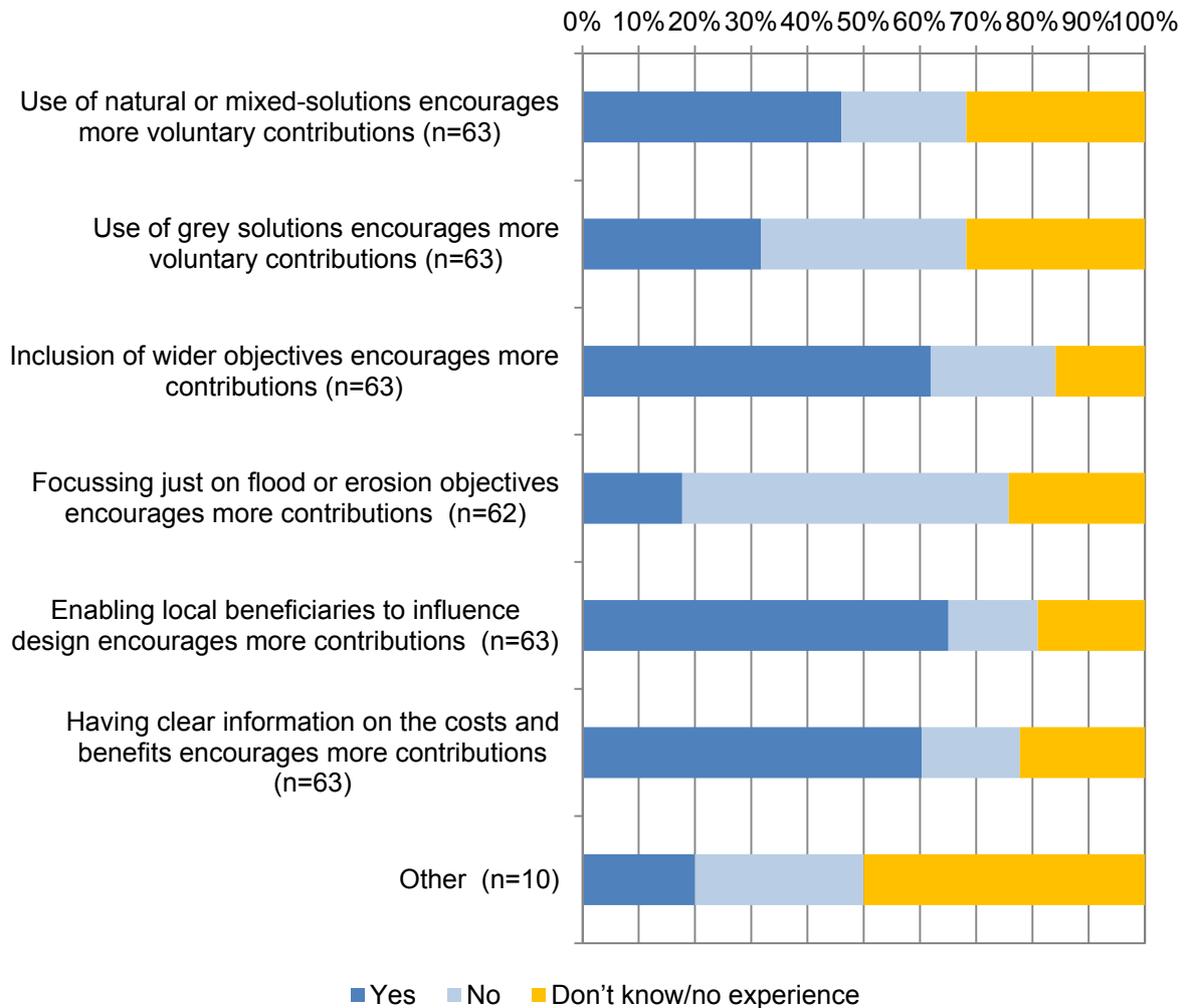
When asked if the design of an FCERM scheme encourages more voluntary contributions, several respondents stated that this was dependent on the location and the experiences of the local communities. For example, if a community has been flooded several times they may prefer to contribute toward a traditional or “grey” scheme as this is seen as offering a reliable standard of protection, whereas if the community wants to keep an area looking natural, they may be more inclined to support a natural or green scheme.

Figure 9-3 summarises responses on the factors that might encourage more voluntary contributions. The factors considered by respondents to be more likely to result in voluntary contributions are:

- Enabling local beneficiaries to influence design ((65%) agreed that this is likely to encourage more voluntary contributions)

- Inclusion of wider objectives (62%)
- Having clear information on the costs and benefits (60%)

Figure 9-3: Responses to survey question: In your experience does the design of an FCERM scheme encourage more voluntary (non Grant-in-Aid) contributions? (n=63)



Responses to the online survey suggest that contributors want to be involved in the design of the schemes and influence the final options; however this is often linked to the amount of funding being provided (i.e. those contributing more would prefer more input). Respondents stated that to encourage contributions, all stakeholders should be involved in the project design but this is often limited by what is practically and financially achievable.

One interviewee felt that there was some subjectivity with regard to the scheme design that communities want. The interviewee thought that in certain areas, people may be more open to schemes that are taking a more natural approach where this

fits with the existing character of the area. They were also of the view that more natural schemes tend to have more benefits (for example, for tourism) and these can bring in different sources of funding. The interviewee also acknowledged that in more built-up areas where there have been many flooding events, people may not necessarily be reassured by blue-green infrastructure; instead they may prefer a concrete wall.

Box 9-2: Case Study: Alde Ore Estuary

Snape is located at the top of the Alde Ore estuary and during the December 2013 storm surge 26 homes were flooded. There is a small river wall along the line of the River Alde and this was overwhelmed during the surge and water crossed the floodplain. To provide protection for the houses in the village in the future, potential scheme options were investigated; this included increasing the height of the river wall, but since a long distance was needed it was not considered to be cost beneficial. The other option proposed was a set back wall near to the village, allowing for a more natural floodplain; this option was not wanted by the village as it was seen to be bringing flood water closer to the village, whilst also obscuring views. The Alde Ore Partnership decided that the amount of money required through partnership funding for the set back wall was too much and that a local engineer could undertake the works for less than the partnership funding contribution required by the EA. The IDB is now preparing a business case for a river wall to go through the partnership funding calculator. The Business Case will need to consider cost of future maintenance as well as to clarify responsibility for this.

One interviewee commented that if the aim of a scheme is purely to maximise the number of houses for which flood risk is reduced, then the solution might be different to what the 'right solution' is for the community and the long term. They felt that if a scheme was creating a natural flood defence which would also function as a habitat and carbon sink and be beneficial for tourism, this should attract funding. In practice, the interviewee thought that it may be quite difficult to get that funding. Their perception was that if there was an urban area where surface water and fluvial flooding required addressing to protect a few houses, it would be possible to consider use of green spaces and sustainable drainage. However, from an economic point of view it might be cheaper to implement property level resilience on a house by house basis. They felt that modelling data may also sometimes suggest that sustainable drainage may not be as effective as property level resilience measures. They felt that this could then drive scheme designers towards measures that only protect a few houses, whereas the best solution for the whole community might be a green scheme that offers a reduced level of protection (in comparison) but other wider community level benefits. Such schemes may also be able to naturally maintain themselves.

Discussions during the interviews highlighted some challenges regarding community contributions to schemes. One interviewee found that communities expect to be able to drive the direction of the scheme particularly if they are contributing. This needs careful leadership by the Environment Agency project team to guide the community as to which areas of the scheme they can influence and which ones they

cannot. Another interviewee noted that communities would often like to engage in the scheme design, but become dis-engaged once they start to hear about the Partnership Funding formula. This may then make the process difficult since the community needs to be brought on board at some stage. It was also noted by an interviewee that awareness can hinder a project if there are a lot of people getting heavily involved early on, particularly when initially investigating what the options might be.

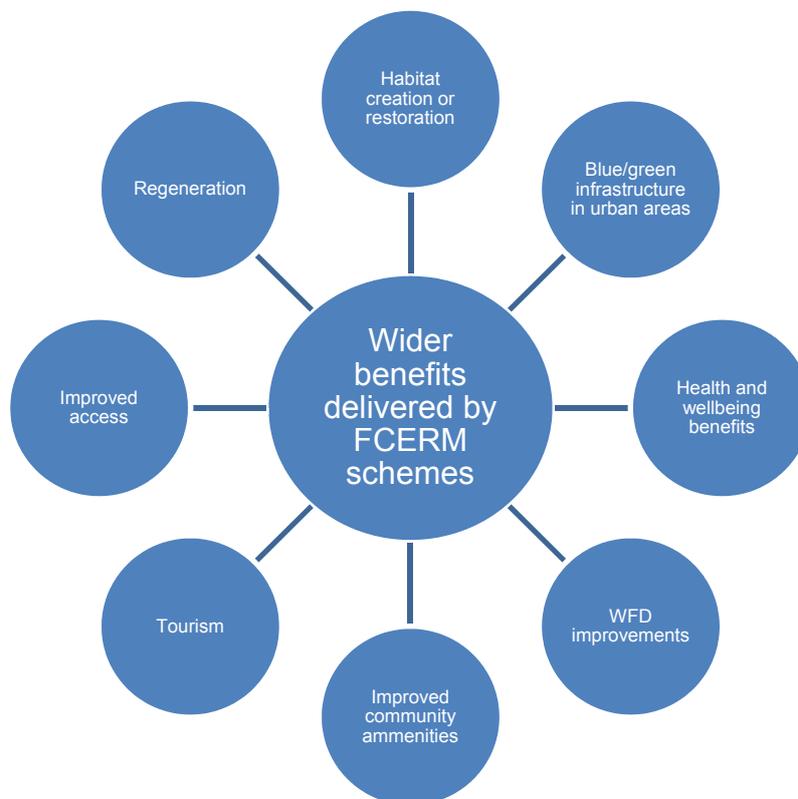
One interviewee noted that whilst the intention of the Partnership Funding policy was to give more independence back to communities with a greater say in the scheme for their area, this had not worked (especially for rural communities). They felt that in reality the power had gone to the RFCCs and the burden of contributions had fallen on Local Authorities and private businesses. This perception is backed up to some extent by the analysis of the Partnership Funding policy scenario which indicates that public sources are providing the largest proportion of contributions (44%). Another interviewee felt that the Partnership Funding policy has not resulted in communities having a greater input into the design of a scheme, but they do have a greater influence over whether a scheme happens or not. The interviewee thought that the policy had given communities the opportunity to help themselves, if they could find the funding. However, the interviewee was also keen to highlight that there was a risk that this could be in conflict with sustainable coastal management, in terms of schemes going ahead because the community can afford them and not because it is the right thing to do.

9.4 Number of schemes where other, wider benefits have been realised

Respondents to the online survey described a variety of wider benefits delivered by FCERM schemes. One respondent noted that wider objectives are considered in all of their schemes as standard practice and they look to align partner objectives with those of FCERM. Figure 9-4 summarises the types of wider benefits that were highlighted by interviewees as being delivered by FCERM schemes.

Discussions during the interviews highlighted some issues with wider benefits. One interviewee noted that practitioners have been told to include wider environmental benefits in Outcome Measure 1, but there have to be many benefits for these to make a contribution towards the overall PF score. In addition, they noted that there has to be a methodology to enable these benefits to be calculated. The interviewee felt that whilst there was existing guidance on ways to determine benefits, the guidance does not identify the most appropriate methodology to use.

Figure 9-4: Examples of wider benefits delivered by FCERM schemes highlighted during interviews



Box 9-3: Case Study: partnership funding facilitating a multi-benefit scheme

The flood problems at the Holderness Drain scheme have been considered several times in the past but the Environment Agency were not able to get a project off the ground. The watercourse is a historic artificial watercourse which relies heavily on pumping; it flooded in 2007. The flood risk includes rural areas in the East Riding of Yorkshire Council authority area and urban areas in the Hull City Council authority area. Partnership Funding has allowed a multi-benefit scheme with habitat creation, and providing blue/green infrastructure on the doorstep of a deprived urban area giving health and well-being benefits. The maintenance will be taken on by the Yorkshire Wildlife Trust. Partnership Funding has helped by providing the initial funding commitment which has allowed other funders to be brought in. Altogether there are 10 funders, so getting them all to align in terms of timings and aspirations is difficult.

9.5 Views on use of benefit-cost ratios for schemes

Respondents to the online survey highlighted several schemes where the chosen option varied from the one with the highest benefit-cost ratio; reasons for this included: environmental designations, improvement in appearance, community support/political pressure, and legal compliance. One respondent noted that the current funding mechanism does not help in funding schemes designed to protect

critical infrastructure assets where there are minimal properties at risk; in their view these schemes are costly and have a low benefit-cost ratio.

Consultees made several comments relating to the use of benefit-cost ratios. One interviewee noted that the PF calculation seemed to focus on the benefit-cost ratio, with the result that project managers focus on achieving the highest ratio possible. The interviewee felt that this led to the greater use of traditional (i.e. grey) schemes. Another interviewee felt that whilst the cost-benefit ratio had not been the most important factor in their experience, a lot of time was generally spent by staff members trying to tweak the cost-benefit ratio to get the scheme they wanted.

However, another interviewee felt that the Partnership Funding score does not necessarily reflect the BCR i.e. a scheme might have a high BCR but a low Partnership Funding score due to the benefits being derived mainly from Outcome Measure 1. They felt that there could be a conflict where the Partnership Funding calculator pushes towards lower cost schemes but quite often the lower cost schemes deliver fewer outcomes, and therefore the Partnership Funding policy is working against its overall aim of delivering more outcomes.

9.6 Projects where the economic optimum was not the preferred option

The survey asked respondents whether they were aware of any schemes implemented where factors other than the benefit-cost ratio had affected the choice of scheme. Whilst 41% of respondents to the question were either unaware of any schemes or selected “don’t know”, 29% responded “yes” (see Figure 9-5). This suggests that for a minority of schemes, an option other than the economic optimum may be selected.

9.7 Projects where wider benefits have resulted in delivery of different types of project

Based on survey respondents’ views, the majority of schemes implemented under the partnership funding approach do include wider benefits (see Figure 9-6). Respondents identified several schemes where wider benefits had been delivered as part of schemes. The telephone interviews provided the opportunity to obtain more information on the delivery of wider benefits.

Figure 9-5: Responses to survey question: Within the geographical area covered by your organisation, have any schemes been implemented where factors other than benefit-cost ratio have affected the choice of scheme? (n = 72)

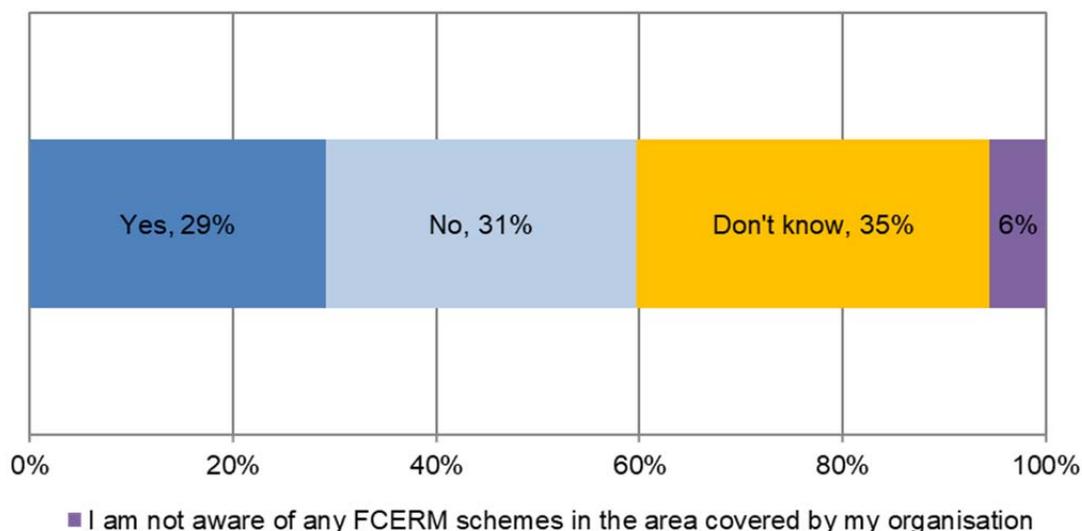
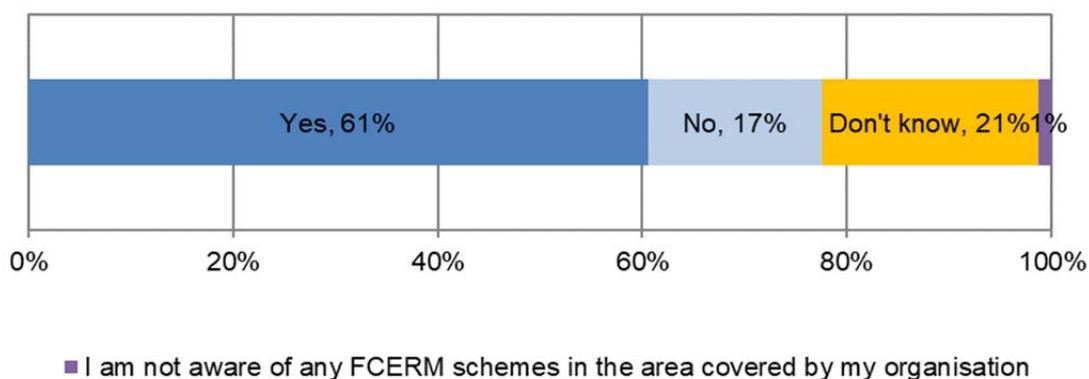


Figure 9-6: Responses to survey question: Have any of the schemes implemented in the geographical area covered by your organisation included wider benefits in their appraisal? (n=76)



One interviewee commented that in the geographical area covered by their organisation, schemes are designed to deliver wider benefits to bring funding in from other stakeholders and without these benefits, the stakeholders would not contribute. Also, during scheme development, discussions are held with specialist colleagues to determine if there are any other environmental benefits that can be included within the scheme. Another interviewee noted that wider benefits are considered in FCERM projects, with regeneration included in many of the larger schemes. The interviewee noted that the most successful schemes will include wider community

objectives, as flood risk management is only one element of a scheme that delivers what the community wants. Both of these interviewees therefore indicate that efforts are being made to include wider benefits. However, the extent to which wider benefits are incorporated may vary by organisation.

One interviewee noted that there were differences between organisations when considering the inclusion of wider benefits. They felt that Local Authorities were very focused on multiple community aspects, so tended to think about wider benefits such as what can be done in relation to deprivation, wider health issues and infrastructure. They thought that this could be more difficult for organisations such as the Environment Agency and IDBs which may have a more limited focus.

Box 9-4: Case Study: partnership funding enabling regeneration in Lowestoft

A large partnership funding gap exists in the Lowestoft Flood Risk Management project, which is a £32.5 million project of which £5 million is GiA and £2.8 million is levy. This gap is due to the large area of brownfield land which is ripe for regeneration, but is at flood risk. There are only 400 properties on the site, which is not enough for full funding to be secured. A case was made to the LEP for £10 million of funding on the basis that the scheme is important in regenerating Lowestoft. By taking a holistic view and considering the benefits in terms of economic development and infrastructure, it was possible to change the design of the scheme to deliver maximum benefits. If the scheme had focused on flood risk alone, it would not have gone ahead, or it would have progressed with a much narrower focus. To get the Partnership Funding it is important to articulate the benefits, understand the beneficiaries and then build the business case around them. The design and placement of the infrastructure is important; this helps to make it acceptable to both the local community and businesses. It also makes businesses more helpful throughout the process and increases interest in partnership funding. Businesses have not been asked for contributions but some of the capital investment will be recouped through business rates.

There are examples of schemes where a funding gap has led to schemes having to provide additional information on their wider benefits in order to obtain funding from other sources. One interviewee indicated that the Eastrington and Laxton Flood Alleviation Scheme (FAS) and the Gilberdyke and Blacktoft FAS are costing £3.6 million and include new pumping stations and improvements to the local land drainage system (required to reduce the risk of flooding). In each of these cases, it has not been possible to obtain sufficient GiA funding to cover the full costs of the schemes. Thus, there has been a need to obtain funding from other sources in order to fill this gap (including applying for local growth fund and levy and also IDB capital reserves). An application has also been submitted to obtain contributions from the Local Enterprise Partnership (LEP), which is mainly interested in the benefits resulting from the number of businesses that will be protected from flooding, with other secondary benefits of interest including the number of jobs sustained and created. Information on jobs proved difficult to determine and has resulted in the development of an appraisal methodology that has been provided to the LEP to review and accept. The appraisal considered the number of agri-businesses protected and their supply chains and also contained a formula that calculated the number of jobs created. This ultimately helped secure funding from the LEP for the schemes.

Box 9-5: Case Study: funding gap in the River of Life Project

The River of Life project (River Thames in Oxfordshire, upstream of Shillingford), which was part funded by GiA, was proposed by the Earth Trust who wanted to undertake significant works in the floodplain, but needed a large grant from the Heritage Lottery Fund (HLF) to do so. The grant could not be obtained without other funding, so the Earth Trust approached the Environment Agency for GiA. The project was ultimately funded by GiA and local levy (for the flooding related aspects) and HLF (for other aspects). The costs of the scheme were split, with an itemised breakdown of who was paying for which aspects (outside of the calculator). It took around 12-14 months to organise the finances; the scheme had already been designed, but the detailed breakdown of costs was needed to ensure sign-off could occur.

Box 9-6: Case Study: Medmerry Managed Realignment scheme

The Medmerry Managed Realignment scheme at £30 million was the largest open coast realignment scheme in Europe. The scheme was progressed prior to the Partnership Funding policy being rolled out (but construction was not completed until 2013) and is a good example of where a project could have been improved under the Partnership Funding policy. It was developed before contributions were included in schemes; if contributions had been the norm then potentially the area could have ended up with a better scheme, and it certainly would have been an easier scheme. The scheme originally included an embankment through the middle of an adjoining caravan site. The landowner objected and was given two options; either accept EA compulsory purchase of land or pay £20 million to construct their own defence around their site. This situation would probably have been easier and had a more satisfactory outcome for both the landowner and EA if it could have been done under the Partnership Funding process.

The Medmerry Managed Realignment scheme did have wider benefits which were already 'maxed' out; due to it being such a big scheme, sacrifices did not have to be made. It is unlikely that the Partnership Funding policy would have improved wider benefits in any way. The wider benefits included ecosystem services, creation of fisheries nurseries, ecotourism boost for local economy (two adjacent caravan sites have even changed their focus to take advantage of higher end ecotourism market rather than traditional caravan market), recreation opportunities (tens of thousands of visitors now go to the site), willingness to pay and increased house prices due to being near a nature reserve (although this element is hard to prove).

Box 9-7: Case Study: realising wider benefits through additional funding for Coast Protection schemes

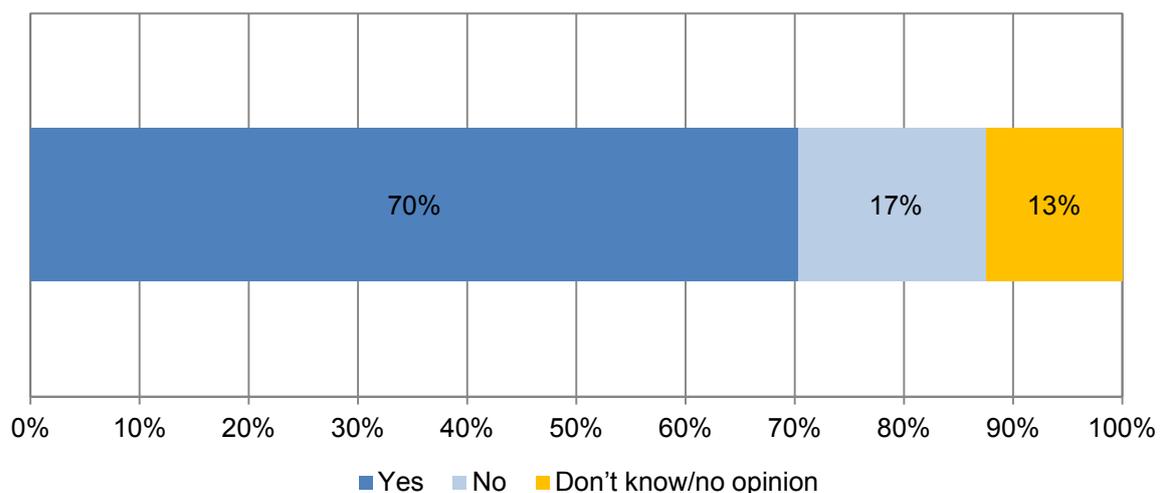
The Anchorsholme Coast Protection Scheme received voluntary contributions from United Utilities. Since 100% GiA had already been achieved, the design of the scheme was already well progressed before the additional funding came in. The additional funding did not therefore allow wider benefits to be achieved. The partnership, however, did work well as the scheme required United Utilities to work on their own assets as well, so their contribution helped in that respect. The wider benefits on this scheme were not realised.

The Central Area Coast Protection Scheme was implemented before the Partnership Funding policy was introduced, however it is a good example of where additional funding was already being utilised to allow wider benefits to be realised. The GiA funding would only cover the concrete seawall and a small amount of coloured concrete by the promenade. The extra funding allowed the sea wall to be sand coloured; as this was the central area this was important for tourism. Partnership Funding therefore changed the scheme a lot; it enhanced the features and even added in some non-flood related bonuses for residents and tourists. The grant was an ERDF from the EU and the GiA was used as match funding.

9.8 Engagement activities related to scheme design

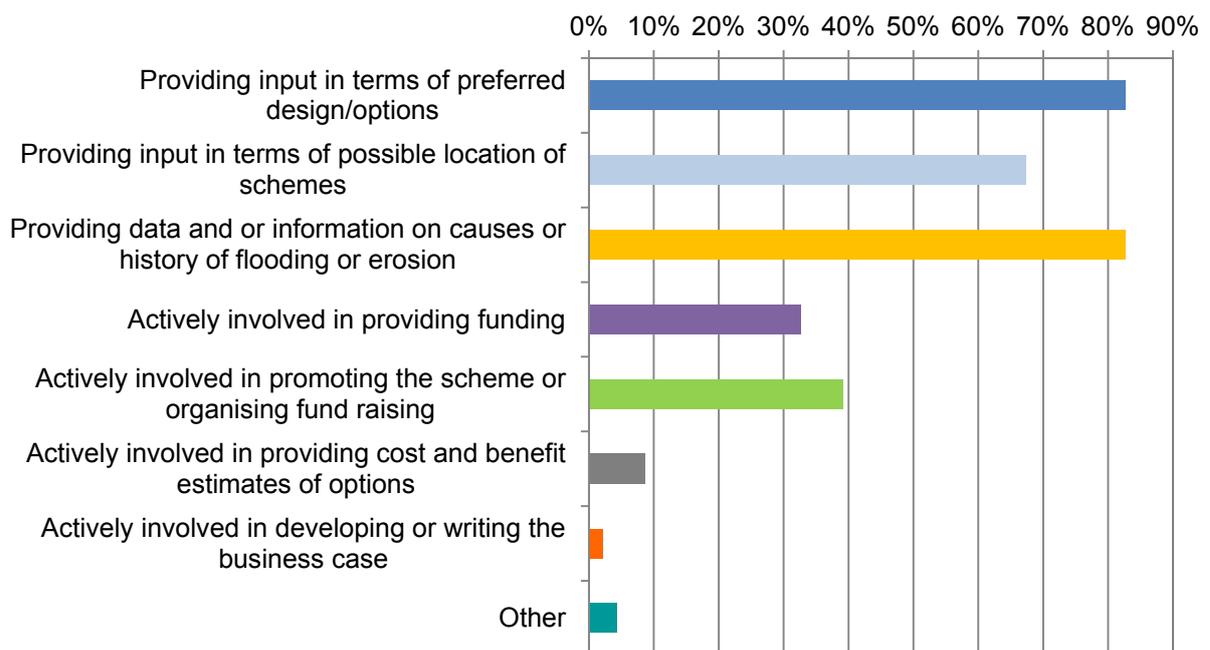
The survey asked respondents whether they thought local communities were involved in FCERM schemes (for example, by providing input in terms of view/opinions on the preferred design of schemes and other aspects of the process). Figure 9-7 summarises the responses to this question. Overall, 70% of respondents answered “yes” indicating that in the majority of cases, local communities are involved in schemes.

Figure 9-7: Responses to survey question: In your experience, are local communities involved in FCERM schemes (e.g. do they provide input in terms of views/opinions on the preferred design of FCERM schemes and other aspects of the process)? (n = 64)



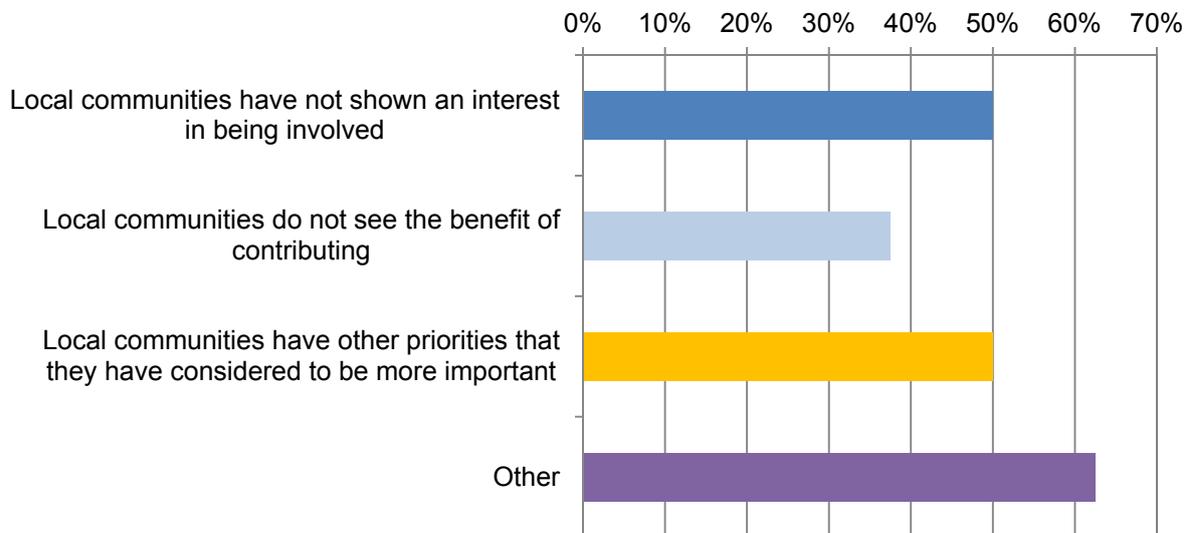
Respondents who replied “yes” in relation to local communities being involved in schemes were asked to clarify the area of involvement. Figure 9-8 provides the results, which indicate that the three most common types of involvement by the local community were the provision of input in terms of preferred design/options, the provision of data or information on the causes or history of flooding or erosion, and providing input in terms of possible location of schemes.

Figure 9-8: Responses to survey question: Please indicate how local communities are involved in FCERM schemes (please select all that apply) (n = 46)



Where respondents thought there was no community involvement in schemes, they were asked why this might be the case. The responses to this question are presented in Figure 9-9. This shows that whilst half of the respondents thought that local communities had not shown any interest in being involved, 63% of respondents cited other reasons for this lack of involvement.

Figure 9-9: Responses to survey question: Please indicate why local communities have not been involved in FCERM schemes (please select all that apply) (n = 8)



More detail was provided by a telephone interviewee who did not feel that communities were sufficiently involved at the national level. They thought that the process was perhaps in the wrong order, with staff members often coming up with an idea of a project and then going to the community, whereas the scheme should be developed in collaboration with the community. The interviewee commented that there was insufficient use of a community-led approach. They felt that using such an approach helps ensure thought is put in to what the scheme should really be delivering. They were also of the opinion that it helps with obtaining contributions since the community is comprised of the organisations and individuals from whom the contributions may be required. Figure 9-10 summarises barriers to community engagement that were highlighted during the interviews.

Figure 9-10: Examples of barriers to community engagement highlighted during interviews



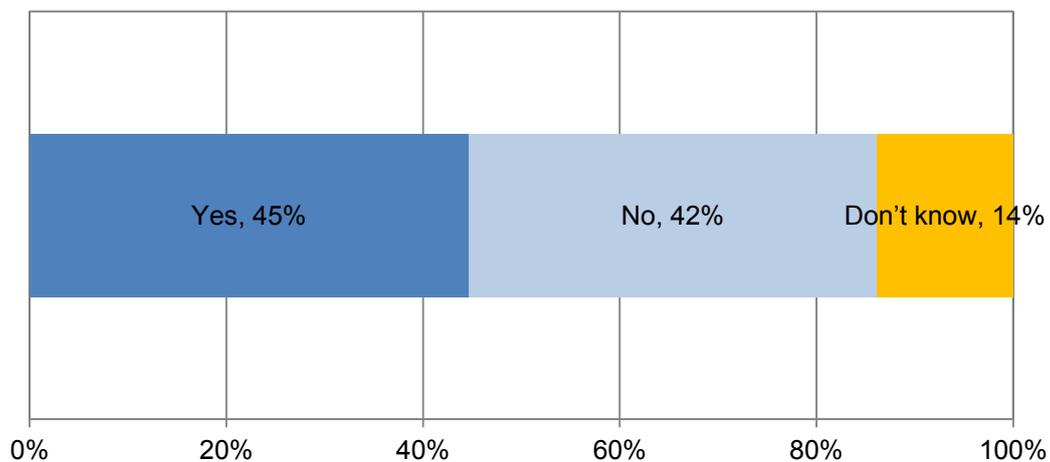
The survey also asked respondents whether they thought that local communities were sufficiently involved in the design choices of FCERM schemes. Figure 9-11 provides a summary of the results, with responses divided and similar numbers of respondents indicating “yes” and “no”.

In terms of improving levels of engagement, respondents suggested increasing awareness early on in the process could encourage continued involvement and also help scheme design, not only to deliver what the community wants, but also achieve wider benefits that could be used to leverage further funding.

Respondents noted that funding for engagement or additional resources needs to be made available due to the specialist nature of the engagement required. Several respondents stated that the involvement of Environment Agency staff could be helpful in managing community expectations with regard to what can feasibly and practically be delivered. Consistent with this point, one telephone interviewee indicated that LLFAs and the Environment Agency do undertake exhibitions and meetings where options are presented to local communities, and this process is considered to be beneficial. However, they noted that as a project develops and the options move forwards, the communities are not that involved in the design choices.

They felt that this could be because community involvement is not important at this point or that community engagement is quite expensive and the resources are not available. An observation made by the interviewee was that the bigger the scheme, the better community engagement seemed to be. They also noted that the level of involvement may also come down to how enthusiastic the community is about the project.

Figure 9-11: In your opinion, do you think that local communities are sufficiently involved in design choices of FCERM schemes? (n = 65)



One interviewee from a Local Authority felt that there was an issue with homeowner public relations in that where people had been flooded, moved out of their properties and then flooded again just prior to when they were due to return, they felt stuck between the Local Authority and the relevant water/sewerage authority. The interviewee felt that if there was a better working relationship between the Local Authority and water/sewerage authority, this would help in terms of public liaison. They were of the opinion that this would remove the blame culture since all RMAs would be putting money in.

Another interviewee noted that their organisation makes sure that schemes are community led so that they deliver what the community wants combined with what is feasible and affordable. The organisation has a community specialist who can engage with the community to try and manage expectations. A board and groups are formed to help drive the schemes forward; these typically consist of parish council leaders, landowners and business owners. The option that is chosen is not necessarily an engineered solution since this may not be what the community wants.

One interviewee felt that the Partnership Funding policy has helped the public to understand that RMAs have permissive powers to carry out FRM works, but do not

have a legal obligation to do them. They felt that although the Partnership Funding policy has not changed the way public engagement is carried out it may have helped the public's understanding of the RMA's responsibilities. This is important as another interviewee has found that once people are used to 100% GiA funding, no matter if it is a national business or the local residents, it is hard to introduce a 'beneficiaries pay' approach to contributions without serious media and political implications. Regardless of that and even if people understand the Partnership Funding policy, the interviewee felt that the public will expect, if they pay their council tax, that the government will provide flood defence projects.

Box 9.8: Case Study: community engagement in coastal erosion schemes

At Thorpeness, the ground is low-lying; there is shingle beach and there are high value properties on a strip metres above sea level. On the Suffolk coast the beach levels can be lost in a single event and then returned; this means there is instability and unpredictability. It is uneconomic to defend the properties as there are only a few; this means that funding will be low. The authority has experimented with different measures such as textile bags, which look unpleasant. The local residents have come together to provide partnership funding to help deliver the work (some have also undertaken work privately at the end of their gardens) and fund the defences. Once the cliff erodes out there will be flood risk.

One interviewee has found that due to extent and frequency of flooding in their area many of the communities are resigned to the flooding, they don't have expectations that the Local Authority will be able to do anything about it. The Local Authority have struggled to get people engaged with flooding, i.e. getting volunteers signed up to be flood wardens, and flooding is usually not the main 'council' issue the public wants to discuss. When projects do go ahead, communities are generally very grateful that the Local Authority is doing anything.

Another interviewee felt that public engagement is quite a reactive environment, but it is always better to begin engagement before there is an outcry for it, as then it is on the RMA's terms. The interviewee thought that engagement has to initially be about managing expectations, particularly with regards to timescales and the potential need for contributions; raising the issue of contributions part way through a project destroys the trust which has been built. They noted that engagement at an early stage is critical for surface water schemes, when the aim is to identify the issues before working towards delivery. In their view, a scheme will never be delivered without engagement; it is necessary to gain political interest within the Local Authority environment and there needs to be public support.

10. Refining the Partnership Funding policy

10.1 Research questions covered

This section discusses the results of the evaluation in order to answer research questions 20 and 21:

- RQ20: Does data analysis reveal any other issues with Partnership Funding which might suggest refinement or modification of the policy should be considered, based on what it is trying to achieve, and in what areas? This could include whether there are any impacts seen so far that may suggest something about future performance, in particular where any identified trends may cause issues if they continue.
- RQ21: Do investigations reveal any other issues with Partnership Funding which might suggest refinement or modification of the policy should be considered, based on what it is trying to achieve, and in what areas? This could include whether there are any impacts seen so far that may suggest something about future performance, in particular where any identified trends may cause issues if they continue.

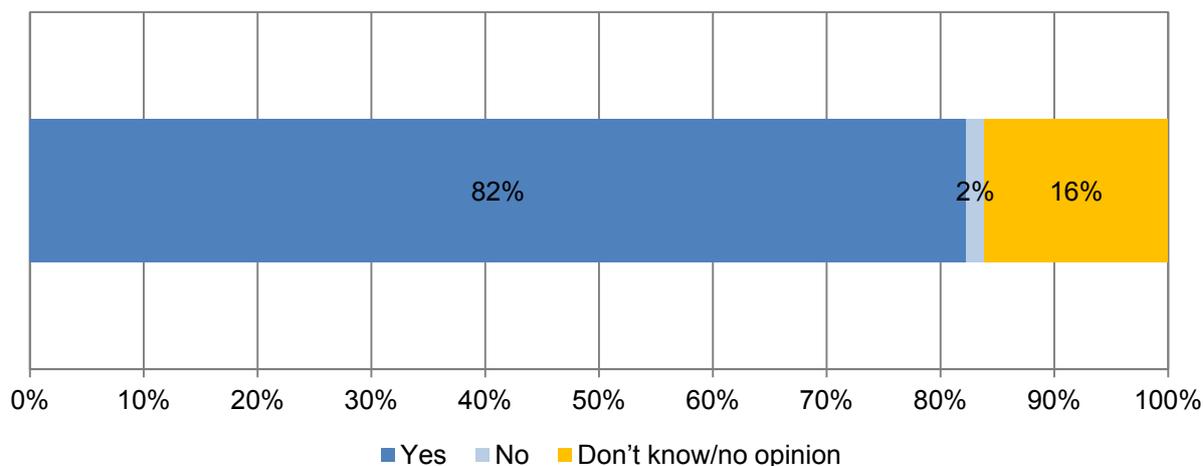
This section focuses on suggestions for changes and concerns arising from the qualitative analysis in terms of addressing any issues that have been highlighted.

10.2 Views on potential refinements of the partnership funding policy

10.2.1 Need for refinement

A large proportion (82%) of survey respondents indicated that the Partnership Funding process could be improved in the future; only 2% of respondents indicated that the process did not need to be improved (Figure 10-1). Survey respondents and interviewees provided suggestions for improvements to the Partnership Funding process and these have been analysed and grouped below.

Figure 10-1: Responses to survey question: In your view are there ways in which the Partnership Funding process could be improved? (n=62)



10.2.2 Environmental benefits/schemes

A significant proportion of respondents stated that refinements are needed within the Partnership Funding calculator to enable more natural or green schemes to progress. Many felt that the process worked well for traditional schemes where more information is available and the standard of protection (SoP) could be demonstrated. However, as there is still limited evidence to demonstrate the SoP from natural or green schemes and modelling can be expensive, it is felt that the benefits of these schemes can only be captured in Outcome Measure 1 or Outcome Measure 4 which is often not sufficient enough. It was also stated that natural or green schemes often provide additional benefits beyond traditional schemes and respondents felt that such benefits could not be captured in the calculator. Suggestions for improvements or refinements included:

- Widening the range of environmental outcomes which achieve Outcome Measure 4 (possibly at different rates for different environmental outcomes)
- Updating the partnership funding calculator to accurately record the latest updated environmental outcomes and indicators (Outcome Measure 4 d, e, f, g, and h) so that schemes can be scored accurately
- Having standard payment rates for these wider ecosystem services to allow easier scheme comparison and prioritisation, requiring schemes to have an element of natural upstream mitigation
- An option to fund different amounts based on confidence (i.e. a 'do something' and 'proven benefit' funding option) as this would allow natural schemes where there is limited evidence to still obtain some funding.

10.2.3 Catchment scale projects and multiple sources of flooding

Several respondents felt that the current Partnership Funding approach favours schemes that only address one source of flooding and that these schemes often still leave communities at risk of flooding. It was also highlighted that if the benefits are claimed by one scheme there may be few (if any) remaining for future schemes that address the residual flooding risk from other sources. Respondents suggested that the calculator could be amended so that it could accommodate projects which consist of widespread smaller schemes which have a cumulative impact (e.g. SUDS schemes) and address multiple sources of flooding (an all sources approach). In addition, it was suggested that consideration should be given to what was best for the catchment and community rather than how much greater than one the benefit-cost ratio was at the end of the process.

Respondents also suggested that a partner funding strategy could be prepared at Area programme level rather than project level so that Local Authority partners and those benefitting from multiple schemes are approached once to contribute toward the Area programme rather than approached for each individual scheme. It was suggested that taking this approach would also facilitate the better use of resources as specialist skills for preparing a business case, negotiating funding contributions and negotiating heads of terms for legal agreements could be shared. A further interviewee felt that operating at the catchment level would probably encourage collaboration between Local Authorities. One interviewee stated that their Local Authority is trying to establish a strategic approach to funding for the area. By trying to secure all available funding whenever it becomes available and then using it to offset GiA, the intention is to then be able to utilise that GiA on future schemes that may not be able to attract the contributions needed.

10.2.4 Sharing of best practice and support

Several respondents to the online survey stated that the approach to Partnership Funding varies by region and organisation according to the knowledge and understanding that staff members have of the approach and what information they needed to provide. To assist with the continued used of partnership funding respondents felt there should be guidance and sharing of best practice. This could include guidance on costing a project to enable the use of best estimates and encourage buy-in from other organisations at an early stage, templates for business cases, guidance for communities about fund-raising and contributions, as well as better collaboration across industry. One interviewee suggested revisiting training programmes; training was provided when the policy was introduced, however many of the staff involved at that time have now moved on, so ongoing capacity building is required.

Throughout the online survey respondents stated that early and well planned engagement was essential to gain community support and voluntary contributions,

as well as robust business cases. RMA's (Local Authorities in particular) are limited on resources to undertake this work and as a result some schemes were failing. Respondents noted that support through dedicated funding officers to help organise Partnership Funding approaches would be useful and support from both the Environment Agency and Defra could also help them with their responsibilities for flood risk management. One interviewee also suggested that there needs to be a national awareness raising programme for the public in order to change the mind-set that flood schemes should be funded by central government.

In addition to this, one interviewee commented that should any changes be made to the Partnership Funding calculator, it would be good for staff members across Defra to be involved in this process. This would ensure that people with different types of expertise were able to feed in their ideas.

10.2.5 Funds

Some respondents to the online survey felt that there was a loss of opportunities due to contributions being time-limited. It was suggested that these funds could be used through a form of Memorandum of Understanding that enables contributions to be 'banked' and used later or returned if unused.

Respondents also suggested that in some cases it would be helpful if GiA funding could come forward before the scheme reached 100% to give the availability of match funding. It was also noted that GiA could be further split or ring-fenced to provide funding specifically to support schemes for smaller communities where the housing density is lower.

10.2.6 Other infrastructure and wider benefits

Many respondents felt that the Partnership Funding calculator should be widened to recognise other benefits including useful agricultural land, critical infrastructure and businesses. It was suggested that this would encourage more voluntary contributions and provide better support to surface water schemes at address risks to critical infrastructure such as motorways, main railway lines and electricity substations.

During stakeholder discussions it was suggested that improvements to the Partnership Funding calculator may help to open up wider benefits where these are beneficial to society. They felt that where significant sums of money are being spent, then it should be possible to design schemes in a holistic way with all the benefits (including intangibles such as health, recreation and the environment) being taken into account. However, it was noted that this would also open up the wider benefits to other schemes and so all schemes would find themselves in the same position in terms of GiA funding. A similar point was raised during a discussion with an RFCC interviewee. It was noted that the formula could be improved to take better account of schemes that protect critical infrastructure and agricultural land. They commented

that there had been numerous discussions within the RFCC about schemes that had not scored sufficiently. In their view, this was because the formula puts the protection of people first, which is appropriate; however, there is a growing feeling that the weightings on other areas could be tweaked to take account of other important matters. An example was provided of a cathedral that had been badly flooded. Consideration of this alone using the funding formula would result in a low score; however, the damage caused is likely to have a significant economic impact in terms of tourism.

10.2.7 Small schemes

Respondents to the online survey stated that, in some cases, getting small schemes through the process was difficult as the amount of resources required and costs involved in putting together detailed business cases and gaining voluntary contributions were often too high in comparison to the overall scheme costs. This is a particular issue with small scale green or natural schemes where the standards of protection are harder to define and prove. One respondent suggested reduced thresholds for small schemes to make small contributions have a bigger effect and give them a chance of being successful. It was also suggested that schemes up to £500,000 could be signed off by local Environment Agency teams as they will have a better understanding of the local geography, thus speeding up the process. One interviewee suggested an approach similar to that used by highways team in Local Authorities may be useful in reducing the bureaucratic process for small schemes. Within these teams block grant funding is provided and a Local Transport Plan is developed to set out priorities and secure the grant block. Block grant funding could be based on a national formula supported by the Local Flood Risk Management Strategies to identify funding needs. The interviewee felt that although this would still need a catchment management approach, RFCCs could have a role in approving programmes of work, and still encourage Partnership Funding principles.

10.2.8 Surface water

Throughout the online survey several respondents stated that they felt the Partnership Funding calculator provides little support to groundwater schemes and those that address surface water flooding. One interviewee felt that the Partnership Funding calculator had been designed with main river flooding being the focus, and therefore it does not work particularly well for surface water schemes. The interviewee suggested that there needs to be a distinction between sources of flooding, with perhaps a simplified approach for small scale schemes. Other responses included a review of the risk bands, with a suggestion for consideration to be given to a 1 in 30 year standard as used by utility companies.

10.2.9 Legal agreements

Some respondents found that the legal agreements needed for Partnership Funding had been the main cause of long timescales for securing contributions and in some cases had also lost project funding; some noted that specialist legal staff had been required, further increasing pressures on resources. One respondent suggested that the mechanism for legally agreeing contributions could be shorter with projects being able to accept a letter of intent whilst a full collaborative agreement is agreed. Another interviewee suggested that there needs to be a streamlined sign-off process for agreeing variations to the standard clauses in the Environment Agency's legal agreement for contributions, in particular with regards to the clauses relating to maintenance.

The interviewee also noted that surface water is a significant issue in the region and there has been encouragement to put forward surface water schemes for GiA. However, very few are progressing as they are not receiving sufficient GiA. These schemes are very complex, thus identifying the benefits is quite difficult (the same could also be said for natural flood management). It was also noted that Local Authorities quite often no longer have specialist drainage staff, which is partly due to Local Authorities losing responsibility to drainage authorities and cuts in funding. The interviewee felt that this meant that many Local Authorities do not have the expertise to develop schemes to deal with surface water.

10.2.10 Inclusion of coastal adaptation

One interviewee stated that dealing with coastal erosion through adaptation is a more suitable option and beneficial to society within some areas, however, in their view, adaptation is not covered by the Partnership Funding calculator. This is a misconception since schemes involving adaptation elements can be submitted using the calculator. This viewpoint could be due to the fear of adaptation measures being classed as compensation which is not allowed under current policy, or due to the definitions of FCERM outcomes. For example, properties relocated through rollback in response to coastal erosion cannot be claimed in the Partnership Funding calculator and these schemes cannot get GiA. It was suggested that the Partnership Funding calculator does not encourage schemes beyond traditional grey infrastructure and there is a lack of innovation in addressing coastal flooding and erosion through natural solutions.

It was suggested that not counting adaptation outcomes in the Partnership Funding calculator creates a situation where risk management authorities either provide a traditional defence scheme or do nothing. Thinking more about adaptation and how that fits with the Partnership Funding calculator will be important for areas where there is about to be a policy change to 'managed realignment' or 'no active intervention' and where funding is required to bring about the adaptation measures needed.

10.2.11 Issues with outcome measures

Generally, respondents to the online survey and interviewees recognised that Outcome Measures are needed in order to be able to apportion benefits and weight scores within the calculator. However, it was suggested that the Outcome Measures within the Partnership Funding calculator were subjective and open to different interpretations dependent on the person assessing the criteria and business case. Respondents also highlighted that in some cases businesses can view the outcome measures (Outcome Measure 1 in particular) as being unfriendly towards businesses in comparison to residential properties. Several interviewees and survey respondents suggested that the outcome measures need to be reviewed and possibly tweaked to account for businesses and critical infrastructure.

10.3 Trends and issues that may cause challenges in the future

Below are trends and issues that have been drawn from qualitative responses during the consultation that may cause challenges in the future.

10.3.1 Multiple sources of risk

Areas susceptible to multiple sources of flooding were highlighted as a future issue due to the way the Partnership Funding calculator works. Several respondents stated that the current system effectively 'sterilises' areas of benefits once a scheme has gone through. Issues arise in areas where communities are faced with multiple sources of flooding and schemes are only developed to deal with one source; communities are either asked to contribute towards two or more separate schemes or they are left vulnerable to the remaining sources of flooding. It was suggested that those at risk from multiple sources should attract greater benefits.

10.3.2 Local government resources

Throughout the stakeholder consultation local government resources were mentioned as a key issue in relation to Partnership Funding. As previously mentioned, austerity measures have impacted both Local Authority financial budgets (e.g. the funds available to contribute towards scheme capital costs, funds needed to design and develop scheme) and staff numbers meaning there are less staff resources (e.g. expertise and time) available. Respondents stated that there was an over reliance on public sector contributions. One interviewee provided an example of instances where communities at risk have contacted the Local Authority to find out whether a scheme could be developed if they contributed (generally small scale projects), but the Local Authority has not had the resources to follow up on these small scale schemes. Respondents suggested that as funding available to public sectors (in particular Local Authorities) was unlikely to increase significantly

and these organisations had other priorities, changing the scoring behind the Partnership Funding calculator may be needed to increase GiA so as to reduce the burden on Local Authorities whilst still maintaining the beneficiary pays principle.

10.3.3 Only difficult schemes are left

Although organisations and professionals are becoming more efficient as familiarity with the process increases, it was highlighted that projects are becoming more complex and GiA funding is harder to achieve. It was suggested that this was down to FCERM projects with strong economic business cases having already been delivered earlier in the programme. The remaining schemes are therefore by default more difficult to justify. One interviewee noted that many of the schemes remaining are those with failing assets and mixed ownership, and require significantly more input in terms of resources. Respondents suggested that the Partnership Funding calculations need to be updated to provide more funding for these difficult schemes.

10.3.4 Landfill sites

One interviewee raised the issue of funding schemes to protect landfill sites. They noted that a national issue was outlined a few years ago recognising that there was no funding mechanism for landfill sites which are at risk of coastal erosion. The Environment Agency's stance has always been not to fund landfill protection schemes, and Local Authorities cannot fund them as resources are already limited. It is thought that such sites are having a detrimental effect on harbours and habitats, and there are also impacts on human health and water quality, however, the situation is very costly to remedy. There are thousands of these sites nationally which have been prioritised based on the risks associated with erosion rates. The payment rate for Outcome Measure 1 is relatively low, which is where protecting landfill sites would potentially fall should it be allowed under the Partnership Funding policy, and therefore it would remain difficult to raise the funding required.

10.3.5 Long term impacts of Partnership Funding Policy

One interviewee raised concerns that the Partnership Funding policy does not consider the long term impacts of schemes beyond the end of their design life. It was felt that there is a risk that the Partnership Funding policy can work against adaptation and long term sustainability, and will result in future generations being placed at risk. For instance, wealthy communities might get a project through but it may be at the expense of a 'No Active Intervention' policy from the Shoreline Management Plan, although this is a non-statutory policy the scheme will then be working against the movement towards adaptation. Another example is how the Partnership Funding policy encourages contributions from developers. Although developers may be contributing towards protecting existing communities this is often at the expense of being allowed to develop in the floodplain if they provide flood

defences for 100 years. It was felt that this may work in the short term but is storing up problems for the long term.

11. Other issues raised during data collection

11.1 Overview

This section describes other issues that were raised during data collection that are not directly related to Partnership Funding policy, but are recorded here for completeness. The section also records issues associated with the data collection process.

11.2 Issues raised relating to FCERM

11.2.1 Committee members taking ownership of a scheme

One RFCC interviewee noted that by the time the RFCC sees a scheme it is already at a very high level and only a broad/brief description is given of the measures to be implemented, benefits expected and scoring given. The RFCC will only receive more in-depth details regarding larger projects or those that have issues due to the sheer number of projects going through the process. It was noted that it can be a challenge in getting committee members to “own” a project that is within their area as some are delivered by district or parish councils and there is not always a direct line of communication. The interviewee also highlighted that Local Authority elected members of an RFCC are there as long as they are elected. They commented that recently, there had been a turnover of members due to the elections; however, this is very unusual as normally there was not a high or frequent turnover of members. A less frequent turnover of members was viewed as a positive thing since it meant that members tended to become more knowledgeable and enthusiastic about the subject/process.

11.2.2 Focus on resolving the problem rather than the paperwork

One interviewee commented that there should be less paperwork and less modelling when dealing with flood risk management. Their preferred approach would be one where the focus was on sorting out the issue, with performance being assessed through an audit. The interviewee felt that currently, the Partnership Funding calculator hindered practitioners from getting on and sorting out the issue.

11.2.3 Potential unintended consequences of obtaining voluntary contributions

Several survey responses noted concern about possible unintended consequences resulting from RMAs obtaining voluntary contributions for schemes. For example:

- One respondent was concerned that the success of bringing in public or private contributions could result in the Treasury diverting funding (i.e. GiA) away from FCERM; and
- Another noted that widening the factors taken into account in the assessment process and promoting more partnership funding could encourage more development in the floodplain. They felt that the prudent approach would be to direct development outside of the floodplain.

11.2.4 Organisation structure, management and responsibilities

Several points were raised in relation to the structure and management of RMAs. These included:

- One LLFA interviewee noted that as LLFAs are relatively new they can be tied into using existing council frameworks which are not necessarily set up for flood risk management projects. This meant that suppliers then needed support from the LLFA to build up their flood risk management capacity;
- Another interviewee commented that there is a difference across the country as to how proactive water companies are at engaging in the Partnership Funding process. They highlighted that some water companies have a dedicated role for Partnership Funding engagement; and
- The point was also made that delivering flood risk management schemes is not a statutory responsibility for the LLFAs, so if there is a flood event, or for example, a big road scheme is being built with land drainage consents that need to be done, these are statutory responsibilities that the LLFA has to do. If workloads increase then the first thing to drop off is quite often the flood risk management schemes, because there are not the resources. It was felt that this could create risks to the delivery of the programme of schemes.

11.2.5 Timescales following flooding events

One survey respondent felt that there should be a clear pathway and timeline for flooded communities. After a community has suffered significant internal flooding, there should be a clear support path with involvement in scheme development being established. In the current situation, access to funds in the capital investment programme takes a minimum of one to two years. The respondent noted that people whose properties flood feel extremely vulnerable in their own homes. They thought

that there should be a minimum service offered (perhaps equivalent to fire safety checks). They acknowledged that the flood recovery grant in 2014 helped many individuals access expert advice to protect their home and make improvements. However, it was difficult to manage other individuals who had flooded but were just outside the allocated funding bracket. The respondent noted that for property level protection these affected householders/businesses would have to wait a further two years for a scheme to be developed and partnership funding secured. They felt that by this time some of the opportunities related to improving a property's resilience during the restoration process would have been missed.

11.3 Issues raised relating to the study scope and methodology

In relation to the scope of the study, one survey respondent noted that there should be a wholesale review of capital grant funding that LLFAs can access rather than just a review of part of the current system.

Another felt that the survey only seemed to focus on financial contributions. They were keen to highlight that they had found in-kind contributions to be invaluable. Such contributions had included landowners digging out ditches and parish councils providing time and space for community engagement. Had these contributions not been provided, money would have had to have been found to pay for them.

12. Summary of findings

12.1 Overview

This section provides a summary of the findings and suggestions for change in order to provide answers to all of the 22 research questions. It draws on the quantitative analysis, comparing the counterfactual scenario with the Partnership Funding policy scenario, and the qualitative analysis, drawing on issues raised from the survey, interviews and case studies.

12.2 Summary of findings by research question

Tables 12-1 to 12-21 provide a summary of the findings drawing on both the quantitative and qualitative evidence, with one table for each research question. It is important to remember that the quantitative analysis is based on the development of two scenarios:

- The counterfactual using the priority score system to select which schemes would be funded; and
- The Partnership Funding policy scenario, using the raw and adjusted Partnership Funding scores to identify which schemes would be funded. The Partnership Funding scenario assumes that all schemes with a probability of 0.77⁵⁴ or greater would secure the contributions required and would be funded.

Both scenarios include a number of assumptions in relation to funds required from year-to-year in order to allow a fair comparison to be made between them. As such, there is some uncertainty over the results that are produced. An analysis of the potential errors resulting from gaps in the data sets used to build the scenarios suggests these errors could be around 6%⁵⁵. Errors associated with assumptions made when analysing the data to provide responses to each research question will be additional to this, but cannot be quantified. The Partnership Funding policy scenario also includes references to 'further contributions required'; these are identified contributions needed to enable a scheme to go ahead but which have not yet been secured. Conclusions on total investment, schemes funded, etc. assume

⁵⁴ Based on modelling undertaken by the Environment Agency.

⁵⁵ Further information on data limitations and assumptions made is included in Section 3.4.

that all further contributions required are found for those schemes with a probability of 0.77 or greater of securing the contributions.

Tables 12-1 to 12-21 provide highlights from the quantitative analysis and do not repeat the full findings. As a result, the totals may not always sum to 100%. Full details and full breakdown of the figures can be found in Sections 4 to 8 of the report.

Table 12-1: RQ1: To what extent has the Partnership Funding policy met its objectives in terms of increasing total worthwhile FCERM investment beyond Exchequer sums, enabling local choice and engagement, promoting cost-effective solutions, and directing government funding to high risk and other target groups?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>Under the modelled Partnership Funding policy scenario, investment increases by £763 million to 2020/21 and by £1,124 million⁵⁶ to 2027/28 compared with the counterfactual scenario due to contributions estimated to be received (assuming all contributions required are secured)⁵⁷.</p> <p>This enables a further 512 schemes to be funded (3,155 under the Partnership Funding policy scenario compared with 2,643 under the counterfactual scenario) between 2009/10 and 2020/21.</p> <p>This results in an additional 132,000 households benefiting from reductions in flood risk between 2009/10 and 2020/21 and 1,300 households benefiting from reduction in coastal erosion risk between 2015/16 and 2020/21⁵⁸ under the Partnership Funding policy scenario compared with the counterfactual scenario. Of these, 6,100 households (5%) at flood risk and 107 households (8%) at coastal erosion risk are in the 20% most deprived areas.</p>	<p>Only 47% of respondents to the survey felt that Partnership Funding had resulted in more schemes going ahead. A further 26% did not feel that more schemes had been funded. This suggests that there is a perception that the Partnership Funding policy is less successful than is estimated from the quantitative analysis, although this may also reflect the 38% of contributions that still need to be secured to ensure the additional schemes can go ahead. Stakeholders believe there are various reasons why more schemes may be coming forward, not all of which may be related to Partnership Funding policy. There are also views that the Partnership Funding policy gives the opportunity to 'buy a scheme', where more affluent communities can raise contributions to secure GiA.</p> <p>Around 70% of survey respondents felt that local communities are involved in FCERM. In total, 30% of survey respondents felt that Partnership Funding policy has been very or somewhat successful in enabling greater civil society involvement and more local choice in the selection of FCERM options.</p>

⁵⁶ All £ values given here are based on entries in the 2015/16 to 2020/21 dataset that forms the basis for the Environment Agency's six year programme and relate to total investment or GiA (cost to the Exchequer).

⁵⁷ Note this varies from the £600 million estimated by the Environment Agency as contributions required to lead to better protection of households within the six year programme. The reflects the assumptions used when modelling the Partnership Funding programme including the assumption that all funding is allocated to the first year in which it is required, which brings contributions forward in time compared with the six year programme. In addition, the Partnership Funding policy scenario includes all schemes, not just those that deliver benefits to households.

⁵⁸ Data were not available that distinguished between flood and erosion risk for 2009/10 to 2014/15, hence, some of the properties identified as benefiting from better protection against flood risk may include properties benefiting from being better protected against coastal erosion risk.

Table 12-1: RQ1: To what extent has the Partnership Funding policy met its objectives in terms of increasing total worthwhile FCERM investment beyond Exchequer sums, enabling local choice and engagement, promoting cost-effective solutions, and directing government funding to high risk and other target groups?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>Under the modelled Partnership Funding policy scenario, 75% of schemes obtained contributions including 327 (19%) that were nominally fully funded but which also obtained contributions amounting to £150 million (to 2020/21) and £184 million (to 2027/28).</p> <p>Total investment in protecting households against flood risk increases under the Partnership Funding policy scenario when compared with the counterfactual scenario. At the same time, the cost to the Exchequer has decreased allowing more households to be protected at a lower cost. In total, 440,000 households are better protected against flood risk under the Partnership Funding policy scenario. This compares with around 380,000 households under the counterfactual scenario.</p> <p>Total investment in protecting households against coastal erosion also increases under the Partnership Funding policy scenario when compared with the counterfactual scenario. An additional 22,000 properties are protected under the counterfactual compared with an additional 24,000 under the Partnership Funding policy scenario.</p>	<p>However, it was also commented that different elements or groups within a community can have different interests and their level of influence is often limited by what is practically possible and affordable.</p> <p>A total of 70% of survey respondents felt that those who provide funding for an FCERM scheme are more able to influence scheme design than those who are not providing a financial contribution.</p>

Table 12-2: RQ2: How has the Exchequer’s GiA contribution to Partnership Funding, and the outcomes it has “bought” been distributed, taking account of: deprived communities, high flood risk communities, rural versus urban areas, households versus non-households, coastal versus fluvial and surface water risk settings, locations in different regions, type of Risk Management Authority, type of technical solution?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>Total investment has increased under the Partnership Funding policy scenario for households moved to moderate or low risk from very significant or significant flood risk (Outcome Measure 2b). This allows an additional 35,000 properties at high flood risk to be better protected compared with the counterfactual scenario.</p> <p>Total investment also increases under the Partnership Funding policy scenario for households in the 20% most deprived areas that are better protected against flood risk (Outcome Measure 2c). This results in 5,500 additional properties in the 20% most deprived areas being better protected compared with the counterfactual scenario.</p> <p>For coastal erosion risk, there is again an increase in total investment for both households protected in a 20 year period (Outcome Measure 3b) and households in the 20% most deprived areas (Outcome Measure 3c) under the Partnership Funding policy scenario. This protects an additional 12 properties (Outcome Measure 3b) and an additional 107 properties (Outcome Measure 3c) to be protected compared with the counterfactual scenario⁵⁹.</p> <p>All RFCC regions except Anglian Eastern (reduction of eight schemes) see an increase in the number of schemes funded under the Partnership Funding policy scenario compared with the counterfactual. Thames and Yorkshire RFCC regions account for the largest number of schemes (14% each) under the Partnership Funding policy scenario. Levels of investment increase in all RFCC regions except two: Anglian Eastern (-£23 million) and Trent (-£40 million). The highest levels of investment are in Yorkshire (£708</p>	<p>Interviewees raised issues in relation to the approaches and gateways that are used by the Environment Agency compared with those used by Local Authorities. There is a perception that Local Authorities may be at a disadvantage in terms of having to secure contributions earlier in the process than Environment Agency led schemes.</p> <p>A number of interviewees raised issues with specific locations, including:</p> <ul style="list-style-type: none"> • The difficulty of raising contributions in rural areas due to of the smaller number of beneficiaries; • The difficulty of raising contributions in urban areas where there are transient communities as it can be difficult to find out who to engage with; and • The likely increased difficulty of obtaining contributions from Local Authorities due to austerity and competing priorities. <p>There were also concerns over the lack of national awareness of Partnership Funding policy and the need to educate communities as each project begins. A different situation is found where communities have flooded, provided they are not in a cycle of repeated flooding and recovery. Communities that are more aware of flooding issues are more likely to be willing to contribute.</p>

⁵⁹ It is expected that the number of properties protected under Outcome Measure 3c would be a subset of those protected under Outcome Measure 3b. Investigation shows that the error arises due to omissions in the original 2015/16 to 2020/21 dataset used for the analysis.

Table 12-2: RQ2: How has the Exchequer’s GiA contribution to Partnership Funding, and the outcomes it has “bought” been distributed, taking account of: deprived communities, high flood risk communities, rural versus urban areas, households versus non-households, coastal versus fluvial and surface water risk settings, locations in different regions, type of Risk Management Authority, type of technical solution?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>million) and Southern (£526 million). Anglian Central has the fewest schemes (74 or 3% of all schemes) under the Partnership Funding policy scenario. It also has the lowest level of investment (£57 million or 2% of total investment).</p> <p>Environment Agency led schemes account for 57% of schemes and 61% of investment under the Partnership Funding policy scenario, compared with 57% of schemes and 63% of investment under the counterfactual scenario. Local Authority led schemes account for 38% of schemes by number and 37% by investment under the Partnership Funding policy scenario compared with 37% of schemes and 35% of investment under the counterfactual scenario.</p> <p>Fluvial flooding schemes account for 56% of schemes by number and 54% by investment under the Partnership Funding policy scenario, compared with 56% of schemes and 60% of investment under the counterfactual scenario. Coastal flooding accounts for 28% of investment but just 9% of schemes by number under the Partnership Funding policy scenario, compared with 9% of schemes and 24% of investment under the counterfactual scenario. Coastal erosion makes up 6% of schemes and 8% of investment under the counterfactual scenario and 6% of schemes and 7% of investment under the Partnership Funding policy scenario.</p>	

Table 12-3: RQ3: How effective has the “equity weighting” of GiA payment rates towards deprived communities been in practice?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>Total investment in protecting households in the 20% most deprived communities against flood risk is £851 million under the Partnership Funding policy scenario, or 32% of all investment in reducing flood risk. This allows an additional 5,471 properties in the 20% most deprived communities to be better protected against flood risk under the Partnership Funding policy scenario compared with the counterfactual scenario.</p> <p>For households at risk from coastal erosion, total investment the Partnership Funding policy scenario is £84 million, or 28% of all investment in coastal erosion schemes. This allows a further 107 properties in the 20% most deprived communities to be better protected against coastal erosion under the Partnership Funding policy scenario compared with the counterfactual scenario.</p> <p>An assessment of contributions from those schemes that result in benefits to properties within the 20% most deprived communities shows that 29% of contributions were associated with schemes that deliver better protection against flood risk, and 75% of contributions were associated with schemes that deliver better protection against coastal erosion risk.</p>	<p>No qualitative evidence was gathered on the equity rating and its effectiveness.</p>

Table 12-4: RQ4: What has payment for environmental outcomes achieved (e.g. in terms of hectares of improved or replacement habitat), and how are these distributed across space and between rural, urban, deprived and non-deprived communities?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>A total of 11,596 ha of water dependent habitat (Outcome Measure 4a) was identified as being delivered under the Partnership Funding policy scenario in 2015/16 to 2020/21, an increase of 207% over the counterfactual</p> <p>A total of 2,277 ha of intertidal habitat (Outcome Measure 4b) was identified as being delivered under the Partnership Funding policy scenario in 2015/16 to 2020/21, an increase of 155% over the counterfactual scenario.</p> <p>A total of 3,536 km of river (Outcome Measure 4c) was identified as being delivered under the Partnership Funding policy scenario in 2015/16 to 2020/21, an increase of 231% over the counterfactual.</p> <p>In total, 164 ha (1.4% of the total area delivered under Outcome Measure 4a) of water dependent habitat, 17 ha (0.7% of Outcome Measure 4b) of intertidal habitat and 24km (0.7% of OM4c) of rivers are delivered in the 20% most deprived areas under the Partnership Funding policy scenario.</p> <p>It might be expected that 20% of the investment would be made in the 20% of most deprived areas if costs and opportunities were equal. The analysis shows though that 28% of total investment in water dependent habitat, 1.2% of total investment in intertidal habitat and 7% of total investment in km of river protected under the Partnership Funding policy scenario occurs in the 20% most deprived areas.</p>	<p>NFM options are considered by interviewees to be more difficult to model, which may result in grey or traditional infrastructure schemes being promoted as they are simpler in terms of showing how many houses will be protected.</p> <p>There were concerns from interviewees that the requirements of OM4 are too specific⁶⁰ such that the wider benefits can only be picked up under OM1. The lower funding rate of OM1 and difficulty of monetising some environmental benefits mean that OM1 is considered to be impacting on the extent to which environmental benefits can be delivered as part of a scheme.</p> <p>Both survey and interviewee respondents commented that more time is needed to develop the business case for natural or green schemes. This can impact on the availability of funding. It can also affect the costs as the evidence to support the appraisal is considered more expensive and difficult to obtain.</p>

⁶⁰ Outcome Measure 4 is designed to pick up statutory requirements, hence, the specific nature of the outcome measures.

Table 12-5: RQ5: Overall, what does the data reveal about quantifiable trade-offs between supporting different groups and outcomes?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>There is a reallocation of investment to other RFCCs under the Partnership Funding policy scenario compared with the counterfactual scenario. Yorkshire sees an increase of £114 million, Southern an increase of £64 million, North West an increase of £64 million and Wessex an increase of £40 million. All other RFCC regions see a decrease. This is largest for Anglian Eastern (-£84 million), followed by Trent (-£73 million) and Thames (-£55 million). All RFCC regions see an increase in total investment over the counterfactual except Anglian Eastern (-£23 million) and Trent (-£40 million).</p> <p>The number of households better protected against flood risk and/or erosion risk also varies with five RFCC regions seeing a decrease compared with the counterfactual (Anglian Central, Anglian Eastern, Anglian Northern, Thames and Trent). Thames sees the largest decrease (-9,917), followed by Anglian Northern (-2,633) and Anglian Eastern (-2,382). Yorkshire see the largest increase (48,992) followed by Wessex (15,603).</p> <p>Total investment is also reallocated under the Partnership Funding policy scenario compared with the counterfactual scenario by risk source. Here, total investment increases across all risk sources except water companies (reduction of £0.4 million).</p> <p>Analysis by size of scheme suggests that there is a difference between sources of contribution under the Partnership Funding policy scenario. Small schemes (less than £0.7 million total investment required) obtain 43% of total contribution from local levy, 30% from public sources and 14% from private sources. Medium-sized schemes (£0.7 million to £7 million) obtain 40% of contributions from public sources, 26% from local levy and 14% from private sources. Larger schemes (greater than £73 million investment required) obtain 51% of contributions from public sources, 17% from private sources and 2% from local levy. Large schemes also obtained 23% of contributions from the Growth Fund,</p>	<p>Interviewees felt that there were opportunities under the Partnership Funding policy for communities to 'buy a scheme'. Alternative views were also provided where interviewees felt that the same schemes would have progressed, especially in terms of those that were notionally fully funded as these would have gone ahead under the previous priority score system.</p> <p>Where respondents to the survey did not think that Partnership Funding policy had led to more schemes going ahead, most (89%) thought this was because the gap between government funding and scheme costs was too big.</p> <p>Responses from the survey and interviews suggested that smaller schemes were considered to benefit from the Partnership Funding policy.</p> <p>Different interviewees raised issues with different risk sources. For example, the Partnership Funding calculator is not considered to work well for adaptation to coastal erosion with no alternatives to a scheme as there are for flooding. Similarly, there were concerns over use of the calculator for urban boroughs where there are complex interlinkages between river and sewerage systems.</p> <p>Interviewees also raised concerns over the extent to which smaller communities may be able to raise contributions compared with larger communities at risk on main rivers where individual contribution requirements may be lower.</p> <p>Interviewees also commented on concerns that businesses did not feel that their needs are taken into account as much as households because of the lower funding rate under OM1 compared with OM2/OM3. Some respondents suggested that businesses may have declined to contribute as they perceived that they were not being adequately valued.</p>

Table 12-5: RQ5: Overall, what does the data reveal about quantifiable trade-offs between supporting different groups and outcomes?	
Evidence from quantitative analysis	Evidence from qualitative analysis
with this making up just 2% of contributions to medium-sized schemes and 1% to small schemes.	

Table 12-6: RQ6: How do non-GiA contributions to schemes break down according to: Local Authority sums provided through other central government grants; new Local Authority funding (such as new council tax precepts or special expenses); private contributions from non-households; private contributions from households; other. What proportion of non-GiA contributions pledged to schemes has been secured by year?	
Evidence from quantitative analysis	Evidence from qualitative analysis
<p>Contributions under the Partnership Funding policy scenario total £763 million (to 2020/21) and £1,124 million to 2027/28 with £2.2 million and £71 million of these are identified as further contributions required that have not yet been secured⁶¹.</p> <p>Sources of contributions secured under the Partnership Funding policy scenario can be broken down into (with the remaining 6% being further contributions required that are not yet allocated to a source):</p> <ul style="list-style-type: none"> • Public sources: 44% • Local levy: 17% • Private sources: 15% • Growth Fund: 13% • Other EA functions: 5% • IDB precepts: 0.4% 	<p>The perception amongst survey respondents and interviewees is that the majority of contributions are from public sector sources. This view is supported by the quantitative evidence.</p> <p>Many respondents considered that public sector sources were likely to be more difficult to secure in the future due to resource constraints.</p> <p>Case studies identified sources from a range of different sources including small amounts from crowdfunding (Middle Tame - Perry Barr and Witton) and precepts on council tax (Pagham).</p>

⁶¹ The Partnership Funding scenario assumes that these contributions will be secured, based on modelling from the Environment Agency that estimates that schemes included under the scenario have a 0.77 probability or greater of securing the contributions.

Table 12-7: RQ7: To what extent are notionally fully-GiA funded schemes successful in attracting voluntary Partnership Funding contributions, given they can be retained by RFCCs to help with priorities elsewhere? Is there evidence that this kind of transfer has happened?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>Based on the modelled Partnership Funding policy scenario, there are 784 schemes (46% of all schemes with sufficient data to allow full/part funding to be identified) that are notionally fully funded⁶². Of these, 327 (19% of all schemes) obtained contributions totalling £150 million (to 2020/21) or £184 million (to 2027/28), equivalent to 19% (2020/21) or 23% (2027/28) of the GiA allocated to those schemes. It is assumed that the GiA which was saved as a result of the contributions (i.e. £150 million to 2020/21 and £184 million to 2027/28) could then be transferred to other schemes through the RFCC. A further 932 schemes (54% of all schemes) that were partly funded under the Partnership Funding policy scenario also secured contributions.</p> <p>Under the Partnership Funding policy scenario, the highest proportion of fully funded schemes is in North West RFCC (30% or 91 schemes) and the lowest in is English Severn and Wye (5% or just six schemes).</p> <p>The highest proportion of notionally fully funded schemes that also obtained contributions is in Southern RFCC (17%) followed by Trent and Anglian Northern (both 15%). The lowest proportions are in Anglian Eastern (2%) and Wessex (9%).</p> <p>IDB schemes are most likely to be notionally fully funded (32%) followed by Local Authority (22%) and Environment Agency schemes (16%) under the Partnership Funding policy scenario. Of the notionally fully funded schemes, 12% of Environment Agency schemes, 11% of Local Authority schemes and 9% of IDB schemes also obtained contributions under the Partnership Funding policy scenario.</p>	<p>In total, 86% of survey respondents felt that voluntary contributions were required to enable the adjusted Partnership Funding score to exceed 100%. This is greater than the percentage from the quantitative analysis (64% where the raw Partnership Funding score was less than 100%) but similar to the percentage of all schemes that obtained contributions.</p> <p>Only 30% of survey respondents agreed that FCERM schemes implemented in their area that were notionally approved for full GiA funding had also attracted voluntary contributions (although 28% responded 'don't know' and a further 20% were not aware of any notionally fully funded schemes). Just 22% replied 'no' indicating that no voluntary contributions had been obtained where the scheme was notionally fully funded.</p> <p>In total, 22% of respondents replied that they had received a transfer of GiA through the RFCC, of which 3% were reported to be to offset maintenance costs. A further 44% said 'no' they had not received a transfer of funds.</p>

⁶² Schemes with a raw Partnership Funding score of 100%. Taking a raw Partnership Funding score of 100% assumes that the risk of cost under-estimation or benefit over-estimation has been adequately taken into account. If a raw Partnership Funding score of 110% is used instead to reflect these risks, the number of fully funded schemes (i.e. those with a raw PF score >110% which also obtained contributions) reduces to 265, or 16% of all schemes.

Table 12-8: RQ8: A policy expectation was that Partnership Funding should not result in increased future liabilities on the Exchequer. How effective has the approach to securing contributions been in avoiding an increase in future liabilities on the Exchequer as a consequence of contribution-enabled capital investment today?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>Under the Partnership Funding policy scenario, the number of schemes and total investment across the different RMAs is as follows:</p> <ul style="list-style-type: none"> • Environment Agency: 57% of schemes (1,412) and 61% of investment (£2,000 million) • Local Authorities: 38% of schemes (934) and 37% of investment (£1,200 million) • IDBs: 6% of schemes (138) and 2% of investment (£63 million) • Water Companies: 0.04% of schemes (1) and 0.02% of investment (£0.6 million) • Highways Authorities: no schemes <p>Maintenance costs are captured within the funding requirement for Environment Agency schemes, i.e. 57% of schemes and 61% of investment. Maintenance costs under schemes led by other RMAs need to be secured separately. A number of case study schemes show that this has been captured through Local Authorities and local communities taking responsibility in some schemes.</p>	<p>There were concerns from interviewees that the Partnership Funding policy could result in greater long-term risks, such as enabling contributions from developers but this may encourage development in the flood plain. This may enable schemes to go ahead in the short-term due to their contributions but could create problems into the future.</p>

Table 12-9: RQ9: What are the risks surrounding securing non-GiA contributions?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>No quantitative evidence is available for this research question.</p>	<p>Survey respondents and interviewees identified a number of key risks and difficulties with securing non-GiA contributions:</p> <ul style="list-style-type: none"> • The same organisations being asked to contribute to several schemes • Liabilities for public sector bodies where they are the lead organisation • A lack of available resources, financial and expertise • Time-limits of certain sources of funding requiring the money to be spent within a specific timeframe or be reduced or lost, or due to claw-back clauses where projects are not delivered to set timescales. Some requirements also need to be identified several years in advance to get onto spend programmes • Lack of a requirement for those benefitting to have to pay means they can refuse to contribute if they believe others will contribute, although this is less likely to occur where flooding has previously occurred • A lack of understanding of risk allowances and what will happen if the project costs increase (although the standard terms in the Environment Agency contract do attempt to cap contributors risk) • A lack of understanding of the problem that needs to be solved, with this needing to be addressed through often lengthy engagement processes <p>Respondents also noted that having a process in place to enable discussions was making the process of obtaining contributions less difficult. Specialist engagement skills, especially with private sector organisations, are needed and are not always available.</p>

Table 12-10: RQ10: To what extent have the “low hanging fruit” been taken in terms of external contributions, meaning that further contributions may be harder to attract and secure?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>The quantitative analysis shows that, under the modelled Partnership Funding policy scenario, 6% of contributions still need to be secured. The total amount of contributions still to be secured varies from year to year but there is a trend towards an increase in further contributions required as a proportion of total contributions needed up to 2020/21⁶³:</p> <ul style="list-style-type: none"> • 2015/16: 9% (£62 million) • 2016/17: 0.4% (£1.4 million) • 2017/18: 5% (£1.9 million) • 2018/19: 0% (£0 million) • 2019/20: 27% (£2.5 million) • 2020/21: 12% (£3.4 million) <p>It is important to note that the Partnership funding policy scenario excludes those schemes modelled by the Environment Agency as having a lower than 0.77 probability of securing the further contributions still required. It is these schemes that are anticipated to have the greatest difficulty in securing contributions and so may be unlikely to attract funding. The Partnership Funding scenario has allocated the £2.3 billion of GiA to those schemes most likely to secure the required contributions.</p>	<p>In total, 25% of public sector and 22% of private respondents thought contributions were becoming less difficult to obtain but 33% of private sector and 20% of public sector respondents thought they were becoming more difficult, mainly due to austerity measures. A further 22% (public) and 34% (private) thought that there had not been any change.</p> <p>Some respondents thought that FCERM projects with a strong economic case have been delivered, leaving those schemes that are more difficult and complex (multiple sources of flooding, low densities of households, multiple landowners).</p> <p>Other respondents however thought that obtaining voluntary contributions was becoming less difficult, including because beneficiaries know that if they do not contribute then a scheme will not go ahead. There also tends to be an increase in engagement and interest in providing contributions where there has been recent flooding.</p>

⁶³ It is important to remember that the modelling exercise assumes that all expenditure (including contributions) is obtained in the first year in which expenditure is required. As such, the contributions required are artificially brought forward to a much earlier year than when they may actually be required if the actual expenditure profile is used. This is why the analysis appears to suggest there are outstanding contributions for years already past – in reality these relate to later years in the life of schemes commenced in those years.

Table 12-11 RQ11: Has the number of projects which seek to integrate FCERM and wider objectives (e.g. regeneration) increased or decreased under Partnership Funding? What is the role of project design or particular technical approaches in securing funding agreements from third parties?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>No quantitative data are available on the number of schemes that include wider objectives</p>	<p>Respondents noted that wider and environmental benefits were seen as opportunities to attract contributions, with schemes being designed to deliver more than just flood and coastal erosion risk management benefits. Survey responses suggest that the majority of schemes (61%) implemented under the Partnership Funding policy include wider benefits.</p> <p>Survey respondents and interviewees identified a range of wider benefits that have been delivered by FCERM schemes including:</p> <ul style="list-style-type: none"> • Habitat creation or restoration • Blue/green infrastructure in urban areas • Improved community amenities • Regeneration <p>Respondents noted that wider objectives are used to align partner objectives with those of FCERM. However, there are issues with these benefits as the GiA from OM1 is limited and the most appropriate approaches to monetising them are not easy to identify.</p>

Table 12-12: RQ12: Have the assumptions and parameters used to derive GiA payment rates under PA Partnership Funding (for example, average assumed per-household damages, and the factors affecting contributions in support of wider economic benefits) turned out to be reflective of actual conditions? Has the choice of parameters led to any under- or over-payment for outcomes, and in what circumstances? (For example, has the actual mean damage reduced per property been greater than or less than the assumed damage embodied in the Partnership Funding formula?)

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>There are no specific data on per-household damages within either the 2009/10 to 2014/15 or 2015/16 to 2020/21 data sets. The only information available is on whole-life benefits which will include much more than just the benefits to households. Any analysis based on whole-life benefits is considered too uncertain to be useful in answering this research question. As such, it has not been possible to compare damages per household with payment rates.</p> <p>Per household investment levels have been estimated, including costs to the Exchequer per household. However, these cannot be compared with the payment rates as investment and GiA allocated are based initially on the payment rates.</p>	<p>No qualitative data are available for this question.</p>

Table 12-13: RQ13: What is the average length of time from receiving a pledge and securing a contribution?

Do the data suggest a more limited time window to secure GiA would increase the amount of external contributions raised or shorten the time needed to secure them?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>Data from the quantitative analysis are not available to answer this question in terms of time taken to secure contributions.</p>	<p>In total, 42% of respondents to the survey thought the time taken to secure contributions had increased while just 5% thought it had decreased. 29% thought it had not really changed and 24% did not know.</p> <p>The average time taken to obtain contributions agreements based on survey responses is 15 months (public sector) and 20 months (private sector).</p> <p>Interviewees suggested that the long timeframes were due mainly to partner organisations not being willing to sign legal agreements due to clauses placing liabilities on them, and the need for additional legal and senior management sign-off which slows the process down.</p> <p>Interviewees suggested that short timescales are appropriate where partner organisations are well-informed about flooding and the Partnership Funding process, or where amounts required are small. End of year spending can also help accelerate procedures but can reduce multi-functional working.</p> <p>There is greater familiarity with the Partnership Funding process but interviewees did not think that there was any reduction in timescales for projects as each scheme is associated with a different, new community. The timescales are considered to be driven by the time needed for community awareness raising.</p>

Table 12-14: RQ14: What effect is full Exchequer funding of some FCERM schemes having in terms of additionality and value for money? Has full funding been important in ensuring a pipeline of work to maximise procurement efficiencies, as originally thought?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>Under the Partnership Funding policy scenario, a total of 932 schemes (54% of all schemes with sufficient data to enable full/part funding to be identified) were part funded while a further 327 schemes (19%) were notionally fully funded but also obtained contributions. A further 2% of schemes were identified as obtaining contributions but these did not have a Partnership Funding score so it is not possible to identify if they were fully or partly funded.</p> <p>The highest proportions of fully funded schemes under the Partnership Funding policy scenario were:</p> <ul style="list-style-type: none"> • RFCCs: North West (30% of schemes in North West RFCC were fully funded) and Southern (29%) • RMAs: IDBs (32%) followed by Local Authorities (22%) • Risk source: reservoir flooding⁶⁴ (40%) and coastal flooding (40%) <p>The highest proportions of partly funded schemes under the Partnership Funding policy scenario were:</p> <ul style="list-style-type: none"> • RFCCs: English Severn and Wye (95% of schemes were part funded), Anglian Eastern) and Northumbria (both at 94%) • RMAs: Water companies (100%)⁶⁵, Environment Agency (84%), Local Authorities (78%) and IDBs (68%) • Risk source: groundwater flooding (81%), surface water flooding (77%), fluvial flooding (76%) and coastal erosion (73%) 	<p>There were few comments on the extent to which Partnership Funding policy has ensured a pipeline of work, although there were comments that full funding was important to enable other work to be carried out, and the importance of GiA funding in enabling other sources of funding to be secured, e.g. ERDF. It was also thought that having some GiA made it easier for other organisations to contribute as it indicated to funders that the project was viable and credible.</p> <p>In total, 36% of survey respondents thought that the Partnership Funding policy had been very or somewhat successful in increasing levels of certainty over national funding of individual projects.</p> <p>There were concerns over the extent to which contributors understood risk allowances where the Partnership Funding score was only just greater than 100% and what would happen if project costs increased.</p>

⁶⁴ Over a small sample of just five schemes with sufficient detail to assess whether the schemes are fully or partly funded.

⁶⁵ Over a small sample of just one scheme with sufficient detail to assess whether the schemes are fully or partly funded.

Table 12-15: RQ15: Has the reduced funding rate for IDB schemes outside of a wider local strategy incentivised more strategic planning?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>In total, 1,684 of the 2,485 funded schemes (68%) under the Partnership Funding policy scenario included evidence that a strategic approach has been taken. A further 59 (2%) did not provide evidence that a strategic approach had been taken (data were not available for the remaining 742 schemes).</p> <p>Of these, 88% of schemes submitted by IDBs show evidence that a strategic approach has been taken. This compares with 50% of Environment Agency and 92% of Local Authority schemes (48% of Environment Agency schemes, 6% of Local Authority schemes and 9% of IDB schemes are not known due to gaps in the data set identifying if a strategic approach has been taken). Just 4% of IDBs schemes, 2% of Environment Agency and 2% of Local Authority schemes do not show evidence that a strategic approach has been taken.</p>	<p>Qualitative evidence is limited to one respondent who identified that IDBs always tick yes to the question ‘Is evidence available that a Strategic Approach has been taken, and that double counting of benefits has been avoided?’ because everything they do is consistent with the relevant LLFA flood risk management strategy. However, there is a question as to whether this is the same meaning of “strategic approach” as intended for PF. It is thought that the original intention was for schemes to be developed within a “Strategy Plan” (underlying a CFMP or SMP) as originally defined in Project Appraisal Guidance in 1999.</p>

Table 12-16: RQ16: Has the FCERM programme Net Present Value (and NPV per £ of Exchequer GiA) been increased under Partnership Funding compared with a continuation of the Priority Score system? If not, why not?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>The Net Present Value has increased by £1.8 billion under the Partnership Funding policy scenario compared with the counterfactual scenario. Economic performance can also be expressed as an effective return to Exchequer GiA. This increases from 18.9 under the counterfactual scenario to 19.7 under the Partnership Funding policy scenario (with the Thames Tidal Defences (TTD) schemes excluded).</p> <p>If the TTD schemes are included (where four are funded under the counterfactual but just three under the partnership Funding policy scenario), then the overall NPV declines from £160 billion under the counterfactual to £153 billion under the Partnership Funding policy scenario. Likewise, effective return to the Exchequer reduces from 65.0 (counterfactual) to 61.2 (Partnership Funding policy scenario). The variation is related solely to the effect of the additional TTD scheme that is funded. Given the significant impact of this one scheme on the overall outcomes, the TTD schemes are removed from the main analysis to enable the results across the remaining 2,458 schemes to be more clearly seen.</p>	<p>No qualitative evidence is available for this question</p>

Table 12-17: RQ17: What is the trend in unit costs of flood schemes, e.g. in terms of properties protected?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>It is possible to provide estimates of unit costs per household, however, these are highly uncertain as the costs associated with just protecting households from risk cannot be identified or extracted from the whole-life costs. As a result the per household costs capture all other costs within the calculation (e.g. protection to infrastructure or providing environmental outcomes). They should therefore be treated with caution (hence why they are reported in an Annex to the main evaluation).</p>	<p>No qualitative evidence is available for this question</p>

Table 12-18: RQ18: What effect is Partnership Funding having on the time taken for FCERM schemes progressing from initial appraisal to delivery? Are there particular stages of the process where delays are experienced, and why?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>The time needed to progress a scheme under the Partnership Funding policy scenario is as follows:</p> <ul style="list-style-type: none"> • Gateway 1 to Gateway 3: mean of 225 days (mode 44 days over 119 schemes and median 109 days) • Gateway 1 to start of construction: mean of 332 days (mode 110 days over 71 schemes and median 197 days) • Gateway 1 to Gateway 4: mean of 668 days (mode 239 days over 39 schemes and median 520 days). <p>When the time taken under the Partnership Funding policy scenario is compared with the counterfactual, the mean time needed decreases across all three time periods. The pattern is less clear when considering the mode or the median:</p> <ul style="list-style-type: none"> • Gateway 1 to Gateway 3: mean decreases by 15 days (mode same; median decreases by 1 day) • Gateway 1 to start of construction: mean decreases by 18 days (mode same; median decreases by 22 days) • Gateway 1 to Gateway 4: mean decreases by 31 days (mode same; median decreases by 2 days). <p>It is likely that there is too much variation within the data entered in the 2015/16 to 2020/21 data set to draw any firm conclusions on the length of time that is required to proceed from one gateway to the next.</p>	<p>Interviewees did not consider that the time taken for a project to progress from appraisal to contributions has changed significantly. However, there are considered to be some efficiencies due to familiarity with the process.</p>

Table 12-19: RQ19: What is the impact of different GiA approaches for Environment Agency, Local Authority and Internal Drainage Board schemes, in terms of the types of scheme funded and longer-term funding availability (e.g. for maintenance)?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>There is little difference in terms of proportion of schemes funded by RMA type between the counterfactual and Partnership Funding policy scenarios. Overall, 57% of funded schemes are led by the Environment Agency under both the counterfactual and Partnership Funding policy scenario. Local Authorities lead 37% of schemes under the counterfactual and 38% under the Partnership Funding scenario, while for IDBs the proportion is 5% under the counterfactual and 6% under the Partnership Funding policy scenario.</p> <p>Total investment across RMAs also shows little difference between the counterfactual and Partnership Funding policy scenario. Total investment in schemes led by the Environment Agency is 63% under the counterfactual scenario and 61% under the Partnership Funding policy scenario. For Local Authorities, total investment under the counterfactual scenario is 35% increasing marginally to 37% under the Partnership Funding policy scenario. IDBs account for 2% of investment under both scenarios. The magnitude of investment does increase under the Partnership Funding policy scenario to £2.0 billion for the Environment Agency from £1.5 billion under the counterfactual scenario. Total investment in Local Authority led schemes increases from £0.8 billion (counterfactual scenario) to £1.2 billion (Partnership Funding policy scenario) and for IDBs from £47 million (counterfactual scenario) to £63 million (Partnership Funding policy scenario).</p>	<p>Concerns were raised during the survey and interviews over the different processes followed by the Environment Agency and other RMAs. The comments related mainly to the timing by when contributions need to be secured, which for Local Authorities is at the outline business case whereas the Environment Agency do not need to have contributions secured until they submit the full business case. There are also cost implications for RMAs that are starting projects that do not then get past outline business case stage due to being unable to secure the contributions that are needed.</p> <p>Interviewees also discussed what costs can be claimed back under GiA. There was inconsistency in understanding between different interviewees on whether Local Authority staff costs could be covered by GiA funding.</p> <p>Interviewees considered that maintenance requirements can be an issue, including getting contributors to sign legal agreements. There is a perception amongst contributors that maintenance is the Environment Agency's responsibility.</p>

Table 12-20: RQ20/RQ21: Do data analysis/investigations reveal any other issues with Partnership Funding which might suggest refinement or modification of the policy should be considered, based on what it is trying to achieve, and in what areas? This could include whether there are any impacts seen so far that may suggest something about future performance, in particular where any identified trends may cause issues if they continue

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>There is little change in proportion of schemes funded by risk source between the counterfactual and Partnership Funding policy scenarios. Total investment increases across all risk sources but the proportion of investment is similar between the two scenarios. For example, £1.3 billion of total investment (60%) is allocated under to fluvial flooding under the counterfactual scenario. This increases to £1.7 billion under the Partnership Funding policy scenario, equivalent to 54% of all investment for this scenario.</p> <p>Investment to protect households against flood risk in the 20% most deprived areas is £850 million under the Partnership Funding policy scenario, an increase of £18 million over the counterfactual. Investment to protect households against erosion risk in the 20% most deprived areas increases to £84 million under the Partnership Funding policy scenario, or by £24 million when compared with the counterfactual.</p>	<p>In total, 82% of survey respondents thought the Partnership Funding process could be improved. Just 2% said that the process did not need to be improved (16% did not know or had no opinion).</p> <p>Respondents considered that refinements were needed:</p> <ul style="list-style-type: none"> • To enable more natural or green schemes to progress • To better enable the benefits of addressing multiple sources of flooding to be captured within the Partnership Funding calculator • Development of a Memorandum of Understanding to enable time-limited funds to be banked and used later • Partnership Funding calculator needs to better recognise agricultural, critical infrastructure and business benefits that are currently captured in OM1 • Further consideration of the appropriateness of the policy towards coastal adaptation surface water flooding, and the specific issues surrounding urban and rural schemes • A review of the need for legal agreements with the potential to accept a letter of intent while a full agreement is being agreed <p>Respondents also suggested that a partner funding strategy should be developed at a local level, such as Environment Agency area or RFCC region so those benefiting from multiple schemes are approached once to contribute rather than for each individual scheme.</p> <p>Respondents felt there was a need for sharing of best practice and support, including provision of further or additional guidance at the community level on fund-raising and contributions, and to revisit and repeat training that was provided when the policy was introduced. This may require greater visibility of existing guidance and/or improved education and understanding.</p>

Table 12-21: RQ22: Is there evidence that communities are having a greater say in design choices about flood schemes in their areas?

Evidence from quantitative analysis	Evidence from qualitative analysis
<p>No quantitative evidence is available for this research question.</p>	<p>In total, 70% of survey respondents thought that local communities are involved in FCERM. A further 17% said they thought that communities were not involved while 13% did not know or had no opinion. In terms of involvement in design choices, 45% thought local communities are sufficiently involved while 42% thought that they were not (14% did not know).</p> <p>Respondents had mixed views when asked whether Partnership Funding policy had enabled more local choice in selection of FCERM options. A total of 30% thought the policy has been very or somewhat successful compared with 31% who thought it had been not very or not at all successful. A further 26% thought it was neither successful nor unsuccessful.</p> <p>In total 29% of respondents thought that factors other than the benefit-cost ratio had affected the choice of scheme. A further 31% said no, they didn't think that other factors had affected scheme choice while 35% did not know (the remaining 6% were not aware of schemes in their area).</p> <p>Respondents highlighted that local volunteer groups had been established to allow communities to take ownership of elements of a project. However, there was also concern that the influence of different interests within communities is limited by what is practicable and affordable. In addition, interviewees felt that communities expect to be able to drive the decision, especially if they are contributing.</p> <p>When asked about factors that might encourage contributions, most survey respondents (65%) thought that enabling beneficiaries to influence design was important. Interviewees commented on the apparent importance of the benefit-cost ratio and that this tends to drive schemes towards more traditional approaches.</p>

12.3 Suggestions from stakeholders for change

Suggestions raised by stakeholders for change cover a wide range of different issues, including:

- **Refinements to the Partnership Funding calculator:** there is a perceived need to revise the calculator so it better reflects the requirements of different types of schemes. This includes the need to promote green schemes, such as NFM, SUDS and green infrastructure. Other schemes such as coastal adaptation and surface water flooding schemes are currently having difficulties with application of the calculator. Stakeholders also consider that specific issues such as agricultural land, critical infrastructure and businesses also need to be better reflected in the calculator in terms of how they are weighted within Outcome Measure 1.
- **Need for better understanding of how the partnership funding formulas are applied and which data are allowed to be used:** there is a need for more guidance and sharing of best practice (e.g. on identification and quantification of expected benefits) to help address this issue. There were also suggestions for revisiting training programmes and the need for more capacity building, especially on engagement approaches with communities and with private investors.
- **Need for consistency across RMAs:** there are concerns that approaches vary between the Environment Agency and other RMAs in terms of what is required at different stages of appraisal, including when contributions need to be confirmed. There are also issues in terms of how wider benefits are estimated, with those RMAs undertaking schemes more regularly having greater knowledge of tools and approaches that enable them to better capture more of the benefits.
- **There is a need for a proportionate approach:** there are concerns that the costs associated with developing small schemes can be disproportionate to the amount of funding required. This can use up a lot of the budget. It can also raise expectations which may not then be met where property level protection is provided rather than a community-wide scheme, for example.
- **Legal agreements:** legal agreements needed for Partnership Funding are identified as one of the main causes of long timescales for securing contributions. A suggestion was made for a mechanism for legally agreeing contributions through projects being able to accept a letter of intent whilst a full collaborative agreement is finalised. Another suggestion was for a streamlined sign-off process for agreeing variations to the standard clauses in

the Environment Agency's legal agreement for contributions, in particular with regards to the clauses relating to maintenance.

- **Outcome Measure 1:** it was recognised that Outcome Measures are needed in order to apportion benefits and weight scores within the calculator. However, it was highlighted that in some cases businesses can view the outcome measures (Outcome Measure 1 in particular) as being unfriendly towards businesses in comparison to residential properties. Concerns were raised that this was affecting the way that businesses perceived schemes and hence their attitudes towards making a contribution. It was suggested that the outcome measures need to be reviewed to better account for businesses and critical infrastructure.

12.4 Wider issues raised outside of the scope of this study

During the course of the evaluation, various issues were raised by stakeholders (both in the survey and in the telephone interviews) that related to Partnership Funding but were not considered directly relevant to the research questions being considered here. These issues include:

- RFCC committee members taking ownership of a scheme
- Focus on resolving the problem rather than the paperwork
- Potential unintended consequences of obtaining voluntary contributions
- Organisation structure, management and responsibilities
- Timescales following flooding events

12.5 Overall performance of the Partnership Funding policy against its three main aims

Overall, the evaluation of the Partnership Funding policy has found that the aims of the policy are, in general, being delivered. The quantitative data analysis has shown that a modelled comparison of the Partnership Funding policy scenario with a counterfactual scenario, based on use of the priority score system, **does result in total FCERM investment being increased above what Government could fund itself**. However, the perception from stakeholders does not always reflect the results of the quantitative analysis with only 47% of respondents to the survey stating that they felt that more schemes had gone ahead under the Partnership Funding policy.

The qualitative analysis found that **70% of survey respondents agreed that there is local involvement in FCERM**. However, respondents also felt that those who provide funding have more opportunity to influence scheme design than those who are not providing a financial contribution.

Both survey respondents and interviewees identified difficulties associated with raising contributions. While 25% of public sector and 22% of private sector respondents thought contributions were becoming less difficult to obtain, 33% of private sector and 20% of public sector respondents thought they were becoming more difficult. A key reason was austerity measures. A number of respondents thought that obtaining voluntary contributions was becoming less difficult, including because beneficiaries know that if they do not contribute then a scheme will not go ahead. In total, **36% of survey respondents thought that the Partnership Funding policy had been very or somewhat successful in enhancing certainty in relation to funding of projects**. There were concerns over the extent to which contributors understood risk allowances where the Partnership Funding score was only just greater than 100% and what would happen if project costs increased.

Annex 1: Linking data to research questions

Tables A1-1 and A1-2 show how the survey data and counterfactual data link to the research questions.

Table A1-1: Matrix linking research questions with survey questions

Survey questions	Research questions																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1: If RMA		Y																				
2: Organisation		Y													Y				Y			
3: Name																						
4: Roles in FCERM						Y																
5: Contact details																						
6: Geographical area		Y																				
7: Scheme involvement		Y																				
8: Schemes needing contributions		Y																				
9: Types of schemes		Y		Y	Y					Y									Y			
10: GiA needed for other contributions					Y									Y								
11: Fill GiA needed to ensure additional work														Y								
12: Full GiA but also contributions		Y			Y		Y															
13: Number of schemes		Y			Y		Y												Y			
14: Transfer of GiA through RFCC							Y															
15: Number of schemes					Y		Y													Y		
16: Wider benefits					Y	Y					Y											
17: Schemes											Y								Y			

Table A1-1: Matrix linking research questions with survey questions

Survey questions	Research questions																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
18: Local choices	Y				Y																	Y
19: Schemes					Y														Y			Y
20: PF successful in...	Y	Y	Y	Y																		Y
21: More schemes going ahead?	Y		Y											Y								
22: Why if yes from 21	Y		Y											Y								
23: Why if no from 21	Y		Y											Y								
24: Contributions from public sector	Y								Y	Y												
25: Overall ease of contributions from public sector						Y			Y	Y												
26: Contributions from private sector	Y					Y			Y	Y												
27: Overall ease of contributions from private sector						Y			y	Y												
28: Encourage more voluntary contributions	Y	Y		Y		Y					Y											
29: Change in time to obtain contribution agreements										Y			Y					Y				
30: Time													Y					Y				
31: Time public sector													Y					Y				
32: Time private													Y					Y				

Table A1-1: Matrix linking research questions with survey questions

Survey questions	Research questions																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
sector																						
33: Involvement of local communities	Y				Y																	Y
34: How communities are involved	Y				Y																	Y
35: Why communities are not involved	Y				Y																	Y
36: Local communities involved enough?	Y																					Y
37: What could increase community involvement	Y																					
38: Say of financial contributors versus others	Y																					
39: Could PF be improved?																					Y	Y
40: Other comments																					Y	Y

Table A1-2: Matrix linking research questions with counterfactual data

Counterfactual data	Research questions																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Number of schemes funded	Y	Y	Y		Y			Y			Y			Y		Y			Y	Y		Y
Number of households benefiting	Y	Y	Y		Y														Y	Y		
Number of non-households benefiting	Y	Y	Y		Y															Y		
Number of households built before 2009 and thereafter benefiting																						
Number of schemes where a different type of project has been delivered than 'economic optimum' from appraisal	Y				Y																	Y
Number of schemes that include environmental improvements	Y	Y		Y	Y														Y	Y		
Area of habitat protected or improved by schemes	Y	Y		Y	Y																	
Km of river protected or improved by schemes	Y	Y		Y	Y																	
Number of schemes that have incorporated wider objectives in addition to flood/coastal erosion risk management	Y				Y						Y								Y			
Number of schemes where additional benefits have been delivered	Y				Y						Y								Y			
Comparison of actual benefits delivered versus those predicted in PAR and funded through GiA																						

Table A1-2: Matrix linking research questions with counterfactual data

Counterfactual data	Research questions																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Number of schemes in pipeline for each year														Y									
Number of funded schemes from IDBs outside an approved strategy											Y				Y				Y				
Number of schemes where economic optimum was progressed compared with number where local choice was progressed	Y				Y																		Y
Level of FCERM investment by year	Y	Y	Y		Y			Y			Y			Y		Y			Y	Y			
Proportion of benefits to households versus non-households	Y	Y			Y																Y		
Level of GiA allocated to schemes that include environmental improvements (proportion of spend on environmental improvements)	Y	Y		Y	Y														Y	Y			
Level of total investment allocated to schemes that include environmental improvements (proportion of spend on environmental improvements)	Y	Y		Y	Y														Y	Y			
Total capital and total maintenance costs	Y	Y			Y			Y											Y				

Table A1-2: Matrix linking research questions with counterfactual data

Counterfactual data	Research questions																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Amount of funding allocated to delivering wider objectives (where can be disaggregated)	Y				Y						Y								Y			
Comparison of actual benefits delivered versus those predicted in PAR and funded through GiA												Y										
Unit costs of schemes per property protected		Y	Y		Y			Y				Y					Y					
Unit costs of schemes per ha protected		Y		Y	Y							Y					Y					
Level of FCERM funding by grey versus green solutions	Y	Y	Y	Y	Y														Y	Y		
Assumptions and parameters used to derive GiA payment rates under priority area funding																			Y			
Total benefits minus total costs across all schemes (overall NPV)	Y		Y	Y	Y									Y		Y				Y		
Time from application to receipt of funds for GiA by scheme													Y					Y				
Time from entering first gateway to approval													Y					Y				

Annex 2: Estimating costs per household

Estimating unit costs per household

The study was originally intending to compare information available on whole-life costs and number of households protected, to provide estimates of costs per household. Such calculations can be useful in comparing how much investment has been allocated to protection of households and to see whether the Partnership Funding policy scenario has reduced costs per household to the Exchequer compared with the counterfactual (i.e. introduced cost efficiency). In practice however, it has not been possible to separate out (from total scheme costs) just those costs that are incurred in protecting households. Instead, whole-life total scheme costs have had to be used. These will also include costs of protecting non-residential properties, infrastructure and delivering environmental benefits. Although “total scheme costs per household protected” have been calculated and are reported below in various forms for completeness, **they should be interpreted with caution and importantly, do not describe the Exchequer cost of protecting an average household under the modelled scenarios.**

Trend in unit costs per household

Unit costs per scheme are reported in terms of per household rather than ‘pure’ unit costs per scheme. This is considered to provide a better basis for assessing and comparing the unit costs across the two scenarios over the investment period. The unit costs are highly uncertain since the individual aspect of the costs that relates to protecting households is not distinguishable from the data set and the whole costs have to be used. The value, therefore, is more in terms of comparison between unit costs by type of scheme rather than as absolute values.

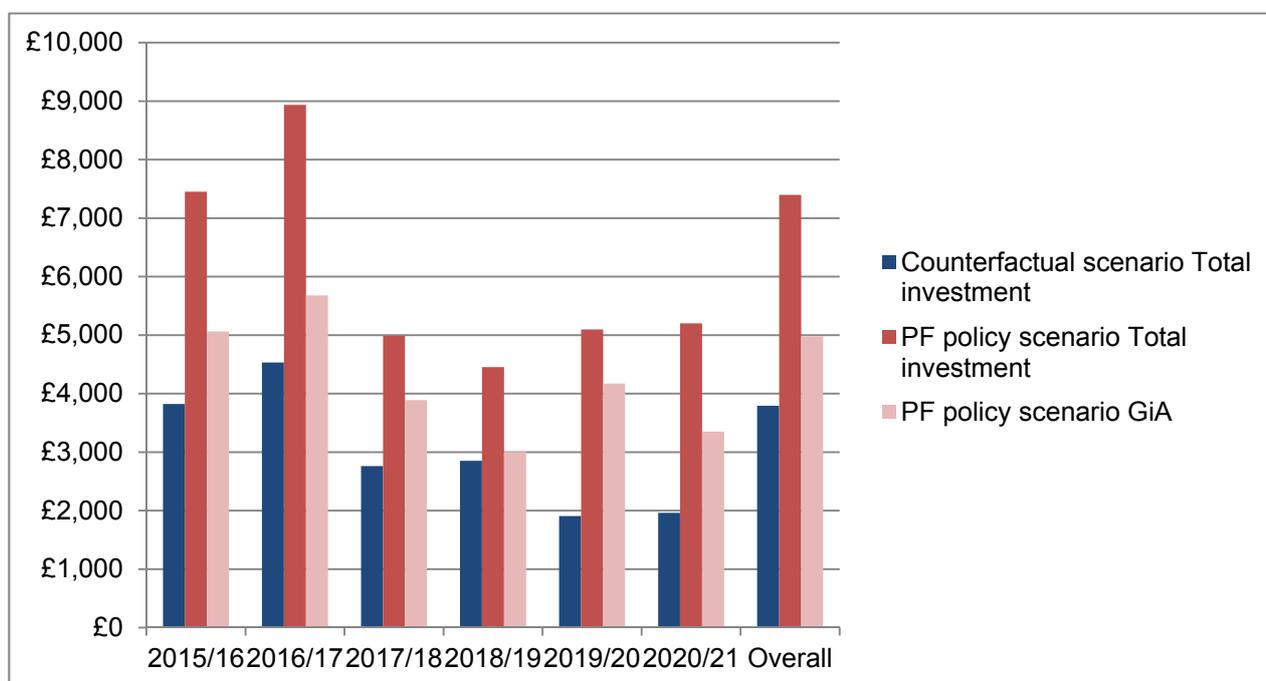
Total investment (GiA plus contributions) in protecting households against flood risk increases under the Partnership Funding policy scenario when compared with the counterfactual scenario. At the same time, the cost to the Exchequer has decreased allowing more households to be protected at a lower cost. In total, 440,000 households are better protected against flood risk under the Partnership Funding policy scenario at a cost of £4,200 per household to the Exchequer. This compares with around 380,000 households at £5,100 per household to the Exchequer under the counterfactual scenario.

The mean cost per household can be estimated based on total investment divided by the number of households better protected from both flooding and erosion. In calculating the unit costs per household, only those schemes that provide benefits to households are included. This helps to avoid skewing the unit costs where schemes funded in any

particular year do not provide any benefits to households⁶⁶. The results are shown in Figure A2-1 for 2015/16 to 2020/21.

Figure A2-1 shows that the costs per household under the Partnership Funding policy scenario for total investment are greater than costs per household under the counterfactual scenario (£6,300 per household compared with £5,400 per household). Overall, the costs per household under the Partnership Funding scenario are lower when just GiA is taken into account (i.e. excluding contributions) at £4,500 per household. There is some variation from year to year, with highest total investment per household seen in 2016/17. The range per household under the Partnership Funding policy scenario is £7,300 (maximum) to £3,400 (minimum) for total investment and £5,800 (maximum) to £2,500 (minimum) for GiA.

Figure A2-1: Mean investment per household (whole-life costs divided by number of households better protected) across the time periods



Trend in unit costs per household by RFCC

The Partnership Funding policy scenario includes investment per household based on total investment (GiA plus contributions to 2027/28) and investment per household based on

⁶⁶ Note though there is no way of identifying how much of the total costs are incurred protecting households versus protecting non-residential properties, infrastructure or delivering environmental improvements, such that the unit costs per household are expected to be over-estimates.

GiA only. Figure A2-2 presents the results in a chart showing the variation between investment per household across the twelve RFCC regions, again comparing total investment per household for the counterfactual and Partnership Funding policy scenarios and investment per household for GiA only for the Partnership Funding policy scenario.

Table A2-1: Mean investment per household by RFCC region (£ millions)					
RFCC region	Total investment (£ millions)		Number of households better protected (OM2 and OM3)	Investment per household (£)	
Counterfactual scenario					
Anglian Central	£35		7,131	£4,900	
Anglian Eastern	£178		14,488	£12,000	
Anglian Northern	£198		63,960	£3,100	
English Severn and Wye	£45		3,762	£12,000	
North West	£233		47,842	£4,900	
Northumbria	£90		7,530	£12,000	
South West	£149		15,354	£9,700	
Southern	£344		94,148	£3,700	
Thames	£409		80,618	£5,100	
Trent	£224		21,199	£11,000	
Wessex	£104		12,079	£8,600	
Yorkshire	£302		32,547	£9,300	
RFCC region	Total investment (£ millions)	GiA (£ millions)	Number of households better protected (OM2 and OM3)	Total investment per household	GiA per household
Partnership Funding policy scenario					
Anglian Central	£57	£35	6,435	£8,900	£5,400
Anglian Eastern	£155	£94	12,106	£13,000	£7,700
Anglian Northern	£248	£193	61,327	£4,000	£3,100
English Severn and Wye	£63	£30	3,803	£16,000	£8,000
North West	£340	£297	47,969	£7,100	£6,200
Northumbria	£124	£67	7,827	£16,000	£8,500
South West	£172	£122	18,899	£9,100	£6,500
Southern	£526	£408	105,416	£5,000	£3,900
Thames	£415	£354	70,701	£5,900	£5,000
Trent	£184	£151	20,740	£8,900	£7,300
Wessex	£272	£144	27,682	£9,800	£5,200
Yorkshire	£708	£415	81,539	£8,700	£5,100

Figure A2-2: Mean investment per household by RFCC region

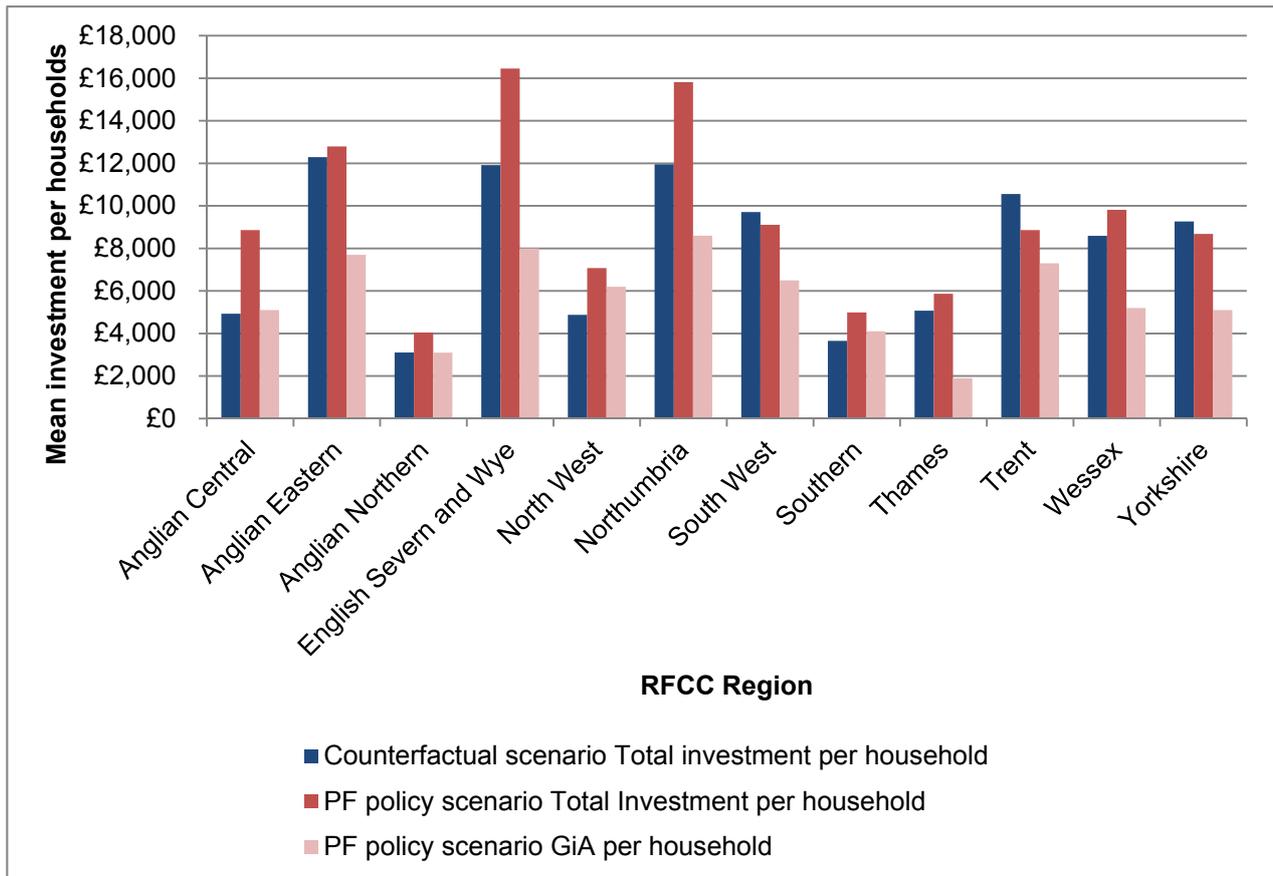


Figure A2-2 shows that mean investment per household under the counterfactual scenario is highest in Anglian Eastern, English Severn and Wye and Northumbria (all £12,000 per household). Mean investment per household under the Partnership Funding policy scenario is also greatest for English Severn and Wye and Northumbria (both £16,000 per household). There is a relationship between the total investment and number of properties better protected, where those regions with a higher number of properties being protected also have a higher level of total investment⁶⁷. Similarly, mean investment per household also shows a relationship with costs generally being higher where there are fewer households benefiting, suggesting that there are economies of scale⁶⁸. Under the Partnership Funding policy scenario, mean GiA investment per household is highest for Northumbria (£8,500 per household) and English Severn and Wye (£8,000 per household).

⁶⁷ An assessment of the correlation between number of households better protected and total investment gives a result of 0.90 for the Partnership Funding policy scenario.

⁶⁸ An assessment of the correlation between number of households better protected and investment per household gives a result of -0.74 for the Partnership Funding policy scenario.

Trend in unit costs per household by RMA

Total investment can be divided by the total number of households better protected per RMA to give an indication of the investment per household per RMA. Table A2-2 presents the investment per household under the counterfactual and the Partnership Funding policy scenarios for 2015/16 to 2020/21. The table shows that total investment per property is highest for water company schemes (£29,000 per household under the counterfactual scenario and £120,000 per household under the Partnership Funding policy scenario⁶⁹). When GiA only is considered, investment per household from water company schemes under the Partnership Funding policy scenario reduces to £8,000. For Local Authority led schemes, investment per household under the Partnership Funding policy scenario reduces from £7,800 (total investment) to £5,200 (GiA). Reductions in investment per household are also seen for Environment Agency schemes (£6,700 to £4,900 per household and IDB schemes (£5,400 to £3,000 per household).

Table A2-2: Average (mean) cost per household by RMA					
RMA	Total investment (£ millions)		No. households better protected	Investment per household (£)	
Counterfactual scenario					
Highways Authority	£0		0	-	
Internal Drainage Boards	£47		11,211	£4,200	
Environment Agency	£1,600		463,973	£3,500	
Water companies	£1.0		35	£29,000	
Local Authorities	£800		125,838	£6,400	
RMA	Total investment (£ millions)	GiA	No. households better protected	Investment per household (£)	GiA per household (£)
Partnership Funding policy scenario					
Highways Authority	£0	£0	0	-	-
Internal Drainage Boards	£63	£35	11,547	£5,400	£3,000
Environment Agency	£2,004	£1,476	299,371	£6,700	£4,900
Water companies	£0.6	£0.04	5	£120,000	£8,000
Local Authorities	£1,195	£801	153,521	£7,800	£5,200

Trend in unit costs per household by risk source

Total investment can be divided by the total number of households better protected per risk source to give an indication of the average (mean) investment per household per risk

⁶⁹ Note this is across four schemes under the counterfactual but just one scheme under the Partnership Funding policy scenario, therefore, uncertainties are expected to be high.

source. Table A2-3 presents the investment per household under the counterfactual and the Partnership funding policy scenarios; total investment includes GiA under the counterfactual and both GiA plus contributions under the Partnership Funding policy scenario. The table shows that under the counterfactual scenario the risk source with the lowest investment per household is coastal flooding at £3,500 and the highest investment is reservoir flooding at £25,000 per household. Under the Partnership Funding policy scenario, the lowest investment per household is also coastal flooding (£4,200 for total investment and £3,200 for GiA only). Highest investment per household is associated with reservoir flooding, but this is only across a very small sample of schemes (six). The next highest investment per household under the Partnership Funding policy scenario is fluvial flooding at £10,000 per household and coastal erosion at £8,700 per household (when considering total investment). When contributions are taken into account, investment from the Exchequer per household is £7,000 for coastal erosion and £6,800 for fluvial flooding.

Table A2-3: Average (mean) investment per household by risk source					
RMA	Total investment (£ millions)		No. households better protected	Investment per household (£ 000s)	
Counterfactual scenario					
Fluvial flooding	£1,339		173,043	£7,700	
Surface water flooding	£161		44,206	£3,600	
Coastal flooding	£544		157,583	£3,500	
Reservoir flooding	£0.20		8	£25,000	
Groundwater flooding	£10		1,221	£7,900	
Coastal erosion	£174		21,803	£8,000	
RMA	Total investment (£ millions)	GiA	No. households better protected	Investment per household (£)	GiA per household (£)
Partnership Funding policy scenario					
Fluvial flooding	£1,698	£1,148	169,748	£10,000	£6,800
Surface water flooding	£303	£187	56,905	£5,300	£3,300
Coastal flooding	£887	£672	209,837	£4,200	£3,200
Reservoir flooding	£23	£23	11	£2,100,000	£2,100,000
Groundwater flooding	£12	£6.6	1,672	£7,000	£4,000
Coastal erosion	£228	£183	26,131	£8,700	£7,000

Mean investment per household better protected from flooding

The analysis of total investment by type of household better protected can be compared with the total investment allocated to protect households to give an indication of the mean investment per property protected. The results are presented in Table A2-4 for both the 2009/10 to 2014/15 and 2015/16 to 2020/21 periods, and for the counterfactual and Partnership Funding policy scenarios.

Table A2-4 shows that the mean investment per household varies considerably under the 2009/10 to 2014/15 time period; the results appear questionable and there is uncertainty over the reliability of the data. The mean investment per household for 2015/16 to 2020/21 is £5,100 under the counterfactual scenario. Under the Partnership Funding policy scenario, mean investment per OM2 household is £6,000 (total investment) and £4,200 (GiA only). Total investment per property increases for those households moved from very significant/significant flood risk to moderate/low flood risk (OM2b) at £7,500 per household under the counterfactual scenario and £8,400 under the Partnership funding policy scenario; this reduces to £5,800 per household if only GiA is considered. The investment per household in the 20% most deprived areas (OM2c) increases again to £15,000 per household under the counterfactual scenario and £16,000 under the Partnership Funding policy scenario (£13,000 per property if only GiA is considered).

Table A2-4: Mean investment per property protected from flooding					
Period 2009/10 to 2014/15					
Risk source	Total number of households better protected	Total investment across all schemes better protecting households (£ millions)		Mean investment per household	
Counterfactual scenario					
All households	3,745,700	£630		£170	
Household moved to moderate or low risk	3,152,140	£440		£140	
Households in 20% most deprived areas	2,450	£27		£11,000	
Partnership Funding policy scenario					
All households	3,812,800	£840		£220	
Household moved to moderate or low risk	3,304,200	£540		£160	
Households in 20% most deprived areas	3,230	£41		£13,000	
Period 2015/16 to 2020/21					
Risk source	Total number of households better protected	Total investment across all schemes better protecting households (£ millions)		Mean investment per household	
Counterfactual scenario					
All households	375,772	£1,916		£5,100	
Household moved to moderate or low risk	187,058	£1,408		£7,500	
Households in 20% most deprived areas	46,466	£684		£15,000	
Period 2015/16 to 2020/21					
Risk source	Total number of households better protected	Total investment across all schemes better protecting household (£ millions)	GiA across all scheme befitting household (£ millions)	Mean investment per household (total) (£)	Mean investment per household (GiA) (£)
Partnership Funding policy scenario					

All households	440,866	£2,625	£1,849	£6,000	£4,200
Household moved to moderate or low risk	222,331	£1,857	£1,283	£8,400	£5,800
Households in 20% most deprived areas	51,937	£851	£658	£16,000	£13,000

Mean investment per household better protected against coastal erosion

The analysis on total investment by type of household better protected against coastal erosion can be compared with the total investment allocated to protect households to give an indication of the mean investment per property protected. The results are presented in Table A2-5 for 2015/16 to 2020/21 period as this is the only time period for which specific data on number of households protected against coastal erosion are available. Results are given for both the counterfactual and Partnership Funding policy scenarios.

Table A2-5 shows that the mean investment per household for 2014/15 to 2020/21 is £9,700 under the counterfactual scenario. Under the Partnership Funding policy scenario, mean investment (contributions and GiA) per household is £13,000 but this reduces to £11,000 per household for Exchequer GiA only. Investment increases per household for those households protected in a 20 year period (OM3b) to £43,000 per household under the counterfactual scenario and £65,000 under the Partnership Funding policy scenario; or £46,000 per household for Exchequer GiA. The investment per household in the 20% most deprived areas increases again to £110,000 per household under the counterfactual scenario and to £130,000 per household under the Partnership Funding policy scenario for total investment; reducing to £110,000 per household for Exchequer GiA.

Table A2-5 shows that total investment in protecting households against coastal erosion risk increases under the Partnership Funding policy scenario when compared with the counterfactual scenario. In total, 23,578 households are better protected against flood risk under the Partnership Funding scenario at a cost of £11,000 per household to the Exchequer. This compares with around 22,232 households at £9,700 per household to the Exchequer under the counterfactual scenario.

Table A2-5: Mean investment per property protected against coastal erosion (2015/16 to 2020/21)					
Risk source	Total number of households better protected	Total investment (GiA) across all schemes better protecting households (£ millions)		Mean investment per household	
Counterfactual scenario					
All households	22,232	£215		£9,700	
Household protected in a 20 year period	2,595	£112		£43,000	
Households in 20% most deprived areas	551	£59		£110,000	
Risk source	Total number of households better protected	Total investment across all schemes better protecting household (£ millions)	GiA across all scheme befitting household (£ millions)	Mean investment per household (total) (£)	Mean investment per household (GiA) (£)
Partnership Funding policy scenario					
All households	23,578	£301	£260	£13,000	£11,000
Household protected in a 20 year period	2,607	£169	£121	£65,000	£46,000
Households in 20% most deprived areas	658	£84	£72	£130,000	£110,000

Contributions per household by source and level of deprivation

The contributions can be disaggregated in terms of average (mean) contribution by type per household better protected. The results are presented in Table A2-6. The table enables a comparison to be made of the mean contribution secured in the 20% most deprived and 80% least deprived areas⁷⁰. The table shows that contributions (from whatever source) are typically higher when expressed as an average per household better protected in the 20% most deprived areas when compared with mean contribution expressed per household from the 80% least deprived areas. Contributions expressed per household from private sources in the 20% most deprived areas at risk of coastal erosion are very high (£1.9 million per household). Investigation of the detailed data set shows that there is one scheme with contributions from private sources that also benefits households in the 20% most deprived areas (OM3c). The highest level of private contributions is £61 million with just 13 households benefiting⁷¹, i.e. £4.7 million as a ratio

⁷⁰ These calculations are based on just those schemes that result in households being better protected.

⁷¹ This is the contribution from the Brighton Marina to River Adur Flood and Coastal Erosion Risk Management Strategy, included as a case study in Box 8-5.

per household⁷². This scheme has total whole-life benefits of £189 million suggesting that the majority of benefits are associated with Outcome Measure 1 and it is protection of these wider assets that is likely to be driving the contribution here (i.e. it is not from or in connection with protecting households).

Table A2-6: Breakdown of contributions by source per household (mean)				
Source	20% most deprived (Outcome Measure 2c)	80% least deprived (Outcome Measure 2)	20% most deprived (Outcome Measure 3c)	80% least deprived (Outcome Measure 3)
Growth fund	£31,000	£13,000	-	-
Local levy	£3,500	£2,000	£20,000	£820
IDB precept	£810	£480	-	£81
Public	£9,300	£2,600	£75,000	£3,000
Private	£12,000	£760	£1,900,000	£3,500
Other EA	£1,000	£3,000	-	-
Further needed	£7,200	£7,500	-	£11,000

Some households receive contributions from more than one of the six sources of funds (excluding further contributions required). Households in the 20% most deprived areas at risk of flooding attract contributions from an average (mean) of 1.7 sources while those in the 80% least deprived areas attract contributions from an average (mean) of 1.5 sources. The average (mean) number of sources of contributions for properties at risk of coastal erosion in the 20% most deprived areas is 1.2, lower than the mean number of sources for properties in the 80% least deprived areas (1.7).

⁷² There are five schemes in total that benefit a total of 560 properties under Outcome Measure 3c, with £1.9 million per household divided across all Outcome Measure 3c properties better protected.