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Joint Flood and Coastal Erosion Risk Management Research and Development Programme

Programme Definition Document

March 2015

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1 Introduction

This document is designed to provide an introduction to the Joint Programme and set out the management structures, principles and processes for the use of programme stakeholders. It describes the arrangements to ensure the development of high-quality research and development outputs that provide the evidence required for sustainable flood and coastal erosion risk management policy, process and delivery.

This edition of the Programme Definition Document has been revised in light of changes to the programme structure and in recognition of the changes to Flood and Coastal Erosion Risk Management (FCERM) governance arrangements in Wales. The document outlines the current thematic structure of the programme following the March 2014 refresh and the objectives by which we aim to evaluate success.

1.1 Rationale

Over 5.5 million people and more than £200 billion of property are at risk of flooding and coastal erosion in England and Wales. A number of recent flood events, including widespread fluvial flooding in 2007, 2012 and 2014 and major coastal flooding in 2013/14 have brought significant political, media and public attention. Flooding (fluvial and coastal) is currently ranked behind only pandemic flu according to the Cabinet Office National Risk Assessment¹.

The strategic direction for flood and coastal erosion risk management in England is detailed in the National FCERM Strategy September 2011², with an equivalent document for Wales produced November 2011³.

The Living With Environmental Change partnership also produced a UK wide FCERM Research Strategy published in January 2012⁴.

The Joint Programme is now in its third cycle, having been established in response to 1999 MAFF review and subsequently reviewed in 2005⁵. Critically, the programme aims to provide the evidence base for sustainable FCERM across all risk management authorities in England and Wales; thus aiming to deliver research that is relevant to government policy makers, as well as Local and Coastal Authorities, Internal Drainage Boards as well as partner organisations and practitioners with an interest in FCERM.

The Joint Programme occupies a broad niche in the research spectrum between fundamental research and operational flood and coastal risk management (FCRM). It aims to help bridge the gap between work carried out by others (basic scientific research) and the development of policy and operational guidance and tools.

¹ National Risk Assessment

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211858/CO_NationalRiskRegister_2012_acc.pdf

² FCRM Strategy for England

<https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england>

³ FCRM Strategy for Wales

<http://wales.gov.uk/docs/desh/publications/111114floodingstrategyen.pdf>

⁴ LWEC FCERM Research Strategy

<http://www.lwec.org.uk/sites/default/files/UK%20Flood%20Research%20Strategy.pdf>

⁵ Penning-Rowsell, E, Bye, P; Rickard, C; Townend, I; Watkinson, A (2005) An Independent Review of the Defra/EA Research and Development Joint Programme in Flood and Coastal Erosion Risk Management, DEFRA

1.2 Objectives

The Joint Programme has a number of key objectives:

- To develop the timely evidence and innovation required to underpin sustainable flood and coastal erosion risk management policy, process and delivery through the provision of leading-edge science and development of good practice driven by user needs.
- To integrate R&D work further into the development and delivery of Flood and Coastal Erosion Risk Management (FCERM) by Defra, Environment Agency, Welsh Government and Natural Resources Wales and other risk management authorities as they work in partnership.
- To improve integration with R&D in other related areas (such as the Research Councils, EU and International Programmes, CIRIA and UKWIR).
- To put in place and manage an effective but simple solution to capture and present benefits arising from the programme to justify the investment made, recognising that some of the benefits arising from R&D are not realised for many years.

2 How we work

2.1 Programme Management Structure

The programme management structure is intended as a flexible framework within which evidence and innovation needs can be met. To ensure our alignment to flood risk management within Defra, Environment Agency, Welsh Government and Natural Resources Wales and to strengthen our links with external partners in flood and coastal erosion risk management, the Joint Programme Board (JPB) agreed changes to programme governance in November 2013. This recognised a need to evolve to respond effectively to the emerging evidence and innovation needs of our customers. The review of Joint Programme groups and roles and responsibilities recommended a simple framework for governance and a greater alignment to key FCRM customers. The diagram in Figure 1 illustrates the refreshed governance framework.

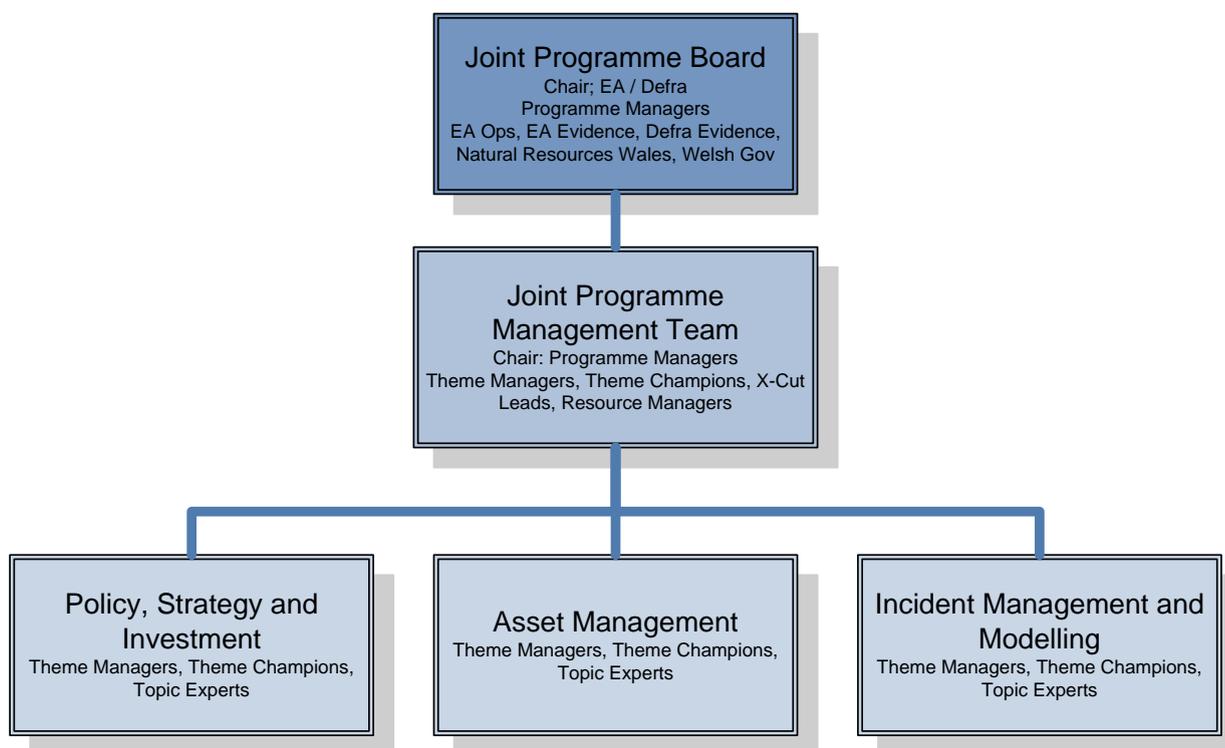


Figure 1: Joint Programme Structure

2.2 Governance and Advisory Groups

2.2.1 Joint Programme Board

JPB is responsible for setting the overall direction of the programme. This group comprises members from Defra, Environment Agency Natural Resources Wales and Welsh Government. It is chaired jointly by Defra and Environment Agency FCRM Deputy Directors. The group is responsible for the overall ownership of the objectives of the Joint Programme. JPB will determine research priorities, ensure the delivery of new research capabilities and maintain the overall integrity and coherence of the programme. The Joint Programme Managers will work with the JPB to achieve this, drawing on technical input from others as appropriate. The Joint Programme Managers will ensure that mechanisms for managing programme level risks and issues, change control, benefits and communications are put in place.

2.2.2 Joint Programme Management Team

The Joint Programme Management Team (JPMT) acts as an integrator of activity across themes and cross-cutting areas. It identifies synergies and efficiencies between programme themes, provides challenge and peer review of proposals and develops recommendations for the JPB. Common areas of interest are also discussed at this group such as communications, monitoring of programme progress, uptake of outputs and management of risks. The JPMT consists of the Programme Managers, Theme Champions, Theme Managers and (as required) cross-cutting leads.

2.2.3 Theme Advisory Groups

Theme Advisory Groups (TAGs) support the Joint Programme in a horizon scanning capacity and in the development of research proposals. TAGs are comprised of individuals who bring a blend of topic expertise and can represent the views from across key stakeholder groups. TAGs are chaired by nominated Theme Champions, who ensure proposals for research are developed on sound scientific thinking and are designed to generate useful outcomes. We encourage the submission of ideas and identified R&D gaps from TAG members and their organisations. Ideas may also arise from practitioner issues and needs generated from lessons learnt or in-year events. The TAGs may provide peer review on ongoing projects if required.

2.2.4 Cross-cutting Groups

Cross-cutting areas have also developed to address specific challenges which do not fit specifically within a single theme. In common with TAGs these groups comprise a range of experts, who provide advice on research needs. Cross-cutting groups may be ephemeral research groups or permanent groups for whom R&D forms only a part of their overall remit. While these groups do not form part of the formal Joint Programme structure they have an important role in defining R&D needs.

The responsibilities of each group and role descriptions outlined above are detailed further in Appendix B: Roles and Responsibilities.

2.3 Planning what we do

The Joint Programme will build upon Defra's Evidence Strategy⁶ and the LWEC FCERM Research Strategy⁷ to meet the needs of the English and Welsh FCRM strategies^{8, 9}. The programme aims to strike an appropriate balance between tactical research to meet immediate needs and strategic research to anticipate and prepare for future and longer-term challenges. The Joint Programme occupies a position between basic academic-led research and practitioner needs and thereby provides a translator role in the pipeline of research delivery.

⁶ Defra Evidence Strategy

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/318610/evidence-strategy-defra.pdf

⁷ LWEC Flooding Research Strategy

<http://www.lwec.org.uk/our-work/uk-first-flood-research-strategy>

⁸ see footnote 2

⁹ see footnote 3

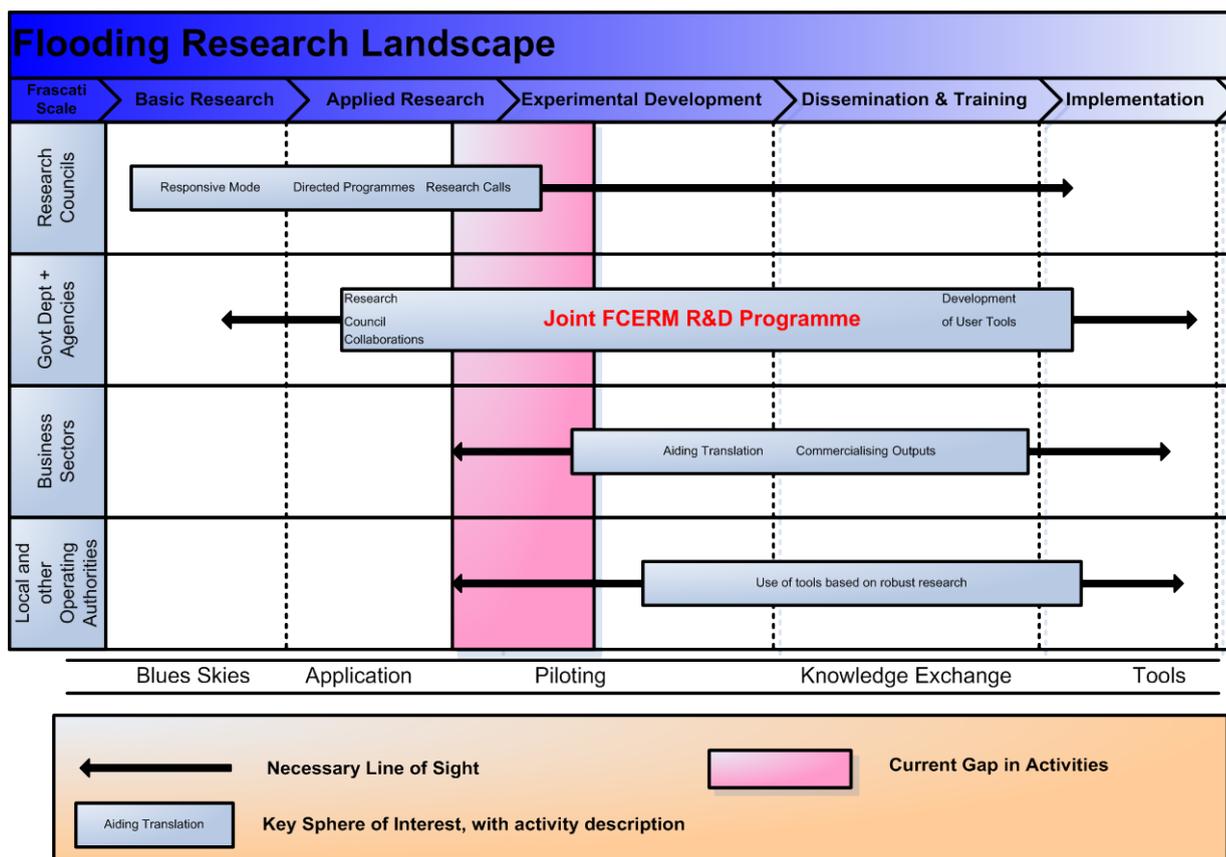


Figure 2: FCERM Research Landscape (adapted from LWEC Strategy 2012)

The distribution of resources and budget across themes will be reviewed annually by the JPB. Capacity and capability are considered as part of the planning cycle at both a JPMT and JPB level.

The Joint Programme will seek to continue and enhance our strong links with external research partners to promote the delivery of and effective investment in FCERM science, evidence and innovation. Theme and Programme Managers are encouraged to identify opportunities to work with other funders to deliver identified research needs and therefore increase the total resources in FCERM R&D.

2.3.1 Rationale and Objective Statements

Each theme within the programme will develop and maintain Rationale and Objectives (RO) statements which identify the key business drivers and the priority questions and issues to be addressed by each theme. These will be reviewed on an annual basis to ensure that they are up to date and take account of emerging issues. The success of the programme will be assessed by measuring programme/project deliverables against the RO statements.

The programme, and each theme within it, will identify priority work packages and a schedule for delivery. This will show how we will respond to the business drivers and objectives identified in the RO statements. It will also be designed to retain a degree of flexibility to enable the programme to respond to urgent, emerging needs as may arise over an approximate five year period.

2.3.2 Annual Project Planning

Annual research plans, detailing specific project proposals to take place within the forthcoming financial year, will be developed by each theme. The timetable for this is outlined in Figure 3 below. These will be developed in liaison with the TAGs and collated by the Programme Managers. It is important to note that the Joint Programme funds work with a specific research objective or the synthesis of research into practical guidance. It does not fund the development of guidance from existing practice.

Proposals for delivery within the Joint Programme are evaluated according to the following criteria:

- The drivers for the research need (Political, Economic, Social, Technological, Legal and Environmental) alongside their relative urgency.
- The likelihood of achieving an output (maturity of the science in this area), the desired outcome (including the scale of change required to yield benefit) and the value of the benefits associated with that outcome, including the opportunity to yield multiple benefits.
- The risks associated with doing nothing within the Joint Programme, alongside other alternate options for delivery.

Each of these criteria are scored on a 1-5 scale to enable inter-comparisons between proposals emerging from different themes. The draft annual research plan will then be subjected to peer review and prioritisation by the JPMT and approval by the JPB. Appendix A describes the annual planning and development cycle in more detail.

When examining proposals 3 key questions help determine the most appropriate route for delivery:

Questions of efficacy, “*can it work?*” – These types of research questions are likely to align with the basic and applied research agendas of the UK’s Research Councils. We will strive to influence research agendas and work in partnership to help pull through applied research outputs for further development and pilot testing.

Questions of effectiveness, “*does it work in practice?*” – These largely ‘development-type’ questions are likely to require testing, piloting and evaluation through case study application and other methods to tackle real world problems. In such cases, partnerships with the relevant delivery organisations may be needed, for example between the Environment Agency, Natural Resources Wales, Internal Drainage Boards, lead local flood authorities and utility companies. We will engage with our international partners to share lessons and benchmark our research to ensure we continue to be world-leading.

Questions regarding efficiency, “*is it worth it?*” - Such questions are likely to be shared with the Policy, Strategy and Investment (PSI) Theme as well as others in the Defra network. When tackling issues of efficiency we will work in collaboration with the PSI Theme and relevant government department and agencies. We will seek to incorporate lessons and best practice from other organisations who manage large infrastructure systems

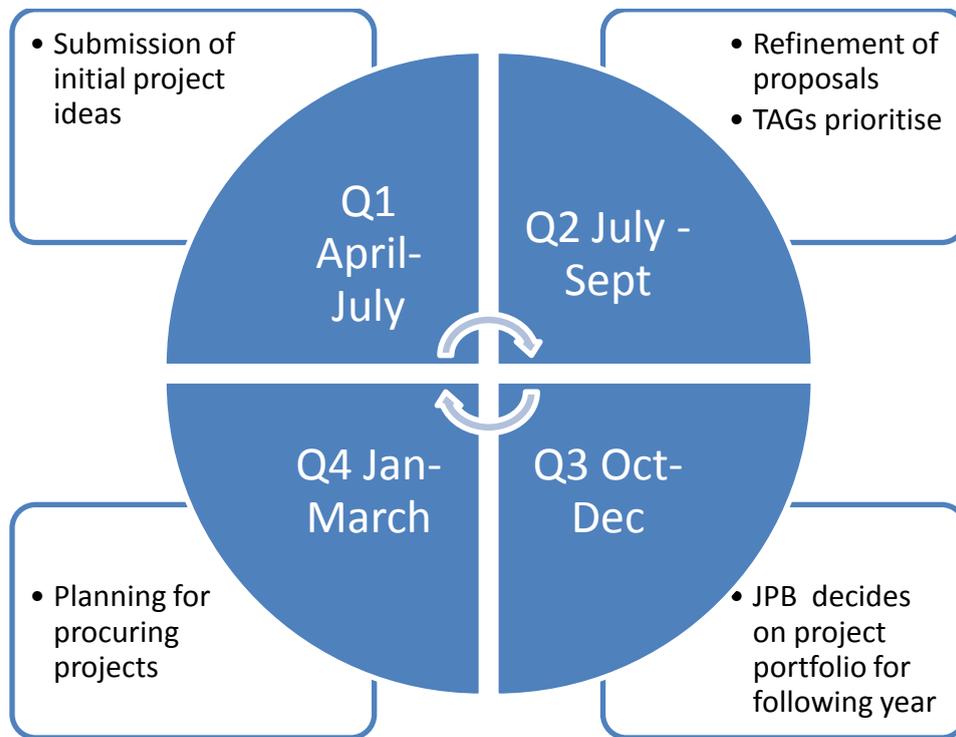


Figure 3: Summary of Joint Programme Planning Cycle

2.3.3 Prioritising in-year proposals

In-year responsive priorities are assessed according to the following principles:

- Is the work requested genuinely a responsive need? For example, prompted due to new activities, legislation or flood events.
- Should the work be undertaken possibly at the expense of other planned activities?
- Who is requesting the work? What purpose does it serve? How will it be used?
- Does the work fit within the existing RO statements of the themes and the overall objectives of the programme?
- Does the work present an opportunity for partnering and leverage on expenditure which might otherwise be missed?

2.4 Who we work with

The Joint Programme is founded on the strength of collaboration and partnership at all levels of the delivery model as outlined in Section 2.2 Roles and Responsibilities. Key partners include but are not limited to:

- Lead local flood authorities and maritime authorities
- FCRM practitioners in the Environment Agency, Natural Resources Wales, Flood Forecasting Centre and other risk management authorities
- Professional partners and emergency responders
- Strategic and supply chain partners (Met Office, WEM consultants and beyond)
- Other government agencies and departments (for example Public Health England, DECC, BIS, DCLG, LGA)
- Leading researchers and industry experts in the field both in the UK and internationally
- Research councils, EU and international research funders
- Internal Drainage Boards and the bodies that represent them and their stakeholders (for example the Association of Drainage Authorities, National Farmers Union)

- Utility companies including UK Water Industry Research (UKWIR)
- Third sector organisations (for example the Joseph Rowntree Foundation, National Flood Forum and ultimately the public who use FCERM services)
- Professional institutions (for example the Chartered Institution of Water and Environmental Management, Institute of Civil Engineers, Institute of Asset Management)

2.5 Communicating what we do

Communication and dissemination are crucial elements of the Joint Programme. Both ensure that the outputs of the research are used by stakeholders involved in policy and operational delivery, and raise awareness of flood management issues in communities at risk.

The Joint FCERM R&D Programme website provides access to information and outputs from the programme in a single location. Outputs are free to download. Detailed information on the projects may be available on request via the project manager. Most projects completed since 2003 (or earlier in some cases) have a published technical summary that includes information on key outputs. Defra projects are also published on the Defra Science and Research website.

<http://evidence.environment-agency.gov.uk/FCERM>

The programme will use a range of approaches to engage with stakeholders and increase accessibility to on-going research and development, building on the programme website and bi-annual newsletter to trial innovative methods of engagement. These include workshops, conferences, webinars, and media coverage (both trade and popular press). Each project within the programme will establish an appropriate communication and dissemination plan early on in project development, with assistance from the programme support team as required. The plan will outline the objectives of the research, where the outputs should be targeted, and what specific communication or dissemination approaches may be required (for example; workshop, article in trade magazine, press notice, key recipients of interim or final reports).

In the future, a specific project management tool may facilitate communication between the management team and its stakeholders. The piloting of the use of Huddle workspaces and Sharepoint sites aims to aid information sharing and collective debate.

2.6 Procuring work

All organisations will use their standard good practice procedures to procure input to the Joint Programme from external contractors. Pre-competed frameworks will be used where practicable in the first instance, followed by competitive open tender and where warranted and justifiable, single tender awards will also be made. Contracts will be advertised on the Government Contracts Finder website.

Intellectual Property Rights (IPR): each organisation will respect their agreed processes and procedures.

2.7 Risk Management Strategy

The programme team will actively manage risks and issues to time, cost, quality, benefits and scope targets. A risk register will be generated to log and track the programme risks in a simple and pragmatic way. Ownership of risks will be allocated as appropriate, usually between the Programme and Theme Managers and mitigation measures will be put in place to avoid risks being realised and becoming issues.

2.8 Quality Management Strategy

Project proposals and plans will be scrutinised by the JPB prior to approval for funding. Quality management is built into the development cycle through the engagement of stakeholders and users via the respective TAGs. Plans will also be exposed to challenge when proposals are discussed at JPMT and JPB meetings. The programme will be reviewed after approximately five years.

Where appropriate, a sample of initiatives will be subject to project manager led, programme led and independent post project appraisals to identify lessons learnt from the projects. These lessons will be captured and shared to avoid repeating mistakes and to build on successes.

Independent peer review is frequently sought as a part of project delivery. Some outputs may also be published within academic journals or as part of conference proceedings where they are also subject to independent scrutiny.

3 Thematic Rationale and Objective Statements

3.1 Policy, Strategy and Investment



Our Vision: *“to deliver the evidence needed to support the development and implementation of flood and coastal erosion risk management strategy and policy in England and Wales”*

Rationale – informing and influencing FCERM challenges

Policy, Strategy and Investment is a broad theme covering both policy and strategic questions associated with FCERM. The theme is jointly managed between Defra and the Environment Agency to reflect the respective organisational roles and topics include issues of immediate concern as well as medium and longer-term requirements.

Since the 2007 floods, and the subsequent Pitt review, flooding and coastal erosion risk management strategy has focused upon ensuring an appropriate division of responsibilities between risk management authorities. This has included devolving and distributing the ownership of risk, to enable it to be managed at the most appropriate level, from the Environment Agency and Natural Resources Wales, down to communities and individuals. The partnership funding model for flood defence spending is also based on principles of shared responsibility, both between different tiers of government, and between public and private sectors. The Policy, Strategy and Investment theme therefore exists to build the evidence base both to enable and encourage the distribution of risk and to evaluate the implementation of this strategic approach, with a view to achieving better value for money for the taxpayer.

The PSI topics will cover a range of topic areas including:

- Communication and engagement
- Coastal and inland strategies
- Partnership working across all risk management authorities
- Growth and development
- Insurance
- Appraisal and investment
- Working with natural processes
- Coastal flood risk management and adaptation

The research undertaken in this theme will draw on a range of different approaches including natural science and engineering, as well as economics and social science.

Aims

We aim to deliver evidence that will enable the development of policies to:

- Enable our partners, including local communities, to take greater responsibility for managing their own flood risk
- Ensure that both capital and revenue spending on flood risk management represent value for money
- Leverage an increase in overall investment in flood management without continually increasing the burden on the general taxpayer

- Increase resilience in a range of domains – for example financial, infrastructure, institutional and social, to reduce the impact of flooding when it occurs
- Ensure that FCERM supports wider economic priorities, for example in relation to growth

Objectives

The theme objectives are to produce robust research to underpin:

- FCERM policy development
- Strategy development and delivery
- Delivery of integrated outcomes on the ground
- Defining investment needs and supporting funding for FCERM

The priority areas for developing our understanding and evidence base are:

1. Improving the management of flood risk from surface water and groundwater
2. Improving our understanding of the economics of flood and coastal erosion risk management.
3. Improving understanding of long term risk and investment need
4. Improving the evidence base to enable households to be more financially resilient
5. Improving the understanding of the wider social context for flooding and coastal erosion and the impact on flood risk management and recovery
6. Improving the effectiveness of strategic planning in the delivery of FCERM solutions
7. Improving the delivery of natural flood management solutions

Policy Strategy and Investment Theme Objectives			
Priority theme	Objective	Approach	LWEC Priority
Enabling our partners	1. Improve the management of flood risk from surface water and groundwater	<ul style="list-style-type: none"> We improve our ability to identify and reduce groundwater and surface water flood risks by building knowledge of risks, interventions, benefits and management approaches We enhance understanding of effective integrated planning to achieve sustainable development in flood risk areas 	UR5, UR7, UR11
Ensure value for money	2. Improve our understanding of the economics of flood and coastal erosion risk management 3. Improve understanding of long term risk and investment need	<ul style="list-style-type: none"> We broaden and deepen the evidence base for economic damages caused by flooding, and the benefits of mitigation We develop tools, data and capability to conduct efficient and evidence based appraisals of flood risk investment We develop our understanding of the linkages between flood risk, investment and economic growth We provide concepts, evidence and tools to enable assessment of future changes in risk from all sources, and to establish appropriate long term investment levels We progress towards improved evidence on the optimal allocation between different FCRM activities and interventions to support the best use of public and other funding sources 	UR14, UR16
Increase resilience	4. Improve the evidence base to enable households to be more financially resilient	<ul style="list-style-type: none"> We enhance the evidence base on the cost, take-up and effectiveness of insurance provision in flood risk areas 	UR18, MC14
	5. Improve the understanding of the wider social context for flooding and coastal erosion and the impact on flood risk management and recovery	<ul style="list-style-type: none"> We understand where and how social research can improve flood risk management delivery We improve the evidence base for the health and social impacts of flooding We enhance our knowledge of behaviours relating to flooding and how to embed that knowledge in flood risk management approaches We develop our understanding and evidence base about effective interventions and approaches that support resilience, flood risk management and recovery 	MC1, MC2, MC3, MC14, MC16
Achieve multiple benefits	6. Improve the effectiveness of strategic planning in the delivery of FCERM solutions	<ul style="list-style-type: none"> We develop tools, data and capability required to support the delivery of partnership -funded multi-benefit, integrated flood risk interventions We understand and improve our ability to produce effective flood risk strategies We understand what is needed to ensure our strategies effectively embed the adaptations required to address climate change impacts 	MP4, MP16, UR2, UR12
	7. Improve the delivery of natural flood management solutions	<ul style="list-style-type: none"> We progress towards taking action to manage fluvial and coastal flood erosion risk by protecting, restoring and emulating the natural regulating function of catchments, rivers, floodplains and coasts We improve the capability to identify, appraise, design and implement interventions that work with natural processes to reduce flood risk 	MP11, MP12, MP13, MP14, MP15, MP16

3.2 Incident Management and Modelling (IMM)



Our Vision: “to deliver the evidence to support communities and partners prepare, respond and recover from flooding and coastal erosion; thereby helping save lives and livelihoods”

Rationale – working together to save lives and livelihoods

In England and Wales, over 5.5 million (or 1 in 6) homes are at risk of flooding. Of these, 2.5 million are at risk from rivers or the sea, with 500,000 at significant risk. We invest a lot of resource in flood prevention and management schemes, but we can never prevent all flooding. Flood incident management (FIM) is crucial in reducing the impacts and consequences of flooding when it does occur (Environment Agency FIM Plan 2015-2020).

Incident Management and Flood Modelling fundamentally underpin all FCRM activities. The Environment Agency FIM Plan (2015-2020) sets out its ambition for the service over the next five years. It is in turn based on the foundations outlined within the EA Mapping¹⁰, Modelling¹¹ and Data¹² Strategies.

The FIM Plan priority areas are:

1. People are aware of their risk and the impact it will have
2. We have robust plans in place to trigger actions when a flood occurs
3. People are warned in good time to take action before flooding
4. People and responders are kept informed throughout flooding
5. We respond effectively and help people who have flooded to recover more quickly
6. We provide an efficient and professional flood incident service

The IMM theme has a key role to play in equipping us with the evidence, practical research and new capabilities to meet future challenges and enable us to benefit from scientific advancements.

To achieve this, the IMM theme covers a broad range of topic areas including:

- Data, methods and models for hazard, vulnerability, impact and wider risk assessments (including longer term)
- Observations and detection
- Hydro-meteorology
- Hydrological and hydraulic modelling and forecasting
- Warning and Informing
- Emergency planning and incident management

¹⁰ Mapping Strategy <https://www.gov.uk/government/publications/flood-and-coastal-risk-management-risk-mapping-strategy-2010-to-2015>

¹¹ Modelling Strategy <https://www.gov.uk/government/publications/flood-and-coastal-risk-management-modelling-strategy-2010-to-2015>

¹² Data Strategy <https://www.gov.uk/government/publications/flood-and-coastal-risk-management-data-strategy-2010-to-2015>

- Uncertainty and decision making
- Capitalising on technology and innovation

Aim

The IMM theme aims to improve the way incident management and modelling practitioners, partners and communities prepare, respond and recover from flooding in good time; ultimately helping to save lives and livelihoods. This is achieved by working in partnership and conducting R&D that is practical and user-driven.

Objectives

Our objectives are to:

1. Enable more proportionate and accurate 'impact-based' and probabilistic forecasts and warnings to support earlier, more tailored and more effective preparations and responses by the emergency responders, communities and those at risk.
2. Provide more accurate and user focussed national and long term assessments of overall flood risk from multiple hazards/processes and joint or subsequent events and their impacts.
3. Work towards more integrated and seamless flood forecasting and modelling capabilities spanning from 'end-to-end' (cloud to coast).
4. Exploit emerging opportunities from 'big data', technology and innovation to deliver more user focused, effective and efficient forecasting and modelling services and risk assessments.
5. Deliver our research in a way that is useful for the needs of different user groups supporting evidence based incident management, emergency planning and FCRM decision making more widely.
6. Improve the communication and use of science in incident management and our understanding of how people behave and respond during flood events.

Incident Management and Modelling Theme Objectives			
Priority theme	Objective	Approach	LWEC Priority
Assessing overall flood risk	1. Provide more accurate and user focussed national and long term assessments of overall flood risk from multiple hazards/processes and joint or subsequent events and their impacts	<ul style="list-style-type: none"> We develop tools, data and capabilities for assessing overall flood risk (from multiple sources) in a practical way We develop concepts, evidence and tools to enable an improved assessment of joint or sequential flood events and their impacts now and in future We improve our understanding of the current risk baseline to enable more robust assessments of future risks, the effectiveness of interventions for long term planning, investment and adaptation We develop our understanding of the linkages between different hazards and how they might cause compound or linked impacts 	UR1, UR2, UR4, UR5, UR6, UR7, UR8, UR11, MC7, MC8
Focusing on impacts and responses	2. Enable more proportionate and accurate 'impact-based' and probabilistic forecasts and warnings to support earlier, more tailored and more effective preparations and responses by the emergency responders, communities and those at risk	<ul style="list-style-type: none"> We improve our ability to assess and predict the range impacts of flooding We build on improvements in weather, hazard modelling and forecasting to enable earlier and more accurate forecasts and warnings We enhance our understanding of how to use such information to enable more tailored and effective preparations 	UR1, UR3, UR4, MC5, MC6, MC8
Integrating capabilities	3. Work towards more integrated and seamless flood forecasting and modelling capabilities spanning from 'end-to-end' (cloud to coast)	<ul style="list-style-type: none"> Working with key partners we explore opportunities for more integrated and seamless modelling and forecasting approaches We improve our understanding the benefits, limitations, data and modelling needs of such approaches Working with leading academics, we seed and support multi disciplinary research in this area 	UR1, UR2, MC5, MC6, MC7, MC8
Fostering Innovation	4. Exploit emerging opportunities from 'big data', technology and innovation to deliver more user focused, effective and efficient forecasting and modelling services and risk assessments	<ul style="list-style-type: none"> We capitalise on innovative approaches by exploring and trialling promising opportunities from 'big data', technology, crowd and cloud based approaches for incident management and modelling We place a clear focus on approaches which have the potential to lead to more user focussed, effective and efficient outcomes 	UR8, MC9, MC10
Focusing on People and behaviours	5. Improve the communication and use of science in incident management and our understanding of how people behave and respond during flood events	<ul style="list-style-type: none"> We ensure our research is communicated well, to the right audiences at the right time We place a clear focus on people, their behaviours and how they respond 	UR1, MC1, MC2, MC10, MC11, MC12
Practical and user driven	6. Deliver our research in a way that useable by and useful for the needs of different user groups supporting evidence based incident management, emergency planning and FCRM decision making more widely	<ul style="list-style-type: none"> We place users and their needs at the centre of our research We provide a clear line sight from how our work aligns and supports the outcomes in FCRM We demonstrate how our research can be used and has value for evidence based emergency planning and 'real world' decision making during incidents 	Cross cutting

3.3 Asset Management



Award winning Banbury Flood Alleviation Scheme

Our Vision: *“to deliver and strengthen the evidence needed to improve asset management practice and reduce flood and erosion risk”*

Rationale – using research to improve asset management practice

The UK avoids billions of pounds of direct flood damages to property annually, and a much greater value of in-direct damages because of our existing flood defence and erosion protection infrastructure. This sunk investment in this infrastructure is estimated at £37bn. Investment in enhancing, maintaining and replacing this infrastructure will also be counted in the billions given the pressures of climate and socio-economic change into the future.

The range of assets which contribute to the management of flood and erosion risks are diverse, and span both ‘built assets’, for example embankments, flood storage reservoirs, pumping stations, barriers, and ‘naturally occurring assets’, for example dunes, salt marshes and river channels. The management of these assets must account for the risk and opportunities which present themselves across social, environmental and economic dimensions as well as over varying temporal and spatial scales.

FCERM infrastructure is an expensive and complex system and involves making difficult decisions often with limited information whilst trying to balance conflicting objectives. Research to help develop the evidence to make asset management tractable, and to ensure our decisions are justified is essential.

Aims

To provide all FCERM authorities with evidence that helps them to:

1. Ensure that flood and erosion risk management assets remain appropriate for the changing conditions in which they must perform
2. Minimise loss of life due to flood and coastal erosion and provide best value over the service life of flood and coastal erosion risk management assets
3. Ensure their assets perform optimally, both under normal service conditions, and resiliently and predictably under extreme storm or flood events and event sequences
4. Drive increasing efficiency in investment by improving the whole life-cycle management of assets, reducing costs and maximising the benefits
5. Work with natural processes to achieve the most sustainable solution which maximises outcomes for society, the economy and the environment

Objectives

We will deliver tools, methods and guidance to ensure we know how:

- to deliver FCERM assets that are resilient and adaptable to future change
- our FCERM assets reduce risk and perform through time

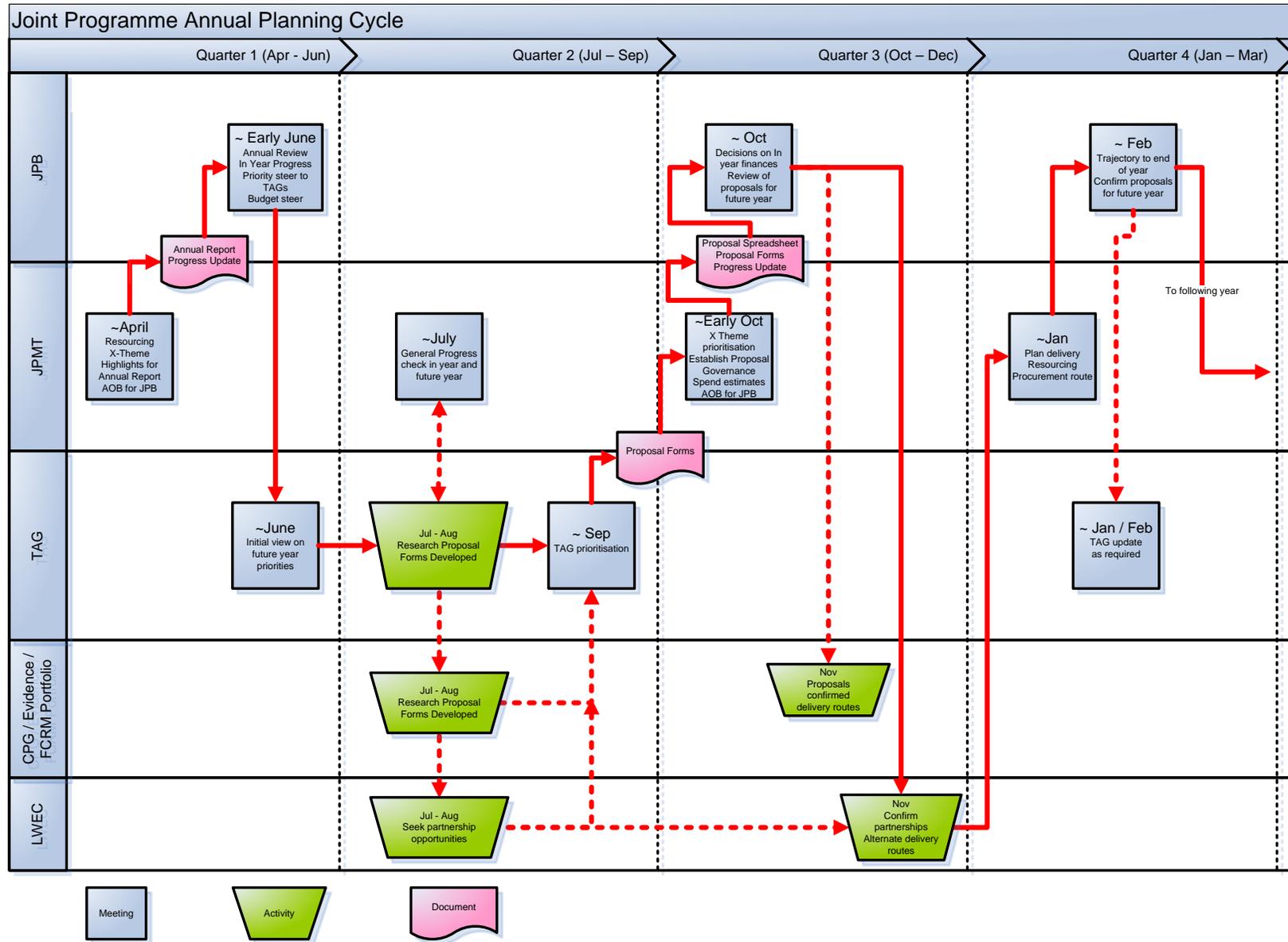
- we can manage our assets as efficiently as possible over the whole asset life cycle
- to deliver a wide range of benefits through the delivery and management of our assets

We will prioritise research and development for England and Wales to improve asset management practice in the following systems:

- Coastal
- Tidal and fluvial (recognising the channel, both natural and artificial, and the floodplain are assets)
- Reservoirs
- Drainage (particularly sustainable urban drainage)
- Low lying and low stream power (typically pumped systems)
- Critical infrastructure

Asset Management Theme Objectives			
Priority Theme	Objectives	Approach	LWEC Priority
System assessment and design	1. Improve the resilience and adaptability of FCERM assets to future change	<ul style="list-style-type: none"> We utilise the best available science to understand the risks and opportunities that future changes pose to our asset and asset management practices We develop methods, tools and guidance that can be used to improve resilience and adaptability to future changes and associated uncertainty We will synthesise research and good practice into guidance which encourages resilient and adaptable approaches 	MP1, MP2, MP9
	2. Move toward risk-based techniques and tools for the design, construction and management of assets	<ul style="list-style-type: none"> We develop a tiered range of practical and proportional tools that allow the management of risk We deliver research which enables future assets to increasingly be designed and managed within a probabilistic framework We work in partnership to ensure that the latest research on risk-based methods are brought in to the Joint Programme 	MC4, MP, 5, MP6, MP7, MC8, MP9, UR1, UR2
Whole life asset management	3. Advance understanding of FCERM asset performance under load and through time	<ul style="list-style-type: none"> We will develop new models to describe and predict how assets perform and deteriorate We will capitalise on advances in remote sensing and monitoring to develop new methods to visually inspect, investigate and test assets in order to identify key performance features We will develop monitoring techniques which can be deployed efficiently to derive time series of asset performance We will develop methods and tools to aid the identification of the optimal point of intervention 	MP1, MP2, MP9, UR1, UR2, UR4
	4. Enhance the efficiency of asset management by identifying novel approaches to reducing whole life costs and maximise benefits	<ul style="list-style-type: none"> We will work with others to research and pilot approaches to asset design, construction and maintenance We will deliver research that explores opportunities for working materials new to FCERM asset management and novel techniques We will explore new research and best practice for delivering asset management by working increasing with natural processes We will develop guidance which helps asset managers maximise opportunities and minimise costs associated with delivery of FCERM within the framework of Water Framework Directive (WFD), Habitats Directive and other legislation 	MP7, MP8, MP9, MP10, UR13
Environment and Sustainable	5. Contribute to sustainable communities and businesses (both urban and rural)	<ul style="list-style-type: none"> The methods, tools and guidance we develop to support asset management will put the needs of the communities and the environment which they serve at their heart We will work collaboratively and forge new partnerships between regulators, service providers, businesses and communities to deliver better asset management together The ecosystem services which can be delivered and enhanced through improved asset management will be quantified and communicated effectively 	MP11, MP12, MP13, MP14, MP15, MP16
Focussing on People and behaviours	6. Identify and embed research outputs by working with RMAs other partners and communities	<ul style="list-style-type: none"> We will seek to benchmark our research output against international practice We will regularly review our existing guidance by refreshing it with practitioner feedback and good practice We will respond to new research needs identified by legislation, lessons learnt and flood events We will work with communities to ensure R&D outputs are embedded 	MP3, UR18

Appendix A: Programme Planning Cycle



Appendix B: Roles and Responsibilities

Joint Programme Board Members

The JPB contains senior level sponsors of the programme providing investment decisions and endorsement of the rationale and objectives of the programme. Members will lead by example and demonstrate commitment and direct involvement in endorsing the Joint Programme. The Group includes the Programme Executives and is responsible for:

- Deciding on the overall direction and future coverage of the Joint Programme
- Reviewing and approving the annual programme of research carried out within the Joint Programme
- Championing Joint Programme research and the implementation of its project outputs and outcomes within and beyond their organisations
- Reviewing the effectiveness of the Joint Programme, its themes, outcomes and benefits
- Ensuring management processes are in place to deliver the Joint Programme effectively
- Providing and maintaining links with other programmes relevant to flood risk management and support the Programme Managers in developing beneficial links with appropriate external organisations

Joint Programme Manager(s)

Under direction of the JPB the Joint Programme Managers are responsible for:

- Delivery of new capabilities from the Joint Programme and maintaining overall coherence and integrity of the programme
- Effective co-ordination of projects and their interdependencies within the Project Portfolio, and management of programme level risks and issues that arise
- Establishing a programme approach to benefits management, to include a framework for defining benefits, assessing progress towards realisation, transition and implementation of new capabilities and achieving measured improvements
- Reporting across the Joint Programme, to include highlights, progress and exception reporting against objectives
- Establishing and maintaining links with research programmes both internal and external to the programme (on a National, European and International level)

Joint Programme Theme Managers

Under the direction of the Joint Programme Managers, Theme Managers are responsible for:

- Developing the strategic direction for the thematic area (with support from the Theme Champions and the TAGs)
- Understanding customer requirements for research and scientific gap analysis to inform the development of robust, customer driven research proposals
- Maintaining links with customers to facilitate effective implementation of evidence and/or new capabilities into FCRM
- Steering the development of projects (and wider staff capabilities) included in the Portfolio
- Contributing to programme reporting and benefits management, for example, in the review and impact evaluation of research outcomes
- Represent the thematic research area in collaborative research programmes/projects, as required

Joint Programme Theme Champions

Theme Champions have a key role representing the end-users of research and are drawn from the FCRM directorate within the Environment Agency and Defra. The role undertakes to:

- Develop Theme Visions and Rationale and Objective Statements with the Theme Manager and TAG members
- Chair the TAG, providing specialist support and understanding of customer requirements in developing its strategic direction and research requirements
- Support the development of robust, customer driven research proposals on an annual basis
- Champion the theme programme within FCRM to support effective delivery and implementation of scientific capabilities as appropriate
- Contribute to programme reporting and benefits management (via Theme Managers), for example, in the review and impact evaluation of research outcomes
- Review project outputs as required, including peer review, where appropriate
- Assess and liaise with external projects and programmes as requested

Theme Advisory Groups / Cross-cutting area group members

Members of TAGs have been selected on the basis of their ability to contribute to the development of the programme by bringing appropriate personal knowledge and expertise. Members should be aware of the latest research and/or operational developments within their field and the potential for research and development to contribute to improvements in knowledge. Members of the group are tasked with providing an independent viewpoint from either a researcher or user perspective. Principal roles include:

- Advising on customer needs and scientific gaps to help scope the strategic direction of the theme (to include horizon scanning).
- Highlighting emerging research and development priorities from an internal and external viewpoint and champion uptake of outcomes.
- Providing support on the development of annual research proposals. To include a robust peer review and indication of thematic priorities.
- As required, provide peer review of specific projects (on a paid basis as agreed by Theme Managers).

Project Board / Project Steering Groups

As well as Theme Managers responsible for the overall direction of the theme's work-plan, each individual research project will have a project manager who will be involved in the project from conception to post project evaluation. Clear project level governance will ensure research and development work is steered by the FCRM customer and appropriate preparations for implementation put in place. Specific roles include:

- **Project Executives:** They are responsible for the delivery of project outputs to time, quality and cost. They chair project board and steering group meetings; they assist the Project Manager to define scope and liaise with contractors and users. They should be the initial contact for document approvals and dispute resolution. Project Executives are the owners of project outputs and are usually responsible for ensuring that deliverables are adopted into practice, often in combination with outputs from other projects.
- **Lead Users:** They are the representatives of the key end users of the project outputs. They have an important role in defining the problem and ensuring that project outputs are fit for purpose and can be readily adopted within their business area.