Conceptual framework Mitigating Risk
“Concepts are the things that Geographers use to help them think about the world and communicate their ideas.” Margret Roberts.

Why take a conceptual approach to fieldwork?

A fieldwork task can be very simple. The student is given a set of instructions. They collect data and draw the graphs. However, this does not help them to gain a better understanding of the geography. Nor does it allow them to apply what they have learned to a new situation – something they need to do if they are to demonstrate progress.

A quality fieldwork enquiry will allow the learner to explore patterns and trends in data – applying their understanding of broad geographical concepts to try to make sense of what they have seen. The process should enable them to can pull together (or synthesise) this new information in order to reach overall conclusions. In doing this, their understanding of the geographical concept that underpins the investigation is enriched.

WJEC Eduqas takes a conceptual approach to fieldwork. Rather than setting closed tasks, we urge teachers to involve their students in the whole enquiry process. This means deciding on a suitable context for your fieldwork (for example, urban or coastal) and then engaging students with the concept from an early stage so that they can see the purpose of their fieldwork enquiry.

Understanding the concept

All human and physical environments pose risk for living things, including the human population. In the physical environment people may be at risk of erosion or flooding from coastal or river processes. In the human environment people may be at risk from traffic accidents or the impact of crime. The concept of risk mitigation is about how these risks may be managed and their impact reduced. Fieldwork can be used to investigate the nature of risk; human perception of risk; or an evaluation of management strategies or future actions.

Risk can be seen as a function of two other factors:

- A hazard which is an event with the potential to cause harm or disruption.
- Vulnerability which is the susceptibility of the individuals, community or population to come to harm or damage. Vulnerability can be broken down into three areas:
  - Exposure: this relates to how hazard events interact with the human population. So, for example, poorer people may only be able to afford to live near a river and therefore are more likely to be more exposed to the hazard.
  - Resistance: Once a hazard hits a population how much damage does it do? If a business put in place flood resistance barriers and flooring, they will be more resistance than a business that hasn't.
  - Adaptive Capacity: The person, business or population's ability to deal with and bounce back from adversity. For example, if a person has an insurance policy which provides funds to rebuild their house, they have a better adaptive capacity than someone who does not.
Risk is varied even within a limited geographical area or population. For example, when a major storm hits an urban area it is more likely that the poor will be at higher risk as they are more vulnerable than the wealthy due to factors such as poor housing quality, lack of insurance and limited geographical mobility. Mitigating risk is how the adverse effects can be reduced. In the past this has focused on hazard management, but increasingly it focuses on reducing vulnerability.

Individuals, organisation and governments must make decisions about the way they perceive, interpret, balance and mitigate risk. Factors which might increase risk and vulnerability include: proximity to hazard hotspots (such as a river flood plain or low elevation coastal zone); overcrowding and high housing densities; remote populations; poor transport and communication; poor economic performance; or poor access to medical care. Factors that might decrease risk and vulnerability include: mapping of hazard zones; creation of early warning systems; planning evacuations; changing people’s behaviour; training search and rescue teams; improving transport systems, infrastructure and education.

Example Links to Methodologies:

Use of Transects
Transects could be used to determine the land-use and height above high tide /river datum at a distance from a coast or river. Transects could also be used to investigate the noise at increasing distance from a major road / quarry. Questionnaires or Likert surveys about hazard perception could be conducted at systematic distances along transect lines.

Change Over Time
Investigations could relate to how the hazard has changed over time, perhaps in terms of how the management of a river has affected its flood levels or frequency. Investigations of this sort are likely to include peoples' perceptions, secondary data from past events, climate or pre-management strategies. Assessments of the effectiveness of management interventions would be another area that could be investigated.

Qualitative Surveys
Questionnaires could be used to determine peoples’ perceptions about a recent hazard event (such as a flood or violent storm), or a potential event. Questions could relate to how the media handled the event and how that might impact on peoples’ perception of the hazard and therefore their behaviour. Questions could also relate to the local council’s planning strategies perhaps investigating a particular building strategy on the flood plain or coastal defence strategy and how people think it might affect certain sections of the population. There are a couple of ways to analyse open responses to questionnaires, the first is to tally the number of times a particular theme was mentioned by people. The second way is to tally how many people or proportion of people interviewed provided a particular response.

Geographical Flows
Water flows, such as infiltration or discharge, could be investigated when linked to the risk posed by river flooding. Flows of sediment along a coastline could be analysed in order to investigate the risk of coastal erosion. Flows of media information, such as after a storm or flood event, could be analysed and the impact this might have on people after a hazard event could be investigated. Flows of vehicles could be measured to investigate risk to either road users (including cyclists) or pedestrians. Variations in traffic flow during the day could be recorded to select the safest route to school from a choice of potential routes or to identify the distribution of road hazards for drivers and identifying potential accident black-spots.

*Field Studies Council* The leading provider of geography fieldwork, has contributed towards the guidance in this document.

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Context Specific Examples:

1 Land Use: Impacts on Flood Risk
In this investigation students could investigate the extent to which flood risk might increase with different land uses or in different areas. This would include how the land use would change the infiltration rates as well as how the different land uses might impact on different groupings of people vulnerability and exposure to the hazard.

Primary fieldwork and secondary data methods might include:

- Measuring flows such as infiltration in areas with different land use.
- Surveying the land use. This could be mapped across the potential flood plain, by dividing up the land into 50m x50m squares and recording the dominant land use in each square. It would also be possible to use a transect perpendicular from the river / coast and determine the dominant land use along equal intervals. Land use vulnerability could also be recorded, perhaps by estimating the potential economic value or height above the spring high tide mark or river datum or land height.
- Questionnaires could be used to determine different groups of people’s perceptions of the risk involved in living and working in a flood risk area. Their perceptions and concerns could also be investigated in relation to the potential management of an event.
- Mapping of the transport infrastructure might provide some information on the types of people that might become more vulnerable to a flood event, this could be combined with secondary census data on the number of car owners to assess the exposure of certain sections of the population. This might provide an insight into the flows of people after a flooding event and might be linked to people’s perception of the degree of risk in the area.
- Movements of people before, during and after a flood event. These might be estimated from newspaper reports, government documents or FaceBook comments/tweets.

2 Environmental risk posed by a wind farm / intensive farm / tourist attraction / quarry
In this investigation, students could focus on the risk of environmental, economic and social damage to the surrounding area of any such development and/or how these risks could be managed or reduced. The wind farm or solar farm, chicken/dairy farm, tourist attraction (honeypot site) or quarry could be in existence or proposed.

Primary and secondary data might include:

- **Using a transect** to determine noise / traffic flows / visual pollution at increasing distance from the area that is at risk due to the development.
- **Landscape and visual impact survey.** This could be completed from a selection of places observing the area of risk, for example from key residential areas or high ground. Or it might be conducted across the landscape directly in contact with the risk area. It might include aspects such as view quality, heritage, local character. Photographs, perhaps taken from varying distances or different viewpoints, could be taken to determine the visual impact of the feature within the broader landscape.
- **Environmental Quality** can be assessed using Environmental Quality Indices or bi-polar scores. Data can be collected in urban or rural areas about the general landscape and upkeep of the area.

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Students could combine this with photos that they take of the worst and the best images in each category.

- There might be impacts on the public access and recreational areas surrounding the risk area which could be surveyed using an audit, with a weighting to measure subjectively how affected each aspect might be. Use of belt transects (using quadrats) to assess abundance of plants and the risk to vegetation of tourist use through trampling. This could be combined with secondary internet research on the location of nature reserves or sites of special scientific interest.

- Economic aspects could be considered, for example, are there any businesses that might have to reduce opening hours during the construction phase or would an opportunity for an increase in revenue happen after the construction. Interviews with key business owners might be a method of collecting this information.

- Construction plans, media reports and interviews with key stakeholders would provide a range of information on the different perceptions of risk to the local population and how long this risk might endure for.

- **Attitude Survey**: collects people's attitudes about controversial issues, for example what they feel about the development of wind farms as a method of reducing carbon emissions and tackling climate change. This could be done using a Likert Scale, which assesses the strength and direction of someone's opinion of a series of statements.

- **Photographic evidence**: photos could be taken of environments that are due to change due to an environmental hazard. Students can annotate the photos, or it may be possible to use the photographs as stimulus within a bi-polar or attitude survey, or possibly linking with an extended interview / focus group.

### 3 Investigating risk (and its mitigation) in an urban environment

In an urban area your fieldwork enquiry could focus on:

- identifying potential risks for pedestrians in the city centre and recommending ways of reducing these risks.
- plotting the distribution of road hazards for drivers and identifying potential accident black-spots.
- selecting the safest route to school from a choice of potential routes
- mapping the measures that have been introduced to reduce the risk of crime (e.g. CCTV cameras and neighbourhood watch schemes). Are these related to another variable such as areas which have higher house prices?

Primary and secondary data might include:

**Visual mapping** can be used by students or as an interview technique with local residents. Participants should be encouraged to represent the things they find important about the place in a map. When these maps are analysed they can provide information about what is important to people about a place. For example asking people to draw a visual map of place paying particular attention to the things that have changed in the last few years might help determine how places and perceptions of places change over time. If students are going to become participants then they will need time to walk around the place during fieldwork before being asked to draw their own map.

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Green mapping can be used to investigate the green spaces within an area such as public parks, recreational areas, churchyards, river banks and canals. Green mapping encourages students to think about the positive and negative environmental and community-based value of their local area, as well as potential environmental hazards. www.greenmap.org

Crime perception surveys can be conducted using questionnaires, Likert Surveys or indices. Indices could be constructed, similar to an Environmental Quality Index (EQI) that record observations of items such as burglar alarms, CCTV cameras, anti-climb paint or Neighbourhood Watch Schemes crime in different study areas. This primary data could be combined with secondary crime data into an index for each output area.

Environmental Quality can be assessed using Environmental Quality Indices or bi-polar scores. Data can be collected in urban or rural areas about the general landscape and upkeep of the area. Students could combine this with photos that they take of the worst and the best images in each category.