



Rewarding Learning

ADVANCED
General Certificate of Education
2018

Geography

Assessment Unit A2 3
assessing
Decision Making in Geography

[AGG31]

THURSDAY 14 JUNE, AFTERNOON

MARK SCHEME

General Marking Instructions

Introduction

The main purpose of the mark scheme is to ensure that examinations are marked accurately, consistently and fairly. The mark scheme provides examiners with an indication of the nature and range of candidates' responses likely to be worthy of credit. It also sets out the criteria which they should apply in allocating marks to candidates' responses.

Assessment objectives

Below are the assessment objectives for GCE Geography.

Candidates should be able to:

- AO1:** Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change at a variety of scales.
- AO2:** Apply knowledge and understanding in different contexts to analyse, interpret and evaluate key concepts, information and issues.
- AO3:** Use a variety of relevant methods, and techniques to:
- investigate geographical questions and issues;
 - analyse, interpret and evaluate data and resources; and
 - construct arguments and draw conclusions.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 17- or 18-year-old which is the age at which the majority of candidates sit their GCE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 17- or 18-year-old GCE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Marking calculations

In marking answers involving calculations, examiners should apply the 'own figure rule' so that candidates are not penalised more than once for a computational error. To avoid a candidate being penalised, marks can be awarded where correct conclusions or inferences are made from their incorrect calculations.

Types of mark schemes

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

Levels of response

In deciding which level of response to award, examiners should look for the 'best fit' bearing in mind that weakness in one area may be compensated for by strength in another. In deciding which mark within a particular level to award to any response, examiners are expected to use their professional judgement.

The following guidance is provided to assist examiners.

- **Threshold performance:** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.
- **Intermediate performance:** Response which clearly merits inclusion in the level and should be awarded a mark at or near the middle of the range.
- **High performance:** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

Quality of written communication

Quality of written communication is taken into account in assessing candidates' responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of levels of response. The description for each level of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within levels of response as follows:

Level 1: Quality of written communication is basic.

Level 2: Quality of written communication is good.

Level 3: Quality of written communication is excellent.

In interpreting these level descriptions, examiners should refer to the more detailed guidance provided below:

Level 1 (Basic): The candidate makes only a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Level 2 (Good): The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning clear.

Level 3 (Excellent): The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a sufficiently high standard to make meaning clear.

General Descriptions for Marking Criteria

Knowledge and Understanding	Skills	Quality of Written Communication	Level
The candidate will show a wide-ranging and accurate knowledge and a clear understanding of the concepts/ideas relevant to the question. All or most of the knowledge and understanding that can be expected is given.	The candidate will display a high level of ability through insightful analysis and interpretation of the resource material with little or no gaps, errors or misapprehensions. All that is significant is extracted from the resource material.	Quality of written communication is excellent. The candidate will express complex subject matter using an appropriate form and style of writing. Material included in the answers will be relevant and clearly organised. It will involve the use of specialist vocabulary and be written legibly and with few, if any, errors in spelling, punctuation and grammar.	3
The candidate will display an accurate to good knowledge and understanding of many of the relevant concepts/ideas. Much of the body of knowledge that can be expected is given.	The candidate will display evidence of the ability to analyse and interpret the resource material but gaps, errors or misapprehensions may be in evidence.	Quality of written communication is good. The candidate will express ideas using an appropriate form and style of writing. Material included will be relevant and organised but arguments may stray from the main point. Some specialist terms will be used and there may be occasional errors in spelling, punctuation and grammar. Legibility is satisfactory.	2
The candidate will display some accurate knowledge and understanding but alongside errors and significant gaps. The relevance of the information to the question may be tenuous.	The candidate will be able to show only limited ability to analyse and interpret the resource material and gaps, errors or misapprehensions may be clearly evidenced.	Quality of written communication is basic. The candidate will have a form and style of writing which is not fluent. Only relatively simple ideas can be dealt with competently. Material included may have dubious relevance. There will be noticeable errors in spelling, punctuation and grammar. Writing may be illegible in places.	1

Introduction: some guiding principles

The ideas outlined in the 'Guidance on Content' section are lines of thought that candidates might take in their report. They are not to be seen as the definitive answer, though it is to be expected that the points outlined below will feature, if only in part, in most answers.

When allocating marks look favourably on answers which:

- (a) avoid undue verbatim quoting from Resource Booklet and adopt a consistent style.
- (b) use the full range of the resource material appropriate to the task – particularly where it is provided in non-literary format such as printed maps and photographs.
- (c) apply knowledge and concepts that are not specifically raised in the resource material, yet are both illuminating and relevant to the task.
- (d) maximise opportunities presented by the resource material.
- (e) appreciate that "bias" might exist in resource material which expresses particular views.
- (f) avoid undue repetition of the same answer material in different sections or, if overlap is unavoidable, present it in a fresh way.
- (g) back up points with specific detail, e.g. giving statistical information where it is provided rather than making vague statements when details are readily available.

AVAILABLE
MARKS

Guidance on content

AVAILABLE
MARKS**A Introduction**

Briefly describe the proposed project and discuss the need for it.

The proposal is for an Atlantic salmon farm in Galway Bay in the west of Ireland. Termed the “Deep Sea Salmon project”, it comprises two sites in the bay, 5 kilometres apart, each of which has 3 sets of 12 salmon enclosures. It is proposed to be located north of Inisheer, one of the Aran Islands, so that it has some shelter from the open Atlantic Ocean. At 456 hectares, this will be the largest salmon farm in Ireland. It will take 3.6 million young salmon each year.

Island communities have a unique culture, but they are relatively isolated and this has led to high levels of deprivation. The coastal area has high unemployment, with Connemara having unemployment of 22% when the rest of the country had just 9%. The population of the whole Aran Islands is small, and people are leaving. There are 1200, in all three islands, and Inisheer has just 249 people. The experience of Clare Island, with a population of 150, seems to have benefitted from a fish farm which has provided 11 jobs on the island and this has been enough to keep the primary school open. This project promises jobs and should safeguard the population of Inisheer. The hope is to make €1 billion in seafood sales, and help the economy of the whole of the country but also the small island communities, such as Inisheer.

If either need or description omitted entirely, maximum [5].

Level 3 ([8]–[10])

The candidate clearly, although briefly, describes the project and discusses the need for it. Both are considered fully. Precise figures and facts will be used where possible, particularly from the maps and diagrams. Quality of written communication is excellent.

Level 2 ([4]–[7])

The candidate makes fewer clear and correct points. There is little or no development of any point, but points made are valid. There may be a major imbalance between the description of the project and need for it, or there may be a lack of detail. Quality of written communication is good.

Level 1 ([1]–[3])

The candidate presents content much of which is irrelevant to the need for the development or the description of it. Some of the points made may lack validity. There may be excessive verbatim use of resources. Quality of written communication may be poor. [10]

B The likely impact on:

- (i) Employment and the economy (Discuss the possible beneficial effects of the proposed development on employment and the economy and the counterarguments)**

This part of Ireland has high unemployment rates. For example, the coastal areas of Connemara have had unemployment of 22%, compared to just 9% across the whole of Ireland. In consequence, few people move there and, in some places, there is net out-migration. The island communities are particularly badly hit, with Inisheer having just 249 people. It is believed that, were the population of any island to fall below 120, then it is likely to be unsustainable, and the island would be abandoned. This is the context in which this new opportunity for the area must be set.

The proposed salmon farm is on a much larger scale than any of the other aquaculture operations in Ireland. It is anticipated that 15 000 tonnes of salmon will be produced each year, which will more than double the amount of farmed salmon currently being produced. As aquaculture provided jobs for 1716 people in 2016, doubling production of salmon has the potential of creating considerable employment. When the salmon farm reaches full production, there will be full-time jobs for 350 people in the farm, rearing the young salmon and in processing and packaging. There will be an additional 150 indirect jobs in supplying fish feed, for example, or in other services. 500 jobs would be an important addition to any area, but in the context of the high unemployment rates in this part of Ireland, this is particularly significant. The wages paid to these workers is estimated to be around €14.5 million annually and this will help to maintain other local businesses, creating further employment. Much of the workforce is expected to be resident in Inisheer, helping to sustain this island community. Donal Maguire of BIM has explained it clearly when he pleaded that "We badly, badly need the jobs and exports".

A further boost might be anticipated in tourism, as has been demonstrated by oyster farmers in Brittany, France. As the salmon farm is some distance from the shore (Resource 1A), it will only be visible from Inisheer, or from ferries to the Aran Islands. It will also not interfere with current marine leisure activity as the farm site has been carefully chosen to avoid areas used in that way. As the project is organic and sustainable, it is believed that it will encourage tourism. Visitors will be able to view information panels at viewpoints close to the aquaculture developments. In addition, there will be efforts made to allow tourists to consume or to buy this organic salmon in local outlets. This is likely to create and maintain further employment.

This development will impact considerably on the economy as well. The global demand for seafood continues to rise with increases in world population. In 2016, for the first time, more fish was farmed than beef. 70% of the fish consumed in Ireland is imported, and the rest of the EU also imports fish. Much of this is from farmed fish and, as there can be no increase in the amount of wild stocks fished each year, any increase is likely to come from aquaculture. There are estimates of 180 million tonnes farmed across the world by 2030, and there is an opportunity for Irish aquaculture to get a slice of this lucrative market. Bord Iascaigh Mhara, the Irish Sea Fisheries Board, want to increase exports of seafood by €650 million each year and to generate €1 billion in seafood sales. This proposed project would be a part of this ambition. As Bord Iascaigh Mhara have estimated the "value of the export market in 2015 at €64 million", a sum which would contribute considerably to the wider economy.

Counter

While the proposed development may bring some employment to this area, it is likely to threaten some existing jobs, as it threatens the viability of river fishing. Inland Fisheries Ireland is strongly opposed to the proposed development because of the potential impact on wild salmon and sea trout stocks, which are key to this economically important pastime. Fishing in the rivers of Connemara, especially for wild salmon, attracts large numbers each year. In 2012, there were 406 000 anglers in Ireland with 150 000 visitors to the country. It is said that anglers contribute €750 million to the economy of Ireland each year. The activity also supports 10 000 jobs in the countryside, which dwarfs the employment from the fish farm. The proposed salmon farm threatens the wild salmon stocks, through escapees which are genetically different from the wild stocks, reducing the chances of their survival in their

home rivers. Sea lice also weakens the salmon and it may be that it is these factors, resulting from salmon farms which has reduced sea trout catches (Resource 6) after 1988. The Corrib river, the largest in the region, has only 15000 adult salmon returning to spawn every year, and the next biggest, the Cashla, has less than 1000 salmon returning each year. This threatens the future of this lucrative industry and the jobs which depend on it.

In any case the claims that there will be 500 local jobs is not credible as aquaculture is increasingly becoming mechanised. The enormous feed barges (Resource 2B) reduce the number of people required to feed the salmon, for example. In fact, it might be that local employment is reduced. If the marine environment is negatively affected by this enormous salmon farm, then the economic prospects for the lobster and prawn fishermen of Galway Bay, for example, could be harmed. The other impact might be on tourism as the fish farm will impact negatively on the scenery of the bay. Even if we accept that jobs are generated, it is very unlikely that Inisheer will benefit from them. Landing on the pier on the island is difficult and so it is likely that employees will be located elsewhere. As the Inisheer Cooperative have said “the only way people from Inisheer would be in a position to seek employment related to the fish farm would be to move from the island.” This will damage the local economy, not develop it.

NB Some candidates may discuss environmental factors in this section and this is acceptable, so long as they focus on the economic and social impacts of such changes to the environment. In B (ii), should the same environmental factors be revisited, candidates should not merely repeat the information, but should treat it in a fresh way.

Level 3 ([10]–[14])

Candidate states clearly the main benefits and the counterargument. The discussion will be detailed and comprehensive. The account will have many of these characteristics:

- The points made will be consistently relevant and logically structured
- The ideas will demonstrate insight and a level of sophistication
- Clear understanding of all concepts will be demonstrated
- Use will be made of most of the relevant resource material, including that in diagrammatic form in the maps, graph, photographs and other resources, and understanding of the resources will be demonstrated – no significant points will be omitted
- Figures, where available and appropriate, will be used to good effect
- Ideas will be expressed clearly and effectively. Quality of written communication is excellent.

Level 2 ([5]–[9])

Candidate will have fewer lines of thought or discussion may be limited. However, while ideas may lack depth and/or detail, they are still adequate. There may be a heavy imbalance between the two sides of the argument. The answer may concentrate on material from one source, e.g. the text, and not utilize the full range of resources available. The account may show deficiencies in the following ways:

- Understanding displayed but may be an over-reliance on verbatim quoting in places, even though appropriate
- Resource material used, but some information not as well exploited as it could be
- Largely related to the question, but some irrelevant material introduced
- Ideas not expressed particularly logically or clearly. Quality of written communication is good.

Level 1 ([1]–[4])

- Simple understanding demonstrated but sketchily dealt with
- Excessive verbatim use of resources
- Some use made of the resource material but many relevant resources omitted
- Little or no structure or logic in the ordering of content. Quality of written communication may be poor. [14]

AVAILABLE
MARKS**(ii) The environment (Discuss the potential environmental damage of the proposed development and the counterarguments)**

There are grave risks to the wild salmon stocks which travel across the bay to enter the sea when they migrate from the rivers, and then back to the rivers to spawn. Sea lice (Resource 4C) are a particular threat to these wild fish stocks. There are high concentrations of these around salmon cages and this is a threat to salmon and also to sea trout. This is thought to be a part of the reason for the enormous drop in the catch of sea trout in 1989 (Resource 6). While there were almost 13000 sea trout caught by anglers in Connemara rivers in 1986, just four years later there were less than 500. It has been widely reported (Resource 5) that ‘disease, pathogens and parasites’ are widespread in the crowded fish pens, and this may affect passing migrations of fish stocks. It has been said that up to 38% of migrating fish, whether sea trout or salmon, are killed by sea lice. Young fish are particularly susceptible as Resource 4C indicates. Those who support the development argue that the salmon migrate along the northern shore of Galway Bay, but there is no scientific evidence to verify this. Even if the fish do take that route out to the Atlantic Ocean, sea lice can still infect them, some scientists argue.

Escaped fish pose another problem for the wild stocks of salmon. Some argue that up to 15% of all salmon being farmed escape. The scale of this project means the release of large numbers of farmed salmon, if there are 2.5 million fully grown salmon in the cages each autumn. These numbers are enormous compared to the number of wild salmon with only 15000 going into the largest river which feeds into Galway Bay. The other rivers have much smaller numbers.

The salmon in the cages are Norwegian, selected for their faster growth. The wild fish have adapted to enhance their chances of survival in their own rivers, and the chances of genetic change with escaped fish is high. This will mean that the indigenous Irish salmon will be less able to survive their migrations. The developers claim that wave heights in the bay where the cages are located will be between 3 and 4 metres in height (Resource 3). However, a local paper, the Galway Advertiser reported on wave heights of between 12 and 15m in a storm in January 2014. This is likely to overpower these cages and cause a massive escape, with disastrous impact on the wild stocks. The last time a fish farm was built off Inisheer, it was destroyed and 150000 salmon escaped. Along with the effects on the genetics of the Irish salmon, the escaped fish will also compete for food and spread disease. The claim that the fish will stay around the cages waiting for the operators of the fish farm to net them and return them to the cages is implausible.

If antibiotics and parasiticides are used on the salmon in the cages, these will flow out into the sea water with an impact on wild fish, and the whole marine ecosystem in the bay. Uneaten food and waste also flows through the cages and accumulates on the sea bed, damaging the marine ecosystem and reducing biodiversity in the bay. The developers themselves concede that this fish farm will generate up to 75 tonnes of excreted ammonia in some months.

The operators of the farms will have to deal with predators such as seals, sharks and birds attracted by a large number of fish confined in a small space. These can get entangled in the nets. Often the operators have to try to deter the predators, for example with underwater loudspeakers. These will have an impact on marine creatures.

The impact of fish farming is much greater than just the local ecosystems. Between 2 and 3 kilogrammes of wild fish needs to be processed into fish meal and fish oil to be fed to farmed fish, just to produce 1 kilogramme of salmon. This has driven fishermen to start fishing in the Southern Oceans on an industrial scale. This will impact on wild fish stocks there, and on the other wildlife that depends on those stocks. This is not sustainable.

Counter

The developers have been very careful in choosing the site of this aquaculture project. It has been sited in order not to damage sea grass, an important marine habitat, as well as known areas of maerl, which is an environmentally important deposit on the seabed. It has also been built to avoid natural areas which are protected by the European Union, particularly Natura 2000 sites.

The people who run fish farms are keen to prevent fish losses, partly because it costs them money, but also because they are aware of their environmental responsibilities. Much has been made of the loss of the previous salmon farm off Inisheer. However, that one was a rigid structure and this one is much more sophisticated. It is built to be flexible, which will reduce any prospect of damage from waves.

Operators do accept that small numbers of salmon may escape when they are being transferred from the cages, or perhaps when there are small rips in the netting around the cages. In any case, even when salmon do escape in large numbers, they tend not to move far from their cages for a few days, as this is where they expect to be fed. This will allow them to be caught and returned to the repaired cages. Additionally, researchers have shown no significant impact on wild salmon in Ireland as a result of escaped fish, despite claims to the contrary.

Of course, keeping large numbers of salmon will generate waste around the 36 fish pens. It is accepted that salmon excrete ammonia. However, Galway Bay has a high rate of water exchange with flows from the open Atlantic (Resource 3) and this means that the waste should spread widely and become diluted. The deep water at the site and the high movement of water will ensure that there will be very little impact on the quality of the seawater. The same things happen when medicines are used to treat sea lice on the salmon, and this too will be flushed away quickly, having 'no significant impact on the marine environment'. As the pens can be moved periodically, this can help to avoid any build-up on the seabed.

In terms of sea lice larvae affecting wild populations, again the location of the proposed development will ensure that the risk is extremely small. Wild salmon from the rivers of Connemara migrate to the sea along the coast, well to the north of the Aran Islands.

NB Some candidates may discuss jobs and economic factors in this section and this is acceptable, so long as they focus on the environmental impact and its consequent cost. Should the same factors have been covered in B (i), candidates should not merely repeat the information, but should treat it in a fresh way.

Level 3 ([10]–[14])

Candidate states clearly the main changes and the counterargument. The discussion will be as detailed and comprehensive as the resources allow. The account will have many of these characteristics:

- The points made will be consistently relevant and logically structured
- The ideas will demonstrate insight and a level of sophistication
- Clear understanding of all concepts will be demonstrated
- Use will be made of most of the relevant resource material, including that in diagrammatic form in the resources – no significant points will be omitted
- Figures, where available and appropriate, will be used to good effect
- Ideas will be expressed clearly and effectively. Quality of written communication will be excellent.

Level 2 ([5]–[9])

Candidate will have fewer lines of thought or discussion may be limited. However, while ideas may lack depth and/or detail, they are still adequate. There may be a heavy imbalance between the two sides of the argument. The account may show deficiencies in the following ways:

- Understanding displayed but an over-reliance on verbatim quoting in places, even though appropriate
- Resource material used but some information not as well exploited as it could be
- Largely related to the question but some irrelevant material introduced
- Ideas not expressed particularly logically or clearly. Quality of written communication will be good.

Level 1 ([1]–[4])

- Simple understanding demonstrated but sketchily dealt with
- Excessive verbatim use of resources
- Some use made of the resource material but many relevant resources omitted
- Little or no structure or logic in the ordering of content. Quality of written communication may be poor. [14]

C Decision**State clearly your decision and justify it on the basis of the greater overall benefits**

The recommendation may overlap with some of the points made in B in relation to the potential economic/employment and environmental impact of the aquaculture proposal. However, the emphasis here has to be on the *greater overall benefits* of developing or not developing the salmon farm and the contrary view. In this section, for example, candidates can weigh up the relative merits of arguable damage to the environment with possible employment and economic opportunities.

There is no mark for stating a decision alone without a justification.

Level 3 ([8]–[10])

Candidate states clearly a decision. A range of reasons is provided in justification. The account will have many of the following:

- There is evidence that the arguments of both sides are being balanced, one against the other
- Links are made between diverse aspects of resource material, not possible in Section B
- Points are consistently relevant and logically structured
- There is a clear grasp of the concepts used
- Quality of written communication will be excellent.

Level 2 ([4]–[7])

There are fewer lines of thought or discussion, but what is provided is relevant and correct or supportable in what is argued. There may be deficiencies such as:

- There is some evidence of balancing
- Too much verbatim quoting or overuse of quotations in full
- Important sections of resource material not utilised
- Irrelevant material introduced
- Ideas not expressed particularly logically or clearly
- Understanding of concepts not always clearly demonstrated
- Quality of written communication is good.

Level 1 ([1]–[3])

- Few lines of thought and sketchy in detail
- Large gaps in the use of resource material
- Little or no structure or logic in the ordering of the concepts
- There may be excessive verbatim use of resources
- Quality of written communication may be poor. [10]

Format

Clear format headings **using the headings provided** throughout [1]

Clear subheadings **using the subheadings provided** in Section B [1] [2]

Role

Role of Dr Mark David, inspector for An Bord Pleanála, adopted [1]

Role maintained [1] [2]

Graph

Reference in report [1]

Appropriateness of the technique used [1]

Accuracy of the data presented [3]

Conventions (key, labelled axes, title) [3] [8]

Total**60**