



Shaping the Future of Weather and Climate Services in Ireland: A Public Perspective

Nell McMahon - Weather Watching on Inishbofin Island, Co. Galway



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FÓGRA: DELIVERING EFFECTIVE, EVIDENCE-BASED WEATHER & CLIMATE SERVICES FOR IRELAND
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1 Introduction

The World Meteorological Organization (WMO) (2015) emphasised the need for a user-centric model of weather forecasts and weather warnings, including evaluating user needs and linking service development and delivery to these. Further, the WMO (2015) cautioned against assuming users will act upon weather advice once it is received and understood. If weather service users judge that the consequences of following weather warning guidelines will be worse for them, in a different way, they may engage in risky behaviour to avoid what they perceive to be a greater risk: “...given warning of a pending storm, one is far more likely to cancel or defer a non-essential weekend trip rather than a commute to work, especially if the avoided work trip leads to a lost day of wages”. Such non-weather factors are essential to understanding deviations from the behaviours expected (for example, staying off the roadways to reduce risk) for those issuing warnings and providing services.” (WMO, 2015, p. 22).

To assist with the delivery of Goals 1, 2 and 4 of Met Éireann’s Strategic Plan 2017–2027:

- Enhance support for impact-based decision making;
- Provide climate information services which promote the safety of citizens and support economic and environmental resilience for weather events;
- Continue to provide an effective authoritative voice on meteorology in Ireland

this Fógra report:

- Examines public and special interest groups’ interpretation of uncertainty in weather forecasting and climate projection information;
- Determines the current and future weather and climate service needs of the general public, including special interest groups;
- Presents evidence-based recommendations for the development of Met Éireann’s public weather and climate services, with particular emphasis on the effective communication of weather forecasts and climate protection warnings.

This report is built on the outputs from eight focus groups comprising members of the general public from two large cities, two rural regions, and an island community and special interest groups of students, marine leisure users, and members of the agriculture community.

1.1 Report Outline

The outline of the report is as follows:

Section 2 details the methodology adopted in this study, including data collection and the qualitative data analysis used.

Section 3 presents the findings from the study, which includes participants’:

- use of weather forecasts and services;
- perceptions of the accuracy of the weather information they receive;
- current and future climate service requirements;
- assessment of the current weather warning system; suggestions for improving weather and climate services.

Section 4 draws conclusions based on the findings and presents recommendations for the future.

2 Methodology

2.1 Data Collection

This study collected qualitative data from eight focus groups. The use of focus groups provided an opportunity to listen, observe and document the perceptions, narratives and reflections of participants, while also monitoring group interactions and gestures to gain rich data (Morgan 1988; Madriz 2000). Furthermore, focus groups provided participants with the opportunity “to explore the issues in their own terms, to formulate questions, and to make their views and priorities explicit” (Seymour et al. 2002, p.519).

2.1.1 Focus Group Participants

Focus groups comprised members of the general public divided into two groups: geographic and special interest groups (see Table 1). Individuals were assigned to the geographic focus groups based on where they lived (characteristic: urban versus rural). The four geographic groups were Urban 1: Dublin, Urban 2: Cork, Rural 1: Donegal / Mayo / Leitrim / Sligo, and Rural 2: Westmeath / Cavan / Monaghan / Louth. Four special interest groups were formed: 3rd level students, marine recreational users, the agricultural sector, and those living on an Island (Inishbofin, Co Galway). In some cases, members of the geographic focus groups also possessed characteristics and experiences similar to those in the special interest groups; for example, some participants were marine recreational users, students, or working in the

agricultural sector. Pseudonyms are used to maintain the confidentiality of participant identity (e.g., U1P1 = Urban 1—Participant 1).

Stewart, Shamdasani and Rook (2007) advise that six to twelve people is considered the optimal number of participants for an in-person focus group, given that at least two participants may not show on the day. Krueger and Casey (2001, p.4) similarly suggest that six to eight people should be sufficient “to generate diverse ideas but not so many participants that they do not have a chance to share”. Due to the COVID-19 pandemic, all focus groups were held online using Zoom, a video communications platform. A recent study by Marques et al. (2021) suggested that when moving a focus group online to a video communications platform, a smaller number of participants (three to four) was considered more desirable in managing interactions and technological issues for participants. Given this information, the target size for each focus group was 4-8 participants. Furthermore, the effectiveness of each focus group was not measured using the number of participants, rather the number of ideas generated (Fern 1982 cited in Stewart, Shamdasani and Rook 2007).

Each focus group lasted approximately 90 minutes and was conducted via Zoom between February and March 2021. Purposive sampling was used to recruit participants through social networking sites (Twitter and Facebook), online forums and email (e.g., contacting GAA clubs). Those who wished to participate responded to the advertisements and were asked to complete an informed consent form. As a result of this recruitment strategy, 54 participants - 25 females and 29 males - attended the eight focus groups.

Table 1 Focus Groups

Focus Group	Code	Date	Participants	Unique Identifiers	Gender
Geographic Urban Regions					
Dublin	U1	February 26 th	Eight	U1P1 to U1P8	5 Females; 3 Males
Cork	U2	March 15 th	Seven	U2P1 to U2P7	3 Females; 4 Males
Geographic Rural Regions					
Donegal / Mayo / Leitrim / Sligo	R1	March 10 th	Seven	R1P1 to R1P7	3 Females; 4 Males
Westmeath / Cavan / Monaghan / Louth	R2	March 12 th	Eight	R2P1 to R2P8	3 Females; 5 Males
Special Interest Groups					
3 rd Level Students	S1	February 19 th	Eight	S1P1 to S1P8	4 Females; 4 Males
Marine (Recreational)	S2	March 3 rd	Six	S2P1 to S2P6	3 Females; 3 Males
Agriculture	S3	March 8 th	Six	S3P1 to S3P6	2 Females; 4 Males
Island (Inishbofin)	S4	March 18 th	Four	S4P1 to S4P4	2 Females; 2 Males

A full list of unique identifiers linked with the corresponding gender is provided within Appendix 1.

2.1.2 Focus Group Procedures

Following completion of the informed consent form, participants were provided with some basic instructions on how to access the online video communications platform and an opportunity to join ahead of the focus group start time to test their connection (sound and video quality). Participants were asked, if possible, to connect using a video-enabled device: only three participants did not enable video.

The focus group used open-ended questions (see Appendix 2) to maximise the potential for an in-depth group discussion. The interviewing style drew from a nondirective approach to “provide more opportunity for group interaction and discovery and greater opportunity for the individual participants’ views to emerge, rather than the researcher framing of the issues imposed on them” (Stewart, Shamdasani and Rook 2007, p.92). Topics were introduced by the lead moderator raising questions, thus encouraging a focused yet natural discussion in the group. Where participants were reluctant to talk on a specific topic, prompts were directed to the entire focus group to provoke a deeper discussion. However, when the focus group went entirely off-topic, the lead moderator intervened to refocus the discussion. In all focus groups, there was at least one additional moderator present. Their role was to observe, support the lead moderator in monitoring what topics were discussed and which remained

unanswered, and provide technical support to participants.

At the beginning of each focus group, the lead moderator attempted to create an atmosphere of trust; participants were invited to ask questions about the process and were reminded of “Zoom” etiquette, before being introduced to each other (Stewart, Shamdasani and Rook 2007). Another critical purpose of this introduction was to ensure that participants felt “that their presence and opinions are not only valued but necessary for the success of the group” (Stewart, Shamdasani and Rook 2007, p.97).

The focus groups were recorded and transcribed verbatim. This included typing everything spoken and documenting non-verbal communicative behaviours, namely agreement or disagreement (e.g., head nodding, raising hands) (Paulus et al. 2014). Several cycles of transcription were undertaken to capture as much information as possible. In the cases of a poor connection or an issue with the quality of the audio, where additional detail was required, follow-up clarification was sought via email.

2.2 Data Analysis

The data analysis adopted for this study was based on an inductive approach to thematic analysis where themes were directed by the codes that emerged from the focus groups (Braun and Clarke 2006; 2020). “Thematic analysis is a systematic approach to the analysis of qualitative data that involves identifying themes or patterns of cultural meaning; coding and classifying data, usually textual, according to themes; and interpreting the resulting thematic structures by seeking commonalities, relationships, overarching patterns, theoretical constructs, or explanatory principles” (Mills, Durepos and Wiebe 2010, pp.926-927).

NVivo software was used to organise and support the analysis and interpretation of the data. Importantly, this software served as a computer-aided qualitative data analysis tool in providing transparency via the logging of data, coding patterns, and mapping themes and thought progression.

Using the thematic analysis approach from the work of Braun and Clarke (2006; 2020), six separate phases of analysis were used:

Phase 1 - Familiarisation with the data (Braun and Clarke 2006; 2020). Data familiarisation involved reading the transcripts and reviewing video recordings to become familiar with each data file. Memos were used to capture thoughts on initial codes. Transcripts of each focus group were imported into NVivo.

Phase 2 – The initial systematic coding of data (Braun and Clarke 2006; 2020). Using open coding, units of data were categorised based on recurring patterns with similar meanings that might be relevant to answering the research questions (Saunders, Lewis and Thornhill 2019). Each reference (unit of data within a focus group transcript) was labelled to summarise its meaning and make it more accessible for further analysis. In most cases, the smallest reference was a complete sentence in a transcript to avoid over-fragmentation of the original data and a loss of meaning. In addition, references could be coded to multiple codes. Each of the eight transcripts was coded by at least two coders.

Phase 3 - Developing initial themes from the coded data (Braun and Clarke 2006; 2020). Codes were reviewed by the entire team of five researchers and arranged into broader potential themes. Labels for each theme were developed based on the data within. Data was then collated for each potential theme and, as new insights were gained from existing codes, each transcript was revised (re-read and recoded) to ensure no relevant data for each theme was overlooked. Finally, these potential themes were reviewed using coding comparisons between coders. This is termed the “constant comparative method”, which helps maintain consistency in how data was coded (Saunders, Lewis and Thornhill 2019).

Phase 4 - The initial themes were reviewed and developed by reflecting on the data (Braun and Clarke 2006; 2020). This was an interpretive process. References for each theme were reviewed for consistency; themes were refined with sub-themes labelled and compared to the parent theme. On review, themes with large numbers of references that became too broad in meaning were sub-divided. In contrast, themes with small numbers of references were merged with similar ones where appropriate (Saunders, Lewis and Thornhill 2019).

Phase 5 - Defining and naming themes. The reviewed themes were further revised, with each theme probed for accuracy in relation to the research questions. Following review and agreement among the research team, each theme was named and defined.

Phase 6 - Analysis and write-up. The final themes were grouped together to create a narrative and written-up as research findings. Key quotes for each theme were selected, and tables created to support the findings.

3 Findings

3.1 Public Use of Weather Forecasts

In this section, responses from all eight focus groups were categorized into three broad themes: the importance of accurate forecasts; reasons for checking the forecast; and the frequency with which the weather forecast is checked.

3.1.1 Importance of Accurate Weather Forecasts

This theme provided data that will help to determine the current and future weather and climate service needs of the general public and specific interest groups such as the agricultural sector. It highlighted the importance of accurate weather forecasts across all eight focus groups. To analyse the responses in greater detail, they were split into two groups, the General Public and Special Interest Groups. Table 2 below shows the number of individual comments linked to each of the three clusters of responses: planning and activities, impact on their profession, and the impact on their region.

Table 2 Importance of Accurate Weather Forecasts

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Planning & Activities	1	2	5	2	2	10	7	5	32
Professional	1	0	4	0	0	1	7	7	33
Regional	0	0	0	0	4	0	0	0	4
Total	2	2	9	2	6	11	14	12	69

Special Interest Groups

The participants from the Student (S1), Agriculture (S3), Inishbofin Island (S4) and Marine (S2) Focus Groups need accurate weather forecasts because of the influence of the weather on their profession or because they live on an Island.

Professional Importance

Participants in this category expressed their need for an accurate weather forecast as the weather was linked directly to their work. Table 2 above reflects that participants from Agriculture (S3) were most vocal about the importance of accurate forecasts. For example, for a farmer an accurate weather forecast is vital when making decisions about farming activities, and especially for those decisions which require a huge investment in terms of time, money or resources. When asked about the importance of accuracy they responded:

Very important because it's kind of the first thing we check every day. We produce apples for Bulmers and its very weather dependent, basically from the day of pollination to the day they were picked. So, every day, we would check the weather. (S3P5)

From my perspective, I suppose, representing farming families in the North, the weather forecast is hugely important. And I suppose I'm thinking of it in relation to, I suppose we say water quality, you know, even in relation to spreading slurry and chemical fertilisers, look it's hugely important to farmers that we don't do either, if there is a lot of rain forecast ... we wouldn't be doing a huge amount of spraying, but obviously, look if you if you're going to go spraying, you do want it to stay for a number of hours afterwards, you know so that that spray is effective. (S3P2)

If you're spraying on agrochemicals, you just can't afford to have it washed off. And it's to do with securing the investment and using, being able to play the weather to secure that investment... Like, we're looking at a week like last week that was supposed to be a broken week and I certainly saw no rain. I'm very glad of that, don't get me wrong, but it would have influenced our decisions if on the run up we had a better indication of what was going to happen, because you could tear up a field and let it begin to dry out knowing there was drying coming behind it ... For the people in our business, for the people in farming in general and I appreciate everybody else around the table, if you're interested in the forecast, you're interested in it for different reasons and it's hugely important. (S3P3)

The decision to salt the roads or not are based on the predictions of frost. And that's a 17-million-euro decision, each day. So that's a big one. So, the accuracy of frost is very important. (S3P3)

Yeah. Well, S3P3, as you know, a bad frost can wipe out a whole crop, especially in pollination. (S3P5)

One participant from the Agriculture (S3) Focus Group mentioned that the accuracy of the historic rainfall radar provided by Met Éireann is a critical element of the local weather forecast:

they're getting the critical information, that radar, the accuracy of that historic radar, is hugely important for the local forecast. (S3P3)

Two other participants, who were event planners, also emphasized the importance of an accurate weather forecast as it would directly impact their work:

Forecasts make or break the event really and I suppose even worse, bad and all as it is, if the forecast is very bad and turns out the actual weather is quite benign, that's, that's really a sickener at the end of a weekend where you look around and say, well, we're down the hole for X number of pounds. (S2P5)

They absolutely do dictate the day's activities, but also in respect of passage planning, even if you're heading over across the water to the Menai Straits or wanted to go down to Greystones or up to Ardglass, again, it will completely dictate number one, when you're going to go, but even down to the hour, if you're going to go as well. So, it'll influence it heavily, so it's important because there's so much planning goes into events like that that you do get the accurate weather forecast. (S2P3)

Another participant, a Physical Education teacher, was very mindful of the weather forecast with regards to planning activities for their students:

Predicting the weather for me or knowing the weather was kind of useful for whether I could bring students maybe outside. I obviously was lucky to have great indoor facilities as well but you kind of, the day before you kind of would have planned out your classes and kind of what you wanted to do. So, I suppose that was a big aspect for me. (R2P3)

Regional Importance

Participants from the Island Community (S4) were dependent on accurate forecasting for a wide variety of reasons. One participant mentioned that, as they were expecting a baby, checking the weather forecast was hugely critical for them while scheduling appointments with doctors on the mainland:

I'm expecting a baby, so I'm trying to arrange hospital appointments and I'm having to keep a close eye on the weather. I was due to have a scan in the hospital last Wednesday and I had to postpone it because there was such a bad forecast, it was so bad. The morning was OK, but the afternoon and evening was dodgy looking, so you had to kind of go, Ooh, take a gamble and end up stuck on the mainland or do I just change it by a week? And it's just you know, you need to have a reliable place to look, so that you don't end up cancelling an appointment and then not needing to. As it happens, I cancelled the appointment and the ferry didn't run in the evening. So, it was the right choice and the forecast served me well and was accurate. But it's just kind of for day to day things like that. (S4P2)

Other participants from Inishbofin commented that from a general perspective, since they were living on an Island, they had to be extra aware of the weather forecast to carry on with their lives:

It's enormously important. Number one, if you're commuting to the mainland, even life here regardless... because it's not only just a rural community, it's also an island community, and weather

has an enormous effect on what you do. And the accuracy of forecasts is hugely important. ... Since the infancy of weather forecasting, it's hugely important to anyone that's involved in anything such as fishing or ferrying or operating any sort of a vessel or any sort of a marine life at all. Forecasting is enormously important and always has been. Traditionally like, there's been a lot of disasters in the past that have happened here, historically, and most were down to the lack of a forecast; storms blow up on people, unpredictable storms. No matter how skilled you are, stuff will happen ... When the forecasts came along, and accurate forecasts came along, and Met Éireann and regular broadcasts, a lot of those sudden storm type disasters stopped. (S4P3)

...it's really important to have accurate, accurate weather forecasting, I think, when you live in remote areas like such as we are. (S4P1)

Certainly wasn't, the forecast never mattered as much to me until I moved here. I didn't, did, you know, it was just something that was on at the end of the news. (S4P2)

General Public

Participants from the Rural (R1 and R2), Cork City (U2) and Dublin (U1) Focus Groups highlighted their need for accurate weather forecasts to plan for daily activities such as cycling and gardening.

Planning and Activities

Participants expressed their level of dependence on accurate weather forecasts to plan daily routines or for scheduling activities. As is evident from Table 2, participants from the Student (S1) and the Marine (S2) focus groups recorded most statements in relation to using the weather forecast to plan their activities. Rural dwellers and those involved in agriculture also commented on how accurate forecasting underpins the planning of their activities:

I am a cyclist, so I refer to the weather forecast every day. When we're trying to plan events and things. And it's difficult because the weather can be bad and the wind is a cyclist's nightmare. (R1P7)

From a personal perspective, it's actually really good to know 'cause it helps you plan what you're going to do during the day and then, as well, from a work perspective ...whether it's planning your route, planning your journey and safety concerns. I think it's important to have as accurate information as you possibly can, so you can be prepared...

I suppose to provide clear, concise and timely information on the weather. That enables people to plan, whether it's ... from an industry or from a work perspective and also from a personal perspective. (R2P7)

I think it's very important that I get accurate weather forecasts. At home I do a lot of gardening, I do a lot of planting and a lot of walks so I would want to know what sort of weather will be like, not just on the day, but, you know, at least three or five days ahead. It tells me to plan, it tells me to do a few things in a place that I should be doing it. In terms of work, it is very important as well. In my line of work, I deal with people who need certainty, who, I deal with people who need accurate information all the time. So having a good weather forecast, knowing exactly what the day is going to be like, it's very important to me to be planning that day. (R2P2)

3.1.2 Reason for Checking the Weather Forecast

As shown in Table 3 below, the six most prominent reasons stated by participants for checking the weather forecast were either due to scheduling exercise and activities, or work. The least cited reason to check the weather forecast was the scheduling of social activities. Many participants exhibited a clear difference in their reasons for checking the weather forecast pre and during COVID-19.

Table 3 Reason for Checking the Weather Forecast

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Clothing Choices	0	5	0	1	0	6	0	0	12
Exercise & Activities	6	2	5	7	0	11	8	0	39
Other	9	0	2	5	4	7	2	0	29
Safety	4	2	3	7	3	0	3	0	22
Scheduling & Social	1	1	1	3	3	6	1	0	16
Scheduling & Work	2	2	4	15	1	4	0	10	38
Total	22	12	15	38	11	34	14	10	156

Exercise and Activities

For those who check the weather to plan exercise and activities, the planning of day-to-day exercise or sports activities such as walking, camping, coaching or excursions, was the most common reason given. A conscious effort was made by them to plan their activities in line with the weather forecast. As evident in Table 3 above, the Students (S1) commented most frequently that the reason they check the forecast was to plan exercise and activities. Participants from 6 of the 8 focus groups were conscious of the weather while planning their leisure outdoor tasks and activities:

I live in the city and I do a lot of walking and I do running and walking and I don't have a car personally, so for me it's very important because I have a tendency to bring an umbrella everywhere I go just in case, because I don't trust that it's just not going to rain suddenly. But yeah, so accurate weather is

especially important for me, especially if you're outside a lot, obviously. But obviously my biggest concern personally would just be getting rained on! That's, that's what I want to know, is it going to rain today or is it not going to rain today? (U2P7)

So, I'm involved, for example, with coaching kids and at weekends we have sport and you end up allocating pitches and planning matches and then I get quite stressed about the weather a day or two before. (U1P5)

When we can go away, we do a lot of camping, so we'd be checking where we could go that would have the best weather, so you'd be very conscious of what was happening around the country or whatever country you were going to. (U1P7)

I check my phone practically every day, and particularly when you've got something outdoors planned or you plan your outdoor activities around my phone app, first of all, for the weather. (U1P4)

I also play tennis as a pastime, and the rainfall radar, as S2P2 says, is critical from the tennis perspective because going to play tennis in the rain is really the pits. (S2P5)

Yeah, for me, it's more the day-to-day stuff...the reason I check the weather is, you're going to go for a walk are you going to get drowned? Or I want to put the washing out... is it gonna to rain? (R1P3)

Interestingly, one participant from the Student (S1) Focus Group segregated their indoor and outdoor activities according to the weather:

Because we have a reading week in college this week, I've planned like what days I'm going to clean my room when the weather is horrible. And then, what days I'm gonna go on walks, meet up with friends and go on walks with them. Like I have planned everything around the weather and I've always been like that, like I think my mother has me like that, because she always plans her washing days around the weather, I think she got me into that routine of I have to plan my plans around the weather. (S1P2)

Scheduling and Work

This theme included comments from participants from different professions such as farming, hospitality, and the emergency, health, public, or environmental services. Their reasons for checking the weather forecast were directly related to their profession, and they had a level of professional

dependency on the weather forecast. As per Table 3 above, Rural Two (R2) focus group participants made the highest number of comments related to the scheduling of work around the weather forecast. Those involved in agriculture made many of their daily farming decisions based on the weather forecast:

The first thing I do every day is I look at my app to see what the weather is like. Um, our farming is, we do some tillage and some dry stock cattle and sheep. So, I suppose, we're all, it's just important what the weather is like, full stop. (S3P1)

Yeah, I agree that you become, look I suppose, dependent, maybe too strong a word. But you definitely have huge reliance on it we'll say that, in relation to the decisions you're going to make, whether it's cutting that field of hay or silage or whatever. (S3P2)

Other participants checked the weather forecast to be prepared for the conditions they could face:

I'm a field ecologist, so my job is very much outdoors. So, I just have to buy really good gear 'cause there's no such thing as bad weather, there's just bad gear. (U2P4)

My dad is a bus driver, so he is very alert when it's any kind of snow or ice or cold. (U2P7)

I suppose, like from a personal perspective, it's actually really good to know 'cause it helps you plan what you're going to do during the day and then, as well, from a work perspective...whether it's planning your route, planning your journey and safety concerns. (R2P7)

I think if you're doing any sort of, even if you're in construction or farm or anything that requires you to be outside...you'll definitely adjust your plans based on the weather, if there's heavy rain promised or whatever. I think everyone does though. (S4P3)

Well, I work as a staff nurse and I travel across counties there and I live in the country. So it's kind of very important for me to check the weather forecast in my county and to check the weather forecast in the county that I'm going to. I find that sometimes in my county it could be there could be sleet and snow and all that, and then I get to the other county and it's sunny and all that. (R2P5)

In addition to checking the weather forecast when planning for their work, others were mindful of the impact that the weather could have on the safety of others with whom they interacted:

As part of the emergency services, it's very important for us to know what the weather's going to be 'cause we do have to activate the snowploughs and put extra resources in place. When everybody else is at home when there's snow or there's wind warnings, we're usually the ones that's out on the road, we're usually the ones that's called in even more. So, it's very, very important from an essential services point of view that the weather predictions is accurate. (R2P6)

And I suppose, for myself there, because it's more work-related from the emergency management perspective. So, you're looking at that feed and it's not just what we call the bad weather, but the hot weather as well is quite influential because of the risk of fires, even from the scrub, etc. around the place. (S2P3)

I worked in the Emergency Services, Fire Service for eight years. And when I was working there, obviously the rain forecast and wind was very important. (R1P4)

It is very important for me also. I've a B&B here in Killybegs, County Donegal and we're on the Wild Atlantic Way, and we depend very much on the accurate weather forecast as well. Always looking for good weather for guests planning trips to Donegal and excursions. (R1P5)

Well, an inaccurate weather forecast can be deadly. So, from my point of view, obviously, I haven't been doing much in the last year, but before that, I would have been very concerned with wind and so on because I was taking people out on the sea, kayaking. And so, an accurate wind forecast in particular was vital. (R1P6)

Yeah, I was going to say from a work perspective as well, so I work in the utilities industry so it's very important, say, to get accurate information in relation to if there's going to be any particular weather events, storm warnings, etc. and particularly like if they fall in under the, you know, the yellow, amber, you know, red, whatever colour coding that there is, because that enables us, first of all, to predict the likelihood that we're going to have an electricity outage. And it also helps us in relation to, you know, the deployment of teams and, you know, just in general, to look at, kind of, the safety aspects of whether it is safe to deploy teams and then obviously the impact of people driving on the road during particular weather events. (R2P7)

Safety

This theme included responses from participants where their primary reason for checking the weather forecast was safety concerns. Participants felt a need to be up to date with the weather forecast for themselves or to inform their family of any upcoming unusual weather:

I think they're very important ... before you get out of bed in the morning you listen to the weather forecast and see is it safe to drive to work? You're wondering about your resources for the day. Are there any severe weather plans coming in? You're watching the news late at night. I have the Met Éireann app on my phone, I watch it very closely. And I have an elderly mother living on her own in Kerry and I watch and mind the weather for her as well like. (U2P1)

And then we're talking about swells, you know, which affect us here a lot. Even when the wind is gone, you still have the swells. So that, that affects your ability to travel, you know. (S4P1)

From an organisers point of view that can make a big difference in terms of return on the event because your resources are still going to be committed, your costs are incurred, and if you have a lot of people who don't turn up, then the economics of the event go out the window. So, you have safety, which is obviously always the primary element of it and you have the, the, the financial end of it and I suppose the enjoyment that people get out of it because if only half of the expected team turn up, it isn't going to be the same craic for everybody who was there and there's always kind of a damper on the event. (S2P5)

For those involved in water sports activities, checking the weather forecast is an important safety measure:

I do care, because I row. And it's not just about rain, it's about flooding, it's about wind, and it's not, you can't go rowing on the river for safety reasons if there's high winds, or what they call white horses on the river. (U2P2)

I suppose, if you're involved with boats and stuff, it's a different level. But, for me, it's just, I suppose it's all, surrounding you all the time. You're hyper aware of wind directions and you know, things like that. (S4P2)

Scheduling and Social Activities

This theme captured the responses of those who check the weather forecast when scheduling social activities for themselves and their family or friends. These activities included scheduling walks with friends or planning the weekend with family or friends:

So you can be sitting at home at seven o'clock and it bucketing down and if you're playing doubles, as I would do mainly, there's a bit of organisation in cancelling four people or having four people down there looking at each other saying, Jaysus, too miserable tonight, we're not gonna play. But with the rainfall radar, you can see what the, generally, as I say with south-westerlies, you can see where the rain is actually at Time X, how fast it's moving towards you, or more importantly, whether it's going to be gone by the time you want to play. (S2P5)

One participant in the Rural Two (R2) Focus Group pointed out that checking the weather forecast on behalf of their teenage children was useful:

I keep an eye on it not because it's critical to anything I do, but just to plan sort of, you know, even exercise and I have teenage boys and looking at, you know, sort of, even for them if they're heading out or whatever. So, it's not critical if it's wrong, if you know what I mean, from my point of view but at the same time it's useful as a planning tool. (R2P8)

While other participants checked the weather to schedule social outdoor activities with family and friends:

I'm basically just trying to check if there's rain coming for the day 'cause I walk to work and nothing too, too important other than what R2P7 and R2P8 were kind of saying as well about just trying to plan stuff for weekends, going out and about. (R2P1)

Yes, especially like during the summer, I think I'd nearly say at the start of the week on Monday, I'd look at the weekend in terms of like when I can now play golf or if I can do something with my mates in the evening. (S1P6)

A hundred percent. This week, because we have a reading week in college this week, I've planned like what days I'm going to clean my room when the weather is horrible. And then, what days I'm gonna go on walks, meet up with friends and go on walks with them. (S1P2)

most weather app usage would just be in terms of planning, um, usually day to today, just if I wanted to go outside. (R1P1)

Clothing Choices

Although this theme had the least number of references, participants' responses made it quite evident that they certainly consider altering their attire as per the weather forecast. As per Table 3 above, the Student (S1) focus group had the highest frequency of comments under this theme. Participants were conscious of the need to dress appropriately for the activity in which they were engaged; to go to college, work, or meet friends. The COVID-19 influence was evident in some of the responses under this theme:

I use a motorcycle a lot, so, I'm kind of pretty concerned really with weather, what gear to put on when you go out, you know? (U2P5)

So, it's very important that I am appropriately dressed for going out on my walks and just to be sure that if it's going to rain I have my raincoat, or whatever, if it's going to be wet on my way back. (R2P5)

Like, I used to check the weather so often, when I was busy with life so I'd be like going on walks let's just say or going to work, going to college, going to classes, and you kind of need to like prepare your outfits in a way because, like you know if it's going to rain, you need something to like cover your hair or whatever. (S1P1)

So, when I'm heading out of the house, I need to know to wear a pair of shorts or wet gear, depending on what the weather is and since the pandemic, I'd hardly check it at all. Like since golf clubs are closed, it impacts me personally then if I was able to go out. I just don't really feel the need to check it anymore. (S1P6)

Yeah, definitely pre pandemic I used to go onto the apps to check the monthly weather to make my plans in advance. I was very obsessed with checking the weather and the outfits and where and how I can do my hair, etc. And then once the pandemic started I kind of toned that back, I still definitely check the weather, every day, like in the morning, I check it. But I wouldn't be as obsessed with checking like how the weather is going to be and plan my days around it, because I wouldn't be leaving the house as much. (S1P2)

Before the pandemic, yeah, if I know that I'm going into college I'm going to need a hoodie, I'm going to need something like an umbrella. Whereas now I'm not leaving the house too much, but if I'm going for a walk like S1P7, so I would check to see what the weather is like. (S1P4)

Like I just wanna know the just sort of want to know the gist of it. Is it gonna lash and I'll take my jacket? So, it's the rain percentage I'd be more interested in. (S1P6)

Other

All the other reasons for checking the weather forecast mentioned by the participants were collated under this theme as they revealed participants interest in checking the weather even where there was no direct impact on specific activities:

Yeah, you're not Irish if you don't talk about the weather. (S1P4)

One thing that I actually forgot to mention was that I watch RTÉ news. Like I wouldn't watch every evening, but I'd watch it probably three times a week. And I'd also wait till the end to watch the weather as well, because they give the five-day forecast on that. So, it's kind of just nice to have at the back of your head, OK, it's going to be really sunny this day to this day or it's going to be really bad this day to this day. Just kind of know in advance. (S1P2)

I think it's the type of thing, if you're interested in learning more, you look it up. But if it's not really impacting on your daily life or kind of in your day to day, you're not going to really read into it too much other than if it was red. (S1P3)

Did you see in the Irish Times some years ago? Um, it was a feature on four women who had come to live in Ireland from different parts of the world, and the idiosyncrasy of the Irish that they found, um, funny, and they all agreed that in most parts of the world, the weather forecast occasionally gets mentioned in a conversation. But they said in Ireland to conversation would begin with a discussion about the weather. Weather heavily features in the conversation and it finishes with a discussion about the weather. (S4P3)

3.1.3 Frequency of Checking the Weather Forecasts

After analysing the importance of accurate forecasting and the reasons for checking the weather forecast, attention turned to the frequency with which participants across the eight focus groups checked the weather forecast. As shown in Table 4 below, five themes emerged from the data.

Table 4 Frequency of Checking the Weather Forecasts

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Activity Driven	9	4	2	5	0	10	2	0	32
COVID Changed	3	0	0	3	0	9	0	0	15
Frequent	3	2	6	9	1	9	1	5	36
Infrequent	1	6	0	0	0	4	0	0	11
Seasonal	1	0	0	0	0	5	0	0	6
Total	17	12	8	17	1	37	3	5	100

Activity Driven

On analysing the participants' responses, there was a strong link between increased frequency of checking the forecast and planning activities around the weather. Such participants checked the weather forecast at least daily and some more frequently.

Participants from the Cork City (U2) and Dublin (U1) Focus Groups checked the weather to plan their daily activities such as walking, outdoor work, hiking or swimming:

I used to work on a building site as well, and like I'd be constantly checking, like, the hourly kind of thing on my phone to see when, like, at what time of the day you could do maybe certain jobs or whatever? (U1P2)

I check my phone practically every day, and particularly when you've got something outdoors planned or you plan your outdoor activities around my phone app, first of all, for the weather. And then because sometimes I find things aren't that accurate, I'll go check other weather apps just to see how they compare. (U1P4)

And the only time I really check in on the weather is if I'm doing anything, I suppose, out of the ordinary, be it hiking or swimming or the likes and I will go on and check on to see the tides or that bit more detail that I need. But day to day, I wouldn't be too tuned in to the weather forecast. (U2P6)

I kind of find myself kind of everyday, kind of just checking it on my phone just to see when would be the best time to, like, just get out and go for a walk. (U1P8)

I'm basically just trying to check if there's rain coming for the day 'cause I walk to work and nothing too, too important other than what R2P7 and R2P8 were kind of saying as well about just trying to plan

stuff for weekends, going out and about. (R2P1)

The Student (S1) Focus Group participants were inclined to check the weather regularly to plan walks or activities with friends – time away from their studies:

I suppose, just for ... scheduling things like going for a walk and when I looked out this morning, I knew it was going to be raining. But to see like the constant rain...I know that I wouldn't get the opportunity to go for a half hour walk at lunchtime. (S1P7)

I wouldn't plan my weekly activities, so I wouldn't look at the weather, for planning my week, I would do it on a more day to day basis. So, I'd look at the weather at night time for the next day to decide if there's something I can't do, based on say lashing rain or something like that. I'd do it more short term rather than the long term. (S1P8)

One participant's response, from the Student (S1) Focus Group, was more unusual as this participant used the weather forecast as the basis of conversation with customers while they were at work:

Like because of the job I work, and I work in retail I kind of like to check the weather as well in advance to make conversation to customers. Because I hate small talk and at least if I know what the weather is going to be like for the week, at least that's something I could talk about when they're waiting on their prescriptions or something. (S1P2)

COVID Changes

As this research took place during the COVID-19 pandemic, a theme linked to the frequency of checking during the restrictions imposed on outdoor activities as a preventive measure to curb the ongoing COVID-19 pandemic, emerged. While some participants shared that they checked the weather forecast more regularly before the pandemic, others felt the opposite impact:

I find myself checking the weather on a regular basis, more often ... since the pandemic has started or since I started studying at home. So, I suppose, from a very personal point of view, I found since the pandemic started, I've been checking it every day, maybe twice a day. (S1P7)

But I've also found that I'm seeing the weather more like this. I wouldn't really have watched the news before like, like coronavirus and everything. So now I kind of end up just sitting there and just watch the news as well, or the weather as well, which I wouldn't have really done before. (U1P8)

Yeah, the snow definitely didn't blow up and I got very ready for that snow, but I actually check the

weather a lot if I'm driving, which of course I'm not doing now, but before COVID if I went down the country, I would always check to see if it was going to rain. I like to go before or after the rain but if it was rain was coming, I'd postpone my journey. (U1P6)

Other participants stated that since the pandemic had impacted on their outdoor activities, they checked the weather forecast more irregularly:

Like, I used to check the weather so often, when I was busy with life so I'd be like going on walks let's just say or going to work, going to college, going to classes, and you kind of need to like prepare your outfits in a way because, like you know if it's going to rain, you need something to like cover your hair or whatever. So, it's like the exact opposite, I feel like since COVID, I don't check it as much as I used to just because I don't have the need to like leave the house as much as I did. (S1P1)

But then at this moment in time, I really barely looked at weather at all because there's nothing to do and nowhere to go. (U1P5)

Since the Pandemic, I'd hardly check it at all. Like since golf clubs are closed, it impacts me personally then if I was able to go out. I just don't really feel the need to check it anymore. (S1P6)

Frequent

As stated previously, most activity-driven participants checked the weather forecast frequently as the weather had a direct impact on their activities. This included outdoor activities such as scheduling walks, cycling, running, and working:

... it's just an inbred habit. The first thing I do every day is I look at my app to see what the weather is like. (S3P1)

And we have a lot of outdoor attractions. So, we get people that cycle as well [at the B&B]. And they're set off in the morning and you're, you know, hoping to help them with their journeys and make them stay as pleasant as possible. So, we try to help them and they're always asking, what's the weather forecast, and they will probably stay a couple of nights if it's given a good forecast for a couple of days in a row. So, you know, it affects your business and your revenue and reputation as well, you know, in ways. (R1P5)

I'd check it every morning before I'd go out the door to make sure I had at least the right clothes on, for if it was raining or if it was going to be warm. (S1P3)

That's coming from, like, someone who checks the forecast a lot for sailing and stuff so I do check, you know, is the wind going to impact my day? (S2P4)

I keep an eye on it not because it's critical to anything I do, but just to plan sort of, you know, even exercise and I have teenage boys and looking at, you know, sort of, even for them if they're heading out or whatever. (R2P8)

And again, kind of what R2P8 said as well, just in terms of exercising, I kind of like to run three times a week and I suppose I'm pretty busy at the moment with college work or you could be sitting at a laptop for, like, 10, 12 hours a day and I suppose you want to try and fit in exercise and you probably don't want to be doing it in the wind and rain and cold so again, the day before you'd look up and see if the morning's going to be nice, you'll go in the morning, if not, and the evening is, you'll just leave it till the evening.

Later, R2P3 also remarked: probably just check it the night before I go to bed. And obviously on a Sunday evening, I kind of check what the week is kind of broadly going to look like, but yeah, generally just the night before I go to bed on my iPhone is, I feel, is the best. (R2P3)

Some participants declared that they frequently checked the weather forecast through habit or because it impacted so closely on their work or where they lived, especially in the case of the island community:

Just search first thing in the morning. That'd be it, yeah, once a day. (R2P1)

Um, very important because it's kind of the first thing we check every day. (S3P5)

I think farming, people in the farming background, like we're just so used to checking the weather, other people don't seem to pay heed sometimes, ... it's just part of our life. I think the weather is a big thing. So, we're just aware of it, or try to be most of the time, I think. To be honest, I find, and I look at this, I go into Met Éireann every day, I just can't help, I just do it. (S3P1)

A habit. (S4P1)

Well, I refer to the weather forecast every day. (R1P7)

Infrequent

Just as it was interesting to identify why some check the weather forecast frequently, it was also interesting to note why some participants stated that they did not feel the need to check the weather forecast:

I wouldn't really check the weather that often. I suppose I kind of look out the window, I'll put on the jacket as I need it, like. I suppose it's Ireland, the worst-case scenario is I get a bit wet, really. Have a good rain jacket. And the only time I really check in on the weather is if I'm doing anything, I suppose, out of the ordinary, be it hiking or swimming or the likes and I will go on and check on to see the tides or that bit more detail that I need. But day to day, I wouldn't be too tuned in to the weather forecast. (U2P6)

I was going to jump in at that point and say that I, I couldn't care less about weather in normal life. (U2P2)

For me personally, I would rarely ever check the weather and I don't think I did before the Pandemic either. It's just something that didn't really interest me, if its sunny I go out, if it's not I wouldn't. (S1P5)

Seasonal

Some participants were very active in checking the weather forecast at particular times of the year.

I think I probably more likely plan during the summer when it's kind of, you're not guaranteed sunshine the whole time. So, plan activities, when it is sunny. And then rest of the year I'll take it as I find it each day when it comes to activities and stuff. (S1P3)

I'd be similar to S1P3 there. I find myself during the summer, I like to go camping, so obviously, the weather is a big part there. You don't really want to get stuck in a tent with the rain pouring on you. (S1P7)

Yes, especially like during the summer, I think I'd nearly say at the start of the week on Monday, I'd look at the weekend in terms of like when I can now play golf or if I can do something with my mates in the evening. (S1P6)

3.2 Perception of the Accuracy of Weather Forecasts

3.2.1 Accuracy of Weather Information: General

The timescales over which participants perceived the weather forecast to be accurate are summarised in Table 5 below. Whenever participants spoke of forecasts being predicted accurately on a scale of days (the majority of the time, less than a week), this was coded under the theme “Days”. Whenever participants spoke of forecasts being predicted accurately on a scale of one to two weeks, or when participants spoke directly of short-term forecasts without being specific about the number of days, this was coded under the theme “Short-term”. Whenever participants spoke of the weather being predicted accurately beyond two weeks, this was coded under the theme “Long-term”.

Table 5 Timescale Over Which Participants Perceived the Weather Forecast to be Accurate

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Days	8	5	19	17	2	4	3	9	67
Short-term	6	1	8	5	3	2	2	1	28
Long-term	0	0	1	0	0	0	3	2	6
Total	14	6	28	22	5	6	8	12	101

Days

The consensus across focus groups was that the weather could only be predicted accurately on a scale of days, with the majority of participants agreeing on an estimate of three days:

I'd agree with the three days. I follow ...Met Éireann closely but anything over, anything greater than three days, I reckon it's not reliable. (U2P1)

To predict them, you can go to long-range forecast but I only trust them sort of two to three days out. (U1P5)

Maybe five days, at the max, I'd say. (R1P7)

As for me, I think, about three days, I'll take a forecast, yeah, within three days. Anything outside that

I think it can be, it can be anything, you know, whatever they were predicting. But three, but within three days it could be a bit accurate there, I think. (R2P2)

But, at the same time I find it very accurate only up until maybe three days before, if you are stretching it, out to a week. 50/50 is going to be the accurate amount. (S1P7)

In the Agriculture Focus Group, some participants described not being able to trust beyond this three-day timeframe. They described constantly checking and re-evaluating the weather forecast as an accurate forecast was crucial to weather-dependent farming activities:

I would say that in terms of the actual question, Moderator, I would say we're probably pretty accurate in the main up to three. It's not always relevant to me, well it is, no more than everybody else. If you're picking a date to do or to start doing something, if there what appears to be a window of opportunity, whether it's going to be hay or silage or whatever. But, if it's out in the distance for a while. But as you get closer to it, that first day becomes very important. So, if you're kind of getting reasonably accurate into the third day, and the next four or five are looking fine, you have a better chance of getting what you're hoping for. And I stress that comment like that regardless of the forecast. (S3P3)

I kinda agree with S3P3. A friend of mine, if you know about making hay and silage, he'll always say, I'll start off to making silage, and we'll see then what will happen then in a day or two. I think that's the way, you know, you see after two or three days, you know. (S3P1)

Yeah, I concur with S3P3, S3P1 and S3P5 completely in relation to that. You know exactly that, once you go beyond the two or three days, it is more shaky and everything else because you can often see quite a bad forecast has been given. And, you know, after a couple of days, it just may change around completely and an opportunity may present itself in relation to getting the work done. (S3P2)

The other focus groups agreed that weather forecasts are accurate for a relatively narrow window of two to three days. They also felt this time period was most significant when planning travel etc.

I'd reckon about three days. It should be, like. Well, I actually use XCWeather. OK, XC, that medium, you know? I started using that since I was on the Island of Barra in Scotland, and I learned how all the islanders actually use that one. And I think of all the apps, weather apps, I think that is probably the most accurate. (U2P5)

I'd have to go away daily like. If I was doing something, I'd have to check the day before because if it

says there's rain on Saturday and its Monday, it could be splitting the stones on Saturday. (U1P1)

If we were planning a kayaking trip to say somewhere like the Inishkea Islands or Árainn Mhór something like that, in a commercial situation, you really be looking sort of 10 days in advance because if it's going to be blowing or something like tonight, then obviously you're going to cancel it. (R1P6)

Short-term

Some participants referred to accuracy in the short-term, with forecasts being accurate for a number of days. Anything beyond this timeframe of a few days was often considered unreliable.

I think the general view is like, obviously, the further out you go, and it makes sense, the less accurate the weather is, which I think is why the app is so good 'cause it's at your fingertip. (U1P5)

you can predict in a long way, but I don't know how much I'd trust it in a long way. (U1P1)

you'd look at it, but you wouldn't start kind of planning your, for a week ahead, because you know that it more often than not is gonna move, you know (S4P2)

Yeah, it can change. (S4P1)

Yeah. (S4P2)

Yeah, yeah. (S4P1)

Some spoke of utilising short-term forecasts, of the order of a week or more, to tentatively plan activities or events:

They feel moderately confident in week one and week two, that's fourteen days, and we've not been talking about fourteen-day forecast up to now. But they'll say beyond that, it's what they're calling it, a low scale as in they're not good at it and it's very difficult to be good at it. But they will find the spot, and they will fine tune it. (S3P3)

I'd say about a week, because you're probably planning an activity. I don't use it from a commercial perspective; it's more from a personal. I'd say about a week, where maybe you're planning to do something on a weekend, or where you just want to understand, whether you're going to be able to be in the great outdoors. (R1P3)

I'd probably agree. I'd say a week would be ideal. But I'd barely put much faith in it beyond two or three days. So, I'd like to plan for a week in advance. I'd check the weather and I'd expect that, but I wouldn't make any concrete plans till maybe it's a Wednesday or Thursday, if I was planning something on a Saturday. (R1P4)

Well, with the short-term forecast from when we were taking people out on the sea, we would have found it very accurate, to be honest with you, because our trips would change. We'd go to different places. Like if it was going to be windy, we'd go somewhere sheltered. And if it was going to be calm, we'd go somewhere more exposed. So, you'd be fairly cheesed off if you went somewhere exposed and you got blown out by wind force 7 or 8 that wasn't forecast and that almost never happened. It never really did happen. So, I would have put a lot of faith in the short-term forecast. (R1P6)

A small number of participants displayed an awareness that the forecasts for certain types of weather events could be accurate. Three participants from three separate focus groups cited the example of a large, slow-moving depression having a longer lead time:

I think it depends whether you're talking about large kind of shifts, like say, hurricanes or large storm events, that they can be kind of predicted a bit further out, so anything up to a week. (U2P4)

Wouldn't you have an idea though, maybe for a week or two, like if there was a big high pressure or low pressure, something coming...We see the weather coming from far away now, like we see coming across the Atlantic or coming from the other direction, coming from the east. But we can sort of see it coming a few days, not saying it's right, but we have an idea. But I don't know. (U1P6)

I think up to about seven or eight days out they can see big changes coming so you can get sometimes, you know, pre-warns of stuff that's starting over towards The Americas or in Europe, and as time goes on, then they can provide more meat on those bones if you know what I mean. So, you do get early warning sometimes of something that's starting elsewhere and may result in X or Y, and you often see that in weather forecasts when they know there's something big coming. (R2P8)

Long-term

No participants described long-term forecasts as accurate, but some spoke of how useful, though difficult, an accurate long-term forecast would be:

I think that if there was a separate scenario where you could deliver a less accurate, but still an attempt at accurate, longer-term forecasting. So, in other words, if you could give us a forecast for a month, which was more accurate than we're getting at the moment, because I know you use different systems

for different forecasts when you're dealing with a longer term, it's not the same equipment and the same information that they're using in the morning. To have the two of them being able to run in parallel, now there is something that could interest people, particularly people may be looking at something that's not ready for a week. So that could be planting or it could be harvesting. It could be the silage and it could be the hay, it could be any agricultural activity. But, not at the cost of sacrificing the accuracy of the nearby, that five-day forecast. I think that's what everybody is saying. (S3P3)

This time of the year, I suppose, is probably quite demanding generally because we tend to get easterlies quite a lot in March, early April, and the conditions that lead to those seem to be harder to predict. You get the oddbod stuff in August, September, like the Fastnet Race in '78, where you get these big storms that spring up very suddenly. (S2P5)

We have to plan ... as a cycling club. We have to advise the national governing body of our events for the whole year in early January.

So, like we have events in April and May and September, whatever, Christmas. It's always impossible to know what the weather's going to be like, and we have them open to for the whole country. So, there are people coming from Cork and Dublin, wherever, you know. We've had to cancel only once, I think, when the weather was horrific. (R1P7)

How bad does it need to be before you cancel? (R1P6)

Well, we cancel it about 48 hours beforehand. (R1P7)

Right. (R1P6)

But we just didn't know how bad it was going to be. So, it can be, can be very difficult. But normally, you know, even if it's raining and windy, we will go ahead with these events. But it is, it's not very pleasant. And it's not very pleasant to see our county, or we could be in Mayo. We could cycle from Mayo to Sligo or to Donegal or wherever. So, it's not very nice if people who are coming from Cork, when you can't see anything. You can't see the coast or the mountains. (R1P6 laughs). So, it's not very nice. But, you know, there's nothing. Just have to get on with it and pedal along. (R1P7)

3.2.2 General Confidence in the Weather Forecasts

When exploring participants' confidence in weather forecasting, there were almost three times as many negative comments (70) as there were positive comments (25). The factors engendering a negative perception of weather information were multi-faceted, and are outlined as by theme in Table 6 below.

Table 6 Confidence in the Weather Forecasts- Negative Sentiments

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Total
Cross-checking	1	0	0	4	5
Forecasting Range	4	6	1	3	14
Inaccuracy	2	7	2	9	20
Inherent Uncertainty	5	1	1	0	7
Lack of Trust	8	5	0	1	14
Personal Judgement	2	0	1	2	5
Techno-pessimism	0	0	0	3	3
Total	22	19	5	22	68

Inaccuracy

The most common negative theme to emerge was that participants found weather forecasting to be generally inaccurate. Some stated this belief without explaining why they thought this was the case:

I don't actually check the weather because I just have to go [out] in it anyway. So, aye, and it tends to be wrong, a lot. (U2P4)

Well, I find they don't even get it right from day-to-day, so. (R2P4)
 ((Laughs)) (R2P7)
 In one day, truth be known. (R2P4)

Most times it's right, sometimes it's inaccurate, but at least it gives me an idea of what to expect. (R2P5)

Two participants from the Cork City Focus Group felt that weather forecasting focussed too much on the Dublin region while neglecting the rest of the country:

my feeling generally about weather forecasts for outside the Dublin region is that I tend to think that it's very Dublin-centric ... I would never rely on, on any of them, even, even the Norwegian one that everyone talks about. (U2P2)

But I don't find the Met Éireann forecast very accurate, again, like U2P2 said, I think it's very, centred very much around Dublin. And even a lot of the time they're on the news and in the newspapers and

what have you, they've kind of newsflashes about Dublin. (U2P5)

Others elaborated that they felt forecasts issued for consumption by the general public were not detailed enough, with one participant remarking that forecasts catering to a specialist farming audience were more accurate:

So, I find it a bit unspecific sometimes. These weather forecasts. (U1P3)

I find that the forecasts I listen to, be it on general media, is kind of very generalised, doesn't always seem to reflect what's actually going to happen. Now I do find, I live in the countryside and some neighbouring farmers get their forecast from farming forecast or sea area forecast, whatever, they seem to get it more accurate than what I find, I'll tell you. (R2P4)

Yeah, I actually find that in terms of, like, television, so RTÉ and BBC, it's probably a bit too broad. (R2P3)

Others described incidents where inaccurate severe weather warnings had resulted in disruption to business or personal plans, leaving them with a poor impression of weather forecasting:

We seem to have a lot of weather warnings lately. Yellow ones, orange ones, connected to where you are in the country. If that makes any sense? I spoke to somebody recently who was having some emergency work done in her house and had all the arrangements made, and there was a weather warning for snow...and they were going to cancel because of this snow, which didn't appear at all in either part of the country - they were coming or going from. (U1P3)

The other point is, if you're responsible for, you know, at work, if you've got, you know, people who report to you, whatever, if you're part of a team, then you have to make a decision, you know, to tell people to stay at home and, or to tell people to be prepared to stay at home and, you know, that's always a bit stressful if you've got a red weather warning coming and you have to sort of make a call and say, OK, nobody come to work tomorrow, because then you wake up ((laughs)) and, sun's shining and birds are singing! ((Laughs)) (U1P5)

((Laughs)) (U1P3)

((Laughs)) And nobody's in work! (U1P7)

Yeah, but that's always the, but even if it's not me making a call, you'd have people ringing you going what do you think, should we tell them to stay at home? Should we tell them to go to work? You always have to say, well, you have to tell them stay at home, you know, there's a weather warning, you've no choice. But like, that one I mentioned earlier, that completely didn't happen, the hurricane, like, so we had a factory of 500 people, nobody went to work. And it was perfect the next day! So that's where it gets (U1P5)

Yes. (U1P3)

Yeah. (U1P7)

very tricky. It wasn't my responsibility to tell them not to go to work but, you know, overall, it's very difficult for for businesses, you know, and farmers and construction and so on, so that's where it gets (U1P5) Yeah. (U1P7) Yeah. (U1P3) quite serious. (U1P5)

And his brother, I think it was, yeah, he owned the hotels. And he was always ringing up because there was a couple of weekends, they were bank holiday weekends, they predicted the weather here and they got it wrong and they announced it and people changed their plans and they went south. So, we would find that a lot, it's a lot of the time, it was inaccurate. (R1P5)

Generally, when I look at the weather, anything beyond just the day to day would probably be a couple of weeks in advance, if I wanted to plan an event or something. But generally, that's more in hope than expectation because I wouldn't actually put that much weight on any results I see. (R1P1)

Forecasting Range

In general, the focus group participants did not trust longer-range forecasts, with most only trusting the forecast for two to three days in advance:

Definitely the weekly forecast I wouldn't pay too much attention to. (U1P1)

No. No. (U1P6)

I'd have to go away daily like, if I was doing something, I'd have to check the day before because if it says there's rain on Saturday and its Monday, it could be splitting the stones on Saturday, so. (U1P1)

Well, for me, I usually don't go beyond two or three days, just as a rule, because I have found in the past that sometimes it's wrong and I have, and I have been misled. So as a rule of the thumb, I just don't go past two or three days, so. (R2P5)

I would understand that the weather can change. They can only make their best predictions using the modelling process that they have (R2P6)

Yeah ((nods)). (R2P7)

and probably, two or three days' maximum. (R2P6)

However, two participants from the Cork City Focus Group preferred an overview of the weather on a longer timescale on the basis that they found hourly predictions of the weather largely inaccurate:

But what I find personally is that ... on an hour-to-hour level even, I can't, there's nothing that I've

found that is very accurate when it comes to predicting the weather...It's probably better to look at it in terms of a week and then you can see it's a bit warmer, it's a bit colder, yeah, on average, it's going to rain a couple of days. (U2P7)

...

I never find any of them completely reliable, in terms of, especially on the hour-to-hour that you mentioned there U2P7, the, you know, if you're going to go out at three o'clock or seven o'clock and you look and see what's the chance of rain it's not necessarily anyway accurate. (U2P2)

Lack of Trust

Among some participants in the Dublin and Cork Focus Groups was an underlying distrust of weather forecasting in general:

It's not necessarily any way accurate. And when you watch the news, I watch the news every night, RTÉ News, and I watch the Met Éireann and I have to say, I'm not confident that it's going to be right. (U2P2)

You can predict in a long way, but I don't know how much I'd trust it in a long way. (U1P1)
No. (U1P6)

I figure I know more from apps than I ever knew about the weather. I think I'm better informed now than I used to be. (U1P6)

Yeah. (U1P3)

But whether it's right or not, what I'm being informed! (U1P6)

There was also a sense of resentment among the Dublin group that weather warnings did not always materialise, with the most recent yellow warning for snow (8th February) still fresh in the minds of participants:

Actually, I have an 11-year-old daughter, and with the last snow warnings I was telling her and her friend, do you know I think we're going to get snow. Whatever week it was. And the friend turned round to me and said, yeah, but it said that last week, so it's not going to happen, which I kind of thought was quite interesting. I think we're now starting to not trust these yellow warnings that we're getting. (U1P4)

I was just saying, the last snow warning, I got really ready for it, like I've got all the shopping, I'd everything ready. And then when it didn't come, it was actually, it was sort of disappointing! It was ridiculous! (U1P6)

Some suggested that general forecasts were deliberately vague so that they could never be incorrect, therefore escaping being held accountable for inaccurate forecasts:

My mother used to always say, she was very elderly, she'd always say don't mind that stupid television, they can't get it wrong, there's everything from heat waves to snow on that thing! ...She never used to trust, a lot of old people would say that! That there's everything from sunshine to snow. (U1P3)

Sometimes the forecast can be “fairly” accurate but I generally find that there is a lot of variance in what is being said. For example, showers with sunny spells or sunshine with scattered showers. You can't really go wrong with these type of statements. (R2P4)

Inherent Uncertainty

With some participants there was an acceptance that a forecast is only a prediction:

I'd use it as an indication and not expect anything too accurate 'cause it's the weather (U1P4)

I don't know what the standard accuracy of a weather forecast is. I assume it's not that high. (R1P1)

Others conveyed an implicit understanding of the limitations of probabilistic weather forecasting:

I wouldn't really know the answer, obviously, but I also think that it's something very small, like you can't really predict weather that far in advance, it's constantly changing, obviously. (U2P7)

But I think it's always a bit unpredictable really, isn't it, like at the end of it all? (U1P6)

Yeah. (U1P7)

Even though we start to have a good idea, it's still you never know exactly what could happen. Something can really change. (U1P6)

Cross-checking

Participants described using multiple weather forecasting services, verifying the forecasts of one against the forecasts of another and averaging them in order to decide what to believe. The Norwegian website and app, Yr.no, was often used to substantiate the Met Éireann forecasts:

I wouldn't put too much faith in it. Definitely have to check the app there, Yr. (U1P1)

I would use it if I'm planning for something in particular, I would compare it with Yr.no! ((Laughs)) (R2P8)
((Laughs)) (R2P7)
And see where, see if they're the same, because they give a similar type of print-out or read-out in terms of almost hour-by-hour or whatever else but I just check to see if they agree with one another! (R2P8)

I use a combination of every available weather forecast and make me mind up from them all, basically! Got to do with looking on my phone, got to do with BBC weather forecast, got to do with RTÉ, and I make an assumption based on all. If two of them out of the three are predicting something and the other isn't, well chances are they're probably, it's more liable that that's going to happen. And that's how I base my assumptions upon. (R2P6)

Personal Judgement

A small number of participants related how they used their own intuition to predict the weather in conjunction with the available forecasts. Most admitted that there was no scientific basis to this, although some reasoned that prolonged periods of stable weather conditions made it easier for them to anticipate the weather in the short-term, while more changeable conditions were less conducive to them estimating the forecast themselves:

It's kind of more just, imagine what the weather might be like and plan a nice event. (R1P1)

So, you have to have some sympathy. My father actually goes so far as to say it depends who gives the weather at half-nine on RTÉ whether it's going to rain or not the following day and he reckons he has it down to a fine art. If a particular person comes on, it's definitely going to rain, if Gerry Murphy comes on, it's going to be dry. So that's the science he actually uses! (R2P6)

I think it partly depends on, you know, how much it's supposed to fluctuate, so as somebody said there, I think it was U1P7, like the next seven days, the forecast is pretty much dry and pretty bright for all seven days. So, no change. So, you kind of trust that because, you know, it seems like it's stable, whereas if it's rain one day, it's sunny the next day, and windy the next day and rain the next day, then you'd have less faith in it because it's, you know, so much change in it. (U1P5)

Well, I mean it depends on, kind of the time of the year as well. Like, the summer if you see the sun for two weeks straight, I'm not going to be expecting crazy rain or anything like that, but particularly in these months when you see sun or even like, partly cloudy, like I wouldn't be surprised if I woke up and it was it was raining, you know that kind of way? (U1P1)

Techno-pessimism

Participants in the Rural Two (R2) Focus Group discussed their perception of the capabilities of weather forecasting technologies. Two of the participants discussed how advances in modern technology did not appear to have resulted in more accurate weather forecasts:

But I'd like to think that, I mean they talk about that they have the technology to go seven days in advance. But personally speaking, I always find that kind of, I don't know, they tell you that it's going to be sunny or raining or whatever and sometimes they're right, sometimes they're not and I tend to get up in the morning and look and see what's in front of me, go by that really. But I'd like to think that they could do it a little bit better, I suppose. (R2P4)

Yeah, I suppose I'd be kind of with R2P4 on this, I think the tech, how far technology has come, it's kind of mad how, how wrong they can get it from day-to-day (R2P3)

I just wish that what is forecast was 100% accurate, and one would imagine with modern technology this should be the case without fail. As one of the contributors said on the day, my grandfather always used a barometer in his house and he always appeared to get the weather forecast right and that was not advanced technology. (R2P4)

The factors contributing to a positive perception of weather information were fewer, and are outlined as the themes presented in Table 7 below.

Table 7 General confidence in Weather Forecasts - Positive Sentiments

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Total
Accuracy	1	0	3	2	6
Improved Accuracy	7	0	1	2	10
Trust in Sources	6	0	2	1	9
Total	14	0	6	5	25

Improved Accuracy

Despite forecast inaccuracy being a source of negativity with regard to confidence in weather forecasting, many felt that weather forecasting had greatly improved over their lifetime:

But I think they've become more accurate than they were. (U1P7)

It has improved. I think we know more about the weather now than we ever did in a way, in the near future. You know, we do have a good idea if it's going to be nice, like I know it's going to be very cold, it's going to be sunny, but I think I know this in the next few days, it's going to be sort of bright, won't have much rain, but it's going to be cold, but it's going to be sunny. Well, that's what I think the weather's going to be like for the next few days, I could be wrong! (U1P6)

And I think that has been an improvement in weather forecasting, certainly over time. (R2P8)

Some participants attributed this improvement in forecast accuracy to an improvement in weather forecasting technology (just as those expressing dismay at inaccurate forecasting had done). They were techno-optimists who projected this improvement would continue:

You know, I don't think, years ago I remember there'd never be, very seldom be, very accurate (U1P7) Yeah. (U1P3) reporting of what was coming in the weather, but now they seem quite on top of it. All the new instruments or whatever they use to judge it, I'm sure have modernised with time. So anybody years ago that would have watched it on television, wouldn't have got the same results as you do now. (U1P7)

But we've been spoilt to a large degree I think by the evolution, the process of the satellite networks and all the rest of it that have improved things over the last few years. (S2P5)

I think models and information are constantly evolving and getting better. And I'm making the assumption that that's going to continue to be the case, but that's just my view of it. (R2P7)

Trust in Sources

Although there was a lot of discussion about a lack of trust in weather forecasting, participants tended to have their preferred sources:

Sometimes I've gone and checked with the postman as well, who forecasts on what's happening in nature. (U1P4)

there's a station, a Met Éireann station, at Finner, which is across the Bay of Donegal, and there's also one up in Malin Head, which is very far north, and find that a bit far away to the core Killybegs area because like they would get a lot of northerly winds up there in, in Inishowen. Um, no the atlantic is hard. (R1P5)

But from Finner, you can get (R1P6)

Pardon? (R1P5)

From Finner you can get the, what's actually happening, isn't that, right? (R1P6)

Yeah, that's right. I looked it up and there is one in Finner and it probably would be pretty accurate there in Finner. We're lucky enough there because it's across the bay in near Bundoran. And um, so we rely on, we rely on that. (R1P5)

I know my dad quite likes to trust enough to RTÉ, but I don't, I exclusively get it on the Internet. (R1P1)

Accuracy

Likewise, participants touted the accuracy of their preferred sources:

And they [Met Éireann] predict it fairly well, that you could have a few days' dry weather and then this current comes in and takes that all away on you, you know, so I think they're fairly accurate, I don't know how much more accurate you could be than they are at the moment anyway. Apart from the snow! (U1P7)

I use Yr, the Norwegian app. (R1P7)

That's good, Yr is good. (R1P1)

Yeah. (R1P6)

Yeah, I think that's pretty accurate. Well, yeah. (R1P7)

And so rather than, you know, going to some of the websites for the weather, or again, looking at RTÉ, I tend more now to rely on Google. And so far, I've found the information quite accurate. (R2P7)

3.2.3 Special Interest Groups' Confidence in Weather Forecasts

The difference between Special Interest Groups' negative and positive comments in relation to confidence in the weather information was less marked than the general groups, with just over twice as many negative comments (74) as there were positive comments (33). The factors creating a negative impression for Special Interest Groups were broadly similar to those for the general public, although some differed in terms of the volume of comments made. These themes are summarised in Table 8 below.

Table 8 Specialist Interest Groups Confidence in Weather Forecasts – Negative Sentiments

	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Cross-checking	0	2	2	1	5
Cry Wolf Effect	0	1	12	0	13
Exaggeration	0	3	8	0	11
Forecasting Range	1	4	0	1	6
Inaccuracy	0	1	6	2	9
Lack of Trust	1	7	6	0	14
Personal Judgement	0	1	4	0	5
Too General	1	6	3	1	11
Total	3	25	41	5	74

Lack of Trust

The most prominent theme negatively impacting Special Interest Groups’ confidence in weather information was a lack of trust. Many watched the Met Éireann forecast on TV but expressed scepticism in it as a source:

And another thing as well, there's a summary at the end of a Met Éireann forecast that shows what happening. They go through the next three or four days, what the weather forecasts are going to be, and then they give you a summary on a little chart in the corner that there's absolutely nothing to what they have said two minutes earlier. I don't know if anyone ever noticed that. (S4P3)

Yeah, I think I think if I was running an event, I would never rely on the Met Éireann weather alert systems. (S2P5)

I find that as well. I do watch it, but I wouldn't usually trust it. Specially watching RTÉ, like S1P3 said it. (S1P5)

As it did for the general focus group participants, the recent yellow weather warning for snow (8th February 2021) appeared to influence Special Interest participants’ thinking and it featured to illustrative the unreliability of forecasts:

But as I say...our missing snow, which was supposed to be of 2010 proportions, I think dented a lot of people's faith in it, and there've been other ones previously with the wind and floods and various things

like that. (S2P5)

Yeah, I think sometimes our trust in what the weather predicts for us can fluctuate, and that will depend on how much we're planning. So, like, if they said it's going to snow and it does snow, I'll be like okay, I'll trust it for the next few weeks. So, whereas like a week or two ago they were saying mad snow and we got like barely anything. I'll be like if it rains, it rains and if it doesn't like depends on if they predicted it right or not. (S1P4)

To a certain extent, like you sort of take it with a pinch of salt, I guess, like if they say it is like say snow for example. (S1P6)

Cry Wolf Effect

The accuracy of Met Éireann's weather warning system was a particular concern of the Marine Focus Group, who worried from an altruistic perspective that repeated false alarms would lead to people ignoring such warnings in the future and taking risks on the water:

If the snow doesn't arrive day one, well then people are going to say, OK, that's the boy that cried wolf there, you know, they got it wrong yet again, and that just again takes away from the whole belief that people will have in the forecast system that Met Éireann use. (S2P2)

I think it is going to come to a stage where people aren't going to heed it and they are actually going to take a chance and get caught out there one day. You know, we promote sort of, you know, for people to go out on their boats in a safe fashion and, yes, pay heed to weather and everything else, but when you keep getting those kind of false warnings as such, it is going to happen. (S2P1)

But for the average man on the street, when he's promised, as he would see it, some very adverse conditions, and bearing in mind the media only pick up on these warnings when they are bad news of a severe nature, but when they hype it time after time, that orange weather alert and all the rest of it and nothing happens, as S2P2 says, everybody turns off the next time and says, well Jaysus, you told us that before and nothing happened. So, we're not going to spoil our lives or make our decisions on something based on false alarms that arose before. (S2P5)

However, one participant showed an appreciation of the difficult situation Met Éireann was in when deciding whether or not to issue weather warnings based on the available forecast data:

The warnings are very blunt instruments and, unfortunately, they have become somewhat

discredited... I can appreciate Met Éireann's position in that if they're wrong and something goes amiss, they're going to be lambasted. But the, I think, was it a fortnight ago when the whole nation was holding its breath for a week of snow? And I think in Dublin we had an hour and a half of snow one morning rather than a full week of it. It's that type of stuff that that just discredits it. It's a Europe, European system as far as I know and they're signed into the system. (S2P5)

Exaggeration

Further to the theme of false alarm weather warnings leading to a sense of complacency among people, both the Marine and Student Focus Groups highlighted what they saw as increasingly exaggerated reporting of the impacts of severe weather alerts and general forecasts:

I would totally agree there is, that's more sensationalism than anything else. (S2P1)

Yeah, more or less what I was going to say, because I think they sometimes I think they forecast it to an extreme level, like it's there's no real, like, happy middle. (S1P4)

about two years ago, maybe, and they predicted a really bad storm or bad winds and they never came. And I think ever since then, or maybe it's just one that sticks out of memory for me, ever since then they like over-exaggerate how it's going to be since. But, with the example of the snow there last week and we didn't get much, but there was other occasions as well, where they said oh it's going to be fairly very rough for next few days and it never actually came. (S1P7)

Some participants speculated whether Met Éireann had ulterior motives for this perceived exaggeration, such as boosting their media profile or protecting themselves from accusations of inaccuracy:

it's like they're, they want to get more involved in the whole, their media presence and they're to get people talking about it but they're not doing a very good job of it because it doesn't. (S2P2)

And then it's either going to be really bad or it's going to be really great and kind of if it's not one of the other, they're kind of nearly protecting themselves because if they're going to say it's really bad, you're going to cancel plans and whatnot and if it's really good, you know, you're just going to go regardless to swim. Like even if it's not like they say it's like twenty-three degrees and even if it's only like 15, you're still going to go. Or if there's a bit of sun, regardless. So, I think they give the extremes of it too often to cover themselves maybe. (S1P6)

Too General

The broad nature of general weather forecasts arose as an issue in Section 3.2.3, when participants bemoaned their lack of detail. However, Special Interest Groups seemed more accepting of this as a feature of general forecasting:

If you listen to the sea area forecast, five past six in the morning, and then you watch the one on the news, it's like they are reporting two completely different things. The sea area is very, I suppose, it's tailored towards seafarers and that but it's very specific, gives wind directions against violent storms or 11 gale force. Then you go to RTÉ ... its very simplified forecast really. (S4P4)

I suppose from my perspective from just general life; I would hear the Met Éireann forecast on the radio, I presume the Met Éireann. So. They will give a general indication of what's likely to happen in their perspective...Or sorry, not some of the established, but some of the more conventional forecasts kind of give you the digested outlook. (S2P5)

The Student Focus Group also critiqued the general nature of radio broadcast weather forecast, with the 5-second weather slot on Dublin's 98FM radio station coming in for particular criticism as being too fast-paced and glib:

Like the 1 o' clock news and they're like oh yeah like it might be sunny, might be rain and chances are you're going to get a rain jacket on your arm, you know, like it's not really helpful... whereas the app, it gives you more information, I feel... I feel like the radio stations are very vague when you get your weather from them because usually, they just say sunny spells with a chance of rain, and you're like, what the hell like? How am I supposed to plan my day with that when you just tell me that it's going to be both? (S1P2)

I think it was spin 1038 who always do the five-word weather, and I've never found that helpful. (S1P8)
Yeah, it's 98FM that do it. (S1P2)

I think it's absolutely ridiculous. It'd be more useful for them, I think, to spend however long, the 10 seconds it takes to do the five-word weather, to just even give a few bullet points. I just think that the five-word weather is more of a novelty than it's actually useful. (S1P8)

It's completely pointless, I completely agree with you, like you're sitting there it's just the most vague thing ever. A bit windy, a bit rainy, a bit sunny, like what the hell, what am I supposed to gain from that? (S1P2)

Inaccuracy

While general inaccuracy in weather forecasting was a chief frustration expressed in the general focus groups, it was less of an issue for the Special Interest groups. They did, however, focus on the disruption to their business or formal events/activities when forecasts proved inaccurate:

I think for myself from a sailing point of view, I know we had last year, and I'm sure S2P6 remembers this, that a number of times during the summer we had planned activities and we cancelled them as a result of weather forecast that was forecast, that was, that we had in hand, and cancelled them a day in advance or two days in advance, to stop parents getting their kids ready and coming down to go sailing and then go away and then the forecast turned out just to be inaccurate... The wind, which was the most important part of it from the sailing point of view... was inaccurate and as a result, the sailing was cancelled and then forecast that was predicted never, never came through, so it is quite vital to run any sailing event or any sailing organisation or training or racing that there is accurate forecasts available and, and, preferably a number of days prior, not just on the day or on the day before. (S2P2)

So quite important for us too, in terms of event scheduling, whether or not it's possible to cancel the event and, you know, not have it actually end up being a lovely day or something like that, which has happened a number of times before, unfortunately. (S2P4)

For the Special Interest Focus Groups, comments regarding forecast inaccuracy were made in relation to specific issues rather than the type of general criticisms made by the General Focus Groups:

Radar is good and the extension of the radar, which they now give you as well, is pretty good. Look, none of us can kind of forecast a shower. Nobody can be blamed for that. But it's equally pretty good. When I said I would look at two or three different things. The most important one for me is the rainfall radar. It's not a forecast, it's historic, but it gives me the direction of travel and the pace of travel. And in other words, the risk that I know I would be taking or that I would try to avoid. And then I'll dip into all of the other ones after that. That rainfall radar is very good. And the rainfall radar, as I learnt, and I'm sorry for maybe saying a little too much. I was talking to a friend of mine during harvest one year, and he was in the combine cutting and we started talking about the fact that he was trying to get a field finished before the rain came because harvest of spraying, it doesn't really matter. And I just went on to Met Éireann and watched the radar and said, you have a couple of hours to get finished. S3P3, are you joking me, he said? The wipers are now on. And I said, how can that be? So, the next time I was in Met Éireann, they told me that it's just literally showers flying under the radar because we only have two radar stations. The areas in the country least well covered are Wexford and Donegal. He was in Donegal and the Connemara mountains destroyed him. Everything came in under the line from the ground over the top of the Connemara mountains, and I couldn't see them. They can cover Wexford if they want to or need to from Wales, but they have no cover for Donegal as long as there are only two Met radars working. So look, that's another little thing that they're working on it. (S3P3)

Yeah, I'd be like S3P3 as well there. I'd keep an eye. The ten-day forecast is never that accurate. (S3P1)

They've varying degrees of refinement on the models. I think in terms of distance, they have, what have they got? They've 13-kilometre ones, 1.3-km ones, now the 1.3-km ones I ignore because I think

it's just too inaccurate. (S2P5)

Forecasting Range

As for the general groups, the Special Interest Groups were similarly conservative in how far ahead they trusted weather forecasts to be accurate, with two to three days again emerging as the perceived extent of forecasting capabilities:

the four- or five-day forecast, we could a few times a year be wrapping up, as we always do, wrap bales of silage. So, we want to get a window of two or three days. So, you kind of have to take a bit of a risk sometimes and just go first. But it would always be keeping an eye on the forecast as well to give yourself the best chance at it, like, you know. (S3P1)

You know if you go on a weather app, on a site, and they give you an extremely accurate forecast for a specific area in four- or five-days' time, I'm very sceptical again because I don't think it's actually possible to predict weather that accurately. (S4P3)

Yes, especially like during the summer, I think I'd nearly say at the start of the week on Monday, I'd look at the weekend in terms of like when I can now play golf or if I can do something with my mates in the evening. But like, I think it's not really as accurate. Like I make a sort of provisional plan, but it's subject to change by the time it comes to like Wednesday, Thursday. (S1P6)

Personal Judgement

In the same vein as the general groups, the Marine Special Interest Group described using their own intuition to predict the weather in conjunction with available forecasts. With the marine users, however, they were better able to justify this approach as it was informed by an understanding of the limitations of weather forecasting depending on the meteorological conditions and topography/geography of a specific area:

Like, you can tell that it's going to be a sea breeze day because there's just like a massive difference between the steady wind and the gusts. And you just know, like, there's no way to predict what's actually going to happen, you're gonna have to just watch for when the sea breeze comes in and then know by, you know, how hot it is, how cold sea is, what kind of strength you'll then get. But the forecast won't, won't, give you anything like that. (S2P4)

So, three miles and the local geography makes a lot of difference. The weather forecasts and the models generally that I've come across will give you the picture a little offshore of what they expect from the conditions that are showing up on the synoptic charts, whereas what happens on the ground can be dictated much more by local conditions and temperature differences and maybe sea conditions or sea temperatures and things like this. So, the forecast, the local knowledge is always going to give a

very valuable overlay on it. If you go to Dublin Bay, it's a total lottery, because of the horseshoe-shaped bay and where you get the sea breeze fighting with the gradient breeze if you have a westerly. (S2P5)

Yeah, I presume it's difficult for forecasters to have the minutiae details of having forecasts for different three-mile gaps and its share of coastline, whereas if you have a straight, long coastline and it's hot like Los Angeles or somewhere, you know the sea breeze kicks in at a quarter past twelve every day and it blows like that until the evening time. But if they have a curvy, winding coast, it must be harder to have the computer models set up for that. Are the, are the, just the recording systems set up to have that forecast? So it is, it does come down to local knowledge, I'm guessing. (S2P2)

Yeah, I reckon like that, I suppose it will be your own knowledge of the area, because if you are, if you do have those kind of warnings and you are heading down the country, you know that there will be frost and ice down in Offaly and Tullamore, areas like that, Midlands, no different than if there's tidal rips in any area that you're going to be sailing in or out on the water in that the weather will have further impact in that area there as well. So, your own knowledge of the area will inform your, your, your, movements as well. And you'll take that in conjunction with the weather forecast that's out there at the time. (S2P3)

One member of the Student Focus Group also described relying on their own judgement along with a weather app:

Sometimes, I'd just really be looking at the weather myself, rather than taking some of the forecast, because I think, like I said, some of them are not exactly very accurate. So, kind of just like get the iPhone or get the app to get an idea. But I'll also just look outside and see what sort of day it looks like it's going to be. (S1P6)

Cross-checking

Similar to the General Groups, Special Interest participants also checked multiple weather forecasting services to verify predictions. The general focus group participants favoured the Norwegian website and app, Yr.no, whereas the special interest groups, while also using Yr.no, used a wider variety of sources:

I do, I certainly do go into Yr as well, because, as I say, I seldom look at one without looking at both, because one is the forecast [the Met Éireann website's rainfall radar] and the other is the interpretation of it [Yr.no]. (S3P3)

Yeah, it kind of varies from site to site, I will say. I like to compare the forecasts to the Atlantic charts as well, which are not actually on Met Éireann anymore. I use the Irish Ballooning website I think now for an Atlantic chart. And then seeing, you know, where the fronts are and stuff like that, 'cause, you

know, the fronts and the clouds are going to have an effect, it's micro-terms on our sailing area. Usually I do racing or coaching, so I'll generally compare two forecasts to an Atlantic chart, and then I'll come up with my average answer through that. (S2P4)

When they said it was gonna be like an awful storm and there's a weather warning like to a certain degree, it's not going to be nice but you kind of get a vague idea, but I don't really trust it, and even then, like I'd look on say at like three or four different apps and some of them might have a slightly different forecast (S1P6)

I'd probably be similar to S1P6 in that sense, I'd take everything with a pinch of salt as well, and as he was saying checking maybe three or four different apps. I think that I, over the years of using these different apps, I have my preferences as to maybe what's the most accurate. And I tend to check that. (S1P8)

Conversely, the factors contributing to a positive perception of weather forecasts among special interest groups are outlined as the themes presented in

Table 9 below.

Table 9 Special Interest Groups Confidence in the Weather Information Received – Positive sentiments

	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Accuracy	2	4	0	1	7
Met Éireann Rainfall Radar	0	1	1	5	7
Presentation of Data	1	0	1	2	4
Trust in Met Éireann	0	6	0	10	16
Total	3	11	2	18	34

Trust in Met Éireann

In spite of a general lack of trust in forecasts, trust in Met Éireann was disproportionately high among the Agricultural and Student Groups. Met Éireann's app was the go-to weather service for many in these two groups:

Met Éireann, mainly. I think it's the best of the apps. I used to use this other app beforehand, it's called Yr.no Carlow and it'd come up. But I find that the Met Éireann one is the best. (S3P1)

Likewise, for me. Met Éireann, yeah, is the most reliable one, yes. (S3P2)

Same here. (S3P5)

I use the app several times a day. (S3P6)

I like Met Éireann one. I have to say, it'll be the only one that I use. I have the Met Éireann app on the phone. (S1P7)

Farmers highlighted specific aspects of Met Éireann's services that they liked. These tended to centre around the forecasting range available and precipitation metrics:

I would have watched, with great interest, the three-hour forecast when Met Éireann made it available. And I found it an extremely useful forecast, which is why we also watch the ten-day forecast and now the month forecast, which Met Éireann offer...

So, Met Éireann for me has always been key. But of course, I would look at Yr, because if Met Éireann was accurate, Yr was also accurate generally on the same day. When you're looking at things like showers and stuff and wondering where you're getting, where you might get caught, it always gave me a pretty good window to within an hour of where I could dip in and do a job safely. (S3P3)

Can I just say for a quick second, um, because the rainfall radar is very important. Literally, you can watch the rain clouds coming from the West to, like three hours beforehand. So that is very important, especially if you're spraying, a load of spray can be a thousand euros, so you don't want to wash it away. So, it's very important. The rainfall radar, anyway. I think, it's good. (S3P5)

I would go, I would never go beyond the five days. Normally the five day Met Éireann is quite good. (S3P1)

Accuracy

Comparable to the general public, special interest groups commended the level of accuracy of their preferred forecasting services:

I look at XC. I think XC is very accurate, I have to say. (S4P1)

Yeah. (S4P2)

Even though I wouldn't understand the swell, but I think it's very accurate for, for, wind and storm and fog and all that. I think it's really good. And it does give a week in it, you know. (S4P1)

Yeah. (S4P2)

But as far as accuracy goes, it would be Met Éireann [app] all right. (S1P7)

On the iPhone one as well, I forgot to mention. Do you know that way it says like percentage? So, it might say, like 30% rainfall or like 80% rainfall and I kind of pay attention to that because, if it says 80%, 90%, I kind of nearly believe that because that usually is fairly accurate. (S1P1)

Met Éireann Rainfall Radar

The Met Éireann Rainfall Radar was highly praised for its accuracy, and was described as being an essential aid to farmers decision-making regarding spraying pesticides, mowing or bagging grass for silage:

Yeah, I'd have to say I would often make you know, they're not huge decisions, but I make decisions after I look at the app or the website. I wouldn't dream of getting somebody to mow a field or silage or go spraying without checking it first. It's just par for the course, you just do it. (S3P1)

Yeah, I agree that you become, look I suppose, dependent, may be too strong a word. But you definitely have huge reliance on it ...in relation to the decisions you're going to make, whether it's cutting that field the hay or silage or whatever... If you're going to go spraying, you do want it to stay for a number of hours afterwards, you know so that that spray is effective. (S3P2)

Well, I actually just go into the Met Éireann website. I actually don't have the app on my phone, but you just Google Met Éireann and that's what I use all the time. And then I'll bring up for our area and that's what I use all the time, you know. And the rainfall radar is the one I'm looking at most of the time, nearly all the time. That's just the way I use it and works fine. (S3P1)

I'll be very similar to that as well. The rainfall radar - Met Éireann. (S3P5)

Likewise, yeah. (S3P2)

Um, that would be my experience of it, because occasionally we try to make hay ((laughs)). So not too often because it's such a risky crop. But in general, five days, not too bad like, you know. (S3P1)

Alongside the Agriculture Groups, participants from the Marine and Student Groups also singled out the Met Éireann Rainfall Radar for praise:

Certainly, like the aspects like the rainfall radar on it. I think that's actually very good. It shows the exact location and where it's coming from and what time it will hit and everything. (S1P7)

Again, for data use, I would definitely use Met Éireann and I totally agree that the rainfall radar would

be the most accurate. (S2P1)

Presentation of Data

Special Interest Groups were complimentary of the style of presentation of weather forecasting data on certain weather services:

The Yr forecast is the Irish forecast, but it's divided up to give you little snippets. (S3P3)

I ... wouldn't be great at interpreting it [XC Weather] now, but I mean, I can. For me, any time I've used it, I obviously know if the tracks are red, that means the boat's not going to go. (Laughs)). (S4P1)

We all look at the digested results now as presented by the various websites, whereas the hardy sailors of old probably would have been looking at the omens in the sky and the barometer dropping and all these things (S2P5)

3.3 General use of Weather Services

This section outlines the weather services used by the participants in the general focus groups and their satisfaction with the weather service or weather app they used.

3.3.1 Sources Used to Access Weather Services

Participants' statements specifying the sources they used to access weather services were analysed using a word frequency query, and the most frequent services mentioned were: Met Éireann, Google, iPhone, Yr, Windguru, BBC, XC Weather, AccuWeather and Magicseaweed.

3.3.2 Services Provided by Met Éireann

Participants were asked to identify the roles and services provided by Met Éireann. There was widespread agreement that the role of Met Éireann was to inform the public about future weather events, which included the forecasting and reporting of the daily weather, and the issuing of weather warnings:

Well, to inform people of what they know of the weather forecast because there's nothing they can do to change it either. So their main role is to let people know what they see ahead for us. (U1P7)

... predominately the weather, well for my opinion anyway. (U1P1)
And weather warnings I suppose is part of that, is it? (U1P6)
Yeah. (U1P1)

I suppose accurate, accuracy in weather forecasting, accuracy would be very important. (S4P1)

A general sea-area forecast ... (S2P4)

I do think as well that for Met Éireann that the vast number of people in Ireland use Met Éireann as their primary source of weather forecasts ... (S2P2)

I think to get out to as many people as possible, accurate information, timely, on time. (R1P6)

I suppose to provide clear, concise and timely information on the weather. That enables people to plan, whether it's, you know, from an industry or from a work perspective and also from a personal perspective. ... (R2P7)

Yeah, I'd agree with that. Nothing to add. (R2P1)

Yeah for me, you know, good clear and accurate weather reporting there, and if there are warnings that has to be in place, you know, regionally, county-by-county, you know. ... (R2P2)

To correctly forecast with great accuracy what the weather is going to be like and in particular to give good long range forecast. (R2P4)

I'd say their main role, from a personal point of view, would be to provide the most accurate weather prediction possible ... (S1P8)

Yeah, I'd probably agree with S1P8. Like at the moment, like delivering or trying to deliver the most accurate weather forecast for sure ... (S1P6)

Less prevalent, but nonetheless important, was the suggestion that Met Éireann played a key role by collecting historical data about weather patterns and providing comparisons using this data:

Maybe to compare as well, just to be able to give us a retrospective, the current view, like, regarding where the weather is, like is it same or is the rain gone up or down or have been more fog or less fog, you know, something like that. So that they have the record, the archive, I suppose. (U1P6)

The statistics on it. (U1P1)

Yeah, that there's a sort of a history of knowledge that I presume they have all that there somewhere, if I wanted to know what the weather was like sometime in the past in comparison to now. (U1P6)

One participant from the Agriculture (S3) Focus Group suggested:

Monitor, analyse and predict weather changes and climate to help certain areas such as farming, construction, aviation etc. (S3P6)

While another presumed informing government:

I presume they have a role in informing government? In order to plan or future planning, whatever. (U1P3)

Looking towards future services, some participants saw a role for Met Éireann in providing climate information:

I suppose the interesting question would be, should they take more of a ... thought-leadership role or whatever you want to call it, try and be more of an influencer? Would that be seen as maybe damaging their credibility or, you know, that they should be seen as just being a reporting organisation rather than an influencing organisation, but it'd be interesting, I mean, they would have the credibility to talk about climate change, for example. I know they don't do it now but I don't know if that's something that could ever could ever be part of the future. (U1P5)

I think that's a very good idea. You know, our own climate change. Use our own weather provider, whatever, forecaster, to be specific about our climate change and what we can do about it. Like, when something is worldwide, you tend to kind of think it's out there somewhere. (U1P3)

Like, I'd be really interested if Met Éireann were like these are our climate projections. (S1P4)

Yeah, if that kind of information was available to me through an Irish source like Met Éireann, I would be much more interested and probably more likely to look at it. (S1P8)

Others sought enhanced feedback regarding the weather forecast, and increased granularity or localisation:

... to be able to see what's actually happening right now, compared to the forecast. (R1P6)

I'd like to see more severe weather forecasting. You can get it on local radio, but they're getting it from probably Met Éireann, just a little bit more localised weather forecasting. (R1P7)

I would want to see more regional and more, you know, down to, to areas. (R2P2)

3.3.3 Satisfaction with Met Éireann Weather Service

This theme explored satisfaction with Met Éireann weather service. To analyse the participants' responses, comments were divided into those with a positive and those with a negative sentiment.

Positive

Table 10 below summarises the reasons why participants reacted positively to the services offered by Met Éireann and the data provides a count of the number of positive statements recorded under each theme.

Table 10 Satisfaction with Met Éireann Weather Services – Positive

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Accuracy	0	0	4	0	2	1	1	2	10
Interface – Accessibility	1	0	0	0	1	2	1	2	7
Rainfall Radar Feature	1	0	0	0	0	0	7	7	15
Trust	0	0	0	1	0	5	1	4	11
Total	2	0	4	1	3	8	10	15	43

Accuracy

Many participants found the Met Éireann forecasts to be timely, accurate and, therefore, very useful:

It's just to re-emphasise what the guys have said there as well. The accuracy, for me, it is pretty good for Met Éireann. I think, R1P6 there referred then to the app, right. I use that same thing on the website where you can move the cursor on your map and it becomes a very localised forecast then. It's really useful because you sometimes get the forecast whereby it's great weather coming. (R1P2)

I think I'd prefer to use Met Éireann's stuff 'cause I think they have a more detailed squares that they use for analysis of the forecast. (S2P2)

I would have watched with great interest, the three-hour forecast when Met Éireann made it available. And I found it an extremely useful forecast, which is why we also watch the ten-day forecast and now the month forecast, which Met Éireann offer. (S3P3)

As reflected in Table 10 above, some participants from the Agriculture (S3) and the Rural One (R1) Focus Groups in particular emphasized that the accuracy of the forecast helped them make more informed decisions when farming or at sea:

He's very happy with what he gets from Met Éireann on his phone, a five-day forecast. So, it really suits him for sheep and beef. He just wanted me to say that, he finds it quite good and it suits him for what he's doing. But he did say he realised it might be different for people. But if you're doing crops and things like that, they may need it longer. But for him, he's very happy with it, the five-day forecast. (S3P6)

I think their weather updates and so on are timely and I do think they're accurate. But overall, if you're out at sea, I found it reasonably accurate. (R1P6)

Interface – Accessibility

Participants confirmed the devices they used to access the Met Éireann's weather service. While some accessed the Met Éireann website on their phone or laptop, others preferred watching broadcasts on television or tuning it to forecasts on the radio:

Use web to access Met Éireann. (S3P4)

I don't use the app, prefer web interface. (S3P4)

Yeah, I've only ever, I've only ever used the Met Éireann website, I've never used actual app. (U1P8)

And plus, you'll always get it on the Met Éireann weather forecast anyway, you know, on the radio or the telly like, you know. You'll know, it's going to be blustery or windy or, you know, storm or whatever (S4P1)

It would be the phone I'd use but probably the first thing in the morning you would be on the laptop,

going into the Met Éireann site for the overall perspective and because of the size of the screen as well you get the better view from that context but you wouldn't be checking the laptop during the day on the, on the Met Éireann site by any means, that's the, that'd be my own experience with it. (S2P3)

An important observation evident from the participants' responses was that many of them weren't aware of, or had not downloaded, the Met Éireann app.

I suppose I never went to download the app because I like Google Met Éireann, click the website and go from there. I kind of never took the extra step to download the app. (S1P3)

I'd be the same as S1P3. The odd time I'd want to go look up Met Éireann, I'd go on to the website, rather than the app. I wasn't even sure there was an app. So, the odd time I would use it, I would just go on to Google. (S1P8)

Rainfall Radar Feature

A specific feature of the Met Éireann weather service that many participants valued was the rainfall data. They expressed trust in the accuracy of this feature:

So essentially, I'd be looking for rainfall data for particular dates. And it'll give you daily rainfall data for the right date, in the last, I don't know how far it goes back. (R1P2)

And the rainfall radar is the one I'm looking at most of the time, nearly all the time. That's just the way I use it and works fine. (S3P1)

Yeah, the radar is quite interesting, sometimes I seem to get the radar on mine, I don't know what I do. But it is interesting to see it coming in and just gives us a lot more information about the weather than we had years ago. You know, you just had no idea of what it really looked like. Whereas you can really see it from a bird's eye view. (U1P6)

the thing that I look at lots of times is the rainfall radar. (S2P2)

Again, for data use, I would definitely use Met Éireann and I totally agree that the rainfall radar would be the most accurate. (S2P1)

Some participants also stated that the accuracy of the rainfall radar helped them to make decisions on the farm or to plan outdoor activities such as tennis:

Met Éireann will be first call. But, as I said, I don't use the app that much, I don't quite know what's not on the app now that I go to the site for. Maybe they're all accessible, well they are not all accessible. But if I thought that I could get on the app what I was getting on the website, I'd probably be more inclined to go via the app. But I haven't gone in there often enough to know. But because the lads are on the move all the time and your phone is in your hand, it's understandably the easiest place for them to go. And they've all said they're getting the critical information, that radar, the accuracy of that historic radar, is hugely important for the local forecast. (S3P3)

Radar is good and the extension of the radar, which they now give you as well, is pretty good. Look, none of us can kind of forecast a shower. Nobody can be blamed for that. But it's equally pretty good. When I said I would look at two or three different things, the most important one for me is the rainfall radar. It's not a forecast, it's historic, but it gives me the direction of travel and the pace of travel. And in other words, the risk that I know I would be taking or that I would try to avoid. And then I'll dip into all of the other ones after that. That rainfall radar is very good. And as the lads said, the radar in the business that we are in mainly, the radar is always going to give you a better picture of the risk, not necessarily whether it would rain or not. (S3P3)

I also play tennis as a pastime, and the rainfall radar, as S2P2 says, is critical from the tennis perspective because going to play tennis in the rain is really the pits. But with the rainfall radar, you can see what the, generally, as I say with south-westerlies, you can see where the rain is actually at time X, how fast it's moving towards you, or more importantly, whether it's going to be gone by the time you want to play. So, I think the rainfall radar is a great asset, and it is radar live, and it's probably the most accurate forecast you can get in that respect. (S2P5)

Trust

Trust in the Met Éireann weather services emerged as a prominent theme. Some participants stated clearly that they preferred Met Éireann over other weather services. They lauded Met Éireann's accuracy, professionalism and reliability:

Met Éireann, mainly. I think it's the best of the apps. I used to use this other app beforehand, it's called Yr.no Carlow and it'd come up. But I find that the Met Éireann one is the best...To be honest, I find and I look at this, I go into Met Éireann every day, I just can't help, I just do it. And I'd be very happy with what's there at the moment. And, you know, I just, I wouldn't give out about it at all. I think it's quite good, very good. (S3P1)

I think that actually Met Éireann presents a very professional, if you watch them on screen, if you do

all of that, they're very professional. (R2P8)

Met Éireann for me has always been key. (S3P3)

Likewise, for me. Met Éireann, yeah, is the most reliable one, yes. (S3P2)

I am very happy with the service they provide. (S3P6)

And then I'd also check the Met Office with that's just my mom because that's her gospel. (S1P2)

And then generally, if I don't have a decent idea, I go to Met Éireann and that's usually the one where, if I think, you know, if I get a sort of vague idea off the other two and that's sort of agreeing with that, I'll probably just go with that. That's my banker of, well that's probably right. (S1P6)

Yeah, I feel like I always use the iPhone one, like most days, but like let's just say if there's actually something happening, like I really need to go outside, I would use Met Éireann. (S1P1)

Well, I think Met Éireann does a particularly good job. I mean, I, you know, probably like everybody in Ireland will watch the RTÉ news service every night and have, I have the Met Éireann app on my phone, which I check, you know, I do check regularly. (U2P3)

I use Met Éireann because it's pushed out by my organisation and as, as a member of the emergency services, it tends to be common across the ambulance service and An Garda Síochána. (U2P1)

And I suppose, for myself there, because it's more work-related from the emergency management perspective, it is Met Éireann because it's linked in with the national office as well. So, you're looking at that feed and it's not just what we call the bad weather, but the hot weather as well is quite influential because of the risk of fires, even from the scrub, etc. around the place. So, it would be, it would be Met Éireann's sea one I would be looking at there in relation to that from the non-sailing perspective. (S2P3)

I was just saying that the Met Éireann website, I find that really useful. It's also handy for historic data as well. (R1P2)

Likewise, I would use Met Éireann I suppose, and being that we're on the coast here, I suppose that would be the nearest point of reference. (R1P5)

I talk a good bit with Met Éireann and I kind of know that there is only one forecast around and Met Éireann make it. And everybody else just takes that information and portrays it in a different way. (S3P3)

Do you know the likes of, of Magicseaweed and Windguru, and all that? They obviously get their weather forecast information for Ireland from Met Éireann, I would imagine. (S4P3)

Met Éireann. I find it very good for what I need. There is another weather app that comes with the I-phone but I don't find it near as good as the Met Éireann one. (S3P6)

Some participants mentioned that they trusted a combination of the information they received from Met Éireann and another app:

You can pick, you can tailor your weather choices on it, which is a pretty good app as well. I would use kinda a combination really of XCWeather and the Atlantic charts there on Met Éireann website. But, but even if they're you know, any of those, they're not going to have their own meteorological stations around the country, or, you know, I can't imagine they do. They must, they must be getting their information from established organisations that take weather readings and work with satellites and all that, I would assume, maybe I'm wrong. (S4P4)

In addition to trusting the information received from two sources, a participant from the Agriculture (S3) Focus Group mentioned that they preferred using the Met Éireann website as they can access more information on the website than on the app:

I would look at Yr, because if Met Éireann was accurate, Yr was also accurate generally on the same day. When you're looking at things like showers and stuff and wondering where you're getting, where you might get caught, it always gave me a pretty good window to within an hour of where I could dip in and do a job safely. Or you know, aim to be inside by a certain time because it was going to be wet. The two of them together, I'd always use and I'd seldom ever look at a single forecast. But I would also say, I never use the app. I always use the website, because I can get access to a lot more information

in there. (S3P3)

Negative

Table 10 above showed all the positive themes, where participants expressed their satisfaction with the Met Éireann weather service. To shape the future services provided, it was equally important to explore the reasons why some participants did not choose the Met Éireann weather service. Two core themes emerged, these can be seen in Table 11 below.

Table 11 Satisfaction with Met Éireann Weather Service – Negative

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Inaccurate or Insufficient Information	4	5	0	0	1	0	7	1	18
Interface Accessibility	0	0	1	0	5	1	4	0	11
Total	4	5	1	0	6	1	11	1	29

Inaccurate or Insufficient Information

Participants in four of the focus groups stated that they found the Met Éireann weather service to be inaccurate and three focus groups raised an issue with insufficient information:

My feeling generally about weather forecasts for outside the Dublin region is that I tend to think that it's very Dublin-centric and it's, I would never rely on, on any of them, even the Norwegian one that everyone talks about. (U2P2) ...

But I don't find the Met Éireann forecast very accurate, again, like U2P2 said, I think it's very centred very much around Dublin. And even a lot of the time they're on the news and in the newspapers and what have you, they've kind of newflashes about Dublin... I actually use XCWeather. OK, XC, that medium, you know? And I started using that since I was on the island of Barra in in Scotland and I learned how all the islanders actually use that one. And I think of all the apps, weather apps, I think that is probably the most accurate. And I also find I look at the forecast there on Countryfile there, the BBC one, and I find that pretty accurate for the week, aye. I think it's [the BBC's Countryfile forecast] far more accurate than the Met Éireann one. That's just my view. (U2P5)

Well, I think from the marine provider, from the marine user's perspective, it has to be accuracy and relevance to the areas that we're interested in at any one time, and that's where they tend to be a little bit too general. (S2P5)

One participant from the Dublin (U1) Focus Group mentioned that they found the weather provided by Met Éireann on the RTÉ news to be an effective weather service due to its lack of detail:

Yes, but I don't check the RTÉ news one, I don't find it effective. I don't find it specific enough...I think that [it] goes so quick, I don't think anybody can figure it out (U1P3)

For some farmers in the Agriculture (S3) Focus Group, it was inconvenient to have an inaccurate rainfall forecast as they mentioned that it hugely impacted their decision making on the farm:

The only other thing I suppose when I think about the weather now, maybe annoy me a little bit with the weather is, sometimes when they give a certain volume of rain, they might give eight mm of rain. And we'd only get one or two, and like that would have a big decision whether you're going to go and try and wrap a bit of silage, because a mm or two doesn't make any difference, like, whereas the intensity eight or ten would make a huge difference and occasionally over. That would be one area sometimes I would find the volume of rainfall wouldn't actually work out what they would have forecasted. (S3P1)

One participant from the Marine (S2) Focus Group mentioned that they preferred not to use the Met Éireann forecast due to lack of detailed information if they were planning events:

I think if I was running an event, I would never rely on the Met Éireann weather alert systems. I probably wouldn't rely on the Met Éireann forecast anyway; I would always refer to the other models to see more detailed information about what is likely in the area where the event is. The Met Éireann system is just too blunt a weapon where things are marginal between being viable or not viable. (S2P5)

Finally, a participant from the Inishbofin Island (S4) Focus Group mentioned that even though Met Éireann provide a forecast for the Island community, they still found the information they were receiving to be basic and felt that other weather services provided more detailed information:

Yeah, it is a bit basic. I actually looked at it today and it is a kind of a basic, you know, like your weather on the news, with your cloudy and your sunny...It is a bit kind of weather for beginners...I notice that there's a section on the islands, which is a new thing, well new to me. I'm not sure how long that's been there. But, yeah, I did notice that. (S4P2)

Interface – Accessibility

Some participants compared the Met Éireann interface with other weather services and stated a preference for another service provider based on either better graphics or more user friendly information:

I used to use the Met Éireann one a lot. But the problem now is that I've only partial sight, so I can't actually see it. And the, I use a screen reader on the phone called Voice Over, and some apps work with that and others don't. And Met Éireann one's that isn't accessible... so that's out the window.

Whereas things like Yr and Windfinder, they are accessible. So, I can still use those. And that's obviously very important to me. (R1P6)

I don't know if interactive is even the right word. But, um, the ones like XCWeather and Windguru that just had a far more accessible and the graphics. You know, show the weather better. For as, I've just thought Met Éireann, well, it's probably very modern at the start, but that just didn't bother to update it. But I just I just found that, that it was a bit antiquated, now might be a bit of an exaggeration to call it that. But, um, it was probably grand at the start. But when others started, you know, coming up with better graphics and just a better a better way of presenting, presenting the weather, I thought they were lagging behind, but they could, they could get the opposite now. For all I know, I haven't changed in a while. (S4P3)

I end up going to the met.ie site using the internet access to try and find the detail you're looking at. I'm not sure whether they're looking at improving it or not but it certainly isn't doing anything for their, for the, for their uptake or the development of a volume of users that it is so clunky to use, whereas the other ones, possibly because they have a commercial imperative to present their products in a way that's accessible and grow their subscriber base, they seem to be far more interested in getting their data readily-accessible and presented in a way where you can get your hands on the information you want in the format you want very quickly. Some of the Met Éireann stuff is just very poor, I suppose, it's fair to say. (S2P5)

There's like a, sort of the same as Windy, they've got the colours and they've got the arrows, fonts, and the actual isobars, so that's why I kind of stopped using Met Éireann, because that was the main thing that drew me to it. I have to say, I do find it fairly annoying of the Atlantic charts, you can't actually zoom out to see what's the happenings on a wider picture, it only gives you quite a close-up view so you can't actually zoom out to see what's happening totally. (S2P4)

But I wouldn't tend to use the website that often. Only like if someone asked me to check Met Éireann specifically because I'll have other apps that I'll use over. But anytime I use the website, I feel like it's just there's so much information on the homepage I feel like it's a lot to take in and maybe because I don't use it that much so I don't know exactly what to look for, but I feel like it's a lot of cluttered – it's very messy. But that's just me personally. Other people could find that they like the big chunk of information. Whereas, I'd rather just be sleek and easy and you don't have to scroll halfway down the page to find like the exact weather for Dublin. Whereas like I'd rather kind of just like have your location services on where it knows where we are and it'll tell you the weather. I'm probably just lazy and don't really want to look through. Something that's just a bit more user friendly. (S1P2)

I've never looked at Met Éireann for my weather, so that's probably a bit of a red flag, is it? (U1P1)

Yeah, it's actually not a website I'd ever really look at, S4P3, to be honest. (S4P2)

3.3.4 Satisfaction with Non-Met Éireann Weather Services

This section explores participants' satisfaction with weather services other than those provided by Met Éireann. This section was also divided into two groups – positive and negative feedback.

Positive

Table 12 below shows all the positive themes which emerged from the focus groups. The themes were similar to those which emerged in relation to Met Éireann services.

Table 12 Satisfaction with Non-Met Éireann Weather Services – Positive

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Accuracy	1	3	1	1	0	1	1	0	8
Information	0	2	0	2	4	2	0	1	11
Interface	0	1	0	0	3	0	0	0	4
Total	1	6	1	3	7	3	1	1	23

Accuracy

Participants shared that they preferred weather services such as XCWeather, AccuWeather, Magicseaweed, Windfinder, Windguru or Yr.no due to their accuracy. As evident in Table 12 above, participants from the Cork City (U2) Focus Group made the highest number of comments in this regard:

Well, I actually use XCWeather. OK, XC, that medium, you know? And I started using that since I was on the island of Barra in in Scotland and I learned how all the islanders actually use that one. And I think of all the apps, weather apps, I think that is probably the most accurate. And I also find I look at the forecast there on Countryfile there, the BBC one, and I find that pretty accurate for the week, aye. I think it's far more accurate than the Met Éireann one. That's just my view. (U2P5)

I'm wondering, on the day-to-day I'd probably use the, whatever, the AccuWeather. I wouldn't check it that frequently if I was looking for the, I suppose more wider events, it'd be, kind of, either Magicseaweed or Windguru. (U2P6)

I've tried them all, I've tried AccuWeather, I tried most of them like, but I definitely find them, and the person advertising this other one now! But I just find it [Yr] so accurate and so easy to use. Yeah, well, that seems to be good. It was recommended to me about two years ago, it's run out of Scandinavia. A

lot of people I know use Yr. Someone told me AccuWeather was like a, you know, a scraper app where it just takes the information from other apps, whereas Yr has actually a metrological or whatever you call it, system driving it. (U2P5)

The big advantage of Windguru I think is that even the paid subscription is very reasonable. I think it was 19 euros a year but you get a, you get a relatively reliable forecast. (S2P5)

Yeah. There's a lot of good opinions about Yr. Another one that I use that I find is accurate is Windfinder. (R1P6)

In my case if, I will always watch, say, the RTÉ weather forecast, either the six o'clock or the nine o'clock, just to get a feel for the coming days, but if I really want to know, you know, if I'm planning something for a weekend or midweek or whatever and I really want to know, I'll both look at the Met Éireann app, but I'll also check Yr.no, which is the Norwegian weather forecasting website. But it's actually very, very good and accurate, I have found, hour-by-hour for, and you can put in in any part of Ireland and it'll give you pretty good, specific data, hour-by-hour. For, you know, up to four or five days ahead. (R2P8)

But probably my go to one I'd be most like agree with would be AccuWeather, the website because, I don't know for some reason I just feel like that's my Bible for weather. (S1P2)

Information

One participant from the Agriculture (S3) Focus Group uses two weather services, one for the accuracy of the weather forecast and the other for its interpretation:

I do, I certainly do go into Yr as well, because, as I say, I seldom look at one without looking at both, because one is the forecast and the other is the interpretation of it [Yr.no]. (S3P3)

Some participants from the Cork City (U2), Inishbofin Island (S4), and Rural Two (R2) Focus Groups mentioned that they were very happy with the level of detail that certain weather services they used provided:

I would use the Magicseaweed or Windguru for the, I suppose, more detailed information, be it the tides, the swells, the wind. (U2P6)

I like XC, I like OK, but I don't, I like to know the swell because I like to know how choppy the sailing is gonna to be, that's all. But it's not for any major technical kind of purposes. It's just what I know and what I'm familiar with. (S4P2)

A lot of them would use Magicseaweed alright, yeah. It's a good indication of the swell and direction of the swell, period of the swell and all that. (S4P4)

I'll also check Yr.no, which is the Norwegian weather forecasting website! But it's actually very, very good and accurate, I have found, hour-by-hour for, and you can put in in any part of Ireland and it'll give you pretty good, specific data, hour-by-hour. For, you know, up to four or five days ahead. (R2P8)

A participant from Inishbofin Island (S4) mentioned that they used Windguru, as it was recommended to them when they first moved into the area. Their choice of weather service was based due to word of mouth and the effectiveness of this weather service:

I like the Windguru because my, one of my, kids suffers from motion sickness. So, say there's two sailings and we can go on either one, I'll look for when the swell isn't as bad and kinda be thinking...it'd be better in the morning; or you know how the journey is going to be. But, it's just small, you know. And Windguru is probably one of the first ones I started or somebody told me about when I moved here, and it was the one I just got used to. (S4P2)

Interface

Many participants expressed their satisfaction with the accessibility of the specific weather service they used. They felt it was user friendly, accurate and straightforward:

But my main one, I think, would be just going on to Google and say: Weather X location. And then, I think it's really user friendly. There's like, especially on a phone, there's like a little toggle you can drag along for the time and it gives you a kind of detailed information for every hour and I find that the most user friendly and the most accurate. (S1P8)

I've tried them all, I've tried AccuWeather, I tried most of them like...But I just find it [Yr] so accurate and so easy to use. (U2P5)

the ones like XC whether and Windguru that just had a far more accessible and the graphics just you know, show the weather better. (S4P3)

I don't know, my husband likes Magicseaweed because I think he likes the visuals of it and you can see the swell coming in and it is interesting to look at it a, it's a visual. It's a more visual thing. (S4P2)

I just found, I don't know, XCWeather was more kind of straight forward. (S4P4)

Negative

Table 13 below shows all the negative themes which emerged from the discussion about the weather services other than Met Éireann.

Table 13 Satisfaction with Non-Met Éireann Weather Services – Negative

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Accuracy	1	0	0	0	0	0	1	0	2
Competitor Services	1	0	0	0	1	1	0	1	4
Total	2	0	0	0	1	1	1	1	6

Accuracy

A participant from the Marine (S2) Focus Group said that although they were satisfied with the Windguru weather service, they weren't happy with it when its forecasts became inaccurate for a period of time:

The big advantage of Windguru I think is that even the paid subscription is very reasonable. I think it was 19 euros a year but you get a, you get a relatively reliable forecast. Now, they went through a bad spell last year, I don't know what went wrong and their forecasts were miserable for, were well off the beam for a month or so, but they seem to have got it together again at the moment and they do give you a wide range of models so, if you find that at your location Model X is generally consistent, then you have the option to always use that model. (S2P5)

Competitor Services

Participants across the focus groups expressed their personal preferences for the weather services they used and stated why they felt one or more were better than the others. They used the weather services to make plans for outdoor activities or used a specific service that they felt was more accurate than the others:

Yr.no seems to be good. It was recommended to me about two years ago, it's run out of Scandinavia. A lot of people I know use Yr. Someone told me AccuWeather was like a, you know, a scraper app where it just takes the information from other apps, whereas Yr has actually a metrological, or

whatever you call it, system driving it. (U1P5)

Would you ever look at that one [Magicseaweed], S4P4? (S4P2)

Um, I used to alright, yeah. But, I just found, I don't know, XCWeather was more kind of straightforward. (S4P4)

Yeah. (S4P2)

I thought, but then, yeah. And I found it more accurate as well. Magicseaweed is probably good for, for swell and that, but for general weather, rain, wind and that, I found XC. Up until recently actually, that's why I started using ... RTÉ, the Atlantic charts there, like they give you a better idea because I found the last six or eight months, maybe even a year, that XC wasn't as accurate as it used to be. That's what I found. (S4P4)

Yeah, I'd agree with that. The apple one is good for like, I need to get out the door, do I need a coat, do I not? And then not really make plans with. So, I just kind of look up first on Met Éireann or see what the news says. (S1P3)

3.3.5 Devices Used to Access Weather Services

Participants' statements about the devices they used to access weather services were analysed using a word frequency query; the most frequent devices mentioned were a phone, radio, television, laptop and computer.

3.3.6 Satisfaction with Met Éireann Weather App

After exploring participants' overall satisfaction with Met Éireann's weather services, it was important to separate out their feedback on Met Éireann's weather app.

Positive

Table 14 below explores all the themes which emerged as positive feedback for Met Éireann's weather app.

Table 14 Satisfaction with Met Éireann Weather App - Positive

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Accuracy	2	1	2	2	0	2	0	4	13
Comparison with Competitor Apps or Services	0	3	0	1	0	0	0	1	5
Location Features	1	0	5	2	0	0	0	0	8
Rainfall Radar Feature	3	0	2	0	0	3	1	0	9
Trust	1	3	0	0	0	2	0	4	10
Total	7	7	9	5	0	7	1	9	45

Accuracy

As can be seen from

Table 14 above, participants from the Agriculture (S3) Focus Group were most vocal in their praise of the Met Éireann app. They found it was particularly helpful in helping them make informed farming decisions:

I can just say that I've been using it, depending on it, and I kind of rely on it, so it's working for me. (S3P5)

I make decisions after I look at the app or the website. I wouldn't dream of getting somebody to mow a field or silage or go spraying without checking it first. It's just par for the course, you just do it. But normally I'd be confident enough up to four or five days, usually from the Met Éireann app. (S3P1)

Participants from the other focus groups also spoke positively about the accuracy of the forecast they received from the Met Éireann app. They mentioned that the 5-day forecast was a helpful mechanism when planning activities around the weather:

I actually think the app is very good, and it does give a five-day forecast that... I have found it to be fairly accurate. I suppose we can't predict definitely what all sorts of things can happen. (U1P7)

I found the Met Éireann app, the biggest progress in the last few years is to give that localised information, which I have found to be pretty accurate. And I've been really impressed with that. I'd agree that a lot of the commentary is about Dublin weather, but when I'm looking at a local forecast on the Met Éireann app, assuming I can see it, then I think it's good. (R1P6)

The accuracy, for me, it is pretty good for Met Éireann. (R1P2)

Irish people would be definitely inclined to the Met Éireann app because it's Irish based. Like, you know, it's going to be presumably the most accurate one. (S1P7)

There is definitions of the weather warnings on the Met Éireann website and on the app. If you're looking on the app, there's a warning section on the front page and there's an information button on the right-hand side and it'll tell you what they mean there. So, it can be just interesting to look up. (R1P6)

Comparison with Competitor Apps or Services

Participants conveyed that they preferred using the Met Éireann app over the competitor weather apps. They also expressed greater trust where they used more than one weather service app:

Met Éireann, I find it very good for what I need. There is another weather app that comes with the iPhone but I don't find it near as good as the Met Éireann one. (S3P6)

I think the Met Éireann app is a little bit better. Sometimes I compare between the Met Éireann app and the iPhone app because, again, I don't, the iPhone app, I just, I don't trust it whatsoever, but the other one, the Met Éireann one I trust a little bit more, so then you kind of compare, maybe then you can get a better idea of what's happening. That's just the way I would do it, and I just have those two then. (U2P7)

I use the Met Éireann app, as I said I use it and I use the Yr.no website as well. And I find that, you know, I do check for different parts of the country depending on if I'm going to travel there or whatever and I find it fairly accurate. I find it, you know, easy to use, easy to navigate. It's just one of a number of tools, you know what I mean, I would use if I really wanted to drill down on the weather... and it's the one I'd go to first and then as I say I might check around a few others just to keep it honest. (R2P8)

Well I think Met Éireann does a particularly good job. I mean, I, you know, probably like everybody in Ireland will watch the RTÉ news service every night and have, I have the Met Éireann app on my phone, which I check, you know, I do check regularly. (U2P3)

you can tailor your weather choices on it [Windy.com], which is a pretty good app as well. I would use kinda a combination really of XCWeather and the Atlantic charts there on Met Éireann website. (S4P4)

Location Features

The location based, accurate local forecast was mentioned as a positive feature of the Met Éireann's weather app:

It's quite good as well in that it'll take a location very close to you, you know, if your location services are on, it'll find where you are and it'll give you a detailed forecast for today and do the same for the next, oh, I think it's about seven or eight days. I can't remember exactly, but it's quite good from that point of view. But there's good stuff on it. And you can change the location like if you're here in Sligo and you want to see what it's like in Killybegs, you can just go up and change the location. (R1P6)

And similar to what I think R1P6 mentioned earlier ... it actually will geo-locate you. So, it doesn't matter where you are, it'll pick up, as long as obviously if you have your location on your phone, but it'll pick up where you are, it's handy. (R1P3)

Rainfall Radar Feature

Some participants were particularly happy with the rainfall radar feature on the Met Éireann app:

The Met Éireann one, I have definitely used that when I was travelling ...I'd see the rain and I often travelled before the rain or after the rain, and I did it! And I was completely on the road let's say for two hundred KM with no rain and the rain coming after me or the rain going before me, and to me it's, that's something I really, I love to beat the rain! I really feel like it's an achievement if I manage to better it! (U1P3)

The only thing that I find of use on it is the rainfall radar, to be honest with you. (S2P5)

So, if you get the Met Éireann app and open it on the front page, the first thing you see is the rainfall radar, which is obviously what a lot of people are interested in. (R1P6)

Certainly, like the aspects like the rainfall radar on it. I think that's actually very good. It shows the exact location and where it's coming from and what time it will hit and everything. I think you're met with the rainfall radar immediately when you open the app, which is what I use usually use it for but it's just, there is nothing user friendly about it which you get with other apps. (S1P7)

Trust

Trust in Met Éireann's was another theme which emerged during the discussion on weather apps. Some participants expressed their confidence in using the Met Éireann app to plan their activities and work. They trusted the information provided and were happy with this service:

Well, I use my phone in the tractor, so it's kind of with me all the time and the Met Éireann app is on the phone and then in the morning we would look at the computer. Well, I can just say that I've been using it, depending on it, and I kind of rely on it, so it's working for me. (S3P5)

I use the app several times a day. (S3P6)

I like Met Éireann one. I have to say, it'll be the only one that I use. I have the Met Éireann app on the phone. (S1P7)

I think I'd prefer to use Met Éireann's stuff 'cause I think they have a more detailed squares that they use for analysis of the forecast. (S2P2)

Negative

Table 15 below collates all the negative themes which emerged after analysing participants' comments in relation to their dissatisfaction with the Met Éireann weather app.

Table 15 Satisfaction with Met Éireann Weather App - Negative

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Accuracy	0	4	0	1	0	0	0	0	5
Awareness	4	1	0	3	2	3	0	0	13
Comparison with Competitor Apps	1	2	0	5	0	2	1	0	11
Prefer Limited Apps	0	2	0	0	1	2	0	0	5
User Interface	1	1	0	0	0	6	15	1	24
Total	6	10	0	9	3	13	16	1	58

Accuracy

Some participants expressed agitation with the lack of accuracy in the weather information they received from the Met Éireann weather app:

Yeah, I'm aware of it and I tried it and I didn't find it as accurate so I didn't use it then. (U2P5)

But what I find personally is that ... on an hour-to-hour level ...there's nothing that I've found that is very accurate when it comes to predicting the weather... it's probably better to look at it in terms of a week and then you can see it's a bit warmer, it's a bit colder, yeah, on average, it's going to rain a couple of days. But if you want something very accurate, hour-to-hour, there isn't really anything that is accurate. So again, they just kind of need to catch up with the times, I suppose. Again, they have an app but I, I just, again, I don't think it's that accurate, I don't think that's accurate where, in particular where you are, 'cause, again, it could say Cork but it just doesn't match up what's happening outside the window even sometimes. So I suppose just catch up with it a little bit, so. (U2P7)

But I think, like most of those other people along the way have said, the phone does tend to be more accurate, I think, than the Met Éireann one. (R2P4)

Awareness

Some participants were not even aware of the Met Éireann app:

So, I didn't even know there was an app. (S1P2)

I never even thought of downloading the Met Éireann app. I didn't really know there was a Met Éireann app. (U1P6)

I didn't know they had an app. (S4P3)

I didn't even know if I knew there was a Met Éireann app. (S4P2)

The odd time I'd want to go look up Met Éireann, I'd go on to the website, rather than the app. I wasn't even sure there was an app. So, the odd time I would use it, I would just go on to Google. (S1P8)

Yes, I was the same. I didn't actually know there was an app. (S1P1)

There's also like some other features that are on weather apps that wouldn't be on Met Éireann, like what time the sun's going to rise and set. Like these days you'd be looking for the grand stretch so like it's good to see what time, how much brightness we're going to have in the evening that sort of thing and I think that's probably the only difference, I could probably tell. I've never downloaded the Met Éireann app to be honest. (S1P4)

Competitor Apps

A number of participants preferred using competitor apps, considering them to be more accessible, accurate, etc.:

I've tried them all, I've tried AccuWeather, I tried most of them like, ... I just find it so accurate and so easy to use. (U2P5)

However, there's another app that I use to get, to get my weather information, which I find sometimes is, it's more, it seems to be more direct or more detailed than what I can get from Met Éireann, and, I'm just looking it up here, I think it's called XR or something, I don't know. It's one that sailors use, XC weather, it's called. (U2P3)

Are they targeting to be catering for people, like, as in, they want that to be the people's number one source of weather or? I'm not sure, because it'd be very difficult to compete with Apple and Samsung and Huawei, whatever, on their own weather app. (U1P1)

Prefer Limited Apps

Some participants mentioned that they didn't use the Met Éireann app as they preferred to have only a few apps on their phones:

I don't, personally I'd keep a very minimal number of apps on my phone and what-not. (U2P6)

No, I haven't, I haven't downloaded the app. I don't use apps as such, don't like them having on my phone. (S4P4)

But I feel like there's an app for everything and I don't see the need to have like two weather apps on my phone because I'd rather just Google it rather than take up storage in a way. (S1P1)

For me personally, I only have the iPhone app. I never have any room on my phone either, so I don't think the need to have an extra weather app. (S1P5)

User Interface

Participants either preferred using the Met Éireann weather service on the website or found the app very limited in terms of accessibility, information, or not being able to run properly on some devices:

Yeah, one of the only differences I could note from just looking at like what the Met Éireann app looks like, it's quite wordy like they will have the weather forecast in sentences, as well as like actually like a map of Ireland, whereas I think the other ones, they'll have like the iPhone one has percentages and it'll have like a rain cloud or like my one, I think it just goes by the hour and if there's just a cloud it's cloudy if there's a sun it's just sunny, that sort of thing. You kind of just get it from pictures or like little icons, rather than actually reading sentences, maybe as a generation we're just lazy but like it's just kind of easier just to see, Okay, there is a rain cloud at seven o'clock so it'll rain, that sort of thing. There's also like some other features that are on weather apps that wouldn't be on Met Éireann, like what time the sun's going to rise and set. Like these days you'd be looking for the grand stretch so like it's good to see what time, how much brightness we're going to have in the evening that sort of thing and I think that's probably the only difference, I could probably tell. I've never downloaded the Met Éireann app to be honest. (S1P4)

I don't use the app, prefer web interface. (S3P4)

I think their [Met Éireann's] app could probably be a bit more user-friendly. Like, I think they kind of released, like, kind of more reports about the weather each day, but they could, like, get people's trust and get people using a bit more by just giving them, kind of like, more accurate information, but quicker as well. (U1P2)

I think the website itself, you have to go onto a desktop or a laptop to get ... the best out of Met Éireann's site, that the app is terrible. (S2P2)

I think Met Éireann even seem to recognise it themselves because, I think, if you go on to the app, in some respects, it does tell you to look at look at the website I think for some information I recall seeing on it at one stage, but certainly, you don't have any other choice. If you want to get the stuff in the format or the detail you want, you pretty well have to go to the website to see if, so the phone app is kind of very much the orphan of their, of their offering. (S2P5)

Yeah, I would have used, mainly used Met Éireann before for the synoptic charts, so now that they're not actually there anymore there's like a, sort of the same as Windy, they've got the colours and they've got the arrows, (lost audio) fronts, and the actual isobars, so that's why I kind of stopped using Met Éireann, because that was the main thing that drew me to it. (S2P4)

Yeah. On their app, I think their colours are, their, their general signage or whatever you call the graphic explanations, are not very accessible in that if you look at the wind one you see the different colours, but you have to look somewhere else to see what the colours actually mean. Now, if you're using it all the time, probably you get to grips with it but most people aren't using it on that regular a basis to remember what the stuff is and the stuff with the arrows on it showing what the relative strengths are, OK, they give you an indication of whether it's a little bit windy or very windy, but what the graduation from one end of the arrows size to the other end of the arrow size isn't clear. And it's that really, that's the information that you need when you're trying to decide whether it's a day I can go afloat and handle the conditions or one that I'll just not bother going out and leave somebody else to suffer. So, just the graph, the graphics and the explanations thereof, for what they do have there, are poor and what they have there in the overall context is also poor. (S2P5)

It's just too vague and just inaccessible. Having a phone app and then relying on people who have an interest going to look at the Met Éireann website on their phone where it's generally too small to look at, but the phone app is, it's a very low common denominator, in my view. There should be better detail on it and the option to go on to screens that are more specific to what you want to see, rather than having this Ireland on a five-inch phone screen where you're trying to make sense of the graduation, as I said, in the arrows. (S2P5)

I have to say, I do find it fairly annoying of the Atlantic charts, you can't actually zoom out to see what's the happenings on a wider picture, it only gives you quite a close-up view so you can't actually zoom

out to see what's happening totally. (S2P4)

I have the Met Éireann app on the phone. But in fairness that is terrible, like not the information it gives, but the actual app itself and the how un-user friendly. And so, yeah, the actual app itself is desperate and nearly puts you off using it. It's just it looks like an app developed 10 years ago like one of the original smartphones for them. I don't know, it's just not clean looking and there's not a nice flow to it anything like that, but as I said, I like the information it conveys and they actually updated it probably about 18 months ago and it used to be easier to use I found. But like, if you want to find the weather on your location, it used to be just there on the screen, whereas you have to go to maybe like two or three clicks to find, I'm in County Louth, you have to go through two or three clicks to find County Louth whereas, I think you're met with the rainfall radar immediately when you open the app, which is what I use usually use it for but it's just, there is nothing user friendly about it which you get with other apps. (S1P7)

Yeah, I had the app. But as S1P7 said, I deleted it because I found it just terrible. I'll just Google it. I found it runs very badly on my iPhone but we have a family iPad that it runs really well on. So, I don't know if it's something to do with the mechanism of the app. So if I am on my phone I'll just Google it because I thought the app was just terrible. (S1P6)

3.3.7 Satisfaction with Non-Met Éireann Weather Apps

This section captures participants' assessment of weather apps, other than the Met Éireann weather app, which they used to access weather information. As evident in Table 16 and Table 17 below, to facilitate a more detailed analysis this section was split into two groups - positive and negative themes.

Table 16 Satisfaction with Non-Met Éireann Weather Apps – Positive

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Accuracy	6	5	1	4	1	2	0	0	19
Convenience	3	3	0	2	0	4	0	0	12
Detailed Information	5	4	1	2	0	4	0	1	17
User Interface	2	1	0	0	0	3	0	0	6
Total	16	13	2	8	1	13	0	1	54

Positive

As outlined in Table 16 above, the most prevalent theme for positive feedback for Non-Met Éireann weather apps was accuracy, followed by the level of detail provided, convenience, and, finally, the user interface.

Accuracy

It was evident from some participants' response that they preferred using apps such as XCWeather, Yr, Windfinder or their standard phone apps, as they found that the weather information they received was accurate:

Well, I actually use XCWeather. OK, XC, that medium, you know? And I started using that since I was on the island of Barra in in Scotland and I learned how all the islanders actually use that one. And I think of all the apps, weather apps, I think that is probably the most accurate. I find again I use the XC app, and I find, I find the XC, I find it very good. I find it very easy to use on the phone because straight away it'll tell you, like, the only time it kind of gets it wrong, for me, is if there's a very light amount of rain, like zero point one mm. But generally, like, I was going for a walk now today with the dog, so we'd gone out to Tramore Road and then this said to me about two o'clock, it said it's going to be misty for a while. And we were out there about a quarter to three when it started and I was saying, Jesus, it's pretty accurate, I give it about 80 percent. (U2P5)

Yeah, I'd be the same, like, I just, if I go into the phone app, I just see the picture of the sun and that's it, I know it'll be sunny. (U1P2)

I think XC is very accurate, I have to say. (S4P1)

There's a lot of good opinions about Yr. Another one that I use that I find is accurate is Windfinder. (R1P6)

I feel like that I actually like my iPhone; I feel like it is way more accurate. I can give you specific times and I suppose the projected percentage of rain that they expect to fall and what time they expect it to fall at. (R2P3)

But I think, like most of those other people along the way have said, the phone does tend to be more accurate, I think, than the Met Éireann one. (R2P4)

I don't have an iPhone, so I just actually like the one that's on my phone, I think it's from the Weather Channel. Sorry to be weird, but yeah, I think it's fairly accurate most of the time. (S1P4)

On the iPhone one as well, I forgot to mention. Do you know that way it says like percentage? So, it might say, like 30% rainfall or like 80% rainfall and I kind of pay attention to that because, if it says 80%,

90%, I kind of nearly believe that because that usually is fairly accurate. (S1P1)

I would use the Magicseaweed or Windguru for the, I suppose, more detailed information, be it the tides, the swells, the wind. (U2P6)

Convenience

In addition to the element of accuracy, some participants preferred using other apps due to their ease of use and easily accessed information. Other participants stated that they never made an effort to download an app because they were happy to use the default app which was available on their phone:

I just use what's convenient on the phone. I don't, I have nothing else downloaded. (U2P2)

I just use the iPhone app because it's just very convenient. And also, if I'm honest, I don't really know a lot of the other kind of good apps or anything. (U2P7)

For me, it would be mostly Google, I think. I find it fast, efficient, I'm like, talking to Google, Hey Google, what's the weather? And it's a thing on the go. You know, wherever I am, I can access Google and that would be my first port of call. (R2P5)

For this theme, two comments from the Student (S1) Focus Group stood out. For them, they weighed the element of ease of access to be much more important than the element of accuracy:

For the iPhone one, I definitely agree that it's not accurate, but I find it easier to just go on my phone, click on it and check really quickly rather than have to go out of my way and search for more. (S1P1)

Yeah, I'd agree with that. The apple one is good for like, I need to get out the door, do I need a coat, do I not? And then not really make plans with. (S1P3)

Detailed Information

Having weather information that was detailed was of significance to many participants who used other weather apps. They conveyed that these apps gave hourly updated information and forecasts were location specific, which met their definition of a good weather app:

XC weather gives me an hourly prediction of the conditions to expect, you know, for my area and I find that very useful, whereas when I go into the Met Éireann app it'll just give me, you know, the Munster region. (U2P3)

I use, on my phone, AccuWeather. It gives you a monthly forecast, weekly forecast, an hour-by-hour kind of thing, that's useful when you're going on holidays to see what it's going to be like in the middle of your holiday. (U1P4)

The app I'm using [the weather channel], you can actually see it by hour and it gives the probability of rain at that time. So that's superimposed on that. (R1P3)

PredictWind, detailed local forecasts, rain/wind maps 6 different models, allows me to form my own view of probable weather. (S3P4)

Yr has gotten very location-specific as well, rather than just Dublin weather like, you can type in the weather in Howth, might be different than the weather in Dún Laoghaire. (U1P1)

User Interface

The theme of accessibility emerged in relation to app preferences. Participants were happy with the information on competitor apps as it was graphically depicted (e.g. presence of percentages and icons):

I just, if I go into the phone app, I just see the picture of the sun and that's it, I know it'll be sunny. (U1P2)

We've gotten used to using apps that are pretty user friendly and they also look really good. So, if we've got an app like you're saying, if the Met Éireann one doesn't look good or it's not like it's not great to look at, you're not going to use it as much. But like any other weather apps that look pretty good, like I open mine and if it says it's raining and the app is raining, I'm like, that's so cool. Like I know that's right into my head, that sort of thing. Like the iPhone one has percentages and it'll have like a rain cloud or like my one, I think it just goes by the hour and if there's just a cloud it's cloudy if there's a sun it's just sunny, that sort of thing. You kind of just get it from pictures or like little icons, rather than actually reading sentences, maybe as a generation we're just lazy but like it's just kind of easier just to see, Okay, there is a rain cloud at seven o'clock so it'll rain, that sort of thing. There's also like some other features that are on weather apps that wouldn't be on Met Éireann, like what time the sun's going to rise and set. (S1P4)

Just on the point that S1P4 made about the little like icons and stuff. Like in a way that's just pleasing to the eye like it's a visual example where you don't actually have to focus too much you can literally just glance quickly and you see like rain or the little like sun that you mentioned and stuff and like that just makes it so much easier in a way for users to know what weather would be like. (S1P1)

Negative

As evident in Table 17 below, trust was the most prevalent negative theme for participants when discussing a lack of satisfaction with the weather apps they used.

Table 17 Satisfaction with Non-Met Éireann Weather Apps – Negative

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Trust	4	6	0	0	0	6	0	0	16
Met Éireann Superior	0	1	0	0	0	1	0	1	3
Total	4	7	0	0	0	7	0	1	19

Trust

While some participants were satisfied with the weather apps they used, others had juxtaposed opinions about the same apps and preferred not using them as they felt the information they received was not accurate:

I use the iPhone app but it's just, it's a really, it's not accurate at all. Like, half the time I'm looking at it and it says that it's, you know, sunny outside and I can see outside the window it's raining. You know, it's not keeping up whatsoever. (U2P7)

It's very important to have an accurate, my app is the standard Samsung app that's on my Samsung phone and sometimes it's very good and sometimes not so. I would never rely on any of them, even the Norwegian one that everyone talks about. I never find any of them completely reliable, in terms of, especially on the hour-to-hour that you mentioned there U2P7, you know, if you're going to go out at three o'clock or seven o'clock and you look and see what's the chance of rain. (U2P2)

Yeah, there's more information so, that's sort of now a few times it said was raining in Portrane and I was in Portrane and I went out and it wasn't raining. I was going "it's not raining", but. So it's not always right. (U1P6)

The iPhone one is just sort of, I think it's pretty terrible. You get an idea, I guess, and then the news, I think, is just, it's probably not as reliable as an actual source. Sometimes, I'd just really be looking at the weather myself, rather than taking some of the forecast, because I think, like I said, some of them are not exactly very accurate. (S1P6)

Preference of Met Éireann

Some participants expressed a preference for Met Éireann over the other available weather apps; they trusted Met Éireann more:

Met Éireann. I find it very good for what I need. There is another weather app that comes with the iPhone but I don't find it near as good as the Met Éireann one. (S3P6)

Sometimes I compare between the Met Éireann app and the iPhone app because ...I don't trust it whatsoever, but the other one, the Met Éireann one I trust a little bit more, so then you kind of compare, maybe then you can get a better idea of what's happening. That's just the way I would do it, and I just have those two then. (U2P7)

Yeah, I feel like I always use the iPhone one, like most days, but like let's just say if there's actually something happening, like I really need to go outside, I would use Met Éireann. (S1P1)

3.3.8 Willingness to Pay for Weather Services

Participants were asked would they be willing to pay for weather services. Table 18 below summarises the discussions by categorising reactions as No, Maybe, and Yes. The data provides a count of the number of statements recorded under each theme.

Table 18 Willingness to Pay for Weather Services

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
No	17	9	5	8	3	5	1	9	57
Undecided	7	3	1	1	5	3	2	2	24
Yes	0	0	0	0	0	1	5	1	7
Total	24	12	6	9	8	9	8	12	88

No

Most participants were not willing to pay for weather services. This reluctance was based on either the argument that there were plenty of free sources or that the services should be regarded as a public good paid for which they already pay through tax:

I feel it would be unfair, that we are saddled with that. Like it's national forecast you know. I wouldn't like to have to pay for it, I'll be honest. (S3P1)

As far as I know, we are paying for it for it to be, to get it more accurate and localised at the moment ... (U2P1)

Ultimately no. I know it's available for free elsewhere (U2P6)

No! ... I feel like I'm paying for enough things, I don't want to pay for anything else, especially on my phone or the computer, no way! I think if I had to pay for the app, I would delete it, to be honest ((laughs)) ... (U1P6)

And look up the weather on Google! ((Laughs)). (U1P3)

Yeah, it's just as quick, just as easy. (U1P1)

I just wouldn't pay for it! (U1P6)

It is, or it should be, a public service. Like people's lives and livelihoods depend on it. So, it's a public service. It should be either, it should be funded through I suppose taxation, basically. So, you end up paying for it one way or another, whether taxes are a set fee per year. (S4P4)

I wouldn't see me paying for a weather forecast. No, I don't see any reason. Maybe if we're in a commercial setting, that it was absolutely mission critical, but even at that, I think it's something, and perhaps it's just the fact that I've grown up with the weather being available. But I would see that as an issue. And when I think of an agreement, as far as I'm concerned, it's part of the, no, I'm paying my TV licence for years, should be a service that's provided. (R1P3)

No, as for me, I'm not going to be paying, I'm not going to be willing to pay for any weather services. At all, I think that that's public service information and I think we should be getting that, you know, for free really, we are paying for, for too much, too many things as it is. (R2P2)

Yeah, totally agree for my purposes anyway. I can understand someone who's like, maybe job or, like, completely depends on accurate weather information, maybe they could pay for some sort of premium

service but for the average user, I don't, don't see a reason. (R2P1)

Yeah, I'd agree, so I could see where industry would pay for it, you know, or people in particular type of businesses for, you know, very specific, accurate information. But as a consumer, I don't think I could ever see myself paying for, for weather information. (R2P7)

I'll be honest, I probably wouldn't purely because what I already have on my phone is grand. I'd probably would be more likely to put the three quid in like a bucket if they were collecting money for it. But I'd probably wouldn't be bothered to, like, get my card out and buy a weather app when the one of my phone is already grand. (S1P4)

Undecided

Some participants were more open to the idea of paying for weather services in the future. Participants coded as undecided were either supportive of a one-off purchase, but not a subscription, or suggested they would not pay now, but might do so into the future:

I suppose personally, if there was a new app, for example, that it doesn't have to be associated with Met Éireann, just a general weather app, and let's just say it's just a miracle, it's just the best technology ever, it told you everything that you needed, it's accurate, I would probably, I would probably pay for it, like, as a once-off where you get the app and you pay for it probably no more than a fiver and then you have it forever. (U2P7)

I don't know! Very, very difficult, the competition is so fierce (U1P1)

They'd have to say here's an 80 percent forecast for those who don't pay, and if you pay you get a 100 percent accurate forecast! (U1P5)

Don't know if I would, but it's hard to, it's a difficult question to answer because at the minute we don't, so I don't see why I would start paying for it, really (S4P2)

... if they withdrew the service from Met Éireann that they're currently providing, there'd be uproar, and what are we paying them for, etc., etc. But if they wanted to enhance their service and charge for it then and compete with the more commercial providers currently in the market, I think that would, they'd be pushing an open door in that respect. They would have to keep up their free service, though, to the consumer base that are paying their taxes and expect that level of return from Met Éireann. Extras. (S2P5)

I suppose if it was a once-off purchase, I'd be more likely to buy it. But if it was like a subscription, I'd kind of be like, oh, fine, I'll just see what the website says, especially if the app isn't running to the highest or when you're not getting the most use out of it. (S1P3)

Yeah, I was just about to say the exact same thing as S1P3. Like if it's a onetime thing, it doesn't really bother me. ... like cup of coffee cost type of thing. But if it's more of a subscription type of thing, I don't think I would because there's free options out there to check the weather. (S1P1)

Yes

As evident in Table 18 above, there were only a small number of participants who were willing to pay for weather services. Most of these comments emerged from the Marine (S2) Focus Group who were either already paying for weather services or supported the notion of paying for greater accuracy and fewer adverts. They acknowledged their willingness to pay was based on their need for regular, accurate weather information on the water, and suggested the wider public would be less likely to pay for these services:

I already pay for PredictWind but as a high-rate taxpayer, I think I already pay for Met Éireann and strongly believe this should remain a free service ... (S3P4)

Well I think some of us here are already paying for it, Moderator, and I suppose our choice, which one we choose to pay for will be, will be determined by what we get out of the offering that is being made. So, I only pay, whatever it is, less than 20 euros a year. I know some of the, Predictwind is considerably more expensive but a lot of people are paying for it, it's 200-and-something euros a year. So yes, I think if Met Éireann were putting out something that was more valuable to me than Windguru is, I would pay for it, I would just be changing my custom from one to the other. (S2P5)

Yeah, I think similarly, Moderator, that I would be paying for it because, you know, your time is such a valuable commodity as well and you want to get the most suitable service and you do not want to be inundated with ads as well, breaking up the service you're receiving. So you would be paying for it. (S2P3)

I agree with, you know, if you, you'll pay for your accuracy and currency of forecasts. I think there might be some of public pushback. It's a government-funded body, Met Éireann, and then if they were to charge extra then afterwards, perhaps, it might be seen as a double-charging for the service that they've provided and I can't see the general public signing up for it. (S2P2)

I have no problem in paying for an app. They're all usually cheap enough anyway. Even if it were three euro, like that's the price of a cup of coffee. If you were to have an app that was designated to the Irish weather, definitely worthwhile. (S1P7)

3.4 Marine Users: Special Interest Group

3.4.1 Importance of Marine Observations and Sea Area Forecasts

The Marine (S2) Focus Group participants discussed how the sea area forecast was critically important while at sea or for planning sea events. Given the fact that they were marine users, it was of prime importance for them to be, as expressed by participant S4P2, “hyper aware of wind direction”:

I suppose, if you're involved with boats and stuff, it's a different level. But, for me, it's just, I suppose it's all, surrounding you all the time. You're hyper aware of wind directions and you know, things like that. (S4P2)

They can be useful I think if you're, if you're on a longer voyage, out at sea, the buoys can be useful obviously if there's a weather system has come in, or on its way in, 'cause they are good to measure wave height and it can give you an indication of whether, you know, the waves are decreasing or increasing and help you to, you know, decide if maybe you'll you'll go back out to sea or if you're going to stay in harbour someplace, they have their uses for longer voyages. (S2P6)

Planning Activities

Planning, or cancelling, events or activities based on accurate weather forecasts was hugely significant for marine users. It is vital that they have accurate information if they are to make correct judgements:

... it is quite vital to run any sailing event or any sailing organisation or training or racing that there is accurate forecasts available and preferably a number of days prior, not just on the day or on the day before. (S2P2) ...

I'd just come in exactly like S2P2's saying, they absolutely do dictate the day's activities, but also in respect of passage planning, even if you're heading over across the water to the Menai Straits or wanted to go down to Greystones or up to Ardglass, again, it will completely dictate number one, when you're going to go, but even down to the hour, if you're going to go as well. So, it'll influence it heavily, so it's important, because there's so much planning goes into events like that, that you do get the accurate weather forecast. (S2P3)

So quite important for us too, in terms of event scheduling, whether or not it's possible to cancel the event and, you know, not have it actually end up being a lovely day or something like that, which has happened a number of times before, unfortunately. (S2P4)

The weather forecasts are fundamental ..., the specific event is in many ways dependent on the accuracy of the forecast from, say, four days out. When people like S2P4, who are deciding, are they going to bother to organise their boat to go to Galway..., do we want to go to Galway and hang around

scratching ourselves for the full weekend because the forecast is bad or do we stay at home and do some training or we do something more enjoyable? From an organisers point of view, that can make a big difference in terms of return on the event because your resources are still going to be committed, your costs are incurred, and if you have a lot of people who don't turn up, then the economics of the event go out the window. (S2P5)

Safety

Marine users explained how their safety, and the safety of others whom they coach or who attend organised events, depends on having accurate weather forecasts and, specifically, sea area forecasts. So, for safety reasons, all individuals involved in marine activities expressed their need for accurate and accessible weather/sea area forecasts:

So you have safety, which is obviously always the primary element of it. (S2P5)

it is a life-saving feature ... it does determine our activities for the day as well. (S2P3)

The Marine Focus Group appreciated the challenge involved in giving detailed sea area forecasts, with one participant stating:

Yeah, I presume it's difficult for forecasters to have the minute details of having forecasts for different three-mile gaps and, its share of coastline, whereas if you have a straight, long coastline and it's hot like Los Angeles or somewhere, you know the sea breeze kicks in at a quarter past twelve every day and, it blows like that until the evening time. But if they have a curvy, winding coast, it must be harder to have the computer models set up for that. Are the ... recording systems set up to have that forecast? So it is, it does come down to local knowledge, I'm guessing. (S2P2)

One participant felt the Met Éireann weather forecast and alert system did not provide information with sufficient detail:

I think, if I was running an event, I would never rely on the Met Éireann weather alert systems. I probably wouldn't rely on the Met Éireann forecast anyway; I would always refer to the other models to see more detailed information about what is likely in the area where the event is. The Met Éireann system is just too blunt a weapon where things are marginal between being viable or not viable. (S2P5)

3.4.2 Marine Services and Apps Used

The Marine (S2) Focus Group was asked about the services and apps they use to access sea area forecasts when planning sea events. Participants mentioned that they used XCWeather, the Met Éireann website, the Dublin Bay weather buoy, Grib, Windguru, and the Irish Ballooning website as

trusted sources to access the weather information. Their responses are presented in two clusters, positive and negative feedback.

Positive

The real-time nature of weather buoys was commented upon in a positive manner:

the Dublin Bay weather buoy, if you're sailing in Dublin Bay, that is the Bible, basically, 'cause that's telling you what is actually happening at the Dublin Bay location, at the buoy location. If you're in the Bay towards the Sutton end and you're on a sea breeze, that, the information being put out by that buoy is what you're going to get in the next half an hour. So it is really as imminent as you can get in terms of a forecast. The regular situation in Dublin Bay is that you have a gradient westerly or south-westerly. (S2P5)

They can be useful I think if you're, if you're on a longer voyage, out at sea, the buoys can be useful obviously if there's a weather system has come in, or on its way in, 'cause they are good to measure wave height and it can give you an indication of whether, you know, the waves are decreasing or increasing and help you to decide if maybe you'll go back out to sea or if you're going to stay in harbour someplace, they have their uses for longer voyages. (S2P6)

While some participants trusted a particular service or app, others used a combination of sources:

My kind of top three things I use, Irish Ballooning for the Atlantic charts, I'll generally go on to XCWeather, it's actually a UK website, but I tend to find that one's actually quite accurate over the couple of years I've had it, so I kind of use those three to triangulate what I can predict is what's going to what's going to happen for us on the racecourse. (S2P4)

I would like to use the synoptic charts, so I would use Grib and also XCWeather. (S2P1)

I would use Met Éireann as kind of the general overlay and then for specifics I would use the Windguru site, which I have a paid subscription to it. (S2P5)

Windguru is the one I would use, along with Windy and Met Éireann. They would be the three primary ones that I would keep popping in to. (S2P3)

I'd prefer to use Met Éireann's stuff 'cause I think they have a more detailed squares that they use for analysis of the forecast. Windfinder, I would think from a presentation point of view, for the bits that you want, is as good as whatever else I've found out there. (S2P2)

Their reasons for trusting a particular app or service varied from the perceived level of accuracy, ease of accessibility, or level of detail provided.

Negative

While some participants were happy with the apps or services they used, others expressed their dissatisfaction with the information or service provided by some apps or services. Some participants were unhappy with either the level of detail in the information provided or due to the limited features of the weather apps or services which they were using:

The main problem with Windguru is that it is quite susceptible to local conditions. So, if you use it for Portmarnock and the wind is any way southerly it isn't going to make any provision for the distortion that Howth Head causes on the southerly winds. (S2P5)

Like, you can tell that it's going to be a sea breeze-day because there's just like a massive difference between the steady wind and the gusts. And you just know, like, there's no way to predict what's actually going to happen, you're gonna have to just watch for when the sea breeze comes in and then know by, you know, how hot it is, how cold sea is, what kind of strength you'll then get. But the forecast won't give you anything like that. (S2P4)

I think I'd prefer to use Met Éireann's stuff 'cause I think they have a more detailed squares that they use for analysis of the forecast. But the app is terrible for anything detailed, it's just a general round Ireland or the whole East Coast. I think the website itself, you have to go onto a desktop or a laptop to get the, to get the best out of Met Éireann's site, that the app is terrible. (S2P2)

The big advantage of Dublin Bay now is because of the full weather station on the Dublin Bay turning buoy. You can look on your phone at any time and see what the actual conditions are there. But that's really when you're there, it doesn't do much for you the day before when you're trying to work out what might be there. (S2P4)

The only advantage I would say now at the moment, S2Moderator, is that there are so many weather forecasting sites available that it really usually becomes down to a process of looking through the sites. And in many instances, I'm afraid, you pick the one that suits you best and put your faith in that, whether it's right or not at the weekend you'll have, you'll know by the following Monday. But it's always a bit of a mystery as to which of the models are going to be right for the following weekend, and Met Éireann use some, Windguru uses other, Windpredict have a range as well. So, between all of them, you're probably find, going to find one that's giving you an answer that you might like to see and then you put your faith in actually turning up. (S2P5)

And I think there's, just comes to mind there is the Coningbeg [Marine Data Buoy] one that's there, I actually, I signed up to that and just get the reports off of it. (S2P3)

Yeah. (S2P5)

But I actually had to delete it because I was getting too many reports. And that was the other piece, that there was too many, there wasn't any significant change, you'd know the pattern coming through. So, the additional information was only nearly just repeating or confirming what you were expecting to happen there at that stage. So, it was actually too much information coming through from it to be of any benefit at that stage. So, for something like that, it's nearly easier to go probing and looking for it, you know, when it's that far out, rather than having constant feeds from it; whereas something local and closer from local racing perspective, a constant feed would be more beneficial there in that context. (S2P3)

3.5 Climate Services

3.5.1 Importance of Climate Information

When exploring the importance attached to climate change information, participants considered both its importance to them at present and how important this information would become in the future. The key themes that emerged under importance at present, and their relative prevalence, are summarised in Table 19 below.

Table 19 The Key Themes Associated with the Importance of Climate Change Information at Present

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Climate Change Communication	1	1	1	0	0	5	1	0	9
Direct Experience	0	1	1	1	0	0	3	2	8
Effect on Other Species	0	0	2	0	1	0	0	0	3
Importance to Children	1	0	0	0	1	0	0	0	2
Indirect Experience	4	0	1	0	0	0	1	0	6
Plastic Pollution	4	0	0	0	1	0	0	0	5
Total	10	2	5	1	3	5	5	2	33

Climate Change Communication

Of greatest concern across the focus groups, but particularly among the Student group, was the style of communication used to convey climate change information. Concerns expressed included what participants felt was a lack of reporting on the impact of climate change on Ireland's agricultural sector, coupled with a desire to see more coverage of rural areas in the context of climate change:

we're such an agricultural country, like, I think it'd be really good to see if/how that was affecting that

side of the industry that we live in and like people's jobs as farmers. (S1P4)

Yeah, I definitely agree with S1P4 there. I feel like the primary sector would really be affected by climate change and I feel it'd be nice, since a lot of kind of the Midlands and the West, even actually kind of all of Ireland would have a good bit of agriculture. It'd be nice to see how it's affecting them because I live in a city like, by now we're contributing so much to climate change, but I want to see how the rural areas are being affected by it more so. Like, it's when you live in an urban area, you feel like you live in your own little bubble, you're not really aware of what challenges are faced by people due to climate change. And it'd be nice, even just to be aware of that more so. (S1P2)

Some felt that media reports of climate change fail to convey its urgency by relying on familiar scenario-style reporting or what was seen as the vilification of different groups for their contribution to climate change, instead favouring a conciliatory and solution-focussed approach:

I think climate change always says what's happened in the future, but they don't go backwards and say, yeah, well, the water's six inches higher in Clontarf than it was last year. People don't notice that. They just, it talks about in 2030 and 2050 and down the road. (S2P2)

if people talk generally about climate change, nobody actually believes it till the storm water is washing past their door and all that sort of thing. So, I would think that the more specific the forecasting could be, the more effective it would be. (R1P6)

we should always in our communication around it be solution-focused and not pointing of fingers because that's just detrimental. You know, it's not, you're bad, you should change something, it's, oh, this is an issue, this is a potential solution, would you be interested? (U2P4)

Alternative reporting strategies were proposed. A more sustained media commentary, or some scoreboard-type coverage, with updates on Ireland's progress towards its international climate action commitments, even down to county-level, were favoured:

I think it's really important that it is brought to the attention of everybody and discussed regularly. (U1P4)

I think for me, it's definitely going to bring more accountability, I think, to your, like imagine if you had it for a county or something like you can see, we're making improvements here, this is what we need to do as well. I just think it would be nice to know, it would just make everyone more accountable for their actions. (S1P5)

I think as we get closer to ...the SDGs, like the 2030, and all those various things that the Irish government signed into doing, I think the closer you get to them, I think the more information, because they're kind of reaching the deadline and if you're not making it as well, I think people kind of want to know that. (S1P3)

Direct and Indirect Experience

Many participants discussed perceived changes in weather patterns that they had observed and attributed to a changing climate. These experiences were not confined to Ireland, with some describing the greater frequency of extreme weather events in other countries:

Well, if it's going to affect the weather, most definitely. I mean, you take the last 10, 10 to 15 years, flooding has become a bigger and greater problem in this country. (U2P1)

I mean, I think there is definitely a change in the weather, definitely. (R1P7)

In terms of food security, ... the part of the world where I used to live [Zimbabwe] many years ago, seeing how the weather patterns and the climate changes that would have taken place, there is more droughts than they used to be when I was younger. And even then, you know, the rainy season's getting shorter and shorter and a lot of people depend on the rainy season for their crops and then for their livestock ... for survival so they, they sell up. Within a very short space of time there has been very significant changes in the weather patterns and then in the weather systems there. (R2P2)

The Agriculture and Marine Special Focus Groups, where monitoring of weather is key to their professional and leisure activities, were especially aware of the potential impact of climate change. Farmers were concerned with changes in the frequency and levels of rainfall, and how this could affect their industry, while marine leisure users were conscious of the effects of rising sea levels and more changeable weather systems:

But we can already see the impact of it, I think, since the last 10 years, definitely. And the rainfall and the amount of it coming all at once. So, maybe, it's an impact that has an effect on our business. So, I mean, we should be thinking about it. (S3P5)

Yeah, I think we're all quite interested in it, see what way it'll go. And I think, as S3P5 says, definitely to rainfall patterns or the intensity, I find, I feel that definitely has changed over the last number of years, for sure. Like it's very important going forward, and especially for tillage and grassland farmers

in particular. (S3P1)

Most of us who are involved in the marine leisure area have certainly noticed the greater frequency of extreme events over the last few years. Some seasons, ... I think that the last season or the season before, there's so little activity afloat last season now it's hard to place it. But we had one season lately which was a really mild, you know, very few days lost sailing because of the conditions, whereas two or three years ago it was, kind of, will we get sailing at all this year? It was just miserable on a consistent basis. So, certainly, the big storms coming through are very severe. I think 2018 we had the big easterlies, which did a lot of damage along the East Coast. Clontarf was flooded again last week, which didn't happen for a long time and then the sea front was all deluged last week, so I think the big interest ... in the future is the, how quickly the weather systems set up and the quick onset of very bad weather. So, you can have a lovely benign day and suddenly the next day is really bad because the weather has changed so quickly. And I suspect that's to do with the climate change scenario. (S2P5)

I feel like it is increasing more, especially with the pier we have down in Broadmeadows, if you get a particularly high tide, it gets covered over with water and then you can't actually see it. So, when we bring the powerboats in you have to be really careful 'cause you can't actually see where the pier is and you might run over it. I definitely don't remember that as much as a kid (S2P4)

Conversely, and principally in the Dublin Focus Group, many described witnessing the effects of climate change second-hand, chiefly through mainstream media and internet sources:

Their springs are coming sooner and all that, you know, the ice is melting quicker. (U1P7)

And the Gulf Stream and then the coastal erosion, things I start to just see in the world. Even if it's on the internet, I see the ice caps or no rain in California, you know whatever, these type of things that sort of gives me an awareness about it. (U1P6)

You see all the horror stories then about the Gulf Stream having weakened in the last few weeks and we're going to end up like Canada, we'll all be going skiing up in the Wicklow mountains for our winters in future. (S2P5)

Plastic Pollution

The third major theme which emerged from the Focus Groups was contemplation of the issue of plastic pollution. Though not so directly related to climate change, the topic of plastic pollution emerged from discussions of environmental degradation in general. This discussion was confined largely to the Dublin

Focus Group, although a participant from the Inishbofin Island Focus Group also expressed dismay at its effects:

I just think we should stop making plastic. I mean, I don't know, I want glass bottles back again, just hate plastic. But it's hard to avoid it. (U1P6)

There's definitely good potential plastic, but there's still things like, say, polystyrene, like, very hard to get rid of. You can't even get rid of it in recycling centres, like. Crazy, like. (U1P1)

No, you can't, it's a nuisance. (U1P3)

But they're just, anything you buy like, they're so quick to give you anything electrical, loads and loads of polystyrene, and you can't get rid of it. So there has to be, there's definitely a big problem. (U1P1)

If you ever want to see how big an issue Single-Use Plastic is and wrapping and packaging in general, go to the pier any day the rubbish is going out and just look at the bags of rubbish. And I guarantee you they're three-quarters full of packaging and plastics. (S4P3)

Participants were especially concerned about the effects of plastic on children:

Tea bags, things we didn't know about, and it's actually poisoning us individually and children, as well as killing the fish and the animals and destroying the environment. Like, we'd no idea, when plastic, like I remember a world when there was no plastic bottles, I think I do. There was only glass bottles, if a bottle fell it broke (U1P6)

And that's where governments need to come in and start (U1P4)

Yeah. (U1P6)

working on on the companies that are producing and supplying things in it. Putting it into our clothes and baby wipes and all (U1P4)

Effect on Other Species

The North West and the Inishbofin Island Focus Groups were the only ones to consider the impact of climate change on other species:

So, the thing about David Attenborough in terms of education, and sorry to go back to that. In terms of educating people on what it was, he even showed the difference in the behaviour of animals and the knock-on effect then through the chain. ...whether it was, you know, migration patterns that were changing and, you know, and the impact it would have then on their feeding patterns and so on and so forth. And it's really ... interesting but scary at the same time. (R1P3)

I think the speed of it is the problem that different species don't have time to adapt because we're told it's happening so quickly. (R1P6)

Yeah. And the terrible thing, you know, when you think of up in the Antarctic, when the ice melts and how the life is affected up there, and all the animals and the polar bears. It's huge implications for everything really, hasn't it? (S4P1)

Importance to Children

Some participants commented on that fact that children were a key driving force behind the modern climate action movement, and acknowledged taking individual actions based on feelings spurred on by their children:

Well, the children take it pretty seriously now, like young children, relatively speaking. (U1P6)
Yeah. (U1P3)

All sort of take it quite seriously and its sort of ingrained into them. So, I really do worry about it, but I sort of think we just have to make the changes and stop burning all the oil and fossil fuels and I just think if we embraced it. (U1P6)

But I think if anything, that's more of a sense of duty as a parent to small kids and kids would come home from school a lot with these kind of, you know, saying no to Single-Use plastic kind of messages, and you have to kind of you know, there's an element of that. (S4P2)

The key themes that emerged under the future importance of climate change information to participants, and their relative prevalence, are summarised in Table 20 below:

Table 20 Climate Change Information in the Future

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Challenges	3	2	1	1	0	1	1	0	9
Consequences	0	1	0	0	4	0	3	1	9
Fear and Worry	2	1	1	2	2	0	0	0	8
Policy Concerns	0	3	0	1	3	0	0	0	7
Younger Generation	1	0	0	2	0	0	0	0	3
Total	6	7	2	6	9	1	4	1	36

Challenges

When considering the future importance of climate change information, both the general and special focus groups showed an appreciation of the wicked nature of the climate change problem. Participants also demonstrated an awareness of the enormity of tackling this problem due to the complex, interlinked factors contributing to climatic and ecological damage, and the implications for their traditional ways of living:

I suppose split it out ..., single-use plastic and recycling and so on is extremely important and, you know, food waste and even fast fashion, which is a big problem now and the pollution and so on that's causing. (U1P5)

I suppose there is a huge demand on the climate by the world population, and its expansion, especially in industrialisation, countries that weren't there before. You'd wonder actually, like I heard a doctor on local, the local radio station today talking about inhaling particulate matter from peat and turf and how bad it is for you. And saying there should not be any open fires. But again, that's a huge impact on people's patterns and their behaviours over hundreds of years. And you'd wonder, when would that really change? (R1P4)

Somebody was telling me recently that the reason that you get a lot of flooding now in towns, more so than previously, is that so many lawns have disappeared. So much grass and trees have disappeared. So, there's much less absorption of water possible now because it's either, you know, you've got your concrete backyard or you've got fake grass, whatever. So, the actual absorption of rainwater has declined dramatically over 30 or 40 years, which means you get a lot more flow off, which is causing an awful lot of overwhelming the drainage system because of the flooding. Yeah, that was an interesting point which kind of links everything together, you know. (U1P5)

There was scepticism that much-vaunted solutions to climate change, such as electric vehicles, could be implemented on the grand scale often envisioned, or that a bottom-up approach of small-scale individual behavioural changes could make an appreciable contribution to Ireland reaching its greenhouse gas emission reduction targets and other climate action-related pledges:

And everybody in California goes with electric cars, what are they going to use to produce the electricity to run them? When we get the solar set up, better advanced, and we have storage capacity like super-sized Turlough Hills, etc., where we can harness solar power, store the energy and then redistribute it later, I think then we get into the realms of having it all feasible. (S2P5)

Cork County Council heads up the severe climate change weather group. But when you hear the other members of the group there speaking, and you talk about changes to individuals in society, if you take for example the planes being out of the skies at the moment and what that's doing for climate change,

it's phenomenal compared to what we as individuals can do. (U2P1)

Consequences

Some participants speculated as to the consequences of the more severe weather events predicted under climate change scenarios, based on local knowledge of the area in which they lived. The prospect of rising sea levels was a source of trepidation for the Inishbofin Island Focus Group and the Marine Special Interest Group in particular:

It's that fine line, with our microclimate here on the Island ... you never see ground frost, except for in extreme conditions, and it's that tiny little change that you know, and so you don't have to be told if you think about it, you don't have to be told that the temperature is going to increase by 10 degrees in the next 20 years. A half a degree, a quarter of a degree is enough to change what we're familiar with. (S4P3)

Somebody sent me a link lately to it. You know these maps that kind of show in 50 years' time where the sea level will be and what kind of areas will be lost. Now, I know I don't know how accurate, I think sometimes they're a little bit on the extremes as well, but it is interesting, particularly interesting S4P1 I'd say for you. Like I used to live over in the North Beach, which was right beside the sea, and now I live in the middle of the island. It's a huge difference in terms of that feeling of safety. But like sea level, how far is the sea from your house, S4P1? It's just outside the door. (S4P2)

Maybe not in my lifetime, but certainly you know it will. I mean those, this area will be I'm sure underwater. (S4P1)

It's something that I keep abreast of and, partially because I live in Clontarf, which is all going to be underwater for the next, in the next 50 years (S2P5)

Fear and Worry

The third major theme to emerge, influenced by participants' recognition of the future challenges associated with climate change and its consequences, was fear and worry. Participants were apprehensive about changes in global climate phenomena they had seen reported and the eventual repercussions for Ireland:

Stuff like the ice caps, though, is a concern, I'd be worried about that now. (U1P6)

So, I'm very worried about climate change, particularly seeing on the news last night about the Gulf Stream weakening and changing direction as well, what effect that's going to have on our climate and weather here. (U1P4)

Yeah, and the rising sea levels, you know, is a big concern down the road. For islands and for everyone, but especially for here, you know, the sea levels are going to be getting higher. (S4P1)

Others were uneasy about what the future may hold in terms of not knowing what measures may be implemented to reduce carbon emissions, and, in the absence of effective solutions, an element of resignation to a level of climate change being inevitable was also expressed:

Definitely, I am not au fait on this topic but one thing that bothers me is like, OK, I think the ozone layer is being wiped away. What happens next? I think there is too much of fossil fuels. What happens next? So that would be something that would be concerning for me, that's just my take. (R2P5)

But in practice, as U2P3 mentioned there, about the cost. I think a lot of people are very worried about the cost. I think in rural Ireland, where a lot of people depend on wood stoves and turf, there's a lot of worry about what will we replace that by. (U2P2)

But yeah, I do feel it is a huge concern. I feel as though we're probably gone past, I think it is a bit late to, to stop it from happening, but I definitely think we can, we can slow it down and mitigate it. But yeah, definitely is a concern going forward. (R2P3)

Policy Concerns

Regarding addressing the issue of greenhouse gas emissions, there was a sense that a policy-driven approach was necessary to effect change, both in Ireland and internationally. There was a feeling that individual actions could only be successful on a large-scale and supported by government-level initiatives:

we certainly have our part to play, as individuals and as a country but, and as a society, but I think we have, I think the world needs to take ownership of climate change and we need to do it now. (R2P7)

I'm not sure that kind of, you know, say, agriculture being pinned against air traffic. You know, we're not going to get rid of both of those industries, but agriculture is typically a third of all, in Ireland, of

our carbon footprint. ...There are ways within agriculture to, you know, shift towards a greater volume of product at a lower CO₂ emission. It is at a cost to the farmer, both in terms of time and money, which is unfortunate, so shifts towards, you know, policy changes to enable better grant assistance to allow that. (U2P4)

We've invested a lot in our house ... if you're looking for individual experiences, we've put in photovoltaic panels, we've put in new windows, ... and we've bought our house up to a B3 or something from a D. At, you know, at a significant cost, as you can imagine. But our individual, if you like, activities, you know, of one family isn't going to make a huge difference in, you know, it has to be a policy decision by government and now that we have the Greens in, then there needs to be more and better grants available to people you know, to retrofit their houses. As it stands, like, we've ended up paying our own way to try and retrofit. But I think unless as a country, we're going to, if we're going to have any impact at all on reducing the CO₂ emissions for the country, then there needs to be a major drive by the government to get this done. (U2P3)

However, in the most rural group, the Inishbofin Island Focus Group, participants voiced their dissatisfaction with the carbon tax approach favoured by the Irish government. It was felt that carbon taxes and other fuel-saving measures advanced by policymakers failed to take account of the different needs and circumstances of more rural communities:

Financially, yes, because it seems to be the solution in this country, tax everything, and that'll fix climate change, it's not necessarily the, kind of like the stick and carrot, it's not necessarily going to solve things. But that seems to be the approach from our political representatives anyway. (S4P4)

Later, S4P2 also remarked: Fuels and stuff like that; I know everyone has to do their part. I'm not denying it's a huge issue in this country. With a lot of things, the solution seems to be to tax people and I know you would get annoyed about it. Like there are other like, say we have our own Green minister who likes to holiday here fairly regularly, but his everything is to carpool for small towns, villages and stuff like that. That's not the solution for rural Ireland. Maybe, okay, say and in cities of public transport, but it's not the solution for rural Ireland and small communities. (S4P4)

Younger Generation

Participants expressed guilt for the role their generation has played in contributing to climate change, but also hope that current and future generations would take better stewardship of the planet:

So, I'm almost at that stage where I'm beginning to wonder what would happen to the next generation. (R2P5)

I'm concerned for the next generation going forward and I'm concerned about the, I suppose, the steps that my generation have taken, to make climate change worse. (R2P7)

I think it's really important for the younger generation to grow up knowing about that and knowing how important it is that their actions are going to have an effect on the climate and the planet as a whole, and I think the more it's discussed and talked about, even though it might be doom and gloom a lot of the time at the moment, but I think if that becomes part of life to, you know, to try and protect our planet for young people, I think it's a really important and a really good thing. (U1P4)

3.5.2 Current and Future Climate Information Needs

While examining climate information needs, participants outlined a variety of knowledge requirements that they felt were not being met in media and policy discussions on climate change. The perceived lack of balance in certain aspects of these discussions emerged as a distinct subset of their information needs and is treated separately. The key themes that emerged under general climate information needs are summarised in Table 21 below.

Table 21 The Key Themes Associated with General Climate Change Information Needs

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Better Signposting	0	2	1	4	0	3	0	1	11
In-depth Reporting	0	3	2	1	0	3	4	1	14
Opportunities	0	1	0	0	1	0	0	1	3
Scientific Debate	0	0	1	0	0	0	3	4	8
Solution-based Reporting	0	2	2	3	0	1	0	0	8
Total	0	8	6	8	1	7	7	7	44

In-depth Reporting

The most prominent theme to emerge was a desire for more in-depth reporting on climate issues. Participants spoke of what they saw as shallow coverage of a complicated issue, which many attributed to media outlets' pursuit of attention-grabbing headlines to attract audiences at the expense of more rigorous analysis:

They leave that to the academics and DCU will no doubt, and Maynooth I think, has a big climate area as well, so they will do the considered element and hopefully the government will consider their outputs rather than just read the newspaper headlines and that's what we just have to rely on and hope for. (S2P5)

So, I just think I would still like to see better science and more measured science because so much of what's there is being driven by sensationalism. (S3P3)

More considered, more considered media coverage, I suppose. (S2P5)

I feel like there's not enough information about it in a way, like we hear, oh, do I need plastic straws or all those little things? But I'd love to know a better kind of understanding of how it's affecting each of us or as you said, like the future as well of it. (S1P1)

Perhaps due to this perceived superficial reportage, participants wished to see and hear more scientific perspectives on climate change. There was a sense that the media should not hesitate to show more complex, mathematical data to general audiences if such data helped to convey the seriousness of climate change:

I mean, the scientists should be coming in here now and saying, because the world was put on pause for nearly a year, industry has stopped, what has this done for climate change? (U2P5)

I was just going to say there about the scientific evidence, you know, that a lot more has to be just for people to understand it. (R1P5)

I'd like to see, I do kind of follow accounts and stuff that would give a lot of statistics, they'd be kind of posting stuff that is quite consumable, and that's easy to understand. And I already kind of consume a lot of that information, but it would be nice to see like more of it, and not just from specific accounts like social media that specialise in that. I'd like to see RTÉ or your Virgin Media news or stuff like that posting more about it. (S1P2)

To aid their own understanding of the topic and filter misinformation, some participants saw merit in having one authoritative source of climate change information:

There isn't a cohesive, one message being given out about climate change, because I think because it has so many factions involved and so many interests involved in every aspect of it and where best to battle it? Like, the ozone thing is gone away, I know that we've, you know, CFCs but the cows are still farting away and depleting the ozone. So, I think if the message was stronger and came from one source globally that people would believe it better. (S2P2)

I think there should definitely be some more like a site or something where you can read up on it, like when you're looking at the SDG goals, it's very nice to see how they're going to, how they have a plan in place to improve over time. Like so I would love to see more of that. (S1P5)

It's very hard to relate to what's happening in other countries. And that's about to be very important, that the information comes out and it can be, it can be put to people properly and in a way that people

can understand it, you know? It's, it's very disjointed at the moment. (U2P5)

Better Signposting

The second most prominent theme was confusion as to where to source climate information in the first instance. Despite criticisms of a lack of detail in climate change discourse, much of this uncertainty stemmed from a surfeit of information, with participants describing a feeling of information overload:

it's so overwhelming the amount of information out there. (S1P4)

unless you know where to start looking, it's very hard to find all of the information or find the pathway to all the information, if that makes sense. (S1P3)

I think there is probably a job of work to be done, probably if you went looking enough, you'd find it. But it's not up front telling you do this, do that, this is the impact this has. You know, it is all there, but it's not. I think there's a communications piece to be done around it in order for it to be internalised more by individuals, you know, in their daily lives. (R2P8)

Some participants appeared to be less engaged with the topic of climate change. Therefore, they were not inclined to seek out information and tended to ignore all but the most significant developments related to climate change:

I have kind of stumbled upon it during my undergrad and my postgrad so far for various reasons. And I have become interested. But my personal research in it would be limited because I wouldn't have, I wouldn't know where to find more detailed information. (S1P8)

I feel, well, I probably don't know an awful lot about it. (R1P7)

I think it's down to frequency. Yes, I'm interested in climate change, yes, I'm interested in knowing how it would change, or how, how the impact and everything would have, but how frequently do I want to receive that information? And in what means and stuff I think is the, probably the bigger, it would be my, like if I was to opt in to such a service, that would be my return question of just like how often am I going to be given this? Is it a weekly bulletin, is it an annual bulletin? But, yeah, I would be interested in it but I, I don't want to be spammed by it either. (U2P6) ...

So, would I want to find out about the climate variables and how they change within 10 years? Probably not. Would I like to know the impacts of that and how we're, you know, seeking to change nationally

our approach to climate action? Yes. But again, as U2P6 said, the number of times that I'd like to hear about that would be, you know, whenever there was a significant change as opposed to just repeating climate change, climate change, climate change, 'cause it dilutes the effect of the movement (U2P4)

The predominant theme of participants feeling that climate change reporting lacked sufficient detail, combined with this feeling of being unable to navigate the large amount of information they know is available, suggests that participants need to have appropriate information which is well packaged and signposted to make it accessible. This could lend further credence to the suggestion that a single, authoritative source of climate change information previously alluded to in under the In-depth Reporting theme.

Also linked to the quality of information available, participants discussed how being unsure about the reliability of the information impeded the climate research and action that they undertook. They were particularly concerned by the inconsistencies in the advice given:

And you just need to be consistent about that, but it has to be some, the information has to reach me very loudly, you know, to actually, and be simple, I suppose, for me to understand and to do. (R2P7)

In terms of recycling, it's, at the moment the information out there keeps changing. So it's kinda hard to be on top of it, really, you know. The amount that we are meant to be recycling, especially domestically, you know, if the waste, it continues to change and change and change, so sometimes you end up recycling inappropriately. But if there is information, yes, I will make sure I try to change habits there. (R2P2)

Solution-based Reporting

It became evident that there was an appetite for a greater focus on strategies to tackle climate change both at a personal and societal level:

it's about how you pitch the conversation so that it's not attacking anyone and it's just, we have this information and this is a suggested benefit. (U2P4)

we have to look at the way we, I suppose treat the planet in a way to, like the products we use and landfill and carbon monoxide and all that type of thing. (R1P5)

But I suppose for us, how we are how we adapt to climate change is probably a big question right? Because climate change is here, regardless of what's causing it. And it seems to be going in one

direction at the minute. So, I suppose how we adapt to it is a question. And by all means, how we can mitigate against it as well. (R1P4)

The main thing that would interest me would be what's being done about it? (R2P3)

This sentiment was reinforced by some participants who described feeling that they lacked guidance as to the individual action they could take to combat climate change and protect the environment. It was thought that more direction in the form of easy-to-digest instructions would encourage the general public to perform such actions:

I think that there's probably, there's a lot of information out there, but I think it's harder for the individual to internalise it without there being specifics said to you, this is what we need you to do. And I think there isn't a lot of that out there at the minute. It's more like a wicked problem, it's got all of these, you know, parts to it, it's almost like too big for an individual to solve. (R2P8)

But I think very simple information in relation to, you know, by recycling 10 bottles what that means, do you know the way? And I think if it could be broken down that way ...into kind of bite-size pieces of information that we can take on as individual tasks, I think we have a better chance of, you know, engaging with it and understanding it more. (R2P7)

But I'd be really interested to see, like, personal reports about how it's affecting or something like what we can sort of do, because I think there is like a gap right now in news articles or like academic literature, on something like what people can do on a personal level to help climate change. (S1P6)

Scientific Debate

Alongside the desire for a more solution-focussed narrative on climate change was an equally strong theme of participants feeling that the science of climate change is still uncertain. This was a particularly strong theme in the Agriculture Focus Group; some participants suggested that the science underpinning anthropogenic climate change was flawed and that scientific findings contrary to the accepted view of climate change were suppressed. These participants felt that they did not have access to all schools of thought on the subject:

So, I'm driven by science, science is my background. So, I can analyse science and we can see poor science. And if the poor science was modified out of it, I'd give you a quick example, there are something like twenty-eight forecasting models for climate change patterns. I'm thinking something like that, it's possibly more. A lot of those models have now been in operation for nearly 50 years. They were inaccurate over the first 50 years, so have they changed them to be more accurate over the

second 50 years? Why do we have so many different ones? Why can't somebody just get it right and make one that works rather than 15 that don't work? All of those things would have a big influence in directing us as to the consequences. (S3P3)

What I want access to, is the people who have reasoned analysis of all of the information that's there. And that's very difficult to get. (S3P3)

I would have at times have looked up, I'd have an interest in it. The European websites have a lot of information there if you go in at times to see where, you know, they produce the statistics every year. And you can read them, and you can see all the different industries and everything else that produce all these because farming in Ireland got terrible bad press there for a few years on climate change. And then you'd ask people to actually realise the figures for agricultural produce and gases and all the rest of in Europe, and they don't have a clue. So, there's lots of bad information out there and sound bites. (S3P1)

You know, it's just, S3P3's right but there isn't enough science-based facts around any of this we'll say that, like, you know what I mean? But people do read the sensational headlines when saying that, like, you know what I mean? And I suppose even, you know, What Planet Are You On and there was many good aspects to it. But it was a one-sided debate programme, you know? And they always worry me, when something is just one-sided. I've no problem arguing the toss with anybody in relation to any issue. Like, everybody stands for something. But it always does worry me when you won't have the debate in relation to, say, allowing all the parties at the table to have a view in relation to this. Of course we can always do better in relation to any of our practices in our farms, but at the same time we'd be extremely foolish to allow ourselves to be scapegoated and not stand up. (S3P2)

It is clear that the strong opinions expressed in the Agriculture Focus Group have been influenced by the heavy scrutiny of their industry for its high carbon emissions and the environmental impact of certain farming practices. As one participant stated, "farming in Ireland got terrible bad press there for a few years on climate change" (S3P1). Nonetheless, across the focus groups some participants questioned the extent to which humans have disturbed the climate system. Possibly linked to participant concerns regarding a lack of in-depth reporting, media coverage neglecting to set current climate events in the context of historical climate conditions has contributed to participants' uncertainty:

I think in the debate, there is an absolute need for good science. And not all science we've seen is good, on many different quarters. And unfortunately, I think that is decreasing what we consider our knowledge to be. It's tampering with what we should be accepting as fact. But we must also acknowledge that climate has always changed. So, we need to know and establish if this change is something that's part of a natural process or whether it's something that is manmade, because that's the inference that we're being given all the time. And I would love to see more clear evidence because

I sit in on another podcasts that are discussing it and not everybody seems to have a very logical and scientific methodology will support what's become a popular press element of it. (S3P3)

I see today there's a twelve hundred square kilometre bit of ice after calving off, which is a source of great contention. But nobody's saying whether that's happened before or how often it's happened before, or whether it's something particularly worrying that it has happened. It's just that, oh, there's a 1200 and odd square metre lump of ice now floating around that was locked onto the land last week. So, what is, what are the implications of that? Has it happened before? And should we be worried about it? Or is it something that is going to be replenished in due course? (S2P5)

So, there's an awful lot more learning to be done out there to try and identify, you know, especially for anybody attempting any kind of transatlantic in any shape or form, that it's much more exposed now from that context because they don't have the, the historical data. (S2P3)

I suppose what's clouded now in terms of climate change is there was probably going to be regardless of a human intervention. There was probably going to be a-level of climate or change in some way. But I suppose there isn't a clear distinction between, have we as humans really caused it or to what extent is or is it just nature? (R1P3)

Opportunities

A less obvious theme to emerge was the prospect of climate change as an opportunity for economic and social development. This was generally viewed from the perspective of using the opportunity presented by climate action measures to spur the adoption of more sustainable practices:

You know, it's an opportunity instead of things just going back to where they were, which probably will. (S4P3)

So, I've worked a lot with ...farmers to promote their agricultural processes, and they end up earning more money with the investment ... and they have an overall better perception of their land, their connection, their connection to the land, the culture, it's all kind of re-connected. (U2P4)

However, one farmer from the Agriculture Focus Group offered an opinion unique across all the focus groups, that climate change itself would benefit the farming sector and was not a phenomenon to be concerned about:

We also have to remember that not all the consequences of climate change are bad for farming. We are really glad of the opportunity to get a bit of fine weather. It might help the hay, but it's not so far!

But the global carbon dioxide and you know, we are looking at a continuously record global harvest year after year after year after year. And you can't separate a higher carbon dioxide atmospheric content from that performance. And while it's of no consequence to S3P2, of course, it's driving grass growth as well. And I don't hear anybody in the dairy industry kind of supporting that one. But it is. Carbon dioxide is to a plant, is what oxygen is to a human. (S3P3)

Balance in Climate Change Information

The matter of balance in climate change discourse was a recurring feature in the discussion on participants' general climate information needs, and so merits a separate treatment. Three key themes emerged under the need for balance in climate change information; these are summarised in Table 22 below.

Table 22 The Key Themes Associated with the Need for Balance in Climate Change Information

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
National-level Reporting	3	0	1	0	0	6	0	0	10
Polarised Coverage	3	2	3	0	0	0	3	2	13
Positive Messaging	3	6	0	0	0	3	0	0	12
Total	9	8	4	0	0	9	3	2	35

Polarised Coverage

The most significant theme to develop under the need for balance was the impression that there was no middle ground in the climate change dialogue, with any opinions outside of a narrow orthodoxy being dismissed as typical of a particular political or ideological persuasion. Some participants talked of how limited conversation on the subject was, and how restrictive and censorious they felt the situation was:

I was on something the other night with a foreign webinar and the speaker who was a scientist, he said that he will not be allowed to speak publicly now anymore, that there's been a change of president in the US. Because the whole thing has become so polarised. Polarised debates are dynamite bad, if I can use that phraseology. (S3P3)

If you like, the conversation on climate change is kind of highly politicised. There's very little neutral ground to talk about climate change, just a factual sense, I feel like in Ireland that kind of creates, kinda almost a zero-sum game... And I feel like that's the way the conversation goes a lot, there isn't a lot of just neutral, kind of, bring everyone together conversation about it, it's quite partisan. (R1P1)

I do think that the message of climate change is somewhat diluted by the other side, that there's no climate change and we're not doing anything bad to the environment, and it's like having two different forecasts and one saying it's going to be really windy next week and the other saying no, it's going to be calm. (S2P2)

Participants also described what they saw as a tendency to single out certain higher-polluting occupations or industries for criticism in climate change debates, which was viewed as impractical and leading to a feeling of victimisation among those involved in these industries. Such an approach was also viewed as destructive, pitting one industry against the other:

I probably feel as farmers, we're probably targeted as being the easy group. I suppose the fact that we work as individuals in saying that, and maybe unlike big businesses or whatever, we're saying that. But, at the end of the day, we say the world still has to have food. (S3P2)

And the conversation kind of went towards, you know, there's nothing really we can do and this kind of disincentive to be involved and kind of pointing fingers at one industry versus another. I'm not sure that kind of, you know, say, agriculture being pinned against air traffic... But that idea is typical in the agricultural community in general of, aw sure, like, why aren't we stopping the planes? We're not going to isolate Ireland internationally and just because the aviation industry is bad doesn't mean we shouldn't stop with the things, and then we can scale that back to ourselves. (U2P4)

So I said, you know, what exactly was it I heard, but it was something recently about some government measure to essentially reduce the peat industry or it might have been peat or turf or something like that, to zero. And all it was, it was outrage in rural Ireland regarding, you know, the effect that's going to have on farming and stuff. (R1P1)

The divisive nature of climate change coverage led some members of the Dublin Focus Group to reflect on the integrity of its reporting, questioning whether certain severe weather events were inadvertently or deliberately misrepresented as the consequences of climate change when there was a more mundane cause:

Actually, the point about the driveways and the backyards and that been cemented in, or tarmacked in or whatever is good, because a friend of ours in Cork, he has his, he had his driveway done with all those little stones and he said the reason he did that was because the ones that are cemented, that creates the drainage. (U1P7)

Yeah. (U1P3)

And the ones, there's so many people now have them all cemented in and there's no drainage in them, so that's creating a lot of the flooding and that, so I thought that was an interesting point, but that doesn't, I've never heard that spoken about by anyone. It's just a point, I thought, and I've never heard it mentioned when it comes to any programmes regarding the climate change or anything like that,

you know? (U1P7)

There was a lot of flooding as well at different stages, and it was just leaves blocking all the manholes, you know, the (U1P6)

The drains, yeah. (U1P7)

the drains, so you've a load of, often, leaves just lying flat over the drain, and the whole place is flooded! But just a bit of drain maintenance would, you know. So, I don't know, that's just the by the way (U1P6)

Positive Messaging

The second most important theme to develop was the belief expressed by many participants that climate change issues should be depicted with a more positive spin. Participants spoke of their fatigue at what they felt was reporting skewed towards negative developments and ominous predictions. Participants felt the general public would become despondent about addressing climate change unless the positive results of climate action and people adopting more sustainable behaviours were portrayed more frequently:

I think in terms of receiving information about climate change, it needs to be done very meticulously because if you're constantly hearing about, you know climate change in any way and it's very negative and you, for example, have done everything in your power to try to, you know, you're recycling and you're, you know, you're doing as much as you can, individually and you're hearing all time, this very negative, you know, it's getting worse and blah blah blah, you're not going to want to hear it anymore. Because you're think, I've done everything that I can and it's going to lose its effect, like U2P4 said. (U2P7)

You know, it was said that, you know, we're recycling, we're doing all the things we're supposed to do and we're only getting negative information back, why am I bothering? Like, we don't want that attitude to kind of get ingrained in people, we want to make sure, just as a society, that we're always kind of solution-focused and oh, have you tried this? Not, you should be doing this. I think it's very different to, "But I'm already, I already have a solar panel, oh, I already do this. ...I think, yeah, it'll become more important only if the narrative is positive. (U2P4)

Yeah, it's a lot of it is doom and gloom, the predictions for climate change and whatever is very doom and gloom. I'd be interested enough to be sowing wild flowers and trees and things like that. To try and do my little bit to offset it. But I don't like the doom and gloom aspect of it. (U1P3)

Because you keep hearing a lot about global warming and all the bad things. But it would be nice to

hear sort of like how we're actually improving. (S1P5)

It was proposed by members of the Student Focus Group that more positive media coverage could not only boost the morale of those already invested in the climate action movement, but could inspire previously apathetic members of the public to become climate-conscious:

I think there should be an emphasis on trying to get good news stories out more often. I know in recent times they've been pretty limited, but I remember when I was about two months into lockdown and there were so many good things done because people went out on the streets and pollution levels were down because factories were closed. Or like, you could see the clear water in Venice and stuff like that. Like there were a lot of good stories about it. I felt that actually made people talk about it more. People who I know, who would have no interest in climate change but they actually found this stuff interesting and they could see improvements and like changing their ways. Like I know at home here, we're always doing our fair share but we kind of kicked on a bit more with other stuff in the house, started paying more attention as to what can actually be recycled and have you. So, I think, getting back to my point, I just have a more good stories about it rather than constant like negativity about, it would definitely be beneficial to people, change people's mind-sets. (S1P7)

But at the same time, I also feel like there should definitely be a balance to reduce that anxiety because we can't just constantly have, like the world is dying. This is bad, this is bad, like even solutions. Like that's kind of good, positive news that we could hear that could change our mind-sets. (S1P1)

Participants were also cognizant that the messaging should be finely-balanced, that it may not be a simple case of an increase in positive messaging leading to greater awareness and engagement of the public with climate change issues:

So, it needs to be done very meticulously in the way that information is given out and at what interval and to who as well, because, you know, I think it's the different age groups as well. (U2P7)

Yeah, on that point, like that would be kind of good because eco anxiety is a thing nowadays. But also, a more negative point of view to that, let's say if there was good news about climate change, I feel like people might kind of stop caring in a way. (S1P1)

National-level Reporting

The next most pertinent theme was participants' wish to see more coverage of climate change from an Irish locational perspective. There was a sense that there were excessive media accounts of the effects of climate change in areas of the world where the most dramatic impacts could be seen. Participants

explained how seeing more of the effects of climate change in Ireland, and efforts to tackle it, would add an extra layer of interest for them:

Yeah, if that kind of information was available to me through an Irish source like Met Éireann, I would be much more interested and probably more likely to look at it. (S1P8)

But we talk very often about the Amazon and the rainforests. I don't hear a lot, and it's only in recent times that some discussions about here in Ireland. And what we have planted in trees is actually not right for Ireland and its contribution to the change for wildlife, etc. And now if a forest is to be planted, then there needs to be an environmentalist involvement. And it's part of the reason why there are some delays in the cutting down of trees and the deforestation. I don't know, does anybody know enough about that? But it's happening all over the world. It's not, we talk and we hear it over and over again about the Amazon. But it's not just about in relation to trees, I'm relating it to trees particularly. (R1P3)

Participants also conveyed how constantly seeing climate change coverage from outside of Ireland contributed to a sense of removal from the issue, as something that does not affect them and therefore it can be taken less seriously: think that's a very good idea. You know, our own climate change. Use, our own weather provider, whatever, forecaster, to be specific about our climate change and what we can do about it. Like, when something is worldwide, you tend to kind of think it's out there somewhere. (U1P3)

I was going to say it'll be really interesting to see how we're affected by it, because quite often you kind of see news around the world and what's happening around the world. And like not that we don't care, but if it doesn't affect us personally in a way, like we don't pay much attention. So, if we had specifically for Ireland, like what's going to happen, what we need to do, that'll be really, really beneficial. (S1P1)

Yeah, I think they should be kind of definitely be like the go-to place for Ireland because I find at the moment it's kind of it's like the general sphere of knowledge where climate change is maybe from the States or like the UK. You don't really hear enough about Ireland and stuff. (S1P3)

3.5.3 Sources Used to Access Climate Information

During the course of the focus groups, participants were asked where they sourced information related to climate change. Participants provided their sources in a direct answer to this question or else revealed their sources of climate change information over the course of the group session. The groups' collective sources are outlined in Table 23 below.

Table 23 The Key Themes Related to Participants' Sources of Climate Change Information

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
3rd Level Studies	0	0	0	0	0	4	1	0	5
Active Consumption	0	0	0	0	0	2	0	0	2
Documentaries	3	0	4	1	0	1	0	0	9
Official Data	0	2	0	0	0	1	1	3	7
Online and Analogue News Features	2	8	2	2	1	0	0	1	16
Passive Consumption	5	4	0	5	1	0	1	0	16
Social Media	1	1	0	0	1	4	1	0	8
Unsure	0	0	0	0	1	2	0	0	3
Total	11	15	6	8	4	14	4	4	66

Passive Consumption

A key theme to emerge was that participants did not typically seek out information on climate change, rather accessing it on a casual basis if something attracted their attention and then reading more extensively if this content piqued their interest. Participants taking this approach cited no specific go-to sources for obtaining climate information:

I probably just get my information through, it's mainly online ... you know, a headline might grab my attention and like that will dig down into a particular issue. (U2P3)

But I suppose what I mean is I don't, I'm not actively sourcing documents or articles or information about it, but if I happen upon this, I'll read it. (S4P2)

So, I'm waiting for, you know, something to catch my attention, whether it's on a TV programme, whether it's on the newspaper, you know, whether it's on social media. But I don't actively go seeking information. (R2P7)

It is noteworthy that participants' propensity to delve further into information on a climate-related topic was dictated by how relevant to themselves they perceived the issue to be:

I wouldn't go looking for information. I actually don't go looking for information on the weather! I mean, other than when there's a real need for it on any issue that relates to most of the topics we've been discussing here today. That wouldn't be my area of exploration. (R2P5)

Yeah, I'd be kind of the same as well, I wouldn't actively seek it but if it stood out for me, if I was listening to a podcast or something like that, I would kind of take hold of it. But yeah, again, I wouldn't actively seek out information unless I really needed to. (R2P3)

As a rule, it's just the high-level stuff, but then I find, I don't know, I'll end up going down a rabbit hole of I'll see the, some headline about the, that it takes a thousand litres of water to, for every pair of jeans and suddenly I'll go down a further rabbit hole and learn more and more but I, I wouldn't have anything on a, a constant, I'd be constantly refreshing it about, it's more, something will catch my eye, I'll get it from the papers. (U2P6)

Many participants also described being unable to avoid climate change information due to its ubiquity as part of the climate action movement and as a popular topic of conversation, leading them to adopt an attitude of waiting to be told climate-related information instead of searching for it themselves:

I don't even think you have to seek it out, I think it finds you. (U1P1)

Yeah, exactly, yeah. I let it come to me, kind of. (U1P2)

Like, doesn't matter where you are, you might see it on the news, you might see it on social media, you might be walking down the road just a poster, like. (U1P1)

it just gets thrown up to you or you get exposed to it through no, through no, not, not fault of your own, but, through no work it just, because somebody will post it on WhatsApp or on Facebook, whatever (S2P2)

Well, I'd say I'm waiting for the information to come to me rather than sourcing it! (R2P7)

Online and Analogue News Features

An equally strong theme to emerge, and consistent with the largely passive nature of participants' consumption of climate-related information, was that the majority obtained their climate change information in the form of online and television or printed news items, or more rarely through work circulars or conversations with colleagues. Most participants accessed climate change information through a combination of these formats:

For me, most of my information is from the, I suppose, the newspapers, the headlines, ... I suppose some of those clickbait articles online. (U2P6)

Mainly online news and there's quite a good bit of information circulated from within our organisation as well. (U2P1)

Usually TV and newspaper/magazine articles, internet, workplace discussions, both formal and informal. (U2P2)

if something stood out to me from what I saw online or saw on the news, something, I'd kind of try and look more into it. (R2P1)

I imagine initially it would have been from news sources and then thereafter from reading articles on the internet. (R2P4)

Smaller numbers cited becoming aware of climate change information only through online sources. Those using solely online source seemed to perform more thorough searches for information and appeared to display greater awareness of the topic of climate change than those who received information from only print or television sources, or a combination of formats:

Google. If you wanted to know anything specific? Well, I'm afraid I'm a Google addict as well as an Alaskan addict! ((Laughs)). I Google everything! (U1P7)

Even if it's on the Internet, I see the ice caps or no rain in California, you know whatever, these type of things that sort of gives me an awareness about it. (U1P6)

The Internet. You know, you dig in and you just have to research like what's causing it, and you compare it to maybe other stories that are out there. And then if you strip away some of the things that they're saying maybe that are causing it, then maybe go back and compare, like what have we done like over the last 200 years, and how we've changed our behaviours and as consumers, and try and relate the two, that's just what I think. (R1P5)

The remainder described acquiring information on climate change via the more traditional means of press articles and television broadcasts:

Probably newspaper articles, just. (U2P3)

Articles from newspapers, magazines, stuff, yeah but it's very disjointed. (U2P5)

the TV news, you know, whether it's through RTÉ, CNN, Sky or, you know, the usual sources, it's just, but it, again, it's just an ad hoc approach. Unless something in particular has caught my eye and then I'll look for more information on it. (U2P3)

Documentaries

In spite of the lower numbers of participants quoting television as a source of climate change information, this could be somewhat misleading as it transpired that television documentaries were often mentioned as a source of environmental knowledge in general, with climate change information being an intrinsic part of their content. Well-publicised factual programmes featuring well-known personalities were popular:

There was a programme on there by David Attenborough, recently, and it was fascinating. And he took, I think the ocean, he took wind, there were five, there was a series of it and the impact ... humankind was having on nature and as a result, the impact on the climate. (R1P3)

I was looking at something similar, Simon Reeves, only a few days ago. And he was talking about, he was probably in the most northerly cabin he could be for a holiday, and glacier had gone in about 30 years, you know. But I don't know, a few hundred feet high and he was saying about the effects of climate change. (R1P4)

I would be very interested; I would usually watch Greta going around the globe! (R2P5)

However, series fronted by less well-known presenters were also popular and provoked much discussion, especially among the Dublin Focus Group. The participants were referring to the 2018 BBC3 documentary, "Stacey Dooley Investigates: Fashion's Dirty Secrets", exploring the environmental impact of clothes production, and the 2019 BBC1 series "War on Plastic with Hugh and Anita" examining the pervasiveness of plastic in everyday products:

There was a programme on the other night about making cotton, about the production of cotton. Now, I always thought cotton was sort of sustainable, but the amount of water that goes into producing cotton, somewhere in India, has dried up all the rivers like, cotton is actually totally unsustainable, the way it's being done at the moment, which I was completely shocked. You know the way I was going to get rid of plastic, we need cotton, we don't want any of this! But I suddenly found out cotton is a huge problem. Nobody else saw that? (U1P6) Oh right. No. (U1P7)

It was really shocking, I didn't know a thing about it, I didn't know that cotton was really bad for the environment. Growing cotton, producing cotton. Because of the amount of water that has to be used to process it. It uses so much water. But I didn't know that, I was absolutely shocked about that 'cause I thought cotton was good, you know what I mean? (U1P6)

It's on the TV as well, I mean there was one on last year, I think, about the war on plastic, where you think you're doing recycling, but then you discover that it's all just being sent over to Malaysia and stuck in fields over there. So, it's not really an easy, so that makes you think again about what you're actually buying and what effect the plastics you're buying are having on the world or, you know, the, the climate change, the effect that that's having on our flora and fauna worldwide as well in nature programmes that are on. So, there's a lot of information out there about the various aspects of things, if you're willing to watch it, and read about it. (U1P4)

Haven't they discovered in some country, I watched a programme one night, they've discovered some kind of microbe that (U1P3)

That eats it. (U1P6)

Yeah. (U1P3)

And I think it was in one of those, I don't know, Malaysia or somewhere like that, where they had mountains of this plastic (U1P3)

Was it to turn it into something else then as well, does it turn into, like, compost or something? (U1P6)

Yeah, they, it actually eats it and spits it out as, I don't know! (U1P3)

Something better anyway. Yeah. (U1P6)

Social Media

Commensurate with the use of online features as a source of climate change information, social media played a key role in participants' exposure to information and developments on the climate. Many participants accessed climate-related social media content in an ad hoc manner and without a high degree of faith in these sources:

It'll catch my eye and I'll investigate further we'll say, and that investigation could be anything from feckin' Facebook comments to a Reddit thread so it's not exactly the most scientific approach! So probably entirely biased as well, but yeah, that's my, my sources! (U2P6)

Yeah, I'd look at a few pages on social media about climate change that just keep you, like, they'd have little facts, like, each day that just kind of keep you informed. (U1P2)

Not sure if I source climate information, but I suppose I'm aware of it just through, just news articles and Twitter feed and things like that, you know. (S4P2)

Perhaps understandably given the younger age group of this cohort, the Student Group seemed to rely more heavily on social media for their climate change information, and placed a greater degree of trust in this source:

Yeah, I feel like social media is like a huge part of it (S1P1)

I think it's the type of thing the more you look into it, the easier it is to find information. Like I know using social media, the more you follow these accounts, the more you find other friends that will tell you the more of the same stuff. (S1P3)

I think if they were to deliver it in a way where, not out of laziness, I hope not, but short kind of bullet points that are straight to the point with facts and figures rather than like, often if you have to click into a LinkedIn article about it or something, you have to go and you're reading reams of stuff and it just takes a lot of time and everyone's time is kind of limited and we're busy with our degrees and what have you. (S1P7)

Official Data

A smaller number of participants preferred to inspect official data released by Irish and International bodies, due to the reputation of these organisations as reliable sources:

But occasionally I would look up, I try and get decent information, honest, to be honest, and look up reputable websites. But our platforms and as I said EU, if you go into their stuff, I've read some of their stuff and it seems to be OK. (S3P1)

Flood/high tide prediction maps I think it is from OPW. (S3P4)

The majority of, kind of, the information that I get about climate change would be, I follow a lot of pages within the European Union and the UN and stuff, and they're kind of, they have a lot of articles regarding just climate change and what's happening in Europe in terms of, again, different agriculture and different statistics and facts, that's kind of where I would be looking at (U2P7)

Mmm. ((Nods)) (U2P3)

the majority of the information, I, like overall about climate change and year to year statistics, most of it, mostly about Europe. (U2P7)

Even if participants did not access official data personally, they were aware of the availability of such sources as they related to their immediate sphere of interest:

I suppose, ... there's some well-established even tidal routes that have been, the data has been built on and compiled since then, I suppose since World War Two, etc. out in the Atlantic and they'll tell you now that they are completely redundant because the patterns have changed so much. (S2P3)

I think there's a lot as well on the reports available like, say multinational corporations or like businesses, like how they're damaging climate change or like what a business is doing for climate change. (S1P6)

3rd Level Studies

Those currently enrolled in higher education described learning more about climate change through their studies. For many, this formed part of an assessable component of their course:

Yeah, for me, I'm studying property at the moment, so that's kind of, you know, college is my life right now, so I guess it comes in. There's so much new research and stuff that we focus on through sustainability and especially in the area of valuing sustainability in terms of the value of your building and accounting for it. (S2P4)

The main thing is like, I probably say, the whole climate action thing. I'm probably learning about from a business perspective rather than like personally, that like studying different subjects in like undergrad and currently at the moment, like, I'm probably becoming a lot more in tune about climate change and climate action, just through my studies rather than general like social media (S1P6)

And then as I came to college, I joined Enactus, where they kind of follow the Sustainable Development Goals and are trying to find ways to like improve our lives and prove our kindness and stuff like that. Like there is a project in Enactus called Renew, that's kind of focussed around, like greener environments and stuff like that, and then kind of personal as well. (S1P2) ...
Yeah, that's definitely something that's been pushed in an educational way over the past few years. Like definitely in college like, the project that S1P2 just talked about, like I literally started that last year with two other girls... (S1P4)

One participant related how they had become more informed about climate change in secondary school and how third level education had facilitated them gaining more knowledge through extracurricular activities rather than as a core component of their course:

Now, I'm kind of the same with S1P6 where like I kind of started learning about it in studies in secondary school. And then as I came to college, I joined Enactus, where they kind of follow the

Sustainable Development Goals and are trying to find ways to like improve our lives and prove our kindness and stuff like that. (S1P2)

Unsure

A small number of participants discussed not having any source of climate change information and, furthermore, being unsure where to even begin to look. It is interesting to note that two of these participants were members of the Student Group:

Yeah, I don't actually know if there is anything out there. (S4P1)

I personally actually wouldn't know where to go. I don't think there's enough about it really (S1P5) ... Like S1P5, I wouldn't know where to, like, a source or sources to get climate projection information. (S1P8)

Active Consumption

In contrast, the Student Group had the only participant who enthusiastically sought out and actively consumed information on climate change, to the point of becoming engrossed in the content they found. This participant looked for climate-related information under their own initiative rather than being obliged to do so as part of their coursework:

I think S1P1 and some of us mentioned like watching documentaries and like listening to people and kind of just personal research. Like I'd be a person that will just sit there and fall down a rabbit hole of like articles and documentaries and YouTube videos and stuff. And I just consume it myself. Like I wouldn't seek out to people to educate me, rather I'd seek the education myself. (S1P2)

...

Yeah, I definitely agree with S1P3 there. Once you kind of find an avenue to get into it, you kind of, it opens a door of like different places and people to kind of follow that will give you the correct information and that will give you insights. And then they will kind of share their sources and you go into their sources and their sources share sources. And then you kind of just have a big, wide variety of sources to kind of educate yourself on. (S1P2)

3.5.4 Trust in Sources Used to Access Climate Information

Over the course of focus group sessions, participants revealed the level of trust they placed in sources of climate change information. The considerations influencing participants' trust in the information provided could be distilled to three broad themes of almost equal weight, as outlined in Table 24 below:

Table 24 Key Themes Related to Participants’ Trust in Sources of Climate Change Information

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Reputation	0	2	0	2	0	3	0	1	8
Scepticism	1	0	0	2	0	1	4	0	8
Vested Interests	0	0	0	1	1	0	6	1	9
Total	1	2	0	5	1	4	10	2	25

Vested Interests

The most cited factor influencing participants’ trust in a source was a keen awareness of the vested interests at play in highly-charged debates, leading to a natural cynicism of any claims made. The term “vested interest” was recurrent as participants described how financial incentives could determine the climate change arguments made by an individual or organisation at a given time, from localised climate impacts, to scientific research undertaken or reported, to claims as to the effectiveness of a clean technology. Participants discussed how two conflicting arguments could be presented with equal zeal, making it difficult for audiences to discern the truth:

My source for that was from the map that went around last week on Whatsapp or on Twitter with a, with a map of Ireland and where is going to be underwater in 2050 and that's (S2P2)

Yeah. Don't buy a house in the red zone! (S2P5)

it just gets thrown up to you or you get exposed to it through no, through no, not, not fault of your own, but, through no work it just, because somebody will post it on Whatsapp or on Facebook, whatever, and then. And you don't know what the truth is or who has, I don't even know what the source of that map was. It's just it was something that just goes around, I'm saying it could be completely inaccurate or it could be absolutely spot on and I've no idea of knowing or no way of knowing because I think one of the problems with the Internet is there are so many sources now and so many vested interests and you don't know what's true anymore or what's fact, an absolute established fact. (S2P2)

It is a huge, huge issue, like when you look at other countries and what they're doing and just come back to Ireland and you read this research. But if you look down to the nitty gritty, you'll find out who this research is sponsored by. So, a lot of it is sponsored by vested interests. (S4P4)

I think there are a lot of people who are proclaiming themselves as being independent who probably have a vested interest in a particular side of the argument, and that makes it very difficult to assess what the true story is. And then you have the people who are just opportunists, like Donald Trump, who denied strenuously there was any human inter, human involvement in promoting climate change, but yet when he wanted to take over some of the beach down in Clare to build coastal defences for his golf course, the reason he was proclaiming on his planning application was that the effects of global warming were going to increase the water levels and wash away his golf course. So you have some

people who'll sell an argument, which is, is determined at any one time by the interest of the results they're going to get from that particular presentation, and it doesn't, they don't see themselves as being inhibited from proclaiming the opposite case when it suits them in another forum. (S2P5)

I think an electric, electric cars are probably oversold, personally, is my belief, because the car makers have to be seen to be, the car makers will have an imperative to bring down their average consumption and they're promoting electric vehicles to do that. I think if you look at the, where the power for the electric vehicles is going to come from, it might skew your, your understanding of what the benefits that they will bring is. (S2P5)

There were postulations that media outlets had jumped on the bandwagon of climate change to engage audiences, boosting their revenue by overdramatising its effects. One participant from the Agriculture Focus Group even suggested that researchers were complicit in an overblown portrayal of climate to secure funding:

So, you know, it's like the, it's like the weather warnings as somebody said, that weather warnings increase media consumption and equally the more draconian climate change argument you can have, the better... The downside of that is that people don't want to read, most people are happy to read the headlines and the newspapers are equally happy to proceed on that basis. They don't, they don't want to invest in a considered research project into why these things are happening when there's nobody going to read it. (S2P5)

But a lot of the stuff at the moment, I think is a little bit more hype and me too-ism than anything else. (S2P5)

So, I just think I would still like to see better science and more measured science because so much of what's there is being driven by sensationalism. If it's not going to be sensational, I can't get more funding. And it's very unfortunate that that's the situation that seems to exist to some degree. I'm certainly not saying all research but some of it. (S3P3)

Scepticism

Questions as to the validity of the climate-related information available also had an important influence on participants' trust in sources. Here there was a good deal of suspicion as to the credibility of information presented online, whether climate or non-climate-related. Participants displayed a high level of media literacy in this regard, with one participant highlighting people's desire to search for information supporting their own beliefs on any subject (confirmation bias):

There's facts for every ...occasion, now which facts you want to believe are based on your own critical assessment. But a lot of people just take them at being face value and being true, which is just life at present. I think the COVID thing is showing that to wonderful extent as to, you have the conspiracy people, the deniers and the sheep as they're termed. So which camp you fall into really depends on your own particular approach to life. (S2P5)

So, like it is hard, but I think if you're, like, really interested in it, there's like quality things out there. But these days, it's hard to tell like what's real and what's not online. So, I think it's probably difficult. (S1P4)

Because like some, the recycling thing is definitely can be a bit of a, a false whatever you want to call it, false, like, solution, because if nobody recycles it, then it's, as you say, it just gets dumped anyway, but compostable plastic is, there, it's in the supermarkets right now. (U1P5)

Two participants cast doubt on the consensus view of anthropogenic climate change, or at least some of the effects represented as such:

I wouldn't be as interested in the climate change and the difference in it because at the end of the day, how do we know the information we're getting is correct? What if the world was just naturally going to get warmer anyway and was going through a cycle? You know, are we being steered down a particular path for somebody else's gain, somebody else's financial gain? So I wouldn't have as big an interest 'cause I don't necessarily believe all the information that's put in front of me in relation to it. (R2P6)

But whether that's like our weather alert of recent weeks, where we were going to get lots of snow, we'll have to wait and see. I won't be buying the skis just yet anyway! (S2P5)

So, and that's an example, really, of where local evolution has, has produced a result that people look at and say, oh, it didn't used to be like this, but it did like, it did used to be like that years ago. Certainly 30 years ago, the Broadmeadows would be over the road on many an occasion because the bridge supports were high enough to hold the water back and it came down the river and flooded the place. And certainly, the Circuit of Ireland produced very spectacular television footage that time. But, and it's a small example of, you know, people looking at things that have happened over the last five years and maybe saying, oh yes, that's climate change. But that is actually a physical change, mainly where CIE messed with the bridge. And you'd wonder how much more of the stuff that we're seeing as being, being promoted as climate change is actually other, other conditions. But I, I personally don't doubt that, that there is. I mean, there's pretty empirical evidence that the ice sheets are reducing, sea levels are rising, temperatures are warming. So that is happening. But it isn't responsible for all of the things that are accredited to that source, I think, that's what it comes down to. (S2P5)

Reputation

The reputation of the source of the information played an equally important role in determining participants' level of trust. For members of the Student Group in particular, Met Éireann's reputation as a long-established, esteemed institution gave its data legitimacy and credibility:

But I think they should probably be at the forefront of the Irish, just general conversation with stuff, because I think it holds them in a better place as well, for I think people would be more likely to trust them to kind of encompass all areas of the climate, not just the weather. (S1P3)

And they're already like, you know, you would believe them, they're not like fake news or anything. (S1P1)

I'd want to make sure it's, kind of, from as good a source or as strong a source as possible before I read too much into it. (R2P1)

This also applied to public figures involved in climate activism, whose investment in the cause and long-standing association with environmental issues was seen by some as synonymous with trustworthiness. However, one participant cautioned against the veneration of younger voices in the climate action movement, feeling that standing in such matters should be gained from experience of dealing with these issues in practice rather than impassioned but idealistic demands:

Greta Thunberg, David Attenborough, I would listen to those kind of people that I kind of nearly trust because that's like their life. (S1P1)

I would be in awe of Greta Thunberg and, you know, the awareness that she's raising around the world in terms of, you know, she's putting the face of a young person but the words that are coming out of her mouth are, you know, like an experienced adult in relation to the issues in relation to climate change. (R2P7)

And even when you talk about the bold Greta, who the whole world loves to idolise, I really don't think she's any clue about real life and I object to a lot of the, her tone, of her preaching tone when she tells politicians they should be ashamed and all the rest and all the rest. I'll, I'll take that from an adult, I won't take it from, from a younger person that, I'm sorry about that too but that's, that's just me being contrary in my old age. While I admire her idealism and vision on Climate Change, I find her tone very

abrasive and angry. I understand her anger and her fears for the future but I think her approach is not the way to win battles or lead change. In my opinion, we need leaders on this matter who are adults, who have worked, who have paid taxes, who understand how politics and policy-making works and who have led change; not necessarily about climate change. (U2P2)

3.6 Weather Warnings

Four broad themes emerged from the analysis of the data associated with weather warnings:

- 1) participants' familiarity with the weather warning system;
- 2) how participants were alerted to a weather warning;
- 3) participants' view of the effectiveness of the weather warning system;
- 4) reflections on behaviours and actions associated with past weather warnings.

3.6.1 Familiarity with Weather Warnings

All participants were asked about their familiarity with the Irish weather warning system and when analysing their responses two themes emerged. The first covered participants' level of familiarity with the weather warning colour coding: yellow, orange and red. The second was their familiarity with the weather warning system beyond these colours: familiarity in practice. This theme came up, for example, in discussions where participants shared that while they knew the colour codes used in weather warnings, they may not fully comprehend what these warnings mean apart from a red warning being worse than the others. In some cases, participants discussed how they did not know the actual difference between them, or the consequences of a warning:

Familiarity with the Weather Warnings Colour Coding System

Participants were generally aware of the colour coded system, and most knew the sequence of three colours from yellow to red. Those who were familiar responded:

Well, I'd be fairly familiar with the yellow, orange, red and so it's. And the marine small craft warnings and gale warnings and so on. (R1P6)

Yeah, I would be familiar with the yellow, orange and red warnings as well. (R1P7)

You can hear them on like the local radio station. I listen to them and you would hear it on those news, you know, weather forecasts in your area. Yellow, orange, red alert, whatever. (R1P3)

I'm familiar with the weather warnings, the yellow, the orange, the red, and I notice that Met Éireann issue them, but also I, they actually can issue them for counties or for, you know, areas of the country, which I think is quite good (R2P8)

Do you mean like, the yellow, orange and red weather warnings? Yeah, I mean, sort of! Like, I even just get an idea of, yeah, like, orange wind warning then you'll think, OK, it's, it's kind of bad, but yeah. (U2P7)

In some rare cases, participants mistakenly referred to the wrong colour. However, it seemed likely they misspoke rather than a lack of familiarity with the colour coding system:

You mean the red, orange, and green carry on? (S2P5)

In one case, a participant suggested they were familiar with the Met Éireann alerts but referenced the possibility of another source of warnings (Google):

Other than Met Éireann, I wouldn't be familiar with anything else. I know we get weather warnings through Met Éireann, but that would be the only source I'm aware of. Other than Google. (R2P5)

Participant R2P5 may have been making reference to the “Google Public Alerts” or “SOS Alert” by Google. But this was not clear from the discussion.

Throughout all eight focus groups, only one participant admitted they did not recall what the weather warnings were when the discussion first began:

Not, not, not at all. Like, to me a weather warning is, I look at Google and there's something comes up. But I'm sure that's not what you're talking about. (R1P3)

During the course of the discussion the participant (R1P3) later suggest they recalled the colour codes:

And we've seen an awful lot more of, now that you say you're talking about those red, yellow, amber or whatever. I've seen an awful lot more as well. And I suppose what I most remember is, I don't even know what kind of weather, but that time when we had that blizzard, where they were warning everybody. Was that red? When they warned literally everyone to stay indoors? The beast from the east? (R1P3)

Familiarity with the Weather Warning System in Practice

When asked about the weather warning system, although the vast majority of participants across the eight focus groups seemed familiar with the colour codes used, many would hurriedly follow up to express feelings of an incomplete understanding. This pattern emerged in all focus groups, except the Agriculture (S3) and Marine (S2) groups, and was most prevalent among the Student (S1) group. This

suggests that members from the Agriculture (S3) and Marine (S2) Focus Groups appeared to have the greatest familiarity with the weather warning system in practice. In contrast, the Student (S1) group had the most incomplete understanding of the weather warning system.

Among participants who expressed a lack of understanding of the system, several sub-themes emerged. Participants seemed to simply lack confidence in their understanding beyond their awareness of the colour codes, for example:

Do you mean like, the yellow, orange and red weather warnings? Yeah, I mean, sort of! Like, I even just get an idea of, yeah, like, orange wind warning then you'll think, OK, it's, it's kind of bad, but yeah. (U2P7)

Like they're obviously fairly intuitive, like yellow to red, you know ... one's worse than the other, but apart from that, I wouldn't really know. (R2P1)

But in in terms of, if that's what you mean, I'm aware of its presence, but I'm not aware of how it's created or anything like that. (S4P2)

The extent of my knowledge would be there is a yellow, orange, red or amber. There is an amber in there as well? And from less severe to most severe. That'll be the extent of my knowledge, I don't know any more than that personally. (S1P8)

In other cases, some participants appeared to be unsure of the consequences associated with some warnings (e.g., what an orange wind warning might mean) or the differences between warnings (e.g., the difference between an orange and red warning):

I wouldn't have known the implications of an orange versus a red. You might a yellow to red and it's more serious. But the one in between, I have no idea what an orange actually means and how severe it actually is. Red is kind of self-explanatory. And then the, the, entry one as well, it means, yes, you can kind of take that, it's going to be a bit more severe. But in the middle, I would have no idea. (R1P3)

And I think red is the one that really catches the attention. Yellow is yeah, ho hum, but we don't hear much of orange so we don't, we may not understand as much about it. (R2P8)

I wouldn't know what constitutes as a yellow or orange warning in the first place, so I'd probably just

wait until it actually happened to see and then make my decisions based off that. (S1P8)

You kind of know it's bad when they say 'oh...' but apart from that I wouldn't know much further about the different warnings. (S1P3)

I'll be exactly the same as well, like it's just a colour code and like you know when it's red it's like going to be really bad. Well, I don't know much more now. (S1P1)

Um, you know, yellow, orange and red and um that makes sense. But, when you talk about a, I'm not 100%, I couldn't see the orange weather warning for wind and just automatically know what that means. I think we've seen a red one means that it's going to be seriously bad. (S4P3)

Yeah. (S4P2)

It's not as easy to make a connection between, you know, your experience of weather and what these represent. It's, with the rain a bit more so, right. For me anyway. (S4P3)

Yeah, I know. That's, I would be the same. I know, you know, you know, yellow isn't so bad ...red bad, but it's, it's, how bad? The scales of, or the levels of severity, I wouldn't know. (S4P2)

Participants at the Dublin (U1) Focus Group were unable to recall if the weather warning system had been in place for a long time:

But they're relatively recent, are they? 'Cause my perception, they've only been running for about two or three years, maybe, or have they been round for longer? Have I just not noticed them? (U1P5)

I think so, too, and if we did have them, I never noticed them, but they seem to be very frequent now. (U1P3)

In other cases, participants' familiarity with the warnings was identified as limited as they suggested the warnings were not entirely relevant for them. As one participant described:

I have a friend that's a pilot and she would be very kind of aware of those weather warnings, whereas I wouldn't be as pressed on them, they wouldn't really bother me as much as someone like her that would need to know them. (S1P2)

Another participant indicated that their understanding of the weather warning system drew solely from prior exposure:

I only know from my own personal experience. I remember when I was in my second year in DCU, they issued a red warning or something and then I remember the wind was crazy and there was a tree blowing along the Collins Avenue. I'll just remember that so I'll always think red is bad anyway. (S1P5)

3.6.2 How Participants Are Alerted to Weather Warnings

Across all eight focus groups, the discussion on weather warnings highlighted the wide range of different ways participants were notified of a warning. In none of the discussions did any participants express uncertainty about how they were notified of a weather warning, with many participants affirming that the more severe warnings are well publicised. Further, many participants mentioned multiple sources of notification once a warning was issued:

We hear it all the time on the news, the weather forecasts, any news apps that you have, if you're looking at Met Éireann's website for weather, you'll see them on there as well. (U1P4)

Yeah, if I wasn't first to hear it from, like Twitter or RTÉ news or something like that, it'd be on the golf WhatsApp group or something or somebody hearing and then sharing it, if I didn't hear it first. (S1P6)

Online media will get you no matter where you go ((laughs)). And the only thing is that they'll multiply it by two before it gets out at all. So, you have to be careful, but all you ever need to hear is the colour and you know the risk. You don't have to hear the rest of it. But I get it from, same as the lads, the radio, the TV, the news. That's kind of where you see it, first of all. And then I'll be finding it on the websites, Met Éireann, etc., because I'll be there anyway, so. (S3P3)

An overview of the themes that emerged in this section and their relative prevalence are summarised in Table 25 below. The three most prevalent themes are news bulletins, social media, and word of mouth.

Table 25 The Key Themes Associated with how Participants are Alerted to Weather Warnings

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Forecast	2	0	0	1	0	0	0	0	3
Met Éireann	2	0	0	1	0	0	0	2	5
News	4	6	4	6	2	3	5	6	36
Online (Social Media)	2	0	1	4	2	4	0	1	14
Word of Mouth	0	6	0	4	0	5	0	1	16
Other	0	7	1	6	0	5	1	0	20
Total	10	19	6	22	4	17	6	10	94

News Bulletin

In all eight focus groups, participants mentioned being alerted to weather warnings via various forms of news bulletins such as watching or listening to the news and radio and receiving warnings via a popup notification from a news app. News bulletins were the most prevalent method participants cited during the focus groups. However, some discussions illustrated participants accessing weather warnings via the radio, listening to the news:

Local radio stations, we'll say, in addition to mainstream ones. They would be quite good in alerting people to it, you know. And it is fairly far up the list of news that is being disseminated. (S3P2)

All the radio stations seem to tie in as well together with regard to the forecasting in that, in that sense, you know? You know, it's either the South or if there's a warning given up further maybe Clare Radio will be doing it. So, I think the radio stations are, are very important and you can get an update, if you're even in the car you will get an update straight away, you know? (U2P5)

I tend to get my weather warnings from the radio forecast in the mornings or from my mother-in-law. (R2P4)

when there's a weather warning and you see it on Twitter and you hear it on the radio or whatever. (S4P2)

References that illustrated participants accessing weather warnings via watching TV included:

Yeah, I think people mostly got their weather warnings from the RTÉ News, I'd say, Six-One. (U1P1)

But from my point of view, being of your mother and parent's generation, radio, television is where I get my information! (R2P8)

Yeah, for me, I suppose it's the RTÉ News and it would feature, as a news item as against a weather forecasting item. And that's where you would more or less pick it up from because it's put out there as a news item on RTÉ that is, that has been issued. So, it's a slightly different context from it being that your sourcing it as a, as a weather warning. (S2P3)

I think most of mine would come through my phone, be it through, I have the RTÉ news app and I get

my notifications through there. (S1P8).

Social Media

Another method mentioned when describing how participants become alert to weather warnings was social media, which was discussed in six focus groups. This method of notification was almost always made along with another method of notification, e.g., a news bulletin, a weather channel, or in reference to a source such as a news provider or AA Roadwatch posting on social media:

They flick up on Facebook, or breaking news and things like that, they usually flash up to you. (U1P7)

Social media, as well as the weather channels that you get on your feed, so they would pop up as well. (R1P2)

Either social media or word of mouth. Kind of like in a family group or just kind of seeing RTÉ or something put up on like Twitter or Facebook. (S1P2)

Yeah, I'd be the same. Either the news app or Twitter or then probably my parents. (S1P4)

From a personal perspective, I would get, I would become aware via either the weather forecast or indeed, you know, tweets maybe from AA Roadwatch in relation to driving conditions, etc., they would be the main areas where I get the information. (R2P7)

Yeah. And then, actually, ... did you ever look at the, you know, there's a Facebook group for weather alerts Ireland. (S4P2)

Word of Mouth

During four of the focus group discussions on weather warnings, participants remarked that sometimes they were alerted to weather warnings by someone else, typically a friend or family member:

Yeah, so I'd say probably like parents, word of mouth, because, like, it doesn't happen often enough, really. So, it's just such a big deal, everyone's chatting about it. (S1P3)

I tend to get my weather warnings from the radio forecast in the mornings or from my mother-in-law. (R2P4)

It'd usually be from social media just scrolling maybe through Twitter, places like that, or else from my parents, just general chit-chat that they'd say that, oh, did you hear there's a weather warning for, for tomorrow? Yeah, they'd be my two main sources. (R2P3)

Now that I'm at home, my parents would usually just tell me, because they always listen to the news on the radio (U2P7)

I suppose I normally listen to the one o'clock news, and that's where I maybe get it first, you know, or word of mouth, sometimes you'd hear somebody saying it to you, I don't know. (S3P1)

And sometimes it could just be a friend, who just sends me a text to say, do you know this is happening tomorrow? (R2P5)

Met Éireann and Weather Forecast

In three focus groups, emphasis was placed on being informed of a weather warning directly by Met Éireann or the weather forecasts. These weather forecasts may also have been from Met Éireann, but participants were not specific:

We hear it all the time on the news, the weather forecasts, any news apps that you have, if you're looking at Met Éireann's website for weather, you'll see them on there as well. (U1P4)

I know we get weather warnings through Met Éireann, but that would be the only source I'm aware of. Other than Google. Go to good old reliable Google! (R2P5)

Other

Finally, some less prevalent themes emerged during some focus group discussions, where participants made reference to being notified of weather warnings through work, sometimes via phone or email:

So, say, from a work perspective, it's, it's an email that goes out centrally with information that's been gathered from Met Éireann. (R2P7)

Similar to R2P7, we'd receive e-mails at work, if it was a red weather warning we could be needed, extra troops on the ground. (R2P6)

Well, in UCC we have this text alert system U2P7, so that's what you're, we have one network for students, one for staff, and we generally give these kind of advices out on that. It's a text message system. (U2P2)

For me, personally, they're at work. I work part time at the weekends at a go-karting track, that's outside. So, we'll always be watching it for the weather because if it's a red weather warning, we still work. But it's just miserable because you are out in the wind and wet. (S1P7)

3.6.3 Effectiveness of the Weather Warning System

Discussions about weather warnings inevitably involved participants providing their thoughts and opinions about the system. Labelled effectiveness, this theme outlines participants' evaluation of the positive and negative aspects of the Irish weather warning system.

Table 26 presents the breakdown of positive and negative comments provided by the participants. The proportions of positive and negative comments provided during the Rural (R2), North West (R1), Cork City (U2), and Agriculture (S3) were relatively balanced. In contrast, the Students (S1), Inishbofin Island (S4) and Dublin (U1) Focus Groups provided a more critical review of the system. Finally, the Marine (S2) Focus Group was the only focus group not to provide any positive comments on the weather warning system, with the discussion solely focused on how the system could be improved.

Table 26 Positive and Negative Aspects of the Weather Warning System

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Negative	26	5	12	9	13	14	25	11	115
Complacency (Some Links to Accuracy)	10	1	2	4	1	6	4	2	30
Generally Poor	0	1	0	0	0	0	4	1	6
Issue with Yellow Weather Warnings	4	0	1	3	0	1	5	4	18
Knowledge	4	0	1	3	8	8	1	0	25
Lack Accuracy (Trust)	6	1	5	0	4	1	8	3	28
Sensationalism	2	0	0	0	0	0	9	1	12
Too Frequent	4	4	3	0	1	0	10	4	26
Positive	5	7	10	9	1	3	0	14	49
Cautious & Alertness	0	0	3	1	0	0	0	1	5
Clear Meaning	1	0	2	0	0	0	0	1	4
Provides Critical Information	1	2	2	1	0	0	0	2	8
Increases Awareness	0	1	0	1	0	0	0	5	7
System Works (Overall)	3	6	7	8	1	3	0	9	37
	66	28	48	39	29	36	66	58	370

Positive Aspects of the Weather Warning System

System Works (Overall)

The most common positive common from participants was that the weather warning system works well to warn and inform the necessary people:

I think they work reasonably well. (S3P1)

I would say the same. (S3P1)

I am happy with it. Farmers very tuned in to weather. (S3P6)

But generally, ... the overall, the warnings are quite good, but maybe over time they might be able to point them a little better. (U2P5)

...it's a good way of just getting a quick view of what's happening around the place. (R1P6)

But I think the fundamental message of it does the job pretty easily, without me even needing to know the details of what each level entails. I just know if it's red, be a bit more cautious. (R1P1)

I usually find that the coloured weather warnings are quite accurate but everything else may not always turn out as forecast. (R2P4)

For me, every little helps. So, I think, ... it's a useful, maybe, device or useful knowledge or whatever to call it, because it makes the difference between my wake-up time to leave home, 'cause sometimes if I know that I need to start the car engine five minutes early, leave the engine running for the glass to thaw, my windshield to thaw, then I get up, I set my alarm like, five, seven minutes early. So that at least I have that extra bit of time so I'm not running late for work because in my situation I can't afford to be five minutes late. So, it makes a lot of difference between my wake-up time and my going to bed time and I think it's a good, I think it's a good thing. It kind of pre-empts your, your day or it pre-empts an outing, I think. (R2P5)

Yeah, I think they're a great idea, the warnings, because the accuracy level has gone way up in them up and what you say now, even if we're getting the tail end of a, of a storm and even the idea of naming the storms, again, it has been brilliant. (U2P5)

Some participants provided positive comments towards the orange and red warnings but were negative about the yellow warnings. In the North West (R1) Focus Group one participant noted:

Just gonna say that the coloured weather system's almost like, it's a handy summary. Well, like a yellow weather warning is almost like a good day. And when it's orange, you're like, oh, okay, I need to pay more attention to this for what's going on. I find it useful from that point of view. (R1P2)

Similarly, in the Agriculture (S3) Focus Group, some mentioned:

The ambers and the reds do. The yellows I think we probably pretty well ignore and maybe I'm talking for what everybody has said because it's only a bad day in farming. Whether it's a yellow warning or a wet day, if you're going to spray, you can't. Whether it's a wet day or a yellow warning, and you're going to spread slurry, you shouldn't. And, you know, it doesn't make that much difference in the main, but serious ones do. (S3P3)

Yeah, I concur with S3P3, 100 percent. (S3P2)

Yeah, same. (S3P1)

Yeah. (S3P5)

Yeah, I agree as well. Yes, sometimes yellow and orange a bit out. (S3P6).

As is evident in the statement by S3P6 above, in some cases, participants were only supportive of the red warnings:

I think red probably still gets attention though, I don't remember the last time we had one of those unless I'm wrong, but I think probably red weather warning might get attention. (U1P5)

There's only really, I don't know, I suppose it works for red weather warnings, because as we all kind of came to the conclusion that we don't pay much attention to yellow or orange. (S1P7)

And I think red is the one that really catches the attention. Yellow is yeah, ho hum, but we don't hear much of orange so we don't, we may not understand as much about it. (R2P8)

Other Positive Sub-themes

Some other positive sub-themes that emerged during the focus groups were that the warning system was: clear; provides critical information; and increases awareness of severe weather. A number of participants emphasised that the colour coded system for warnings was easy to understand:

All you ever need to hear is the colour and you know the risk. (S3P3)

I think on, like a quick glance, if you hear yellow, orange or red, it works in the fact that you kind of know if it's important or not. (U1P1)

On a basic level, I'd say yeah. It's fairly simplistic in yellow, orange, red, you know, it's bigger or more severe. I think it's fairly intuitive to understand. (R1P1)

Others underscored that the warnings are important, and once a weather warning is issued, they believed people should or would be on alert:

Yeah, and the only other little thing I would add to that maybe is, like it is important to give these warnings of storms, because the farmyard can be a very dangerous place in a storm. (S3P1)

Yeah, I think they're a great idea, the warnings, because the accuracy level has gone way up in them up and what you say now, even if we're getting the tail end of a, of a storm and even the idea of naming the storms, again, it has been brilliant. Because you just don't take it for granted anymore. And sometimes you learn. Learn the sense of caution rather than take a chance and it's been very, very

accurate, as I said, and especially when it comes to Cork as well as regards flooding, it has proved to be a, to be a boon really, because people have, they've, it's to be hoped they can, take precautions. We've a lot of flooding in town, we've a lot of flooding in the surrounding areas. And I think these, these, these are, kind of, very, very important, they're at the top end of the scale, really. (U2P5)

I think largely they are a great tool to give people advanced notice although sometimes I feel they can be overrated as some previous warnings have been downgraded closer to their expected arrivals. (R2P4)

I think the level of detail they're getting now is far superior to what it was 10 or 20 years ago, and I find that very reassuring. (R1P6)
Yes, especially for coastal areas, you know, that you would rather be on the side of caution than whereas on land, it might not matter as much. (R1P5)

While some participants felt that the warnings rightfully grab attention and have credibility:

And they, the news does pick that up pretty well so if you listen to, shall we say, the standard news channels, you will hear the weather warnings being issued, being talked about, not just part of weather forecast, but actually talked about in the news, there's a yellow weather warning or there's an orange weather warning ... And I think red is the one that really catches the attention. (R2P8)

It certainly raises awareness. And it certainly, well, for me, it makes me pay attention. So, it would be, it would be a factor in planning, whether it's at home or for work. So, I do, I broadly think it works. (R2P7)

I think credibility, if you look at it from a national point of view, the National Director for Emergency Management, under the umbrella of the Department of Housing and Local Government over the past five, six years, has really brought its A-game on behalf of many government departments. And they, they have now a lot of credibility and the organised forecasts and the way they bring their different partners together gives it a national sense of focus and it drills down much more into communities and homes now. (U2P1).

Negative Aspects of the Weather Warning System

Trust and Complacency

The most predominant negative comments concerning the weather warning system were related to a lack of trust in its accuracy. In some cases, this appeared to result in complacency or lack of action. For

example, if a weather warning was issued, but the severe weather event did not materialise, some participants suggested they, and others, would ignore the following warning. In three of the focus groups this was referred to as a "cry wolf" effect, prior false alarms resulting in the subsequent rejection of the following weather warning:

I'd use it as an indication and not expect anything too accurate 'cause it's the weather, but as I was mentioning before, the weather warnings, the red, green and ambers, or the yellow, red, amber warnings, I would worry that when, the more they don't happen, people are just going to completely ignore and then some time where we are actually going to have a hurricane and we're not prepared for it. (U1P4)

Later U1P4 also remarked: But again, I find I'm getting complacent because you get a weather warning and it doesn't materialise. (U1P4)

Yeah, I think the sense is it's overused and as somebody said then we become complacent about it. I mean, if there ever is a big, big issue coming they're going to have to work really hard to get people sort of tuned into it, I think, at this point. (U1P5)

It started off as a good idea, I think. But those were the years, like, it's ...so many storms. Like we've got some of the worst weather we ever got here was in an orange wind warning. I'm sure, it should have been red. I know it's very hard to pinpoint the weather wind direction, all that and strength for one particular area like. But, in general I think, I'll pick out, um, red or yellow along the West Coast there. But I suppose within the space of 100 miles could be completely different, um, wind. But, yeah, I think I wouldn't pay too much attention to the colour code really, because they have gotten it so wrong so many times, especially around here anyway. (S4P4)

Or if you are erring on the side of caution a bit too much. Because it's a few times that they've been storms from, you know, if you do that too many times. Well, it means people, you know, the boy cried wolf thing, even though it, you know, intentions are good. But, um, if you've been warned about structural damage over and over again and whatever, and then and it's not happening, then you're going to get complacent like. (S4P3)

The danger, though, sometimes is that it's like the boy who called Wolf, that if it happens to often, it then becomes almost a disbelief to the extent that you just carry on as normal. (R1P3)

Yeah, but I feel sometimes if there's a couple of weather warnings in quick succession and the earlier ones or the first few don't tend to be as bad as we're warned about, the ones coming afterwards people won't take it as serious then, that's the concerns I'd have from listening to people. (R2P6) ...

Yeah, no, just to highlight I think what R2P6's point, he brought up a great point, like, if there's a few in a row that don't happen, like even I think the last few weeks, there was a few kind of predicted and

they never really fully developed. And then if a big one does come, I feel like people aren't as prepared. Again, just to highlight what R2P2 said, like sometimes if there's just the littlest of things I think there's like, oh, it's a yellow, it's an amber, and people just don't take it as seriously. I feel like they shouldn't be highlighted as much if they're not going to be that severe. (R2P3)

Linked to a lack of trust in the accuracy of a warning, some participants suggested the warnings were too generalised:

Yeah, I just think they're too broad, I think they're too sweeping. I think you can't, you know, you can't just say the whole country, any country is going to have the same weather conditions across the, all of it. You know, I think needs to be much more tailored to specific. Again, you know, just the idea of the kind of more exposed areas or coastal areas are kind of, you know. Yeah, you know, there's a huge scope for variation within a county. I think that it's and I'm not sure how effective it is. I'm not sure when you hear, do you know, it's hard to know. Sometimes you hear weather warning and, and, it is that bad, or sometimes they, they give one and there's nothing. Or then there's the other nights, we've had terrible weather and there have been no weather warning in place at all. It's just, I'm not, I think the accuracy may be in a bit of what S4P3 says, but the boy who cried wolf may be relevant, especially if you get a few weather warnings in a row, that kind of end up being nothing. (S4P2)

I was just going to say I do think that it can be also very generalised and, you know, because even within a county, I think you can have different weathers on the same day. And if you're going to apply it, don't apply it in a generic way. Make sure that it's specific to areas or even refers people on to where, we're all pretty much, I think, dealing with technology now that I could refer you on if wanted to look at your local area to see where does it sit in that scheme. But yeah, that would be my comment. I think that it's too generalised. (R1P3)

Yeah, I would agree with you that they are fairly generalised. Like in Leitrim, there could be a hell of a difference between the weather in Kinlough in the North End and Carrick-on-Shannon on the south. I mean, it's more than an hour's drive, so an awful lot can be happening there. (R1P6).

In some instances, comments made concerning trust in the accuracy of the weather warning system were more general, simply suggesting the warnings were not accurate:

They've been wrong too often. (U1P6)

Yeah. (U1P5)

In recent times they've been just wrong too often. (U1P6)

I think the weather, weather forecast is accurate and dependable. However, the weather warnings don't seem to be as much. We produce apples and I mean if there's a storm coming, the apples would be on the ground literally. But you get a warning sometimes and it never happens or you don't get a warning and it does happen. So, the forecast themselves, as far as rain is concerned, are reliable. (S3P5)

During the Dublin (U1) Focus Group it was suggested that weather warnings applied to everywhere but Dublin:

I think there definitely is a sense of weather warnings now are for the rest of the country, not for Dublin. I mean, it just seems to me that perception is there and I think we had this potential hurricane a couple of years ago. And, you know, obviously it was quite serious, but not in Dublin. And I think that kind of mindset's now embedded in Dublin, ah yeah, that doesn't ever happen here, that's somewhere else ((laughs)). (U1P5)

Warnings Issued Too Frequently

Related to the previous Trust and Complacency theme, there were suggestions that the weather warnings were issued too frequently and that, at times, Met Éireann were overly cautious. This negativity was frequently directed towards yellow warnings, but sometimes orange warnings or weather warnings in general were also mentioned. These comments were, at times, linked to complacency and a lack of action. Some suggested that after several warnings (yellow and orange) were issued over a short period, with no severe weather event witnessed, participants felt the purpose of alertness or action was lost:

But I think the warnings, like they're all the time let's say. But you would take heed of the red warning more than the yellow warning (S3P5)

I think maybe a year ago, could be longer but I don't, I felt like there was a yellow warning almost every single day, every single week, so as a result it probably lost its meaning to me. Probably early on, might have been a bit more, I don't know, thinking of sorting the, I don't know, maybe fix the garden or something, make sure there's nothing astray and then suddenly like, well, there's actually one every single day almost. So, I think it lost its meaning to me about the general scale. So as a result, if a yellow warning happened tomorrow, I'd do very little, if anything. (U2P6)

But I think they're predicting a bit too much at the moment, and I think it is making us not take it seriously, so I think they might have to rebalance that a little bit, like err on the side of getting it right rather than caution. (U1P6)

Yeah, I think the sense is it's overused and as somebody said then we become complacent about it. I mean, if there ever is a big, big issue coming they're going to have to work really hard to get people sort of tuned into it, I think, at this point. (U1P5)

Later U1P5 also remarked: But you know, yellow and orange, I think we're all kind of saying are, we're almost a bit ambivalent about them now. (U1P5)

I think calling them weather alerts for yellow as well is, you know, people, if it's an alert it means that there's something wrong, but generally from the lowest level, the yellow level, it just means it's going to be raining maybe a little bit heavier than it would normally or it's going to be 15 or 20 knots of wind, which is nothing. And its people, you know, Ireland is windy. They know that, we don't have to have an alert every time it gets up to those low levels of wind, you know, give us alerts and warnings when they are necessary or else it just makes the mockery of the whole system. (S2P2)

Later S2P2 also remarked: I would say get rid of yellow alerts maybe, and half of the orange ones and just leave warnings for when people need to be warned of something. (S2P2)

if I think since the Beast of the East, if I think since then, I would have said there's been an awful lot more. Maybe we're just more conscious of them because that was a real event and people did stay in and they were more conscious of hearing some of the warnings. But they didn't necessarily have the impact that we would have expected. Thankfully. (R1P3)

I think there's a lot of them. Over this past winter, we seemed to be hearing about yellow and orange warnings a lot. Um, I don't know whether they're just being overly cautious or not. I'm not sure. Um, but sometimes they, they, call a yellow and really, it's, it's not nearly as bad as they portray. But maybe just in the west of Ireland, we're used to bad weather and maybe, the east, like you know, maybe more severe for them, I don't know. (R1P7)

Later R1P7 also remarked: I think they use them a bit much. Um, you know, I just seem to notice that there seems to be a lot of yellow and orange alerts given out on the television news or on the radio, and really the weather isn't as bad as they make, maybe make out. So, I think they should only be used in, when there is, you know, bad. Like today, like tonight, which is horrific here. (R1P7)

There's only really, I don't know, I suppose it works for red weather warnings, because as we all kind of came to the conclusion that we don't pay much attention to yellow or orange. So, it's either one or the other, it's either going to be really good or really bad or not really good, but okay or really bad. So, it's like a binary kind of code rather than this 3-4 traffic light method kind of thing. (S1P7)

Participants from the Agriculture (S3) and Marine (S2) Focus Groups suggested that the warnings were issued for insignificant weather events, implying that the threshold for issuing a warning was too low:

You know, and they seem to err on the side of having an orange to red, or warning when, and why we even have yellow warnings I don't understand, because they're not, there's nothing going on with a yellow warning, it's just, it's a rainy day or it's a slightly breezy day but it, you know, people survived for years without the system and didn't go to sea and all of a sudden get capsized and drown. I don't think it's saving anybody or preventing, do you know what it is, its, if anything, making people immune to even listening to them because they just ignore them. (S2P2).

I do not think the weather warning system works because I think they are over cautious based on Ireland's litigious culture. They are afraid of negative publicity so always air on the cautious side. NB I never change my plans until I see the weather on the day. After all, it is only a forecast, a prediction based on probability and personal interpretation. (S3P4)

In contrast, another participant from the Agriculture (S3) Focus Group expressed disappointment in how people become complacent when warnings do not materialise as a severe event:

For what it's worth, I think that the major obstacle to people heeding the warnings is the fact that we've all experienced situations where they haven't been accurate. And as against that, we can't afford to kind of give way to complacency, because I can remember the very first time they had the warning, I think it was they had a red out very quickly, and it certainly helped to save lives. (S3P3)

Knowledge and Terminology

Linked to the previous theme, familiarity with the weather warning system in practice, some respondents did not fully understand the system and, as a result, expressed negativity or frustration towards it:

Um, but like I wouldn't have known the implications of an orange versus a red. You might a yellow to red and it's more serious. But the one in between, I have no idea what an orange actually means and how severe it actually is. Red is kind of self-explanatory. And then the, the, entry one as well, it means, yes, you can kind of take that, it's going to be a bit more severe. But in the middle, I would have no idea. (R1P3)

Yeah, because I don't know when it moves from yellow to orange or orange to red, I wouldn't have a clue of what. (S4P2)

I think that a lot of people are familiar with red and yellow, orange doesn't quite get the same exposure or the same discussion or even the same understanding I think sometimes. (R2P8)

This was summarised in the Student (S1) Focus Group by one participant:

I think there's like nearly like a stereotype around that because the system's been here for what seems like a while, that people actually have an understanding of it, that we're kind of like creatures of habit, that we just know what sort of, what to do for each sort of weather warning. Whereas like, we don't. And like the notifications, like just saying what it is probably one of the simplest ways to do it, like from RTÉ without causing a big, massive panic, like just sort of an explanation of what it is like just a brief like education on what the actual system is, rather than just assuming that we know. (S1P6)

During the Inishbofin Island (S4) Focus Group, participants suggested the coloured warnings were not as intuitive as other expressions that Met Éireann could use:

I think terminology is important, but I think people are far more inclined to heed stuff when they hear about gale force winds or storm force winds or expressions like that would cause far more than the colour codes. (S4P3)

Yeah. That's so true, S4P3. (S4P2)

And I know storm force winds, gale force winds from whatever direction, you certainly pay more heed to that and act on something like that before you will about from orange, red or whatever. (S4P3)

Yeah. I agree with that, S4P3. (S4P4)

Yeah, that's a good point. (S4P2)

I would think that the colour code system has lost its, lost is authoritative, I wanted to go for a better word. As S4P3 said there, the gale force, the storm force winds would, that's what we, even myself, would have grown up listening to. Like, you know, if the storm force wind or violent storm force winds, it's serious, like rather than orange or red, there is no, it doesn't give specifics, whether it's 100 miles an hour or 50 miles an hour. At least, the gale force and storm force winds are defined by their strength. (S4P4)

Sensationalism

During the Marine (S2) Focus Group, some participants felt there was a sense of sensationalism connected with the warnings Met Éireann issued:

it's like every day the world's going to end according to Met Éireann. That there's going to be some gale or storm or something that's going to tear up trees and knock your house down. And then nothing happens because it's just a windy day. But they, it's like they're, they want to get more involved in the whole, their media presence and they're to get people talking about it but they're not doing a very good job of it because it doesn't. They're almost like the boy that cried wolf a lot of the time that they will put up warnings and then nothing will happen. (S2P2)

I would totally agree there is, that's more sensationalism than anything else. And I think it is going to come to a stage where people aren't going to heed it and they are actually going to take a chance and get caught out there one day. You know, we promote sort of, you know, for people to go out on their boats in a safe fashion and, yes, pay heed to weather and everything else, but when you keep getting those kind of false warnings as such, it is going to happen. The chances are going to be taken. (S2P1)

One participant from the Marine (S2) Focus Group was particularly negative:

Yeah, I think I think if I was running an event I would never rely on the Met Éireann weather alert systems. I probably wouldn't rely on the Met Éireann forecast anyway, I would always refer to the other models to see more detailed information about what is likely in the area where the event is. The Met Éireann system is just too blunt a weapon where things are marginal between being viable or not viable. (S2P5)

3.6.4 Behaviour and Actions Related to Weather Warnings Issued

During the discussions on weather warnings, participants were invited to discuss what they would do in the case of a yellow, orange and red snow and ice warning being issued for their local area. The data from this discussion were categorised into two clusters:

- Table 27 shows the number of coded references for participants who suggested they would change their behaviour or take actions when a weather warning was issued;
- Table 28 displays the number of coded references for participants who suggested they would not change their behaviour or take any action when a weather warning was issued.

For both tables, participants responses were coded per warning, yellow, orange and red and, in the case of Table 27, these were further divided into two groups: actions and behaviours.

Table 27 Behaviour Change or Action Taken Associated with Weather Warnings

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Yellow - Action	0	5	2	4	0	0	0	1	12
Yellow - Behaviour	0	5	3	7	0	3	0	2	20
Orange - Action	0	6	0	6	0	1	0	5	18
Orange - Behaviour	10	8	1	3	0	6	4	6	38
Red - Action	8	10	3	21	0	5	0	12	59
Red - Behaviour	5	2	6	6	3	13	3	6	44
Total	23	36	15	47	3	28	7	32	191

Table 28 A Lack of Behaviour Change or Action Taken Associated with Weather Warnings

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Yellow	2	8	7	9	4	16	3	5	54
Orange	6	3	2	1	1	17	2	3	35
Red	0	0	1	1	2	3	0	0	7
	8	11	10	11	7	36	5	8	96

Yellow Weather Warnings

The Met Éireann status yellow warning concerns “not unusual weather, localised danger”. The Status Yellow concerns “Weather that does not pose a threat to the general population but is potentially dangerous on a localised scale”. Met Éireann suggests: “Be aware about meteorological conditions and check if you are exposed to danger by nature of your activity or your specific location. Do not take any avoidable risks”.

When discussing yellow weather warnings, most participants indicated that they would not take action or change their behaviour. The most prominent reasons for this inaction were that they either disregarded yellow warnings entirely or understood the weather event had a limited impact on them:

I think the yellow; I don't think any of us put much in the yellow. (S3P2)

I do find that sometimes the yellow weather warnings can I'm starting to ignore them because it just gives regular weather rather than, you know, this is actually a warning to be careful of whatever's going to be out there. Because regularly you find that the yellow weather warnings in particular don't really materialise in Dublin for sure. (U1P4)

I think calling them weather alerts for yellow as well is, you know, people, if it's an alert it means that there's something wrong, but generally from the lowest level, the yellow level, it just means it's going to be raining maybe a little bit heavier than it would normally or it's going to be 15 or 20 knots of wind, which is nothing. (S2P2)

I don't tend to take that much notice unless it's a red weather warning, 'cause we can deal with the yellow and the Amber and they're not that serious and the Defence Forces and essential services aren't usually called in unless it's red, so they're the ones I'd tend to focus on most. (R2P6)

In the case of those who suggested this would have a limited impact upon them, they usually indicated that they would take care or remain watchful. Given the context, this appeared a suitable position to adopt for the most part as it suggested some alertness or understanding that this warning was not relevant for them:

Well, for me, it wouldn't actually affect me all that much. Well, it would affect me, but I would still have to continue. I have to go out every day. I have, I live in a very rural area. I have to drive everywhere, you know, to work, at supermarkets or whatever. So, you know, I just have to be careful. I have to get out. And so yeah, it's just, it's just the way it is. (R1P7)

I'd be the same, I'd say, I wouldn't probably wouldn't change my behaviour. I'd drive maybe a little bit slower. Maybe take a little bit steadier, but it wouldn't affect any of my behaviours. I certainly wouldn't stay in or anything like that. (R1P1)

Yellow would just raise awareness for me, I don't think I'd take any particular action. I think it's only

when it goes into the amber and the red that really kind of makes me sit up and take action. (R2P7)

So, I live in quite an urban area, and it probably wouldn't affect things much as say in a rural area as well. (S1P2)

I probably wouldn't put a lot of heed into the yellow. I'd probably consider this probably a minor one in the back of my mind. But I don't think possibly, Moderator, it would impact that much in relation to the decisions I would make, because I see yellow, you know, as being possibly a low on risk, to be honest about it. It needs to be orange or red for me to pipe up my ears to be really listening, you know, to be honest. (S3P2)

Yeah, I'd be the same. A yellow snow warning, I wouldn't really worry about it that much. Even though I do have a few sheep around the place, we just keep an eye out. It's kind of yellow flag, just keep an eye on it. I wouldn't worry about it. (S3P1)

In the instances where participants spoke about altering behaviours due to a yellow snow or ice warning, they would primarily refer to avoiding travel or staying alert while driving:

Um, so the yellow snow or ice warning, thankfully we don't have to go out every day, which is great. So, the yellow snow or ice warning, we plan on basically not travelling. (R1P6)

Like I suppose, like I live in the town, so it wouldn't affect our behaviour too much. But you would notice that there wouldn't be as much activity around the town, possibly. People would be stocking up for a few days and they wouldn't have to go out as much. So, we kind of have to change our behaviour a little bit like that, in that you would stock up more and not take a risk. (R1P5)

Yeah, likewise, yellow warnings. It's a heads up, I suppose. Make sure you've got your resources prepared. But severe weather assessment teams within major emergency plans don't meet until orange warnings kick in. (U2P1)

As regards other warnings, I think, like especially for, as regards ice or what have you, I think most people in estates, the first thing they'll do in the morning, they get up and look at the window and sometimes the hardest thing that you have to do is to get out of your estate and get on to the main road. So, if people are very kind of aware of road conditions, then when they get up, and they're wondering like has the, have the roads been gritted? (U2P5)

I kind of agree with what U2P5 was saying there in terms of I wouldn't worry about the house, I'd worry about the road outside the house (U2P7)

Personally, for me, if I was driving, I'd definitely be worried about the ice because you never know, it can be fairly dangerous. Sometimes you wouldn't even think when you're driving somewhere. So, I'd definitely be concerned for the ice. (S1P5)

In a small number of cases, participants spoke about taking action: checking the garden or house, having the appropriate clothing, or stocking up on supplies:

Well generally with a warning like that I'd just check around the house and I've a glasshouse now and the recent storm there, there were some things, the glass blew, but they didn't break, you know? I couldn't have done a whole lot about that but the likes of the bird table now takes off usually so, and you just put it on the ground like, just keep an eye out, you know? (U2P5)

So even anything as light as a yellow weather warning, I go around ensuring that everything is secure and make sure that, you know, just be sure that everything is, is, in the right place! The cars are parked where they should be parked. If the roof is falling off, it's not landing on the car, at least! You know, so, things like that. Because I know very quickly it could change from a yellow, it could change to a red. And we've, we've had such experiences. So personally, I wouldn't take any weather warning for granted. I would react immediately. (R2P5)

I don't like the snow, it's an inconvenience. But, ... you wrap up well and are careful on the roads and have good walking boots on, you're fine. (R1P7)

Just the one point there, you know. In the past, sometimes the meal lorry for the hens has got stuck because of the frost or the weather. So, I would make sure that there's meal in the meal bin, but that would be the only concern really. (S3P5)

Orange Weather Warnings

The Met Éireann status orange warning is described as “infrequent and dangerous weather conditions which may pose a threat to life and property”. This warning encourages households to prepare as “all people and property in the affected areas can be significantly impacted” (Met Éireann 2021).

When discussing orange weather warnings, some participants indicated they would not take action or change their behaviour. The two most prominent reasons for this were that they disregard or ignore orange weather warnings, or wait to see if the situation would deteriorate:

I'd almost ignore it at this stage to be honest with you. (U1P5)

Like, to me, if it's not red, that's it like, I won't look at it again. (U1P1)

Yeah, I'd be the same as that. If I heard status yellow or status orange wind or rain warning, it probably wouldn't affect me too much. (S1P8)

Yeah, I definitely agree, orange and yellow wouldn't really faze me as much as red. (S1P2)

For me, when it comes to an orange weather warning, I probably wouldn't do anything to my house 'cause like, like the previous girl said, you know, my house is in a housing estate so it's kind of just like, it's a modern, new kind of house so the slates are in place. (U2P4)

Most participants who suggested they would wait and see if the situation would deteriorate were from the Student (S1) Focus Group:

Probably just wait to see if it actually did snow and then, like, I'd wait for the evidence probably, and then make changes, if I need to do. (S1P4)

Yeah, I'd agree with that. I'd kind of just wait and see. (S1P3)

Yeah, I definitely agree with S1P4 and S1P3 there. The ice, maybe, during an orange weather warning, I'd be a bit careful of, but other than that, like it probably wouldn't affect me that much. (S1P2)

I'd be the same way. I wouldn't know what constitutes as a yellow or orange warning in the first place, so I'd probably just wait until it actually happened to see and then make my decisions based off that. (S1P8)

Similar to S1P8 as well. I wouldn't be completely aware of what the difference was between the two of them, so unless it's a red, I wouldn't go out of my way to change plans. I'm probably being naive there as well. But for me personally, there isn't much difference between a yellow or orange. I wouldn't let it change my plans. (S1P7)

I mean, same for me as well. I'd probably wait and if I'd see a lot of ice on the road, then I'd start thinking about it really. But if I heard amber or yellow, I wouldn't be too bothered about it. (S1P5)

Yeah, I just I judge it off sort of waking up in the morning and seeing if it's actually there because like I think the majority of the time when it is ice, the likelihood that it falls overnight is there and then you sort of wake up in the morning and you actually see what the effects actually are of it. Like if it's an

orange warning, you probably see the roads being a bit icy and whatnot. So, it just depends on when you wake up, really. (S1P6)

Apart from these students, one participant in the Rural (R1) group also suggested:

I would probably only pay heed it so far as I could see evidence of it being dangerous that I'd heed it. If there was a red or orange weather warning in my, my, area, unless I saw that it was bad, I probably wouldn't heed it. Probably fall back into heuristic that we tend not to get that bad weather even when there is orange or red weather warnings. So, unless I saw significant snow, I probably wouldn't change my behaviour that much, if there was an orange warning. (R1P1)

Changes in behaviours resulting from an orange warning were most frequently associated with two themes: avoiding travel or being alert to possible risks while driving and general alertness. Participants in seven focus groups referred to general alertness once they were aware of an orange warning. However, some suggested this would depend on the season or type of event. In several cases, this general alertness would not result in preparedness actions:

Consider some actions? If there is an orange warning I would start to look at all the weather forecasts at my disposal and form my own opinion on factors that affect me. I would not be too concerned. (S3P4)

I think, Moderator, one other thing that we might add there is that it depends very much on whether it's a summer orange or a winter orange, because we can get both. And obviously we'll respond differently based on our farming system to the summer one versus the winter one, because the feed won't be the issue in the summer one. Perhaps flooding or things like that could be the major consequence or just wind, just depends on what it's for. It's dangerous weather, but the weather is a lot of different things. (S3P3)

I think awareness, I think the first thing is being aware that something is going to happen. (U2P5)

Yeah, yeah. I would take note of an orange one for that. (U1P3)

I think you'd be foolish to ignore them and there has to be a certain reliance on the competence of the forecasters and the fact I know that they're doing their best for us. So I wouldn't ignore a weather alert like that. (S2P5)

So, yeah, it does make a difference, really, an orange, depending on your location where you are. (R1P4)

The only time I'd really take notice is when there's a wind warning, just because we do have a lot of trees and even, I remember about four or five years ago, I was on my way to work very early one morning and there was about two or three trees in the middle of the road. So, I had to turn around and it added about 15 or 20 minutes to my journey 'cause I'd have to go all the way back around. But yeah, just in terms of that, probably wind is the biggest thing, especially around where I live 'cause it's just so many trees and it's just quite dangerous. Yeah, that's probably the one I'd take the notice of the most. (R2P3)

The ice maybe, during an orange weather warning, I'd be a bit careful of, but other than that, like it probably wouldn't affect me that much. (S1P2)

Participants in three of the focus groups referred to avoiding travel or being alert to possible risks while driving:

I'm terrified of frost too; I probably would take note of it if I had to drive anywhere. (U1P3)

I think it would depend on the type of weather, if it's flooding or high winds or whether it's snow and ice. I think snow and ice in this country, we wouldn't be as well-equipped as other countries. So therefore, you'd take more precautions. You would see that, and I travel on the M25 every day, you would see if there are ice and snow conditions there's, drivers take much more heed. I live at the bottom of a hill, so I'd be conscious about getting up that hill in the morning. (U2P1)

Well, I think if I was travelling, for example, if I had work to do down the country and I had an option about going and there was a weather alert for Wednesday saying there was going to be ice and all sorts of unpleasant things, I might be well tempted to rearrange it for another day so it would influence me to that degree anyway. (S2P5)

When discussing taking actions to prepare once an orange weather warning was issued, some participants in the Cork City (U2) and Rural (R2) Focus Groups spoke about gathering supplies or equipment and preparing the home, garden and neighbourhood:

I'd always just know what, which type of weather they're talking about when they're issuing the warning and then if it goes to amber or red, I would certainly be tuned in even in terms of things like, you know, getting the, we've a snow shovel and stuff like that, making sure that stuff is to hand if it's

going to be red or amber, just to clear the footpath outside the house and stuff like that, we've significant experience of snow on footpaths and that over the past number of years, so we tend to have that gear or just make sure it's available, just make sure that we can, we can, you know, clear areas and clear for the car and that, too. So just depends on what the weather warning is and then the colour, whether or not, how much attention I'll pay to it. (R2P8)

I think it's only when it goes into the amber and the red that really kind of makes me sit up and take action. ... So as, as it would go up, say if it went to red, I would take precautions in relation to, well amber, amber or red. I would say things like, I'd put me bins into the shed, I would secure any loose items from around the place. You know, obviously, just make sure that there was nothing lying around outside that could become a projectile in the wind. (R2P7)

I'd possibly have a few bags of salts as well in the garage. We have a neighbourhood group that comes together in the park and we would clear pathways for the cars to get out in the past when we had bad snow and ice. (U2P1)

I'm not sure if I'm getting my questions mixed up here now, but I would just say that in yellow I just notice and don't do anything, but on orange I would prepare. (U2P2)

For participants in the Agriculture (S3) Focus Group, this means preparing the farm:

Only make sure there is meal in the meal bin basically. (S3P5)

Barring what S3P5 rightly said, the issues of supplies and feeding. The stuff you absolutely need for more than a week on the run, because if the weather does turn crooked, particularly for snow or something, you couldn't guarantee you would have supplies in a week. And if that's feed, that becomes critical. And the other one you may have to watch would be with water, if particularly under an orange cold, you could have pipes freezing around the yards and stock would be without water and that type of stuff. (S3P3)

For us, I suppose if it was an orange, we're saying that, snow or ice, like S3P5, definitely the meal because where we're staying, we are very, very, high. So, it wouldn't take for us to have an orange. It possibly will be quite severe by comparison to my neighbour, who is two miles down the road, because we're actually quite high where we're living. But also there was a lot of frost in that weather warning, severe frost, because all of our water troughs out the field would be concrete troughs. And, lookit, we'd probably possibly have something turned into them. We'd possibly do that at the beginning of the winter anyway because, lookit, you have a 3 or a 500-gallon water trough, a concrete trough, the last thing you want is bloody well it leaking we'll say, and that the frost's actually, you know, the water's expanding, the bloody trough is bursting and everything. But we would take the orange one, would definitely in relation to ensuring that the meal bin was full. And I suppose also, look, you know, even in relation to having the milk collected because once milk goes beyond a certain number of days, obviously your co-op isn't going to take milk that has been in the tank for too long, irrespective of refrigeration or not. So, we'd be anxious that the milkman came, and I'm just thinking, particularly in the area where I'm actually living, it is quite high. So an orange weather warning would have quite an

impact on us. (S3P2)

Yeah, I suppose like S3P2 there, the orange warning. I suppose if you had to go to get some meal in the co-op or something, go down the trailer for some meal, you would make sure you had it. And the other thing then is to watch out for water, kind of make sure everything is lagged or you hope it is lagged well enough and keeping an eye on the water would be the big thing, you know. (S3P1)

Red Weather Warnings

The Met Éireann status red warning are issued for rare and dangerous weather conditions. Upon issuing a red warning, Met Éireann suggests taking action to protect the household and property (Met Éireann 2021). When discussing red weather warnings, only a limited number of participants suggested they would not take action. Two participants were unsure what they should do:

I think so. What you would do about it? I don't know, because there's probably isn't a lot you can do. (S4P3)

Yeah, I'd be the same. I'd assume, actually, I wouldn't know but my inkling or my assumption would be if it's red, they would want you to stay at home. But other than that, I wouldn't, I wouldn't know if there's any particular measures or steps that you have to do. (S1P8)

While others suggested they could cope as they were:

Yeah, I suppose the big thing for, for our family, I suppose, we live on top of a hill, so we'd be pretty lucky, like, if a flood came or it was, it was rain, it would be fine. Probably the biggest issue for us. (R2P3)

Yeah, same here! (R2P5)

Yeah, a bit like, the biggest issue for us would be if it, it snowed really badly so we live in a really rural area so, like, you can, our back roads, you can only fit one car, so if it snowed very heavily you wouldn't be able to get out to get supplies, so, again, if there was a red, a red snow warning, we probably have to look at packing up on more, more food and, again, ready-to-eat kind of food, just because we wouldn't be able to get out to, to get further supplies. They'd be, that'd be probably the main issue for, for us. (R2P3)

In a way, we also kind of adapt, like unless it's the worst thing ever. So, the red in this case scenario, we're kind of like, sure, we can go on with our days. (S1P1)

One participant suggested they would wait to see how the situation unfolded:

No, I think you'd probably wait and see if we actually got it and then maybe do something. (S4P2)

In other instances, participants suggested they might disregard the red warning:

I would probably only pay heed it so far as I could see evidence of it being dangerous that I'd heed it. If there was a red or orange weather warning in my area, unless I saw that it was bad, I'd probably wouldn't heed it. (R1P1)

And I remember even when there was that, those really big storms, I think Ophelia or I don't remember, it was like really, really, bad, everything was shut down, we still didn't do anything, we didn't. We just checked that the bins were in and that's it, really. 'Cause we live in a, it's like a row of houses, so it's only the front and the back that would be affected, but again, we're really lucky, I suppose, that we've been kind of a bit ignorant, I suppose, and it's been OK so far. (U2P7)

They were fun when we were kids. Like, I remember bagging my light up shoes when the lights went out, like that sort of thing, like lighting and trying to find the lighter for the candle. But nowadays, it's just inconvenient and also that's what like what we're doing all the time anyways, because we're never leaving the house. So, I don't think, it would take me a while to actually heed another red weather warning. (S1P4)

Unsurprisingly, participants spoke most about changing behaviours or taking actions for a red warning compared to the other warnings. A theme constant for all warnings was participants altering their behaviour concerning driving but, with a red warning, several suggested they would, where possible, avoid leaving home altogether:

Stay at home, if you could. (S3P3)

I mean, some people are still forced to go outside, I suppose, so I think I would just reconsider, you know, do I really need to go there? Or, you know, I'd probably stay inside, I suppose. I would be more considerate that way. (U2P7)

Just make sure that you don't need to go out driving in that, so stock up on whatever supplies that you need. (U1P4)

I was saying, like for a yellow, I don't think I'd change anything. But if they start to talk about a red

warning, that would be different. I'd probably start to think twice about going anywhere. (R1P3)

Yeah. Like, I think if it was yellow or orange, I wouldn't be too worried. But red, I'd be like, oh, better stay inside. (S1P4)

I'd say definitely stay in the house and stay off the roads. Just don't leave the house. (S1P5)

Others suggested they would keep alert with some taking unspecified actions:

That's it. Just hope it's not too bad, I suppose. Be as prepared as you can, you know. (S3P1)

So, it'll be a matter of people assessing the risk. And generally, they'll have taken provision for that risk before the event occurs. But on red, it gets very important to have a bit of a good notice that is it going to happen. (S3P3)

Yeah, you're dead right, S4P1. That's true, you'd definitely, if you knew it was going to snow tonight, you'd make sure that whatever animals you had, there was plenty of feed available and all this and they were in a place where they wouldn't want to, but they had the space to go around or whatever. (S4P3)

And I'm just saying, I think if, a red warning, you kind of might say, oh, OK, let's have a look at that and also make your own informed decision by looking at different sources, I'm not just saying it's a red warning, batten down the hatches and buy lots of toilet paper and stock up and you know, have a look, anything up to that, I don't, I just ignore them, to be honest, I don't give them any heed because it's not weather that really affects what you do. Until there, but a red warning, then, perhaps you'd pay a little bit more interest. (S2P2)

Yeah. I think, I'll fairly much be like that. I might be inclined to go if it was somewhere very local and you weren't seeing the impact of the red warning in your local area. I might go down to the local shops. But no, I think generally, if I had to. But for a red warning, I'd be taking it much more seriously. (R1P3)

Numerous participants outlined a multitude of specific preparedness related actions:

Well, at the very least, you'd make sure you've got the essentials. Bread and milk and food to tide you over for two, two and a half, three days. Make sure you've enough shopping. For example, we've a

small shed out the back, we've a deep-freeze in there, so we, we keep a, where I grew up it was a rural area so I was probably following through from there, even though I'm living in the middle of a city now, Cork South-central, but it's still force of habit, even on food, you know? Make sure, you know, you've got a good torch nearby make sure, check your oil level of your tank, make sure you've sufficient heating or gas, whichever the case may be. Essentials so you can hunker down for two or three days if the need arises. (U2P1)

For me it would be, you know, just maybe if there's a red snow, just making sure that my heating is functional and with an open fire just stocking in on the, on the wood and whatever that I need to burn to, to, to produce heat. And to cook, if there's no power, you know, you can improvise there. I keep a lot of bottled water in the house just in case, you know, I need that, and a lot of dry foods, really, you know, that, that we don't normally use only when, when there's a bit of emergency. (R2P2)

The two most common responses given were to gather supplies and prepare for a loss of electricity and heating. Other less common responses included preparing for a loss of water and preparing the home, garden or workplace by moving items or animals indoors etc. Those who would gather supplies said:

Well, at the very least, you'd make sure you've got the essentials. Bread and milk and food to tide you over for two, two and a half, three days. Make sure you've enough shopping. (U2P1)

Just make sure that you don't need to go out. Driving in that, so stock up on whatever supplies that you need. (U1P4)

There is going to be something fairly serious to make me go out in any sort of red warning, whether it's wind, water or snow. I mean, you're talking about structural damage and deep snow and all that sort of thing, like with a red wind warning, you'd be putting the chainsaw in the boot, but obviously not with snow. (R1P6)

I ensure there's ready to eat food, where you don't have to use the microwave or, you know, at least that would tide us over for, for a little bit of time, so. The first lesson was good enough for me, since then I've been more careful! I just make sure I have things handy, touches and, you know, some kerosene lanterns and kerosene heaters, have mobile kerosene heaters, so those could kick in and, you know, we've put a lot of things in place in the house to be able to cope, at least for 48 hours. (R2P5)

If it was red, I'd probably go out to shop or make sure I have everything I need in the house, make sure like someone's who's older, like my granny has everything and then just stay at home until the

warning's over. (S1P2)

Those who suggested they would prepare for a loss of electricity or heating by securing extra fuel, or organising additional power, heat, or light sources said:

back in 2014, when that big wind came, we bought a generator the following winter, even though our electricity didn't go. But my neighbours down the road, were in a different line and it was a wakeup call. I think it was probably the best investment we made in the farm, because even last August when we had the heavy wind and electricity was gone for quite a number of days, having the generator ensured that it was business as usual. You know what I mean? (S3P2)

Make sure, you know, you've got a good torch nearby, make sure, check your oil level of your tank, make sure you've sufficient heating or gas, whichever the case may be. Essentials so you can hunker down for two or three days if the need arises. (U2P1)

And turf and, not turf, like coal ..., or logs. (U1P6)

Yeah, fuel, yeah. Yeah, I agree with that, that's one thing I'd be chasing is getting sticks and, you know, briquettes and so on as they can go very quickly. (U1P5)

Yeah, I'd be very clued in as well to heat, do you know the way just to make sure that I have adequate oil, etc. and also, I would be making sure ...that I would have access to alternative lighting, you know, so battery torches, candles (R2P7)

I would actually get the generator out if I thought there was going to be a wind warning that we might lose electricity 'cause whatever about having food, unless you've some way of heating it, unless you've light, heat and water, you need electricity for most of them so I have the house wired with a standby generator so if I hear there's red weather warning coming for winds that I might lose electricity, I'll make sure I have enough petrol for the generator. I might actually give it a start up and make sure it's running in advance. (R2P6)

Make sure have electric heaters just in case it's freezing and the house needs to be warmed up and candles just in case the power goes and stuff like that. (S1P2)

During the Agriculture (S3) and Rural (2) Focus Groups, participants also stressed the need for water:

The next worry will be water. You hope there is a tractor that you get to a river somewhere to haul water in, if the mains get frozen. And you know, again, it'll be different things for different people. If you have a house full of five thousand cattle, which is not the norm I know ...versus a house with 10

cattle in it, you could bring in a bucket if you can find the source of water anywhere. So, it'll be a matter of people assessing the risk. (S3P3)

Yeah, I think, I wouldn't have huge number of stock, but I do stock as well, and with a red weather warning, I suppose what would I do is make sure that you have one access point to water. And that you would have, I have a couple of hundred litre things you can fill up the water or whatever they are. A few of them standby and I'd make sure I have pipes that I could fill them because you don't believe the amount of water stock use until you run out of it. And that'll be the key thing I suppose. And make sure the pump house, as I call it, that the well was well lagged and everything was lagged. And where it comes off that unless electricity went down, we'd have water like. (S3P1)

You know, if we weren't there to stop the pipes freezing or that I'd make sure that we had it on a timer to come on. Even when we are in the house, I'd be looking at running taps and making sure that, do you know, stuff didn't get frozen. (R2P8)

Once there is a weather warning I'm filling those receptacles with water, I'm filling the bathtubs with water and, you know, I'm just a lot more careful and a lot more cautious now. (R2P5)

In other cases, participants mentioned preparing the house, garden, or workplace, and supporting neighbours or relatives:

Get vulnerable animals into sheds. Get other animals closer to the farm. (S3P6)

I would say things like, I'd put me bins into the shed, I would secure any loose items from around the place. You know, obviously, just make sure that there was nothing lying around outside that could become a projectile in the wind. (R2P7)

I live in a very rural area. So, the winds, winds pick up fairly heavy around here. Like when there is a red warning, I remember we had a shed there, we all woke up one morning and half of it was gone. It's grand now. But, when we were getting red warnings, we made sure that it was secure as much as possible. Especially road blockages ...and be mindful of that or the trees falling down. (S1P7)

One thing I, I do slightly differently for a red weather warning would be check in on relatives, the elderly relatives and neighbours just to make sure they had the essentials as well just, and make sure they have enough, kind of, logs, a lot of, so my relatives that I'm thinking about in particular would not have central heating systems. So, it's like fire and coal. So just make sure they have firelighters, coal, etc.

and the thing that they need, fresh milk. Yeah, same things. (U2P4)

If it was red, I'd probably go out to shop or make sure I have everything I need in the house, make sure like someone's who's older, like my granny, has everything and then just stay at home until the warning's over. (S1P2)

3.7 Weather Warnings - Suggestions for Improvement

Participants across all focus groups offered various suggestions for improving the weather warning system. These responses were grouped into three themes, accuracy and time, alerts, and education (see Table 29).

Table 29 Weather Warnings - Suggestions for Improvement

	Dublin (U1)	Cork City (U2)	Rural One (R1)	Rural Two (R2)	Inishbofin Island (S4)	Students (S1)	Marine (Leisure) (S2)	Agriculture (S3)	Total
Accuracy & Time	6	5	2	4	3	0	3	12	35
Alerts	1	2	0	12	0	2	0	1	18
Education	3	4	3	0	9	10	0	0	29
Total	10	11	5	16	12	12	3	13	82

Accuracy and Time

Participants in several focus groups expressed a need for more localised warnings:

I think the only way it could be improved is if it could be, if it could become more accurate in, within certain areas. Like people, for instance, that are round the coast, they obviously would experience a lot more problems with wind and they'd be far more exposed, but that's the only way I could see it. But generally, ...the warnings are quite good, but maybe over time they might be able to point them a little better. There's a certain area here in particular like Kinsale or Crosshaven and they're, they're going to be more vulnerable whereas it might be, inland you might be getting a seven and it could be hitting nine out there, you know, something like that, that's the only thing I could think of. (U2P5)

I think the weather warnings should be more area-specific so that so that we don't become complacent when we do need to prepare. (U1P4)

Probably a more area-specific red, yellow and orange warning would be paid more attention to. If I want to go from here to the Midlands, I'd like to know what the weather is like between here and there but I'm not really interested in what's happening in Cork. ... So maybe a little more specific weather warnings would be more, people would pay more attention to. (U1P3)

Yeah, I just think they're too broad, I think they're too sweeping. ...I think needs to be much more tailored to, specific. Again, you know, just the idea of the kind of more exposed areas or coastal areas are kind of, you know. ... Yeah, that's what I mean. I suppose that's what I mean about Bofin being in the same category as Loughrea, you know, it's just really, really genera, I sweeping kind of. (S4P2)

Sorry. No, I was just going to say I do think that it can be also very generalised and, you know, because even within a county, I think you can have different weathers on the same day. (R1P3)

Oh yes. (R1P7)

And if you're going to apply it, don't apply it in a generic way. Make sure that it's specific to areas or even refers people on to where, we're all pretty much, I think, dealing with technology now that I could refer you on if wanted to look at your local area to see where does it sit in that scheme. But yeah, that would be my comment. I think that it's too generalised. (R1P3)

During the Agriculture (S3) Focus Group, the importance of prior notice for a warning was emphasised:

So, it'll be a matter of people assessing the risk. And generally, they'll have taken provision for that risk before the event occurs. But on red, it gets very important to have a bit of a good notice that is it going to happen. (S3P3)

When asked if they would they willing to accept a less accurate weather forecast and warnings in exchange for longer lead times or notice, all Agriculture (S3) participants suggested they would not:

No, straight answer ((laughs)). (S3P1)

I think no for us as well. (S3P6)

Yeah, no, no from everybody. (S3P3)

No, from everybody, yes. (S3P2)

During the Dublin (U1) Focus Group, the importance of an adequate lead time was discussed. Participants suggested that while they had sufficient time to prepare, this may not be the case for those living in rural areas. This was not raised as an issue during either rural focus group:

It probably depends on where you live as well. If you're five minutes from Tesco's, you'll be prepared very quickly but if you're in the middle of a mountain in Kerry, maybe not, I don't know. (U1P3)

Definitely, 'cause it does come in plenty of time. But again, I find I'm getting complacent because you get a weather warning and it doesn't materialise. I think the weather warnings should be more area-specific so that so that we don't become complacent when we do need to prepare. (U1P4)

Alerts

Some participants suggested there was a need for a national text alert system or national notification system delivered via the mobile telephone networks:

I suppose maybe alerts, I know in places like, obviously places that are prone to earthquakes, maybe places like Hawaii and things like that, they, they get actual text messages from, from whoever the government or whatever (R2P3)

Yeah, I'd be on the same page ... Something that, like, almost breaks into your phone rather than having to sign up for it, you know, that it's a national alert, particularly if it's a red weather warning, ... that it comes to you no matter, as long as you have a mobile phone, it comes to you. What you choose to do with it is your, whatever. (R2P8)

Maybe this is a little bit impossible. OK, maybe not, but I'd say, like, let's just say there is a yellow or orange warning. Like, what if everyone got like a notification on their phone? I mean, everyone has a phone and everyone looks at the phone all the time and maybe like a little explanation at the bottom of what it is and what you should do or something, along those lines. I don't know, maybe that's already a thing, but I don't I don't get those, so. (S1P1)

GSM text to all mobile users in relevant areas. They do this in NYC, I didn't give them my number so they must do it through the network. (S3P4)

Well, in UCC we have this text alert system, ... we have one network for students, one for staff, and we generally give these kind of advices out on that. It's a text message system. (U2P2)

Education

Some participants felt that additional information, for example explaining the local impacts, or what to do to prepare, should be provided with the weather warnings:

It might be useful if more information was given in relation to warnings that Met Éireann issue. For example, if a yellow warning is issued, it could be explained further as to what this means for ordinary people in the area affected. (U1P4)

I'm not so sure people know exactly what it means. You know, what's yellow, what's orange? You know, red is bad, but, ...I think those weather warnings, they don't connect with people. Um, I don't think anyway. And I think what everyone else is saying, they don't think it either. (S4P3)

I'm sorry, I was just going to say, a bit more education on that would be I suppose helpful because like they say, that we're obsessed with the weather, but that was like maybe last year we were talking about it. (R1P5)

To touch on that point, like we all said, that we usually get the RTÉ push notifications and it would say red weather warning. It doesn't explain what the red weather warning means. Like if it just had a little dash and then literally five words after it. I think people would be more aware of what it was, what it meant, what to do. (S1P7)

Yeah, I'd be the same. Even something as simple as like an infographic, even embedded into the weather app, maybe there is in the Irish weather apps. I haven't seen them personally, but something as simple as that would definitely help my awareness personally. But I haven't seen anything like that. (S1P8)

3.8 Weather Services – Suggestions for Improvement

Participants were invited to suggest improvements they would like to see in the weather services they use, or have used. Participants were keen to have the Met Éireann three-hour forecast reinstated and sought a more user-friendly interface with up-to-date graphics on the Met Éireann app:

Love to see Met Éireann giving me back to three-hour forecast. Not to change, not to replace anything else, but just to have it there. It was bloody brilliant, when it was there. (S3P3)

Met Éireann should provide downloadable weather GRIBs for various models and improved viewer

interface like PredictWind app and PredictWind Offshore app. (S3P4)

when you want an instant response or an instant look at what the weather's going to be doing for the next few hours, you can't do that with Met Éireann. So I think ... providing that feature would be a positive advance. (U2P3)

I know one thing that Met Éireann should do. They, they, should have better interactive. When you Google Met Éireann and then you get on the screen, I don't know that they have an app and I used to do that years ago. But their um, their website and to look at the forecast on that in comparison to some of the other sites is kind of clumsy. They, even though I'm sure that their information is probably superior, because it is a proper scientific organisation ... it's not as accessible as some of the others. So, I, it's just a matter of updating it I suppose. (S4P3)

So, I think the rainfall radar is a great asset, and it is radar live, and it's probably the most accurate forecast you can get in that respect. If there was only something of equivalent nature for the wind it'd be excellent. (S2P5)

And I would like to say that, we'll say now, they're gonna predict rain. Well, OK, you see this cloud with rain and then you might see a bit of sunshine up on the corner. Like you can't make any plans if it's like with the clouds showing the rain and then there's a cloud, there's also a piece of sunshine on the same picture. So, I would like if there could be a bit more accurate there and saying, OK, for a couple hours you're going to get no rain. Like, don't show the rain and a sunshine as well, because that can be very confusing. Like people will generally take the worst message out of it and change plans totally. For as, you know, given the credit, if they know there's going to be no rain, well then just show that. Instead of mixing it. (R1P5)

I think if they were to deliver it in a way where, not out of laziness, I hope not, but short kind of bullet points that are straight to the point with facts and figures rather than like, often if you have to click into a LinkedIn article about it or something, you have to go and you're reading reams of stuff and it just takes a lot of time and everyone's time is kind of limited and we're busy with our degrees and what have you. So, I think if it was delivered in a way that was short and to the point, with good strong facts and figures. I think that could be something everyone would be willing to consume. (S1P7)

I think it was mentioned that, like improving the app. But also, I think it would be a really good idea if there was some sort of notifications like, yeah, we get the little RTÉ things, but maybe kind of improve that just sort of inform people more. And it's a really good idea to kinda include the climate change ideas that we all talked about here, because, I mean, it is a national business and it's a really good opportunity. And they're already like, you know, you would believe them, they're not like fake news

or anything. So, they could definitely look into that. (S1P1)

I think I'd genuinely love to see them market themselves better. Like, if you see some companies even like, God forbid, Ryanair's TikTok account, like some sort of stuff that will just like make people really aware of, like what they do. And like, I know some sort of it's kind of silly, like it's Ryanair, but I wouldn't say they have a good image, ... I think there's a lot of respect for Met Éireann, but I think they could better their image and they could make it more popular to a lot of generations. (S1P4)

Participants responses also alluded to the fact that, given the reputation Met Éireann has as the national weather service of Ireland, they can market themselves better by being more appealing to the younger generation:

I think that actually Met Éireann presents a very professional, if you watch them on screen, if you do all of that, they're very professional. I think their challenge is to engage the generation, and I'm going to go back to them, that includes R2P3 and R2P1 in these people! So, you know, their value is only in relation to who tunes in, who picks up their message and how they internalise that. So, I think they have a challenge in terms of getting the message out to, via other platforms, maybe? Maybe via the social media platforms to the R2P3s and R2P1s of this world? And if they do that, and present themselves as professionally as they do on, say, you know, the traditional media channels, which is where myself and maybe R2P7 and R2P6, not, not that I'm saying you're all my generation, but you're not that far off it! ((Laughs)) Then their value might be improved or they, it might be, you know, more valued by a cross-section of, you know, the population rather than, I think maybe at the minute it's the older generation that value them more or pay more attention really. (R2P8)

It's not bad! I think there's always room for improvement, but it depends on, you know, the access to information that they have, you know, the models that they use, etc. And I think, I think models and information are constantly evolving and getting better. (R2P7)

3.9 Apps – Suggestions for Improvement

Participants were asked to suggest improvements to the current weather apps. The themes that emerged were: better accessibility; a need for new features; the importance of improved accuracy; and suggestions for new features.

Accessibility

Participants want apps that are convenient to use and easy to comprehend:

I think the Met Éireann app could probably be a bit more user-friendly. (U1P2)

Yeah, for me with the Met Éireann app like it's just, everything is so slow and like it's not responsive like you know might have to tap it twice say or maybe it's like just because it's really small like thumbs on or something. It's just it looks like an app developed 10 years ago, like one of the original smartphones for them. I don't know it's just not clean looking and there's not a nice flow to it anything like that, but as I said, I like the information it conveys and they actually updated it probably about 18 months ago and it used to be easier to use I found. But like, if you want to find the weather on your location, it used to be just there on the screen, whereas you have to go to maybe like two or three clicks to find, I'm in County Louth. There is nothing user friendly about it which you get with other apps. S1P7

Yeah. On the Met Éireann app, I think their colours are, their, their general signage or whatever you call the graphic explanations, are not very accessible in that if you look at the wind one you see the different colours, but you have to look somewhere else to see what the colours actually mean. Now, if you're using it all the time, probably you get to grips with it, but most people aren't using it on that regular a basis to remember what the stuff is and the stuff with the arrows on it showing what the relative strengths are. OK, they give you an indication of whether it's a little bit windy or very windy, but what the graduation from one end of the arrows size to the other end of the arrow size isn't clear. And it's that really, that's the information that you need when you're trying to decide whether it's a day I can go afloat and handle the conditions or one that I'll just not bother going out and leave somebody else to suffer. So, just the graph, the graphics and the explanations thereof, for what they do have there, are poor and what they have there in the overall context is also poor. (S2P5)

One participant in particular from the Student (S1) Focus Group mentioned that they experienced the Met Éireann app running efficiently on an iPad but not on a iPhone:

I found the Met Éireann app runs very badly on my iPhone but we have a family iPad that it runs really well on. So, I don't know if it's something to do with the mechanism of the app. (S1P6)

Desirable Features

Up-to-date infographics, icons and widgets, were among the features participants mentioned they would want in the Met Éireann app.

One participant from the Rural One (R1) focus group mentioned that although they had been satisfied with the Met Éireann app, because of failing sight they could no longer use it. To be inclusive of all individuals, the app needs to be more accessible:

I used to use the Met Éireann one a lot. But the problem now is that I've only partial sight, so I can't actually see it. And the, I use a screen reader on the phone called Voice Over, and some apps work with that and others don't. And Met Éireann one's that isn't accessible... so that's out the window.

Whereas things like Yr and Windfinder, they are accessible. So, I can still use those. And that's obviously very important to me. (R1P6)

If I really need to, I'll google it but, as I think as S1P1 mentioned, it has like the percentage and that's usually the thing I go for, like okay it's 85% rainy or it's like 85% sunny, I kind of take that more than the temperature it gives and stuff like that. (S1P3)

Like the main aspect is the rainfall percentage, that's the thing I use. The other features are like secondary sort of. They're not really too important to me to be honest, like because it's more so rain, I think the majority of people are concerned about and wind I'm not too fussed about, or anything like that. Like I just wanna know the just sort of want to know the gist of it. Is it gonna lash and I'll take my jacket? So, it's the rain percentage I'd be more interested in. (S1P6)

There's also like some other features that are on weather apps that wouldn't be on Met Éireann, like what time the sun's going to rise and set. (S1P4)

Even something as simple as like an infographic, even embedded into the weather app, maybe there is in the Irish weather apps. I haven't seen them personally, but something as simple as that would definitely help my awareness personally. But I haven't seen anything like that. (S1P8)

Like all Android phones have widgets, even iPhones have widgets now. So, you could have it easily set up there on your home screen and just make the whole thing more friendly, like and not have to go through a lot of loopholes to get just basic weather. And then you can have the warnings when there is a warning in place right in front of you on your phone. (S1P7)

Improved Accuracy

The need for accuracy across forecasts was a recurring theme:

I suppose we're kind of becoming, we, we intake information very fast and we need it very rapidly. So, I suppose when it comes to Met Éireann, again like, I, I suppose everyone's said it, just get ... just a better app that's more accurate, and like U2P3 was saying, is better, you know, at locating where you are and, you know, what's happening right now. I don't think it's that accurate. I don't think that's accurate where, in particular where you are, 'cause, again, it could say Cork but it just doesn't match up what's happening outside the window even sometimes. So, I suppose just catch up with it a little bit. (U2P7)

It seems to me, and I hope I'm not jumping ahead on the conversation, but it seems to me that it is like the future of weather forecasting is at your fingertip and, you know, the closer time-wise the better in terms of accuracy. (U1P5)

New Services

More frequent updates, notifications and location-driven forecasts were the general services participants would like weather apps to provide.

A more accurate, you know, location-driven app. Because other apps can actually, you know, if another, if one app can tell you, you know, that Douglas in Cork is going, the weather is going to be like this, whereas with Met Éireann you can't do that. You can't get anything more local than Munster. I think. 'Cause I actually don't use it very much now but I do, I do watch the weather forecast on, on RTÉ because I think that at least gives you the overall picture of what's going to happen. But, you know, when you want an instant response or an instant look at what the weather's going to be doing for the next few hours, you can't do that with Met Éireann, so I think the ability, or they, you know, providing that feature would be a positive advance. (U2P3)

One participant from the Dublin (U1) Focus Group mentioned that they would like to see a forecast for fog in particular:

Well, I never see them kind of predict fog on any of the apps or anything like that. (U1P2)

Even as well I think, ... they could nearly turn their app into a website or an app that could deliver content as well as like news articles and sort of stuff like that, where you can actually see what is happening, because I don't think they do not currently. I could definitely give, rather than somebody just seeing the weather and thinking, oh, X, Y and Z are saying something about climate change, it's actually backed up by an article or something like that. I think long term it could be much more effective. (S1P6)

Well, I've watched it for the last few days just so that I could inform myself a bit, I feel it just flew through it so quick from a quick satellite (U1P3)

Yeah (U1P1)

to a four-day warn, four-day squares, you know, the next four days. (U1P3)

They're very keen on giving you the full week, like, it might be 14 degrees, 13 degrees, 12 degrees, and then like, a picture of whatever it is Leinster, Ulster. (U1P1)

Yeah, a very quick one. (U1P3)

But that's no good to anyone really like, you know what I mean? (U1P1)

Yeah, I think that's my point. (U1P3)

But they can't compete against the hourly weather apps like, so, that's where I think their hands are tied a little, with the weather (U1P1)

Or a little bit more time be given to it? (U1P3)

You'd nearly need a whole channel dedicated, like, RTE News Weather! (U1P1)

Maybe so! ((Laughs)) Maybe so. Although I suppose our weather is not unpredictable enough to warrant a channel. (U1P3)

3.10 Met Éireann – Suggestions for Improvement

The last item for discussion in each focus group was possible ways to improve the services delivered by Met Éireann. The participant-led recommendations are presented across four themes: Brand and Awareness-raising; Weather Data and Information; Forecasting (Probabilistic); and Climate Information.

Brand, Awareness-raising and Communication

Some participants suggested that Met Éireann could do more to raise awareness of their services, particularly their mobile application. The benefits of overcoming this lack of awareness was evident in some of the focus groups where participants who were previously unaware of the Met Éireann mobile application expressed a keen interest to download it following the focus group. Some examples of this sentiment included:

After talking about it now, I feel like downloading the Met Éireann app. 'Cause actually, it's one of the things I've really not had much conversation about, the app, even though we do talk about the weather. It's sort of funny talking about the apps. It's like another perspective on weather. (U1P6)

Later U1P6 also remarked: I wonder should, should they advertise it a bit? I really feel like, I think I'll download the Met Éireann app after this conversation, just 'cause I now want to know what it does, I'm going, I better find out! (U1P6)

Yeah, I think the same! (U1P7)

... I don't really see the Met Éireann advertised. I mean, could they not have an association on the news or something where they suggest use our app as well, stuff like that? (R1P1)

They actually have a lot of things in their favour as well, from a business point of view. Like, everyone is their target audience, like, you know, the weather isn't strange to one demographic of people. It concerns everyone, concerns peoples, jobs, their activities. So, it'd be pretty easy to build it up even. I think, there could be an openness from people to engage with them and really buy into their products. And when I say products, like delivering weather. Like, there's no competition essentially in Ireland for doing it. Like, all we rely on is AccuWeather widgets on our phones, or, so, they have like a market share before they even enter a market. (S1P7)

Some participants were also unaware that the RTE weather, following the news, was presented by Met Éireann meteorologists:

Is it true that, I think it's true is it, that the guys who present the weather on RTE are all meteorologists? (U1P5)

So they're all actual meteorologists? (U1P5)

They all have a background in it I think, yeah. (U1P1)

Yeah. (U1P7)

There was also a desire for Met Éireann to provide more in-depth explanations of the reasoning behind any weather predictions made in their forecasting to aid end-user understanding. In this way, Met Éireann would assume an educational, as well as a public service, role:

I think on the Today show, the weather is, the weather ladies, I think they're mostly women. I think sometimes they, like, do a little lesson on the weather. They [Met Éireann], like, could spend a few minutes explaining about the pressures and this and that. And in a way I think, I think that would be a good thing, I think, if there was a bit more explanation about the weather. Like some people understand a bit about low pressure and high pressure and tides and the moon and the spring that, you know there's so many variables that affect the weather. But I think a lot of people understand it less. So in a way I think it would be nice, it would be good to have some education, in a way, about the weather. A little bit. (U1P6)

Generation Z: Social Media

Among students, there was a consensus that Met Éireann should do more to engage with their age group (approximately 18-24 age bracket) through social media. They recognised Met Éireann as a respected professional organisation and suggested their form of engagement should reflect this; they should not adopt a TikTok style of engagement through social media to engage with their age group. Drawing from previous remarks, it appeared their preference was less text-based engagement and greater use of visuals. Some examples of this sentiment included:

I think I'd genuinely love to see them market themselves better. Like, if you see some companies even like, God forbid, Ryanair's TikTok account, like some sort of stuff that will just like make people really aware of, like what they do. And like, I know some sort of it's kind of silly, like it's Ryanair. But I wouldn't say they have a good image, but like everybody respects them, like I think there's a lot of respect for Met Éireann, but I think they could better their image and they could make it more popular to a lot of generations. (S1P4)

I'd definitely agree with S1P4. I feel like Met Éireann just kind of cater to an older audience. Like I'm only 19 and I wouldn't definitely not like say that Met Éireann's my go to place. I feel like if they kind of market themselves better on social media, they'd definitely be able to garner a younger demographic rather than just like my mom. Like she's like the only really person I know personally. But none of my friends use Met Éireann and no one in college that I'd be friends with uses Met Éireann. But like my mom and my granny would. That's like the only people I really know that would use it on a daily basis. (S1P2)

Yeah, to build on that, I think their like engagement with the population as a whole is so poor. Like the only reason, like I would actually probably use it is because, like, my parents used it. Like it wasn't as if I had seen it. Like even for example, Ryanair's TikTok, like you see a funny video, you click on the link, you look through the content. Next thing you know, like you're looking at flight prices. Like it's stuff like that you just engage with, with like your audience a lot better. And I wouldn't search Met Éireann on Twitter to see like are they posting anything. Like it's just sort of, I'd go to it for the weather. But I think they could just be, it's only because of like a family habit, really, rather than me actually wanting to check. (S1P6) ...

And also like with saying that, I don't want Evelyn Cusack making TikTok's. Like, I think that would made to be like a laughingstock. Like Ryanair can get away with it because they have a three-euro flights. Whereas I'd see another Met Éireann as a professional company. I feel like they need to let people know that like a younger generation, they're like they are professional company and there here to give you like, accurate, correct information. And they're not really showing that through the social media. Like, social media is like the future, like a lot of companies like, The Wall Street Journal and stuff like that, they can't go on selling physical newspapers anymore. All their articles are online. So, I feel like they need to make their online presence more well-known and they need to make it more consumable because people's attention spans go like that ((finger snap)) on the Internet. It needs to be quick, easy, flashy, like if they want to keep their kind of reputation. Look, I know that they are very reputable already, but the generations to come might not think that, as such. (S1P2)

Overly Communicative

Some participants suggested Met Éireann's social media channel was targeted towards too many audiences, and they described how most of the information disseminated was superfluous to them. As a result, these participants explained that they did not follow or subscribe to notifications from Met Éireann's Twitter account:

Now, I don't get, while I follow Met Éireann on Twitter I don't have their alerts, you know, sort of, ping on my phone, because there's so much that comes in that's grass growth and stuff like that, if you know what I mean. So I don't, but whereas if it was only sort of an update on the forecast every two hours, I would be following them, do you get me? I would have those alerts coming up on my phone or those Twitter notifications. But because there's so much more coming in that's of no relevance or use to me, I don't have them coming up that way. So it's just, it's about maybe tweaking their service to what, you know, what's appropriate where, and which, which media they use for which type of communication as well. (R2P8)

Yeah, I can't see myself actually following Met Éireann on Twitter or anything, just purely because it'd be a lot, about a lot that isn't relevant to me, you know? So if there's a way it can, like, personalise, personalise it to you based on your location or something, maybe, but I'm not interested in the hundreds and hundreds of tweets. (R2P1)

Weather Data and Information

Some participants from the Agriculture and Marine focus groups were critical of Met Éireann's forecasting accuracy for conditions relevant especially to them, such as wrongly predicted levels of rainfall, or lack of localised information on winds:

The only other thing I suppose when I think about the weather now, maybe annoy me a little bit with the weather is, sometimes when they give a certain volume of rain, they might give eight mm of rain. And we'd only get one or two, and like that would have a big decision whether you're going to go and try and wrap a bit of silage, because a mm or two doesn't make any difference. Like whereas the intensity eight or ten would make a huge difference and occasionally over that would be one area sometimes I would find the volume of rainfall wouldn't actually work out what they would have forecasted. (S3P1)

Well, I think from the marine provider, from the marine user's perspective, it has to be accuracy and relevance to the areas that we're interested in at any one time, and that's where they tend to be a little bit too general. (S2P5)

And I think wind doesn't come into it for a lot of people. They don't look at the wind or what the wind is going to do. They just want to see the sun shine. And there's always, you know, every forecast there's a chance of rain because that's just what they, it's like the standard tag-on at the end of any forecast scenario that there's a chance of rain, because there always is, I guess. (S2P2)

Participants in the Agriculture group also lamented the loss of the 3-hour forecasting service once provided by Met Éireann, while Marine users preferred to consult synoptic charts from sources other than Met Éireann:

Love to see them giving me back to three-hour forecast. Not to change, not to replace anything else, but just to have it there. It was bloody brilliant, when it was there. (S3P3) ...

But I do concur with S3P3's point from a tillage farmer's point of view, definitely, that three hours would be of huge importance. (S3P1)

The Agriculture focus group also emphasised the importance of an accurate longer-term forecast. While they were content with the 4/5-day forecast for seasonal activities (hay/silage making, harvesting, etc.), the prospect of Met Éireann making a month-long forecast was highly anticipated:

I think that if there was a separate scenario where you could deliver a less accurate but still, an attempt at accurate longer-term forecasting. So, in other words, if you could give us a forecast for a month, which was more accurate than we're getting at the moment, because I know you use different systems for different forecasts when you're dealing with a longer term, it's not the same equipment and the same information that they're using in the morning. To have the two of them being able to run in parallel, now there is something that would interest people, particularly people may be looking at something that's not ready for a week. So that could be planting or it could be harvesting. It could be the silage and it could be the hay, it could be any agricultural activity. But, but, not at the cost of sacrificing the accuracy of the nearby, that five-day forecast. I think that's what everybody is saying. (S3P3)

What you're saying, S3P3, is a long-range weather forecast would be great for people. Especially for tillage farmers in particular, long range would be great. Even at the moment, we've had a particularly wet winter. (S3P1)

Could you, Moderator, could you make one that would help people to make hay? And I say constructively rather than anything else. As in, how much drying have we had for three days or four days? And it's a recurring one. You kind of consult something, you look back and we've had this much drying in most parts of the country for the last four days. You know, one more pass should make it and because it would be no harm if we could go back to making better hay. Unfortunately, it doesn't change the bloody weather. It just tells you when it's going to rain. (S3P3)

Other participants emphasised a desire to access live data to allow them to judge the weather at a specific location in real-time:

What I'd love to see Met Éireann doing more of is actual places like weather stations like Feigner Camp or Dún Laoghaire pier or something like that. Because it's very useful for me to be able to see what's actually happening right now compared to the forecast. But other than that, I think they're doing a good job. But I definitely like to see more weather stations coming online and be easily accessible. (R1P6)

I remember when it was very cold a few years, ten years ago or whatever, but like, when it was really cold and you were trying to get out, we all got very sophisticated on it, because at one point I was going onto the National Road Roads Network or whatever, and they were giving you the temperature of the road right across the country. So, if you're driving along, like, the M3, or whatever, the M3, you can see the little things on the side of the road with the, you know, with the what-do-you-call-her for catching the sun. Yeah. And they were giving the road temperature every sort of five or six kilometres. (U1P5)

Oh right, yeah. (U1P7)

And that was brilliant, 'cause you knew then what the actual driving conditions were live, you know? I'd forgotten about that, but everybody was using that for a while. So again, I think it's like everything, necessity's the mother of invention, you know, it's when things are quite bad and you really need it then you'll, there's a lot more data there than you might think. But I mean, fundamentally in your daily lives. (U1P5)

Forecasting (Probabilistic)

Across the focus groups, participants were favourably disposed to services that include the level of probability associated with the weather conditions predicted:

I would like to see the probability being introduced. It works in many other countries. And it would help, you know, if you have the rain on the forecast. Well, is it a 10 percent chance of rain or a 90 percent chance of rain? It influences the risk you'll take. And that's useful in so many different corners. And I think when they get there, I would love to see them put in probability on their monthly forecast, because in a few years' time, they may very well have a reasonably good handle on what's going to happen in week three and week four. (S3P3)

And maybe with a more nuanced type of website you could, the subtleties of that, the percentage likelihood of it happening maybe could be presented rather than just having it presented as: this is what we think will happen. There's always kind of greys, it might be this or it might be that, but on the, on the balance of probability, we're going with this forecast. And that would probably allow a little bit more wriggle room for them [Met Éireann]. (S2P5)

People now want precise information, whereas, it's, there's a 70 percent chance it's going to rain at 11 o'clock in the morning tomorrow. Like, I think that's what people want. I feel like people don't want, there could be bright spells during the afternoon tomorrow, people want more accurate and precise information. So. I feel like that's where it's going to go. And I feel like that's, that's what people are kind of looking for now as well. (R2P3)

On the iPhone one as well, I forgot to mention. Do you know that way it says like percentage? So, it might say, like 30% rainfall or like 80% rainfall and I kind of pay attention to that because, if it says 80%, 90%, I kind of nearly believe that because that usually is fairly accurate. (S1P1)

However, some participants from the Agricultural and Marine focus groups cautioned against reporting the level of probability a forecaster associated with the weather predicted, suggesting this could lead to a different set of issues by opening forecasters up to more scrutiny from their audiences, or possibly simply confusing those used to the conventional weather forecasting format:

... if the probability of something happening was very low and a shower fell on you, you could lose all confidence in it very early on. (S3P3)

It's, look I suppose, with probability, we're saying that, it may or may not, it just brings more uncertainty. I think farmers may end up cursing it more than embracing it, to be honest, Moderator. (S3P2)

There's a certain comfort for the consumers at present in having this black and white forecast that it is going to be a Force eight and therefore stay at home and lock your windows, et cetera, et cetera. Now, that, there has to be a situation where there's a 70 percent chance it'll be a Force eight, but on the other hand it might be only a Force four. But that isn't the way the message comes across from Met Éireann and if they could do something to better clarify that to the consumers it would probably be more in their interests, and might be also in the interests of the consumers because it will give them the opportunity to be more critical, perhaps, of what the likelihood of it happening is. (S2P5)

On the whole, participants mostly wanted an accurate forecast that is localised:

I would say, just I think it's been said already, it's just the localisation and by localisation, I mean, within a certain kilometre of where you are, you know. (R1P3)

I would like to see more regional weather and not just an all-Ireland forecast. The weather changes so frequently here. (R1P7)

I just wish that what is forecast was 100% accurate and one would imagine with modern technology, this should be the case without fail. (R2P4)

And it will reach a wider audience and hour-by-hour is the way to go now, you know, I need to know what's happening in the next hour, not the estimation of what's going to happen, you know, in the next day. (R2P2)

A very local forecast would be great, to within a few miles radius. (S3P5)

And again, just even hourly, because, again, people consume information so much faster, they don't, you know, watch the news in the morning to check the weather and that's it, they don't think about it again. We're always on our phones, always checking. (U2P7)

I think the only way it could be improved is if it could be, if it could become more accurate in, within certain areas. (U2P5)

And to give more, more specific information on the weather phenomenon that would affect certain

areas. (S4P3)

Maybe, I suppose, the idea of a better breakdown of weather reporting. And again, I go back to making the warning system a bit more specific to, especially coastal areas. (S4P2)

Climate Information

Some participants felt that Met Éireann should take a more proactive stance on sharing climate information that is specific to Ireland. Others were unsure of the type or extent of Met Éireann's climate change coverage:

I'm not sure if anyone can answer this, but is climate projections something that Met Éireann does report on? I suppose I would probably just associate Met Éireann with like the daily weather or like the weekly weather. It's just not something that I was aware of, if they do. (S1P4)

Um currently, I'd say they're main role, from a personal point of view would be to provide the most accurate weather prediction possible. That'll be my opinion on it, just from a current perspective. From a future perspective - I'm not even sure if it's something they already do, providing probably a more user-friendly information on climate projections and kind of just to encourage more accountability at a local level and stuff like that. (S1P8)

Yeah, I'd probably agree with S1P8. Like at the moment, like delivering or trying to deliver the most accurate weather forecast for sure, but I think long term there's definitely room for improving the sort of content that they deliver, like even in terms of climate change and climate action. Even as well ... they could nearly turn their app into a website or an app that could deliver content as well as like news articles and sort of stuff like that, where you can actually see what is happening, because I don't think they do that currently ... rather than somebody just seeing the weather and thinking, oh, X, Y and Z are saying something about climate change, it's actually backed up by an article or something like that. I think long term it could be much more effective. (S1P6)

Some participants were keen for Ireland to be the focus of any climate change reportage undertaken by Met Éireann:

I mean, I suppose the interesting question would be, should they take more of a, you know, ... a thought-leadership role or whatever you want to call it, try and be more of an influencer? Would that be seen as maybe damaging their credibility or, you know, that they should be seen as just being a reporting a reporting organisation rather than an influencing organisation, but it'd be an interesting. I mean, they would have the credibility to talk about climate change, for example. I know they don't do it now but I don't know if that's something that could ever, could ever be part of the future. (U1P5)

I think that's a very good idea. You know, our own climate change. Use, use, our own weather provider,

whatever, forecaster, to be specific about our climate change and what we can do about it. Like, when something is worldwide, you tend to kind of think it's out there somewhere. (U1P3)

But I think they should probably be at the forefront of the Irish, just general conversation with stuff, because I think it holds them in a better place as well, for I think people would be more likely to trust them to kind of encompass all areas of the climate, not just the weather. (S1P3)

4 Conclusion

This report examined public and special interest groups use and interpretation of weather forecasts, weather warnings, and climate information to provide evidence-based recommendations for the development of Met Éireann’s public weather and climate services. Members of the public were engaged from across Ireland, and included some based in the urban centres of Cork and Dublin, rural dwellers from the North Western (Donegal, Mayo, Leitrim and Sligo), and the Midland and the North-Eastern (Westmeath, Cavan, Monaghan, Louth) regions, and special interest groups whose use of weather forecasts merited a separate examination; those from the agricultural and marine leisure sectors, third-level students, and those living on Inishbofin Island, Co. Galway. The key findings from the focus groups are:

4.1 Use of Weather Forecasts

- The need for accurate weather forecasts was underlined by all groups, whether planning for work or leisure. Accuracy was essential for those whose livelihoods were dependent on weather conditions and those living in island communities. Communities such as Inishbofin Island rely on accurate forecasts for their safety and when planning their daily activities, particularly for trips to the mainland. They also recognised the vital role accurate forecasts and the regular broadcasts by Met Éireann have played in reducing weather-related disasters. Similar points were reflected by marine leisure users and farmers, where safety and planning relied on accurate weather forecasts.
- The weather forecast influences everything from scheduling professional activities through planning social activities and even choice of clothing: “there’s no such thing as bad weather, just bad gear”.

4.2 Perception of Accuracy

- The vast majority of participants only trusted the accuracy of the forecast three days out. However, they did appreciate that certain weather conditions are easier to predict with certainty over a longer time frame. A wish for greater reliability beyond a three-day timeframe was expressed, and participants hoped that technological developments may lead to greater accuracy in longer-range forecasting.
- Participants often expressed a lack of confidence in weather forecasting, most often suggesting the weather forecasting was generally inaccurate or that they did not trust the information they received. Some participants crosscheck multiple weather forecasts to determine what they believe to be the most likely scenario.
- Despite a general lack of trust in forecasts, trust in Met Éireann was disproportionately high among the Agricultural and Student Groups.

4.3 Use of Weather Services

- The most frequently used weather services are Met Éireann, Google, iPhone, YR, Windguru, BBC, XCWeather, AccuWeather and Magicseaweed. Marine Users also mentioned weather buoys, Grib, and the Irish Ballooning website (for Atlantic charts).
- Participants trust the accuracy, professionalism and reliability of Met Éireann.
- The overwhelming view of participants was that the key services required from Met Éireann are the provision of the most accurate weather prediction possible and warning of severe weather events. Met Éireann's role in maintaining weather data archives and in advising the government were also flagged as critically important.
- Some participants were unaware of the range of services provided by Met Éireann, such as their weather app. Met Éireann should capitalise on the fact they are the Irish National Meteorological Service and increase awareness of its services
- Participants were most vocal about their satisfaction with the Met Éireann Rainfall Radar feature, which was highly praised for its accuracy and usefulness. It was described as an essential aid to farmers decision-making regarding spraying pesticides, mowing or bagging grass for silage. The Marine and Student Groups also spoke favourably about this feature.
- The Met Éireann app was highly regarded, especially by members of the agriculture focus group. Participants appreciated the improvements in localised forecasting, the convenience of information provided on weather warnings, and the ready availability of the rainfall radar. The user interface of the Met Éireann app was criticised, particularly by Marine users and students. In contrast the user interface of some competitor apps was praised for being user-friendly through the use of graphics and addition of probability percentages, making them easier to read. A simplistic presentation was not lauded by all, with some groups preferring access to greater details.
- When selecting a weather app, participants looked for accuracy, ease of accessibility, the user interface, and the level of detail provided.
- Participants are generally unwilling to pay for weather services as currently provided, believing they should be available as a public service funded through tax revenue. Exceptions were some marine users who already pay for access to specialised marine and wind forecasts. A few participants, mostly students, would consider paying a one-off payment for a new, improved app, but not a subscription charge.

4.4 Climate Services

- It was felt Met Éireann had the credibility to present data and analysis in relation to climate change; but participants were unsure as to extent of Met Éireann's current role in this area.
- Many reported passive consumption of climate change information, waiting for it to be provided to them. For those who seek out information, the volume of sources of data and the differing views on the impact of climate change are overwhelming, and there is a need for reliable signposting to relevant, credible sources.

- The focus for many individuals is how climate and associated policy changes designed to mitigate against adverse effects will impact directly on them and Irish industries such as agriculture.
- The Agriculture and Marine Focus groups were particularly aware of the potential impacts of climate change and the need for reliable scientific and policy information.
- Concerning climate services, participants want more Ireland-focused data and research, balanced reporting, science-led coverage instead of sensational headlines designed to grab attention, and a single, authoritative source of climate change information.
- The reputation of the source of climate-related information played an important role in determining participants' level of trust in the data. In particular, for members of the Student Group, Met Éireann's reputation as a long-established, esteemed institution gave its data legitimacy and credibility.

4.5 Weather Warnings and Severe Weather Preparedness

- While individuals are aware of the colour coding associated with weather warnings, their knowledge and understanding beyond that is limited.
- Yellow weather warnings were perceived to be overused, and the consensus was that this leads to them being ignored. In contrast, the red and orange warnings were considered more effective in capturing due attention and were deemed more credible.
- Frequency of use, lack of localisation, and warnings issued when threats failed to materialise were aspects that could lead people to ignore the warnings and not undertake appropriate preparedness action. These individuals sometimes referenced the latter as the "cry wolf" effect.
- The various approaches used to inform the public of a weather warning worked well. Most heard about the alert through news bulletins on TV and radio, though social media and word of mouth also featured widely in discussions.
- Orange Warnings:
 - Participants who indicated they would not take action or change their behaviour usually suggested they simply disregard these warnings, or wait to see if the situation actually deteriorates within their local area.
 - Changes in driving behaviour and general alertness were the most cited responses to an orange warning.
 -
- Red Warnings:
 - Very few people said they did not take action when a red warning is issued. Those who failed to act were either unsure what to do or believed they could cope as they were.
 - Participants avoid leaving home during a red warning or alter their driving behaviour if staying at home is impossible.
 - Many participants outlined a range of preparedness actions taken in response to a red warning. These actions included: stocking up on essential items and supplies, preparing for a loss of electricity and heating, preparing the home/garden/workplace, and checking on family members or neighbours.

- Participants expressed negativity or frustration towards the weather warning system when they did not fully understand the warning and the required actions.

4.6 Suggestions for improving Met Éireann Services

- Met Éireann should increase brand awareness and improve communication with the public. Many respondents were not aware of some of the core services provided by Met Éireann. As one respondent confirmed: “their value is only in relation to who tunes in, who picks up the message and how they internalise that” (R2P8). The launch of new sections on the website should be publicised, the monthly podcast is often overlooked by people who have an interest in these topics, and even the launch of the app was missed by many.
- There is an opportunity to improve the user interface of the Met-Éireann website and app. Ease of use could be enhanced, as well as overall accessibility and the use of infographics, icons and widgets.
- Participants want: more accurate, localised forecasts; downloadable GRIBs; reinstatement of the three-hour forecast; a more accurate long-term forecast; a forecast for fog; and a service akin to the rainfall radar for wind.
- Met Éireann has developed a strong presence on social media, however, this success could become problematic as the volume of tweets and posts has become so vast as to irritate rather than inform some followers. Segmentation of social media feeds by topic, such as weather forecasts, weather warnings, be winter/summer ready, and by user group, such as farmers, marine users, students, could help sustain successful engagement through social media.
- More localised warnings (especially for more vulnerable locations such as the islands), the use of text alerts, and more guidance on what to do in response to a warning were considered critically important.
- Met Éireann should take a more proactive stance on sharing climate information that is specific to Ireland.
- Met Éireann should switch to probabilistic forecasting. There is a clear preference for probabilistic forecasting, focused on occurrence and magnitude probability. Many respondents expressed a preference for short, factual (facts and figures), to the point forecasts - citing the example of “there’s an 85% chance of rain” (S1P3).
- The high level of trust reported in Met Éireann, and the prevalence of emergency information being sourced through the news media, gives Met Éireann a powerful platform to influence emergency preparedness. The public suggests Met Éireann is given an extended post-news slot before, during and immediately after weather-related events.

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6 Appendices

6.1 Appendix 1

Appendix 1 Participants ID and Gender

Unique Identifier	Gender
R1P1	Male
R1P2	Male
R1P3	Female
R1P4	Male
R1P5	Female
R1P6	Male
R1P7	Female
R2P1	Male
R2P2	Male
R2P3	Male
R2P4	Male
R2P5	Female
R2P6	Male
R2P7	Female
R2P8	Female
S1P1	Female
S1P2	Female
S1P3	Female
S1P4	Female
S1P5	Male
S1P6	Male
S1P7	Male
S1P8	Male
S2P1	Female
S2P2	Male
S2P3	Male
S2P4	Female
S2P5	Male
S2P6	Female
S3P1	Male
S3P2	Female
S3P3	Male
S3P4	Male
S3P5	Male
S3P6	Female

Unique Identifier	Gender
S4P1	Female
S4P2	Female
S4P3	Male
S4P4	Male
U1P1	Male
U1P2	Male
U1P3	Female
U1P4	Female
U1P5	Male
U1P6	Female
U1P7	Female
U1P8	Female
U2P1	Male
U2P2	Female
U2P3	Female
U2P4	Male
U2P5	Male
U2P6	Male
U2P7	Female

6.2 Appendix 2

Focus Group Questions

Weather Forecasting: Accuracy / Uncertainty

How important are accurate weather forecasts to you in general?

Prompts:

- How often would you check the forecast to find out that information?
- How many days in advance do you want to get accurate weather forecasts?
- Does anybody else feel like that?

How many days ahead do you think the weather can be forecast accurately?

When it comes to scheduling your daily or weekly activities would you plan these activities to take advantage of forecasted good weather, or to avoid bad weather conditions?

Weather Forecasts

From what service do you get your weather forecast?

Prompts:

- (If more than one service) Which one of these do you prefer?
- Why is that?

Are there any particular reasons why you use this service?

Prompts:

- In other words, why do you like the particular service you use?
- Or: In other words, is there anything you don't like about a particular one?

How do you access this weather forecast (using what device)?

Is anybody here aware of the Met Éireann app?

Prompts:

- If yes, do you use the Met Éireann app?
- If yes, please share your feedback on it (user experience, accessibility).

Weather Warnings

Are you familiar with the weather warning system used in Ireland?

Prompts:

- How many different warning categories are there?
- Do you know their colours?
- What is the lowest/highest category?

What would you do if there is a yellow snow/ice warning issued for your area?

What would you do if there is an orange snow/ice warning issued for your area?

What would you do if there is a red snow/ice warning issued for your area?

Prompts:

- Do the warnings influence your behaviour in any other way?

Do you think the weather warning system works?

Prompts:

- Do you feel you are given enough time to prepare when a severe weather warning is issued?
- How do you feel when the severe weather that was predicted doesn't happen?

How do you become aware if a weather warning is issued for your area?

How could awareness of the weather warning system be improved?

Prompts:

- Why do you think that would help?
- Does anybody else here agree with that suggestion?

Climate Information

How interested are you in the topic of climate change and receiving information on how the climate may change in the future?

Why is this information important to you?

Do you think this information will become more important to you?

Prompts:

- Can you think of a situation when this information may become more important to you?

How (and from where) do you source this information?

Prompts:

- Why do you use this source? (if any)

- Does what you learn from these sources affect your day-to-day behaviour? (Do you make an effort to conserve energy, or take less flights?)

Current/Future Weather and Climate Service Needs

What do you see as the key roles or services delivered by Met Éireann at present?

Prompts:

- Do you think it succeeds in these roles?

a) What changes would you like to see to the services they provide?

b) How could their services be improved?

Prompts:

- Why do you think that would make a difference?
- Would you be prepared to pay to see that change?

Would you be willing to pay for weather and climate information in the future? Either the current services or those you've suggested?

Focus Group S4 Inishbofin Island

Given the nature of island life is there any other information you would like to share or recommendations you would like to make?

Focus Group S3 Agriculture

It would be very helpful for us to learn about any particular weather apps you use for farming, and why you use any of these apps?

Do these vary by season or activity?

Do you find that the weather forecast, and weather warnings, give you enough time to make decisions about your critical activities – for example, to plant or harvest?

Would you be willing to accept a less accurate weather forecast and warnings in exchange for longer lead times or notice?

How helpful would it be if Met Éireann showed a range of possible weather outcomes and how likely they think each one is?

Met Éireann currently issues blight warnings - Are there any other specific disease warnings that you would like to see issued by Met Éireann?

Focus Group S2 Marine

From what service do you get your marine observations and sea area forecast?

Regarding marine observations and the sea area forecast – how often do you access this type of data before going out onto the water?

How does this data influence your activities on the water?

Are there any specific marine weather forecasts apps that you use? – And if so, could you please share the names of these with us?



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