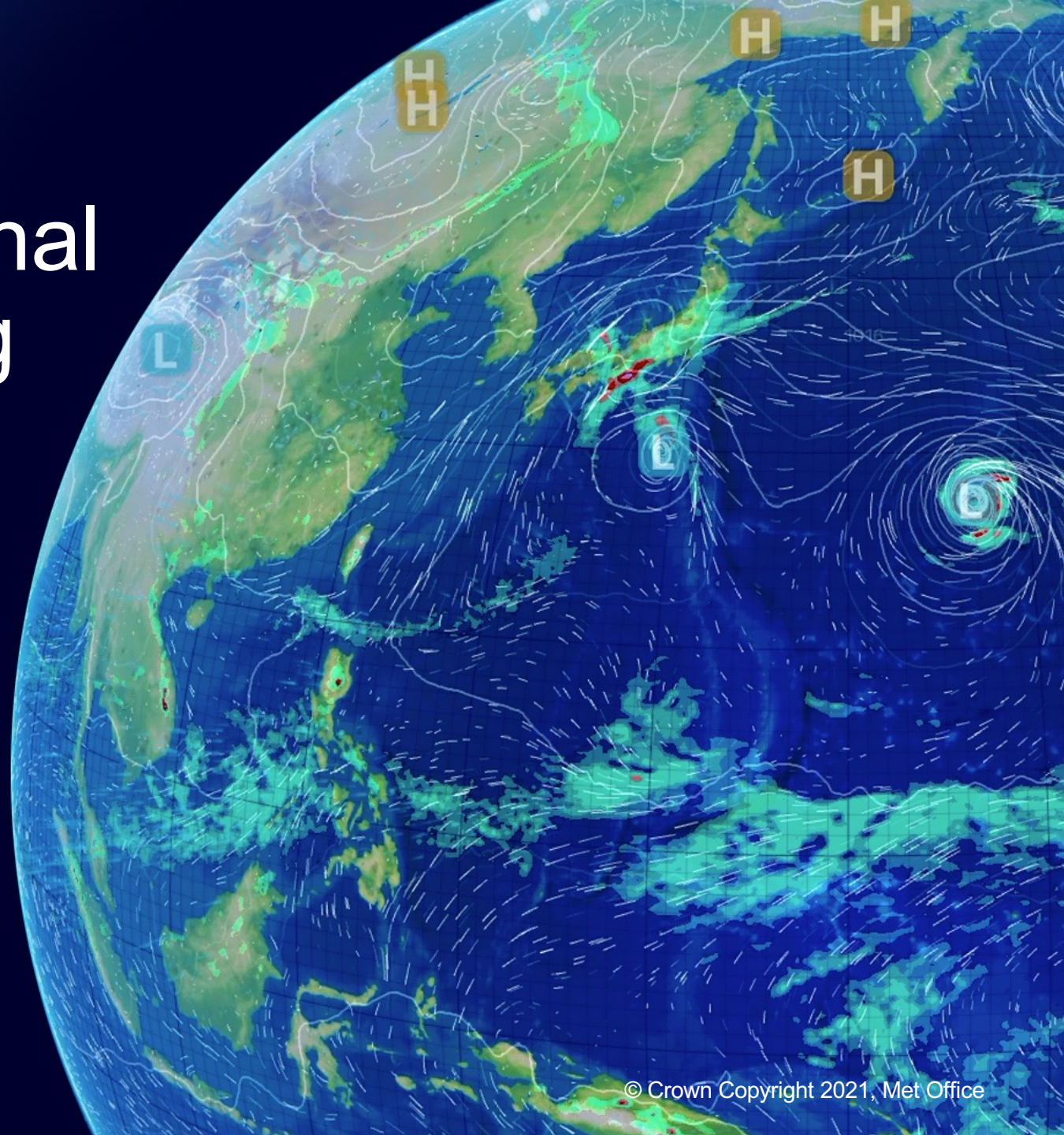


“Downscaling” traditional forecasts for IBF using local information



Aim

To explore the potential to **overcome limitations** associated with forecast resolution or resource capacity, **through use of known vulnerability and exposure information**, to **target warning alerts** at appropriate scale*.

**This scale will likely vary depending on structure of DRR (or other sector) within a region/country.*

The appropriate resolution is a balance between

- 1. useful warnings*
- 2. overburdening forecast/warning systems*
- 3. implying false level of accuracy*

Objectives

- Summarise how information on **vulnerability and exposure** helps refine warnings, especially the differences between neighbouring areas.
- Apply the concept to a fictional scenario exercise.
- Recognise the benefits for enhanced communication, achieved by including **action orientated advice** in warnings.

Scenario Exercise

Synoptic Situation

Currently, the country is affected by the westerly low-pressure system, the low-pressure line extending from east to west near the southeast region and the moisture-laden system enhancing from the Bay of Bengal.

Day 1

Afternoon: Generally, to Mostly cloudy in Province 1 and Province 2 along with hilly region of the rest of the Province and generally cloudy in the rest of the country.

Light to moderate rain with thunder and lightning is likely to occur at some places of the country , chances of heavy rainfall at one or two places of the Province 1, Province 2, Bagmati Province and Gandaki Province.

Night: Generally, to Mostly cloudy throughout the country. Light to moderate rain with thunder and lightning is likely to occur at some places of the country , chances of heavy rainfall at one or two places of the Province 1, Province 2 and Bagmati Province.

Day 2

Afternoon: Generally cloudy across the country. There is a possibility of light to moderate rain with thunder / lightning in some parts of the country. There is a possibility of heavy rain in one or two places of Far Western Province and Lumbini Province.

Night: Generally cloudy in the hilly areas of the country and partially cloud in the rest of the country.

Day 3

Afternoon: Generally, to Mostly cloudy in Province No. 1, Province No. 2 and other hilly areas and there will be partially to generally cloud cover in the rest of the land. There is a possibility of light to moderate rain with thunder / lightning in some parts of the country.

Night: Generally cloudy in the hilly areas of the country and partially cloudy in the rest of the country.

Synoptic Situation

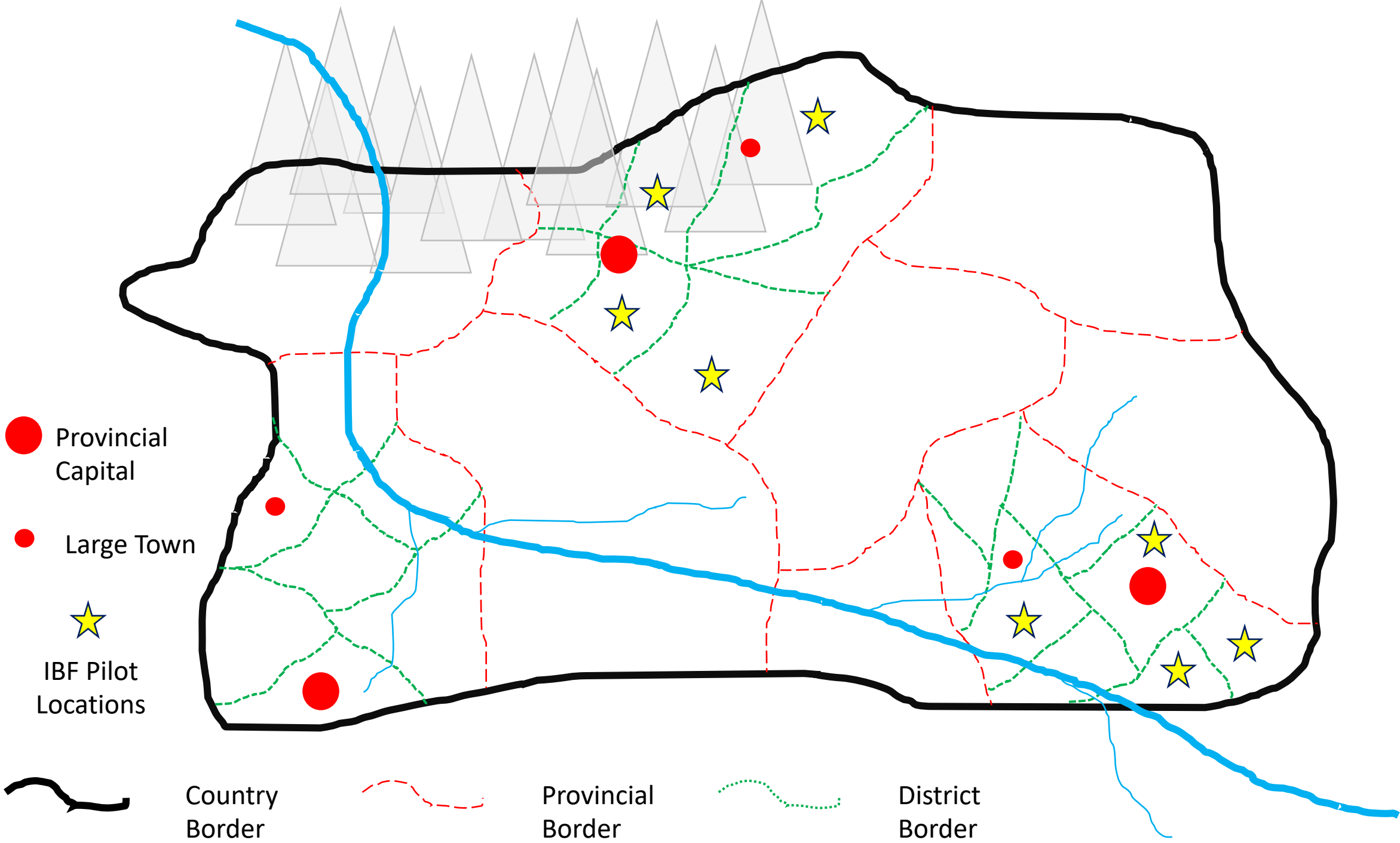
Currently, the country is affected by a westerly moving low-pressure system.

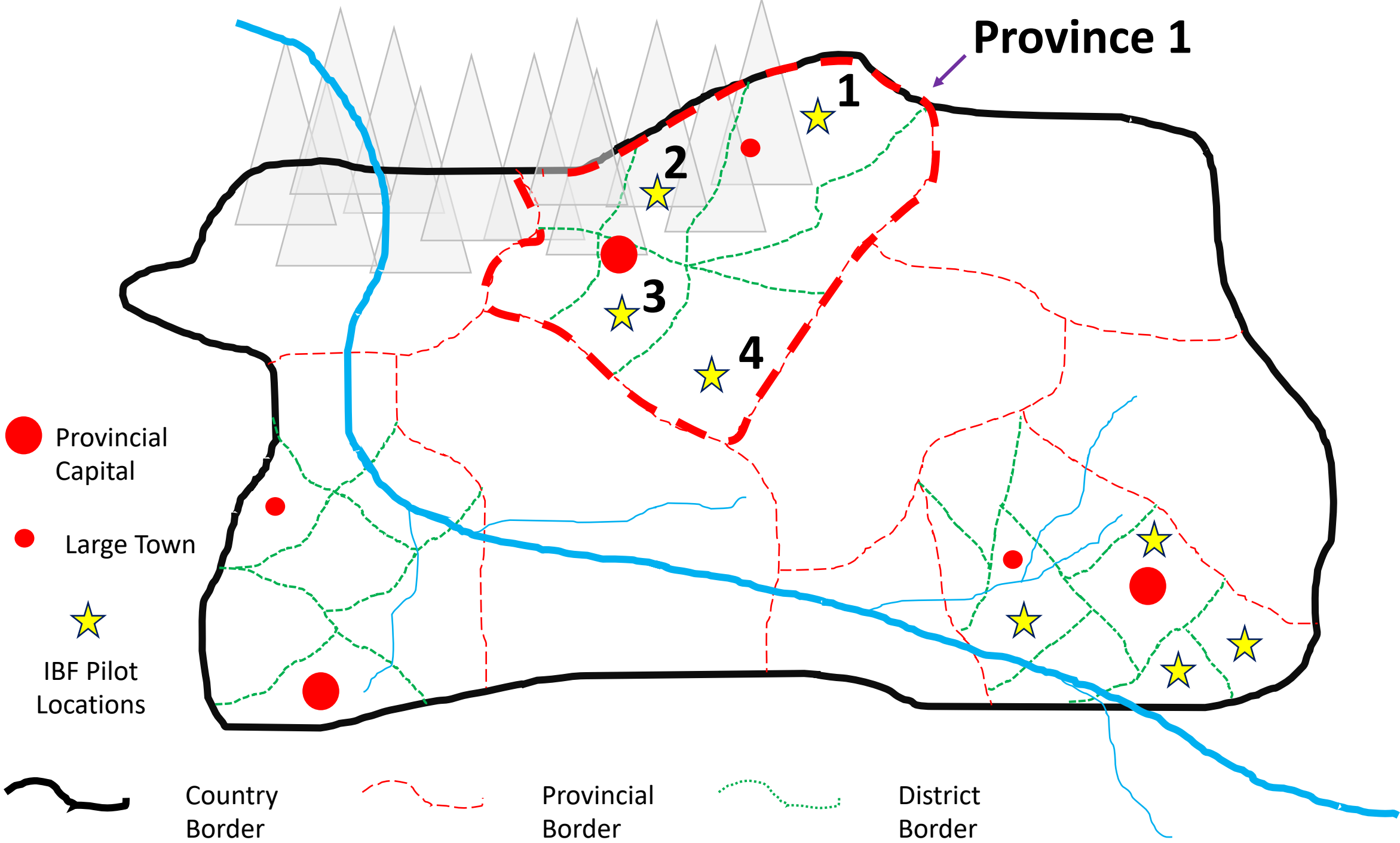
Day 1

Afternoon: Generally, to mostly cloudy in Province 1, especially through the hilly regions, and generally cloudy in the rest of the country.

Light to moderate rain with thunder and lightning is likely to occur at some places of the country, chances of heavy rainfall at one or two places of Province 1.

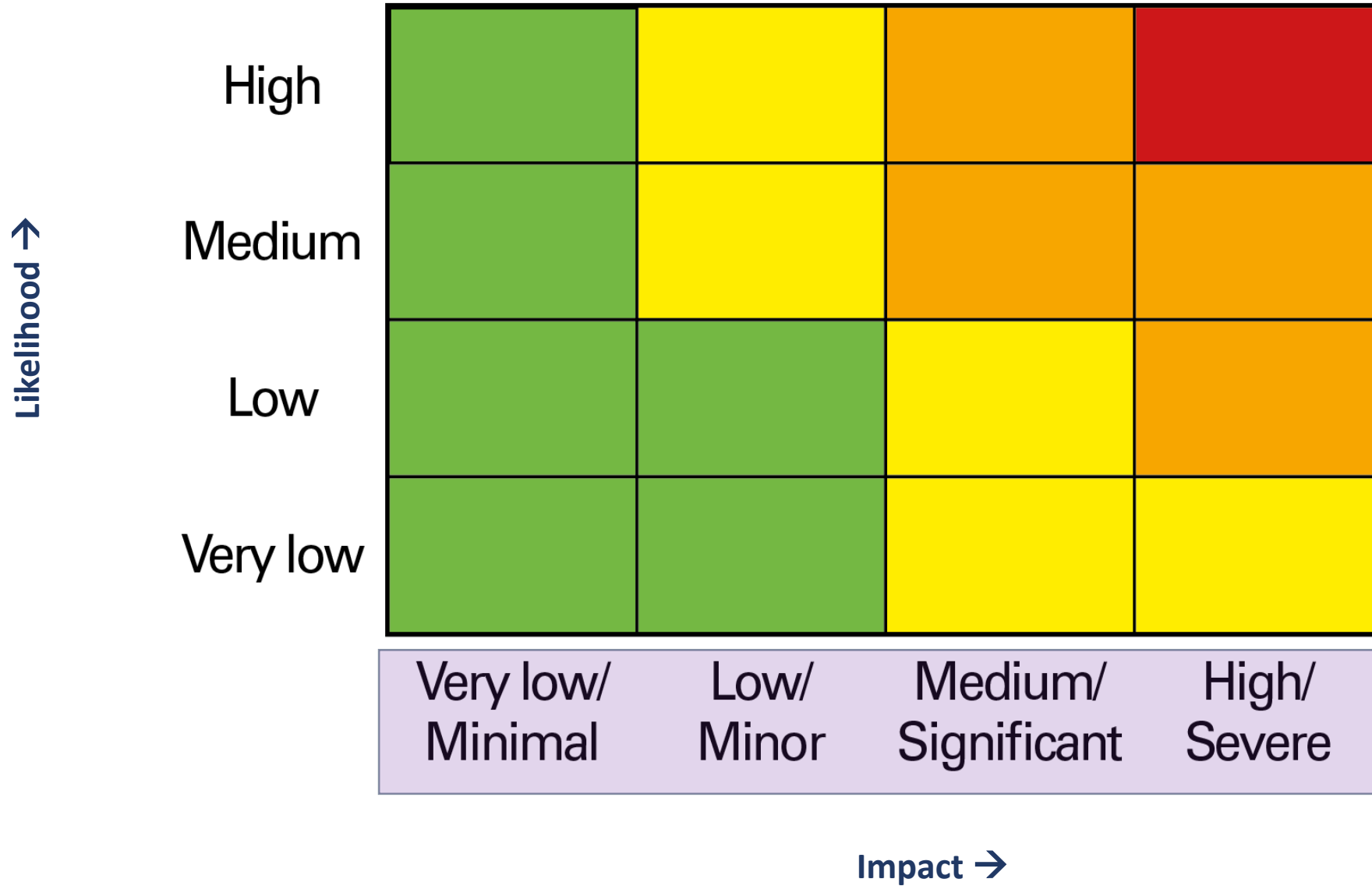
Night: Generally, to mostly cloudy throughout the country. Light to moderate rain with thunder and lightning is likely to occur at some places of the country, chances of heavy rainfall at one or two places of the Province 1.





Determining Levels of Impact

1.



Severity of Hazard



Very Low



Low / Minor

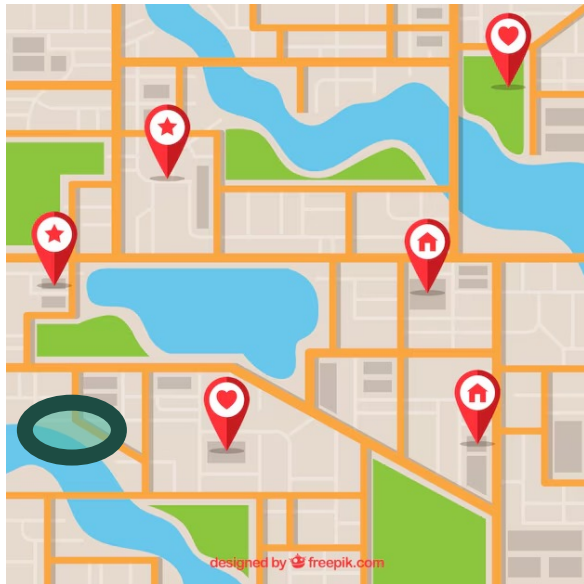


**Medium /
Significant**

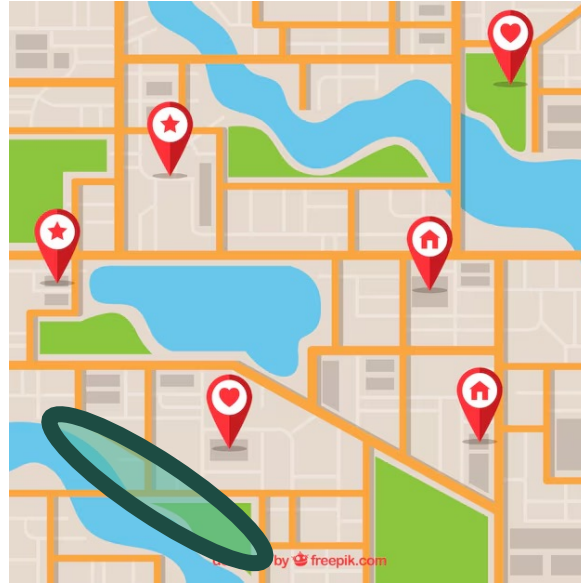


**High /
Severe**

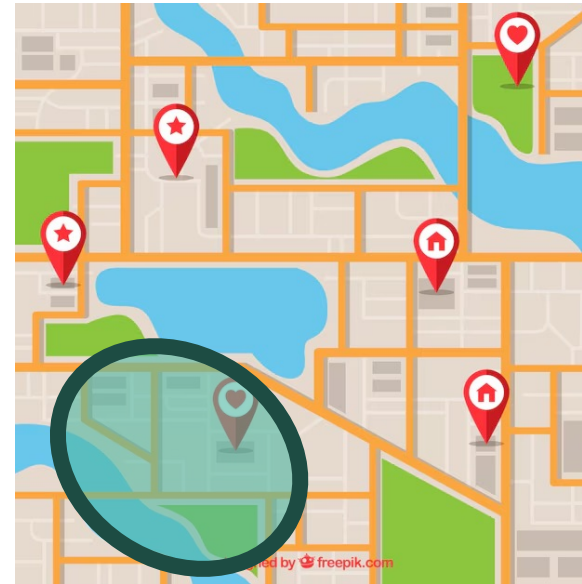
Extent of Hazard e.g. Flood



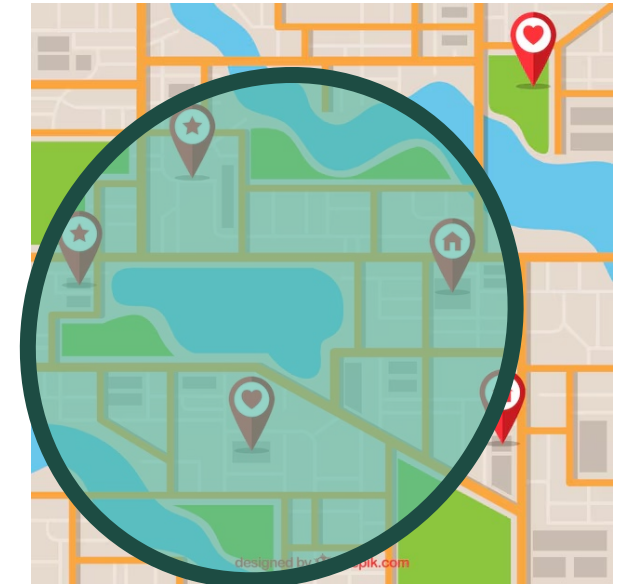
Very Low



Low / Minor



**Medium /
Significant**



**High /
Severe**

Duration of Hazard/Recovery Time

Impact Levels for All Weather Types			
Very Low	Low	Medium	High
On the whole, day to day activities not affected but	Some short lived disruption to day to day	Injuries with danger to life	Danger to life
'NORMAL WEATHER'	'BUSY DAY'	SHORT TERM STRAIN ON EMERGENCY SERVICES	PROLONGED STRAIN ON EMERGENCY SERVICES
affected.	under 'business as usual' response by		



Minimal/Very Low	Minor/Low	Significant/Medium	Severe/High
Temporary interruption to communication services	Interruption of communication services for a few (?) days	Interruption of communication services for several (?) days	Prolonged interruption of communication services

Minimal	Minor	Significant	Severe
Business as usual	Localised Business as usual	Localised Short term strain on emergency personnel	Widespread Prolonged strain on emergency personnel
<ul style="list-style-type: none"> • Some pooling of water on roads or in formal/informal settlements • Day to day activities not disturbed • Wet roads and reduced visibility • Minimal traffic congestion • Isolated mudslides and rockfalls 	<ul style="list-style-type: none"> • Localised flooding of susceptible formal/informal settlements or roads, low-lying areas and bridges • Major roads affected but can be used, increased travel times • Difficult driving conditions on dirt roads • Minor motor vehicle accidents due to slippery roads and/ reduced visibility • Closure of roads crossing low water bridges • Localised and short term disruption to essential services (water, electricity, hospitals, schools etc) • Localised mudslides, rockfalls and soil erosion • Localised disruption due to sinkholes/potholes/blocked drainage systems • Isolated cases of breakages of farm dam walls • Localised damage to mud-based/make-shift houses/structures • Localised disruption of access to drinking water and damage to crops 	<ul style="list-style-type: none"> • Flooding of roads and settlements (formal and informal) • Danger to life (fast flowing streams / deep water) • Displacement of affected communities • Some communities temporarily not accessible/cut-off • Damage to property, infrastructure, loss of livelihood and livestock • Major disruption of traffic flow due to major roads being flooded or closed • Possible damage to roads and bridges • Disruption to essential services (water, electricity, comms, schools, etc) • Mudslides rockfalls and soil erosion • Disruption due to sinkholes/potholes/ blocked drainage systems • Isolated incidents of communicable diseases • Isolated cases of breakages of informal/farm dam walls • Damage to mud-based/make-shift houses/structures • Disruption of access to drinking water and damage to crops 	<ul style="list-style-type: none"> • Widespread flooding of roads and settlements • Danger to life (fast flowing streams / deep water) • Large communities not accessible/cut-off for a prolonged period • Widespread displacement of affected communities • Widespread damage to property, buildings and loss of livelihoods and livestock • Widespread transport routes and travel services severely affected • Major roads and bridges damaged or washed away • Widespread, prolonged disruption to essential services (water, electricity, comms, schools, etc) • Widespread mudslides, rockfalls and soil erosion • Long term disruption due to sinkholes/potholes/ blocked drainage systems • Widespread incidents of communicable diseases • Breakage of dam walls • Widespread damage to mud-based/make-shift houses/structures • Widespread disruption of access to drinking water and damage to crops

Gathering Information

Synoptic Situation

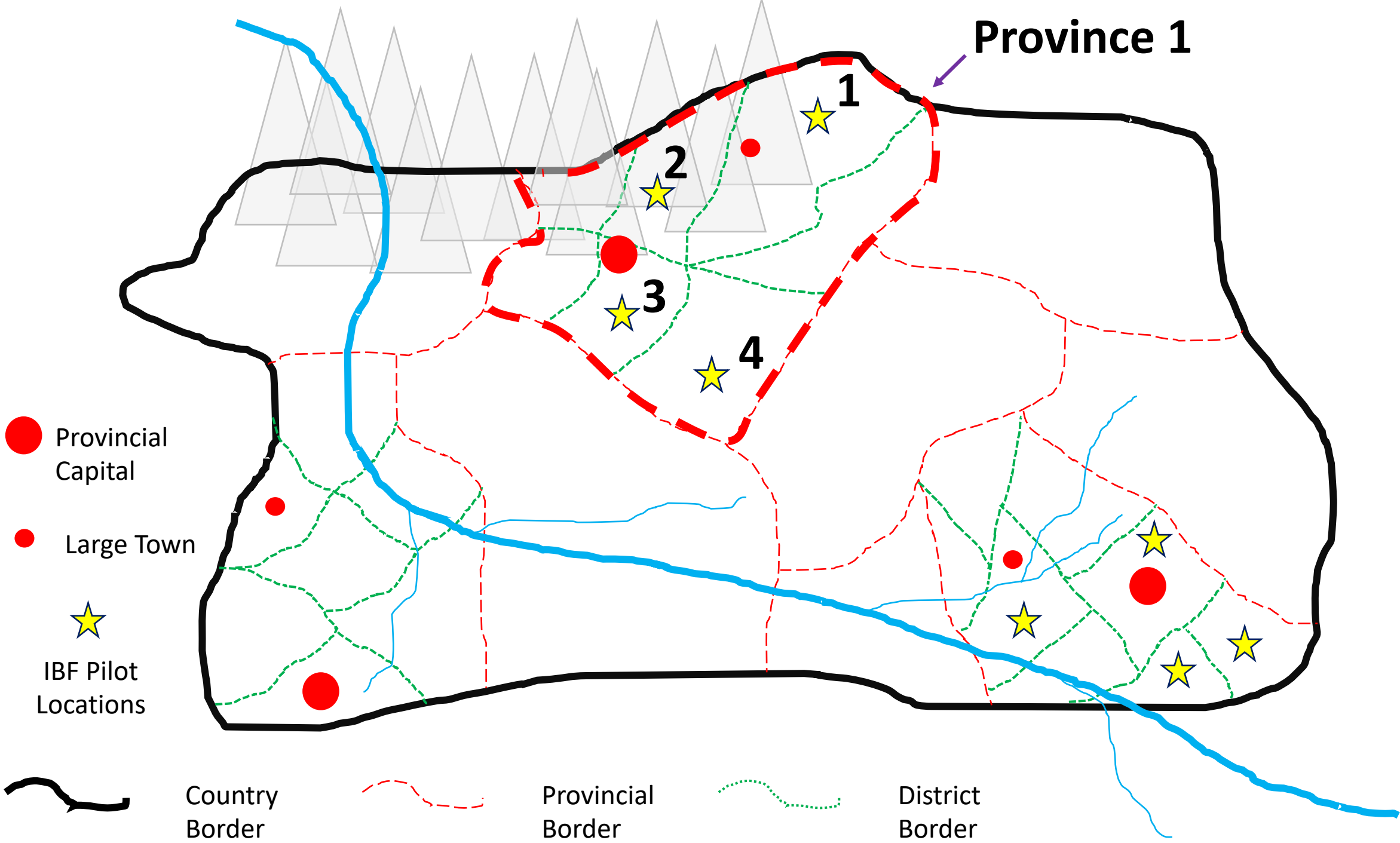
Currently, the country is affected by a westerly moving low-pressure system.

Day 1

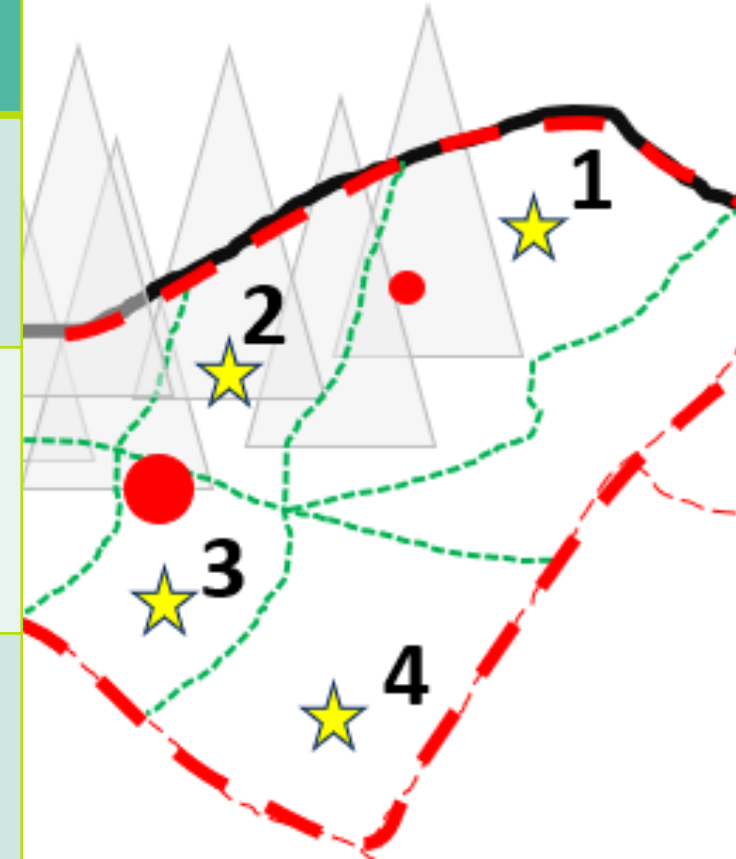
Afternoon: Generally, to mostly cloudy in Province 1, especially through the hilly regions, and generally cloudy in the rest of the country.

Light to moderate rain with thunder and lightning is likely to occur at some places of the country, chances of heavy rainfall at one or two places of Province 1.

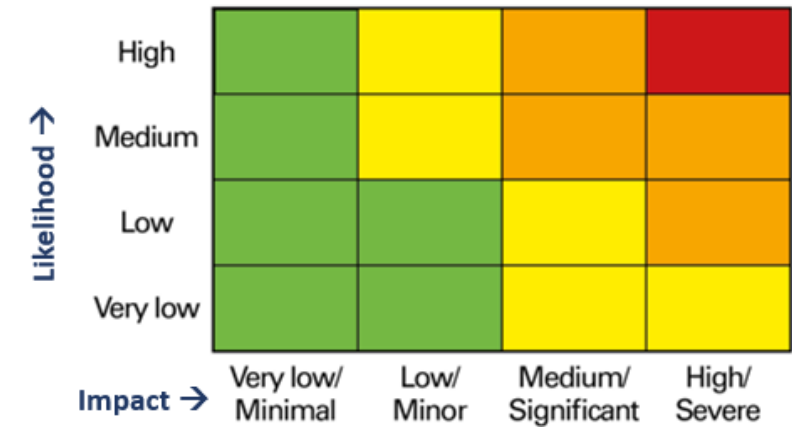
Night: Generally, to mostly cloudy throughout the country. Light to moderate rain with thunder and lightning is likely to occur at some places of the country, chances of heavy rainfall at one or two places of the Province 1.



District	Known Information
1	<ul style="list-style-type: none"> • Quite densely populated. • Only one main road, any landslides will cut off this town. • There is some shelter from rain when comes from the west.
2	<ul style="list-style-type: none"> • Relatively sparsely populated rural hillside • The population mainly work tending to animals on the hill sides. • This province often has the highest rainfall observed for this area, especially in a westerly, due to topographic effects.
3	<ul style="list-style-type: none"> • Population density is very high, includes the capital city. • Most people rely on public transport to move around both the city, and to return home to areas in the rest of the municipality. • Houses are well built, utility supplies are generally good and well maintained, even in times of bad weather.
4	<ul style="list-style-type: none"> • Low-lying area, predominantly agricultural land with very good drainage. • Houses are well spread out and population density is low.



Exercise – Part 1



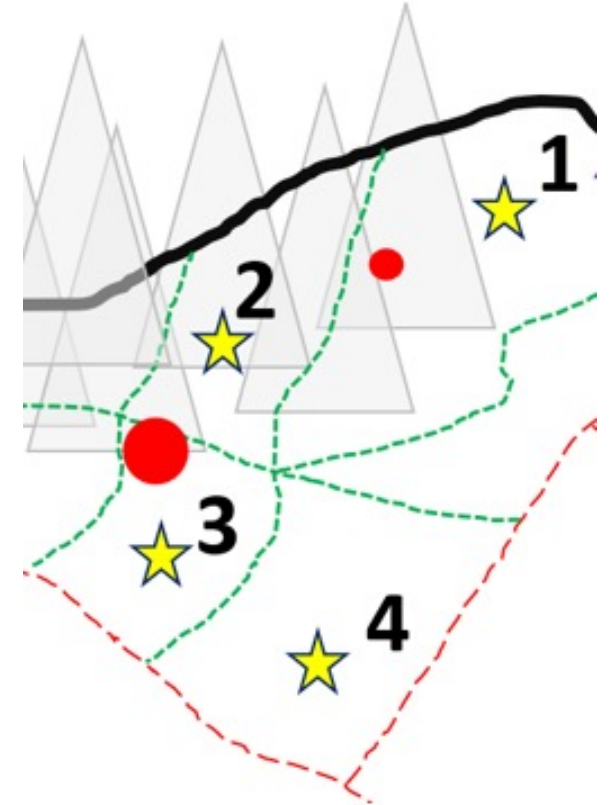
Each table works as a team

Discuss and agree where to assign each district on the hazard matrix.

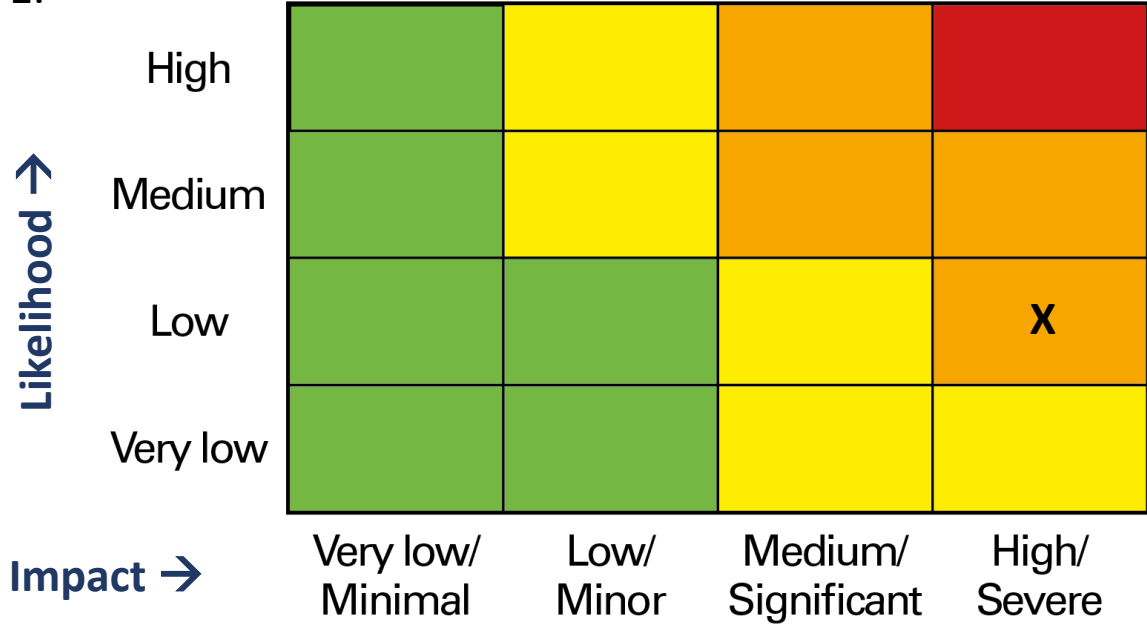
Colour cards hold more information about each district. This simulates additional information that may be held by partner agencies.

Grey prompt cards will help discussion.

District	Known information with shared information from disaster managers
1	<ul style="list-style-type: none"> • Quite densely populated. • Only one main road, any landslides will cut off this town. • There is however some shelter from the rain when it is from the west. • Landslides are common in the general area, and houses are not generally built to withstand these, outside of the main towns.
2	<ul style="list-style-type: none"> • Relatively sparsely populated rural hillside • The population mainly work tending to animals on the hill sides. • This province often has the highest rainfall observed for this area, especially in a westerly, due to topographic effects. • Many dwellings are poorly built and often on steep, unstable hill sides.
3	<ul style="list-style-type: none"> • Population density is very high, includes the capital city. • Most people rely on public transport to move around both the city, and to return home to areas in the rest of the municipality. • Houses are well built, utility supplies are generally good and well maintained, even in times of bad weather. • Roads around the capital, especially to the north, are closed frequently after landslides. However, there are good evacuation routes to the south.
4	<ul style="list-style-type: none"> • Low-lying area, predominantly agricultural land with very good drainage. • Houses are well spread out and population density is low. • Flooding is very rare - it needs to rain a lot!

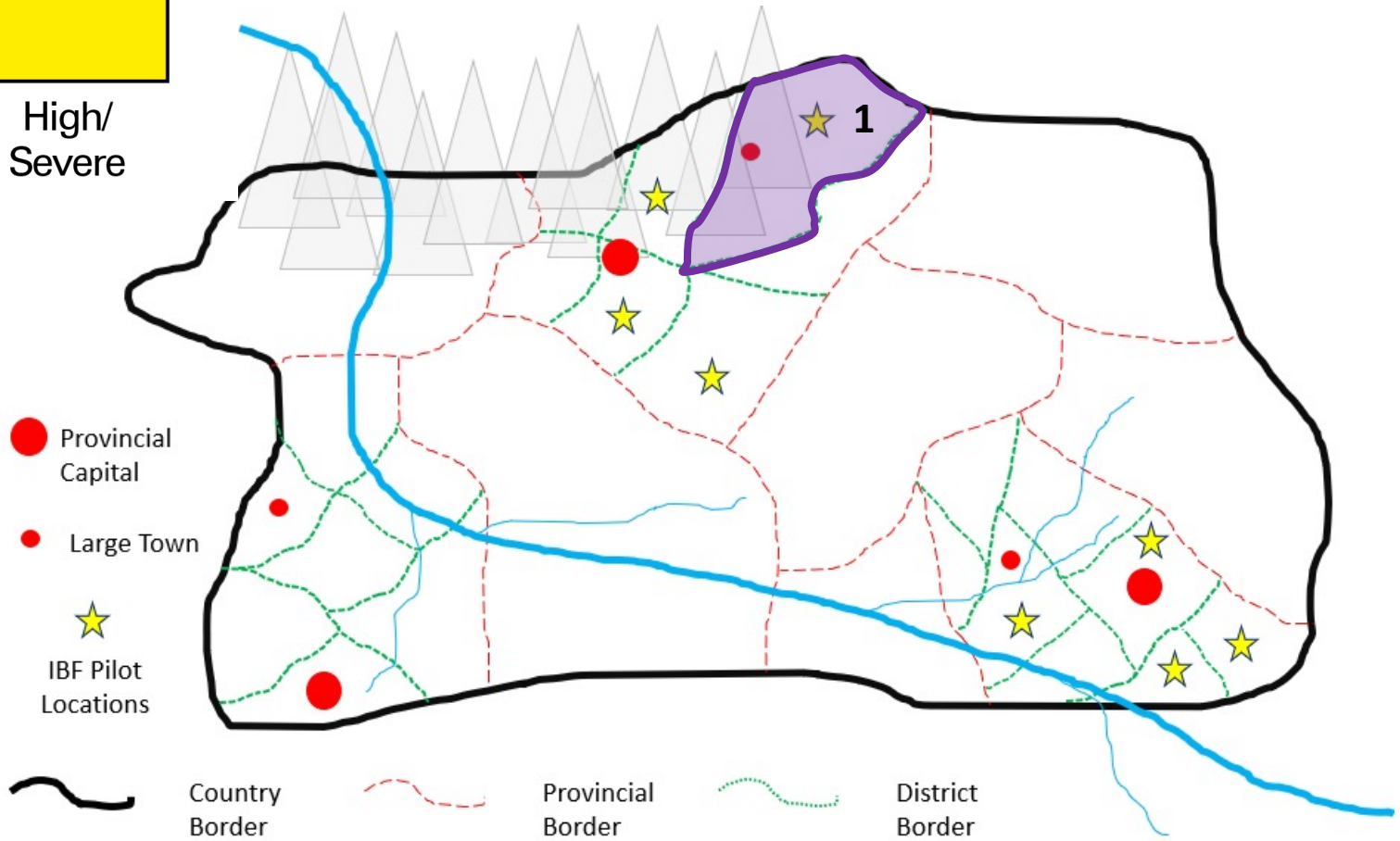


1.

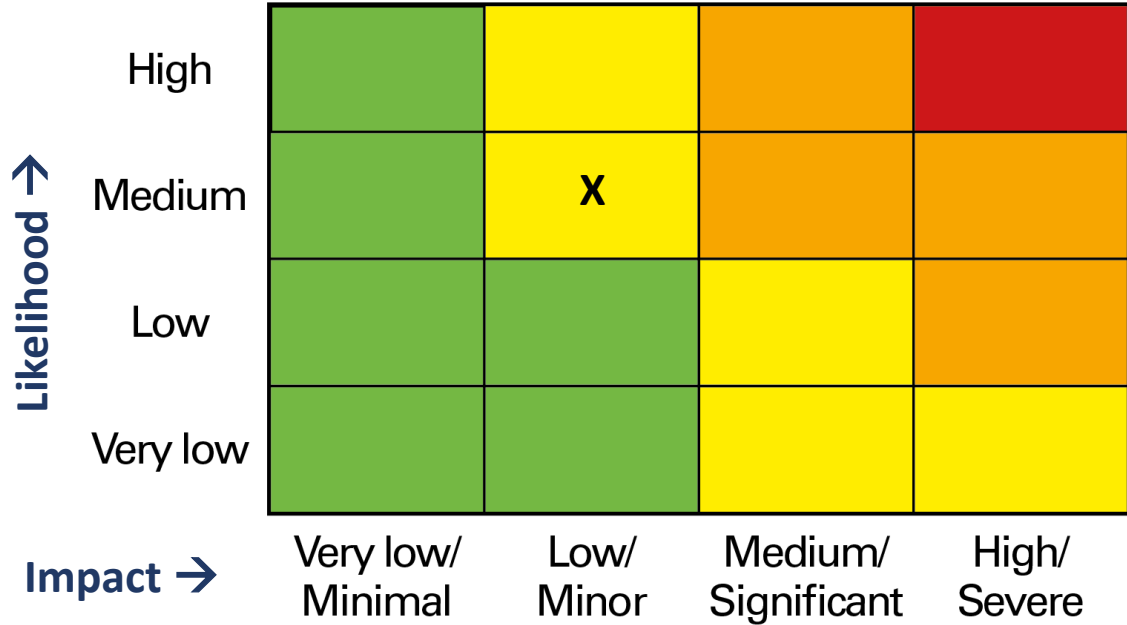


District 1

- Quite densely populated.
- Only one main road, any landslides will cut off this town.
- There is however some shelter from the rain when it is from the west.
- Landslides are common in the general area, and houses are not generally built to withstand these, outside of the main towns.

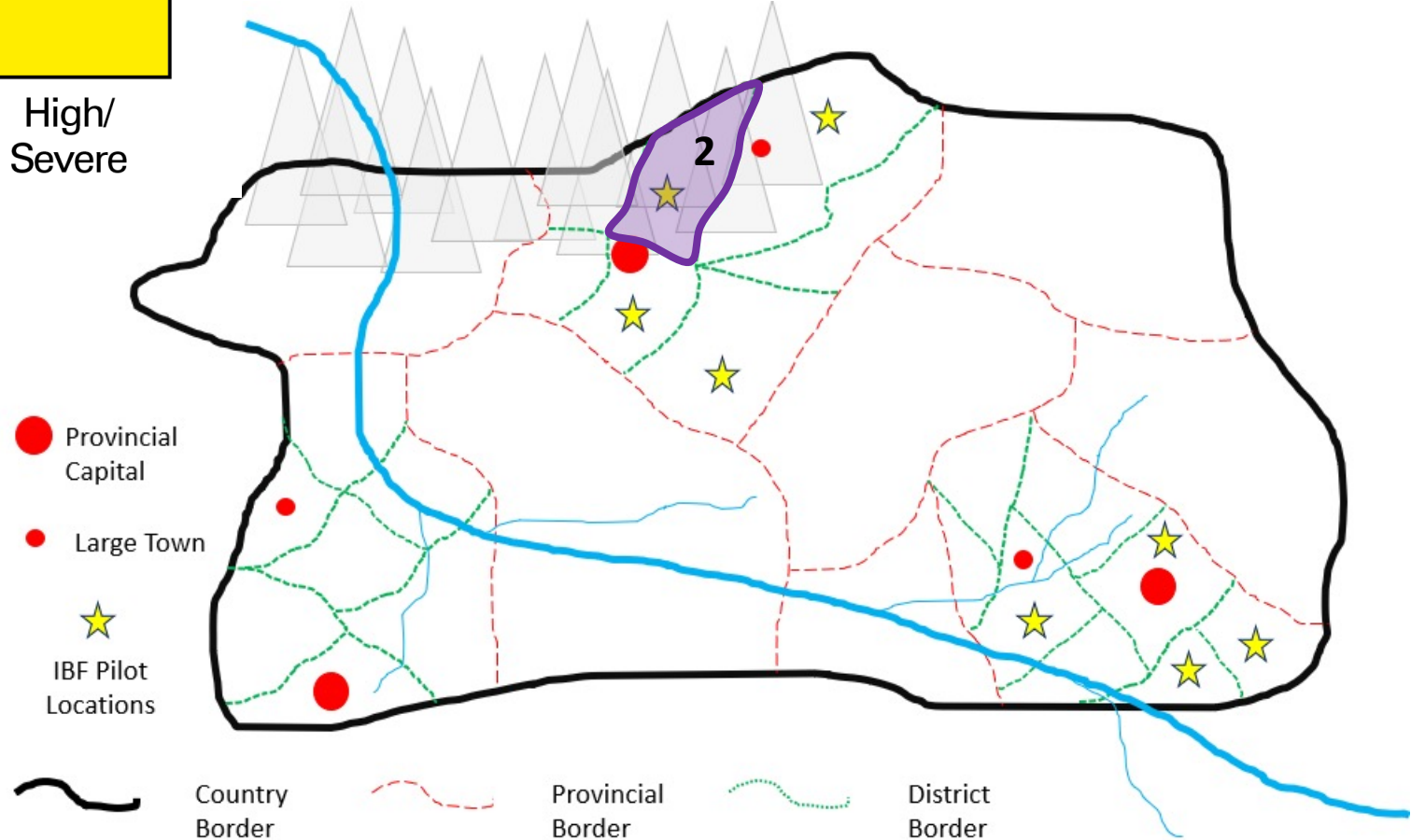


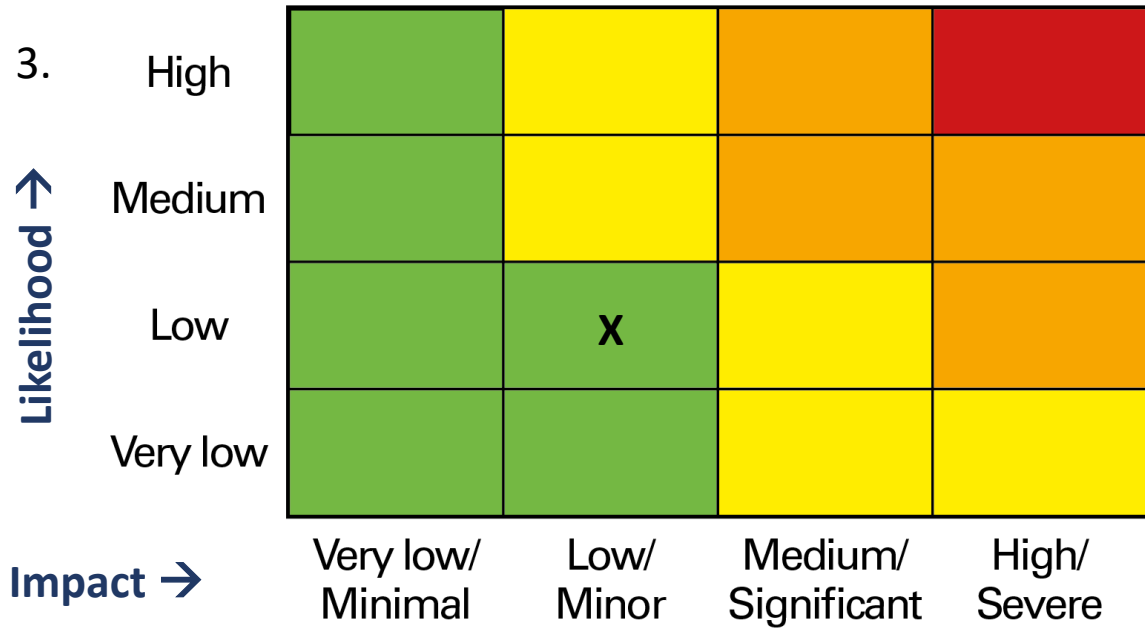
2.



District 2

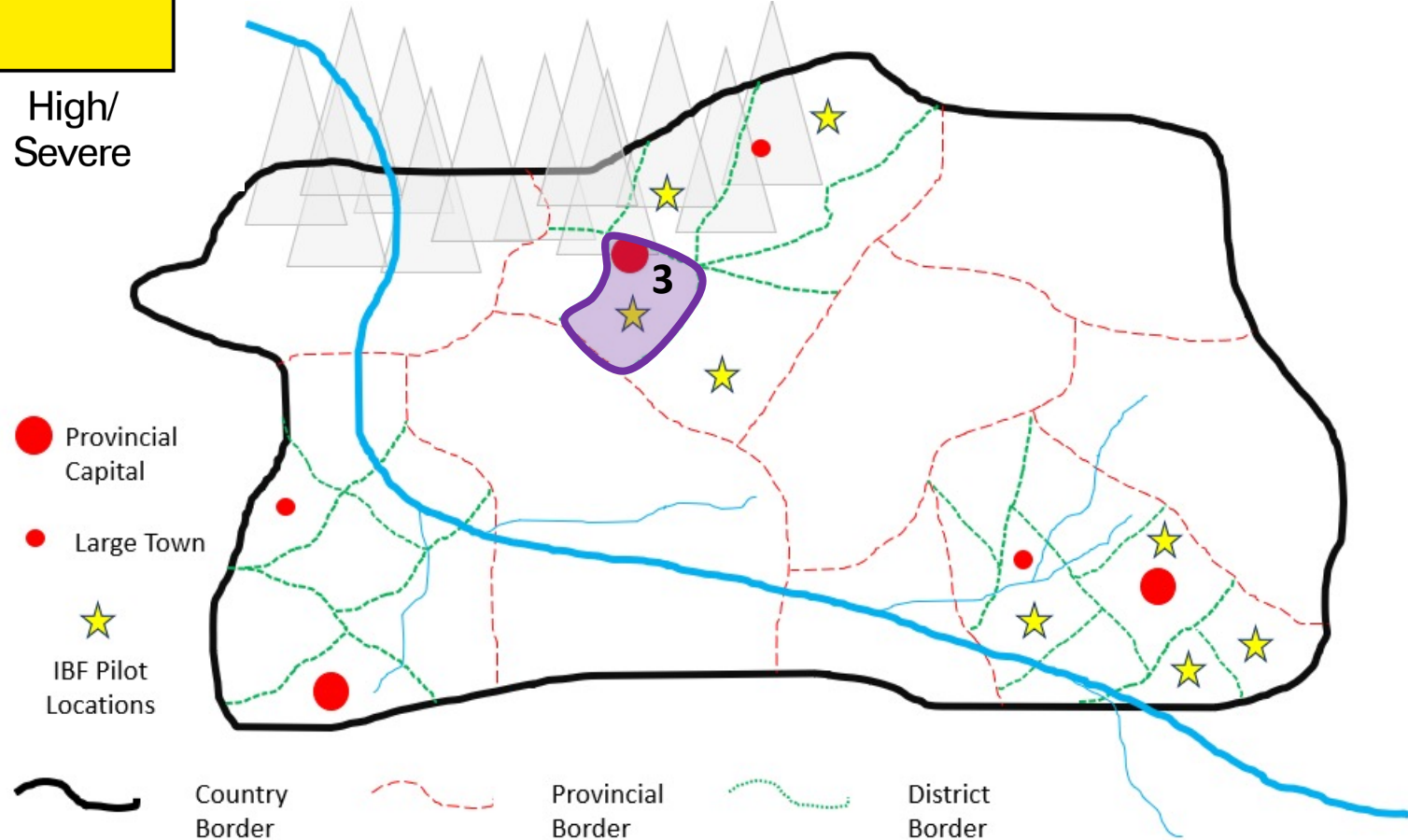
- Relatively sparsely populated rural hillside.
- The population mainly work tending to animals on the hill sides.
- This province often has the highest rainfall observed for this area, especially in a westerly, due to topographic effects.
- Many dwellings are poorly built and often on steep, unstable hill sides.

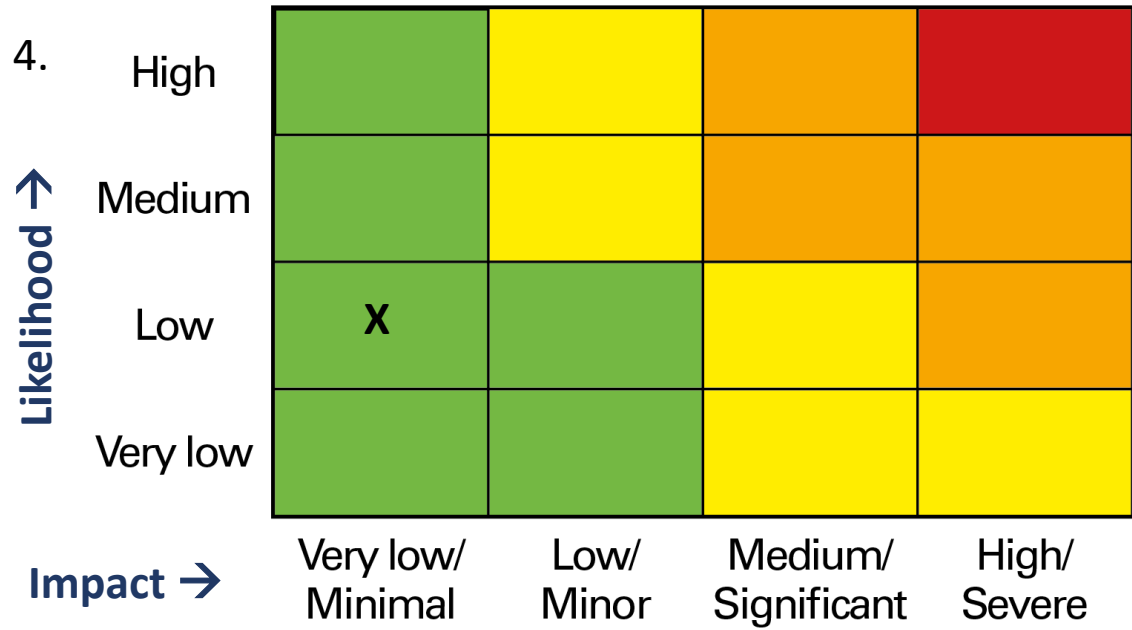




District 3

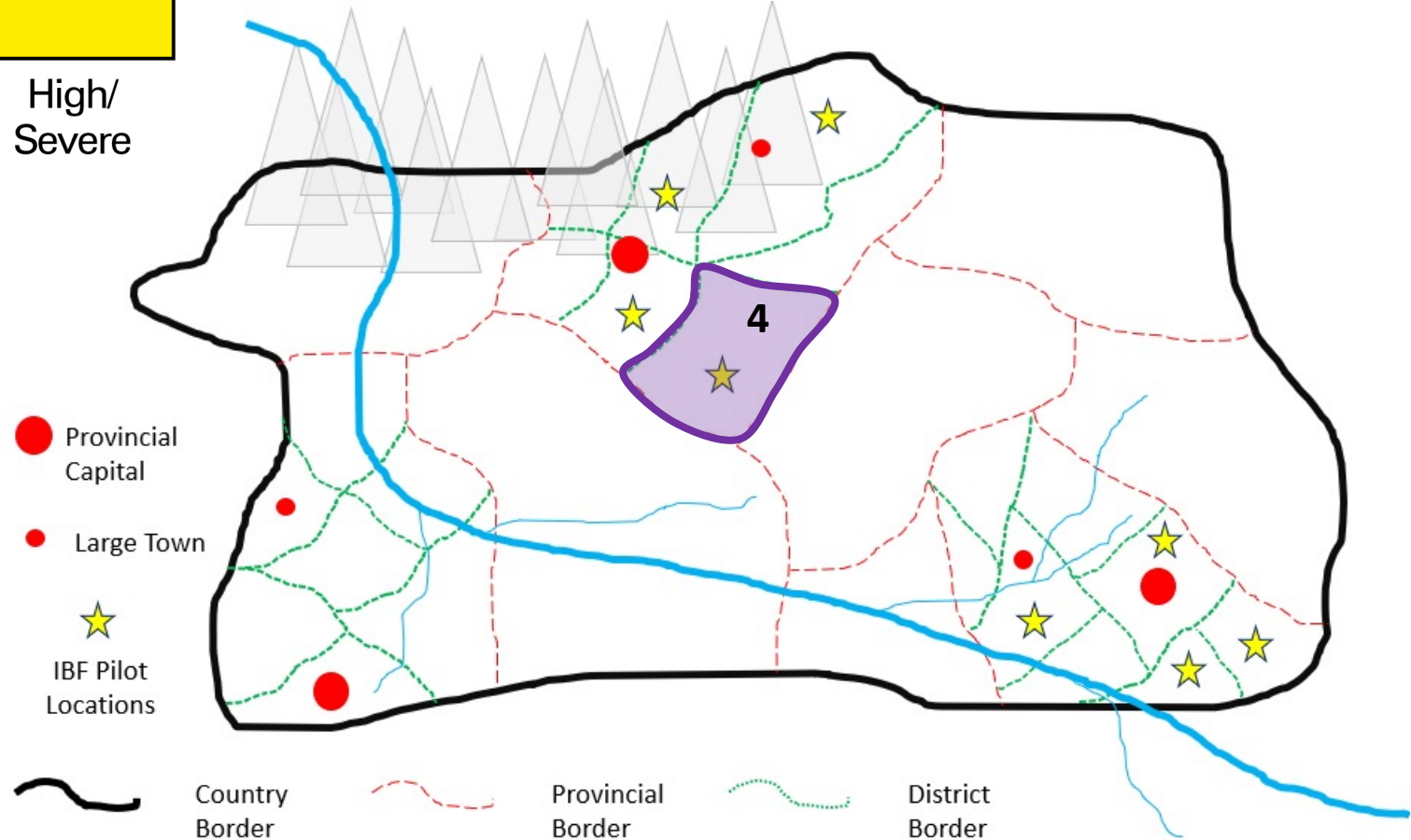
- Population density is very high, Most people rely on public transport to move around both the city, and to return home across the municipality.
- Houses are well built.
- Utility supplies are generally good and well maintained, even during poor weather.
- Roads around the capital, especially to the north, are closed frequently after landslides.
- Good evacuation routes to the south.

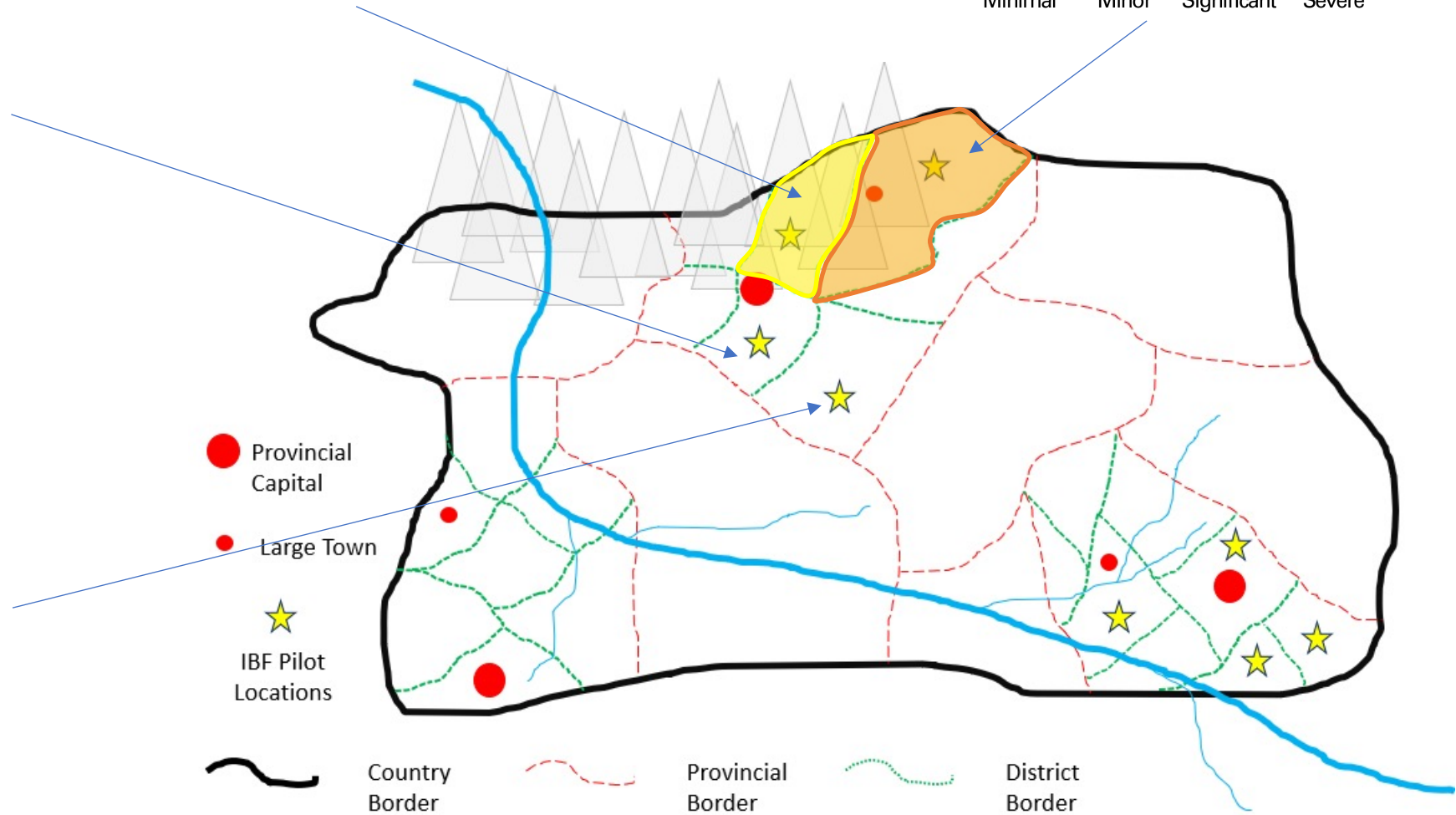
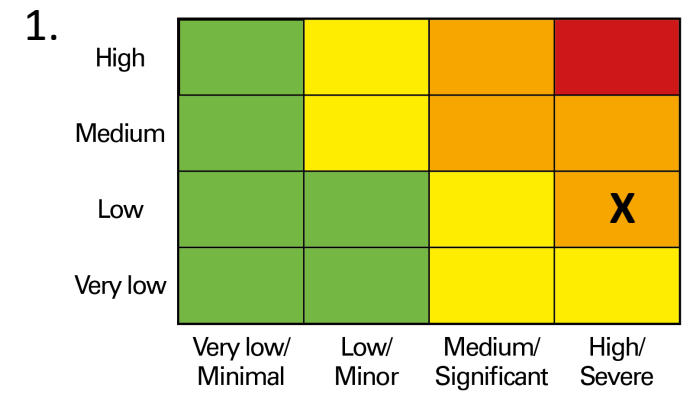
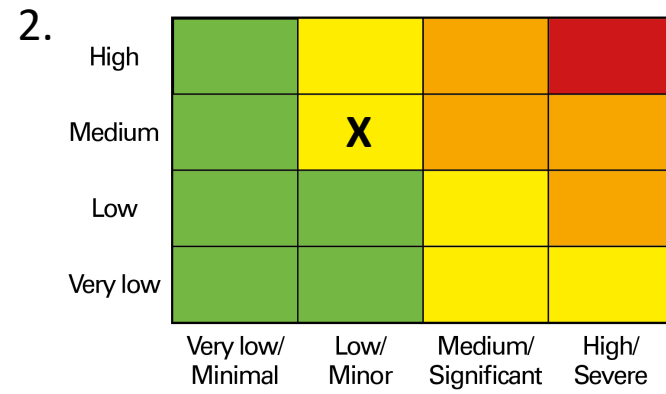
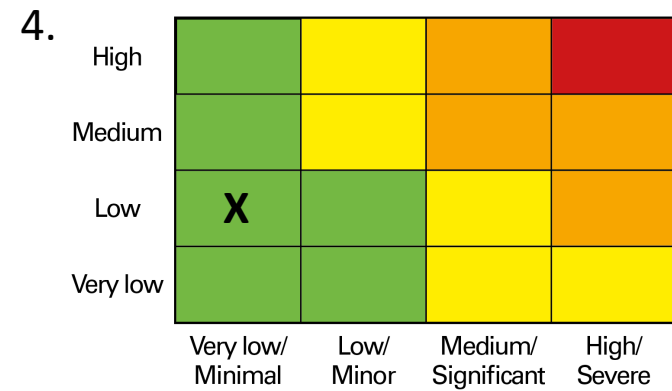
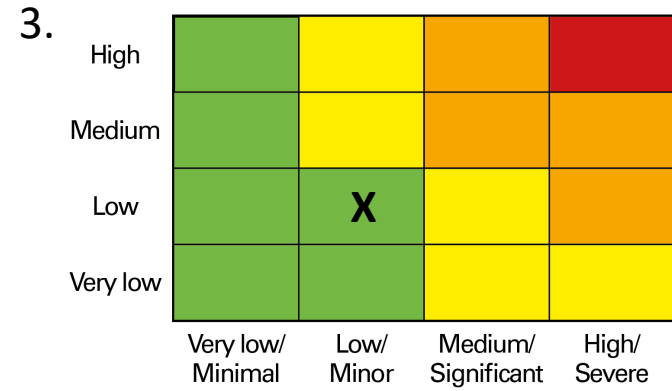




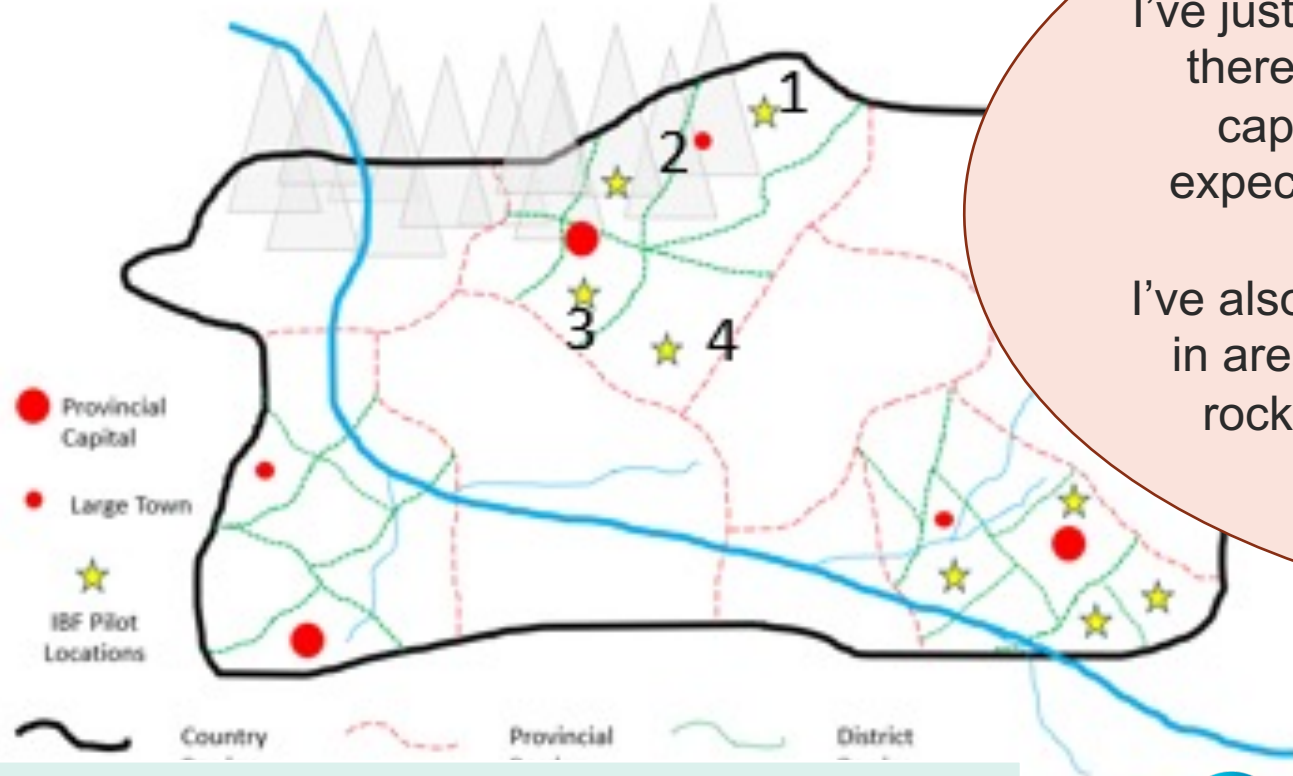
District 4

- Low-lying area, predominantly agricultural land with very good drainage.
- Houses are well spread out and population density is low.
- Flooding is very rare - it needs to rain a lot!





Exercise – Part 2

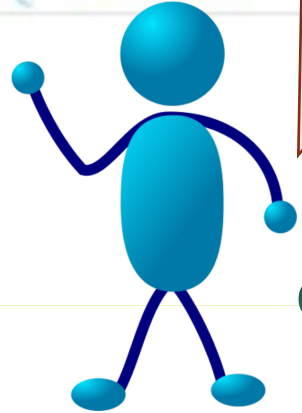


I've just been told by one of my stakeholders that there is a big concert planned for the district capital on Friday evening, which they are expecting a large number of people to attend.

I've also been told on hills close to the large town in area 1, a farmer observed some significant rock slips this morning following some rain overnight.

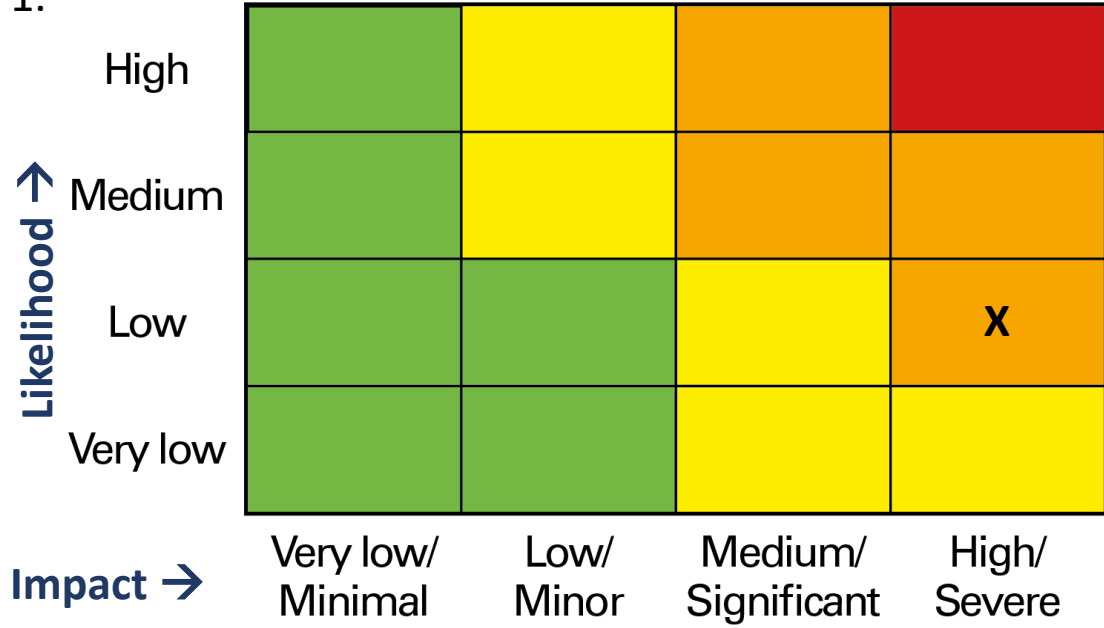
How does your warning strategy change, based on this new information?

... For District 1?

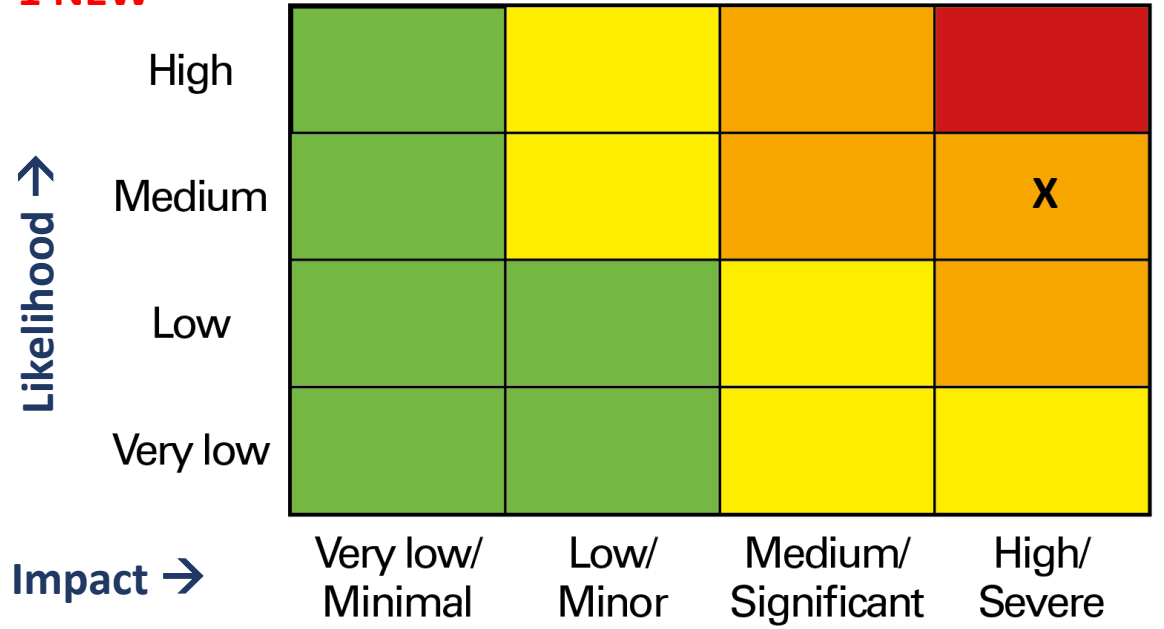


Consultant

1.



1 NEW



1.

Likelihood →

Impact →

High	Green	Yellow	Orange	Red
Medium	Green	Yellow	Orange	Orange
Low	Green	Green	Yellow	Orange
Very low	Green	Green	Yellow	Yellow
	Very low/ Minimal	Low/ Minor	Medium/ Significant	High/ Severe

GREEN	NO SEVERE WEATHER EXPECTED
YELLOW	BE AWARE. There is a moderate risk of severe or a low risk of extreme weather occurring. <i>Remain alert and ensure you access the latest weather forecast.</i>
AMBER	BE PREPARED. There is a high risk of severe or a moderate risk of extreme weather occurring. <i>Remain vigilant and ensure you access the latest weather forecast. Take precautions where possible.</i>
RED	TAKE ACTION. There is a high risk of an extreme weather event occurring. <i>Remain extra vigilant and ensure you access the latest weather forecast. Follow orders and any advice given by authorities under all circumstances and be prepared for extraordinary measures.</i>

Very Low	Low	Medium	High
A few places will have flooding of low-lying land and susceptible roads.	Some flooding of homes and businesses and susceptible roads.	Flooding of homes and businesses.	Widespread flooding of homes and businesses.
A few transport routes affected.	Some transport routes and travel services affected.	Danger to life from fast flowing/deep water.	Danger to life from fast flowing/deep water.
Road conditions affected with spray and some standing water in a few places.	Some journeys require longer travel times.	Damage to buildings/ structures.	Extensive damage to and/or collapse of buildings/ structures.
	Road conditions affected by spray and standing water.	Transport routes and travel services affected. Longer journey times expected. Some road closures.	Transport routes and travel services disrupted for a prolonged period. Long travel delays.
	Short term disruption to utilities and services in some places.	Difficult road conditions due to spray and standing water.	Widespread road closures.

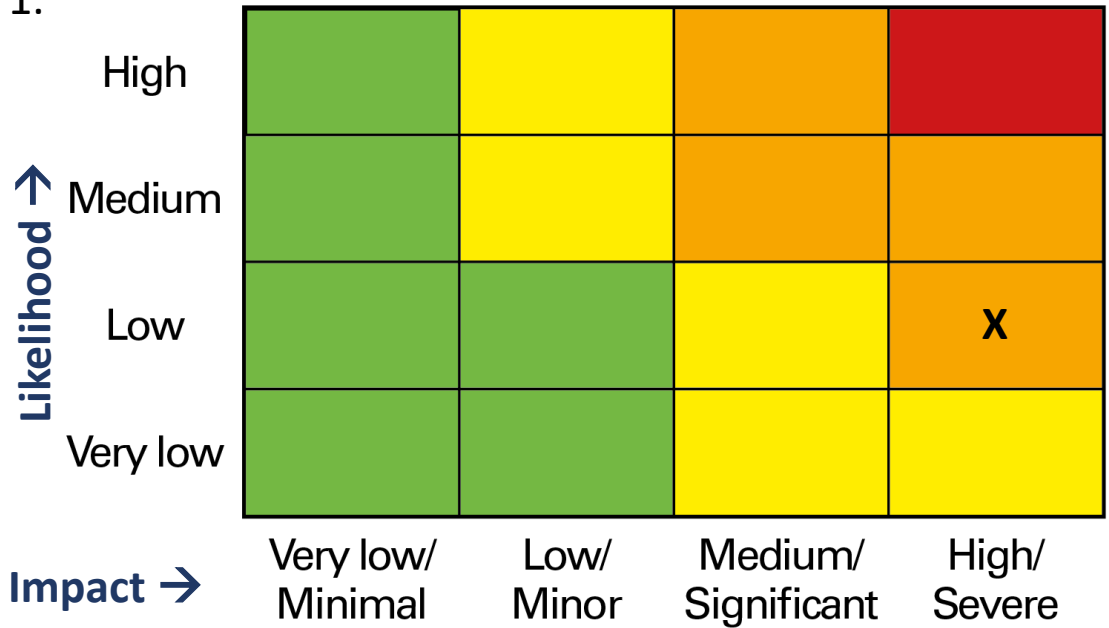
Matrix Likelihood Label	Best Practice Likelihood %	Word/Phrase
High	>80%	Definitely
High	>80%	Certain
High	>80%	Will happen
High	>80%	Almost Certain
High	>80%	Very Likely
High	>80%	Expected
Medium	50-80%	Anticipated
Medium	50-80%	Good chance
Medium	50-80%	Likely
Medium	50-80%	Probably (probable)
Low	30-50%	Possible ¹
Low	30-50%	Might
Low	30-50%	Potential
Low	30-50%	Maybe
Low	30-50%	Perhaps
Low	30-50%	Could Happen
Low	30-50%	Chance
Very Low	10-30%	Slight/Small Chance
Very Low	10-30%	Not Likely
Very Low	10-30%	Unlikely
Very Low	<10%	Not expected (therefore no warning issued)

Table 4: Words NOT to use

Based on user and marketing research findings, we have found that public audiences do not respond well to the following words.

Word/s not to use	Rationale	Suggested alternative
Localised / Isolated	It is meaningless to those outside meteorology	Some places, small areas.
Confidence/confident	Feedback suggests that confidence implies an individual's personal view and the message is not considered authoritative or reliable	Use likelihood words to convey the level of certainty. Describe issues leading to uncertainty in the Further Details section, if appropriate to do so.
Best estimate	Interpreted as guessing.	Use likelihood words to convey certainty
Uncertainty	Uncertainty is overused.	Every warning is inherently uncertain, therefore it is not necessary to state it all the time. Using the likelihood words will convey probability without stating 'this forecast is uncertain'. Phrases such as 'it is possible that the impacts could occur further north' conveys uncertainty without stating 'it is uncertain'.
Be Aware	No longer effective and so removed from all warnings communications	Next Generation Warnings format removes the need for these phrases.
Be Prepared	No longer effective and so removed from all warnings communications	Next Generation Warnings format removes the need for these phrases.
Take Action	No longer effective and so removed from all warnings communications	Next Generation Warnings format removes the need for these phrases.

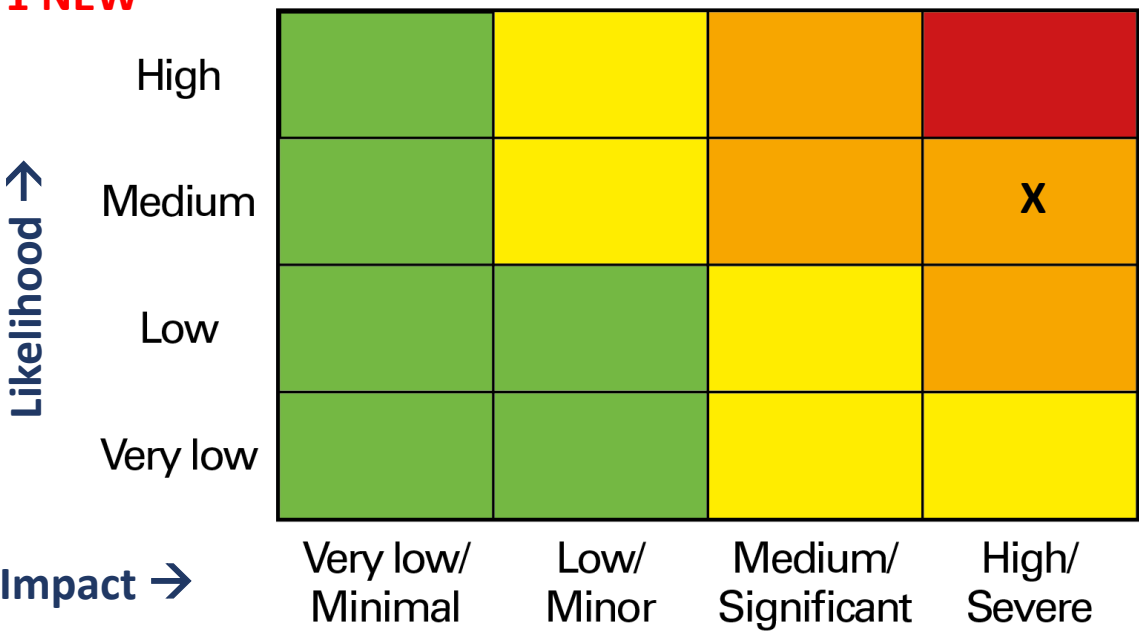
1.



Low likelihood of High impacts **Rain**

	<ul style="list-style-type: none"> • Fast flowing or deep floodwater is possible, causing a danger to life • Extensive flooding of homes and businesses is possible • Damage to buildings and structures or building collapse might happen • Road may potentially close, along with bus and train service delays and cancellations • Dangerous driving conditions might occur, because of spray and flooded roads • Loss of power and other essential services, such as gas, water or mobile phone services, is possible • Communities could be completely cut off by floodwater, perhaps for several days
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1 NEW



Medium likelihood of High impacts **Rain**

	<ul style="list-style-type: none"> • Fast flowing or deep floodwater is likely, causing danger to life • Extensive flooding to homes and businesses is likely, which could lead to collapsed or damaged buildings or structures • Road closures and bus and train service delays and cancellations likely • Dangerous driving conditions because of spray and flooded roads • Power and other essential services, such as gas, water or mobile phone service, will probably be lost • There is a good chance communities in flooded areas could be completely cut off, perhaps for several days
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1.

Likelihood ↑	High				
	Medium				
	Low				X
	Very low				
		Very low/ Minimal	Low/ Minor	Medium/ Significant	High/ Severe
	Impact →				

What should I do?

Check if your property could be at risk of flooding. If so, consider preparing a flood plan and an emergency flood kit.

Give yourself the best chance of avoiding delays by checking road conditions. You may need to amend or even cancel journeys if driving conditions are dangerous. Keep up to date with bus and train timetables for delays or cancellations.

It is not safe to drive, walk or swim through floodwater, avoid it where possible and if you are affected by fast flowing or deep-water call 999, and wait for help.

People cope better with power cuts when they have prepared for them in advance. It's easy to do; consider gathering torches and batteries, a mobile phone power pack and other essential items.

Be prepared for weather warnings to change quickly. When a weather warning is issued, the Met Office recommends staying up to date with the weather forecast in your area.

1 NEW

Likelihood ↑	High				
	Medium				X
	Low				
	Very low				
		Very low/ Minimal	Low/ Minor	Medium/ Significant	High/ Severe
	Impact →				

What should I do?

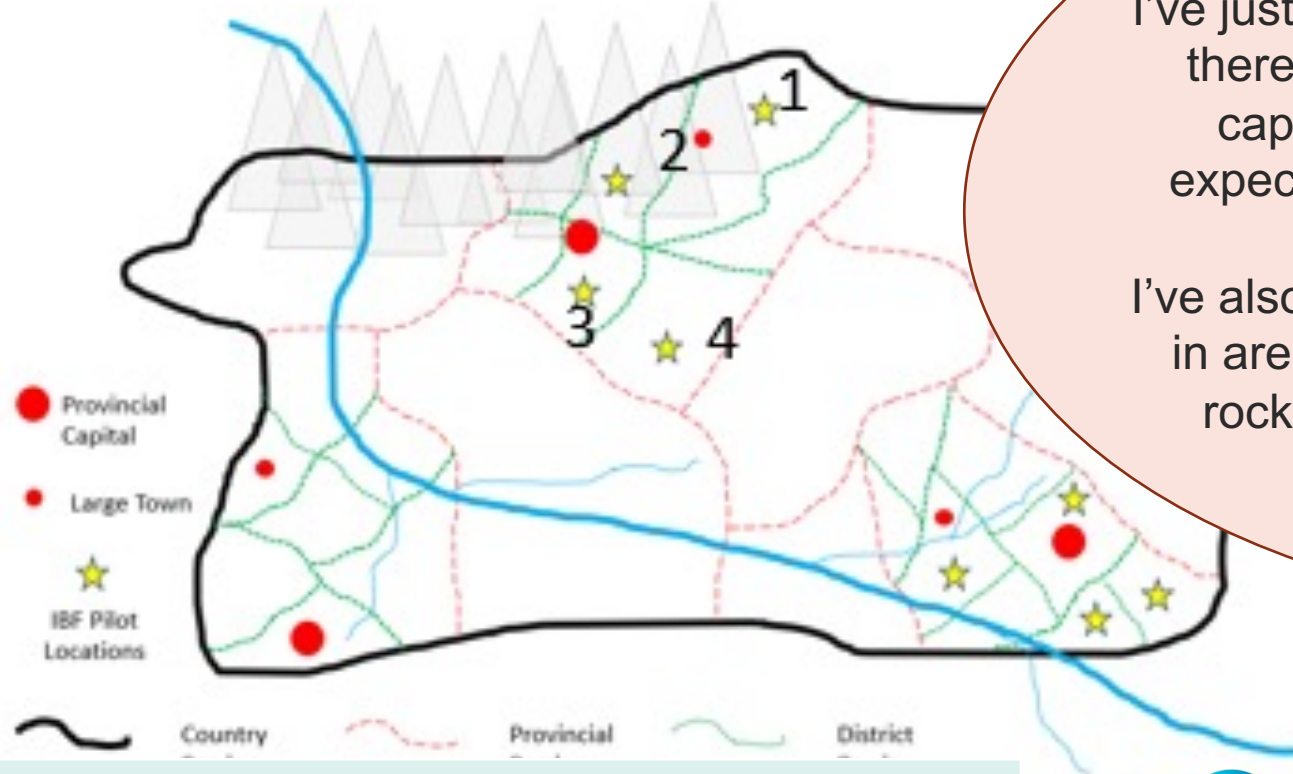
Keep yourself and others safe; prepare to avoid travelling by road during potentially dangerous road conditions. If you must travel, ensure you watch for possible danger and drive cautiously.

It is not safe to drive, walk or swim through floodwater, avoid it where possible and if you are affected by fast flowing or deep-water call 999, and wait for help.

It's never too late to take action and prepare for flooding. Preparing a flood kit could save you from loss or damage due to flooding to your home or business. In your flood kit have: insurance and any other important documents; a torch & spare batteries; a first aid kit, prescription medicines and supplies for looking after your family members or pets; and warm, waterproof clothes, blankets, food and water.

Help to protect vulnerable people that you know including older people, those with underlying conditions and those who live alone; they may need support with food and medical supplies. If you are worried about your health or that of somebody you know, ring NHS 111 (or consult NI:DIRECT if in Northern Ireland).

Stay up to date with the weather forecast for your area and follow advice from emergency services and local authorities.

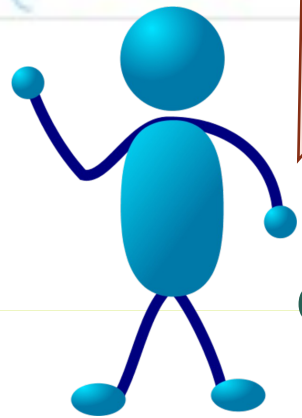


I've just been told by one of my stakeholders that there is a big concert planned for the district capital on Friday evening, which they are expecting a large number of people to attend.

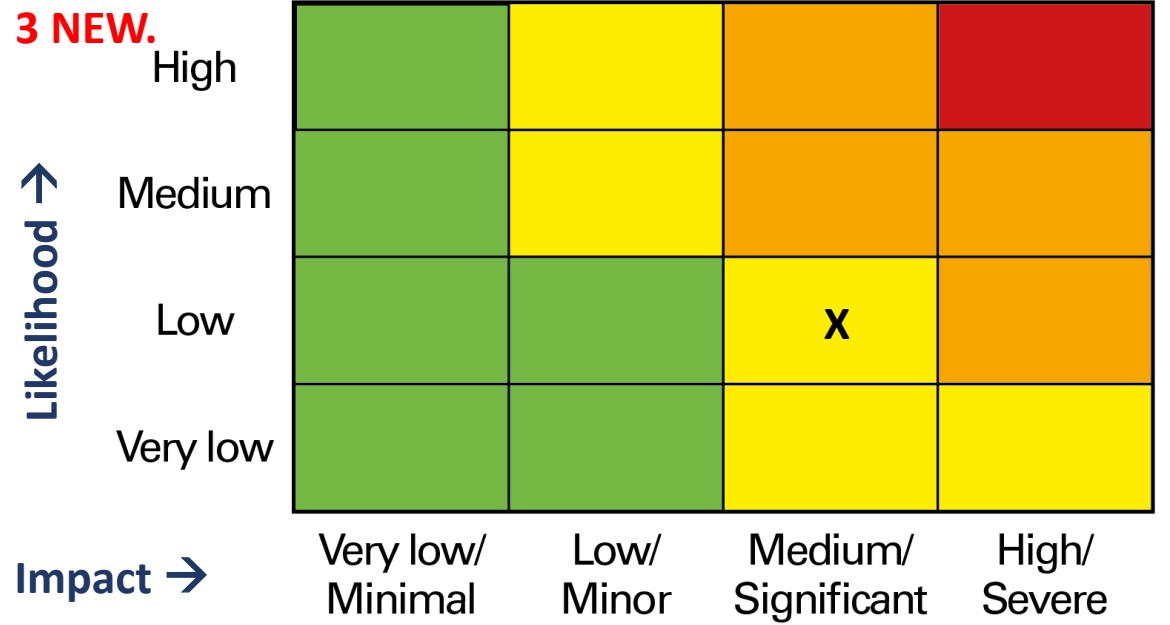
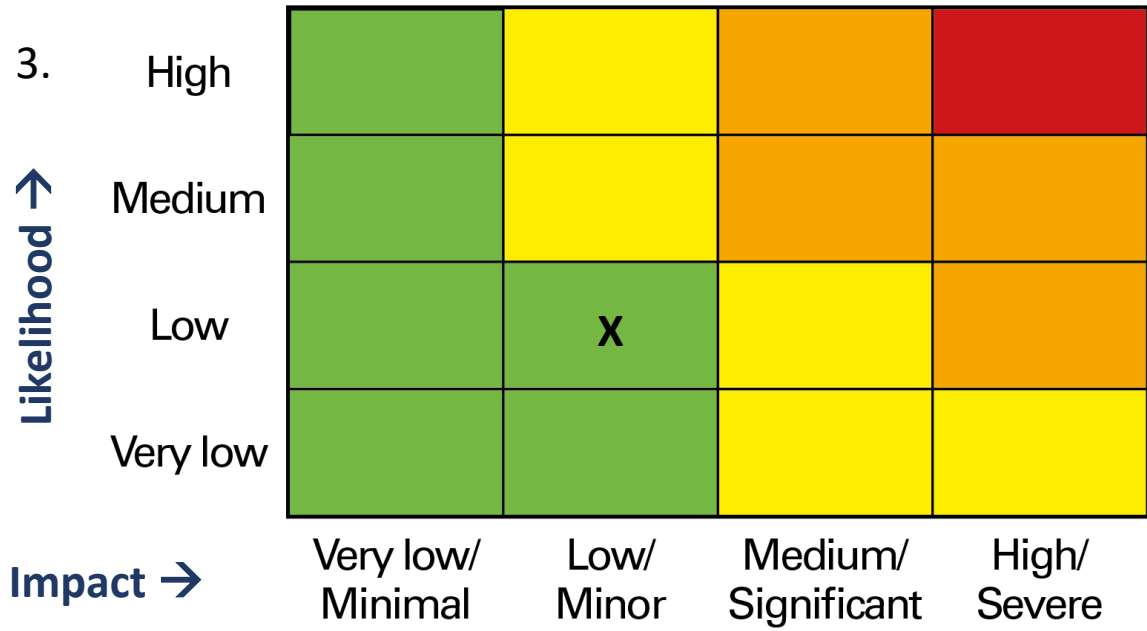
I've also been told on hills close to the large town in area 1, a farmer observed some significant rock slips this morning following some rain overnight.

How does your warning strategy change, based on this new information?

... For District 3?



Consultant



Any questions?