



ECONOMIC RESILIENCE CHALLENGE



What are economic resilience challenges?
Economic resilience challenges occur when there is a loss of confidence in the economy. This can be seen as a reduction in investment, leading company closures, job losses, and a general reduction in consumer spending .

Severity is a product of impact and duration; extreme events will be deeper and longer than mild ones.

		Event Severity		
Resilience		Minor (1-3)	Average (4-5)	Extreme (6)
	<1	Under prepared	Severely under prepared	Severely under prepared
	1-2	fitting	Under prepared	Severely under prepared
	3-4	overkill	fitting	Under prepared
	5-6		overkill	fitting
	>6	overkill		

Minor Resilience Challenge

A large local employer closes down. All of a sudden, many people are out of work and companies that rely on the closed company have a reduction in their turnover.

Average Resilience Challenge

Bad weather impacts the summer holiday season. This results in many local businesses being impacted by a downturn in their trade. Some businesses will be able to 'weather the storm', but for smaller businesses that rely on the summer season, a washout will mean the end of their business.

Extreme Resilience Challenge

A global credit crunch, economic decisions in a country far, far, away impact the town's economy by removing money from the economy. This results in some international companies closing their operations in the town, increased costs for goods and services and a reluctance by people to spend their limited cash.



BIODIVERSITY RESILIENCE CHALLENGE



What are biodiversity resilience challenges?

Biodiversity resilience challenges occur when the fauna and or flora of an environment is threatened by external sources. Typically, this may occur as a side effect of industrial pollution, or the introduction of non indigenous flora and fauna.

		Event Severity		
Resilience		Minor (1-3)	Average (4-5)	Extreme (6)
	<1	Under prepared	Severely under prepared	Severely under prepared
	1-2	fitting	Under prepared	Severely under prepared
	3-4	overkill	fitting	Under prepared
	5-6		overkill	fitting
	>6	overkill		

Minor Resilience Challenge

A local dairy farm has a storage failure, releasing milk into the local river, killing all the fish. Whilst the leak is repaired quickly and the dead fish removed, it takes considerable time for the river to return to pristine condition.

Average Resilience Challenge

An oil tanker runs aground up the coast, spilling a million barrels of oil, wiping out much of the bird life and destroying the local beach tourism industry for a couple of seasons.

Residents and businesses are starting to get nervous about the future.

Extreme Resilience Challenge

A local farm uses a pesticide that destroys the local bee population. Without bees, local crops and plants are not pollinated, resulting in a commercial and environmental collapse.

Some residents and businesses are now looking to move away to areas that have a better quality of life.



RESILIENCE CHALLENGE OUTCOMES



Severely under-prepared

The decisions made by the municipality have made the town highly sensitive to economic events. As companies close and jobs are lost, there is nothing in place for the residents of the town, making a bad situation much worse. People feel that the municipality has 'really dropped the ball' with their economic resilience planning, and it's expected that the mayor will resign.

Under-prepared

The town has been impacted by the economic event with some knock on business failures and many residents reporting financial hardship. People feel that things could have been worse, but they could have been a lot better. There's a sense that the municipality has 'fumbled it' with their economic resilience planning.

Fitting

Whilst there are some impacts to the event, they tend to be small in nature and there are no major causalities, this is a huge relief for the local businesses and towns people. People feel that the municipality has 'got it right' with their economic resilience planning.

Overkill

There appears to be little impact of the economic event in the town, which is a huge relief for the local businesses and towns people.

However, the impact is so small people wonder if the municipality has over prepared for such events and whether the town will be able to overcome over events with such ease.



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.



RESILIENCE CHALLENGE OUTCOMES



Severely under-prepared

The decisions made by the municipality have made the town highly sensitive to environmental pollution, and there appears to be nothing in place for the residents of the town, making a bad situation much worse. People feel that the municipality has 'really dropped the ball' with their biodiversity resilience planning, and it's expected that the mayor will resign.

Under-prepared

The town has been impacted by the event, with much work to do to recover the town's fauna and flora, and the people and businesses that are involved. People feel that things could have been worse, but they could have been a lot better. There's a sense that the municipality has 'fumbled it' with their biodiversity resilience.

Fitting

Whilst there are some impacts to the event, they tend to be small in nature and there are no major causalities, this is a huge relief for the town's fauna and flora and the people and businesses that are involved. People feel that the municipality has 'got it right' with their biodiversity resilience.

Overkill

There appears to be little impact of the event in the town, which is a huge relief for all. However, the impact is so small people wonder if the municipality has over prepared for such events and whether the town will be able to overcome over events with such ease.



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FLOOD RESILIENCE CHALLENGE



What are flood resilience challenges?
Flood resilience challenges occur when there is water in places where water shouldn't be, and can occur from excessive rainfall, storm surges, or man-made flooding. Flooding causes damage in two main ways, firstly from water damage and then secondly from the debris and waste left by receding water

		Event Severity		
Resilience		Minor (1-3)	Average (4-5)	Extreme (6)
	<1	Under prepared	Severely under prepared	Severely under prepared
	1-2	fitting	Under prepared	Severely under prepared
	3-4	overkill	fitting	Under prepared
	5-6		overkill	fitting
	>6	overkill		

Minor Resilience Challenge

It's been raining more than expected for the time of year and the ground has become sodden, resulting in localised flooding. This impacts local people and businesses and takes resources to clean up once the flood water recedes.

Average Resilience Challenge

The town has been battered by multiple winter storms, with each storm causing flooding that the town is struggling to recover from before being hit by the next one. Residents and businesses are starting to get nervous about the future.

Extreme Resilience Challenge

The region has been absolutely battered by a once in a lifetime storm that has dumped unprecedented amounts of rain in the region, causing huge amount of damage. Rebuilding will take time and effort. Some residents and businesses are now looking to move away to areas that have a better quality of life.



DROUGHT RESILIENCE CHALLENGE



What are drought resilience challenges?
Drought resilience challenges occur when provisions for water consumption are not met. Typically, droughts are caused by insufficient water resources availability due to reduced precipitation over a period of time, or long-term over-exploitation of surface water and groundwater.

		Event Severity		
Resilience		Minor (1-3)	Average (4-5)	Extreme (6)
	<1	Under prepared	Severely under prepared	Severely under prepared
	1-2	fitting	Under prepared	Severely under prepared
	3-4	overkill	fitting	Under prepared
	5-6		overkill	fitting
	>6	overkill		

Minor Resilience Challenge

The town has a drier winter than expected, resulting in the main supply reservoirs being low, and a dry spring. By summer, the water board is restricting water use to essential activities only.

Average Resilience Challenge

For the last year or so the town has been experiencing lower rainfall than typical. It was hoped that last year's low rainfall was a blip, but it's being repeated this year.

Residents and businesses are starting to get nervous about the future.

Extreme Resilience Challenge

The town appears to be affected by climate change that the rainfall has reduced significantly. Resulting in the town becoming drier and browner, and making water a scarce resource.

Residents and businesses are now looking to move away to areas that are less harsh and have a better quality of life.



RESILIENCE CHALLENGE OUTCOMES



Severely under-prepared

The decisions made by the municipality have made the town highly sensitive to flooding. As the town floods, there appears to be nothing in place for the residents of the town, making a bad situation much worse. People feel that the municipality has 'really dropped the ball' with their flood resilience planning, and it's expected that the mayor will resign.

Under-prepared

The town has been impacted by the flood, with much work to do to recover the town's infrastructure with some knock on business failures and many residents reporting hardships. People feel that things could have been worse, but they could have been a lot better. There's a sense that the municipality has 'fumbled it' with their flood planning.

Fitting

Whilst there are some impacts to the flood, they tend to be small in nature and there are no major causalities. This is a huge relief for the local businesses and towns people. People feel that the municipality has 'got it right' with their flood planning.

Overkill

There appears to be little impact of the flood in the town, which is a huge relief for the local businesses and towns people.

However, the impact is so small people wonder if the municipality has over prepared for such events and whether the town will be able to overcome over events with such ease.



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RESILIENCE CHALLENGE OUTCOMES



Severely under-prepared

The decisions made by the municipality have made the town highly sensitive to fluctuations in its water supply. As the town's water reserves dwindle, there appears to be nothing in place for the residents of the town, making a bad situation much worse. People feel that the municipality has 'really dropped the ball' with their drought planning, and it's expected that the mayor will resign.

Under-prepared

The town has been clearly impacted by the drought, with much work to do to recover the town's infrastructure with some knock on business failures and many residents reporting hardships. People feel that things could have been worse, but they could have been a lot better. There's a sense that the municipality has 'fumbled it' with their drought planning.

Fitting

Whilst there are some impacts to the drought, they tend to be small in nature and there are no major causalities. This is a huge relief for the local businesses and towns people. People feel that the municipality has 'got it right' with their drought planning.

Overkill

There appears to be little impact of the drought in the town, which is a huge relief for the local businesses and towns people.

However, the impact is so small people wonder if the municipality has over prepared for such events and whether the town will be able to overcome over events with such ease.



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HEAT RESILIENCE CHALLENGE



What are heat resilience challenges?

Heat resilience challenges occur when there is a prolonged period of local excess heat as a sequence of unusually hot days and nights. Heat waves amplify many risks, such as health related or economic risks, including increased human mortality, drought and water quality, wildfire and smoke, power shortages and agricultural losses.

		Event Severity		
Resilience		Minor (1-3)	Average (4-5)	Extreme (6)
	<1	Under prepared	Severely under prepared	Severely under prepared
	1-2	fitting	Under prepared	Severely under prepared
	3-4	overkill	fitting	Under prepared
	5-6		overkill	fitting
	>6	overkill		

Minor Resilience Challenge

The town normally has great summers, but this summer was a lot hotter than normal, making it hard to enjoy the weather as it was just too hot.

Average Resilience Challenge

The town's hot summer has now extended into a hot autumn and a hot winter. Whilst tourists are enjoying the winter sun, residents have had their fill.

Residents and businesses are starting to get nervous about the future.

Extreme Resilience Challenge

The town appears to be in a climate change where it's just so hot all the time, resulting in the town becoming drier and browner.

Residents and businesses are now looking to move away to areas that are less harsh and have a better quality of life.



RESILIENCE CHALLENGE OUTCOMES



Severely under-prepared

The decisions made by the municipality have made the town highly sensitive to heat waves. As the town suffers in the heat, there appears to be nothing in place for the residents of the town, making a bad situation much worse. People feel that the municipality has 'really dropped the ball' with their heat wave planning, and it's expected that the mayor will resign.

Under-prepared

The town has been impacted by the event, with much work to do to recover the town's infrastructure with some knock on business failures and many residents reporting hardships. People feel that things could have been worse, but they could have been a lot better. There's a sense that the municipality has 'fumbled it' with their actions.

Fitting

Whilst there are some impacts to the heat wave, they tend to be small in nature and there are no major causalities. This is a huge relief for the local businesses and towns people. People feel that the municipality has 'got it right' with their actions.

Overkill

There appears to be little impact of the event in the town, which is a huge relief for the local businesses and towns people.

However, the impact is so small people wonder if the municipality has over prepared for such events and whether the town will be able to overcome over events with such ease.



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APPROVE A FISH FARM



Municipality has been approached to approve an offshore fish-farm. The farm will use modern methods to optimise fish yields.

The farm will create local jobs in growing and processing the fish and will make good quality fish available in the region and nationally.

However, fish farms are often criticised for creating monocultures, both for the fish and other water users as the farms are somewhat secretive about their methods of fish husbandry.

EP	BP	FP	DP	HP
4	-1	0	0	0

APPROVE A MONOFARM



Municipality has been approached to approve a commercial super-farm on unused farmland. The farm will use modern methods to optimise crop production.

The farm will grow high yield, resistant crops and will create local jobs to support its operations. However, the high use of pesticides and high water consumption are likely to have negative impacts on biodiversity and water availability.

EP	BP	FP	DP	HP
4	-1	-1	-1	0



CITIZEN BIODIVERSITY



Municipality has been approached to approve citizen science project to engage with members of the public to observe and record local fauna and flora using a mobile app.

Recording the environment will help researchers to understand the current state of the environment and capture its changes over time, to determine positive and negative biodiversity changes.

EP	BP	FP	DP	HP
0	2	0	0	0



PROTECT LOCAL BIODIVERSITY



Municipality has been approached to approve the development of a wildlife park that specialises in protecting and supporting local flora and fauna.

The park will develop a breeding programme for rare fauna and look to release animals back into the local community to maintain viable stocks.

EP	BP	FP	DP	HP
1	3	0	0	0



MONOFARM OUTCOMES



1: Oh Dear!

The crop chosen have proved extremely invasive and has spread to other farms and to peoples' gardens, outcompeting native species and reducing local biodiversity.

The citizens demand a new mayor!

2-3: Not Good

The farm is producing bumper crop yields, but requires considerably more water than anticipated, resulting in the local water company suggesting that people only shower once a week to save water.

4-5:Not Bad

The farm is producing an expected return and has created local jobs. The farm operators are careful to consider local biodiversity issues.

6:Great

The farm is producing bumper crop yields and is managing to deliver them in harmony with the environment. To conserve water, the farm has developed a sophisticated irrigation system that has gained wide praise.



FISH FARM OUTCOMES



1: Oh Dear!

Water has been greatly contaminated by the operation of the farm. As a result, the natural marine life has been endangered by the release of pathogens and parasites

The citizens demand a new mayor!

2-3: Not Good

The fish farm attracts a marauding shark pod that attacks a local surfer.

4-5:Not Bad

The fish farms are operational and working well, creating jobs and adding fish to the local palette.

6:Great

The fish farming has been a great success! Many more people can afford to have locally supplied fresh fish, saving air miles. The income from the farming has been put back into the local community in educating local fishermen on sustainable fishing practice



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PROTECT LOCAL BIODIVERSITY OUTCOMES



1: Oh Dear!

The project is a disaster! An initial breeding programme to strengthen the wolf community led to wolves growing out of control and decimated local pets.

The citizens demand a new mayor!

2-3: Not Good

Whilst the wildlife park has been able to breed endangered local animals, returning them to their environments always proved difficult, leading to accusations that the park staff were incompetent.

4-5:Not Bad

The project is a success, with the wildlife park receiving awards for its programmes. There's interest from the community, but it's felt that people would rather enjoy their days out.

6:Great

The project is a great success, with the success reintroduction of rare species. The park is popular with both locals and tourists, offering both the opportunity to see rare animals and to learn about conservation.



CITIZEN BIODIVERSITY OUTCOMES



1: Oh Dear!

The project is a disaster! The app is developed by a consultancy with little understanding or interest in the project and product a buggy mess that nobody wants.

The citizens demand a new mayor!

2-3: Not Good

There's a small, but hardcore set of citizen users recording everything they can. This provides researchers with useful insights, but the project really needs more scale.

4-5:Not Bad

The project is a success, with the app being popular for school projects and wildlife enthusiasts. The app is niche, but provides a lot of value.

6:Great

The project is a great success, with residents keen to monitor the wildlife they see around them. The app's data provides local biodiversity researchers with clear insights into the state of the environment allowing for meaningful interventions.



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LEGALLY PROTECT LOCAL CROPS



Municipality has been approached a local farming group to legally enshrine their locally produced crops using appropriate EU legislation. This would stop similar crops grown in other regions from using this regions' name.

EP	BP	FP	DP	HP
2	2	0	0	0

CREATE A BIODIVERSITY KNOWLEDGE BASE



Municipality has been approached to develop a community website that will provide residents with useful information and support to help them support biodiversity.

Research has shown that people often make poor biodiversity decisions due to a lack of knowledge and suitable support. A website that provides support and information will help residents to become more knowledgeable.

EP	BP	FP	DP	HP
-1	2	0	0	0

EP	BP	FP	DP	HP
-1	2	0	0	0



CREATE A BIODIVERSITY DIGITAL TWIN



Municipality will develop a biodiversity modelling digital twin to evaluate the likelihood and impact of activities that may be adverse to biodiversity, to build biodiversity resilience.

The digital twin will combine real-world data with simulation models to create insights, so it will be largely dependent on the quality of data collected and the accuracy of modelling.

EP	BP	FP	DP	HP
-1	3	0	0	0



APPROVE RESERVOIR CONSTRUCTION



Municipality has been approached by the local water company to build a large reservoir in a local valley. The reservoir will capture the heavy winter rains, creating a more permenant water supply and reducing water scarcity in the summer months.

However, flooding the valley will impact local wildlife and stop fish migrations through the river that the reservoir is on.

EP	BP	FP	DP	HP
-2	-1	2	3	0



BIODIVERSITY KNOWLEDGE BASE OUTCOMES



1: Oh Dear!

The project starts with a lot of fanfare, but the work is passed off to a low-cost bureau who have issues and produce a strange website that serves no-one.

The citizens demand a new mayor!

2-3: Not Good

The project is well-managed with a suitable design bureau delivering a great website. However, the ball is dropped when it comes to advertising the site, with few residents even being aware that the site even exists.

4-5:Not Bad

The project is delivered and residents are aware and using the website. After an expected biodiversity event, many residents cite the website as being a great resource for helping to deal with issues.

6:Great

The project is a great success with residents regularly engaging and contributing with the website, to the point that it has become nationally recognised with other towns starting to adopt a similar approach.



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LEGALLY PROTECT LOCAL CROPS OUTCOMES



1: Oh Dear!

The project is a disaster! The lawyers engaged didn't understand trademarking and lost their case, severely undermining the financial security of the farmers.

The citizens demand a new mayor!

2-3: Not Good

The project is a limited success. Whilst the crop has been protected, companies in other regions have been quick to relabel their ingredients and food products with new names. For many consumers, the difference are neither here nor there.

4-5:Not Bad

The project is a success, with crop protection in place, the farmers can operate securely knowing that their crop comes from this town.

6:Great

The project is a great success, with the local crop being protected, farmers have built a popular heritage industry around their crop and the foodstuffs that can be made from it.



RESERVOIR CONSTRUCTION OUTCOMES



1: Oh Dear!

The project is a disaster! The dam has been successfully constructed, but it's empty! It turns out that the municipality signed the wrong water ordinances and the expected inflowing rivers are flowing elsewhere.

The citizens demand a new mayor!

2-3: Not Good

Reduced flows downstream have affected local fish population. The local angling community are unhappy

4-5:Not Bad

There was a severe drought in the summer. Luckily because of the reservoir there is enough water for the township.

6:Great

There was a severe drought in the summer. However, with the winter rains captured in the reservoir, there is easily enough water for all.



BIODIVERSITY DIGITAL TWIN OUTCOMES



1: Oh Dear!

The project is handed off to a consultancy group who appear to have strange views about what constitutes appropriate biodiversity data and models, resulting in a useless tool.

The citizens demand a new mayor!

2-3: Not Good

The digital twin generally works, but its AI seems to produce a lot of nightmare fuel, often predicting extinction events. This makes it hard to trust the twin's outputs.

4-5:Not Bad

The digital twin works well and is providing some good biodiversity strategy insights. The municipality is happy and would like to develop it further.

6:Great

The digital twin is providing the municipality with great insights and predictions, allowing biodiversity protection activities to be far better targeted. Most residents don't notice, but biodiversity resilience is growing year on year.



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APPROVE A GOLF RESORT DEVELOPMENT



Municipality has been approached by a premier resort developer to build a golf course resort on unused land.

The course will attract wealthy golf enthusiasts and will spread wealth around the local area, with jobs and commercial opportunities for locals.

There is some concern that the course will require significant water resources to keep the course green and that the wealth of the members may stay in the gated community of the resort.

EP	BP	FP	DP	HP
5	-1	0	-1	0

APPROVE WATER DELIVERY SERVICE



The municipality is looking to ship in bottled water from another country in order to ameliorate problems with drinking water supply during drought conditions.

This will give the town a dependable supply of drinking water during the summer and it's much cheaper than updating the towns water collection and distribution network.

However, the constant deliveries of bottled water will create traffic congestion. There's also the public relations issue that the municipality isn't prepared to solve its hard problems and just buys in solutions.

EP	BP	FP	DP	HP
-2	0	0	2	1



INSTALL SMART WATER METERS



The municipality is looking to install smart domestic water meters, allowing customers to view consumption and highlight leaks within their houses.

The meters allow customers to view their water consumption on a minute by minute basis, easily seeing the impact of showers, watering the gardening and running the washing machine and dishwasher.

However, customers often lose interest in their consumption once the novelty of a smart meter has worn off.

EP	BP	FP	DP	HP
2	0	1	2	1



SMART IRRIGATION PROGRAMME



The municipality is looking to work with local market gardeners to install smart irrigation systems to reduce water consumption.

The town has a large market garden industry which often places great demand on the water distribution network, with farmers preferring to water more than less, even though over watering can adversely effect crops. Using computers to access crop need should lead to less water consumption and allow currently marginal land to be used.

EP	BP	FP	DP	HP
2	0	1	2	0



WATER DELIVERY SERVICE OUTCOMES



1: Oh Dear!

It's a disaster, the water did not pass quality assurance and can not be consumed. Instead the costly water is just being used for non-human use.

The citizens demand a new mayor!

2-3: Not Good

The effects of a hot and dry summer have been offset through the water. While not a perfect solution, it has had a positive effect.

4-5: Not Bad

Despite a hot and dry summer, there are adequate water reserves and tourism benefits.

6: Great

Despite a very hot and dry summer, there's more than enough water bringing in lots of tourists from other drier areas.



GOLF RESORT DEVELOPMENT OUTCOMES



1: Oh Dear!

The project is a disaster! Whilst the course was constructed with no issues, running the resort requires a vast amount of water, with the water company suggesting that people only shower once a week to save water.

The citizens demand a new mayor!

2-3: Not Good

The high resort fees tend to greatly limit the number of guests at any time and most just come to play golf and move on. There's not a lot of trickle down to the town, and if you didn't know the course was there, you probably wouldn't know about it.

4-5: Not Bad

The course is a success, though the high resort fees tend to keep the resort ticking over, giving a relaxed feel. The course has been good for the town, with jobs to support the course and the customers.

6: Great

Golf tourists come from far and wide to play, and when they aren't playing a lot of them are visiting the town and spending money on good days and nights out.



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SMART IRRIGATION PROGRAMME OUTCOMES



1: Oh Dear!

The project is a disaster! The smart irrigation platform is very buggy and is over-watering to the point of causing local flooding.

The citizens demand a new mayor!

2-3: Not Good

Smart irrigation systems have been installed, with mixed results. Some farmers are reporting success, but many are reluctant to use them as they feel that they have a much better understanding of crop requirements.

4-5: Not Bad

The smart irrigation system seem to be working alright, though there have been a few teething issues. Most farmers are reporting that the system is working well for them, though a few have run into issues.

6: Great

The smart irrigation systems are working well, with most farmers reporting both significant reductions in water requirements but also increases in yield. In some cases, marginal land is being returned to use.

1: Oh Dear!

The project is a disaster! The municipality advocated for the smart meter app, but it turned to be full of spyware, collecting customer details and making unauthorised charges on customer accounts.

The citizens demand a new mayor!

2-3: Not Good

Meters have been installed, but the public response is apathetic. There is a perception that the meters are part of a 'surveillance society' that will use water consumption data to clamp down on civil liberties.

4-5: Not Bad

The smart water meters have been accepted by residents and water consumption is starting to show a reduction as enthusiastic residents look to minimise consumption.

6: Great

Residents love the app and consumption is at an all-time low. This allows the water company to spend more time and resources addressing leakage.



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CREATE A DROUGHT DASHBOARD



Municipality has been approached to develop a community website that will provide residents with useful information and support to help them through drought event.

Research has shown that people are more stressed about the idea of being in a drought, rather than actually experiencing a drought. A website that provides support and information will help residents to become more knowledgeable.

EP	BP	FP	DP	HP
-1	0	0	2	0

CREATE A DROUGHT DIGITAL TWIN



Municipality will develop a drought modelling digital twin to evaluate the likelihood and impact of potential drought events, to better prepare for droughts and long-term planning for drought resilience.

The digital twin will combine real-world data with simulation models to create insights, so it will be largely dependent on the quality of data collected and the accuracy of modelling.

EP	BP	FP	DP	HP
-1	0	0	3	0



APPROVE SEA WALL CONSTRUCTION



The community around the coastal road has been plagued by frequent sea floods, from high tides and onshore winds. This causes a great deal of disruption and leaves the area with costly flood damage and debris to clean up.

Building a sea wall will stop these flooding events. It will be a messy and disruptive construction process, but stopping the floods will help the area to stabilise and grow economically, even if it does ruin a good sea view.

EP	BP	FP	DP	HP
2	0	2	0	0



APPROVE OUT-OF-TOWN LEISURE RESORT



Municipality has been approached by a retail company to develop a large out of town retail and leisure park on unused land.

The proposal is well regarded as it will provide long term employment for the area with many new jobs and attract a lot of visitors to the town. However, it's likely that the town centre will be hit financially with shoppers preferring to use the new out of town shops. In addition, the preferred development site is a meadow that's popular with the locals.

EP	BP	FP	DP	HP
4	-1	-1	0	-1



DROUGHT DIGITAL TWIN OUTCOMES



1: Oh Dear!

The project is handed off to a consultancy group who appear to have strange views about what constitutes appropriate drought data and models, resulting in a useless tool.

The citizens demand a new mayor!

2-3: Not Good

The digital twin generally works, but its AI seems to produce a lot of nightmare fuel, often predicting droughts during rain storms. This makes it hard to trust the twin's outputs.

4-5: Not Bad

The digital twin works well and is providing some good insights, not least a model for forecasting water scarcity. The municipality is happy and would like to develop it further.

6: Great

The digital twin is providing the municipality with great insights and predictions, allowing conservative water consumption activities to be far better targeted. Most residents don't notice, but the impact of droughts is decreasing year by year.



DROUGHT DASHBOARD OUTCOMES



1: Oh Dear!

The project starts with a lot of fanfare, but the work is passed off to a low-cost bureau who have issues and produce a strange website that serves no-one.

The citizens demand a new mayor!

2-3: Not Good

The project is well-managed with a suitable design bureau delivering a great website. However, the site isn't advertised well, with few residents even being aware that the site even exists.

4-5: Not Bad

The project is delivered and residents are aware and using the website. After an unseasonal flood, many residents cite the website as being a great resource for helping them to come to terms with flooding issues.

6: Great

The project is a great success with residents regularly engaging and contributing with the website, to the point that it has become nationally recognised with other towns starting to adopt a similar approach.



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OUT-OF-TOWN LEISURE RESORT OUTCOMES



1: Oh Dear!

The complex is a titanic success, so much so that there's gridlock in and around the town as everybody wants to go there making it impossible to travel anywhere.

The citizens demand a new mayor!

2-3: Not Good

The complex is a success, but heavy rains frequently flood the huge car parks and cause major traffic jams.

4-5: Not Bad

The complex is a success with tenants that complement rather than compete with the town centre attractions.

6: Great

The complex is a real success and careful transport planning has enabled people from all over the region to attend films, gigs, and shows without causing chaos.



SEA WALL CONSTRUCTION OUTCOMES



1: Oh Dear!

The project is a legal disaster area! Residents of nearby 'Cliff Heights' raise long and costly objections as their district is being allowed to erode into the sea, resulting in the project being substantially delayed.

The citizens demand a new mayor!

2-3: Not Good

The project completes on time and is warmly received despite ruining the view of the bay from the, now protected, coast road.

4-5: Not Bad

The project completes slightly ahead of time, early enough to protect the coastal road from some unseasonably high tides.

6: Great

Shortly after the project completes, the town is buffeted a number of huge storms, the worst in living memory. Unlike previous storms, the coast road district doesn't flood saving the council by not having to perform a large clean-up.



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APPROVE NATURE-BASED FLOOD PROTECTION



Municipality has been approached by local university to host a beaver land management project to reduce river flooding.

The proposal is positively regarded as it positions the municipality as being forward looking by adopting nature-based solutions and the trial should be a low-cost activity.

However, as a research project, it's unproven and may go horribly wrong. There's also the consideration that beavers are an introduced species, so may adversely impact the local flora and fauna.

EP	BP	FP	DP	HP
0	3	2	1	0

RETURN SEASIDE GOLF COURSE TO SEA



The town's seaside golf course is becoming submerged by global warming and high tides, with the municipality current spending a lot to protect it from nature. Returning the course to the sea would allow the municipality to spend its limited budgets where they can have the biggest impact, support the creation of a wildlife wetland, and reduce motor traffic by that part of the shoreline.

However, such an action is likely to anger the golfers that current use the course and may be seen by townspeople as the municipality abandoning parts of the town to nature.

EP	BP	FP	DP	HP
0	2	2	1	0



ENGAGE IN FLOOD PLAIN MANAGEMENT



Municipality has been approached to develop flood plain management for the local river, removing existing developments and allowing land to flood and store flood water.

This should reduce flooding to downstream neighbourhoods and better management of the flood plans will facilitate the creation of new recreational activities and attract wildlife.

However, the flood plains will not remove flooding, which is likely to cause issues with stakeholders if not communicated properly.



CREATE A FLOOD SUPPORT WEBSITE



Municipality has been approached to develop a community website that will provide residents with useful information and support to help them through floods.

Research has shown that people are more stressed about the idea of being in a flood, rather than actually experiencing a flood. A website that provides support and information will help residents to become more knowledgeable.

EP	BP	FP	DP	HP
-1	2	2	1	0



RETURN SEASIDE GOLF COURSE TO SEA OUTCOMES



1: Oh Dear!

As the golf course returns to nature, the town is hit by a 'once in a generation' storm with extreme tides that rush over the course and undermine the mainline rail track, causing it to be out of use for six months.

The citizens demand a new mayor!

2-3: Not Good

The course is returned to nature, but local golfers protest the decision by playing 'urban golf' in the town centre.

4-5:Not Bad

As the course returns to wetland, it becomes a popular destination for firstly, birds and then bird watchers.

6:Great

Hearing the news, a former champion golfer buys the old typewriter factory and rejuvenates it into a high-quality course that keen golfers flock to, boosting tourism substantially.



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NATURE-BASED FLOOD PROTECTION OUTCOMES



1: Oh Dear!

The research is a disaster! The beavers have moved to the local arboretum and destroyed most of the rare saplings. The university abandoned the research as unworkable.

The citizens demand a new mayor!

2-3: Not Good

The beaver area suffers from a heavy rainstorm resulting in beaver damn bursts and flooding in the downstream

4-5:Not Bad

The beaver experiment is working well, and the university is working to increase size of the project, protecting more land.

6:Great

The beaver experiment is working well, with fewer floods. The beavers have been a local point of interest , drawing in beaver tourists and the sale of beaver plushies is through the roof.



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FLOOD SUPPORT WEBSITE OUTCOMES



1: Oh Dear!

The project starts with a lot of fanfare, but the work is passed off to a low-cost bureau who have issues and produce a strange website that serves no-one.

The citizens demand a new mayor!

2-3: Not Good

The project is well-managed with a suitable design bureau delivering a great website. However, the ball is dropped when it comes to advertising the site, with few residents even being aware that the site even exists.

4-5:Not Bad

The project is delivered and residents are aware and using the website. After an unseasonal flood, many residents cite the website as being a great resource for helping them to come to terms with flooding issues.

6:Great

The project is a great success with residents regularly engaging and contributing with the website, to the point that it has become nationally recognised with other towns starting to adopt a similar approach.



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FLOOD PLAIN MANAGEMENT OUTCOMES



1: Oh Dear!

The project is a disaster! There was a major flood , and a much larger area of land was flooded. Farming land has been destroyed and polluted waters flow through the town.

The citizens demand a new mayor!

2-3: Not Good

The project appears to have been a success but key stakeholders seem unhappy with the outcomes and are currently blaming each other for any issues that arise.

4-5:Not Bad

The project appears to have been a success and stakeholders appear happy with the outcome. There appears to be less flooding after recent heavy storms and evidence of increased biodiversity .

6:Great

The project was a great success. A rare species of butterfly has been seen in the area and bird species have increased. The downstream town also did not suffer flooding in the last heavy rainfall event



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CREATE A FLOODING DIGITAL TWIN



Municipality will develop a flood modelling digital twin to evaluate the likelihood and impact of potential flooding events, to better prepare for flooding and long-term planning for flood resilience.

The digital twin will combine real-world data with simulation models to create insights, so it will be largely dependent on the quality of data collected and the accuracy of modelling.

EP	BP	FP	DP	HP
-1	0	3	0	0

APPROVE INSTALLATION OF COOL ROOFS



Plans have been submitted to paint roofs with reflective paint, reducing the overall temperature in buildings and surrounding environment.

The project is generally a low-cost and non-invasive method of reducing urban heat. However, it only really benefits areas with long periods of very hot weather and is counter-productive in areas where solar panels have been installed.

EP	BP	FP	DP	HP
1	0	0	0	3



APPROVE INSTALLATION OF FIREBREAKS



Plans have been submitted to install fire breaks in the dry hinterland to reduce long-term damage of heat-induced forest and scrub fires.

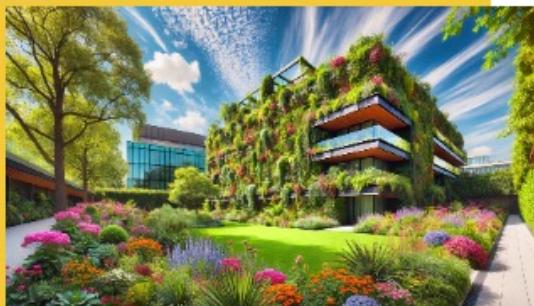
The breaks should contain fires and stop them spreading so widely. This should reduce reliance on the emergency services and reduce biodiversity loss.

However, there are costs associated with installing and maintaining the breaks and the biodiversity impact of initially removing trees and scrubland.

EP	BP	FP	DP	HP
1	1	0	1	2



APPROVE INSTALLATION OF GREEN WALLS



Municipality has been approached to install green walls on buildings in the town. The process should reduce local temperatures, making the buildings, and moreover, the streets around them cooler during the day, allowing residents to make more of the town's shops during the day.

However, the walls require a water supply to keep them green, otherwise, the plants will die creating bio and fire hazards.

EP	BP	FP	DP	HP
1	1	1	1	2



COOL ROOFS OUTCOMES



1: Oh Dear!

The project is a disaster! The painters have ended up painting everything and damaging many roof-top solar panels.

The citizens demand a new mayor!

2-3: Not Good

The roof painting phase of the project has been completed, but the expected heat wave is noticeable by its absence. The townspeople reckon the municipality is just wasting money on vanity projects.

4-5: Not Bad

The roofs have been painted just in time for the summer heat wave and are having the desired effect. Rooms in painted houses feel cooler and the surrounding streets are far more pleasant to be in.

6: Great

The roofs have been painted and there's a record breaking heatwave in the region. Unlike last year, it feels cooler in the streets, even though the weather is warmer. Residents are relieved and thankful that their summers are liveable again.

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INSTALL GREEN WALLS OUTCOMES



1: Oh Dear!

The green walls have not been adequately maintained. Clogged drainage systems have led to sewage overflows, making the buildings unpleasant to be around.

The citizens demand a new mayor!

2-3: Not Good

The green walls have been retrofitted and there has been no major setbacks. However, there has been an infestation of aphids and spiders in one of the buildings which requires additional pest control.

4-5: Not Bad

The project was a success, many people have commented on the reduction of noise and stress within the workplace.

6: Great

The project was a great success. A local study has found that urban temperatures and air pollution have reduced, and less money has been spent on heating the buildings.

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FLOODING DIGITAL TWIN OUTCOMES



1: Oh Dear!

The project is handed off to a consultancy group who appear to have strange views about what constitutes appropriate flood data and models, resulting in a useless tool.

The citizens demand a new mayor!

2-3: Not Good

The digital twin generally works, but its AI seems to produce a lot of nightmare fuel, often predicting impossible tsunamis on the coast. This makes it hard to trust the twin's outputs.

4-5: Not Bad

The digital twin works well and is providing some good insights, not least a predictive flood model for coastal road closures. The municipality is happy and would like to develop it further.

6: Great

The digital twin is providing the municipality with great insights and predictions, allowing flood protection activities to be far better targeted. Most residents don't notice, but the impact of flooding is decreasing yearly.

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INSTALL FIREBREAKS OUTCOMES



1: Oh Dear!

The fire breaks have been a massive failure after a scrubland fire overcame the breaks and raged out of control until it burnt itself out.

The citizens demand a new mayor!

2-3: Not Good

The fire breaks are a success, but there is a lot of backlash from locals and tourists that the breaks have ruined the natural beauty of the hinterland.

4-5: Not Bad

High winds and a prolonged drought have hit the area, leading to wild fires breaking out across the region. However, the breaks are able to contain the fire to relatively small regions, greatly reducing damage.

6: Great

The fire breaks have proved to be very capable in limiting the spread of wildfire. However, they've had the added bonus of becoming popular tourist hiking routes.

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CONSTRUCT A MIYAWAKI FOREST



Municipality has been approached to install some small, but densely populated fast growing forests.

The tennis court sized forests can be planted almost anywhere, given their size, and provide the benefits of a forest right in the heart of the town, creating urban spaces that help mitigate the impacts of heat stress and connect people with nature.

However, the desire for fast growing forests can lead to the selection of tree species that are susceptible to disease and pests.

EP	BP	FP	DP	HP
0	2	1	0	1



EMBRACE HEAT TOURISM



Municipality is looking to make the most of its annual heatwave and brand the town for 'extreme heat tourism', to attract northern European tourists looking for hot holiday action.

This should create a tourist boom and help the local economy by creating jobs to service tourist needs. However, supporting tourists may adversely affect the town by choosing developments that meet tourist, rather than local needs.

EP	BP	FP	DP	HP
4	0	0	0	-2



CREATE A HEAT KNOWLEDGE BASE



Municipality has been approached to develop a community website that will provide residents with useful information and support to help them through heat waves and extreme heat.

Research has shown that people often make bad choices about dealing with heat and will generally make bad decisions when dealing with heat stroke. A website that provides support and information will help residents to become more knowledgeable and make more appropriate decisions.



CREATE A HEAT DIGITAL TWIN



Municipality will develop a heat wave modelling digital twin to evaluate the likelihood and impact of potential heat waves, to better prepare for heat waves and long-term planning for heat resilience.

The digital twin will combine real-world data with simulation models to create insights, so it will be largely dependent on the quality of data collected and the accuracy of modelling.

EP	BP	FP	DP	HP
-1	0	0	0	3



HEAT TOURISM OUTCOMES



1: Oh Dear!

The town has become a tourist destination for booze-filled stag and hen parties, making the town a right mess and stretching the emergency services.

The citizens demand a new mayor!

2-3: Not Good

The town has developed its reputation as a winter sun destination, but the summer heatwaves make it too hot for many tourists, resulting in a highly seasonal industry and not really addressing the issue.

4-5: Not Bad

The town has become a popular destination, with tourists coming from around the world. This has created a boom for the locals, with many now working in tourism.

6: Great

The town has gained a reputation for being a great destination for discerning tourists throughout the year and it turns out that as much as tourists like the heat, they also like cool environments making the town liveable for all.



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MIYAWAKI FOREST OUTCOMES

1: Oh Dear!

Although fast growing, the tree species selected for the forest were susceptible to a local pest, resulting in many of the trees dying and becoming fire risks.

The citizens demand a new mayor!

2-3: Not Good

The forests are a limited success as the many of the trees selected seem to die quite quickly, leading to a patchy feel to the forest. Some of the forests have been more resilient and the locals appreciate being close to nature.

4-5: Not Bad

The forests have been fairly successful and provide interesting talking points for the townspeople, though there are some concerns that the forests are becoming home to rats and feral pets.

6: Great

The forests are a great success, providing local cool spaces in the middle of the town and providing opportunities for heat stress residents to engage with nature.



HEAT DIGITAL TWIN OUTCOMES



1: Oh Dear!

The project is handed off to a consultancy group who appear to have strange views about what constitutes appropriate heat data and models, resulting in a useless tool.

The citizens demand a new mayor!

2-3: Not Good

The digital twin generally works, but its AI seems to produce a lot of nightmare fuel, often predicting impossible scenarios. This makes it hard to trust the twin's outputs.

4-5: Not Bad

The digital twin works well and is providing some good insights, not least the predictive medium-term heat wave model. Allowing residents to plan accordingly. The municipality is happy and would like to develop it further.

6: Great

The digital twin is providing the municipality with great insights and predictions, allowing heat protection activities to be far better targeted. Most residents don't notice, but the town is coping with long-term heat.



HEAT KNOWLEDGE BASE OUTCOMES



1: Oh Dear!

The project starts with a lot of fanfare, but the work is passed off to a low-cost bureau who have issues and produce a strange website that serves no-one.

The citizens demand a new mayor!

2-3: Not Good

The project is well-managed with a suitable design bureau delivering a great website. However, the ball is dropped when it comes to advertising the site, with few residents even being aware that the site even exists.

4-5: Not Bad

The project is delivered and residents are aware and using the website. Residents are better able to prepare for the long summer heatwave and pass invaluable knowledge to visitors to the town.

6: Great

The project is a great success with residents regularly engaging and contributing with the website, to the point that it has become nationally recognised with other towns starting to adopt a similar approach.



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STUDENT



You're a student, living and studying in the town. The local college is great, but you really like all the outdoor amenities in the town.

You like the idea of having money and freedom but are unsure how to get it. Getting outdoors and doing nice things with your friends and fam. Not having to work that much at the moment.

You hate older people telling you what to do and where to go, were they ever young? The state of the environment, everything seems to be messed up and getting worse. You worry deeply about your future and the state of the world.

YOUNG WORKER



It's been a couple of years since you left education and have been finding your feet in the adult world of employment and responsibilities.

You like having a stable job with a decent wage and room to grow, having nice things to do when you're not at work, being able to get on, buy a nice flat with your partner and start putting down some roots.

You hate the lack of work opportunities, you want to get on and build a career. You're struggling to make ends meet and you seem to pay a lot of tax but not see much for it, given the state of the local environment, every thing looks tired and needs a good clean up.



FAMILY



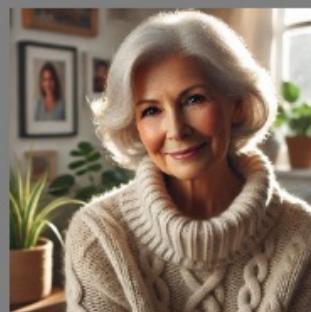
You're a young parent with some rug rats. Life has new levels of complexity and you're still trying to find your feet.

You like things you can do for and with your family, knowing that your kids have a future in the town, and being able to unwind with your partner at the end of the day.

You hate people and policies that hate people with children, excessive government intervention, and pollution that may impact your family.



RETIREE



You are a retired worker. You've spent your lifetime working hard and, at your age, you are entitled to everything you deserve.

You like activities that meet your needs as an active member of society, opportunities to shop, socialize and be entertained, and easy transport links so you can get around without any stress

You hate change that adversely impacts you. Young people whining about having it tough as you had it tough when you were young, and it didn't affect you much. Taxation as you've paid tax all your life and should be done with it now.



BUSINESS OWNER



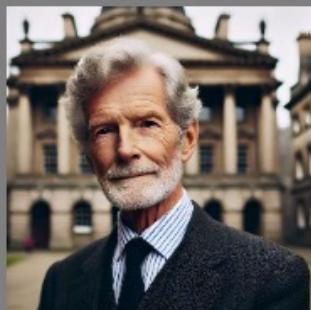
You are a local business owner. You've managed your shop for years. It keeps you busy enough and financially secure, but not wealthy.

You like nice customers that make good purchases, tourists and holidaymakers that are keen to buy at your shop, and being apart of the local community

You hate the mall and out of town shopping taking away customers, high parking charges stopping people coming to town. The municipality needlessly changing things, you like things the way they are and want to keep them that way.



POLITICIAN



You are a local politician who got into politics to address injustice both locally and in the wider community.

You like being a force for good in the local community, being an agent of change, even if the change is often what people need rather than want, and keeping big businesses and the powerful in check.

You hate people and organisations that don't understand that we are just tenants, not the long term owners of the town. Carpet baggers trying to make a short term profit on the backs of hard working people.

