

# Farmer



Patricia, a local farmer, is concerned about her access to water. Currently, Patricia uses surface water from a local river, delivered by a canal, and her own groundwater wells. Some of her neighbors only use groundwater. Falling groundwater levels and potential shortages of surface water threaten her crops. Installing efficient irrigation equipment would help her cope with drought, but at a high cost. She wants to help conserve but needs to keep her business competitive by keeping her costs low. She also worries that drought or water restrictions would reduce the amount of local food available to the community.



**Farmer**



**Farmer**



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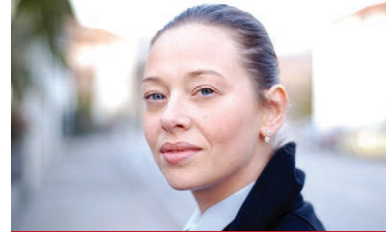
# Construction Company Owner



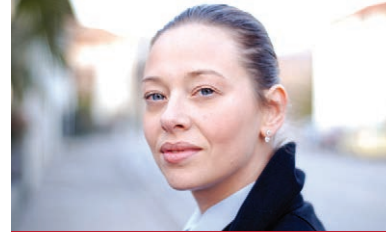
Lori is a home builder that invests heavily in Ottawatta. She worries that water shortages could lead to lagging home sales. Just a few years ago, a major drought scared off potential customers concerned about future water security. While she wants to build residences that are water efficient, she worries homes with drought tolerant landscaping are less competitive on the market than homes with lush yards. Most of her company's new construction lies on the outskirts of the city where land is cheaper, including farmland.



**Construction  
Company Owner**



**Construction  
Company Owner**



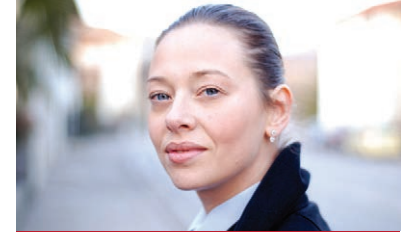
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Company Owner**



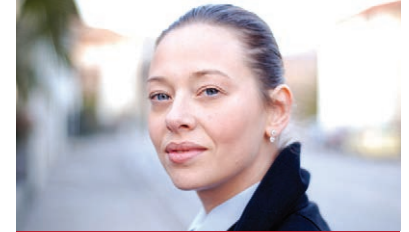
**Construction  
Company Owner**



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Company Owner**



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Company Owner**

# Suburban Resident



Carlos lives with his family in the suburbs outside of Ottawatta. He and his wife own an average sized house with several trees in the yard and a lawn. A few years ago, a minor drought forced them to stop watering their grass during the summer. Carlos worries that a more severe drought would mean removing the grass entirely. He lives comfortably but higher utility bills can stress the family budget. Carlos is concerned there won't be enough water in the city when his kids are grown up. Though his family is concerned about water shortages in the future, they don't think about them often: the water is always there when they turn the tap on.



**Suburban Resident**



**Suburban Resident**



**Suburban Resident**



**Suburban Resident**



**Suburban Resident**



**Suburban Resident**



**Suburban Resident**



**Suburban Resident**

# Outdoor Enthusiast



Water is vital to many recreational activities outside the city. Eric often goes to the mountains outside of town to hike, fish, and hunt, which benefits tourism in those areas. His family has fished the same streams for nearly 60 years. He worries that a drought could lead to wildfires that degrade the land, affecting animal populations on land and in water. He is also concerned about changes to streams where he fishes. Drought could lower water levels in the stream. If the city pumps groundwater during the drought, the water could fall even more, jeopardizing fish populations.



**Outdoor  
Enthusiast**



**Outdoor  
Enthusiast**



**Outdoor  
Enthusiast**



**Outdoor  
Enthusiast**



**Outdoor  
Enthusiast**



**Outdoor  
Enthusiast**



**Outdoor  
Enthusiast**



**Outdoor  
Enthusiast**

# Manufacturing Plant Manager



Northern Industries has a long history in the city. They employ several hundred people at their main manufacturing plant. The plant is one of the largest water users in the city. The plant manager, Jeffrey, is concerned that water shortages would force the plant to reduce production or close. In the past, the plant cut water use with new manufacturing technologies, but further reductions would be very costly. Reclaimed water systems are costly and disruptive to install, but Jeffrey would prefer if the plant used reclaimed water because it would allow the plant to operate during drought without using valuable drinking water.



**Manufacturing  
Plant Manager**



**Manufacturing  
Plant Manager**



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**Manufacturing  
Plant Manager**



**Manufacturing  
Plant Manager**

# Environmental Group Director



Ana, the director of the Ottawatta River Conservation Group, has helped with conservation programs along the river for the past decade. She's enacted programs to improve water quality and keep invasive fish and plants out of local streams. She is concerned about decreasing flows in the river due to drought and groundwater pumping. Lower river levels would also mean fewer visitors to their river conservation center, where they have trails, fundraising events, and educational programs. She wants to see measures in the city's resilience plan to protect the river.



**Environmental  
Group Director**



**Environmental  
Group Director**



**Environmental  
Group Director**



**Environmental  
Group Director**



**Environmental  
Group Director**















**Environmental  
Group Director**



**Environmental  
Group Director**















**Environmental  
Group Director**

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_001

Our plan puts a lot of money towards the Conserve and Protect strategy and a little money towards the New Supplies and Storage strategy. Once completed, a new groundwater treatment plant will clean polluted groundwater, making it safe for municipal use. Many buildings and homes will have water efficient fixtures and drought tolerant landscaping. Some farmers will have efficient irrigation equipment that reduces their water use. New groundwater wells will be available to supply the city in the event of a surface water shortage. A new groundwater recharge facility near the river will use excess surface water and reclaimed water to recharge underground aquifers. A reclaimed water system will supply industrial users, golf courses, and parks. Newly developed buildings will have stormwater basins onsite. Overall, the city will use less water and will have more groundwater available to use during a drought. However, a severe drought could still cause groundwater levels to fall, impacting farmers and ranchers and those dependent on private wells.

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_002

Our plan puts a lot of money towards the Conserve and Protect strategy and a little money towards the Prepare the Public strategy. Once completed, a new groundwater treatment plant will clean polluted groundwater, making it safe for municipal use. Many buildings and homes will have water efficient fixtures and drought tolerant landscaping. Some farmers will have used grants to purchase efficient irrigation equipment. In the event of a severe drought, the city will have water trucks available to help those whose wells run dry. Homeowners on the outskirts of the city will protect their homes against wildfires by clearing brush and trees away from their homes using small grants from the city. City residents have been encouraged to prepare for extreme drought by keeping bottled water in their homes. The city's emergency preparedness budget will be larger to cope with the impacts of a potential drought. Overall, the city will use less water and have slightly more groundwater available to use during a drought. The city hasn't invested in new water supplies, meaning there's a risk of surface water shortages and groundwater levels could fall during a drought.

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_003

Our plan puts a lot of money towards the Conserve and Protect strategy with one coin leftover. Once completed, a new groundwater treatment plant will clean polluted groundwater, making it safe for municipal use. Many buildings and homes will have water efficient fixtures and drought tolerant landscaping. Some farmers will have used grants to purchase efficient irrigation equipment. Overall, the city will use less water and have slightly more groundwater available to use during a drought. The city hasn't invested in new water supplies, meaning there's a risk of surface water shortages and groundwater levels could fall during a drought. Falling groundwater levels could impact farmers and ranchers and those dependent on private wells.

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_004

Our plan puts a little money towards each of the strategies. Once completed, city-owned buildings will have drought tolerant landscaping and water saving fixtures. Parks will have less grass and drought tolerant trees. Some homes and businesses will have water saving fixtures and drought tolerant landscaping. Water will be more expensive for large water users, incentivizing them to use less water. New groundwater wells will be available to supply the city in the event of a surface water shortage. A new groundwater recharge facility near the river will use reclaimed water to keep groundwater levels from falling. A reclaimed water system will supply industrial users, golf courses, and parks. In the event of a severe drought, the city will have water trucks available to help those whose wells run dry. The city's emergency preparedness budget will be larger to cope with the impacts of a potential drought. Overall, the city will use a little less water and will have more groundwater available to use during a drought. However, there's still a risk of surface water shortages and a severe drought could still cause groundwater levels to fall, impacting farmers and ranchers and those dependent on private wells

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_005

Our plan puts a little money towards the Conserve and Protect strategy and a little money towards the Prepare the Public strategy with one leftover coin. Once completed, city-owned buildings will have drought tolerant landscaping and water saving fixtures. Parks will have less grass and more drought tolerant trees. Some homes and businesses will have water saving fixtures and drought tolerant landscaping. Water will be more expensive for large water users, incentivizing them to use less water. In the event of a severe drought, the city will have water trucks available to help those whose wells run dry. Homeowners on the outskirts of the city will protect their homes against wildfires by clearing brush away from their homes using small grants from the city. The city will support shelters and other emergency services in the event of drought. Overall, the city will use a little less water. Water supplies will remain about the same as before. Despite these changes, the city could face water shortages during a drought. A severe drought could still cause groundwater levels to fall, impacting farmers and ranchers and those dependent on private wells.

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Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_006

Our plan puts a little money towards the Conserve and Protect strategy and a little money towards the New Supplies and Storage strategy with one leftover coin. Once completed, city-owned buildings will have drought tolerant landscaping and water saving fixtures. Parks will have less grass and more drought tolerant trees. Some homes and businesses will have water saving fixtures and drought tolerant landscaping. Water will be more expensive for large water users, incentivizing them to use less water. New groundwater wells will be available to supply the city in the event of a surface water shortage. A new groundwater recharge facility near the river will use reclaimed water to keep groundwater levels from falling. A reclaimed water system will supply industrial users, golf courses, and parks. Overall, the city will use a little less water and will have more groundwater available to use during a drought. A severe drought could still cause groundwater levels to fall, impacting farmers and ranchers and those dependent on private wells.

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_007

Our plan puts a little money towards the Conserve and Protect strategy with two leftover coins. Once completed, city-owned buildings will have drought tolerant landscaping and water saving fixtures. Parks will have less grass and more drought tolerant trees. Some homes and businesses will have water saving fixtures and drought tolerant landscaping. Water will be more expensive for large water users, incentivizing them to use less water. Overall, the city will use a little less water. Water supplies will remain about the same as before. The city hasn't invested in new water supplies, meaning there's a risk of surface water shortages and groundwater levels could fall during a drought. Falling groundwater levels could impact farmers and ranchers and those dependent on private wells.

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_008

Our plan puts a lot of money towards the New Supplies and Storage strategy and a little money towards the Prepare the Public strategy. Once completed, a desalination plant in a nearby town will supply water to Ottawatta through a system of canals, pipes, and pumps. An aquifer recharge facility will use excess water from the desalination plant to recharge groundwater aquifers under the city. In the event of a severe drought, the city will have water trucks available to help those whose wells run dry. Homeowners on the outskirts of the city will protect their homes against wildfires by clearing brush away from their homes using small grants from the city. The city will support shelters and other emergency services in the event of drought. Overall, water use will be about the same but the city will have more water available from groundwater and the desalination plant. Farmers and ranchers dependent on rainfall could face financial hardship during a drought. Residents dependent on private wells could see declining groundwater levels.

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_009

Our plan puts a lot of money towards the New Supplies and Storage strategy and a little money towards the Conserve and Protect strategy. Once completed, a desalination plant in a nearby town will supply water to Ottawatta through a system of canals, pipes, and pumps. An aquifer recharge facility will use excess water from the desalination plant to recharge groundwater aquifers under the city. Once completed, city-owned buildings will have drought tolerant landscaping and water saving fixtures. Parks will have less grass and more drought tolerant trees. Some homes and businesses will have water saving fixtures and drought tolerant landscaping. Water will be more expensive for large water users, incentivizing them to use less water. Overall, the city will use a little less water and the city will have more water available from groundwater and the desalination plant. Some people may be displaced due to wildfire or lack of water in their wells.

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_010

Our plan puts a lot of money towards the New Supplies and Storage strategy with one leftover coin. Once completed, a desalination plant in a nearby town will supply water to Ottawatta through a system of canals, pipes, and pumps. An aquifer recharge facility will use excess water from the desalination plant to recharge groundwater aquifers under the city. Overall, water use will be about the same but the city will have more water available from groundwater and the desalination plant. Despite increased supplies, some in the community still face the threat of dry wells and wildfires. Farmers and ranchers dependent on rainfall could face financial hardship during a drought.

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Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_011

Our plan puts a little money towards the New Supplies and Storage strategy with two leftover coins. Once completed, new groundwater wells will be available to supply the city in the event of a surface water shortage. A new groundwater recharge facility near the river will use reclaimed water to keep groundwater levels from falling. A reclaimed water system will supply industrial users, golf courses, and parks. Overall, water use will be about the same but the city will have more water available from groundwater. Despite increased supplies, some in the community still face the threat of dry wells and wildfires. The city's water supplies could be strained during an extreme drought.

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Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_012

Our plan puts a lot of money towards the Prepare the Public strategy and a little money towards the New Supplies and Storage strategy. Once completed, the city's expanded municipal water system will connect to thousands more homes who previously relied on private wells. A forest and grassland management and restoration program will reduce the risk of wildfires and restore areas burned by prior fires. A drought insurance fund will protect farmers, ranchers, and residents who may face financial trouble during drought. New groundwater wells will be available to supply the city in the event of a surface water shortage. A new groundwater recharge facility near the river will use reclaimed water to keep groundwater levels from falling. A reclaimed water system will supply industrial users, golf courses, and parks. Overall, water use will be higher but the city will have more water available from groundwater. Despite these changes, the city's water supplies could be strained during an extreme drought.

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Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_013

Our plan puts a lot of money towards the Prepare the Public strategy and a little money towards the Conserve and Protect strategy. Once completed, the city's expanded municipal water system will connect to thousands more homes who previously relied on private wells. A forest and grassland management and restoration program will reduce the risk of wildfires and restore areas burned by prior fires. A drought insurance fund will protect farmers, ranchers, and residents who may face financial trouble during drought. Once completed, city-owned buildings will have drought tolerant landscaping and water saving fixtures. Parks will have less grass and more drought tolerant trees. Some homes and businesses will have water saving fixtures and drought tolerant landscaping. Water will be more expensive for large water users, incentivizing them to use less water. Overall, water use will be slightly higher and water supplies will remain about the same as before. Despite these changes, the city's water supplies could be strained during a drought.

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_014

Our plan puts a lot of money towards the Prepare the Public strategy with one leftover coin. Once completed, the city's expanded municipal water system will connect to thousands more homes who previously relied on private wells. A forest and grassland management and restoration program will reduce the risk of wildfires and restore areas burned by prior fires. A drought insurance fund will protect farmers, ranchers, and residents who may face financial trouble during drought. Overall, water use will be higher and the city's water supplies will remain about the same as before. Despite these changes, the city could face water shortages during a drought.

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		













## DR\_015

Our plan puts a little money towards the Prepare the Public strategy with two leftover coins. Once completed, the city will have water trucks available to help those whose wells run dry during drought. Homeowners on the outskirts of the city will protect their homes against wildfires by clearing brush away from their homes using small grants from the city. The city will support shelters and other emergency services in the event of drought. Overall, water use and supply will be about the same as before. The city could face water shortages during a drought. Farmers and ranchers dependent on rainfall could face financial hardship and residents dependent on private wells could see declining groundwater levels.

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		

## DR\_016

Our plan puts a little money towards the Prepare the Public strategy and a little money towards the New Supplies and Storage strategy with one leftover coin. Once completed, the city will have water trucks available to help those whose wells run dry during drought. Homeowners on the outskirts of the city will protect their homes against wildfires by clearing brush away from their homes using small grants from the city. The city will support shelters and other emergency services in the event of drought. New groundwater wells will be available to supply the city in the event of a surface water shortage. A new groundwater recharge facility near the river will use reclaimed water to keep groundwater levels from falling. A reclaimed water system will supply industrial users, golf courses, and parks. Overall, water use will be about the same as before and the city will have more groundwater available to use during a drought. Despite these changes, the city's water supplies could be strained during an extreme drought. Farmers and ranchers dependent on rainfall could face financial hardship during a drought. Residents dependent on private wells could see declining groundwater levels.

 CONSERVE & PROTECT	 NEW SUPPLIES & STORAGE	 PREPARE THE PUBLIC
Plan A	Plan A	Plan A
 	 	 
Plan B	Plan B	Plan B
		

DR\_017

No strategies implemented. The city continues to experience growing vulnerabilities to drought without a resilience plan.



# CONSERVE & PROTECT



## Plan A

The city will build a new plant that cleans polluted groundwater to increase the amount of water available for municipal use. The plant will be operational in 5-10 years. The city will promote water-savings in buildings older than 25 years old through a grant program providing \$1,000-\$5,000 for new fixtures and leak repair in residential and commercial buildings. New indoor water efficiency requirements for sinks, showers, and toilets will apply to new buildings. A second grant program will support outdoor water-saving measures including turf removal, drought tolerant landscaping, and efficient irrigation systems. A third incentive program will provide farmers up to \$10,000 to install irrigation systems that reduce water use. All three grant programs will last several years but can begin within 1 year.

## Plan B

The city will invest in a widespread education program to promote sustainable indoor and outdoor water use. A 2-year grant program will provide up to \$500 for homeowners and \$1,500 for commercial building owners to install water-saving indoor fixtures, drought tolerant land-scaping, or irrigation systems. Preference will be given to buildings over 25 years old. A new water pricing system increases the price of water for large water users to promote efficiency. The city will create demonstration projects at its own buildings and parks to highlight water saving technologies and strategies. This includes replacing landscaping at city parks with drought tolerant trees, bushes, and grasses and replacing faucets and toilets in city buildings. These changes will take about 10 years to implement.



# NEW SUPPLIES & STORAGE



## Plan A

The city is concerned about future water shortages and wants to increase its supply of water. The city will build a desalination plant that turns salt water into freshwater. The plant will lie on the coast, about 150 miles away, and will require a lot of electricity to operate. A system of canals, pumps, and tunnels will channel water from the desalination plant to the city. The plant and canals will be operational within 10-15 years. When the desalination plant produces more water than the city needs, the city will store extra water in existing reservoirs or will pump it underground using aquifer recharge wells. Storage in aquifers and existing reservoirs will require additional construction to build pumps, canals, and pipelines.

## Plan B

The city will focus on expanding aquifer storage and using treated wastewater to prepare for drought. The city plans to build new wells and pumps across the city. The new wells will be used if surface water sources cannot meet demand. To keep groundwater levels from falling, the city will invest in passive groundwater recharge efforts, including new codes that require retention basins on commercial lots, a grant program for residential stormwater capture, and building recharge basins near the river. The recharge basins will use excess surface water or reclaimed water from wastewater treatment plants that will slowly soak into the ground and replenish the aquifer. The city will invest in new pipes to distribute reclaimed water from wastewater treatment plants to major water users. These plans will take 5-10 years to implement.



# PREPARE THE PUBLIC



## Plan A

The city wants to ensure that people are safe during extreme drought. It's investing in a 20-year forest and grassland management program to minimize impacts of wildfire. Restoration efforts for areas that have already burned will limit erosion and the chance of landslides and increase water retention. Over the next 10-years, the city will connect communities that depend on individual wells to the municipal water system to minimize the impacts of falling groundwater levels. An assistance and relocation fund will help those whose wells run dry and that lack access to other water sources. A separate drought insurance fund will provide financial help to farmers and ranchers whose livelihoods depend on water.

## Plan B

To prepare for the human impacts of drought, the city plans to invest in emergency water supplies and delivery trucks for those whose wells run dry during drought. The city will create an outreach program to encourage people to prepare for wildfires and will provide \$400 grants to help residents manage trees and grass to prevent damage from wildfires. The grant program will last 2 years. A separate outreach program will encourage residents to prepare for dwindling water supplies by keeping bottled water on hand and minimizing use during drought. General emergency preparedness funds will receive a 10-year boost to provide shelter, water, and food to those hardest hit by an extreme drought.