

The Clay Oven

In a place far away, or perhaps not so far, there was a village. In the center of the village was a large clay oven. Every morning, the villagers would arise and prepare for the day's activities that revolved around that clay oven. The children would gather wood around the village, others would chop wood and start the fire, and some would prepare dough for bread, cakes and cookies. The fire was started and the oven would begin to warm. And after a few hours it was hot and ready for baking. First, the bread would go in, near the back of the oven, then soon after, the cake, a little off to the left, a pudding, a little off the right, and finally, the sesame cookies, near the front of the oven. The villagers would then go off to enjoy their day at the river, swimming, fishing, and playing games. A few hours later they would return. First they'd remove the sesame cookies, near the front of the oven. Then the cake, a little off to the left, the pudding, off to the right, and finally the bread, at the back of the oven.

Every once in a while, the fire might be a little too hot, and the bread might turn out a little tough, or the cake perhaps more crumbly than some would prefer. A cookie or two might burn. But most of the times, everything would turn out just right.

That is how they always did it.

One day, the children came back from gathering wood to inform the village that the shrubs they always collected for the fire could no longer be found. They had had to go to a new part of the forest, where a different shrub, which no one recognized, was found. They had gathered up several bundles of the wood and brought it back to the village, where it was prepared for the fire. Once the clay oven was hot, they put in the bread, near the back, then soon after, the cake, a little off to the left, a pudding, a little off the right, and finally, the sesame cookies, near the front of the oven. The villagers then went off to enjoy their day by the river, as they always did.

A few hours later they returned. First they removed the sesame cookies, near the front of the oven – all but one of them was burnt! Then they took out the cake, a little off to the left, and it crumbled into a thousand pieces before they could even set it down. They took out the bread, at the back of the oven, and it was as hard as the bricks they used to make their houses. The pudding turned out OK.

At first, they thought it was just a strange accident. But the next day, the same thing happened. And that day after that, the cookies were even more burnt, the cake crumblier, and bread harder. The pudding was still OK. They realized that the wood was burning hotter now than before, sometimes much hotter! And no matter what they did, with the new fuel source, the oven was now hotter, sometimes by a little and sometimes a lot. (It's worth mentioning that a few of the villagers didn't think there was a difference between the traditional and new fuel source and were convinced that everything would soon go back to normal, but they represented less than two percent of the village.)

The villagers began to quarrel, and they all wondered “what are we going to do?” They could not imagine their lives without fresh bread, cakes, and especially the sesame cookies they had all grown up with. (At least they still had pudding.)

One of the villagers said she knew of scientist who studied at a university in the next village. He might be able to help! She gave the scientist a call, and a few days later, the scientist (who coincidentally looked a little like me) showed up with a wagon full of instruments, machines, and unrecognizable objects. He spent the day arranging them carefully around and within the oven and then told the villagers to light their fire and prepare their food as they had always done, but with the new wood. Sure enough, a few hours later, when the villagers returned from the river, they again found that the cookies were burned, cake was crumbly and the bread was tough. (The pudding turned out OK.) The scientist scratched a few notes on his notepad, gathered up his instruments, and went back to the university.

After what seemed like ages, the scientist returned to the village. “What have you discovered?” they all asked?

The scientist confidently cleared his throat and said, “I have discovered the problem. Your oven is too hot!” And he showed them a detailed graph of the internal temperatures of the oven, measured by his fancy instruments, that were much too hot for their bread, cookies, and cakes.

The villagers were silent. Then a small girl asked, “So what can we do? I really miss those sesame cookies!”

The scientist looked at the girl strangely. “I’m afraid that telling people what to do is not the role of the scientist!” And with that he packed his bag and went back to the university.

The villagers realized that, though they perhaps didn’t need to worry about the pudding, they would never enjoy their cakes, cookies and breads again if they didn’t do something. So, they gathered the entire village together and began to discuss their options.

One of the elders, who often made the bread, mentioned that, “one time, I forgot to put salt in the dough and it turned out much too soft. Perhaps if I change the recipe, the bread won’t be so hard.”

Another villager, who often prepared the cake said, “You know, the village over the hill also makes cake. I’ve always found it to be a little chewy personally, but if they are willing to share their recipe, I can see if it makes our break less crumbly.”

The villager who often made the fire for the oven said, “I’ve noticed that there’s a very small crack in one part of the oven, where it’s a little bit cooler. Perhaps if we bake the cookies there they won’t be burned.”

They conversed into the night. By the next morning they had a plan. The baker went off to the next village to ask for help and the others began to experiment with different recipes, carefully observing what would happen when they moved the dough to different parts of the oven.

The little girl also found some instruments that the scientist had left and configured an alarm that rang just when the temperature got too hot for the cookies. The scientist heard about her project and came back to the village to help, teaching the villagers how to use other instruments to measure the intensity of the fire and how to interpret the information that the instruments produced.

After several months, the villagers had discovered new recipes for the bread and cake, which were almost as good as they had remembered before they began using the new wood source. They couldn't make as many sesame cookies as they used to, but when they baked them in the slightly cooler part of the oven, and quickly took them out whenever the alarm rang, they were wonderful. The pudding always seemed to turn out OK.

Questions to ponder

-) What are the resources you care about (e.g., species, landscapes, ecosystem services)? – *Cakes, cookies, pudding*
-) How sensitive are they to environmental change (climate or otherwise)? – *differential sensitivities of cookies and pudding to higher internal oven temperature*
-) What range of adaptation options exist (e.g., vegetation management, conservation of critical areas on the landscape)? – *new recipes, cooking time, location in oven*
-) What strategies can make critical resources more resilient to environmental change? – *recipes that give acceptable outcomes over range of uncertain conditions*
-) What information might trigger adaptation actions? – *key indicators; monitoring systems*
-) What mitigation options are possible (e.g., reduce GHG emissions)? – *planting and conservation of traditional wood sources*

Key Concepts

-) Vulnerability = sensitivity + exposure
-) Sensitive resources may be at risk with even low exposure, while less sensitive resources may require intense exposure to stressor(s) before they are threatened
-) Traditional and scientific knowledge can play a role in understanding both sensitivity and exposure (though perhaps traditional knowledge more important for quantifying sensitivity, while scientific knowledge more helpful for quantifying exposure)
-) Adaptation measures seek to increase resilience by reducing the sensitivity of valued resources and/or their exposure to environmental change