**Results**

The parameter settings ensured that communities would try and fell trees, thus increasing their yield, if it was possible to do so given the policy set by the manager. The values and positive slope of the community resources ensured that communities had sufficient power to clear the majority of the forest by the end of the 50 time steps in all scenarios (Table 2). These extreme parameter settings resulted in clear differences in the deforestation trajectories between the scenarios (Figures 3 and 4).

*Scenarios 1 to 3*

Out of the three primary funding models, scenario 1 was the most effective at minimising deforestation over the 50 time steps (Figure 3). In all time steps, excluding time steps 4 to 9, scenario 1 retained the highest number of trees. This is despite having a felling count that increased linearly throughout the simulation (Figure 5). The increasing felling count in scenario 1 resulted in the loss of trees accelerating over time (Figure 3). Conversely, scenario 2 had a decelerating felling count over time (Figure 5) as the manager budget increased, resulting in a deforestation rate that slowed over time (Figure 3). Nevertheless, the low manager budget values, which were lower than scenario 1 for the first half of the simulation period, resulted in higher deforestation overall (Figure 3). Scenario 2 performed worse than all other scenarios (including scenarios 4 and 5) for the first half of the simulation period (Figure sx), highlighting the effects of chronic underfunding. The fluctuations in the manager budget in scenario 3 is reflected in both the rate of deforestation (Figure 3) and the felling count (Figure 5). During periods of high manager budget, the felling count and deforestation rate decreases, and during periods of low manager budget, the felling count and deforestation rate increase. Despite the peaks in manager budget in scenario 3 regularly reaching values much higher than the manager budget in scenario 1, this funding model had the worst outcome in terms of forest loss than scenarios 1 and 2 (Figure 3) and resulted complete loss of forest cover (extinction) in xx simulations (Table 2). This can be explained by the felling count which shows that during periods of very low manager budget, the number of trees lost is between two and three times greater than scenarios 1 and 2 (Figure 5).

*Scenarios 4 and 5*

Scenarios 4 and 5 showed the potential effects of unpredictable and uncertain funding models on forest loss. Scenario 4 had less variation in manager budgets than scenario 5, and the simulations were much more likely to retain more forest cover than scenario 5 (Figure 4) across the 100 simulations. Interestingly, deforestation rates for scenario 4 were very similar to those of scenario 1, and scenario 4 outperformed scenarios 2 and 3 in most cases (Figure Sx). This suggests that unpredictable variation in manager budgets is not necessarily catastrophic, provided fluctuations are small and that manager budgets do not drop too low (Figure 2). Scenario 5 showed that large uncertainty and variability in manager budget could have very serious negative effects on forest cover over time (Figure 4). Despite many of the scenario 5 replicates having very high peaks in manager budgets (Figure 2), most simulations resulted in a worse outcome than scenario 4 in terms of forest cover. Of the 100 simulations, extinction occurred xx times in scenario 5 (Table 2). As with scenario 3, the driver of forest loss can be seen in the felling counts for scenario 5, which reach extremely high levels during periods of low manager budget (Figure 5).

Chart, line chart

Description automatically generated

**Figure 3. The number of trees remaining at each time step for scenarios 1, 2, and 3. Solid lines and faded ribbons are the 50, 2.5, and 97.5 percentiles from the 100 runs, respectively.**

Chart

Description automatically generated

**Figure 4. The number of trees remaining at each time step for scenarios 4 and 5. Solid lines and faded ribbons are the 50, 2.5, and 97.5 percentiles from the 100 runs, respectively.**

Chart, histogram

Description automatically generated

**Figure 5. The count of felling actions taken by all communities at each time step for the five scenarios. Solid lines and faded ribbons are the 50, 2.5, and 97.5 percentiles from the 100 runs, respectively.**

**Table 2. The number of trees remaining at time step 50, and the number of extinctions, for each of the five scenarios.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Scenario | Trees remaining after 50 time steps | | | Number of extinctions |
| Mean | 2.5 percentile | 97.5 percentile |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |