Lessons learned from 25 years of operational large-scale restoration: The Sow-A-Seed project, Sabah, Borneo

ABSTRACT

While restoration projects globally scale-up to meet the growing demand to restore degraded ecosystems, data on the long-term benefits of restoration are still rare. Here, we describe the lessons learned from the Sow-A-Seed project in Sabah, Borneo: a long-term and large-scale restoration project launched in 1998 with the aim to rehabilitate 18,500 ha of tropical rainforest degraded by logging and forest fires. The project was built from the ground-up, including establishment of essential infrastructure and knowledge creation via trial-and-error. Three restoration techniques were used depending on the level of degradation; 1) Assisted Natural Regeneration (weeding, climber cutting and selective girdling) to promote natural regeneration of late-successional species in the least disturbed forests, and; 2) Enrichment Planting in gap-clusters in moderately disturbed forests, and; 3) Enrichment Planting in rows (i.e, line-planting) throughout heavily degraded forests with no- or few late suc cessional tree species in the overstory. The project includes successful propagation of 92 native tree species including dipterocarps and fruit trees, and planting of over 5 million trees during the last 25 years. Long-term monitoring shows that the mortality rate of planted seedlings is ~15% per year up to 3 years, but decreases to ~2% between years 3–10 and 10–20. One of the largest trees, a Shorea leprosula planted in 1998, is now 74 cm in DBH and some planted trees have reached reproductive age and are contributing to natural regeneration. A range of wildlife including orangutans, elephants, hornbills and all five wildcat species in Sabah have been documented in the area. In 2015, the area was classified as a Class 1 protected forest, the highest level of conservation status in Malaysia, and removed from commercial forestry. We highlight that there is much knowledge to be gained by research dove-tailing with operational activities, and we encourage that the lessons learned from operational restoration are shared among practitioners and restoration ecologists. We present 8 key lessons learned from the Sow-a-Seed project.