

Directions:

Read the following text and match each of the numbered items in the left column to its corresponding information in the right column. There are two extra choices in the right column. Mark your answers on the **ANSWER SHEET**. (10 points)

In an effort to support restoration programmes, specialists are developing supplies of seeds and seedlings, maintaining gene banks and sequencing the genomes of indigenous trees and other crops. Their work deals with one of the problems that could block major restoration efforts in different parts of the world.

"Where's the planting material going to come from? That's one big bottleneck," says genetic-resources specialist Ramni Jamnadass.

Asia is arguably the region most neglected by global efforts to increase diversity in restoration and to study native species. Christopher Kettle, Biodiversity International's director for forest genetic resources and restoration in Rome, says that the need for infrastructure — things such as mechanisms for collecting and storing seeds, and nurseries to raise seedlings — might be most desperate here because many trees are 'masting' species, which don't produce seeds every year. People need to be ready. "Otherwise, you miss the boat, you lose all the seed and you've got to wait another seven years," says Kettle. "This is a really, really critical issue for restoration in Southeast Asia, because many of the most important timber species and tree species — the ones that will lock up the most carbon — they're all masting species."

Climate change is a driving factor in the push to restore forests, but it also raises questions, such as where trees can thrive in the future. Climate change is also expected to alter relationships between trees, insects, diseases and other forest species. "Insects that today are a minor problem may become a major problem if they can produce three or four generations in a year," says forest ecologist John Stanturf. This remains a significant knowledge gap. "We know enough to know that this is a concern, but we don't know enough about how to respond to it yet. That's a great area to be doing research." So is soil, says Cindy Prescott, a forest ecologist at the University of British Columbia in Vancouver. "If you don't look at the soil at the start, you can spend a lot of money and time putting in species that aren't going to survive there."

With so much research left to do, leaders in the field have been doing some soul-searching, and acknowledging that restoration can be motivated by — and designed to meet — different needs. "When you talk about conservation or restoration, the first question has to be restoration by whom, for whom?" says Daniel Janzen, a biologist at the University of Pennsylvania.

The question can have more than one answer. Much of the global funding for restoration is dedicated to developing it as a tool to mitigate climate change, notes restoration ecologist Pedro Brancalion. "But if you ask a farmer in Brazil if he or she is concerned about climate change, they would say, 'No, I am concerned about water,'" he says. Their interests as stewards of the land need to be better integrated with those who have the money to support restoration.

That has been the strongest lesson of all for forest ecologist Robin Chazdon. Restoration is about more than what gets planted in the ground, she says. "Yes, it's about forests, but it's really about people. They are the agents of restoration."

	[A] People must pay attention to the fact that some kinds of trees do not produce seeds annually.
41. Ramni Jamnadass	[B] Soil is an important element to be taken into account in forest restoration.
42. Christopher Kettle	[C] The purpose of restoration efforts may be different from the real needs of the people involved.
43. John Stanturf	[D] Human factors, as well as trees planted, should be emphasized in forest restoration.
44. Pedro Brancalion	[E] The supply of seeds is a tough problem that has to be dealt with.
45. Robin Chazdon	[F] When it comes to restoration, we have to stay with an awareness of whose interests to serve.
	[G] Some creatures in the forest that multiply fast can become a great threat to forest restoration.