

Clip #4 Transcript: Research Implications

The **ecosystem's** effects are a big concern particularly with the idea of assisted migration, and something that needs to be weighed heavily against the benefits of it. So for example, if my research supports the idea that western larch is adapted to future climates across a broader range of British Columbia, and we start to plant outside of its range, those plants will be interacting in new populations and new **communities**. That can have effects in terms of **competition** among tree species, it can have effects in terms of **mutualisms** or pathogens, and so those interactions among species and within the ecosystem are really important considerations and potential risks of approaches like assisted migration.

Assisted gene flow on the other hand may pose less risks because you're moving some individuals from a population into another population where the species already inhabits. There's still some risk as the climate changes of affecting competitive interactions and other things. Climate change will already impose a lot of ecosystem effects that we have to consider when we're weighing those options.

One of the major implications would be where we plant seed sources in the future. For those practicing **reforestation**, or tree breeding, my research would have implications and would also contribute to our understanding of a new policy called '**Climate-Based Seed Transfer**' which is shifting a system that was previously based on geography to basing it on climate, which is already in the process of being put in place for both people doing reforestation and breeders. And then it would have specific information to provide breeders, at least for western larch, in terms of what populations might be worth focusing on or what families to continue breeding with. Or if breeding, particularly if you focus on growth and productivity traits, whether that has some cost in terms of adaptation to climate stressors.

Long-term, research from CoAdapTree may provide new tools for tree breeders such as **genomic selection**, in which you can start to use information from the genome to design your breeding program.

So the communities that might be impacted by this research in the short-term would be tree breeding programs. Information from both my species and others in CoAdapTree, we include material that's already used in some of the breeding programs to test further some of their traits adapted to climate. So that can immediately provide them some information on what materials to focus on and maybe what some of the strategies that may or may not impose some risk to continue using. For Climate-Based Seed Transfer, if my research or others from CoAdapTree suggests some of those strategies, then anyone planting seeds in the future—industry or otherwise—may want to consider those new changes to the Climate-Based Seed Transfer strategy. Longer term, genomic selection could also be used by breeders; particularly if the tools become affordable enough. And assisted migration could be another thing that breeders and people doing reforestation could use.

The key message is that climate change is going to have such strong impacts on forest health, that it is becoming more and more crucial that we understand how forests are adapted to climate through new tools like through genomics. And genomics can provide new information and understanding to advance our overall understanding of adaptation to climate and forests.

