



Invasive Species Topic Overview

An invasive species is a non-native species that causes harm to an ecosystem. Any kind of living organism can be an invasive species. They are most commonly generalists, meaning they [“can live in many different types of environments, and have a varied diet.”](#) Invasive species also typically have the ability to grow and reproduce quickly. In addition, they [rarely have natural predators](#) in their new ecosystems. All of these characteristics together make it easy for invasive species to outcompete native species; invasives eat the food of native species, utilize the native species' habitats, and overall, use up resources the native species depend on, leaving the native species unable to compete.

Invasive species are one of the biggest causes of biodiversity loss and pose a major threat to native species worldwide. Whether they're brought in from a foreign country or from another region of their own country, the impact is the same – devastating loss. And once they're in the new location, invasives can be quite challenging to remove. The global economic [cost of removing invasive species is quite large](#) and that total doesn't even include the cost of fixing the damage they cause. As they invade new ecosystems, invasives can damage infrastructure, properties, and agricultural lands.

Invasive species pose a [major threat to agriculture production](#) as they can invade grazing fields and destroy, or outcompete, crops. They can also [carry diseases with them](#), spreading pathogens to new areas and potentially causing new outbreaks. This is compounded by the fact that humans are the primary mover of invasive species, whether intentionally or inadvertently, especially as the world has become more globalized and connected.

Climate change will only exacerbate the spread of invasive species. Invasives are typically much quicker to adapt to changes in their ecosystem than native species. Climate change also makes ecosystems more vulnerable to invasive species.

Possible Invasive Species Subtopics

Invasive Species is a broad topic. Rather than taking on the entire topic, consider focusing on just one part of it (a subtopic). We've put together a list of subtopic angles you could take, and linked to a variety of credible sources, below. But remember, there are many other subtopics under invasive species, and tons of other sources, so no need to limit yourself to what's included here!

Click on the colored tiles below to navigate to resources about each subtopic or a planning document to help generate your own ideas!



Biodiversity Loss

As invasive species spread, they outcompete native species, changing landscapes and ecosystems. Invasive species have attributes that make it easy for them to live and thrive almost anywhere, which gives them a leg up over more selective native species.

- In 2019, the United Nations reported invasive alien species as a top driver of species decline. (Source: [Invasive Species Center](#))
- Invasive species are one of the leading causes of global biodiversity loss as they can damage native habitats, spread diseases and ultimately cause extinctions. (Source: [National Geographic](#))
- An international team of researchers found there could be massive global biodiversity loss if there was a 20-30% increase in invasive species - a value that is likely to be reached soon, as the number of invasive species is constantly increasing. (Source: [The Guardian](#))
- The direct threats of invasive species include preying on native species, food or other resources from native species, causing or carrying disease, and preventing native species from reproducing or killing a native species' young. (Source: [National Wildlife Federation](#))
- Some invasive species are capable of changing the conditions in an ecosystem, such as changing soil chemistry or the intensity of wildfires. (Source: [National Wildlife Federation](#))

Economic and Social Impacts

Invasive species can have monetary impacts on both the economy and society. The cost of managing and stopping the spread of invasive species, alone, is astronomical. However, there are other costs as well, such as the damage done to infrastructure, the loss in native fisheries, the destruction of property, and the loss of culturally significant species. The impact of invasive species is one that is felt by everyone.

- Direct economic impacts of invasive species include management costs, research and monitoring programs, reduced crop yield, job losses, damage to infrastructure, and impacts to international trade and tariffs. (Source: [Invasive Species Centre](#))
- Indirect economic impacts of invasive species include loss of ecosystem services, reduced biodiversity, reduced resource production, impacts to tourism and recreation, and reduced property values such as when zebra mussels overrun a lakeside cottage. (Source: [Invasive Species Centre](#))
- Globally, it is estimated that the economic cost of invasive species has been \$1.3 trillion over the past 50 years. (Source: [National Invasive Species Information Center](#))
- Annual economic costs of invasive plants and animals are estimated at \$137 billion in the U.S. and 33.5 billion in southeast Asia. (Source: [UN Environment Programme](#))

- In some regions, invasive species are a major threat to the incomes and livelihoods of the people who live in the areas affected. (Source: CABI: [Invasive Species](#))
- Invasive species can have significant impacts to Indigenous communities by impacting infrastructure, economy, health and cultural practices including traditional economies and harvesting, especially when culturally important species are affected. (Source: [Invasive Species Council of British Columbia](#))

Climate Change

As the climate warms, invasive species are likely to become an even bigger problem than they are currently. The biological traits that make them so successful at becoming invasive species, like being highly adaptable, will also give them an upperhand to adapting to changes caused by climate change. And because invasives can thrive in varied climates and ecosystems, they will be able to adapt much faster than native species.

- Invasive plants, such as the purple loosestrife in the US, are adapting faster than native plants to longer seasons caused by climate change, allowing them to further outcompete natives. (Source: [Smithsonian Magazine](#))
- Many scientists agree that climate change will alter destination habitat and increase ecosystems' vulnerability to invasion because of resource scarcity and increased competition among native fauna and flora. (Source: [Climate Institute](#))
- Human responses to climate change could worsen the threat of invasive species because some proposed energy crop species (biofuels) are invasive and could cause new invasive problems. (Source: [Invasive Species Council](#))
- Invasive species can reduce the resilience of natural habitats, agricultural systems, and urban areas to climate change. (Source: [IUCN](#))
- Climate change is creating new pathways for invasive species to be introduced, such as shipping routes that open up as sea ice retreats. (Source: [U.S. Geological Survey](#))
- Invasive species can negatively impact climate change mitigation efforts in many North American ecosystems. (Source: [National Invasive Species Awareness Week](#))

Impact on Agriculture

Some invasive species have had a huge impact on agricultural production. Invasive pests have wiped out whole crop fields by eating them. Invasive plants have outcompeted the growing crops, reducing crop yields significantly. Other invasive plants have taken over grazing fields reducing the amount of available food for cattle. The expense of managing these invasive plants and animals has also taken a toll on agricultural production.

- Invasive species are a major cause of crop loss and they pose one of the greatest threats to food security in the United States. (Source: [National Invasive Species Awareness Week](#))
- In Ethiopia, 82-95% of sorghum yields are lost to the invasive weed Santa Maria feverfew (*Parthenium hysterophorus*). (Source: [UN Environment Programme](#))
- West Indian Lantana (*Lantana camara*) invaded many pasturelands in India and poisoned cattle. In Queensland, Australia it led to 1,500 animal deaths, reduced productivity and loss of pasture. (Source: [UN Environment Programme](#))
- The Tomato Leafminer (*Tuta absoluta*) was brought from South America to Europe and Africa and has been devastating to tomato production in both regions. (Source: [Canadian Food Inspection Agency](#))
- Invasive weeds can turn pastures into monocultures, limiting the diets of livestock especially since livestock will often avoid eating invasives in favor of native plants. (Source: [Center for Invasive Species and Ecosystem Health](#))
- The most vulnerable countries to agricultural invasive species are located in sub-Saharan Africa. The United States and China are the countries with the greatest likelihood to spread agricultural invasive species to the rest of the world. (Source: [PNAS](#))

Globalization

As our society becomes more globalized, an increasing number of invasive species are being spread around. It is often done unintentionally as people travel and goods are shipped across the globe. It can also happen intentionally when people bring exotic animals or plants into their homes.

- Invasive species are transported through the ballast water of ships and create environmental problems throughout the world. (Source: [Florida Fish and Wildlife Conservation Commission](#))

- Invasive plants are easily spread around the world through e-commerce. (Source: [UN Environment Programme](#))
- Some invasive species are kept by people as exotic pets that are intentionally or accidentally released. For example, pet Burmese pythons are becoming a big problem in the Everglades. (Source: [National Wildlife Federation](#))
- The increase of activities such as tourism and trade have meant people and goods can move all over the planet, and they often take invasive species with them. (Source: [National Geographic](#))
- Some species were brought to a location on purpose to be used as pest control, but then turned into invasives themselves. For instance, the cane toad, which was brought to Australia from Puerto Rico, now numbers in the billions. (Source: [The Institution of Engineering and Technology](#))

Disease Spread

As invasive species move around, they can bring diseases with them, causing global outbreaks. This especially puts at risk previously disconnected communities that have little or no immunity to these newly brought diseases. Invasive insects are especially big culprits of spreading disease to new areas.

- Land-use and climate change interact with human transportation networks to facilitate the spread of invasive species, vectors, and pathogens from local to continental scales. (Source: [Ecological Society of America](#))
- Invasive species can infect humans with diseases or cause wounds through bites, stings, allergens, or other toxins. (Source: [U.S. Department of Agriculture](#))
- The Asian tiger mosquito, a highly invasive insect, transmits both West Nile Virus and Dengue fever. (Source: [U.S. Department of Agriculture](#))
- The global movement of invasive species poses a major threat to human health as it can introduce new pathogens to an area leading to the emergence of new zoonotic pathogens/diseases. (Source: [National Center for Biotechnology Information](#))
- New trade routes among previously disconnected countries, and transportation technologies, have spread invasives that increased both the frequency and magnitude of potentially deadly disease outbreaks. (Source: [U.S. Forest Service](#))



Generating Your Own Subtopic

Coming up with your own subtopic can be intimidating if you don't know where to start. To help, we've created the following list of questions and reminders to help you formulate your own subtopic. Ask yourself these questions, and as you answer them, notice what stands out or find repeating trends in your answers. Those are what you should focus on to generate your subtopic!

Probing questions

1. Have you noticed anything related to this global topic in your community?
 - a. How does what is happening locally connect to challenges globally?
2. Does this topic connect to an area of interest to you?
 - a. How does it connect?
3. What does this topic first bring to mind when you think about it?
 - a. What emotions does this topic make you feel?
4. What do you already know about this topic?
 - a. What do you want to know?
5. Have you read any books or articles or listened to podcasts about this topic?
 - a. What if anything did you learn from them?

Keep in mind that the subtopic you choose should be:

- Connected to population growth
- Focused on a single problem or issue
- Researchable using primary and/or secondary sources
- Feasible to answer within the timeframe of 60 seconds
- Specific enough to answer thoroughly