



THE SEED VAULT: PRESERVING CROP DIVERSITY, FOREVER

DURATION: 17 mins | **DIRECTOR:** Daniel Sherer

Amid a snow-covered Nordic landscape, a portal on the side of a frosty mountain leads to a long, dark tunnel and then a frozen door. Behind that door: the history of agriculture, — of cultivation, selection and environmental symbioses — as told by more than 880,000 seeds. This is the Svalbard Global Seed Vault, the largest collection of seeds in the world and a safeguard against loss of diversity, insurance that human agriculture can adapt and continue to feed the world. This film follows world-renowned scientist Cary Fowler as he delves into the state of agriculture, co-evolution, extinction and the future of our food supply.



STANDARDS

Literacy in History/Social Studies:

- **CCSS.ELA-LITERACY.RH.6-8.4 (Craft and Structure)**
Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.
- **CCSS.ELA-LITERACY.RH.6-8.6 (Craft and Structure)**
Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).
- **CCSS.ELA-LITERACY.RH.6-8.8 (Integration of Knowledge and Ideas)**
Distinguish among fact, opinion, and reasoned judgment in a text.

Literacy in Science:

- **CCSS.ELA-LITERACY.RST.6-8.2 (Key Ideas and Details)**
Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
- **CCSS.ELA-LITERACY.RST.6-8.7 (Integration of Knowledge and Ideas)**
Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

Writing:

- **CCSS.ELA-LITERACY.WHST.6-8.1.E (Text Types and Purposes)**
Provide a concluding statement or section that follows from and supports the argument presented.

TAGS: Climate change, preservation, agriculture, biodiversity

VOCABULARY: Biodiversity, climate change, preserve, evolve, extinction

FILMMAKER INTERVIEW: DANIEL SHERER



WHERE DID YOU GROW UP? Atlanta, GA

WHAT IS YOUR FAVORITE COLOR? It's a tie between green and orange

WHAT IS YOUR FAVORITE FOOD? Changes every day, this morning it was nectarines

WHAT IS YOUR FAVORITE FILM? Anything the Coen brothers direct, but my ultimate favorite is probably the Disney animated, *The Jungle Book*

IF YOU COULD HAVE ANY SUPERPOWER, WHAT WOULD IT BE? Communicate with animals

WHAT IS ONE THING YOU ARE AFRAID OF? The American economy

WHY DID YOU BECOME A FILMMAKER AND HOW DID YOU GET STARTED?

It was a bit of a natural progression. From a young age I was in love with drawing and creating worlds from my imagination. I started paying attention to how films made me feel. They were so powerful and full of emotion. I was really interested in the magic that happened when an image and sound were placed together. Growing up, we would borrow our parents video cameras and film everything, making our own little movies, noticing what worked and what didn't. My dad had a computer with video editing software and I remember the first day he showed me how to make a simple edit. I was hooked. I started making rock climbing films in highschool and then every project at school became another excuse to pull out the camcorder. Eventually my fascination became something I started taking more seriously and I decided to study film in college. School taught me a lot about the history of cinema and that's when I knew I wanted to tell stories with moving images.

HOW DID YOU MEET CARY AND WHY DID THIS STORY APPEAL TO YOU?

I met Cary after working at GoPro for 2 years. Our media team had connected with the organization called the Crop Trust, which runs the Seed Vault, and this was a story we really wanted to tell. At the time, GoPro was working directly with non-profits to help amplify their voices to a wider audience. This one was a perfect fit for me as I've always been enamored with our relationship to food. Before deciding to study film, I was on track as a horticulture and plant biology major. I've built a relationship with food over the course of my life, and it's without a doubt one of the topics I'm most passionate about. I actually came into the project late, but after meeting Cary for the first time on a pre-production call, I knew it was going to be a powerful experience.

WHEN EDITING THE FILM, WAS THERE ANYTHING YOU WISHED YOU COULD HAVE INCLUDED IN THE FINAL CUT?

Yes. I really wish I could have included more of the socio-political aspects of the story. For example, Cary had told us a lot about the seed bank formerly located in Syria which was destroyed in the war and how they actually had backup seeds in the Seed Vault so nothing was lost. I wish we could have included more about the Arab spring and how civil unrest is amplified when food security is threatened. That's powerful stuff, but when discussing with my mentors about the story, it was agreed that the film didn't need all that to make it's point and that simplifying our structure would help bring it to a wider audience. I had so much good interview footage with Cary and it was really tough not to include more of it, but therein lies the art of short documentary filmmaking.

WHEN YOU MADE THE FILM, DID YOU HAVE A SPECIFIC AUDIENCE IN MIND?

We wanted the film to appeal to as many people as possible, which is a tall order when discussing agricultural biodiversity, but Cary is so clear when he speaks and we used animated stories instead of infographics to cover the more complicated aspects which really helped. In the end, everyone on earth needs food, and that food comes from agricultural systems that we all take for granted. The hope was to catch the imaginations of the young and the wise and connect them with something familiar in an unfamiliar way.

IS THERE AN ACTION YOU HOPE PEOPLE ARE INSPIRED TO TAKE AFTER SEEING THIS FILM?

My biggest hope is that the film inspires people to think about our dependency on agriculture. We depend on the plants and the plants depend on us. I hope people want variety and diversity in their life. I hope they walk away from the film having learned about the value of protecting seed diversity so that future generations can continue to enjoy a thriving food system and we don't lose 15,000 years of some of the most beautiful history we have.

WHAT ARE SOME OF THE CHALLENGES YOU ENCOUNTERED MAKING THIS FILM?

There were many challenges. Beyond the production challenges of shooting everything on GoPro cameras, filming in the arctic and keeping batteries charged and hands warm, the toughest challenge was the endurance of finishing the film. This short film actually came together pretty quickly, however it still took me the majority of a year and many hours of being with the footage and studying my subject. There were tons of distractions along the way. I would get anxious if I wasn't actively working on the film, and it was hard to keep the balance between work and life, but in reality most of the time I spent away from the editing timeline resulted in big breakthroughs for me.

HAS WORKING ON THIS PROJECT CHANGED ANY OF YOUR OUTLOOKS ON PRESERVATION OR HUMAN NATURE?

The biggest thing it has taught me is that our imaginations are shaped by what we experience on a daily basis and if we aren't experiencing the variety we have in the world, then we will surely forget about it and realize it's gone after it's too late. After working on this film, I'm now more aware of how much humanity and agriculture are linked, it's an undeniable codependency that's founded on diversity.



WHY DO YOU THINK IT IS IMPORTANT TO INCLUDE THIS FILM IN MOUNTAINFILM FOR STUDENTS?

I think it's important for this film to be included in the Mountainfilm for Students because we are losing the diversity of our food crops and the next generation is going to inherit what we leave them. More than ever, our younger generation needs to be involved with the conversations surrounding agriculture so that it can not only feed a growing world population, but it can survive a world that's experiencing massive shifts in growing seasons. Hopefully the students can put the pressure on the current generation to protect and preserve those valuable resources so that they may have them in the future.

WHAT'S THE NEXT BIG ADVENTURE OR FILM PROJECT ON THE HORIZON FOR YOU?

The next big project on the horizon for me is open ended. Currently we are working on some cool ideas that the GoPro media team will be able to tackle in 2018. Until then, we are testing some new technology and waiting for the right story.

WHAT IS ONE PIECE OF ADVICE YOU CAN GIVE STUDENTS THAT YOU WISH SOMEONE HAD SHARED WITH YOU?

Oh man, there is so much good advice out there, but when it comes to doing what you love, don't rush it and try your hardest not to multi-task. Collect as much advice as you can from all perspective and seek out the simple threads that connect it all.

SUBJECT INTERVIEW: CARY FOWLER



WHERE DID YOU GROW UP? Memphis, Tennessee

WHAT IS YOUR FAVORITE COLOR? Blue

WHAT IS YOUR FAVORITE FOOD? Fried chicken

WHAT IS YOUR FAVORITE FILM? To Kill a Mockingbird

IF YOU COULD HAVE ANY SUPERPOWER, WHAT WOULD IT BE? Wisdom

WHAT IS ONE THING YOU ARE AFRAID OF? Organized meanness

WHY DID YOU DECIDE TO SHARE THIS STORY?

The simple answer is that I was asked to. The personal details were facts and facts are what they are. I only hope that people feel empowered and energized after seeing the film.

IS THERE AN ACTION YOU HOPE PEOPLE ARE INSPIRED TO TAKE AFTER SEEING THIS FILM?

No specific action. I think everyone has to choose the action that is right for them. I see my work with seeds as part of a larger effort to make the planet healthy and to support justice, kindness and long-term solutions to big problems. So I see people working in all these areas as kindred spirits and allies.



WHAT ARE SOME OF THE CHALLENGES YOU ENCOUNTERED DURING THE MAKING OF THIS FILM?

The filmmakers were great — it was so nice to work with, so the challenges for me were tiny. It's difficult not to be self-conscious when being filmed, so perhaps the biggest challenge in any film is simply to relax and be yourself. Mostly, I think I can do that. I don't get nervous in these situations.

HAS WORKING ON THIS PROJECT CHANGED ANY OF YOUR OUTLOOKS ON PRESERVATION OR HUMAN NATURE?

My work is literally always at the ground level, not the drone level. Seeing the stunning visual scenes of the Seed Vault and our garden was moving and lent some majesty to these things. It's humbling.

WHAT CAN INDIVIDUALS TAKE FROM THIS FILM TO INSPIRE THEIR COMMUNITIES TO PRESERVE ITS ENVIRONMENTAL ASSETS?

The most important thing to realize is that individuals matter and can make a difference. One isn't guaranteed success in life, but most of us are guaranteed choices and thus the opportunity to try. Without trying, failure is a certainty. I hope the film, upon reflection, would dispel any notion that you have to be an Einstein to do something like this, something important. Integrity, perseverance and creativity are the most important ingredients. IQ is overrated and often doesn't necessarily come packaged with the other traits that are needed for success. I didn't come close to graduating at the top of my class in high school, for example. Whoever you are, wherever you are, whatever the issue ... just jump in.

WHY DO YOU THINK IT IS IMPORTANT TO INCLUDE THIS FILM IN MOUNTAINFILM FOR STUDENTS?

I hope it will capture their attention and that they will see that the world is full of possibilities for them if only they engage.

WHAT'S THE NEXT ADVENTURE ON THE HORIZON FOR YOU?

I am chairing the Board of Trustees of Rhodes College, a wonderful liberal arts college that is one of the most service oriented colleges in the country. I love being associated with an institution that changes students lives so profoundly. Otherwise, I am doing my small part in these difficult political days to defend democracy and generally advocate for a kinder more civil society. I abhor it when I see disadvantaged people stepped on and put down.

WHAT IS ONE PIECE OF ADVICE YOU CAN GIVE STUDENTS THAT YOU WISH SOMEONE HAD SHARED WITH YOU?

Youth comes with inexperience and inexperience breeds lack of confidence. That's understandable. You are probably much better than you think, and for sure your capabilities and potential are far greater than you can now imagine. Don't be discouraged.

PRE-SCREENING ACTIVITY

Write the list of vocabulary words on the board (biodiversity, climate change, preserve, evolve, extinction). Give students around five minutes to look up definitions for each word. You can have the students do this on their own or as a whole class. (Collinsdictionary.com is a great tool for English Language Learners).

Once all of your students have reviewed the vocabulary terms, split them off into partners, and designate one partner as 'Partner A' and the other as 'Partner B.' For the first round, Partner A and B will face each other, with Partner A's back to the board. Rewrite the vocabulary words on the board in a different order (preserve, extinction, climate change, biodiversity, evolve) and set a timer for one minute. During this time, Partner B will be responsible for describing the word to Partner A without using the vocabulary word. Partner A will be responsible for guessing the word without looking at the board. When the timer goes off, each pair will total the amount they guessed and switch. Rewrite the vocabulary words on the board in a different order (evolve, extinction, preserve, biodiversity, climate change) and set a timer for one minute while Partner A faces the board and explains the word to Partner B.



INTRODUCING THE FILM



Depending on your class, you may decide that you need to frontload your class with more information regarding The Seed Vault in Svalbard, Norway and The Crop Trust's mission in choosing to preserve seeds from around the world. Two great resources for frontloading this topic are:

1. <https://www.croptrust.org/our-work/svalbard-global-seed-vault/interactive-visit/> (Here you can take an interactive visit through The Seed Vault and learn more about their mission. If you choose this activity prior to watching the documentary, partner students off to visit the website together and write down three to five questions they have about The Seed Vault onto separate sticky notes. When each partnership has finished writing questions, have the students sort their questions by category. Students will post their sticky notes according to similarities in questions. The purpose of this activity is to show that the class has similar questions (i.e. Why does The Seed Vault exist? would be grouped into the same category as another partner's question "What is the purpose of The Seed Vault?")
2. <https://newsela.com/read/seed-vault/id/12178> (This article that can be adjusted for reading level and also read to students who need additional support — either using Google Chrome plugins (Read and Write) or partnering off. If you choose to do this activity with students, write the following prompt on the board: "Why is it important to preserve seeds for future generations?" Ask the students to read alone (or in pairs, depending on scaffolding needed) and circle any important words necessary to understanding the article (nouns, vocabulary words they are unfamiliar with) and underline any claims the author is making (i.e. "The world's food supply could be badly hurt if they cannot.") (You may decide to do this as a whole class activity as well). Give the students a designated amount of time to read the article (seven-ten minutes) and annotate the text. Once they are done reading, partner them off with another student and have them answer the question, "Why is it important to preserve seeds for future generations?" together. Have them write their answer on a sticky note and share with class.

Prior to starting the documentary, let students know that the title of this film is quite deceiving. This movie is about so much more than just The Seed Vault in Svalbard, Norway. At the end of the movie, students will be asked to create a movie poster with a partner or in a small group to better advertise the film's message. Let students know that they will be asked to create a movie poster with a partner at the end and to look for ways to increase viewing of this movie so that The Seed Vault's mission is continued.



DISCUSSION QUESTIONS/CATEGORIES

GENERAL/OPEN PROMPTS

1. In your own words, what would you say is the purpose of this documentary? Was it effective?
2. Compared with all of the other problems the world faces (civil wars, unequal rights, dictatorships, the refugee crisis) do you agree with Cary Fowler that lack of biodiversity is the biggest problem that humanity faces?

EXPLORING SELF

1. The Seed Vault in Svalbard, Norway is reminiscent of a time capsule that tells a history of humanity's agricultural system. If you were to create a vault or capsule of your story right now, what would be included in it? Clothing, memories, thoughts, ideas, food, friends, family are some things to consider when selecting for your capsule. Why would it be important to preserve this time in your life? What would be important to leave out?

EXPLORING THE WORLD

1. Cary Fowler describes the lack of biodiversity as a domino effect. If we don't create seeds that are resilient to climate change, we will no longer be able to adapt. Do you see biodiversity as the first domino in this effect? What other potential dominoes could be the start or root of this problem?
2. Cary Fowler hints that the world will not be able to function without biodiversity, but gives few details what this world would look like. What do you think a world lacking biodiversity would look like? Would humans be able to adapt to find out?
3. Do you think that The Seed Vault in Svalbard, Norway is an effective way to solve this problem? What are some other solutions you see to this problem?
4. Cary Fowler argues that it is important for governments to come together to solve this problem: "All the countries in the world doing something cooperative and for the long term gives hope. We don't have too many examples of that in this world of ours." What are some potential drawbacks to solving this problem from a global standpoint? Do you think the United States should have its own Seed Vault?

EXPLORING FILMMAKING

1. Think of the segment in the documentary when Fowler narrates the effect of climate change on crops (8-9:45). The filmmaker has chosen to show a time-lapse of the rotting fruit and food to strengthen Fowler's argument. Do you think this was an effective way to strengthen his argument? What other ways would you have chosen to edit this segment in the documentary?
2. The filmmaker chose to reveal that Cary Fowler battled cancer. Fowler states "What I did learn about having cancer, is that you don't want to get to the end of your days truly dying with a lot of regrets" and feels as though cancer helped him to appreciate things on a daily basis. Do you think that it helped strengthen or weaken the filmmaker's argument by adding in Fowler's personal experience? What was the purpose of adding in this personal information?
3. It is not until the very end of the documentary that GoPro reveals its patronage. Do you think that this took away from the legitimacy of the documentary, or did it enhance it? Should this patronage be revealed during the introduction? Why or why not?

EXPLORING SOCIAL ISSUES

1. The Seed Vault controls access to its supply. Do you think an American citizen would have a greater chance of having access to this supply as compared to a Nigerian citizen? Do you think this is fair? How could this controlled access lead to greater problems?

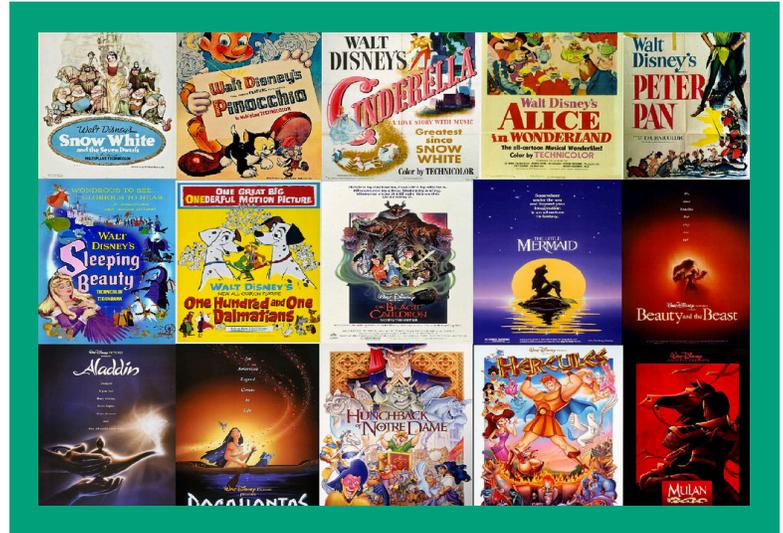


SENSE OF WONDER

1. If you were to preserve the flora and fauna from your city, what would you preserve? Would you preserve the invasive species as well? Would you only consider naturally occurring flora and fauna? Would humans be included in this preservation as well? How could you make it fair regarding who gets to decide what needs to be preserved?

ACTIVITIES

Alright everyone, let's make a movie poster!



MATERIALS NEEDED:

Colored pencils, markers, construction paper, scissors, glue, large sheets of white paper (one per group or person), masking tape (for hanging posters at the end), sticky notes (three per student for voting on posters at the end)

DIRECTIONS:

Prior to starting activity have the following quotes from The Seed Vault written on the board: (It might be easier to have them projected from a slide)

- “My real concern is that we are losing diversity within species within tomatoes, within the melons, corn and wheat, we are losing that day by day and so there is a real urgency. If we don’t collect it and conserve it now then we’re not going to have it ever in the future.”
- “In the last 100 years, 93% of the known fruit and vegetable varieties in the US have become extinct.”
- “The crops are on the front lines, they’re the first things that have experienced climate change, they are not adapted to conditions they have not seen before, our domesticated crops are totally dependent on us, their survival depends on us, that’s our future and like it or not, we’re together”
- “We have two rolls of the dice to get this right. We have to get climate change ready crops in the field and we have to do that rather quickly. Because quite literally, if agriculture doesn’t adapt to climate change, neither will we. What are we doing if we’re not conserving that foundation of civilization?”
- “Gosh, there are a lot of extinction stories I’m afraid, to some extent we don’t know what we’ve lost.”
- “Our agricultural system goes back hundreds of human generations so all of our ancestors have had a role in conserving this diversity and handing it off to us, we just have to hand it off to the next generation.”



- Let students know the following requirements for the movie poster. They must have at least ONE quote from the above quotes (do not have to use entire quote), their names and dates written on the back of the poster, the movie title, and one illustration. (It is important for names to be written on the back to create a sense of anonymity during the gallery walk)
- Divide students in small groups or partner off and give them one sheet of white paper. Have materials out in front of class so that everyone can come up and use them.
- Give students an allotted amount of time (around 10 minutes) and let them know that they will be voting for the best poster individually during a “gallery walk” at the end of the activity.
- When students are done, have them hang their posters on the wall. They will be voting on who made the most effective movie poster (Who created the poster that advertises the movie BEST and therefore helps to continue to the mission of The Seed Vault).
- Give each student three sticky notes. They will be participating in a “gallery walk” to vote on the best poster (Remember: Who created the poster that advertises the movie BEST and therefore helps to continue to the mission of The Seed Vault). Students are not allowed to talk during the gallery walk as it will sway opinions. Ask each student to go around and write one thing they liked about the poster they are voting for on a sticky note and stick it to the posters they thought did the best job out of the class. They are not allowed to vote for their own creation! To facilitate less talking, put on classical music in the background and set a timer for three minutes.
- When timer has gone off, students are asked to review their own poster to read the comments. As a class, review who got the most votes and what they did well.

OTHER RECOMMENDED ACTIVITIES:

- Have students keep a food diary for a day. Ask them to bring in one nutritional label of something they eat everyday. See if there are any repeats within the class and pair those students off (i.e. if three students brought in a nutritional label from Cheerios have them all work as a group). Have them divide and conquer—each student researches three ingredients and create a poster to present to the class about what they discovered about the ingredient.
- Have students complete a “jigsaw” reading of the article “Crop Diversity: Why It Matters” (<https://www.croptrust.org/our-mission/crop-diversity-why-it-matters/>). There are six sections to the article: ensuring food security, adapting to climate change, safeguarding biodiversity, protecting nutritional security, reducing poverty, and ensuring sustainable agriculture. Split the students up into six groups and assign them a section of the article. They will only be responsible for reporting on that section. Have each group read the assigned section together. Give each student a poster and have them split it into three parts. The three sections of the poster will be “connections, summary, and visualize.” It will look something like this:

| CONNECTIONS | SUMMARY | VISUALIZE |
|-------------|---------|-----------|
| | | |

- Each group will be responsible for reading the assigned section of the article and creating a poster
- Once all the groups have completed the activity (around 10 minutes total), they will be responsible for presenting the poster to the class
- After all students have presented their poster, give the class time to ask questions and reflect



EXIT TICKET

List the vocabulary words on the board (biodiversity, climate change, preserve, evolve, extinction). Ask students to create a summary of The Seed Vault in pairs using all of the vocabulary words. They will record their work on a sticky note and share with the class or with teacher before leaving for the day. S

RECOMMENDED EXTENSIONS:

Has your class watched the documentary *Adaptation: Bangladesh*? In this documentary, Alize Carrere makes an argument that the solution to climate change is through humanity adapting to the changing environment in innovative ways. After watching *The Seed Vault*, ask your students to create a pro/con chart either in partnerships, individually, or as a class comparing and contrasting the messages of *Adaptation: Bangladesh* and *The Seed Vault*. After class has created a pro/con chart, hold a class discussion and ask students to take a stance and articulate their thoughts regarding the following statements: (Make sure each student has a copy of the pro/con chart to reference during the debate. To encourage everyone to speak, give each student three tokens. Once they have spoken, they have to give the teacher their token. If a student is hesitant to share, partner them off with someone who loves to share, but have that more reserved student be the “voice” for the partnership).

- Do you think the solution to climate change is adaptation or preservation? Why or why not?
- Do you think that preserved seeds will be useful in a landscape that will be dramatically different by 2050?
- Which documentary was more effective in communicating their message? Why or why not?
- How could you create a solution to climate change that synthesizes the ideas of adaptation and preservation?

REFERENCES:

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