CATAN
SCENARIO
CROP TRUST™
Rules

Story

Have you ever wondered if people on Catan only grow wheat? No, of course they don't. Among other crops, you'll find beans, maize (aka corn), quinoa, and rice in the fields of Catan. This crop diversity lends strength to the settlers' nutrition and Catan's ecosystem.

At harvest time, the inhabitants of Catan plant a diverse variety of seeds, "rotating" their harvests in order to replenish the soil, vary their produce, and balance their nutrition. They store seeds to ensure a future of crop diversity and healthy agriculture. It's a careful but vital balance. Otherwise, some crops might disappear altogether from Catan.

Theme

What if crop loss threatened Catan? Can you settle Catan without threatening the food supply?

We live in an ever more crowded world. Food shortages and famine stress populations in poor and marginal environments. Regional plant losses threaten crop diversity.

Catan: Crop Trust™ is an engaging and fun game experience for the family that may lead to thoughtful understanding about the importance of crop diversity to our food supply. Here, we introduce simple, semi-cooperative rules that enliven and educate the *Catan*® experience. Players must weigh their need to harvest crops against a collective goal to store and preserve seeds in the seed vault.

The Crop Trust

We developed this scenario in collaboration with the Crop Trust (officially known as the Global Crop Diversity Trust). The Crop Trust is an independent international organization whose goal is to preserve crop diversity in order to protect global food security. Among other things, the organization supports the work of the Svalbard Global Seed Vault to store seeds of some of the world's most important crops in Svalbard, Norway.

If you want to know more about the seed vault and Crop Trust's work, we recommend that you read the enclosed almanac.
For further information, please visit www.croptrust.org. All proceeds of this scenario will be donated to the Crop Trust to support crop conservation work.

Have fun playing the *Catan: Crop Trust* scenario!

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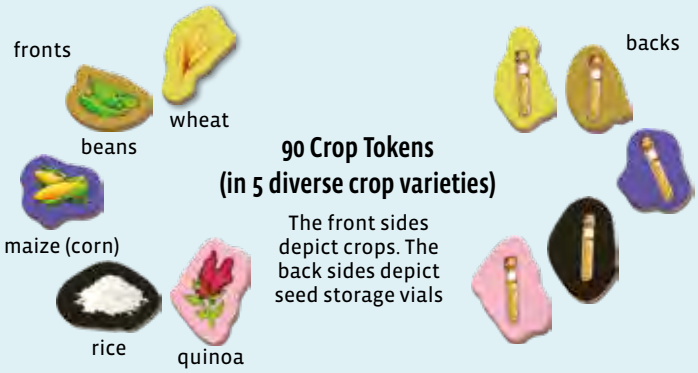
GAME BOARD PREPARATION

For your first *Catan: Crop Trust*™ game, we recommend the set-up shown below. Please note that the desert is not used in this scenario. Instead, you use the additional fields hex included in this scenario (watermarked with a seed vial icon).

Add your scenario components (shown below) to those found in your *Catan*® game. Then, set up as follows.

Starting set-up for your first game

SCENARIO COMPONENTS



90 Crop Tokens
(in 5 diverse crop varieties)

The front sides depict crops. The back sides depict seed storage vials

41 Event Tokens
(in 4 different categories)

1 Fields Hex
(replaces desert)

4 Crop Storage Records
(with build costs and seed storage)

1 Number Token "9"

Seed Vault display

1 Rules Book
w/Crop Trust Almanac

GAME PREPARATION

GAME COMPONENTS

Player Pieces

Each player chooses a set of game pieces in one of the available colors. If this is your first game, place your starting settlements and roads on the board as shown in the Starting Set-up. After you are comfortable with the new rules, try the variable setup (see page 7).

In a 3-player game, set aside the pieces of 1 color. Do not place the starting settlements and roads of this color on the board.

Each player receives a Crop Storage Record player aid and places it in front of him/her.

The Seed Vault & Crop Tokens

Place the starting crop tokens on the fields hexes as shown in the "Starting set-up for your first game."

Place the seed vault display beside the game board. Each player places 4 crop tokens (seed vial side up) of one plant type on one of the 2 seed vault spaces marked in their player color. Red chooses rice, White chooses beans, Orange chooses maize, and Blue chooses quinoa.

Place all remaining crop tokens beside the board.

The Robber

The robber starts on the pasture hex marked "2".

Starting Resources

At the beginning of the game, each player receives the starting resources for the settlement of his/her player color (marked with stars ☆ in the starting set-up for your first game).

Event Tokens

Shuffle the event tokens face down (seed vial side up). Each player takes 7 of these tokens and places 1 face-down token under each of the remaining 3 settlements and 4 cities of his/her supply.

In addition, place 1 face-down event token each on the special victory point cards "Longest Road" and "Largest Army."

Arrange the remaining event tokens into a face-down supply stack and place it beside the board.

SCENARIO RULES

Unlike in the *Catan* base game, the *Catan: Crop Trust* scenario specifies the crops depicted by the "grain" card. Here, the fields produce wheat, maize, rice, quinoa, and beans. Hence, for all these crops we use the generic term "**food**" instead of "grain." The grain resource cards are called "**food cards**."

Play this scenario according to the standard *Catan* board game rules. Apply the following scenario rules, which modify game play.

HARVESTING FOOD

If someone rolls the number of a fields hex adjacent to your settlement/city, you may choose to harvest or not to harvest food. To harvest food, you remove a crop token of your choice from the fields hex and return it to the supply. After removing a crop token—no matter of which type—from a fields hex, take a food card (grain card) from the supply. For a city, you may remove 1-2 crop tokens and accordingly take 1-2 food cards in exchange.

Per normal *Catan* game rules, you **must** take 1 resource card for each settlement and 2 resource cards for each city adjacent to a terrain hex whose number was rolled. This rule also applies to this scenario… **except for the resource "food" (grain)**. If someone rolls the number of a fields hex adjacent to your settlement/city, you may choose not to remove a crop token from the field. In this case, however, you receive no food card.

You make the choice to harvest/not harvest in 1-2 harvest rounds. Harvest rounds are conducted in player order, starting with the player that rolled the dice (called the "active player"). If the active player does not have a settlement/city adjacent to the producing hex, start with the next player in clockwise order entitled to receive production from this hex. During a harvest round, each player who has a right to harvest crops from this hex decides whether to remove 1 crop token and take 1 food card in exchange. Each player participating in the harvest of crops produced by a fields hex may only remove 1 crop token when it is his/her turn to select.

before harvest

Example: *White rolls a "9". The player order is White-Red-Blue-Orange. Red, Orange, and Blue are on the "9" grain hex. Red is the first player clockwise from White and decides to harvest. She removes 1 wheat crop token from this hex (returns it to the supply) and exchanges it for a food card (takes a grain card from the supply). Blue also decides to harvest. He removes 1 beans crop token and takes a food card. Blue cannot remove a 2nd crop token until the 2nd harvest round. Orange removes 1 maize token and takes a food card. Blue can now take his second harvest for his city, but he chooses not to harvest.*

This hex has only 2 remaining crop tokens. The next "9" roll will definitely force some hard choices due to a crop shortage on this field.

after harvest

CROP SHORTAGE

If someone rolls the number on a fields hex and that hex does not contain enough crop tokens for all players entitled to harvest the crops produced by that hex, you still harvest food in 1-2 rounds as normal. Harvesting stops when the hex bears no more crop tokens.

Should there be no more crop tokens on a fields hex when it is your turn to harvest, you cannot harvest. You cannot obtain a food card. Now, all the owners of settlements or cities adjacent to this fields hex can no longer harvest to receive food cards.

ENSURING CROP DIVERSITY

Depositing Seeds in the Seed Vault

You may store crop tokens—and thus seeds—in the seed vault once during your turn by making a seed deposit. You may only deposit crop tokens of which there is at least 1 on a fields hex adjacent to one of your settlements or cities (***for example:*** *if none of the fields hexes adjacent to any of your settlements/cities have a rice token, you cannot deposit rice*).

The robber does not affect the storage of crop tokens in the seed vault. You may take a crop token from a fields hex and store it in the seed vault even if that fields hex is being blocked by the robber.

If you decide to store crop tokens, follow this 4-step process (you must complete each step):

1. Pay the storage costs
2. Record the deposit and receive rewards
3. Store seeds in the seed vault
4. Replant crops in the fields

1. Pay the Storage Costs

First, pay the storage costs by returning 1 lumber and 1 ore to the supply. Then you proceed as follows:

Example: *Red takes 1 ore card and 1 lumber card from her hand and returns them to the card supply. Her storage costs are now paid.*

2. Record the Deposit and Receive Rewards

Take 1 crop token from a fields hex adjacent to one of your settlements or cities. Place it on an unoccupied space of your Crop Storage Record. The Crop Storage Record shows 2 rows, each with 5 spaces for crop tokens. Place your first crop token on the green-framed space in the upper row. Place additional tokens one by one on the next spaces in the direction indicated by the arrows. The following rules apply:

- You may only place 1 crop token of each type in each row.
- If you want to store a crop token of a certain type and you have already placed a token of that type in the upper row, you may place it in the second row.
- If you have already placed a token of a certain type in both the first and the second rows, you may not place a third token of that type on the Crop Storage Record. This also means that you cannot store crop tokens of this type in the seed vault (see below, *Store seeds in the Vault*).
- You don't receive a reward for the first crop token placed in a given row of your Crop Storage Record. When you place a second token, you receive 1 development card for free. For the third, fourth, and fifth crop tokens you place in one of the rows, you receive 1 victory point each. In theory, you can receive these rewards twice—if you manage to place 5 different crop tokens on the spaces of the second row as well.

Example: *Red removes 1 crop token "beans" from a fields hex adjacent to her settlement/city. She may not place the token in the first row of her Crop Storage Record because she has already placed a beans token there. She must place it on the first space of the second row of her Crop Storage Record, because that is the first available space in that row.*

3. Store Seeds in the Vault

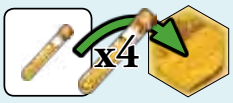
You have 2 spaces of your player color on the seed vault tile. Use these as your storage areas in the seed vault. One space is empty. The other space is always filled with 4 crop tokens (remember that you filled that space at the beginning of the game).

From the supply, take 4 crop tokens of the same type as the token that you placed on your crop storage record (step 2 above). Place these tokens on your unoccupied space in the seed vault (seed vial side up).

If there aren't enough crop tokens of a type available (which is very rare), place the remaining crop tokens of this type in the seed vault (again, even if they are less than 4).

Example: *In step 2, Red placed a "beans" token on her crop storage record. She now takes 4 "beans" tokens from the supply and places them on her empty space in the seed vault.*

4. Replant Crops in the Fields



Take the 4 crop tokens currently on a space of your color in the seed vault (i.e., the tokens next to the space you just filled with new crop tokens) out of the seed vault. Place the 4 tokens on the fields hexes of the game board. Distribute them as follows:

- You must place each of the 4 crop tokens on a different fields hex.
- You don't have to own a settlement or city adjacent to the fields hexes on which you place them.
- A fields hex may contain various identical crop tokens.
- A fields hex may contain no more than 7 crop tokens. You may not place a crop token on a fields hex that already contains 7 crop tokens.
- Should multiple fields hexes already contain 7 crop tokens and, as a result, you are unable to distribute all 4 crop tokens among the fields hexes, return the remaining tokens to the supply.

Example: *Red now takes the 4 "rice" tokens that are already in her other seed vault space and replants them. She distributes these 4 tokens by placing each of them on different fields hexes on the board (1 token per hex).*

EFFECTS OF GROWTH

Crop tokens are not only removed from the board by harvesting. Building and developing the island's network of settlements, cities, and roads and providing food for the knights also causes pressure on crops.

Revealing Event Tokens

Each time you build a settlement or city, take the event token underneath, turn it over, read the respective event out aloud, and resolve the event. Proceed similarly whenever you receive the special victory point cards "Longest Road" or "Largest Army" (be it the first time these cards are awarded or later, when they change hands).

If you have built a city and returned your settlement to your supply, draw a new event token from the supply stack and place it under this settlement. You take a similar approach when a special victory point card changes hands and you are the new owner of the card: after revealing the event token on the card and resolving the event, you draw a new event token from the supply stack and place it face down on the special victory point card.

If you have played all event tokens from the supply stack, shuffle them and arrange them into a new face-down supply stack.

The fronts of the event tokens show various symbols indicating different disastrous effects as described below.

Regional Crop Loss

Remove all crop tokens of the type depicted on the event token from the fields hexes marked with the depicted numbers and return them to the supply.

In this example, you would remove all "beans" crop tokens from the fields hexes marked with the number tokens 5, 6, or 8.

Small-scale Crop Loss

Remove 2 crop tokens of the type depicted on the event token from the board. Return these 2 tokens to the supply. You must first remove crop tokens of the depicted type from fields hexes adjacent to which you have built a settlement/city. If there are fewer than 2 of the affected crops on such hexes, remove the required number of crop tokens from other fields hexes.

In this example, you would remove 2 "quinoa" crop tokens from the board.

Large-scale Crop Loss

Remove 3 crop tokens of the type depicted on the event token from the board. Return these 3 tokens to the supply. You must first remove crop tokens of the depicted type from fields hexes adjacent to which you have built a settlement/city. If there are fewer than 3 of the affected crops on such hexes, remove the required number of crop tokens from other fields hexes.

In this example, you would remove 3 "maize" crop tokens from the board.

Monoculture

Monoculture is the cultivation of a single crop species in a given area. If a fields hex contains only 1 type of crop token (***for example:*** *only beans tokens, or only rice tokens*), you must remove **all** of these tokens and return them to the supply.

> ***Example:*** *If a fields hex contains 2 beans and 3 maize, no action is taken. However, if one hex contains only 4 beans, and another hex contains only 1 rice, you must remove all 4 beans tokens and the single rice token.*

Extinction of Plant Species

Crop tokens may disappear from the game board during harvest and due to the event tokens. If there are no crop tokens of a given type on the board, and if no crop tokens of this type are stored in the seed vault, this plant species is considered extinct.

If this occurs, return all crop tokens of this type from the supply back into the box. Tokens of this type on crop storage records still remain.

It is now no longer possible to plant or harvest this crop, nor is it possible to store this crop in the seed vault.

If you reveal an event token that depicts an extinct plant species, return it to the box. Then draw a new event token from the supply and resolve its effects.

END OF THE GAME

The game ends as soon as any 1 of the following 3 end game conditions occur:

1. A player reaches 10 victory points on his/her turn.
2. 3 of the 5 fields hexes no longer contain crop tokens.
3. 2 of 5 plant species are extinct.

If you meet end game condition 1, you win the game!

Important: If you reach your 10th victory point (***for example, by building a settlement/city***), you must still reveal an event token. If this event token causes end game condition 2 or 3 to occur, then end game condition 2 or 3 takes precedence.

If end game conditions 2 or 3 occur, the game ends immediately. If you are the player with the most crop tokens on your crop storage record, you win, because you are the player who most contributed to conserving plant diversity. In case of a tie, the tied player who has the most victory points wins. If the tie persists, both players win.

Please note: If, during the **production phase**, you remove a crop token from a fields hex, thereby causing end game condition 2 or 3 to occur, **you lose the game**—even if you have the most crop tokens on your crop storage record. In this case, the player with the 2nd most crop tokens on his/her crop storage record wins.

If you reach 10 victory points during your **build phase** but are forced to reveal an event token, and this event token causes end game condition 2 or 3 to occur, you may still win the game, if you have the most crops stored in your crop storage record.

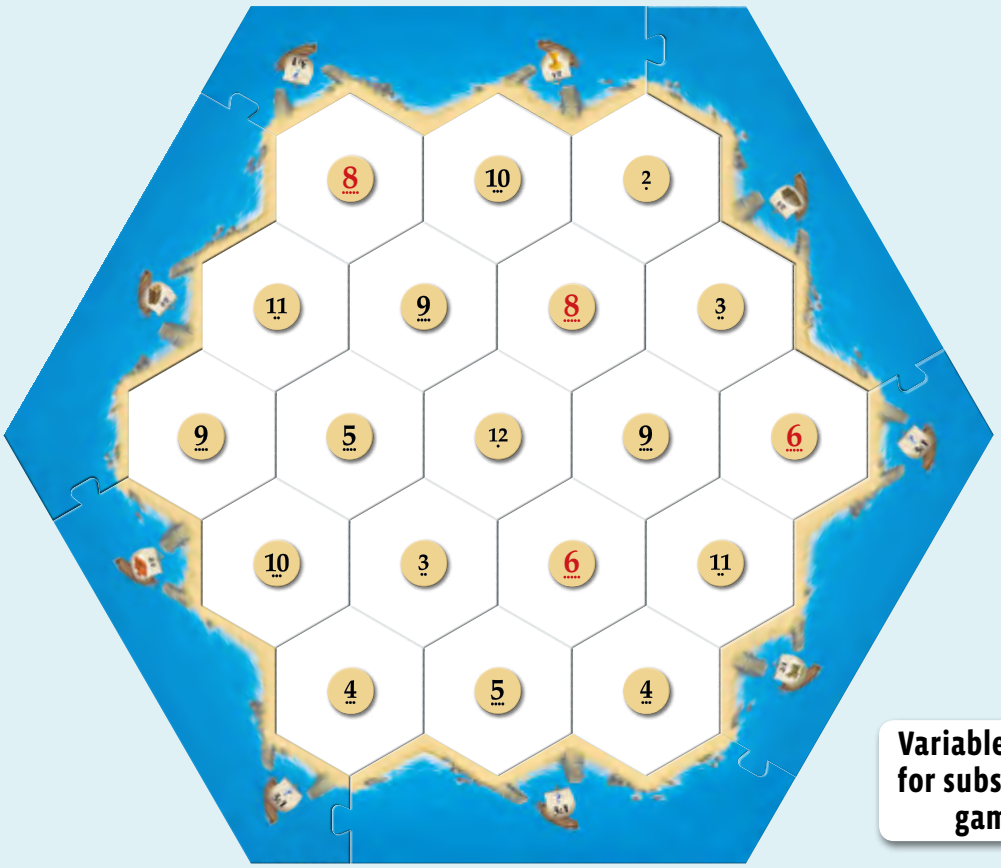
VARIABLE SET-UP

For subsequent games, we recommend that you use a variable set-up. To this end, shuffle the terrain hexes, distribute them face down, and then turn them over. Place the number tokens as shown in the set-up example below. This ensures a balanced distribution of the number tokens, while the varying positions of the fields hexes transform every game into a different and unique experience.

Distribute the crop tokens among the fields hexes as follows:

- Place 1 quinoa on each fields hex marked "2" and "12".
- Place 1 quinoa and 1 maize on each fields hex marked "3" and "11".
- Place 1 quinoa, 1 maize, and 1 wheat on each fields hex marked "4" and "10".
- Place 1 quinoa, 1 maize, 1 wheat, and 1 beans on each fields hex marked "5" and "9".
- Place 1 crop token of each crop species on each fields hex marked "6" and "8".

At the beginning of the game, the following crop tokens are placed on the seed vault spaces: The starting player places 4 crop tokens "rice" on one of the 2 seed vault spaces of his/her color. The next players in clockwise order each choose 4 crop tokens "beans," "wheat," and "maize."



Variable set-up for subsequent games

CATAN: CROP TRUST ALMANAC

INTRODUCTION

Our world now faces an enormous challenge: sustainably producing enough healthy food for a population expected to be over 9 billion people by 2050, all while our climate is changing and competition for natural resources grows. Fortunately, there is reason for optimism: crop diversity.

Did you know there are 150,000 different types of wheat and 115,000 different types of rice? So what? Well, we all need this diversity so that we can be prepared for whatever challenges agriculture may face. Without crop diversity it's like playing a game of Catan without every resource card available to you. Using the wealth of diversity of our food crops is one of the most valuable, yet least recognized, ways of responding to the challenges facing the world's food system. That's because crop diversity is the foundation of agriculture, enabling it to evolve and adapt no matter what the future holds. However, much of this diversity has disappeared over the history of agriculture. Fortunately much of it is safeguarded in the world's seed banks. The Svalbard Global Seed Vault, which opened in 2008, acts as a backup for these collections. The Crop Trust was established to ensure we don't lose any more vital crop diversity by supporting these seed banks and the Svalbard Global Seed Vault.

THE SEED VAULT VISION

Deep inside a mountain on a remote island in the Svalbard archipelago, halfway between mainland Norway and the North Pole, lies the Svalbard Global Seed Vault— the world's ultimate backup of crop diversity. It is a seed storage facility built to stand the test of time— including natural and man-made disasters. The Seed Vault holds the world's largest and most diverse collection of crops, frozen for humanity.

Worldwide, thousands of seed banks conserve food crops, yet many of these are vulnerable. Natural catastrophes, war, or even a lack of funding or electrical failure can threaten daily operations. Something as small as a poorly functioning freezer can ruin an entire crop collection, and the loss of even a single crop variety is as irreversible as the extinction of a dinosaur. t was this vulnerability that sparked the idea of establishing the Svalbard Global Seed Vault: to serve as a back-up collection for these seed banks, securing—for centuries— some of the world's most important food crops.

INFO ABOUT *THE CROP TRUST*

The Crop Trust is the only organization whose sole mission is to ensure humanity conserves and makes available the world's crop diversity for the future of our food system. Established in 2004 and based in Bonn, Germany, the Crop Trust supports international and national seed banks and the world's backup facility, the Svalbard Global Seed Vault. At the heart of the Crop Trust's work is an endowment fund, which is designed to provide support for seed banks, forever.

A 10,000 Year Legacy We Can't Leave to Chance

Throughout the history of agriculture, farmers have nurtured millions of crop varieties, using them to create ingenious solutions to local challenges such as drought, soil salinity and pest and disease outbreaks.

Today, crop diversity is what enables farmers to feed the world. It is the foundation of agriculture, and will enable it to meet the challenge of sustainably producing enough nutritious food for a growing world population.

But crop diversity is at risk. If it's not used or conserved, it disappears. And once it's gone, it's gone forever.

No single seed bank can hold all crop diversity and make it available to plant breeders and farmers. That's why the Crop Trust provides support to a number of different seed banks around the world, to ensure our agricultural legacy is conserved for all of us.

How You Have Already Helped

By purchasing this *Catan* scenario, you have contributed to strengthening the foundation of our food system. Thank you!

Now let's break bread and settle Catan.

FAQ

Who is involved in the Svalbard Global Seed Vault?

The Seed Vault is owned and administered by the Norwegian Ministry of Agriculture and Food. The Crop Trust provides support for operations, and funds the preparation and shipment of seeds from developing countries. The Nordic Genetic Resource Center (NordGen) operates the facility and maintains a public online database of samples stored there. Statsbygg, an agency of the Norwegian government, is responsible for monitoring and maintaining the Seed Vault around the clock.

Why the island of Svalbard?

Svalbard was chosen partly because of its remote location: It is the furthest north you can fly on a commercial flight and a place with more polar bears than people. The area is also geologically and politically stable. The Seed Vault itself is built into a mountain called Platåberget in Norwegian, which means Plateau Mountain, far above the point of any possible future sea level rise. Chiseled 120 meters (393.7 feet) inside the mountain, the Seed Vault is surrounded by permafrost, ensuring that the Seed Vault rooms remain naturally frozen, even if the mechanical cooling system fails.

How much did it cost to build the Seed Vault?

The Norwegian government spent approximately US$9 million constructing the Seed Vault. In 2018, another US$12.7 million was invested to upgrade the access tunnel. Operational costs are shared between the Norwegian government, the Crop Trust and NordGen.

Who owns the seeds in the Seed Vault?

Depositors own all the seeds they send to the Seed Vault, and can request them back at any time, just like a safety deposit box at a bank. The boxes of seeds are sealed by the depositors prior to shipment to Svalbard, and only they can retrieve them.

How many seeds can be stored in the Seed Vault?

The Seed Vault can store 4.5 million seed samples. Each sample contains on average, 500 seeds, so a maximum of 2.25 billion seeds can be stored there. It currently contains around 1 million seed samples, making it the world's largest seed collection. This includes all of the crops in the fields of Catan (maize, rice, wheat, quinoa and beans)—and many more.

How are the seeds stored?

The seeds are stored at minus 18° Celsius (minus 0.4° Fahrenheit). They are sealed in specially designed foil packets that are placed in sealed boxes and stored on shelves inside the Seed Vault. The low temperature and moisture levels ensure little metabolic activity. This means the seeds can be grown decades, centuries, or in some cases, thousands of years into the future.

Are genetically modified seeds stored in the Seed Vault?

Nope… Norwegian law prohibits the import of genetically modified seeds.

What are the main differences between the Seed Vault and seed banks?

Svalbard stores frozen copies of seeds held in other seed banks, acting as a kind of insurance policy. Scientists use seed banks every day to obtain seeds for research. This includes work to breed crops that are more resilient to climate change, healthier, and even tastier. If for whatever reason a seed bank runs into trouble, they can rest assured that their seeds are safely backed up in Svalbard. This happened in 2015 when a seed bank in Syria could no longer function due to civil war. It withdrew some of its seeds from the Seed Vault to re-establish its collection elsewhere.

THE CROPS OF *CATAN: CROP TRUST*

Rice

Mmmm… sushi. Paella. Risotto. You, me and half of the world eats rice every day; however, the popular grain faces a range of challenges. One of the biggest is salty soil, particularly in low-lying areas. This is likely to become more serious as sea levels rise. Scientists are using rice diversity to cook-up salt-tolerant types that also produce high yields, have better grain quality and are resistant to some diseases.

There are over 162,000 rice samples in the Seed Vault.

Maize/Corn

This giant tropical grass is one of agriculture's biggest success stories. From tortillas to cornflakes to popcorn and ugali (an east African favorite), maize is the preferred food for more than 1.2 billion people worldwide. But for some, maize is the only thing on the menu, leaving their diets lacking in key vitamins. Scientists have studied the maize stored in the world's seed banks to find those highest in vitamin A. Through crop breeding, scientists have used these to develop new types of maize that are both more nutritious and productive.

There are over 38,000 maize/corn samples in the Seed Vault.

Beans

You might have gotten wind of the fact that beans are grown all around the world and that's no surprise: they're a vital source of protein, vitamins and minerals. But they are also sensitive to the effects of climate change, which could devastate production. Scientists are now using beans from the world's seed banks to breed several "heat beating" types. These can tolerate temperatures up to 4 degrees higher than the crop's normal "comfort zone." These are among the thousands of bean samples backed up in the Svalbard Global Seed Vault. Cool beans!

There are over 48,000 bean samples in the Seed Vault.

Wheat

As any committed Catanian knows, no wheat means defeat, and that applies beyond the borders of the game. Wheat is a US$150 billion industry, providing almost a quarter of our daily calories. However, the crop is threatened by pests and diseases—and that could mean defeat for humankind. One of the most notorious diseases is the fungus stem rust. In 1999, a new stem rust strain, Ug99, appeared in Uganda and began wiping out entire fields as it spread towards the major wheat growing regions of Asia. As soon as Ug99 was discovered, the race began for scientists to scour the world's wheat diversity in search of new sources of resistance and breed more resilient types.

There are over 175,000 wheat samples in the Seed Vault.

Quinoa

Many cultures across the globe love quinoa, and rightly so: it is a highly nutritious crop that has adapted to thrive in a wide range of environments, and it tastes great. While it has become popular recently with foodies and hipsters, quinoa originated in the Andes over 7,000 years ago and was known as the "mother grain" of the Incan Empire. Now 20 different kinds of quinoa are grown in over 70 countries, as farmers and consumers alike realize the crop's potential. To help crop scientists ensure future generations can enjoy this "superfood," safeguarding it in the world's seed banks is essential.

There are over 500 quinoa samples in the Seed Vault.

THREATS TO CROP DIVERSITY

As a Catanian, we know you have an inquisitive mind, so we'll tell you a little bit about what crop loss can mean. There are two important types:

- **Production loss:** When yields tumble due to, for example, a pest or disease outbreak, as you'll see below with potato and banana.
- **Diversity loss:** A reduction in the number of varieties of a particular crop. If there are 4,500 varieties of potato and only five are grown, the remainder are at risk of being lost forever if they are not conserved.

Both types of loss can have devastating effects. Here are some examples:

Small-scale crop loss

Lentils: Lost but not Forgotten

Lentils are a traditional crop on the Swabian Alb. Although this region in south-western Germany is characterized by relatively poor soils and a harsh climate, farmers have been able to produce lentils there for centuries. Due to this long history of lentil farming, traditional varieties that are well adapted to this region have emerged. One such variety is called the *Albleisa*, which had gone extinct in the 1960s, as the production of lentils and other "pulses" declined throughout Germany.

In the early 2000s, farmers in Swabia realized that this variety had vanished—even though they particularly liked its taste. They contacted one of the world's largest and oldest seed banks, the Vavilov Institute in St Petersburg, Russia, and discovered that they still conserved a sample of this old variety. Scientists at the institute were able to help reintroduce *Albleisa* lentils to the Swabian Alb. Today it is one of the most popular local varieties and a local product that is sold well beyond the region. This is an example of relatively small-scale, local loss of crop diversity and how, thanks to conservation in seed banks, sometimes what seems to be lost forever can be brought back to life.

Large-scale crop loss

Potato Late Blight & the Irish Potato Famine

The potato is the world's third most important food, consumed by more than 1 billion people. But late blight might just be the most notorious disease in agriculture, affecting potatoes as well as tomatoes and other "nightshade" plants.

Late blight mutates and spreads like the flu, constantly overcoming plant resistance. More than 160 years after the disease wiped out potatoes across Europe and triggered the Irish Potato Famine, it continues to threaten farmers' livelihoods around the world. It causes US$9 billion-worth of potato losses every year in developing countries alone, where the majority of potato farmers live.

Ireland's famine was due to the fact that the island relied on a single potato variety, the lumper. It had no resistance to late blight. The keys to help fight the blight (and other diseases) can be found in the 4,500 different kinds of potato, grown and conserved around the world.

Regional crop loss

Apples in the United States of America

Crop loss doesn't only mean productivity loss. It can also mean the loss of options. This was the case with apples in North America. Apples originated in Central Asia, and have been grown for thousands of years across Asia and Europe. They came to North America on the ships of European settlers, and from there, spread like wildfire. After all, what would the United States be without apple pie?

In the mid-1800s, there were thousands of different apple varieties grown in the United States—an astonishing amount of diversity. However, with changes in agricultural practices, many of these varieties were lost or died off, along with the orchards and family farms that grew them. Estimates suggest North America may have lost 80% of its traditional apple varieties, leaving those remaining vulnerable to pests and disease, and depleting the culinary culture of the region. Old varieties like Mother apples, for example, were good for making dessert, while Harrison apples, were renowned for making a delicious golden cider.

While thousands of these varieties have become commercially extinct, they are not all biologically extinct. Horticulturists known as "apple detectives" are tracking down these old apples tucked away in abandoned orchards or growing in back yards, and seed banks, such as those run by the United States Department of Agriculture (USDA), are helping to conserve them. These apples not only have important genes for resistance to the threats facing the modern apple orchard; they might just bring back some unique flavors too.

Monoculture

The Cautionary Tale of 'Big Mike'

Until the 1960s, the *Gros Michel* (known as Big Mike) was the main commercial banana variety. It was so popular with Western consumers that thousands of hectares of tropical forests across Latin America were converted to vast monocultures of this variety. However, Big Mike's popularity led to its demise. A fungus known as Panama disease wiped out plantation after plantation during the 1950s and 60s and along with it, the international trade in bananas.

Luckily, the banana industry bounced back with a new, immune variety, called the Cavendish, which soon became just as widely grown. In fact, the Cavendish (the bright, yellow variety ever-present in supermarkets and fruit bowls) may be the only banana you have ever eaten—and every one you eat is genetically identical. It's this genetic uniformity, which also makes it vulnerable to disease, and in recent years a new strain of Panama disease has appeared which could kill off the Cavendish. In the scramble to save bananas from this incurable fungus, the world is looking to the 1,000-plus banana varieties conserved in seed banks to ensure the banana doesn't split for good.

SUMMARY OF EVENT TILE EFFECTS

Regional Crop Loss:
Eliminate all of the crop tokens of the depicted type from the fields hexes with the depicted numbers.

Monocultures:
If a fields hex has only 1 type of crop token on it, eliminate all crop tokens from that hex.

Small-scale Crop Loss:
Remove 2 tokens of the crop depicted from the board, starting with fields hexes adjacent to your own settlements/cities.

Large-scale Crop Loss:
Remove 3 tokens of the crop depicted from the board, starting with fields hexes adjacent to your own settlements/cities.

SUMMARY OF STORING SEEDS IN THE SEED VAULT

One time on your turn you may:

1. Pay 1 lumber and 1 ore to the supply.

2. Take 1 crop token (your choice) from a fields hex adjacent to 1 of your settlements/cities. Put that token onto your Crop Storage Record in the appropriate space. Your choice: top row or bottom row. Max. 1 of each crop type per row.

3. Take 4 corresponding crop tokens from the supply and place them into your seed vault storage area.

4. Take the 4 crop tokens previously in your seed vault storage area. Place these tokens onto 4 separate field hexes of your choice.

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