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HEIFER NICARAGUA

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THOSE WHO CAN, TEACH

PLUS

GLOBAL GREETINGS

Should you shake hands or pat that belly? Here are some suitable salutations from around the world.


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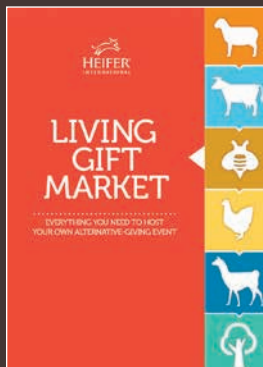


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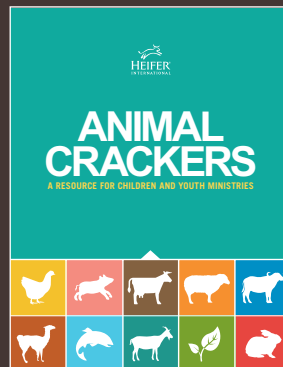
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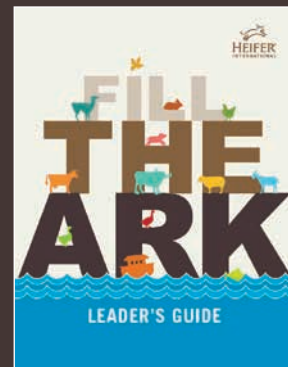
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Dear Fellow Activists,

In the late 1800s, American suffragette and activist Elizabeth Cady Stanton wrote, “The history of the past is but one long struggle upward to equality.” More than a century later, humanity continues to strive for equality. At Heifer International, we have a long history of and a present commitment to promoting equitable livelihoods and food security for families around the world.

Our founder Dan West, a farmer from Indiana, was moved by his experience as an aid worker during the Spanish Civil War to provide a **more lasting solution** to the extreme poverty he witnessed. The single cup of milk rationed to the refugees daily was simply not enough, so he pioneered a

movement to deliver livestock and training that continues to this day. We have successfully empowered 155 million people around the world to escape extreme hunger and poverty.

To completely end the global scourges of hunger and poverty—and we are getting closer—there can be no room for hatred, violence, racism, misogyny, anti-Semitism, homophobia or religious intolerance. Amid differences of opinions and strong feelings, we are all humans seeking peace, happiness and security. Heifer will continue our work to empower communities so that everyone can lead lives of dignity and self-reliance.

In this issue of *World Ark*, you’ll see how we are helping

farmers in Nicaragua adapt to hotter and drier farming conditions in the face of climate change. You’ll read about farmers in Uganda who are finding innovative, natural ways to enrich the soil. And you’ll see how women in Nepal are training to become community animal health workers, a critical component for success.

I hope you’ll be moved by these stories and that you’ll pass your copy on to a friend or neighbor who needs a little inspiration.

Yours for a better world,



Pierre U. Ferrari

A low-angle, close-up shot of a person's legs and feet as they run on a paved road. The person is wearing dark athletic shoes with white soles. The background shows a sunset or sunrise with a warm, golden glow over a landscape with distant hills and a body of water.

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COVER

Guillermina Castro cuddles a goat in El Pavon, Nicaragua. She's the boss of the family's farm, and her husband and children are happy to let her lead.

Top photo: Miriam Sabika preps seedlings for her garden in Mukono, Uganda.

Both photos by Lacey West

12 **Wisdom of the Seed Master**
Genetic preservationist Cary Fowler says he's not sure why people call the seed bank on the Svalbard Islands of Norway the "Doomsday Vault." Preserving seeds and the possibilities they offer is Fowler's optimistic way of preparing for the future.



22 **Those Who Can, Teach**
A family in Uganda masters the innovative thinking needed to thrive as small-scale farmers, and they share their expertise with anyone who wants to learn.



32 **Female Farmers Tackle a New Reality**
Mothers in Nicaragua are staving off malnutrition and keeping their families afloat with a new approach to farming that takes hotter temperatures and drier weather into account. As these women take the lead in providing for their families, they chip away at the machismo culture that's long plagued this Central American country.





SEEING IS BELIEVING

Thank you for the rich photos that accompanied the articles on guinea pigs and açai. They helped me identify with project participants and enhanced my enthusiasm for the things Heifer helps people accomplish.

JANET REED-MASSMAN
Fallbrook, California

LIVE AND LEARN

Thank you for your revelation several issues ago about a project failure in Haiti due to water problems (Spring 2016). It is nice to see that we are doing so much and taking bold steps to such an extent that there are failures. Surely never failing would mean playing it too safe and not seizing opportunities, however difficult or unfamiliar.

JEANNETTE SCHWERBEL
Stevens Point, Wisconsin

I was shocked to see a rather egregious error in the feature article on Heifer Zambia (Holiday 2016). The writer of the sidebar on Zambia's Copperbelt said

Zambia was known as Southern Rhodesia during the colonial period. Actually, Zambia was then NORTHERN Rhodesia. Southern Rhodesia is now Zimbabwe.

I hope the composer of the sidebar was not the senior editor who wrote the article! I was shocked to find such an easily fact-checked error in the publication of a society with international aspirations. Please correct your error and proofread more carefully in the future!

KATHLEEN ASHLEY
Portland, Maine

WHEN IN ROME

We have lived many years in Peru and we have enjoyed eating guinea pig. Peruvian food is fantastic. Being Swiss/French, I was always telling everyone how wonderful French food was. And indeed it is, but right beside it, we can put Peruvian food. There is nothing weird about eating guinea pigs; it's the local food in the Andes. It's like having chickens in your backyard, and eating them. If you go to France, you might eat snails; If you go to Germany, you might eat pig knuckles; and so on. Eat the specialty of the country you are visiting and you will gain even more joy and understanding of different countries, people, places.

FRANCOISE D'AURIOL-PIETZNER
Sheboygan Falls, Wisconsin

LONG-TERM RELATIONSHIP

In 2006, we went to Tanzania on a mission trip to Magome in the Iringa diocese. We brought nine solar stoves. The village is on the top of some hills so they have ample sunshine. We prepared banana bread in five of the ovens for an afternoon snack. When they sampled it, that enticed enough women to come

help prepare food in the ovens the next morning. We showed them how to cook beans, vegetables, *ugali* and eggs, and how to purify water. We were surprised when some men showed up to see how the ovens worked. Over the past 10 years, the St. Paul congregation also supplied solar lights for the pastor's house and three churches in the area. An entrepreneurial villager recharges phones using solar energy.

While in Tanzania, we visited a farmer, Lati, in the village of Ngisesi. He was a wonderful example of how Heifer projects work. The representative taught him contour terrace farming and supplied him with a cow. Eleven years ago he had successfully implemented all the principles to enable him to change his family's life. He was the reason we have continued to donate to Heifer International.

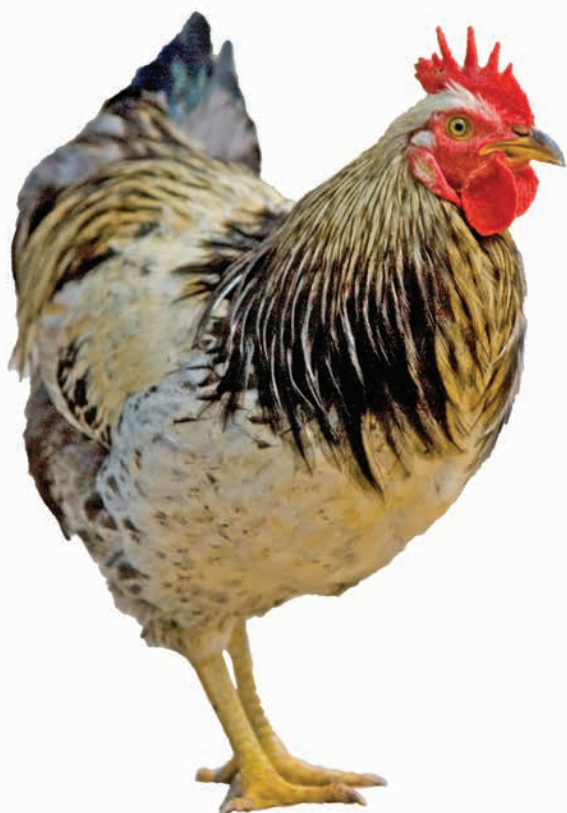
GEN NAKANISHI
St. Paul, Minnesota

Q&A SUMMER

Farmers around the world are already feeling the effects of climate change. Are you? Has climate change altered your life yet? If so, how?

We want to hear from you!

Please send your comments to worldark@list.heifer.org. Include your name, city, and a telephone number or email address. Letters may be edited for length and clarity, and may be published online as well as in print. Because of the volume of mail we receive, we cannot respond to all letters.



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Since 1944, Heifer has helped 31 million families, directly and indirectly, move toward greater self-reliance through the gift of livestock and training in environmentally sound agriculture.

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Bountiful Diversity

Story and photos by **Elizabeth Joseph**, garden and education coordinator at Heifer Farm



Evan Shaer picks lettuce at Heifer Farm.

After a spring of seeding and tending to plants, the warmer days of summer arrive, and the harvest is in full swing. Before we know it, young transplants have matured and put forth an abundance of roots, shoots, fruits, stems and seeds. The bounty is beautiful, abundant and, ideally, diverse.

In nature, biological diversity means strength. The more variety of plants and organisms present in an ecosystem, the greater the resilience of the larger whole. Our gardens and agricultural fields are no exception—the more, the better!

Polycultures, or the growing

of multiple crops in the same area, improve the soil, stimulate microorganisms critical for plant health, attract beneficial insects and pollinators, and break up weed, pest and disease cycles. For example, cilantro planted amongst tomatoes attracts beneficial parasitic wasps that prey on tomato hornworms, providing a built-in pest deterrent and maximizing use of space ... two crops in the space of one!

Another well-known example of polycultures is the three sisters garden, a Native American farming method of planting corn, beans and squash together, each helping the others grow. The corn provides

a trellis for the beans, which fix nitrogen in the ground, while the squash occupies the lower growing strata, preventing weeds, holding on to soil moisture, and, with their prickly leaves and stems, providing a deterrent to raccoons and other critters.

At Heifer Farm, we grow more than 50 different types of vegetables and plant multiple varieties of each of those crops; for example, we grow more than 20 varieties of tomatoes alone! Some withstand disease and others produce well in cool, wet summers. Some are best for tomato sauce and others for eating fresh. There are red, purple, black, green,



yellow, orange and variegated fruits. Some are round but others are oblong, lumpy, heart-shaped or bite-sized. The garden peach variety is even fuzzy! Two dozen tomato varieties just scratch the surface when it comes to biodiversity, though; indigenous farmers in Peru, for example, grow more than 3,000 types of potatoes!

Crop diversity also ensures economic security for farmers and food security for consumers in the event of a crop failure. The Irish potato famine is perhaps the most well-known and devastating example of a dependency on a single crop and crop variety. Diversity safeguards against the unpredictability of nature in the present and preserves genetic variations for yet unforeseen challenges and environmental conditions in the future.

All of this diversity is most welcome for all of us eaters as well, adding a cornucopia of nutrients, flavors, textures and colors to our plates. The produce aisle of a good grocery store may seem like it has everything to offer, but peruse a seed catalog sometime to see just how many options are missing from the shelves—purple cauliflower, fractal Romanesco, a rainbow of carrots and beets, heirloom tomatoes, yin yang beans, pointed cabbage heads, brilliant-tasting melons and celery, lemon-shaped cucumbers, pink and white eggplants, and a tremendous assortment of greens ... just to name a few.

While this sampling of what is missing from produce aisles may be significant, it does not represent the 75 percent of genetic plant diversity lost since 1900. The good news is there is still time to preserve what's left. You can plant new varieties in

your own garden, support small-scale farmers who grow heirloom varieties or ask the produce buyers at your grocery store to stock more varieties that are untraditional.

Diversity and varieties of food can also jumpstart curiosity and excitement at mealtime for fussy eaters, both children and adults! The response is the same every time groups gather to pull carrots from the ground at Heifer Farm: everyone digs right in and smiles abound. One after the next, triumphant hands hoist their carrot into the air, and there are gasps of surprise when the root isn't orange as expected, but instead white, yellow, pink, red or purple (their original color!).

We live in a world filled with diversity—people, cultures, climates, geography, animals, plants, fields and food—that's definitely worth celebrating with a carrot raised into the air!



Women visit Heifer Farm to learn about homesteading in kitchen and garden.



Members of the Worcester, Massachusetts, chapter of Girls, Inc., pick carrots at Heifer Farm.

Interested in bringing your group for an educational program at Heifer Farm, Heifer Ranch or Heifer Village? Email reservations@heifer.org, or call 855-3HEIFER.



Garden Patch Cake

Makes one cake in a 13-by-11-inch pan, or 30 cupcakes

A cake that's also a vegetable? OK, we admit, it's a bit of a hard sell. But try it! You'll like it! And so will the children, as long as you don't mention the squash and beets until afterward.

Ingredients

- 1 ½ cups (3 sticks) butter, melted
- 6 eggs
- 2 ½ cups sugar
- ½ tablespoon vanilla
- 5 cups shredded vegetables*
- 3 cups flour
- ½ tablespoon cinnamon
- ½ teaspoon salt
- 1 teaspoon baking soda
- 1 tablespoon baking powder

*The shredded vegetables can be any combination of:

- Carrots
- Parsnips
- Beets
- Zucchini
- Summer squash



Instructions

- 1.) Preheat oven to 350 degrees and oil a baking sheet or cupcake pan.
- 2.) Melt butter.
- 3.) In a large bowl, mix together the melted butter, eggs, sugar and vanilla.
- 4.) Mix shredded vegetables in with wet ingredients.
- 5.) In a separate bowl, combine flour, cinnamon, salt, baking soda and baking powder.
- 6.) Add dry ingredients to wet ingredients.
- 7.) Pour batter into pan, spreading it all the way out into each corner or filling each cupcake ¾ full.
- 8.) Bake for 25-30 minutes or until cake is golden and springy and a toothpick inserted in the middle comes out clean. Let cool completely before frosting.

Notes:

This cake is good with cream cheese frosting or just with a dusting of powdered sugar over the top.

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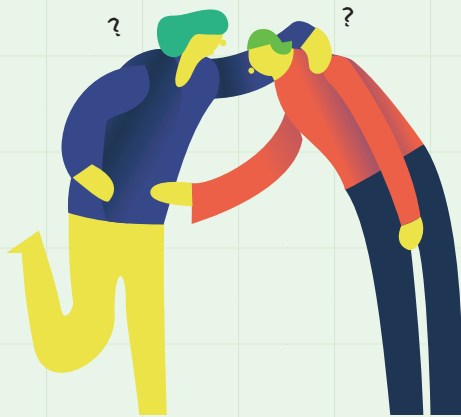


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SHOULD I BOW OR JUST PAT THAT BELLY?

A quick primer on how people greet each other in the countries where Heifer works.

UNITED STATES

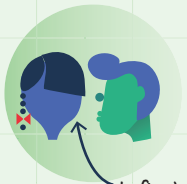
In the United States, **shaking hands** is usually a pretty safe bet.



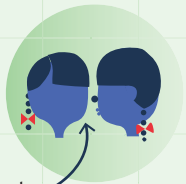
shake hands

LATIN AMERICA

If you're headed to Latin America, get ready for some kissing. Standard practice is for men and women to greet women with a **cheek kiss to the left**. Men usually greet other men with a standard handshake.



left cheek



or



handshake

AMERICAS



1



2

extra kiss

HAITI

In Haiti, tradition mirrors its French colonial past—Latin American rules apply here, but with an **extra kiss on the right cheek**.

Good friends of the same sex might hold hands while they walk and talk.

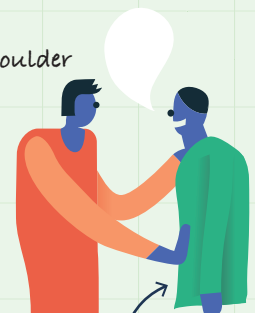
ANDEAN COUNTRIES

One notable exception comes from **Peru** and **other Andean countries**. A man there might greet a good friend first with a handshake and an arm around the shoulders, then rest the right hand on a **buddy's stomach** for a bit while they chat.



1

shake hands

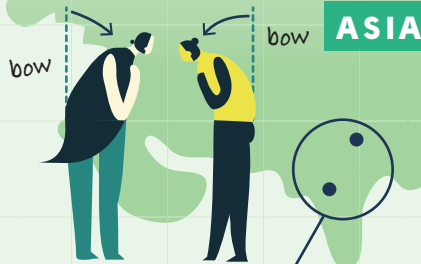


2

hands on stomach



In Asia, **variations of bowing** are common where we work. The most common practice is probably a small bow of the head with hands pressed together and placed in front of the chest.



ASIA



CHINA

In China, there's a **little bit of bowing** and **then hand shaking**. If you're close, you might hold both hands. Do not make eye contact, and execute the handshake lightly and with constant shaking.

PHILIPPINES

In the Philippines, younger people **bow slightly** and then **place the right hand of their elder on their forehead**. There might also be a pat on the shoulder for good measure.



INDIA AND NEPAL

Although **Namaste** is the more familiar greeting for yoga practitioners, **Namaskar** is as common in India and Nepal. The latter is the more formal of the two.



CAMBODIA

It might be OK in Kenya and Tanzania, but **do not touch anyone's head** in Cambodia. That's really disrespectful.



KENYA & TANZANIA

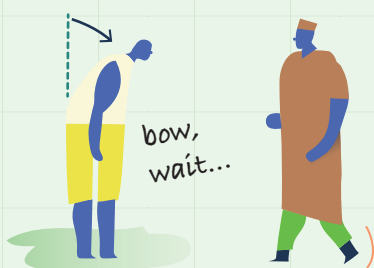
In Kenya and Tanzania, children and youth **bow** their heads so their **elders might tap their head or place their hand on their head**.

For everyone, **handshaking is done with the right hand**, with your left hand holding the right elbow. **NEVER** shake with the left, as that hand is reserved for bathroom duty.



CAMEROON, GHANA & SENEGAL

There's a lot to keep straight in Africa: In Cameroon, Ghana and Senegal, bow slightly when you come into the room and **wait for elders** to extend a hand first. Sometimes, you might **clap three times** for the elder instead. Greetings are never rushed.



AFRICA

ZIMBABWE & NEIGHBORING COUNTRIES

A **couple of handclaps** are a good way to greet somebody.



ZAMBIA

Zambians might include a **thumb squeeze** when saying hello.





asked & answered BACK-UP PLAN

SEED SAVING

At The Edge Of The World

Interview by Jason Woods, *World Ark* senior editor



PHOTO BY JIM RICHARDSON

Seed Master Cary Fowler examines a specimen.



Just outside of Longyearbyen, Norway, the northernmost permanent settlement in the world, sits the Global Seed Vault. Some call it the Doomsday Vault. But to Cary Fowler, the father of this ambitious undertaking, the Seed Vault is a symbol of hope and ingenuity in the face of a serious problem. In recent decades, our world suffered huge losses in crop diversity. By storing hundreds of thousands of seeds, the Svalbard Global Seed Vault is an insurance policy for the continued existence and diversity of the crops most important to the future of humanity.

In his new book, *Seeds on Ice*, Fowler outlines the importance of preserving genetic diversity while giving readers a rare glimpse inside the mysterious storage facility and the surrounding beauty of the Svalbard Islands.

WORLD ARK: How did Svalbard Global Seed Vault come about?

CARY FOWLER: Probably the most common question I get is, “Whose idea was it?” And I kind of cringe a little bit because I don’t think it’s the important question to ask. I’m not even sure what the right answer is. There could be multiple answers. Which kind of leads you to the more accurate conclusion, that multiple people were involved.

Several of us were involved in upgrading seed banks in the consortium of international agricultural research centers, and at the end of that process, we looked around, and we were pretty happy with what we’d done. These institutes are the major suppliers of genetic resources for plant breeding in the world, and also the major crop breeders for major crops in developing countries, so not a trivial group of institutes. And they had been a little bit neglected in terms of the gene bank functions there.

We got a World Bank grant to upgrade them, and everything

on the surface looked really good. But we realized that, as good as the equipment was, they were still located in some potentially dangerous places. Moreover, after 9/11 and Hurricane Katrina, which is when this was, you had to question what a safe place was. Were there any safe places? We realized, furthermore, that a catastrophe striking one of these facilities would truly be a global catastrophe because these facilities contained worldwide collections of major crops and supplied plant breeders all over the world with their materials. We wouldn’t be able to recover from such a loss. It would be a permanent one. So, that got us thinking about what we could do as an insurance policy, kind of a plan B—what if something really goes wrong with one of these facilities? And we hit upon Svalbard.

I drafted a letter to the Norwegian government, coming from these research institutions. I didn’t sign the letter, it had the higher-up’s signature. It went off to the Norwegians, and they decided to take it seriously.

Much to my surprise, they asked if I would head the committee that would assess the feasibility, which, since we didn’t have a facility, there was nothing to assess really. Our committee had to design the facility, had to figure out the management plan, the cost and legality of it, the politics of it, the science of it, everything, and then take a step back and ask ourselves, is this really going to work? And we concluded that it would, and that’s what we said to the Norwegian government, and they agreed. And they allocated \$9 million to build it. And here we are.

It’s a series of improbable events, I will tell you that. And really, I think it’s getting increasingly difficult for people to understand just how unlikely it was about 10 years ago. That Norway would say yes. Now people look at that Seed Vault—I think it’s got about 880,000 different crop varieties in it, probably going up to about 900,000 in a few weeks. And it seems perfectly reasonable and logical now. But going up near the North Pole to build



MANY PEOPLE DON'T UNDERSTAND THAT THERE'S A CONSTANT TURNOVER OF VARIETIES OF OUR MAJOR CROPS IN THE FIELD BECAUSE THE REAL WORLD IS CONSTANTLY CHANGING, AND PESTS AND DISEASES MUTATE AND EVOLVE, AND THE CROP VARIETIES THAT FARMERS GROW HAVE TO KEEP UP WITH THIS.

a tunnel and put seeds at the end of it, 10 years ago, was one crazy idea. And people telling me this is the last thing I would do in the field, because people were laughing, and this was just a gigantic boondoggle.

Why is the Seed Vault an important thing to have?

The given is that none of the existing collections are completely safe because any kind of threat that can affect the contents of a building can affect the contents of a seed bank. That includes equipment failures and funding cuts and natural disasters and wars and all those kinds of things.

But the other part of that story, the flip side to the coin, is that these resources are irreplaceable, and they are essential to the continued success of agriculture. They are the raw material for plant breeding. Many people don't understand that there's a constant turnover of varieties of our major crops in the field because the real world is constantly changing, and pests and diseases mutate and evolve, and the crop varieties that farmers grow have to keep up with this.

How do they do that? They don't do it by us wishing or wanting. They do it because we help them do it through plant breeding. Whatever agriculture can be in the future, whatever wheat or corn or tomatoes or

potatoes can be in the future, whatever kind of traits or characteristics they'll have is contained in the genetic diversity that we're trying to conserve.

I look at conserving this diversity as conserving options. You might not need all the options in the future, and that's the interesting part about it. We don't have a crystal ball, so we don't know which options we will need. Since it's very doable, and very cheap, actually, to conserve all the options, it behooves us to do exactly that, just in case we'll need some of them.

So, we need a robust system for conserving the diversity because it's so important to agriculture, to food security, to our own species. We need a plan B, an insurance policy to make sure that, not if, but when something goes wrong in one of the seed banks, it's not a catastrophe for everybody.

There's no country, by the way, that's independent in terms of the genetic resources it needs, so this is not a case where the United States, with all its wealth and power, could just assemble a copy of everything and cut the rest of the world adrift and say, "We don't need you, we don't care." I think the United States has 5 percent of the world's wheat collection. And that's a big crop in the United States. And so, I usually tell audiences, if you're content with the future of wheat in this



The village of Longyearbyen, which sits on Norway's Svalbard islands, is the northernmost settlement in the world.

country being based on 5 percent of the samples, and you don't think you'll ever have any need to use any of the diversity found in the other 95 percent, then good luck. But there's no scientist in the world who would think that's a good idea.

In a way, we are our brother's keeper. That's why, when a research facility goes down in Syria, we don't jump up with



PHOTO BY MARITFERE

joy and say, "Oh that's just a bunch of extremists over there, and good for them, that they lost their seed bank." We exchange these resources all the time to help everybody's agricultural systems keep going.

In the book, you show that many common vegetables in the U.S. have lost as much as 95 percent of the varieties that

existed just a century ago. What caused this loss of varieties?

I think the major cause is simply the modernization of agriculture. And as you modernize agriculture, and you have larger farms and more commercial agriculture and more plant breeding, then plant breeders produce modern, high-yielding varieties. And there's a tendency of farmers to adopt those varieties.

There's a tendency for people first getting into this subject to try to look for the villain in it. I think it's better to look for the irony in it. You want farmers to be in control of their decisions. Farmers, rather than people who live in the cities, ought to be the ones who are making decisions about what's planted every year. They know the conditions the best. So, we honor the farmers by saying they're the



PHOTO BY MARIEFERRE

Artwork gracing the vault's entrance sparkles day and night, year-round.

smart ones, and they can make the decisions. But when they make a decision to grow a modern variety rather than the older variety, well, maybe we don't like that decision.

Without getting into the blame game, I think it's just incumbent on governments, and to some extent NGOs, to get involved in the solutions to the issue. You know, some people say we should just all go back to the heirloom varieties. And I don't think that's a solution.

How do you feel about the "Doomsday Vault" nickname?

In the beginning I cringed a little bit about that because I thought

that attaching that name to it was going to sensationalize it in a bad way and make people not want to pay attention to it. [They would] just think it was some kooky, weird idea by some kooky, weird people. And I never used it for years and years, and I still never use it, really. It's not like I'm averse to it, but it's just not how I think of the Seed Vault. It's not why we built the Seed Vault.

When you put Doomsday Vault in the title, people think of a global catastrophe. And we were never thinking we needed to build a seed vault because of a global catastrophe. We were

worried about an institute-specific catastrophe. A fire in a particular gene bank or a war or a really bad equipment failure or something like that.

And also regular losses occur in a gene bank, even if it's well-run. They're like libraries. You have a library with hundreds of thousands of books in it, and you ask the librarian, have you ever lost a book? The librarian, if she's telling the truth, says, "Well, sure, of course." And a seed bank manager is going to give you the same answer. Even the best seed bank manager.

So, we knew that we were



WE'RE OPTIMISTIC PEOPLE WHO DECIDED HERE WAS A GLOBAL PROBLEM THAT COULD BE SOLVED. TO ME, PESSIMISM IS HAVING A GLOBAL PROBLEM THAT CAN'T BE SOLVED. YOU DON'T TRY TO SOLVE IT. SOLVING IT, OR TRYING TO SOLVE IT, IS MUCH MORE OPTIMISTIC.

losing diversity. In other words, some varieties were becoming extinct. As in forever. Just through normal operations that you just couldn't prevent in the real world with human beings in it. We wanted to have an insurance policy for all of those kinds of cases, from the situation where you just lost one variety to the situation where you lost a building of variety. And then, you know, when media would press me on the subject of the Doomsday Vault, I would have to admit that, if there's a regional—it's very hard to imagine a global conflagration—but if there was some kind of regional issue, yeah, OK, then I suppose probably the Seed Vault would come in really handy. But I don't know that that means it should be called the Doomsday Vault.

To a lot of people, it also conjures up an image of people who are deeply pessimistic about the world and who see catastrophe ahead of us. And I think those of us who built this Seed Vault are actually quite the opposite. We're optimistic people who decided here was a global problem that could be solved. To me, pessimism is having a global problem that can't be solved. You don't try to

solve it. Solving it, or trying to solve it, is much more optimistic.

The Seed Vault has seeds from 234 origin countries and 71 institutions, including many governments. How complicated do things get working with all these separate government institutions?

Every government provides a bit of a complication. It's easy to find a safe place to store seeds that should be naturally frozen—duh, that would be the Arctic. That's not rocket science. But where it really gets complicated is the management plan. How are we really going to operate this so people want to use it? And a big part of the management plan was figuring out that we could sidestep a lot of issues and also generate a lot more trust if we simply didn't claim ownership over the materials ourselves, and we said to any would-be depositor, this is operating like a safety deposit box. So, Norway owns the mountain, you'll own your seeds. And we'll return the seeds to you, we won't be returning them to somebody else. And that calmed [governments] down. This is a fairly contentious political issue now—who owns genetic diversity, who owns this gene, that gene?

There are still a few countries that, for reasons that are hard to fathom, frankly, still haven't gotten on board. And I have to think that these are rational countries and that, like individuals, and like different cultures, they just see time differently and they're on their own schedule about

how they're relating to this. I suspect all the countries will eventually come on board.

What countries haven't sent seeds to Svalbard?

Well, China and Japan. Iran, Ethiopia. India, for the most part. Now, that doesn't mean that we don't have seeds from all those countries. Indeed we do. But they are seeds that have come from institutions not in those countries but seeds that were originally collected in those countries. We have a lot of rice from China, for instance, and other crops from India. But we don't have the Indian collection. Or the Chinese collection. And they have some materials that never left the country to go to another institution. So, we do eventually want to get that. And since it is run as a safety deposit box, and there's no charge for storage, it's free, it's hard to see what the downside is.

In the book, you say that seeds last for hundreds or thousands of years in the cold of the Seed Vault. Is that true?

Many thousands of years. That also can be misleading because it's not a time capsule. We never envisaged it as just putting seeds in a seed vault and then walking away. It's really a living institution with seeds going in and out.

In September of 2015, we had our first return of seeds. It was to this institution that had been based in Aleppo, Syria. I tell that story in the book. They had to flee that research center in Aleppo, and they reestablished themselves in Morocco and



Lebanon. And we sent a portion of the seeds back to them so that they could regrow them, get more seeds and reconstitute their gene bank. So now, they've done that, and they're sending seeds back to us. The ones that we sent to them are coming back to reconstitute that insurance policy.

In the beginning, we really targeted the major collections in the world to try to get them safely protected first. But since then, we've been going down our list and getting more and more collections from smaller gene banks, particularly gene banks in developing countries. My guess is that, just because of the normal problems in developing countries, instability, but also electricity, supplies, equipment, funding and all that, we'll be making more returns in the future than we have in the past, unfortunately.

The Seed Vault is one step—one really big step—in securing our future in this regard. What else needs to happen to secure our future?

In one sense, you could say that while the Seed Vault is a backup for all the other seed banks around the world, the reverse is also true. They're a backup for the Seed Vault. I think all of these institutions need to have secure funding. And I don't know of a single gene bank in the world that has an adequate and secure multi-year budget. This is penny smart and pound foolish, as they say. This is a very cheap area of government to work in, and the return on investment is enormous. You wish you could

have a day in the stock market like this, where you invest a little bit and get a gigantic return.

One thing that really worries me is climate change and the enormous impact that it is already having. By mid-century, many countries in Africa will be having something like half of their cropland in a climate that's never before existed in that country. Are these crops adapted to climates they've never seen before? No. Then how do those crops and how are those farming systems going to adapt themselves without diversity and without plant breeders? I don't think we're going to solve the plant breeder problem very quickly. It takes years, and it takes economic systems to employ those plant breeders.

I think in the future we have to look at ways to open up the gene banks and get some of that diversity out to farmers in the field. And to get farmers acting as plant breeders themselves, as experimenters armed with a lot of diversity. That's the only way I can see that our crops and our farmers are going to adapt to climate change.

So, there are a lot of challenges out there, but if we were to think about it and have a little bit of political will, we could actually overcome them. And I think not overcoming them is going to lead to absolute catastrophe: a lot of food instability, a lot of political instability, all kinds of bad things. This is a problem that can be solved if we want to.

If I were 20 years younger and had 30 years ahead of me to try to do something, I think I

would be trying to take the climate change models on one hand and match what we know about the seeds and the gene banks on the other hand and start to distribute genetic diversity in developing countries that matched up with the conditions that are coming, so as to give the farmers a chance of helping their crops adapt. That's where I see the use of diversity going, or where it should go.

At the end of the book, you say, "Don't assume someone else is responsible for this living heritage. You are. Together, we are." How can ordinary people be more responsible stewards of this resource?

There are a lot of ways. Some of them are very direct and others are indirect. On the direct side, it's very possible to get involved conserving this diversity yourself and making sure that it survives. Individuals can have a big impact. I'm providing a little bit of financial support and advice when needed to a group of people out in Oregon who have established something called the Temperate Orchard Conservancy. And there was this old man named Nick Botner in Oregon who assembled this gigantic collection of apples, something like 4,500 varieties—of which maybe, I'm just guessing, 3,500 are unique. It's probably the biggest apple collection in the world. Or really close to it. But he's in his mid-90s, and he can't take care of that number of trees. So three individuals, and they're not getting paid for it, have organized this little nonprofit to graft his trees and move them to



THESE VARIETIES THAT WE'RE CONSERVING ARE AT THE END OF A LONG, UNBROKEN CHAIN OF SUCCESSFUL HISTORY. THEY'RE ALL SURVIVORS, AND THEY ALL COME FROM OUR ANCESTORS. HUNDREDS OF GENERATIONS OF OUR ANCESTORS. YOURS AND MINE.

a safer location and begin to offer grafting wood themselves and eventually trees of these varieties. And here are three amateurs who are not on a salary or anything but are just taking it upon themselves to conserve the world's largest apple collection. I think there are many, many opportunities like this to get your hands dirty and do this kind of work.

There's also political action. Your senator or congressperson might get 1,000 emails about a particular issue, but they are not expecting to get an email from you about the funding cuts at our national gene bank. And they will perk up. If one person wanted to organize a letter-writing campaign to educate our Congress about the importance of preserving the biological foundation of agriculture, I could think of worse things to do in your spare time. I think it could have a measurable impact.

A lot of people work now on climate change and environmental stuff, [and] they don't typically see agriculture as being part of the climate change discussion. But as I say in the book, I don't think we will adapt to climate change if our crops don't. So even if you're working on other areas of environmentalism and climate



Fowler files away seeds inside the frigid subterranean vault.

PHOTO BY JIM RICHARDSON



The doors to the Seed Vault rooms remain encrusted in ice.

PHOTO BY MARI TEFRE

change stuff, I think it's good to have the agriculture and food security perspective in there.

What is the inside of the vault like?

When you open the first door, you're just looking down a very long tunnel. There are a few doors along the way. But it's a straight tunnel going about 130 yards. At the end of that, you get to a very big room that I've always thought of as a cathedral room. Off of that are three vault rooms. We're only using one at this time. That stores all the seeds that we have. We built the whole facility with a lot of redundancies so we never really run out of space. There's always a backup for whatever system we have.

When you enter the one vault room where we're keeping the seeds, that door is encrusted with a lot of

ice and ice crystals. You walk in, and it's incredibly cold. It's minus 18 there. On the other side of that door, it's about minus 5.5 Celsius.

So, yeah, it's a strange sensation for most people walking into that room. You don't see any seeds because they're in packets inside of boxes. But you can walk down the rows of shelves—a bit like a warehouse—and see where the seeds are coming from because the depositing institutions will put their national flag on it, like maybe the maple leaf flag from Canada.

Most people don't stay too long in that room because it's really cold. But ... I've noticed after a while over the years that people will walk out of that room very quietly. And they don't talk much on the way back out of the tunnel to the outside. I have had

people cry, walking outside. Because I think it's just very overwhelming from an emotional standpoint. They realize that this is certainly one of the biggest collections of biodiversity in the world. These varieties that we're conserving are at the end of a long, unbroken chain of successful history. They're all survivors, and they all come from our ancestors. Hundreds of generations of our ancestors. Yours and mine. Just about everybody's on Earth have cared for these seeds, they've selected them. So, it's a history of agriculture, and it's the future of agriculture. And if you're a person who cares about agriculture, that can be a very emotional experience walking down there. It is for me, still, and I've spent a lot of time walking down that tunnel. ■



SEEDS ON ICE

An Excerpt

Agriculture faces its most severe set of challenges since the Neolithic period. Society will need at least a 50 percent increase in food production by the middle of this century to keep pace with population growth and development. We will expect farmers to produce more food on less land with less water (agriculture already consumes 70 percent of the world's fresh water supply) and reduced nutrients (phosphorus production, absolutely essential to plant growth, will peak later in this century and become much more expensive long before that). Then there is climate change.

If even the conservative projections are correct, we are headed toward climates that our crops have never before experienced. Global warming will give us climates that are pre-rice, pre-wheat, pre-potato, pre-agriculture.

This will include higher average temperatures, higher extremes, higher minimum (night-time) temperatures, longer periods of very hot weather, hot weather at times when plants are vulnerable such as when flowering, and more fluctuation in temperature and rainfall. Temperatures above certain thresholds have the effect of sterilizing pollen—not good for production. Above a certain threshold, for example, a 1°C shift in temperature during the period when rice flowers lowers production by 10 percent. There is diversity that might come to the rescue. Most modern varieties open their flowers in midday, when it's hottest. Some wild relatives of rice express a different

CLIMATE CHANGE WILL PRODUCE UNCERTAINTY, SURPRISES, AND HEIGHTENED RISK IN AGRICULTURAL PRODUCTION SYSTEMS.

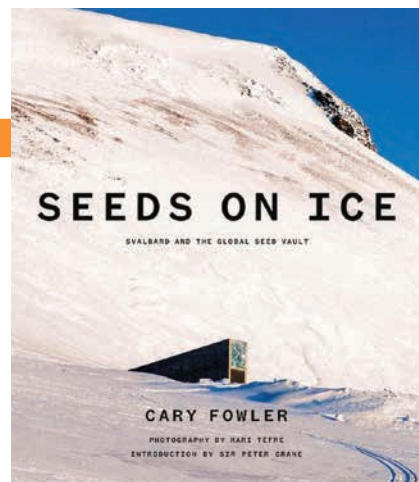
trait: they open up and make their pollen available in the evening or early morning, providing them with a cushion of several degrees.

With climate change, expect germination to alter and fall out of sync with rainfall patterns, and expect flowering times to shift and perhaps fall out of sync with the presence of pollinators. Expect insect pests and diseases to migrate to new homes, presenting crops with new combinations of species and conditions with which to contend. In this new context, as Professor Townsend Peterson of the University of Kansas notes, there are likely to be “idiosyncratic responses.” That's not what you want from your food supply.

Climate change will produce uncertainty, surprises, and heightened risk in agricultural production systems. As in the past when production dropped unexpectedly, we will face market disruptions, food export bans, civil strife, and increased vulnerability of people who are already food insecure.

Disruptions are already evident and documented. Climate change is here now. And crops have not come preadapted to it.

Chasing cooler temperatures by shifting production will not solve the long list of problems associated with climate change. A crop variety happy



Seeds on Ice
By Cary Fowler
Photography by Mari Tefre
Hardcover, \$45

in southern Italy today may well fail in Germany when it encounters a new photoperiod, new seasonality, new patterns and timing of rainfall, new soils, and new pests and diseases.

The international community is procrastinating, declining to mitigate climate change. An increase of 2°C or more is now baked into the atmosphere and our future. One can call this climate change, natural fluctuation, or just bad weather. Regardless, crops are on the front lines. They cannot escape it. Their evolution, their adaptability to the environment, depends on us and on crop diversity—the stockpile of heat-tolerant traits found in genebank collections that plant breeders and farmers can employ to produce new varieties better suited to new climates than existing varieties bred for climates fast disappearing. In this context, conserving diversity and ensuring its survival in the Seed Vault become essential to crops, food security, and people living in this century and beyond.

THOSE WHO CAN, TEACH

By **Austin Bailey**,
World Ark managing editor

Photos by **Lacey West**

Moses and Miriam Sabika mapped a path to prosperity, and they're happy to show everyone else the way. The couple started with a single cow but are now model farmers who raise pigs, chickens and vegetables, too. And they welcome guests to their farm in Mokuno, Uganda, to come learn from their success.

Moses Sabika, 58, used to earn money as a fisherman, blacksmith and chicken salesman to support his wife and three children. Selling chicken in the capital city of Kampala was especially taxing, requiring Sabika to pedal his bike more than 30 miles a day. Eventually his family asked him to try something else because he was looking tired and old.

Rejuvenation came from Heifer International in the form of a cow named Mirembe, whose name means "peace." Sabika has since added more cows to his farm, along with pigs, chickens and vegetables, but the work they require energizes him, building his strength and enthusiasm. Becoming a farmer was like retiring, he said, and he loves teaching other people how rewarding working the land can be. A guest book at Sabika's farm includes the names of all the visitors who have come to see how one cow can multiply into a bounty. ■





1. Moses and Miriam Sabika on their farm in Mokuno.
2. Miriam's kitchen is fueled with biogas.
3. Moses uses soil microorganisms to keep his pig houses clean and fresh.



4



5



6



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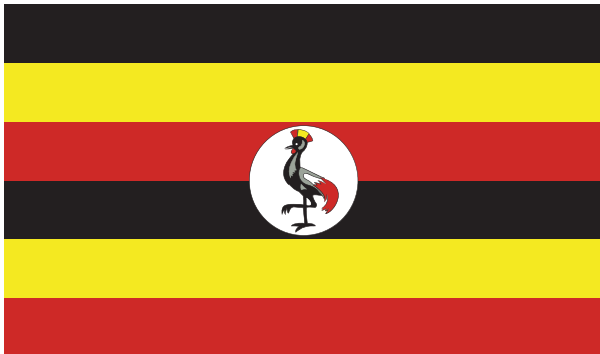
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4. Miriam Sabika preps plants for the garden.
5. Jovan Kayiki, 10, feeds a calf on his grandparents' farm.
6. Plants are pampered in individual sacks until they're hearty enough to thrive in the fields.
7. The farm is productive enough to provide daily glasses of milk to all of the couple's grandchildren.
8. The Sabika family farm is home to cows, pigs and lots of chickens.



9. Isabella Komugishah, 7, holds a kuroiler chicken at her grandparents' farm.

UGANDA FAST FACTS



The bird on the Ugandan flag is not a regal chicken, but a **grey crowned crane**. This unique bird is known for its booming call and its dancing, which happens primarily during breeding but can also occur throughout the year.

▼ **\$1.25**

UGANDA REMAINS ONE OF THE POOREST COUNTRIES IN THE WORLD. ROUGHLY 38 PERCENT OF THE POPULATION MAKES DO WITH LESS THAN \$1.25 PER DAY.

No Ugandan dinner plate is complete without a mound of **sticky, starchy ugali**. Made from cornmeal or millet, this staple food is used to scoop up stews and sauces.



1962

GAINED INDEPENDENCE FROM BRITAIN. ENGLISH REMAINS THE OFFICIAL LANGUAGE, ALONG WITH SWAHILI.



Gender inequality in Uganda contributes heavily to poverty. Ugandan women work long hours, averaging nine hours per day on domestic tasks, on top of any farm work or paid jobs. That means they clock about **15 hours of work per day**, compared to between eight and 10 hours for Ugandan men.



THE AIDS EPIDEMIC CONTINUES TO PLAGUE UGANDA, WITH HIV RATES AMONG ADULTS AT 7.1 PERCENT.



10

10. Excess vegetables are dried for later use.

11. Moses Sabika offers a before-and-after look at his eggplants, which are dried so they don't spoil.

12. Because their farm has been so successful, Moses and Miriam Sabika often receive visitors hoping to learn some of their tricks. The solar dryer is especially popular.

13. The family farm is prosperous enough to ensure that all grandchildren can go to school.



11



12



13

TINY ORGANISMS SWEETEN THE SOIL

PRISTINE PINK PIGS PRANCE IN THEIR PENS ON THE SABIKA FARM IN MOKUNO, UGANDA. THEY SEEM AWFULLY PROUD OF THEMSELVES, AND PERHAPS THEY SHOULD BE. THEIR PENS ARE NOT ONLY TIDY, BUT THEY ACTUALLY SMELL SWEET. THE SABIKA FAMILY TREATS THE PENS WITH INDIGENOUS MICROORGANISMS THAT BREAK DOWN WASTES QUICKLY, KEEPING FLIES AND SMELLS AWAY.



Start with any kind of edible starch, such as bananas, rice or bread. Tear it into bite-sized pieces.



Wrap individual pieces of starch into scraps of cotton cloth and tie closed.



Bury the wrapped starch in a shady spot in a hole about one foot deep. Wait one week.



Dig up the starch, unwrap and make sure it doesn't smell bad. If so, discard.



Mix the starch pieces together in a bag and top off with molasses or sugar.



Hang the bag up for a week or more.



Pour the mixture in a bucket, add water and mix. Add maize bran and more molasses or sugar. Cover the bucket and wait three days.



Loosen the dirt bedding in the pen.



Sprinkle the mixture over it. Attracted to the sweet smell, the pigs will dig at the indigenous microorganism mixture, helping to mix it into the bedding.

FEMALE FARMERS TACKLE A NEW REALITY

WOMEN TAKE THE LEAD ON HEIFER'S NICARAGUA PROJECTS. AS THE MERCURY GOES UP AND RAINFALL LEVELS DROP, FARMING FAMILIES IN THE DRY CORRIDOR TWEAK TECHNIQUES TO KEEP THEIR CROPS GROWING.

BY **AUSTIN BAILEY**, *WORLD ARK* MANAGING EDITOR
PHOTOS BY **LACEY WEST**

Guillermina Castro is the lady of the house and the undisputed boss of her family's 40 acres, but queen bee status doesn't stop her from working alongside her sons to prep a dusty, sun-scorched hillside for planting. Castro digs her sandals into loose dirt to steady herself, then carves small holes with half of a broken jicaro fruit shell. Into each hole she drops a handful of nutrient-rich composted manure, layering it with dried leaves. When (and if) the rainy season comes, the leaves will compost, too, fertilizing the soil further and helping it to hold moisture.

Guillermina Castro and her husband, Hector Guevara, keep their farm humming despite drought conditions.





IN RECENT YEARS, HOWEVER, THE EARTH NEEDS CARE AND CAJOLING TO PRODUCE THE CROPS CASTRO AND HER FAMILY NEED TO SURVIVE.



Enriching the depleted soil helps crops to grow.

Soil prep hasn't always been part of the routine on this farm in Nicaragua's El Pavon community of San Juan de Cinco Pinos. Corn and beans used to grow without much fuss, and coffee flourished on her steep and shaded slopes. In recent years, however, the earth needs care and cajoling to produce the crops Castro and her family need to survive. Rain shortages and baking heat in Nicaragua's dry corridor are rendering traditional farming methods largely ineffective.

"As soon as we started having less rain and more dry weather, the practices that were once efficient became less efficient," explained Elder Francisco Andrade Alvarez, director of ADENOC, a partner organization that helps Heifer implement its work here.

On Castro's farm and many others nearby, crops simply stopped growing. So agriculture experts with Heifer International are helping Castro and other families adapt to hotter temperatures and drier soil by introducing new techniques and seeds. The project started with 1,000 families and has since grown as families share calves, seeds and expertise with neighbors.



All members of the family help out on the farm.



Castro is teaching her daughters how to manage all aspects of running a farm.



PHOTO: FRIENDS OF BAHIA LAVA VOLUNTEERS

Shells from jicaro fruits are dried and used as bowls and scoops.



Fresh milk keeps the family strong and healthy.

"We never had a project that helped us like this," Castro said. Through the project, she learned how to tap a spring on her land and pipe water to her fields, an improvement that's doubling her crop yields because she can now grow food year-round and harvest in both August and December. The heifer she received two years ago has already calved, and the milk from her cow means her family has fresh cheese every day.

Heifer's contributions here, simple as they seem, injected hope and momentum into Castro's farm. Her husband, Hector Guevara, and their six children, ranging in age from 11 to 26, are all benefitting from daily doses of animal-based

protein that boost energy levels and health. In recent years the family didn't have eggs, meat or milk, and subsisted on tortillas and salt.

This barebones diet is all that's available to many in the region, and it shows. It's not uncommon to glimpse children with streaks of red in their hair, a telltale sign of kwashiorkor, a severe protein deficiency.

For Castro and her family, better seeds and livestock brought better health, and better health gave them the energy to diversify their money-making endeavors. The thriving family now gets a third of its income from selling cassava, pumpkins, beans and carrots. The rest comes from a new



A broad, shaded courtyard makes a nice spot for working.



When they're not farming, the family sews and mends.



BETTER SEEDS AND LIVESTOCK BROUGHT BETTER HEALTH, AND BETTER HEALTH GAVE THEM THE ENERGY TO DIVERSIFY THEIR MONEY-MAKING ENDEAVORS.

sewing business they started with proceeds from the sale of a cow. Daughter Candida Guevara, 19, went to sewing school in the closest large city, Chinandega, and then taught what she learned to the rest of the family. Now they mend clothes and make school uniforms. The shop started with two machines, but demand was heavy and they now have six sewing machines lined up in a row under their front porch eaves.

Most of the children prefer sewing to farming, but not Carlos Vargas, 25, who can usually be found by his mother's side. Vargas is pleased to be experimenting with new crops and livestock, including a fat pink pig. But years of hunger are not easily forgotten, and Vargas relaxes only when he plants and reaps a hefty crop of corn. "When we grow corn," he said, "there's no lack of food for the whole year." ■



An enormous pink pig promises a big payout.



A new generation of women expects more opportunities, less discrimination.



MACHO NO MAS

The machismo culture that infects most of Nicaragua has no hold at Guillermina Castro's house. The mother of six is used to taking charge and has no trouble managing both family and farm. "Sometimes men have no idea how to handle finances. Sometimes women are better at that," son Carlos Vargas said.

This seemingly obvious, common-sense attitude is actually quite rare in rural Nicaragua, where traditional gender roles often keep women from claiming overt positions of authority. Heifer International and its partners have a clever work-around: By giving gifts of livestock and training directly to women, Heifer empowers women with confidence, leadership skills and the raw materials they need to build a sturdy economic base for their families.

The strategy is working, Heifer Nicaragua Director Milton Castillo said. Even men reluctant to share power with their wives are coming around as women begin making money. "I have seen a lot of changes in the lives of the beneficiaries," Castillo said. "Men and women are sharing the work of the house, and wives are less stressed." ■



Pod Goals

Reviewed by Molly Fincher, *World Ark* writer

We're betting our readers can relate to a problem your friendly neighborhood *World Ark* editors ran into for this issue: finding the time to read another book just wasn't in the cards this time around. Luckily for all of us, podcasts are tailor-made for multitasking. The rising popularity of the podcast format means that whatever you're interested in, there is very likely a podcast (or 10) about it.

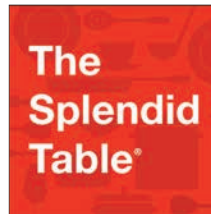
Whether you listen while commuting, hitting the gym or cleaning the kitchen, podcasts are a great way to feed your curiosity and exercise your brain while plodding through your to-do list. Here are our recommendations on some favorite subjects: food, culture and, of course, cows.

THE SPLENDID TABLE

This classic is for listeners who want to get into the nitty gritty of food and cooking. Produced and distributed by American Public Radio, *The Splendid Table* is a proven favorite, having run for more than 20 years—they were talking about food culture before food culture was cool (in the U.S., at least).

The heart of the show has always been the beloved host, Lynne Rossetto Kasper, though in episode 624, "A New Chapter," Kasper announced her intention to hand hosting duties over to food writer Francis Lam. Kasper and Lam have a chat at the beginning of the episode, and when asked what he finds special about the show, Lam says that it's always been the curiosity and generosity of spirit exhibited by Kasper, and that he hopes to continue the show in that same spirit.

This hour-long program goes both broad and deep. The show features interviews with all the movers and shakers of today's food culture, including filmmakers, chefs, food writers and fellow podcasters. Recipes are offered up after most segments, and tutorials range from complicated Thanksgiving dinners to how to keep your sponge clean. To contrast these broad takes, Kasper takes listener questions every episode and does not hesitate to delve into the more mundane cooking questions, like how best to make your brownies fudgy, with the same level of passion and interest with which she explores more far-reaching aspects of food culture. With such a wide range of topics, there's probably something here for everyone—after all, this is the show "for people who love to eat."



THE FOOD CHAIN

This weekly program produced by the BBC World Service takes on "The economics, science and culture of what we eat." *The Food Chain* focuses on a different dish every episode, exploring not only what the dish is, but the history of how it came to be and what it can teach us about culture and society. The show zooms out to examine the role of food in society, taking on issues such as how politics affect diets and vice versa, or why hunger still exists even in wealthy areas.

The Food Chain is all about answering the who, what, where, why and how of whatever dish each episode serves up. This pick is

going to be the most like getting a newspaper-style article in audio form: focused and well-paced (clocking in at exactly 26 and a half minutes), the show doesn't lag or go in for the meandering that many podcasts tend to fall into.

The soft-spoken Dan Saladino is our only host; other voices come from on location: chefs, food journalists, cooks and eaters who know what's what. It's fun to travel with Saladino and encounter the different characters who make our food or have the historical knowledge to answer the esoteric questions about what we eat that we didn't even know to ask.

BEEF AND DAIRY NETWORK

This one's all about our favorite subject, cows, but perhaps not in the way you're thinking. Hosted by Ben Partridge, this surreal comedy declares itself "The number one podcast for those involved or just interested in the production of beef animals and dairy herds." Delivered in a quintessentially British style, the characters on the *Beef and Dairy Network* follow the subject of cows down delightfully bizarre rabbit holes, all while playing it completely straight.

You might understandably be struggling to conceptualize what a comedy podcast about beef and dairy would even sound like. Here's an example: in episode 19, Partridge

is joined by Henry Parker playing the part of Michael Banyan, the newly appointed "Bovine Poet Laureate." The interview includes discussion of his first commission (to rewrite the cow noise) and shares a few of his poems with such memorable lines as "Black as night and white as snow / you're like an edible domino." Like any good podcast, the interview is broken up with a listener response section in the middle. One recent question: "How does looking into a cow's eyes make you feel?"

If you're looking for actual information about beef and dairy, you probably want to look elsewhere. Otherwise, sit back and enjoy a weird and wonderful ride. ■



READ TO FEED

Last year, students at Pleasant Valley Elementary School in South Windsor, Connecticut, raised more than \$4,000 for Heifer International through Read to Feed. This year, four more elementary schools, as well as the middle school and high school, joined in the effort. Third-grader Pia Squatrito is participating for a second year, carrying on a family tradition of supporting Heifer that was started by her grandmother.

What did you like most about Read to Feed?

When my school become involved in the program, my grade level raised money for chicks! We got to raise money for people who don't have food. That made me feel good inside.

What have you learned about Heifer International?

The people who get the animals have to promise to give it shelter, food and medicine, and they have to take care of them. Then the families get the food and can use it for their families or sell things like eggs or milk. Even animal poop is used in their gardens to help make the plants grow faster!

How does it feel to know that you helped change the world?

I'm proud that I helped the world by supporting Heifer. It was lots of fun reading books and having my family and friends support me.

PIA SQUATRITO

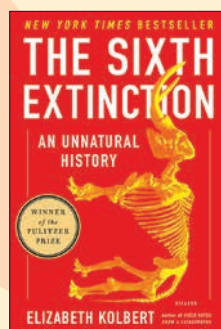
3rd grade

Pleasant Valley Elementary School
South Windsor, Connecticut

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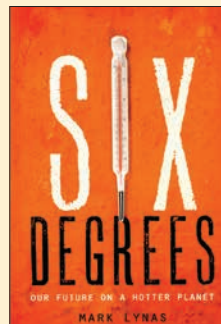
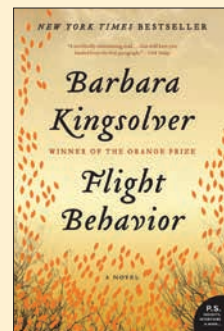
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See Jane Run

MOTHER-DAUGHTER TEAM MOTIVATED BY TEAM HEIFER

ATHLETE PROFILES



Jane Overend

Age: 18

Loves running because: "I enjoy the challenge ... I like the feeling when you've finished a run. It's such a rewarding feeling."



Carrol Overend

Age: 47

Loves running because: "I like the thrill of the long race, the crowds and the music ... that's what attracts me to the distance runs."

By **Molly Fincher**, *World Ark* writer

Anyone who takes on the physical challenge of distance running knows that half the battle is mental. How will you find the motivation to put in hours, weeks, months of training? For Jane and Carrol Overend, motivation comes from knowing that because they run for Team Heifer, their efforts will have a positive impact not just on themselves, but on the world.

When Jane Overend decided to go for a half-marathon last summer, she signed up for the closest race to her home in Berwyn, Pennsylvania: the Philadelphia Rock 'n' Roll Marathon. Inspired by her daughter, Carrol Overend decided to join her. "Jane motivated me, so we're doing it together," she explained.

The duo found further motivation when they joined Team Heifer and started looking for people to sponsor their race. They raised more than \$1,000 to help end hunger and poverty around the world, and knowing that their run was helping others helped the Overends stay committed to the challenge.

Team Heifer is the newest way you can take action to help Heifer end hunger and poverty. Athletes of any skill level can join and turn their next race, whether it's a run, walk, bike or roller skate for that matter, into a fundraiser for Heifer. By doing so, their hard work, sweat and support from family and friends can make the world a better place.

Many athletes find that turning their endeavors into fundraisers is not only rewarding in spirit, but it also helps them stay motivated and give it their best. "I find it very motivating to run for a charity. When I'm running, I think about trying to help people," Carrol Overend said.



Jane Overend found that running for a charity works because people know how hard it is to run long distances and are eager to show their support. "I sent out an email to friends, family, neighbors just to see who would be willing to support, and I found that a lot of people were willing to support," she said with pleasant surprise. "They were really excited to help."

Of course, there are a lot of charities out there to support. Jane Overend picked Heifer International in part because of her interest in international development, which she discovered through studying environmental science in school.

"I love the goals of Heifer and the work that Heifer does in other countries to support local communities that really just need help, and they need people to support them. This will hopefully really make an impact in their communities and their lives."



How to Join Team Heifer

1. **Go** to TeamHeifer.org to find a race, or pick your own.
2. **Create** a fundraising page (it's easy!). Share the story of why you're running for Team Heifer.
3. **Ask** for support. Let your friends and family know that you're taking action and that they can be part of it!
4. **Suit up.** Earn cool gear when you meet your fundraising goals. You get a Team Heifer soft T-shirt just for registering!
5. **Change lives.** The money you raise will change lives for the better around the world.



A Nepalese Woman's Journey As a Community Animal Health Worker

By Alina Karki, Heifer Nepal communication officer, and Jason Woods, *World Ark* senior editor



Bhujel provides basic veterinary services when animals are sick or injured.



daughter and two sons and sent all three to college.

Now 46 years old, Bhujel is tackling her next phase. She lives in the village of Raiyapur, where raising livestock is ingrained in the way of life.

But the remoteness of the village makes it difficult to get veterinary assistance when animals are sick or injured.

"The closest veterinarian is 22 kilometers [about 14 miles] away from this village," Bhujel said. "It is a long journey in this treacherous terrain. By the time a vet reaches our village, it is already too late."

As a young girl growing up in Nepal, Rita Kumari Bhujel aspired to be an athlete. She played volleyball in school and worked her way to the district team. Eventually, she got her chance to try out for the national team.

But after Bhujel traveled to Kathmandu for tryouts, her family

suddenly summoned her back to her village.

"Later I found out that they had fixed my marriage," she said. "I felt bitter and betrayed. My dreams were left incomplete."

Bhujel's husband was a member of India's army, so the couple started a life together there, but they eventually moved back to Nepal. They raised a



Bhujel's training as a community animal health worker gives her paid work and helps farmers, too.

To help farmers who are far away from veterinarians, Heifer Nepal trains people to serve as community animal health workers. These community members provide basic veterinary services like vaccinations, examinations and medicine.

In 2015, less than a year after joining a Heifer International Nepal project, Bhujel trained to become a community animal health worker. She got 35 days training, medical tools and a small startup fund to establish her vet shop.

Now farmers in Raiyapur can get veterinary care fast. Bhujel recently helped a water buffalo through a dangerous, difficult labor.

"The buffalo was in a lot of stress, and so was the family," Bhujel said. "The mother of the family had been crying all night as her husband had bought the buffalo before recently passing away. For her it was his last keepsake. Her daughter-in-law was also crying, as losing the buffalo



would mean no milk for her toddler."

Bhujel's service helps farmers, and it also allows her to make a living by charging fees for her work. "My children are grown up now," she said. "My husband is at home and helps me in household chores. Now I am free to pursue my dreams.

"I am determined to continue with this work as long as I can provide the service. Heifer has invested so much in me. Now it is time to pay back."

Bhujel is one of 308 community animal health workers trained by Heifer Nepal to support the success of small-scale farmers.



"A lot of kids think food comes from the back of Kroger. At the urban farm, they get to see where their food really comes from."

Chris Wyman, Heifer Urban Farm

Chris Wyman cares for the urbane pigs, alpacas, chickens, ducks, goats and turkeys who live behind Heifer International headquarters in downtown Little Rock. Wyman says he's excited to see more urban farms setting up on plots of land that might otherwise go unused. His grandparents kept victory gardens during World War II and passed on their know-how to their grandson. "I took that to heart," Wyman said.



LEAVE A LEGACY

We all feel compelled to make a difference—to leave a lasting impact on our families and the world. Now, you can become part of the solution to help eliminate hunger and poverty for hardworking farm families.

Heifer 2020 Legacy Challenge allows you to designate a part of your estate planning to Heifer and have a portion of it matched for our work now.

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TO LEARN MORE ABOUT THE BENEFITS OF MAKING A CHARITABLE BEQUEST THROUGH HEIFER 2020 LEGACY CHALLENGE, CALL 888.422.1161 X 4922 OR VISIT WWW.HEIFERFOUNDATION.ORG/LEGACYMATCH.





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Through Friends of Heifer, your gift will propel us toward our goal of helping 4 million families achieve living incomes by 2020. This means families will achieve a level of income that allows them to feed their families daily; educate all their children; and have proper housing, water, hygiene and other essential resources.

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To join Friends of Heifer, you can also use
the envelope between pages 24 and 25.


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