

TARGET: Zero Hunger #05

A Pantaneiro Revival: 500 Brazilian cows and the future of food security

Hello and welcome to Target: Zero Hunger, a podcast exploring the food challenges and solutions of our time -- brought to you by the UN's Food and Agriculture Organization. I'm your host, Kim-Jenna Jurriaans.

[Theme music in]

At the center of the South American continent lies a region that's considered one of the most spectacular ecosystems in the world.

It stretches out over an area roughly the size of Tunisia or the US state of Florida. Its heart is Brazil's western state of Mato Grosso do Sul, spilling out north into Mato Grosso and across borders into Paraguay and Bolivia.

It's the world's largest tropical wetland, with a biodiversity and local culture so rich that it's a UNESCO World Heritage site. Its name.... is the Pantanal.

[Theme music out]

In this week's episode we take you into this unique region, to explore what conserving the genetic heritage of one animal breed in particular means for the local ecosystem, for local culture and traditions... And for food security on an increasingly harsher planet.

[Pantanal bird sound: Cantorchilus Leucotis bird]

[soft rowing sound, peddling through water]

Imagine a tropical paradise of lush green grasses and water lilies the size of hoola hoops - - stretching as far as the eye can see. It's formed around an inland river delta that, depending on the season, will make the water level rise by meters at a time -- forcing cowboys on horseback to lead their herds through shoulder-deep water.

[Pantanal bird sound: Saltator coerulescens + Cariama Cristata bird]

The region is home to over 1000 animal species -- including tropical birds, jaguars, and fish that can't be found anywhere else in the world. Temperatures here can vary from freezing to scorching heat of 40-degrees-Celsius.

It's in this rough environment that we find an animal breed that over centuries of natural selection has become perfectly adapted to the local conditions and of which there are fewer than 500 left today: the Pantaneiro cattle...

[Noise of 20 cattle being herded from the paddock onto the field –fade in/out]

We're on a farm called Fazenda NHUMIRIMM, some 150 Km east of the Bolivian border.

But this is not just any farm. It's an experimental farm – a test ground for researchers from various backgrounds to study the ecosystem of the Pantanal and its many inhabitants.

[Raquel] This herd was formed with animals rescued from Poconé, in Mato Grosso, in the north of the Pantanal -- some cows and some bulls were rescued from there and then brought to our experimental farm, to begin the research into their genetic characteristics and start the conservation of this breed within our research institute. [1:30]

That's Rachel Soares Juliano, a researcher at Embrapa Pantanal, the government research agency that runs the farm. It's part of the research arm of Brazil's Ministry of Agriculture, Livestock, and Food Supply.

[Raquel] In the 1980s a project emerged within Embrapa to create centers for locally adapted animal breeds all through Brazil. And it was in this period that a group of researchers from Embrapa Pantanal initiated the revival and rescue of animals – and they formed a center that exists until today.

[Cricket sound -- Person walking in field through tall grass]

[KJ] Rachel explained that, back in the 80s, the conservation focus originally came to EMBRAPA through a researcher who collaborated with FAO and who brought this new knowledge to the agency.

[Cow snorting – animals walking slowly]

Today, there are some 70 Pantaneiro cattle on this farm – also known as *Tucura* cattle. Their lineage runs back to Portuguese and Spanish breeds brought over by the colonizers. They intermixed and over time became a new breed uniquely resistant to the perils of the local environment. Pantaneiros can protect themselves against jaguars, and they have strong hooves that can handle the seasonal transitions from floods to drought. They eat grasses submerge in water, and their resistance to many common diseases and parasites means they don't need to be medicated in the same way other cattle breeds do.

[Person walking in field through tall grass]

It's these traits that the researchers are particularly interested in and keen to preserve and promote for wider use. But finding the animals to start a true Pantaneiro revival is not a straight forward affair...and sometimes, it requires some luck...

[Sound of dog barking, ducks quacking, cows mooing. Marcus Ruiz opens gate and welcomes Marcus Oliveira]

That's Marcos Ruiz... who runs a dairy farm in Guia Lopes da Laguna, in Mato Grosso do Sul. His family's history with the Pantaneiro cattle goes back four generations, he says, to the time of his great grandfather, when people would still use them as riding cattle.

[Farmer Marcus Ruiz] The person who was passionate about this breed was above all my father.

[Farm sounds]

[Farmer Marcus Ruiz] In the 70s, when my father started the Sao Marcos Farm, he came across this robust breed again, thanks to a gift from a family friend.

Back in those days, it was common among friends that when a child was born, friends would gift a cow to guarantee the future of the newborn child. My parents had three children, so they received three Pantaneiro cattle.

[KJ] And that's how the Pantaneiro, with its characteristic red coat and white face, became the basis for milk production at Marcos Ruiz' farm.

[sound of cow being milked – milk spraying into bucket]

[KJ] He boasts of his cows. Their milk is fatty, which is great for producing cheese – especially the region's traditional Nicola cheese.

[Farmer Marcus Ruiz] When my father died six years ago, my brothers and I divided the herd of cattle among us. Because I'm the oldest child... I have a special connection with the cattle: I used to milk the cows, I bottle fed the calves...

So I decided to keep the cattle, both as an inheritance and a strong reminder of my father.

When I took this decision I was very much criticized, because I live in a region where the use of the Nelore breed is very dominant, and where cattle producers produce high quality cattle – breeders who invest strongly in Nelore

[Farmer Marcus Ruiz] I found myself outside of that group. But I persisted.

[KJ] The fact that there were more and more Nelore cattle in the region started becoming a big problem for him, because the cattle dealers today only want to buy these white Nelore cattle, he says. And they pay a much lower price for the Tucura - the Pantaneiro cattle. Few of them know that the Pantaneiro is a much more resistant breed.

[Farmer Marcos Ruiz] And then this incredible thing happened. I found myself holding a book, called Animals of the Discovery. I was leafing through this book, looking at the pictures and drawings from the 15th and 16th Century. I saw the characteristics of this breed and understood that I had something on my farm that has been around in Mato Grosso do Sul since the early creation of Brazil.

[sound of typing on computer keyboard]

[KJ] So he did what most people these days would do: he went on the internet and looked for a photo of a milk cow that looked like the one in the book. And he found it.

[sound of computer mouse click]

[Farmer Marcos Ruiz] It was a website of UEMS, the State university of Mato Grosso do Sul, where students were discussing the capacity for milk production of these cows. I commented on one of the pictures and said that I knew this Tucura breed and that I was raising some of these animals. The professor saw my comment on the photo and got in touch with me via email and made an appointment to come visit my farm.

It was professor Marcus Vinicius from UEMS in Aquidauana.

[Marcos Vinicius Oliveira] My name is Marcus Vinicius Oliveira. University professor and curator of the conservation center for Pantaneiro cattle here in Mato Grosso do Sul, in Brazil.

[Marcos Vinicius Oliveira] Together with my partners I run a multidisciplinary program to rescue the Pantaneiro. This work aims to keep the purity of the breed and multiply it. And to learn about the genetic base of this European breed that's so magnificently adapted to the conditions of the Pantanal.

[Farmer Marcos Ruiz] When he arrived at my house, he was surprised by my little herd of cattle. "You have this many?!" he said. And I responded, "But professor, what are you saying? It's just 24 head of cattle." And then he explained to me that for years this cattle has been threatened with extinction. That there are fewer than 1000 left here in Mato Grosso and Mato Grosso do Sul and that the government is very interested in conserving this genetic material.

[KJ] Here is Marcos Vinicius Oliveira again.

[Marcos Vinicius Oliveira] Indiscriminate cross breeding with other commercial breeds is the main threat to the Pantaneiro cattle. The loss of this genetic group would be an irreversible loss for science, for Brazilian cattle and cattle production worldwide. These characteristics that have been built over centuries of natural selection would be lost. It would permanently prevent the use of this genetic material in breeding programs that aim to improve the genetic makeup of cattle and transfer these characteristics to other, standard breeds.

[KJ] And those characteristics are increasingly valuable for farmers and researchers trying to work out sustainable ways to feed a growing world population in the age of climate change and antimicrobial resistance, to name two pressing challenges.

[Farmer Marcos Ruiz] I entered the Pantaneiro program with 17 animals. In return, I received Girolando cattle to continue to produce milk here at my farm. Because these Tucuras were my milk cattle at the time.

[Farmer Marcos Ruiz] Who knew that this little cow, which for so long was considered nameless and worthless, is now considered the answer for the future of livestock?!

[KJ] Today his cattle are part of a selection program that includes harvesting the cow's eggs and producing embryos. They're inseminated with sperm from Pantaneiro bulls in Porto Jofre, in the Northern part of the Pantanal, where there are still some animals left in the wild. These wild animals are caught to collect their sperm as a way to prevent inbreeding and maintain genetic diversity of the Pantaneiro.

[whistling sound, person walking]

One person who knows first-hand how difficult it can be to lasso these wild Pantaneiros for the benefit of science is Thomas Horton, a cattle farmer and vice president of the Pantaneiro Cattle Breeders Association.

[Thomas Horton] At the end of 2007, I was contacted by a group that had bought a big farm in the Payaguas subregion of the Pantanal. When they moved in and started to explore the edges of this large farm, they came across this cattle that they didn't know – completely different from the commercial breed. They reached out to me because I knew various breeders and researchers, too. So through a friend I got in contact with Embrapa and told them about these animals. And as coincidence would have it, the researchers were also trying to get in touch with the new owners of this farm where they knew these animals lived.

[KJ] Finally, they all met at the Embrapa regional headquarters in Corumbá and began to map out the work that needed to be done to capture the cattle.

[Thomas Horton]] ...they had been living there for many, many years...and they were extremely wild...completely wild. And so we started with the whole group... The people [from the Embrapa test farm] came to help us... and together we began the process of catching these animals. We identified this one particular bull, he had strong genetic stock – he was really beautiful. In the end, it took us 31 days to capture this one animal. It shows the complexity, and the dedication of everybody involved in trying to rescue this breed and discover all the good traits they have to offer. [2:47]

[KJ] They brought these select animals together on another farm nearby and began to study them -- their size, their coat, their reproductive performance.

As a cattle farmer, Thomas was first and foremost interested in studying their production capacity.

[Thomas Horton] Today, some 90 percent of the cattle on my own farm are Pantaneiro. I'm satisfied. It's an animal that has low production cost, a high pregnancy rate --- some 87 percent in the field. The cows give birth easily, and the calves are born at a good weight... not too big so they don't hurt the cows....They gain weight quickly once they're born...The bulls have a very high libido – they very much like to “work”, so to speak. So I'm very satisfied, and we're now looking to build market recognition of the breed, so we created the Brazilian Pantaneiro Cattle Breeders Association.

[KJ] He co-founded the association three years ago, not just to bring together Pantaneiro farmers across the region but also to collaborate with research organizations like Embrapa to improve the breed – to make it even stronger and more productive.

[Bird sound: Trogon Curicu bird]

Back at the Embrapa test farm researchers like Raquel Soares Juliano are looking for ways to intensify the use of these animals in all kinds of production systems. This is Raquel again.

[Raquel] Originally, the idea was to learn more so they could be used to improve the production system in the Pantanal, but now that we know more about the special qualities of the Pantaneiro we are realizing that there are opportunities to use their genetic makeup to improve various other production systems, too. [3:20] – within the Pantanal, and outside, in traditional livestock systems. Or, alternatively, for tourism in the Pantanal region, so that people here can reap the benefits of this genetic heritage in other productive sectors.

[Traditional Pantanal guitar music in/out]

[KJ] When we think of genetic resources, we often think of laboratories and test tubes. We don't immediately think of culture. And yet, in the Pantanal, conserving the

Pantaneiro is intrinsically linked with preserving a unique local culture and environment. And local food culture in particular...

[Dirce] Despite the idea that it's a paradise, adapting to life in the Pantanal is not easy. The water cycle, with periods of floods and sporadic drought determine the rhythm of life here and causes people to get isolated by the water.

That's Dirce Luz... She's also a professor at the University of Mato Grosso do Sul.

[Dirce] That's why people who live in the Pantanal deeply understand the climate and its dynamics. And that knowledge is essential to lead the cattle through the wetlands of the Pantanal, to escape the floods and the large herds of cattle. That abundance of water creates a unique culture that's intimately linked with milk cows and subsistence milk farming.

[KJ] According to Dirce, the typical person from the Pantanal is reserved, discreet and cautious – the kind of person who listens well before they speak, she says.

[Dirce] They drink Tereré, a tea served in the horn of an Ox ,and live according to social norms that foreigners don't always understand.

[KJ] The people here live a simple life and want to make sure that their culture and traditions are being respected. This, according to Dirce, is essential to keeping the uniqueness of the Pantanal. The Pantanal Kitchen is another part of this distinct culture. It's a mix of Indigenous influences, along with Portuguese, Spanish and other adventurers that colonized the region and brought unique recipes with them and adapted them to the local climate.

[Dirce] There was a need to find food that could be preserved in the open air because electricity isn't common in this region. From this came the Nicola cheese, which only comes from farms in the Pantanal and which doesn't need to be refrigerated. It's eaten by locals and tourist alike. It's a cheese with a distinct taste, and a smell, texture, colour and flavour that people really like.

The true Nicola cheese is made with milk from Pantaneiro cows. Producing [this] cheese is an art with important influences from the local food culture. The skill that's required to shape the cheese is a secret that's passed on from generation to generation. Even today, the cheese is all made by hand in a fully artisanal way.

[KJ] Because the traditional Nicola cheese is made with the milk of the Pantaneiro, it is threatened with extinction, along with the breed itself. But it may also hold a key to the breed's conservation, providing people in the region with regular income and helping them conserve the local ecosystem.

[Theme music in – build momentum]

This is why researchers including Marcus Vinicius have started a special project that brings together the indigenous community, Embrapa, the State University, and Thomas Horton's cattle breeder association to officially certify this cheese and the genetic heritage of the animal that are the basis of the product.

[Theme music out]

Through the Pantanal Biome Chees project, they identify and select the best milk cows and share this genetic material among farmers to improve the milk and cheese production.

[KJ] So... how do breeding programs work? And how does all this work in the Pantanal factor into building food security around the world? To better understand this link, I've invited Beate Scherf into the studio with me – She's an animal production specialist here at FAO.

Hello Beate.

[Beate] hello Kim-Jenna

[KJ] Let's talk about genetic markets for a minute. What are they and how are they used to improve pure breeds?

[Beate] Genetic markers are very simply DNA sequences and they can be used to study how much breeds of animals are related to each other. So if one gets the genetic material from selected animals one can construct with complicated procedures a so-called phylogenetic tree and see how closely these breeds are related. And the same can then be done also for animals to see how closely an animal is related to a certain breed.

And this is particularly important when you have – like in this case the Pantaneiro cattle – they have been crossbred with animal of other breeds so one is not sure how much foreign blood there is in that animal and if you use genetic markers you can find out whether one animal is closer related to, let's say, the core of the breed. And this is important for finding out how many pure breed animals there are and to start a conservation breeding program.

[KJ] And how is the genetic diversity of our livestock linked to our ability to feed the planet in the future?

Genetic diversity of livestock is needed to enable production in the very different production systems of the world, ranging from -- like in our example here, the tropical

wetlands, which is extremely specific-- to very dry areas, high mountain areas to very particular production environments.

And for this the animal breed needs to be adapted to that environment. So there is a particular link between the genetics and the ecosystem, which is particularly present in indigenous breeds. So we need this genetic diversity to produce the different products humankind demands and for this, the animal breed needs to be adapted to the environment.

And this is particularly important also in the face of climate change, that we are able to adapt our production to the changing environments. And genetic resources are actually the building blocks for genetic improvement. In order to provide food security also in the future we need to increase production and for this we need genetic improvement. And this is a way to produce more with less and to satisfy the growing demand for animal-sourced foods in the coming decades.

[KJ] So what is the importance of breeding and research programs like the one Embrapa is running in the Pantanal?

[Beate] Breeding programs are needed to increase the productivity of these animals as they might otherwise be replaced by other high-producing animals. And when these cattle would leave, the ecosystem would also change. So there would be different grass compositions and so on. But these other high-producing animals would likely not be as well adapted to the specific production environment – you couldn't keep them out on the pasture most probably.

[KJ] And what trends are you seeing internationally when it comes to efforts like these?

[Beate] FAO just published a second survey of World Animal Genetic Resources for Food and Agriculture, which is based on 130 country reports, and the data showed us that countries have generally increased their activity in the management of animal genetic resources -- and particularly in the development and implementation of breeding tools, which are prerequisite for breeding programs. And these breeding tools range from animal identification -- in order to select animals and follow their performance you need to know exactly who is who -- artificial insemination, breeding goal definitions, performance recording is extremely important – you need to know how much does every animal produce in order to make proper mating plans and plan genetic improvement. And genetic evaluation to see what the outcome is of your mating plan, for example. So developing fully fledged breeding programs is particularly important for indigenous breeds of livestock where we don't have a lot of breeding programs in the world. And that's the next big step for countries to take.

[Theme Music in]

Conserving genetic resources of animals is about more than saving breeds from extinction – it's about identifying the unique traits that certain animals have developed over centuries and actively using them to respond to new challenges, like climate change and growing demands for milk and meat.

But it's also about valuing the people, environment and traditions that depend on these animals – from the artisanal cheese maker to the farmer leading his cattle through belly-deep water before sitting down to rest with a horncup of terréré.

Target Zero Hunger is produced by myself and Sandra Ferrari. Audio mixing by Eric Deleu. Special thanks to Marcus Vinicius Oliveira for collecting audio for us in the Pantanal.

If you have any questions or feedback for us, please write to FAO-audio@fao.org. I'm Kim-Jenna Jurriaans. Thanks for listening.

[Theme Music out]

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