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GLYPHOSATE RESOURCE GUIDE

GLYPHOSATE IS EVERYWHERE. LET'S TALK ABOUT IT.

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A RESOURCE GUIDE ON GLYPHOSATE

This guide reveals how glyphosate became so deeply woven into our food system — and how we can all help rewrite the story.

Glyphosate didn't exist as an agricultural chemical before the 1970s, yet today it's found in the food we eat, the water we drink, the air we breathe, and the soil we depend on - not to mention our own bodies.

As glyphosate use rose sharply in the 1990s with the invention of Roundup Ready® genetically modified seeds, so did the signs of harm to our health, our soil, and the natural systems that support life.

This guide explores how we got here, the systems that support glyphosate's dominance, and how each of us can help shape a different future for our food system, our health and our planet.

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**“WE NEED MUCH MORE EDUCATION
TO GET MORE PEOPLE AWARE OF
WHAT'S GOING ON. AND ALSO
AWARE THAT TO REMEDY THIS
WOULD ACTUALLY BE SO MUCH
EASIER THAN PEOPLE BELIEVE.”**

- HELENA NORBERG HODGE

EP 6: CLOSE TO HOME: GLYPHOSATE AND RELOCALIZING FOOD

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THE ORIGIN STORY: HOW GLYPHOSATE TOOK ROOT

FROM LABORATORY DISCOVERY TO
GLOBAL DEPENDENCE

"THE REASON PUBLIC HEALTH RISKS, SOIL HEALTH RISKS, AND RISKS TO FARM FAMILIES AND RURAL COMMUNITIES HAVE BECOME SO MUCH MORE SERIOUS IS SIMPLY THE INTENSITY OF HERBICIDE USE. WE'RE USING AT LEAST THREE TIMES MORE IN 2025 THAN WE WERE IN 1980."

- DR. CHARLES BENBROOK

EP 7: THE LONG GAME: GLYPHOSATE AND PRACTICE CHANGE
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1964: GLYPHOSATE WAS FIRST PATENTED—NOT AS A WEED KILLER, BUT AS A CLEANER USED TO REMOVE MINERAL BUILDUP FROM BOILERS AND PIPES².

1980s: FARMERS BEGAN USING GLYPHOSATE IN A NEW WAY—SPRAYING IT ON CROPS RIGHT BEFORE HARVEST TO DRY THEM OUT FASTER, A PROCESS CALLED DESICCATION⁴.

2015: THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC), PART OF THE WORLD HEALTH ORGANIZATION, CLASSIFIED GLYPHOSATE AS A PROBABLE CAUSE OF CANCER IN HUMANS⁶.

2024: MOST U.S. CROPS ARE GENETICALLY MODIFIED TO SURVIVE WEED KILLERS—96% OF SOYBEANS, 93% OF COTTON, AND 90% OF CORN ARE GROWN FROM SEEDS DESIGNED TO TOLERATE GLYPHOSATE AND SIMILAR HERBICIDES⁸.

1974: MONSANTO PATENTED GLYPHOSATE FOR USE IN AGRICULTURE AND INTRODUCED IT TO THE MARKET AS THE MAIN INGREDIENT IN ROUNDUP®, A POWERFUL WEED KILLER³.

1997: MONSANTO PATENTED GENETICALLY MODIFIED (GM) CROPS THAT COULD SURVIVE BEING SPRAYED WITH GLYPHOSATE, KNOWN AS ROUNDUP READY® SEEDS⁵.

2018: IN THE FIRST MAJOR LAWSUIT OVER ROUNDUP, A SAN FRANCISCO JURY RULED THAT MONSANTO'S WEED KILLER CAUSED A MAN'S CANCER AND ORDERED THE COMPANY TO PAY \$289 MILLION IN DAMAGES⁷.

2025: BAYER (FORMERLY MONSANTO) GAINED LEGAL PROTECTION FROM HEALTH IN TWO U.S. STATES (GEORGIA & NORTH DAKOTA), WITH SEVERAL OTHERS CONSIDERING SIMILAR BILLS THAT WOULD LIMIT LAWSUITS OVER ITS WEED KILLER, ROUNDUP⁹.

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HOW GLYPHOSATE WORKS

A DISRUPTOR OF LIFE'S BUILDING BLOCKS

Glyphosate kills plants by blocking a process called the shikimate pathway—used by bacteria and fungi to make nutrients they need to survive¹⁰.

Humans don't have this pathway, but the good bacteria in our gut—and in the soil that feeds us—do. Even our mitochondria—the tiny “engines” inside our cells that create energy—depend on a similar process.

OVER HALF OF THE BENEFICIAL GUT MICROBIOME OF HUMANS IS SENSITIVE TO GLYPHOSATE¹⁰.

By killing beneficial microbes, fungi, and insects such as earthworms and monarch butterflies, reducing the soil's natural capacity to fix nitrogen, and binding to key minerals including zinc, iron, and manganese, glyphosate weakens the living systems that keep soil fertile and resilient^{11, 12, 13, 14, 15}. Over time, this turns living soil into lifeless dirt, accelerating topsoil and carbon loss and resulting in weaker crops and food with fewer vitamins and minerals¹⁰.

“YOU ARE WIPING OUT THE COOPERATIVE WORKFORCE OF BACTERIA AND MITOCHONDRIA THAT MAKE A HUMAN CELL CAPABLE OF BEING ALIVE.”

- ZACH BUSH, MD

EP 1: THE CHEMICAL WITHIN: GLYPHOSATE AND US

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ONE-THIRD OF EARTH'S SOILS AND OVER 40% OF FARMLAND ARE ALREADY DEGRADED. AT THE CURRENT RATE, 90% COULD BE DAMAGED BY 2050, LEAVING ONLY ABOUT 60 YEARS OF USABLE TOPSOIL¹⁶.

CLOSER THAN WE THINK

GLYPHOSATE'S PRESENCE IS NOT RESTRICTED TO FARMS — IT'S SPRAYED ON OUR LAWNS, PLAYGROUNDS, AND MOST PUBLIC SPACES.

Globally, more than **8 billion** kilograms of glyphosate has been sprayed, its use rising **15-fold** since Roundup Ready® crops were introduced 1997¹. In the U.S., glyphosate use increased nearly 300-fold between 1974 and 2014, with two-thirds of all glyphosate ever applied being sprayed in the decade leading up to 2014¹.

Yet its reach extends far beyond agriculture. Glyphosate is commonly sprayed on lawns, parks, campuses, roadsides, forests, and backyards—anywhere “weeds” grow.

EACH YEAR, **MORE THAN 21 MILLION POUNDS OF GLYPHOSATE¹⁵** ARE APPLIED IN NON-FARMING SETTINGS BY HOMEOWNERS, LANDSCAPERS, AND PUBLIC AGENCIES—**A 40-FOLD INCREASE SINCE 1974¹**—**MAKING GLYPHOSATE NOT JUST A FARM CHEMICAL, BUT A CHEMICAL OF DAILY LIFE.**

“IT HAD NEVER OCCURRED TO ME THAT THESE AGROCHEMICALS COULD BE USED ON LANDSCAPES. I GREW UP THINKING PESTICIDES WERE A FOOD SYSTEM ISSUE — BUT THEY’RE BEING SPRAYED ON THE LAWNS WE LIE ON, THE FIELDS WE PLAY ON, AND THE CAMPUSES WE LEARN ON.”

-SHENIA CRYSTAL

EP 10: THE NEXT GENERATION: GLYPHOSATE AND EMERGING CHANGEMAKERS
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THE HUMAN COST

NOT ONLY A FARMERS' ISSUE —
A *WHOLE* COMMUNITY HEALTH ISSUE.

Glyphosate's reach is now global—found in rainwater¹¹, tap water¹¹, air¹⁵, pet food¹⁹, wine, beer²⁰, fruits, vegetables²¹, wheat²², and even school lunches²².

**STUDIES SHOW IT'S PRESENT IN THE URINE OF 80% OF ADULTS
AND 87% OF CHILDREN TESTED²³.**

This invisible exposure has been linked to a growing list of chronic illnesses and cancers. Compounding the issue, the nutrient density of conventionally grown fruits and vegetables has **declined sharply over the past 50 years**, with major drops in protein, iron, and key vitamins. As soil health declines, so does the nutrition in our food, contributing to rising rates of obesity, diabetes, and other chronic diseases¹⁷. **Poor diets now cause 1 in 5 early deaths worldwide**, linking the health of our soil directly to the health of our bodies¹⁸.

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LEGAL TURNING POINT

“MONSANTO WAS NEVER SUPPOSED TO LOSE. BUT AFTER THAT FIRST VERDICT, TENS OF THOUSANDS OF PEOPLE CAME FORWARD. EVENTUALLY, BAYER FACED AROUND 180,000 LAWSUITS AND PAID OUT OVER \$10 BILLION IN SETTLEMENTS. IT IS ONE OF THE LARGEST CORPORATE ACCOUNTABILITY CASES IN HISTORY.”

-BRENT WISNER

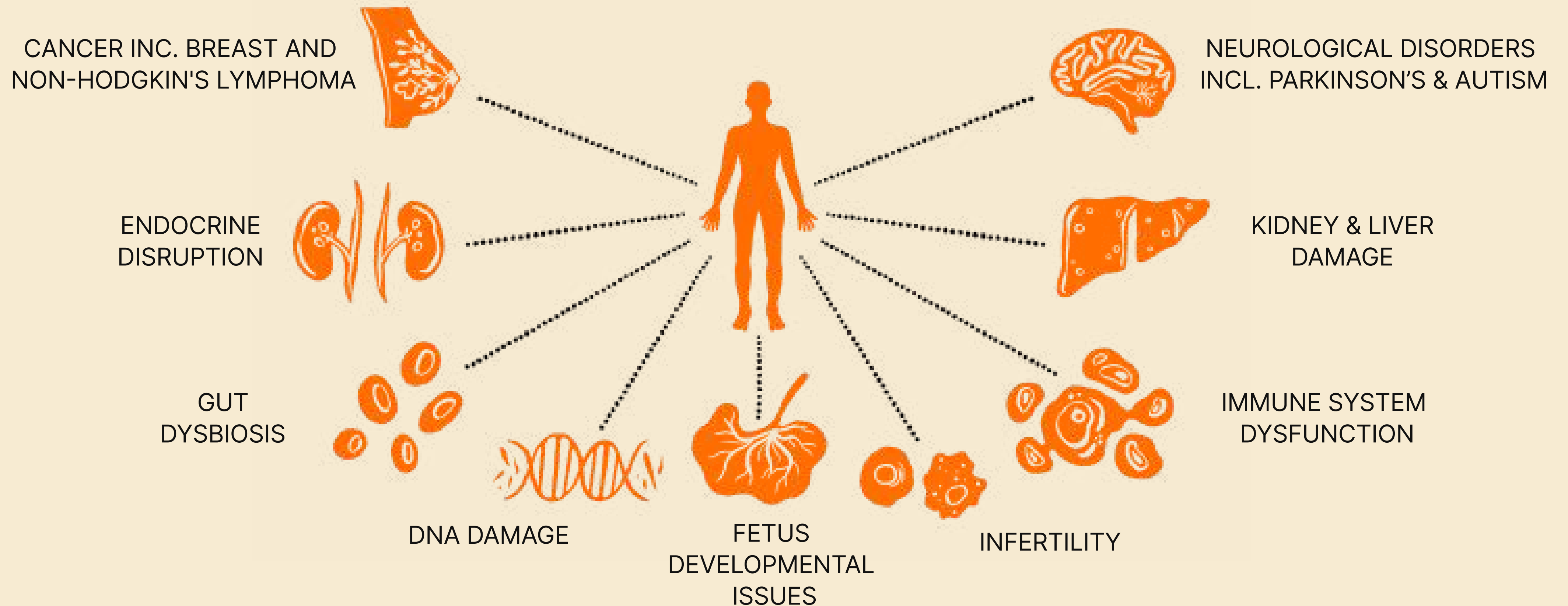
EP 9: PATHWAYS TO JUSTICE: GLYPHOSATE AND LEGAL REFORM
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THE HUMAN COST

CHRONIC AND PERVASIVE EXPOSURE TO GLYPHOSATE IS LINKED TO AN ALARMING LIST OF HEALTH RISKS INCLUDING:

SOURCES 24, 25, 26, 27



THE GMO CONNECTION

THE RISE OF GMO CROPS WAS MARKETED AS INNOVATION — BUT IT CREATED AN INDUSTRY BUILT ON CHEMICAL RELIANCE AND CORPORATE CONTROL.

In 1997, Monsanto patented RoundUp Ready® seeds which are genetically modified organisms (GMOs) capable of surviving being sprayed with glyphosate, allowing farmers to blanket entire fields without harming their crop and changing the food industry forever. In the U.S., most major “commodity” crops—like corn, soy, and cotton—are grown using GMO seeds.

But here's the catch: patents and corporate contracts prevent farmers from saving those seeds after each harvest, forcing them to buy new seeds each growing season.

What began as a promise of easier farming has become an expensive cycle—fewer crop varieties, stronger weeds, and more chemicals¹⁵—while also eroding seed sovereignty, the long-held tradition of saving and replanting seeds suited to local soils, and wiping away generations of farming wisdom.

“[NON-GMO] SEEDS ARE THE MOVEMENT FOR FREEDOM. WHEN WE RETURN SEEDS TO THE HANDS OF COMMUNITIES — RATHER THAN CORPORATIONS — WE RETURN THE FREEDOM OF OUR FOOD SYSTEMS AND THE FREEDOM OF OUR SOIL.”

-DR. JESSICA HUTCHINGS

EP 8: LIVING KNOWLEDGE: GLYPHOSATE AND FOOD SOVEREIGNTY

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THE GMO CONNECTION

This GMO model is the backbone of U.S. agriculture, and in pursuit of new markets, Monsanto has used its influence worldwide—pressuring governments and farmers alike to adopt the same system.

In 2024, about 18 million farmers across 29 countries—including 19 in the developing world—grew crops using GMO seeds³¹. On the flip side, 26 countries have full or partial bans on GMO cultivation, and nations like Mexico³², New Zealand³³, Peru, and those in the European Union³⁴ remain in active GMO battles.

To learn more about GMOs and their impact on our health and food system, explore the important work of [the Non-GMO Project](#).

HUMAN EXPOSURE TO GLYPHOSATE HAS RISEN BY 500% SINCE THE INVENTION OF GMO CROPS³⁰.

THE DEBATE OVER GLYPHOSATE'S SAFETY

WHEN THE SAFETY OF GLYPHOSATE IS QUESTIONED, IT OFTEN FACES PUSHBACK. RESEARCH REMAINS DIVIDED, REVEALING CONTRADICTIONS AND CORPORATE INFLUENCE THAT SHAPE THE STORY.

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1

Conflicting “Safe” Exposure Rates - Countries differ on what’s considered a “safe” acceptable daily intake (ADI) of glyphosate. In the U.S., the limit is 1.75 mg/kg/day³⁵, while in the EU it’s 0.5 mg/kg/day³⁶—3.5x lower. These limits are based on adult studies, not children, who absorb more glyphosate for their size and yet have no separate safety standard.

A 2025 study found that even low exposure - equal to the EU’s “safe” ADI - caused increases in both non-cancerous and cancerous tumors in lab rats²⁴.

2

Research Interference - *The Monsanto Papers* are a collection of internal Monsanto documents which outline how the company hid research about glyphosate. Internal emails showed Monsanto ghostwrote studies, paid outside scientists to use their names, and pressured researchers who found harmful effects. The company also stopped its own scientists from publishing results showing DNA damage and made them sign secrecy agreements³⁷. One of the most cited examples—a *paper by Williams et al.*—has been repeatedly used to claim that glyphosate is non-carcinogenic, even though Monsanto helped write it behind the scenes³⁸.

3

Government Lobbying - From 2023 to mid-2025, Bayer (formerly Monsanto) spent \$21.3 million lobbying Congress and federal agencies to sway legislation like the Cancer Gag Act and Farm Bill³⁹ - a 43% increase from the prior period.

The ‘Cancer Gag Act’ would shield pesticide companies from lawsuits and block states from adding warning labels. Bayer lobbyists reportedly helped craft the bill and tried to quietly attach its provisions to other legislation

THE TURNING POINT

FROM BREAKDOWN TO BREAKTHROUGH

AWARENESS ALONE DOESN'T RESTORE ECOSYSTEMS OR HEALTH—ACTION DOES. THESE THREE PATHWAYS HELP INDIVIDUALS, FARMERS, AND COMMUNITIES MOVE FROM DEPENDENCY TO REGENERATION.

REDUCE - LIMIT EXPOSURE TO HARMFUL CHEMICALS AND PRACTICES THAT DEGRADE HEALTH AND ECOSYSTEMS.

- **Wash produce** under running water or in a baking soda soak (avoid soap or detergent, and peel when possible).
- **Choose organic foods** when possible, especially avoiding items on the “Dirty Dozen” list; eating organic has been linked to a 25% lower cancer risk⁴².
- **Avoid glyphosate-based lawn and garden products**, such as Roundup, to limit direct exposure. Explore more natural garden maintenance practices for your yard and home.

REVITALIZE - RESTORE LIFE AND VITALITY TO YOUR BODY, SOIL, AND COMMUNITY THROUGH NOURISHING CHOICES AND REGENERATIVE ACTION.

- **For health:** Choose fermented foods, minerals (from nourishing foods such as broths), and support your gut microbiome—a key defense against glyphosate’s effects.
- **For land:** Compost food scraps, plant pollinator-friendly flowers, and use cover crops to bring microbes and carbon back into the soil. Support biological, organic, or mechanical weed management methods that reduce chemical dependency and enhance biodiversity.
- **For community:** Join or start a community garden, farmers’ market, or local food co-op to reconnect with food sources and neighbors, or connect with a group online to share advice.

REFORM - TRANSFORM THE SYSTEMS THAT SUSTAIN US BY ADVOCATING FOR REGENERATION AS THE NEW STANDARD.

- **Listen to *The Invisible Ingredient***, our new glyphosate-awareness podcast, and share it with someone to bring the reality of glyphosate into consciousness.
- **Start conversations** at the dinner table or in the supermarket about glyphosate and food system reform to help shift our collective mindset.
- **Vote with your dollar:** Farmers can’t transition without markets that value their efforts; choosing organic and regenerative products drives systemic change.
- **Build bridges between growers and eaters:** listen and learn from farmers, of all kinds. Bridging the gap between growers and consumers builds understanding, unity, and shared purpose. If you can’t do this in person, you can connect via social media. Send a farmer a DM today.
- **Support policies and leaders** that prioritize soil health, biodiversity, and regenerative agriculture.

FARMERS, WE SEE YOU.

Transitioning away from chemical dependency is a deeply nuanced process—unique to your region, land, and needs. If you're interested in learning more about practical steps toward regenerative farming, connect with our friends at the [Soil Climate Initiative](#) (US), [MadLand](#) (US), [Soils For Life](#) (AU) for guidance and support on what your transition journey could look like.

TOGETHER, WE CAN CHANGE THE STORY OF OUR FOOD SYSTEM.

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HELP US GROW THIS MOVEMENT

Change happens when consumers, farmers, scientists, and policymakers come together with a shared goal: to heal our food system.

The Invisible Ingredient is more than a podcast, it's a call to awareness and action. Through storytelling, education, and collaboration, Farmer's Footprint is working to illuminate the hidden threads of our food system and support those growing differently.

This Giving Season, your donation expands this global glyphosate awareness campaign, funding resources like this guide, amplifying farmer voices, and bringing evidence-based education to communities worldwide.

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**LEARN MORE.
TAKE ACTION.
LISTEN TO THE INVISIBLE INGREDIENT
[THEINVISIBLEINGREDIENT.ORG](https://theinvisibleingredient.org)**

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“IT'S GOING TO BE CONSUMER DRIVEN (THE SHIFT TOWARDS REGENERATIVE AGRICULTURE) THERE'S NO QUESTION ABOUT THAT. IT WILL NOT COME FROM LAND-GRANT UNIVERSITIES.. BIG FOOD COMPANIES.. PESTICIDE COMPANIES, EQUIPMENT COMPANIES, OR THE EXTENSION SERVICE.

IT WILL ONLY COME FROM CONSUMERS.”

- WILL HARRIS

EP 2: LIFE IN THE FIELDS: GLYPHOSATE AND A FARMER'S BURDEN
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