TRACEGROW

WE GIVE OUR EARTH A SECOND CHANCE

Circular economy fertilisers from recycled raw materials

TRACEGROW
grow with us

OUR MISSION

WE ARE A CIRCULAR ECONOMY CHAMPION

by cleaning and returning valuable material streams back to use.

OUR VISION

WE SUPPORT HUMANKIND'S PROGRESS

and the Earth's vitality

TRACEGROW

TRANSFORMING OUR WORLD

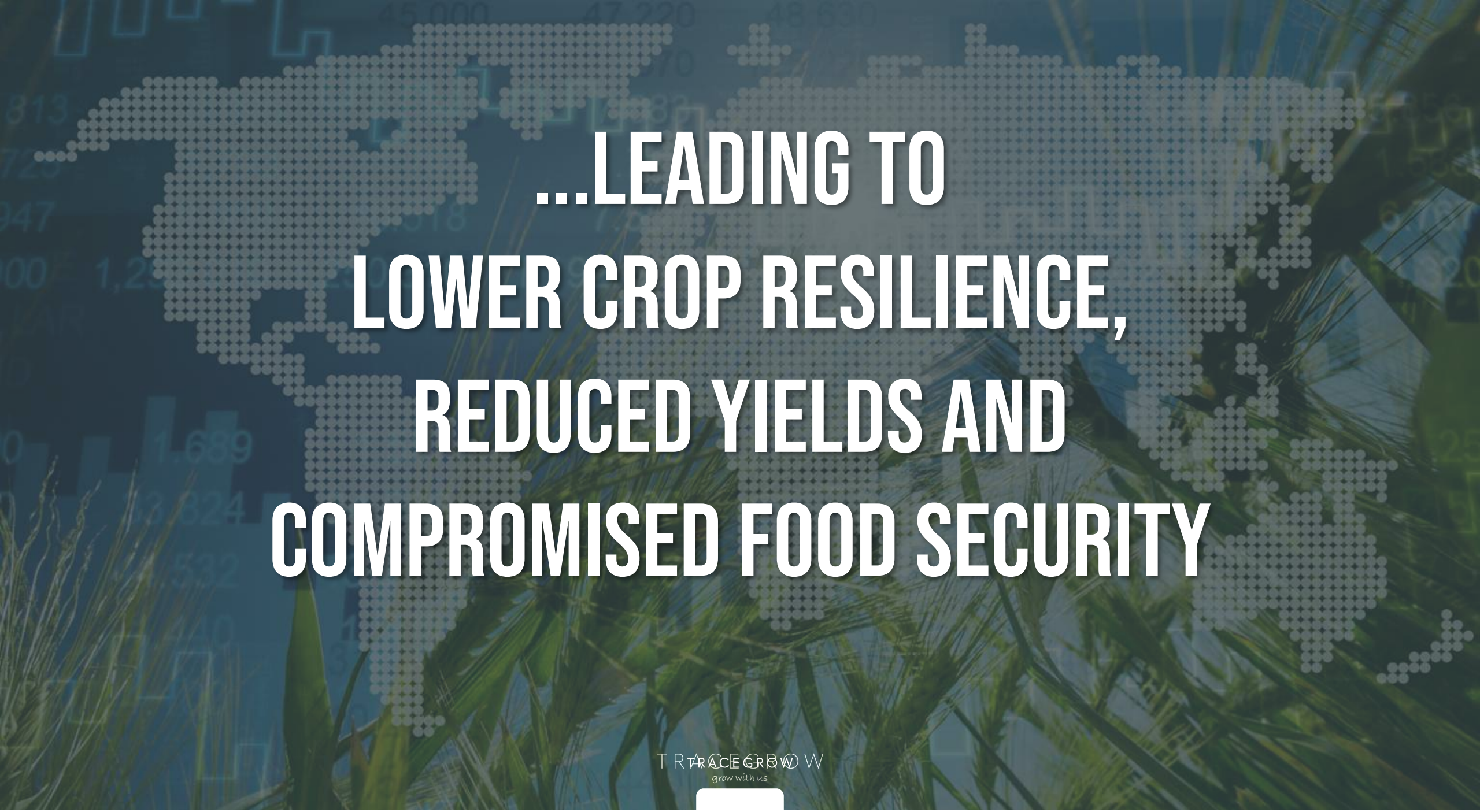
TRACEGROW'S IMPACT ON KEY UN SDGS

- **SDG 2 - Zero Hunger:** Enhancing agricultural productivity through sustainable fertilizers that improve soil health and increase crop yields.
- **SDG 7 - Affordable and Clean Energy:** Leading in energy storage and electric vehicles by recycling materials for sustainable energy solutions.
- **SDG 13 - Climate ActionReducing:** CO2 emissions and supporting eco-friendly transportation options through our focus on electric vehicles and recycling practices.
- **SDG 12 - Responsible Consumption and Production:** Promoting: a circular economy by recycling trace elements from industrial side streams and batteries, minimizing waste and reducing the demand for virgin materials.
- **SDG 9 - Industry, Innovation, and Infrastructure:** Driving innovation with sustainable technologies and processes that contribute to resilient infrastructure and industrial advancement.
- **SDG 15 - Life on Land:** Contributing to biodiversity preservation and sustainable land use by reducing the necessity for mining.
- **SDG 8: Decent Work and Economic Growth:** Creating sustainable employment opportunities and fostering economic growth within the green economy.
- **SDG 6: Clean Water and Sanitation:** Ensuring environmental protection and supporting clean water access by preventing hazardous waste pollution.

TRACEGROW

CIRCULAR ECONOMY
THROUGH TECHNOLOGY


OVER HALF OF GLOBAL AGRICULTURAL SOILS SUFFER FROM MICRONUTRIENT DEFICIENCIES...
TRACEGROW


...LEADING TO
LOWER CROP RESILIENCE,
REDUCED YIELDS AND
COMPROMISED FOOD SECURITY
TRACEGROW
grow with us

MICRONUTRIENT DEFICIENCIES REDUCE PLANTS' ABILITY TO ABSORB NITROGEN FROM NPK FERTILISERS

- 50% of soils are zinc-deficient
- 10% lack sufficient manganese

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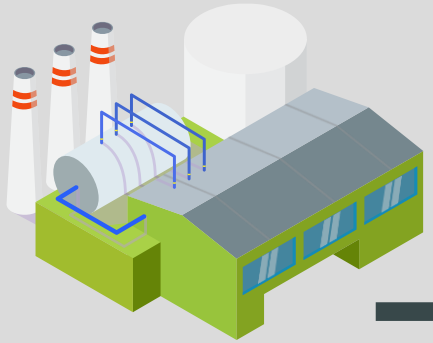
TRADITIONAL LINEAR BUSINESS MODEL

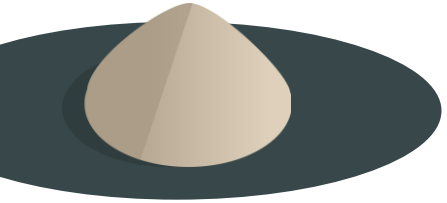
MINING

Zn Mn

CO_2

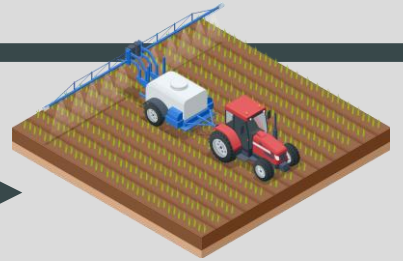


INDUSTRIAL MANUFACTURING

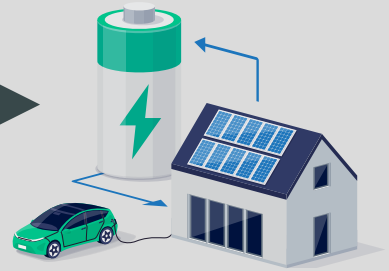


INDUSTRIAL WASTE STREAMS

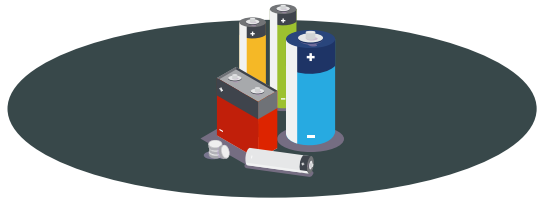
CO_2



FERTILISERS



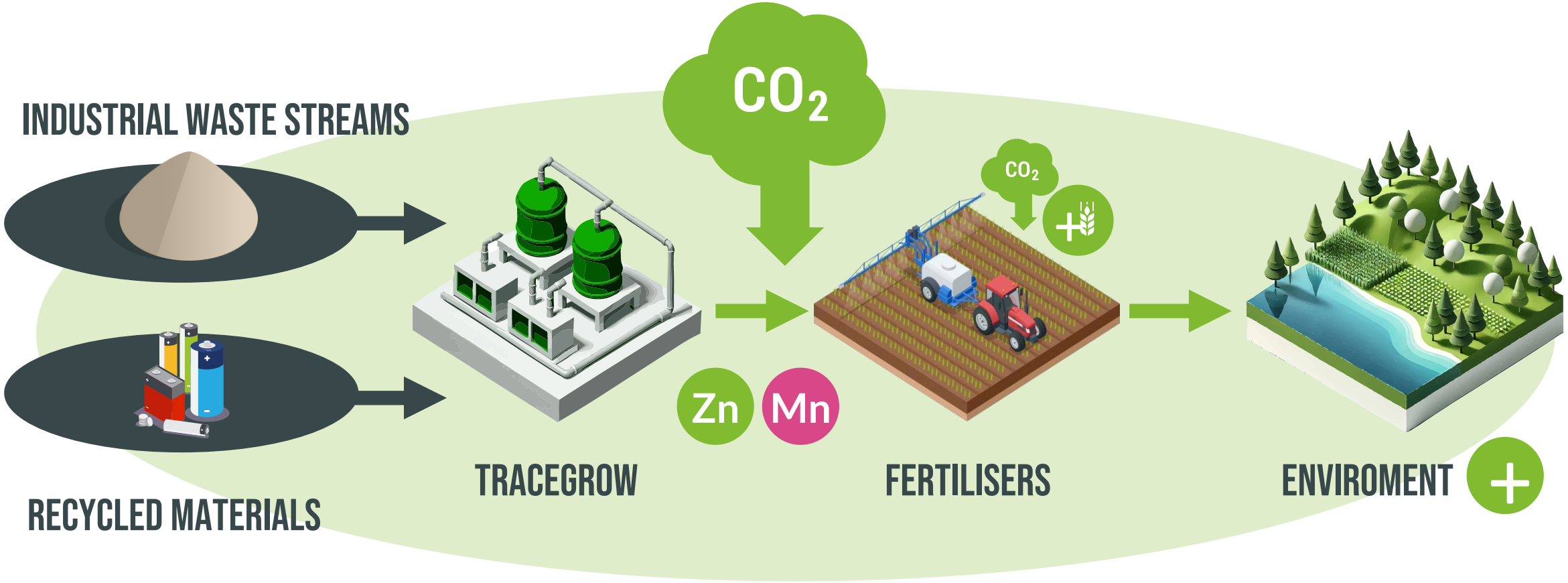
ENERGY STORAGE



ALKALINE BATTERY WASTE

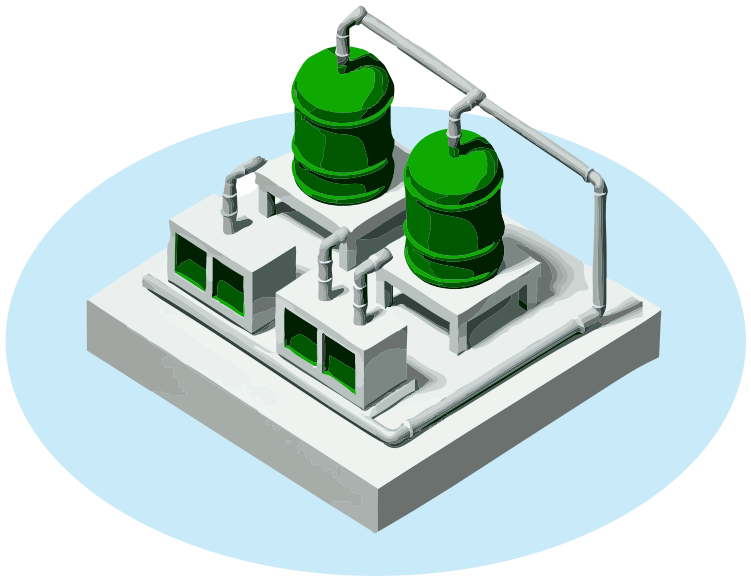
TRACEGROW

CIRCULAR ECONOMY IN AGRICULTURE



PATENTED RETRACER TECHNOLOGY

Family of Hydrometallurgical Processes

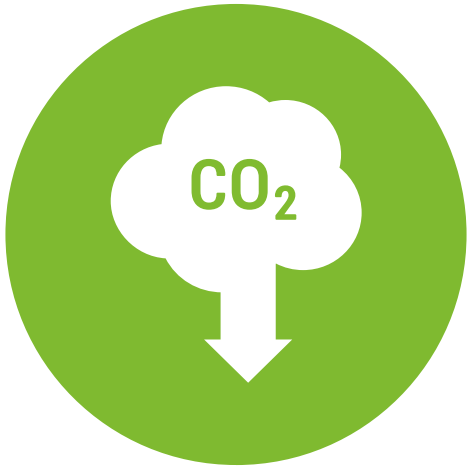


- Low Emissions
- Low Energy Use
- No Wastewater

FUTURE-PROOF SOLUTIONS - TODAY

SUSTAINABLE PRODUCTS

Circular economy
raw materials



LOW EMISSIONS

50 % CO_2 emission reduction
compared to mining

BIODIVERSITY IMPACT

Minimal impact on
biodiversity compared to mining

COMPETITIVE ADVANTAGES

STABLE PRICING

Shielding against global market fluctuations with circular economy efficiencies.

EU MANUFACTURING

EU recycling and manufacturing enhance supply chain resilience and ensure ESG compliance.

CONSISTENT QUALITY

Patented processes guarantee reliability

PRACTICAL LIQUID PRODUCTS

SAFER TO USE

Liquid sulphates are safer to use compared to alternatives

EXCELLENT MIXING PROPERTIES

Liquid sulphates mixes very well with other products

SIMPLE PROCESSING

No need for solid processing equipment

AGRICULTURAL FERTILISERS

Mitigate global health and environmental challenges

EACH MATERIAL STREAM HAS ITS OWN PROCESSING LINE

SUSTAINABLE MICRONUTRIENT LIQUID FERTILISERS

MADE IN EU

LOW CARBON EMISSIONS CIRCULAR ECONOMY PRODUCT

CE 2806

RECYCLED ALKALINE BATTERIES

Zn Mn

ZM-GROW **family**

SIDE STREAM FROM ZINC SMELTER

Mn

M-TRACE

SUSTAINABLE MICRONUTRIENT LIQUID FERTILISERS

CE 2806

Zn Mn Cu

ZIMACO-PRO

Zn Mn Cu

ZMC-GROW

Zn Mn

ZM-GROW

Mn

M-TRACE

TRACEGROW

KEY ADVANTAGES OF OUR FERTILISERS

PROPERTIES

100 % SULPHATE BASE
4x better absorption than suspensions

100 % WATER SOLUBLE
No solid particles

ORGANIC FARMING
Certified for organic use

MULTIPLE USAGE
- Foliar fertiliser
- Seed nutrient coating
- Granular coating

BENEFITS

EXCELLENT MIXING PROPERTIES
Easily mixes with agrochemicals

EQUIPMENT FRIENDLY
No sprayer blockages
Enhances seed flow

USER FRIENDLY
Simple dosing and easy cleaning

PROVEN RESULTS
Increase crop yields 10 – 20 %

TRACEGROW

ZIMACO-PRO

CHELATED MICRONUTRIENT SULPHATE: ZINC + MANGANESE + COPPER

CE 2806

DOSAGE

Foliar Fertiliser: 1 -2 l/ha to min. 200 l of water
Seed treatment: 2-4 l per 1000 kg of seeds.

Zn Mn Cu

NUTRIENT CONTENT		
Zinc	25 g/l	2,0 %
Manganese	28 g/l	2,3 %
Copper	9 g/l	3,3 %
Sulphur	40 g/l	40 g/l
Total nitrogen Ureic nitrogen	92 g/l	7,5 g/l
pH	2,5-3,5	
Density	1,23 kg/l	

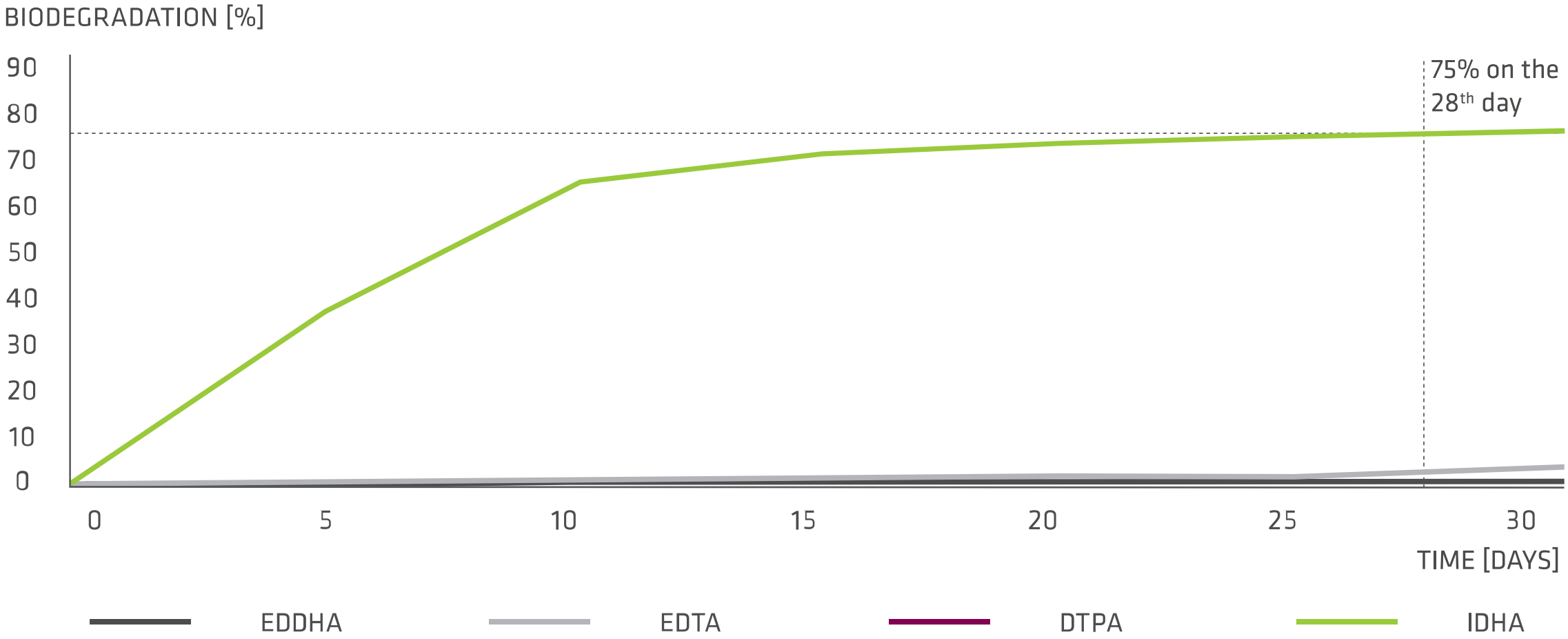
TRACEGROW

BENEFITS OF IDHA CHELATION AGENT

- IDHA is a natural, completely biodegradable chelation agent
- IDHA does not accumulate in soil, unlike other chelation agents, e.g. EDTA
- High degradation rate, >75 % after one month
- Quick foam disappearance
- Exceptional mixability
- High cost-effectiveness

IDHA BIODEGRADATION TIMESPAN

HIGH DEGRADATION RATE, >75 % AFTER ONE MONTH



ZMC-GROW

MICRONUTRIENT SULPHATE: ZINC + MANGANESE + COPPER

CE 2806

Zn Mn Cu

NUTRIENT CONTENT		
Zinc	58 g/l	4,3 %
Manganese	64 g/l	4,7 %
Copper	21 g/l	1,5 %
Sulphur	85 g/l	6.3 %
pH	3,4	
Density	1,36 kg/l	

DOSAGE

Foliar Fertiliser: 2 -3 l/ha to min. 200 l of water
Seed treatment: 2-4 l per 1000 kg of seeds.

ZM-GROW

MICRONUTRIENT SULPHATE: ZINC + MANGANESE

CE 2806

Zn Mn

NUTRIENT CONTENT		
Zinc	60 g/l	4,4 %
Manganese	67 g/l	4,9 %
Sulphur	75 g/l	5,5 %
pH	3,9	
Density	1,36 kg/l	

DOSAGE

Foliar Fertiliser: 2 -3 l/ha to min. 200 l of water
Seed treatment: 2-4 l per 1000 kg of seeds.

TRACEGROW

M-TRACE

HIGH PURITY, CONCENTRATED MANGANESE SULPHATE

CE 2806

Mn

NUTRIENT CONTENT		
Manganese	150 g/l	10,9 %
Sulphur	90 g/l	6,6 %
pH	3	
Density	1,37 kg/l	

DOSAGE

Foliar Fertiliser: 1 -2 l/ha to min. 200 l of water
Seed treatment: 2-4 l per 1000 kg of seeds.

TRACEGROW

ZM-GROW PRODUCT FAMILY

	ZIMACO-PRO	ZMC-GROW	ZM-GROW	M-TRACE
MIXING PROPERTIES	Excellent	Good	Excellent	Excellent
CHELATED WITH IDHA	Yes	-	-	-
100 % WATER-SOLUBLE	Yes	Yes	Yes	Yes
SULPHATE BASED	Yes	Yes	Yes	Yes
USERFRIENDLY	Liquid Concentrate	Liquid Concentrate	Liquid Concentrate	Liquid Concentrate
EQUIPMENT FRIENDLY	No particles	No particles	No particles	No particles
ORGANICALLY APPROVED	Country dependant	Yes	Yes	Yes
RECOMMENDED USAGE	Fastest absorption and longest lasting effect	Copper deficiency, especially for oat, barley and wheat	Zinc and manganese deficiency	Manganese deficiency

TAILORED BLENDS

TAILOR BLENDS TO MEET DIVERSE NUTRIENT NEEDS

Zn Mn Cu

ZMC-GROW

+

Mn

M-TRACE

Zinc g/l	Manganese (g/l)	Copper (g/l)
58	64	21

Manganese (g/l)
150

=

Zinc g/l	Manganese (g/l)	Copper (g/l)
29	106	10

Combine products to create nutrient blends tailored to specific crop requirements.

Zn Mn

ZM-GROW

+

Mn

M-TRACE

Zinc g/l	Manganese (g/l)
60	67

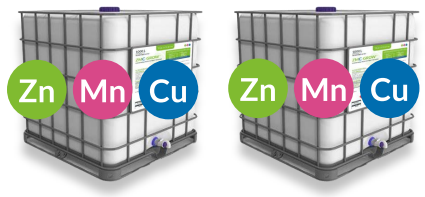
Manganese (g/l)
150

=

Zinc g/l	Manganese (g/l)
30	109

ZMC-GROW + M-TRACE

Tailored blends to meet diverse nutrient needs

ZMC-GROW	M-TRACE		Zinc g/l	Manganese (g/l)	Copper (g/l)
		=	39	91	13
		=	29	106	10
		=	19	121	7
		=	15	128	5

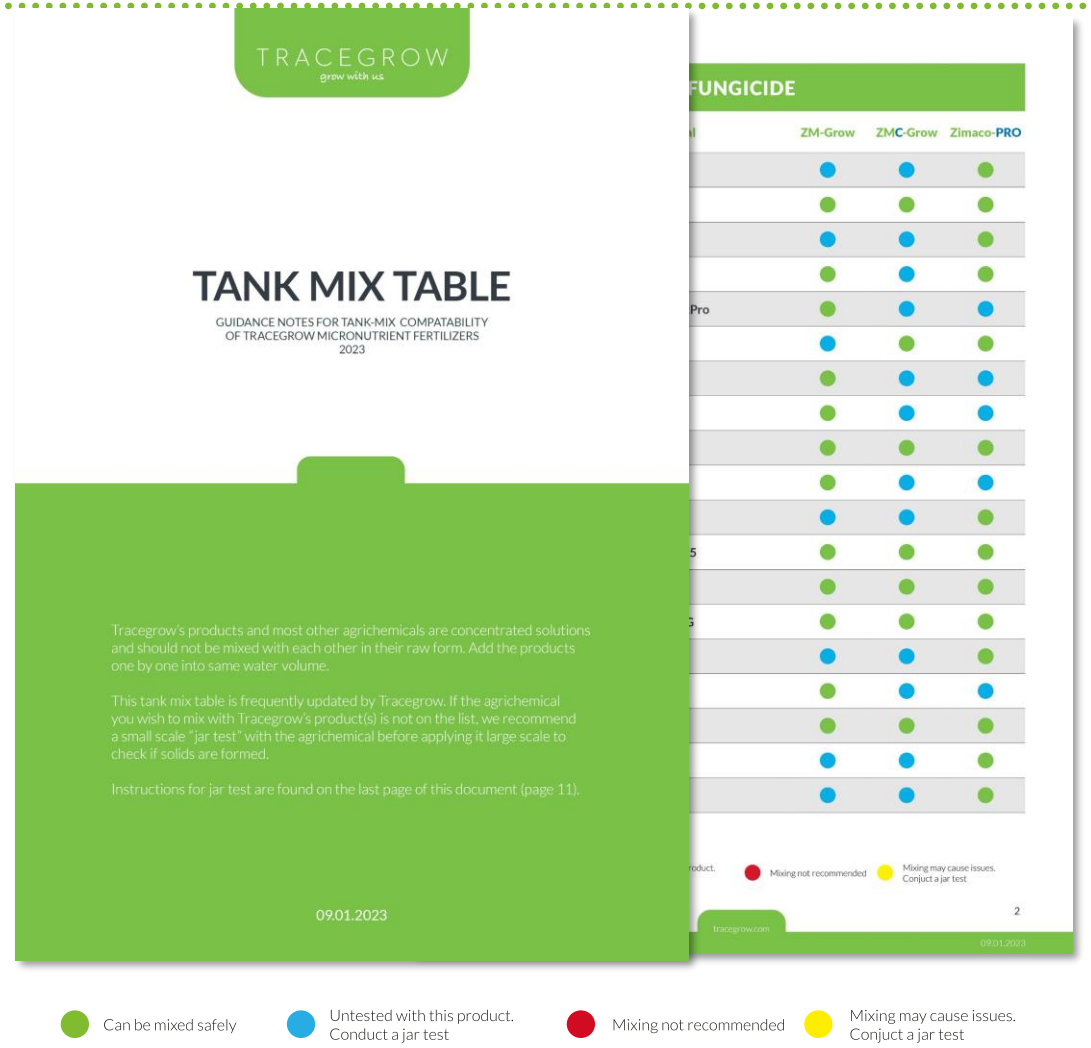
ZM-GROW + M-TRACE

Tailored blends to meet diverse nutrient needs

ZM-GROW	M-TRACE	Zinc g/l	Manganese (g/l)
		40	95
		30	109
		20	122
		15	129

TRACEGROW

EXCELLENT MIXING PROPERTIES



Can be mixed safely

Untested with this product. Conduct a jar test

Mixing not recommended

Mixing may cause issues. Conjuct a jar test

- Excellent mixing properties
- Mixes well with most used agrochemicals without any complications
- Foliar fertilisation can be easily combined with other applications like e.g. herbicides
- Lower spraying expansions, less time consuming

TEST RESULTS

Strong plant growth and
increased yield

FIELD TRIALS

- Tests in many countries
- Different crops
- Tests on test sites and farms
- Results have shown good yield and quality increasements

YIELD INCREASE RESULTS FOR FIELD TRIALS

Potato

Corn

Oat

Barley

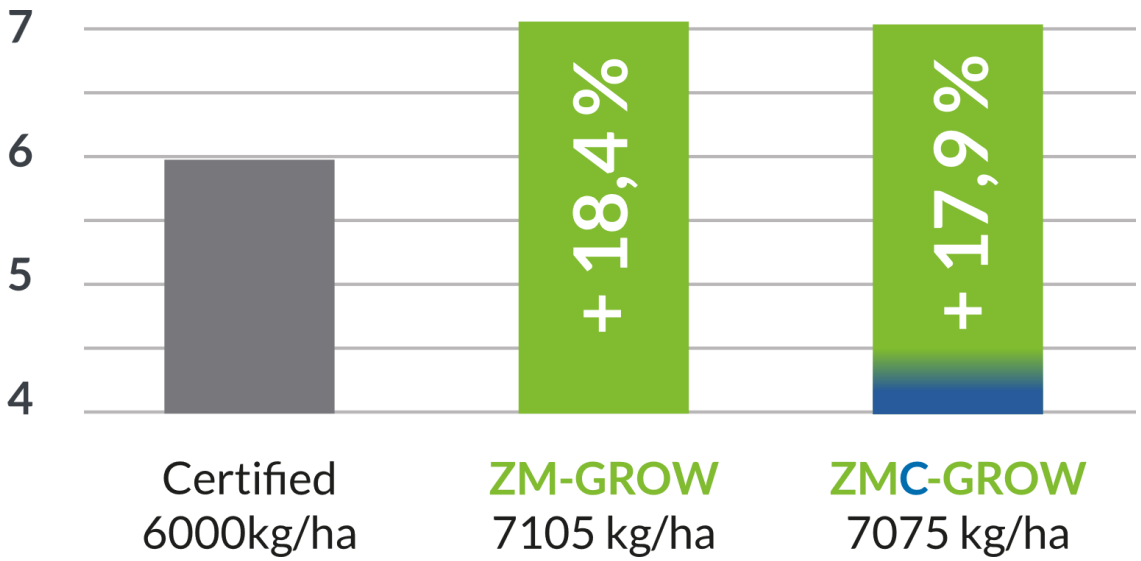
Sugar Beet

MICRONUTRIENTS ARE COMPLEMENTARY TO FERTILISERS

- Increases efficiency
- Lowers related carbon footprint
- Increase plant health and root development.

OATS YIELD INCREASE FROM SEED COATING

ONLY DIFFERENCE BETWEEN TRIAL AREAS - SEED TREATMENT



ALL TRIAL SEEDS WERE TREATED WITH:
Redigo-Pro.

OAT TRAILS: ROOT AND LEAF GROWTH FROM SEED COATING

ONLY DIFFERENCE BETWEEN TRIAL AREAS - SEED TREATMENT

Root development 1.5 months after sowing

Leaf growth:
3 weeks after sowing

VISIBLE EFFECTS ON PLANT GROWTH

- Increased growth of root system
- Increased leaf length
- Increased plant resilience

IDENTICAL TREATMENT

All trial areas received:

- NPK- and micronutrient fertilisers
- Weed control chemicals
- Plant disease chemicals

CARBON REDUCTION

CO_2 reductions compared
to virgin raw materials

CARBON FOOTPRINT REDUCTION IN AGRICULTURE

60 %

CO_2 reduction compared to virgin materials

4X

Sulphate based micronutrients absorb 4x times more efficiently than oxide-or carbonate-based products requiring less application of manganese and zinc

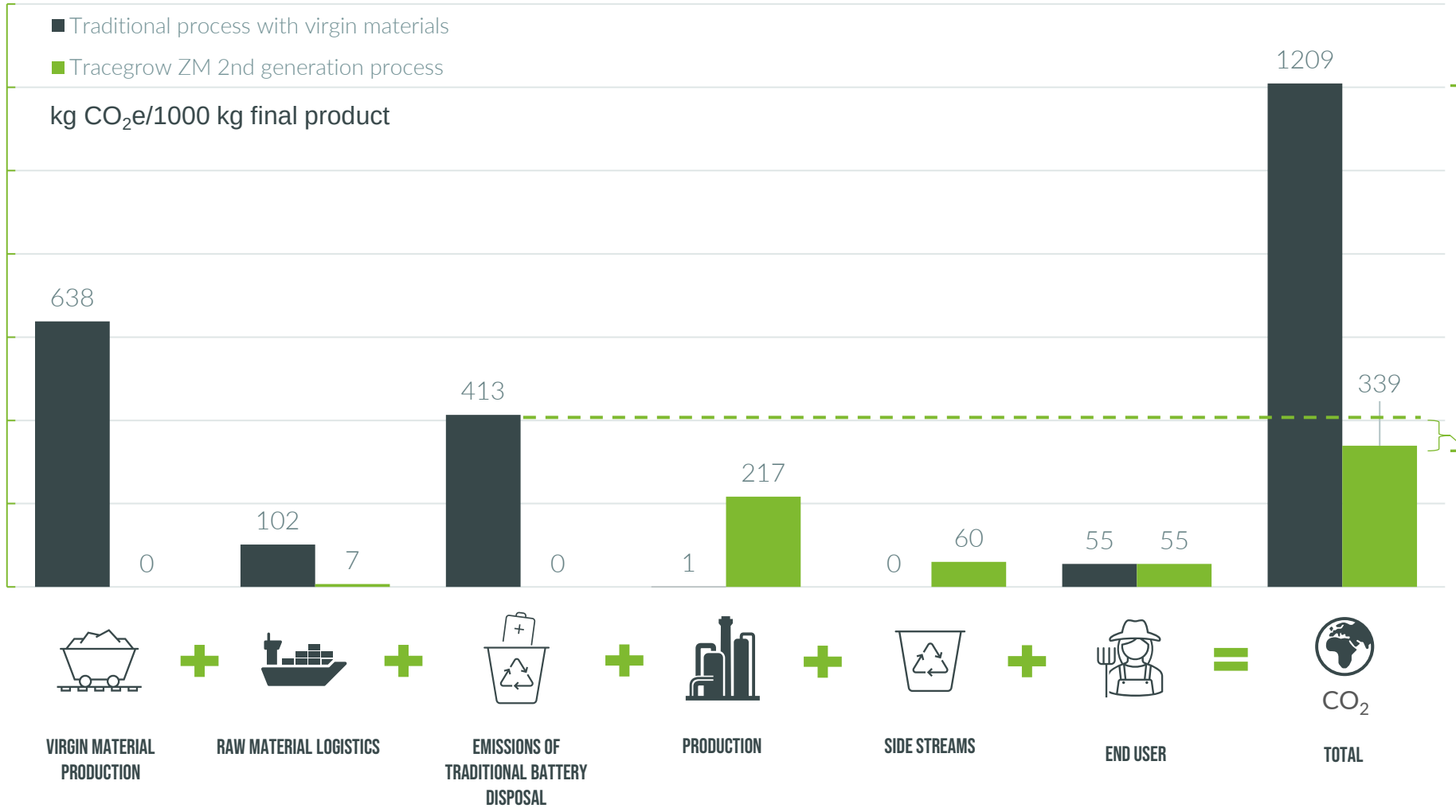
0 %

No additional fuel emissions due excellent mixing properties with herbicides and pesticides – less driving on the field

15 %

Boosting crop yield with more efficient use of macronutrients (NPK) and reducing relative carbon footprint

ZM-GROW: REDUCE CO_2 EMISSIONS UP TO 70%



70%
EMISSIONS REDUCTION

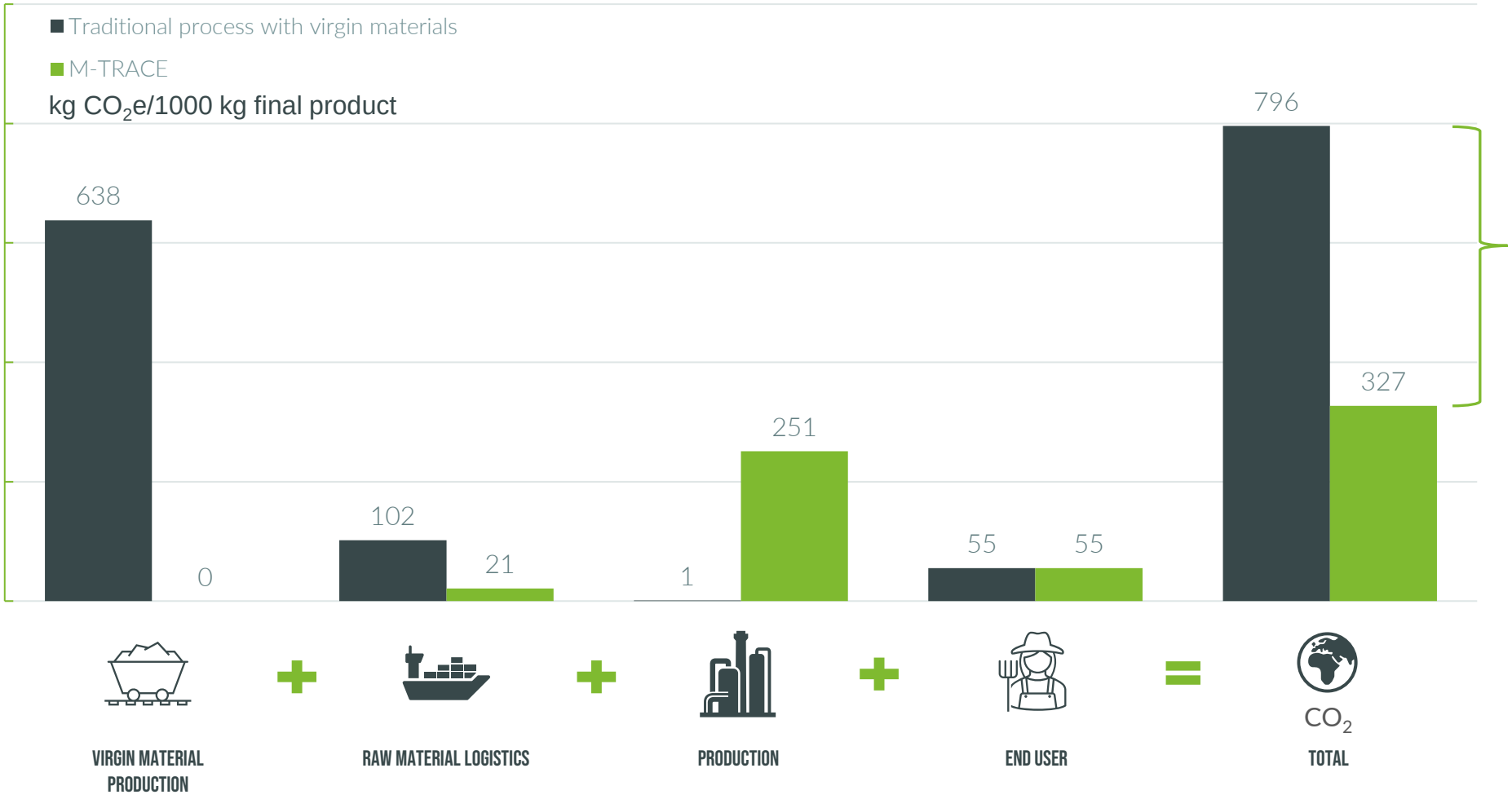
15%
LESS EMISSIONS THAN BATTERY INCINERATION

TRACEGROW

REDUCE CO_2 EMISSIONS APPROXIMATELY BY 70%

PATHWAYS	VIRGIN MATERIAL PRODUCTION	RAW MATERIAL LOGISTICS	EMISSIONS OF TRADITIONAL BATTERY DISPOSAL	PRODUCTION	WASTE AND SIDE STREAMS	END USER	TOTAL (KG CO_2E/1000 KG FINAL PRODUCT)
Tracegrow's 2nd gen process	Only the process chemicals	Minimal local logistics	No notable emissions	Processing and purification of crushed alkaline batteries	Solid residues from alkaline batteries (graphite, plastics)	Use at farm and container disposal	Total: 339
Making traditional sulphate solution from virgin materials	Mining and manufacturing of zinc and manganese sulphates	Average global logistics emissions of virgin material	High CO_2 emissions from incinerating the battery mass in centralized European location	Mixing the solid sulphates to water	No notable emissions	Use at farm and container disposal	Total: 1209

M-TRACE: REDUCE CO_2 EMISSIONS UP TO 60%



60%
EMISSIONS REDUCTION

TRACEGROW

M-TRACE: REDUCE CO_2 EMISSIONS APPROXIMATELY BY 60%

PATHWAYS	VIRGIN MATERIAL PRODUCTION	RAW MATERIAL LOGISTICS	PRODUCTION	END USER	TOTAL (KG CO_2E/1000 KG FINAL PRODUCT)
Tracegrow's process	Only the process chemicals	Minimal local logistics	Processing and purification of manganese sludge	Use at farm and container disposal	Total: 327
Making traditional sulphate solution from virgin materials	Mining and manufacturing of manganese sulphate	Average global logistics emissions of virgin material	Mixing the solid sulphates to water	Use at farm and container disposal	Total: 796

THANK YOU!


RECYCLED ALKALINE BATTERIES
INDUSTRIAL STREAMS
TRACEGROW
grow with us
AGRICULTURAL FERTILIZER
INDUSTRIAL MATERIALS