AFRICA WORKS! 2022
Innovation for Resilient Growth

CLIMATE-RESILIENT SEEDS AND BIOLOGICAL CROP PROTECTION FOR FOOD SECURITY

*Solynta
hybrid potato breeding

Koppert

TNO innovation for life

NL.IN. BUSINESS

NABC
Confidence in African Business

Government of the Netherlands

MODERATOR

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MR. KABIR ADEMOH

Local Coordinator for the Seeds 4 Change Project in Nigeria

Netherlands-African Business Council

PRESENTATION 1

MR. HEIN KRUYT

CEO & Founder

Solynta

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How something this small can change the world

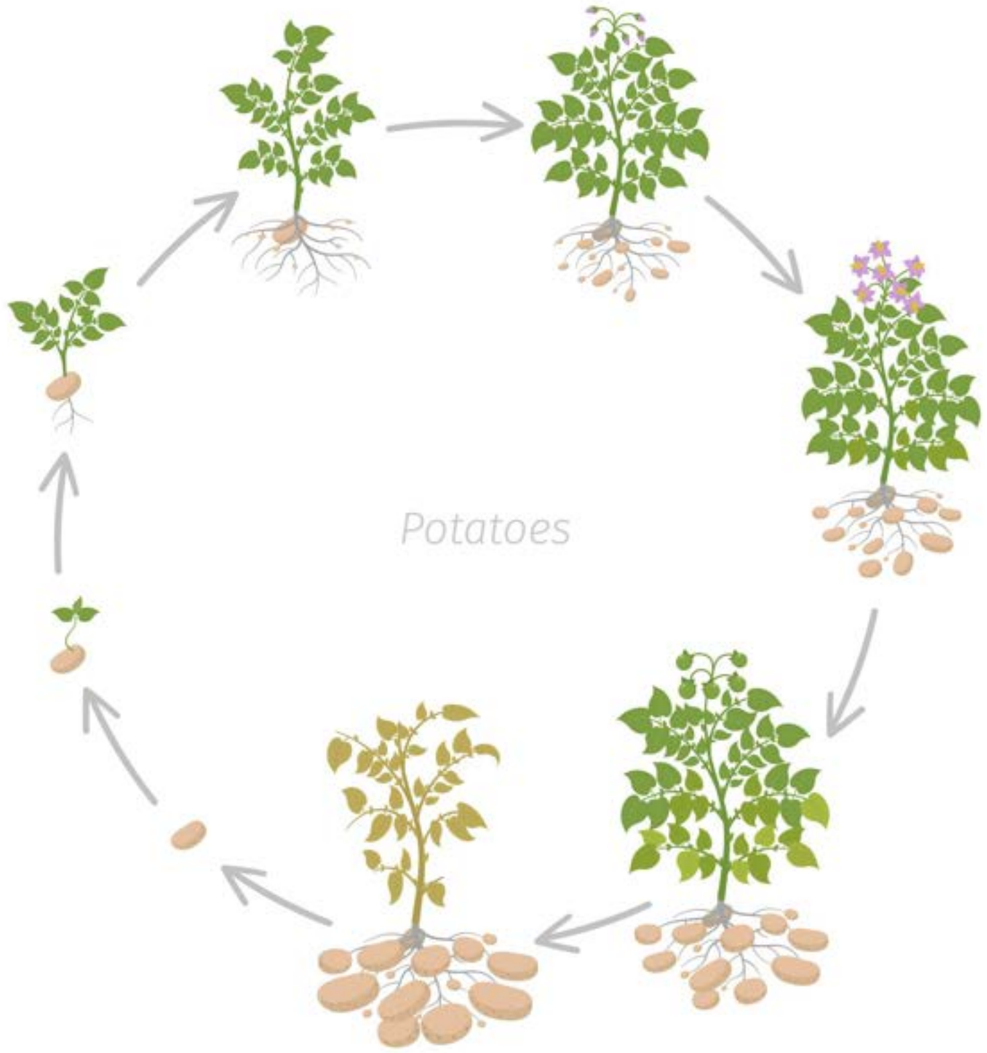
Hein Kruyt – CEO Solynta

Solynta
hybrid potato breeding

Climate – Resilient Seeds for Food Security

Africa Works! 2022

How potatoes are grown, ….



…, until

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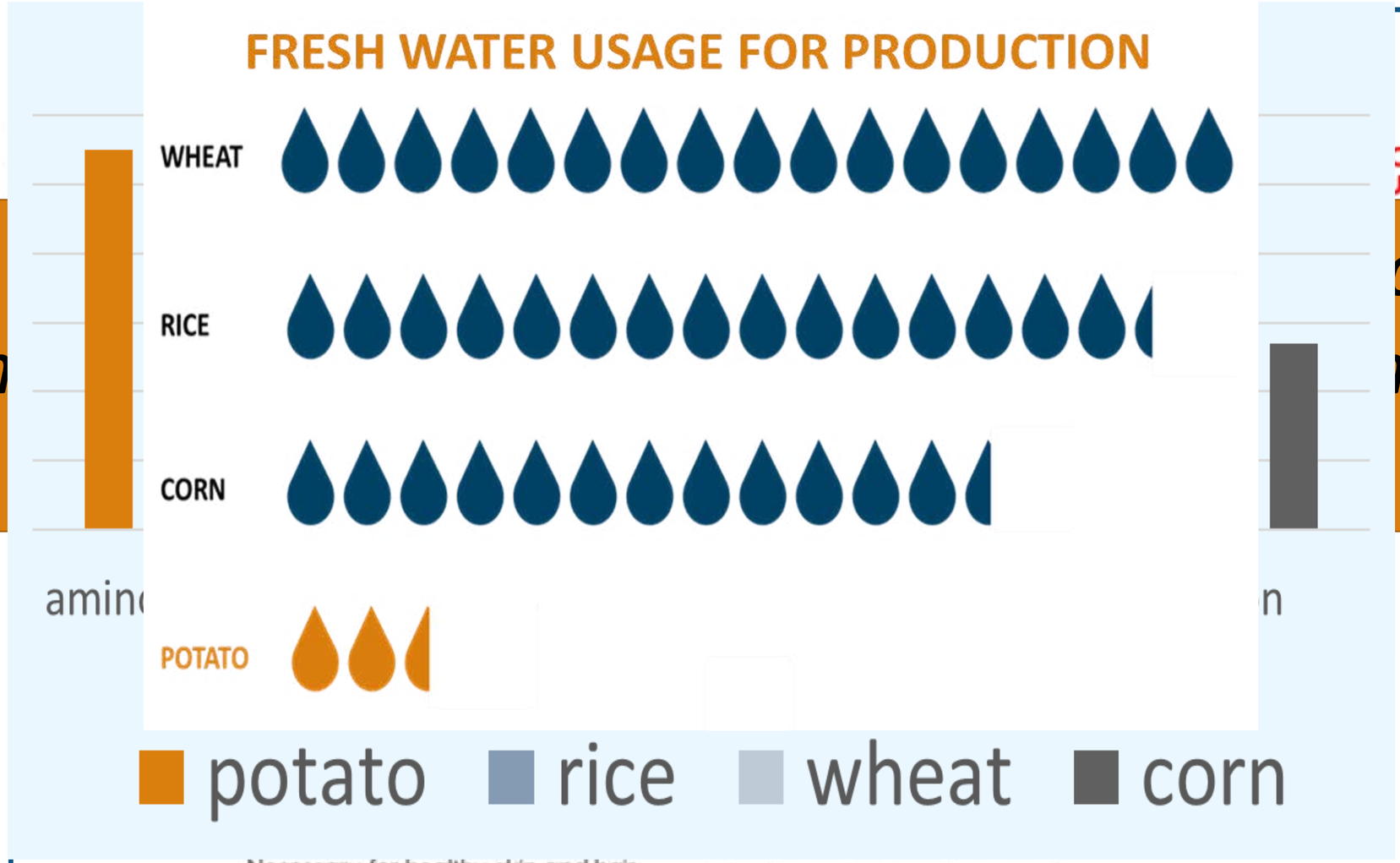

Necessary for healthy skin and hair and for strong bones, teeth and gums

Contributes to strong bones and teeth (together with calcium)

Source: BPC

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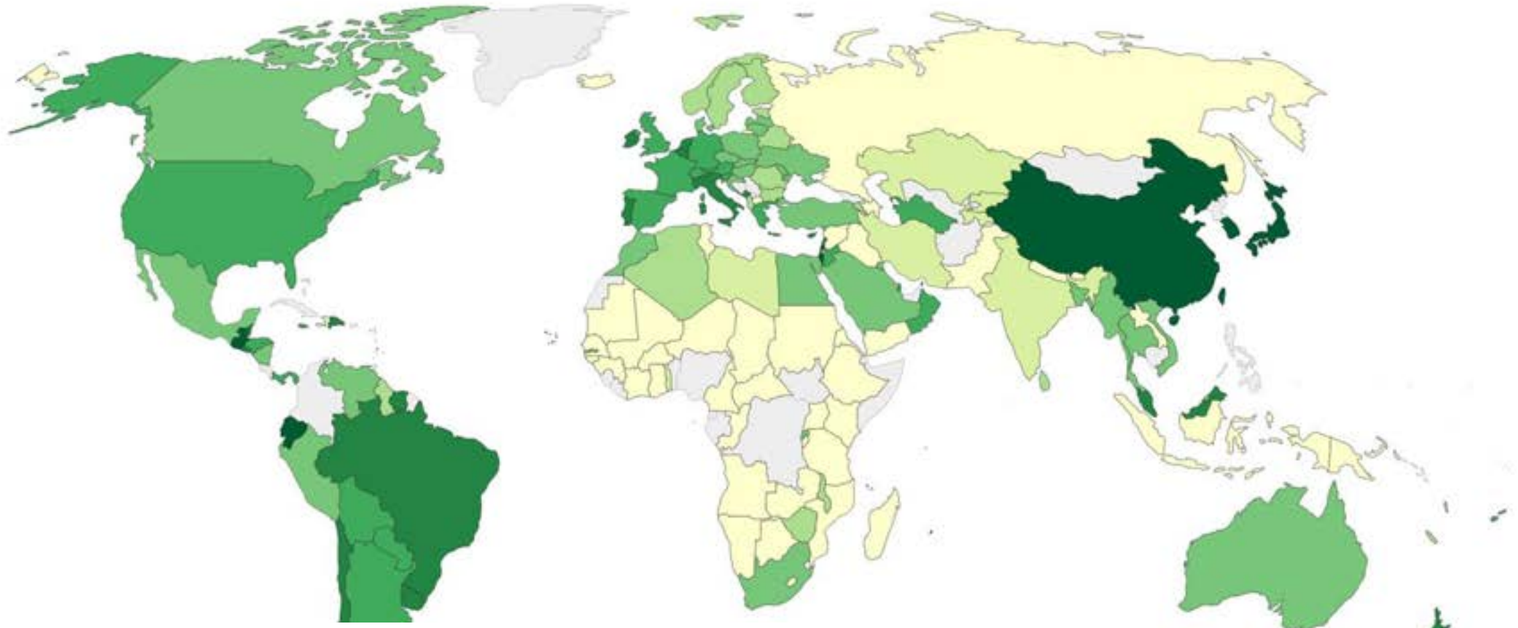
Pesticide use per hectare of cropland, 2017

Average pesticide application per unit of cropland, measured in kilograms per hectare.

Our World in Data



No data 0 kg 0.25 kg 0.5 kg 1 kg 2.5 kg 5 kg 10 kg 25 kg

Source: UN Food and Agricultural Organization (FAO)

OurWorldInData.org/pesticides/ • CC BY

Lowe

1. Dis

as sta

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Material

ling

2. Breeding for disease resistant varieties impossible

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The disruptive innovation

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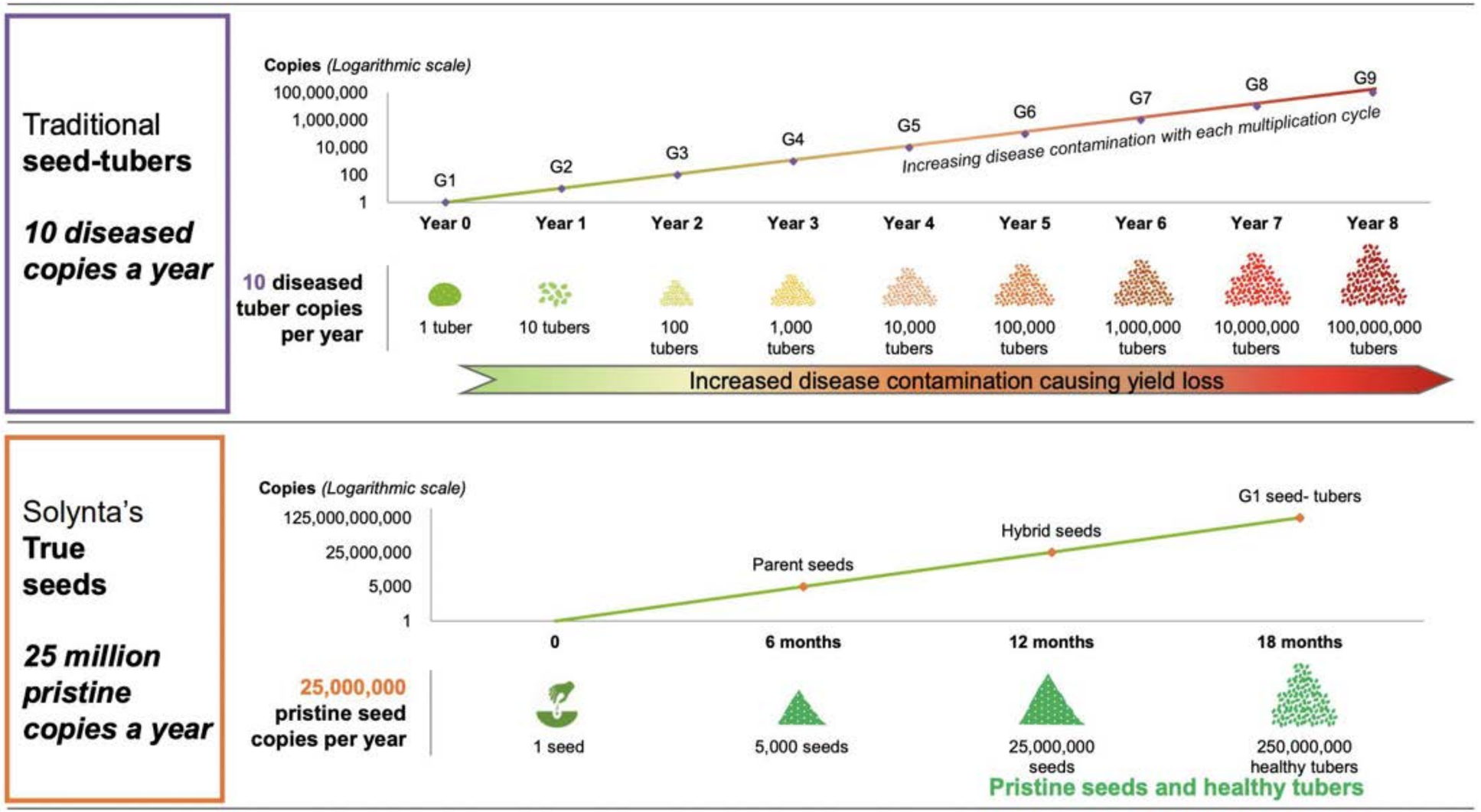
Comparison: Traditional Seed Tubers vs. Solynta True Potato Seeds



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Traditional Potato Breeding...

- Relies on seed tubers: **transportation issues**
- Seed tubers **prone to disease** and pests.
- Lacks **genetic diversity**
- Is **slow to scale (10 copies a year)**: most popular varieties were developed 150 years ago
- Requires **2500 kilo to plant** one hectare.
- Massive amount of storage space and transportation**: impact on planet**

Hybrid Potato Breeding...

- Produces true potato **seeds**
- Are **easy to ship and store.**
- Creates **disease-free starting material** for local farmers to grow their production.
- Is **fast to scale,** with **25 million copies** produced per year.
- Only needs **25 grams to plant** a hectare
- Allows researchers to **adapt potato to local circumstances and pest resistance**.

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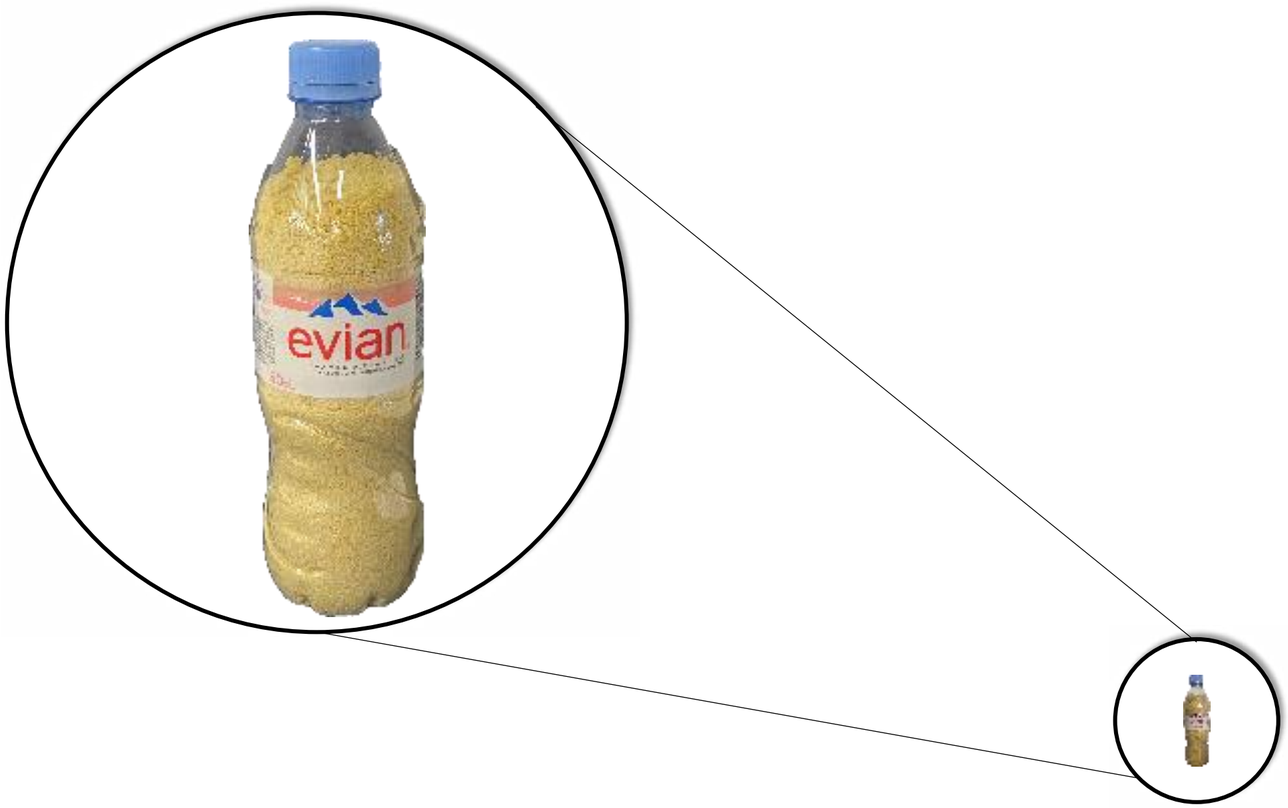
hybrid potato breeding

~~Lack of~~ healthy

Starting material

A single 50cl water bottle holds ~1.5 million seeds, this is sufficient to plant ~30 hectares…



…which would require 60 pallets of regular seed- tubers

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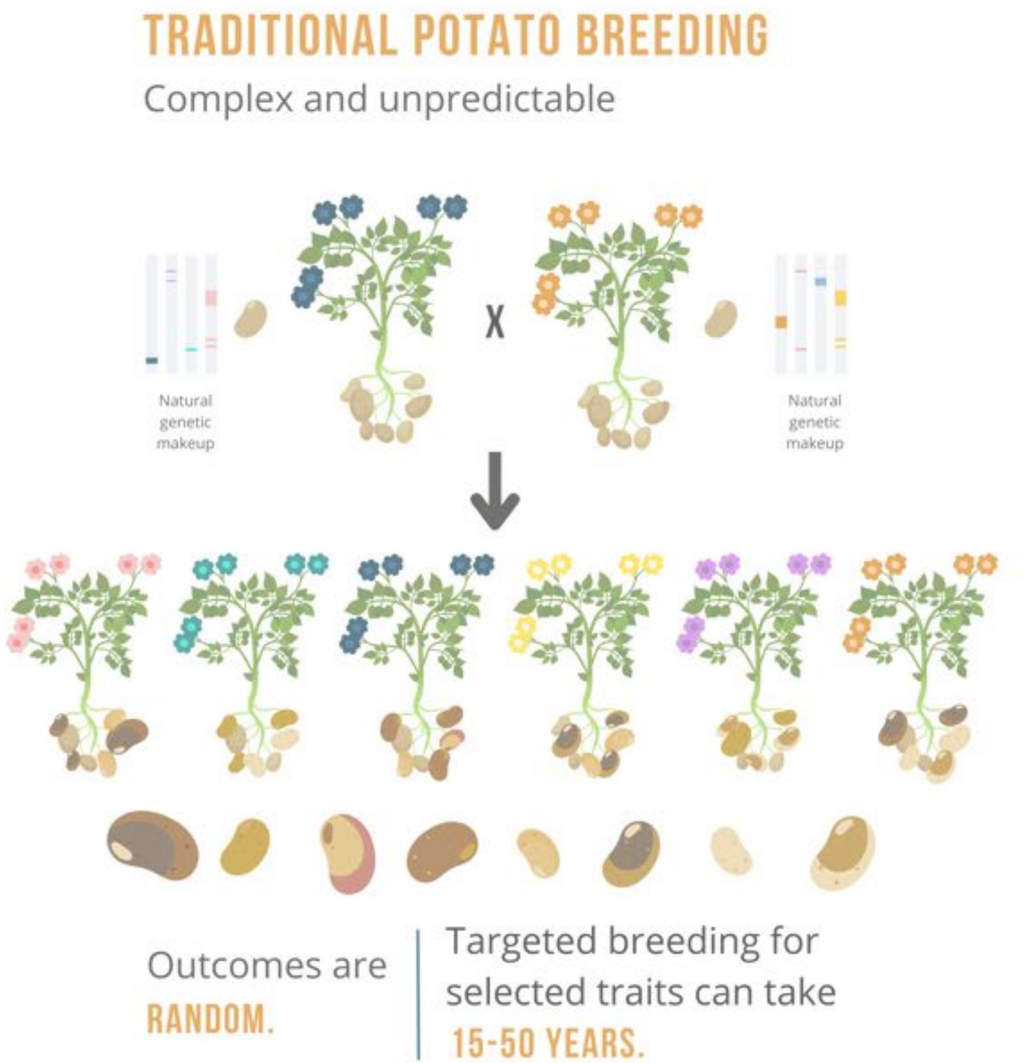
A new way of breeding



Targetable, Predictable, Fast & Efficient

Breeding

Plot with non-resistant variety

Single gene resistant variety

Double gene resistant variety

Double-stacked resistance against late blight developed within 2 years, finding a sustainable solution for a disease with €6B in annual damages

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Potato 2.0

nature

Hybrid breeding, a revolutionary technology

CIP
INTERNATIONAL POTATO CENTER

A game changing technology

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What if ..
These solutions come from this **tiny seed?**

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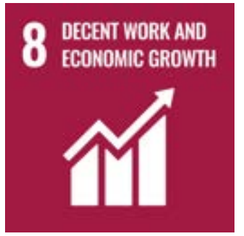
Imagine what we could…

Breed hybrid potatoes with higher resistance to

Climate change
Known pests and diseases
Robust yields

And positively contribute to the UN SDG's

- **SDG 1: No Poverty**
- **SDG 2: Zero Hunger**
- **SDG 3: Good Health**
- **SDG 8: Decent Work and Economic Growth**
- **SDG 13: Climate Action**



Solynta
hybrid potato breeding

Solynta’s mission

- To unlock the true potential of potatoes
- To provide hybrid potato innovations to enhance the livelihood of producers around the globe which will drive sustainable improvements in world food security.
- Using hybrid breeding technology, we will:

  - **Double potato yields**
  - **Dramatically reduce the use of pesticides**
  - **Improve food security and reduce hunger**

….in the next 6 years

Solynta
hybrid potato breeding

22159

Solynta
hybrid potato breeding

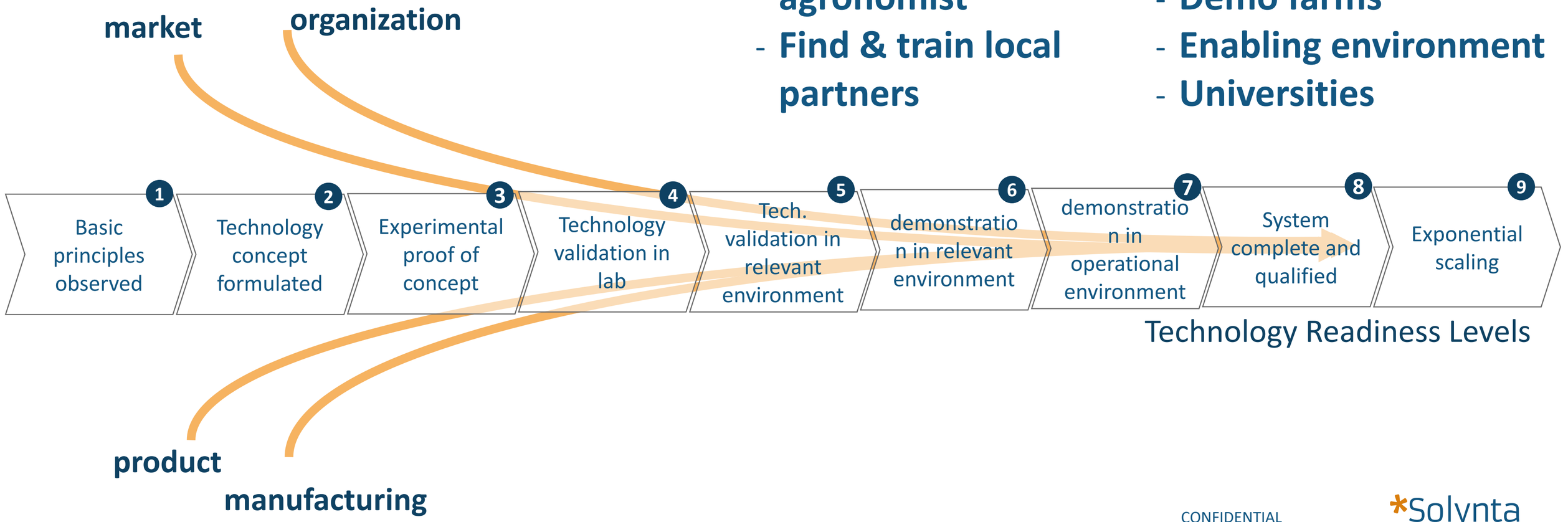
30 NOV 2020

International Conference "Potato futures: impact of hybrid varieties"

university of groningen | Rathenau Instituut | WAGENINGEN UNIVERSITY & RESEARCH | Solynta hybrid potato breeding | NFP Netherlands Food Partnership

Commercialization Enabling Technology:

- Importation
- Registration
- Testing varieties
- Train / educate local agronomist
- Find & train local partners
- Local for local production
- Distribution
- Smallholder farmers
- Demo farms
- Enabling environment
- Universities



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KIT
Royal Tropical Institute

NFP Netherlands Food Partnership

Solidaridad

RAB
RWANDA

FMO
Entrepreneurial Development Bank

Seeds2B AFRICA

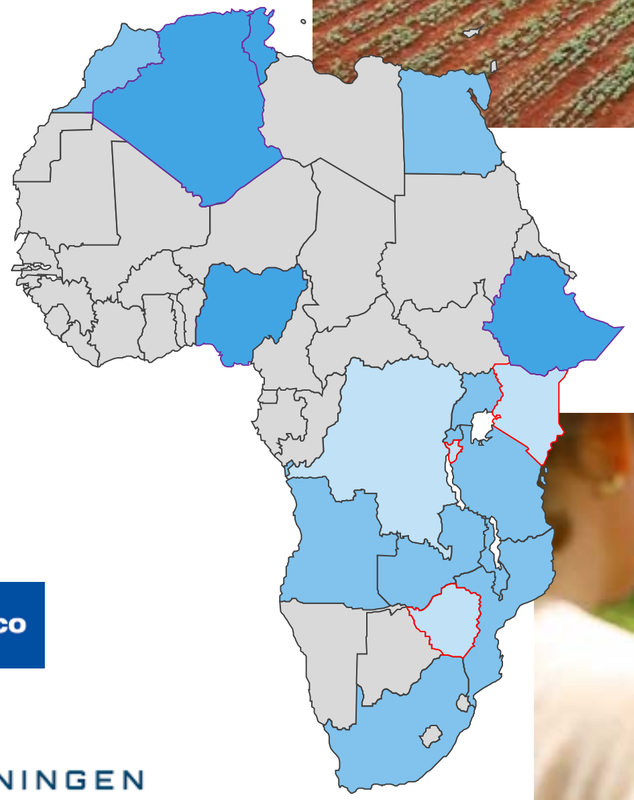
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

PEPSICO

WAGENINGEN
UNIVERSITY & RESEARCH

Rijksdienst voor Ondernemend Nederland

PYXUS



Solynta
hybrid potato breeding

The Solynta journey - sneak preview
Experimental hybrids in the Netherlands @ harvest 120 field days
> 50 T/ha from seedling grown crop

Solynta
hybrid potato breeding

Tomorrow starts today

- Seeds are the future for sustainable agriculture
  - Robust yields
  - Climate resilient
  - Disease resistant
- Increased food security & self-sufficiency
- Hybrid Potato seeds are best starting material
- We are ready to change the world with True Hybrid Potato Seeds

But we can’t do it alone

hein.kruyt@solynta.com

Thank you

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hybrid potato breeding

PRESENTATION 2

MR. YASSIN LAHIANI

Export Manager MENA and India

Koppert

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Koppert

Koppert - Corporate presentation

Partners with Nature

Koppert

At a glance

Global market leader

In biological crop control and pollination

Family company

Founded in 1967

300 million

Turn over 2021

30

Subsidiaries

2750

Employees worldwide

11

Production sites

100

Countries using our solutions

>400

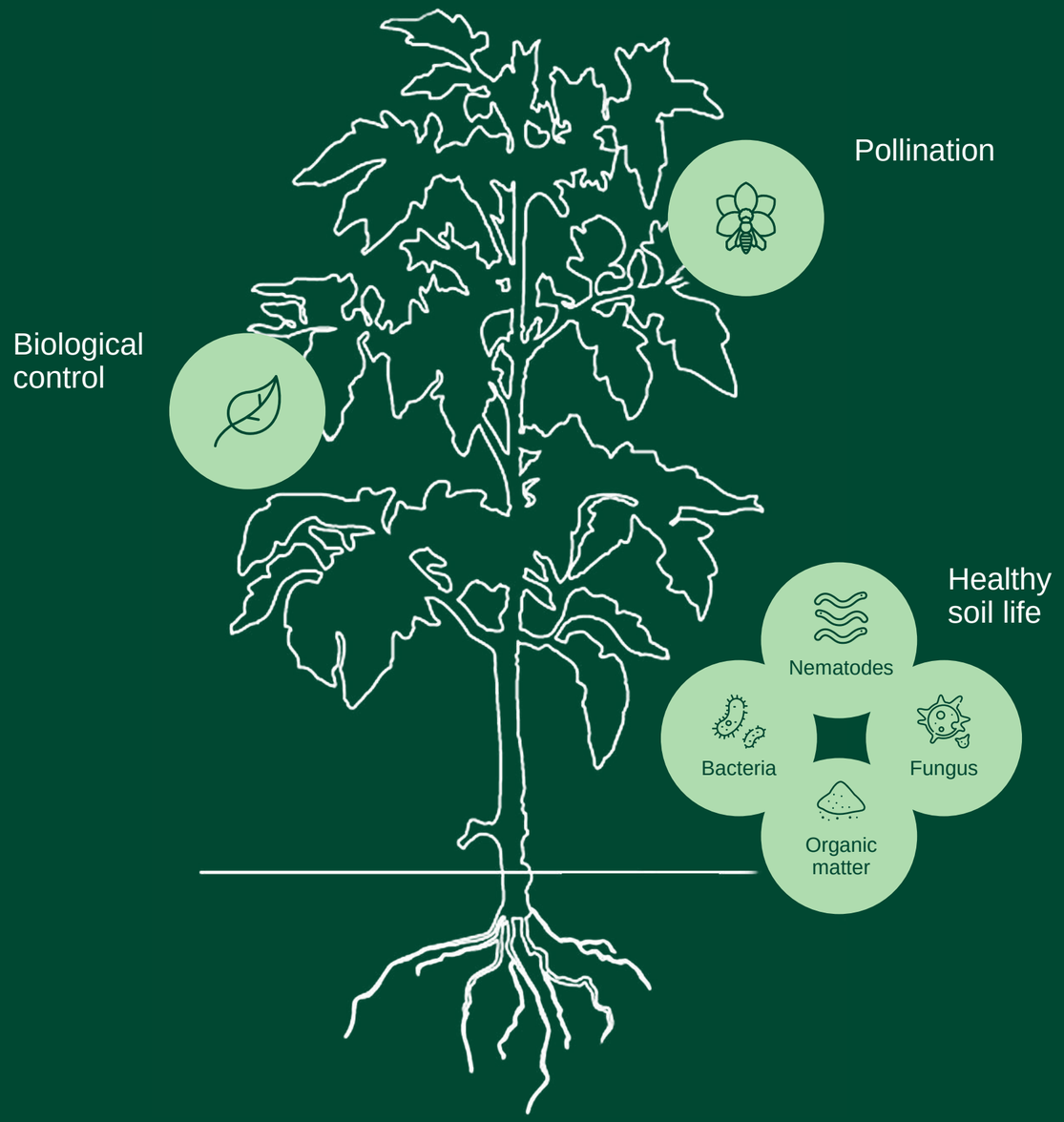
Advisors

120

Natural solutions

What we do

Our holistic approach is what sets us apart



Trends

The world is changing

There will be **9 billion** of us in **2030**

We will need to **produce more than ever before**

70% of us will live in cities

Our energy demand will **increase** by **50%**

We will live in cities of **40 million** people

50% of the world population will experience **severe water scarcity**

How will we **feed 9 billion** people?

10% of today's **biodiversity** will be lost

- [x] Biodiversity
- [x] Reducing greenhouse gases
- [x] Soil quality
- [x] Food safety
- [x] Sustainable intensification
- [x] Economics
- [x] Social/Politics
- [x] Circular economy
- [x] Legal requirements on growers
- [x] Reduce bee unfriendly pesticides
- [x] Food security
- [x] Less impact on environment and public health
- [x] Consumer demands residue-free products
- [x] Certification and trust

Our vision

The world needs 100% sustainable agriculture

What we do

Our Solutions

Macrobials

Parasitic wasps, predatory insects and mites

- Pest management is one of the biggest challenges
- Each pest has specific characteristics
- Vary greatly in cultivation, region and season

Helping growers to restore the natural balance in their crops

- Dramatically reducing use of agro-chemicals over years
- Greatest impact has been in tomato cultivation
- Use of crop protection chemicals decreased by 95%

Pollinators

Natural pollination since 1988

- Introducing bumblebees for commercial pollination
- Producing millions of bumblebees for a variety of applications
- Helping growers around the world cultivate crops successfully

Reduced labour costs for the grower

- Pollination results in considerably higher yield
- Improves quality and shelf life of both seeds and fruit

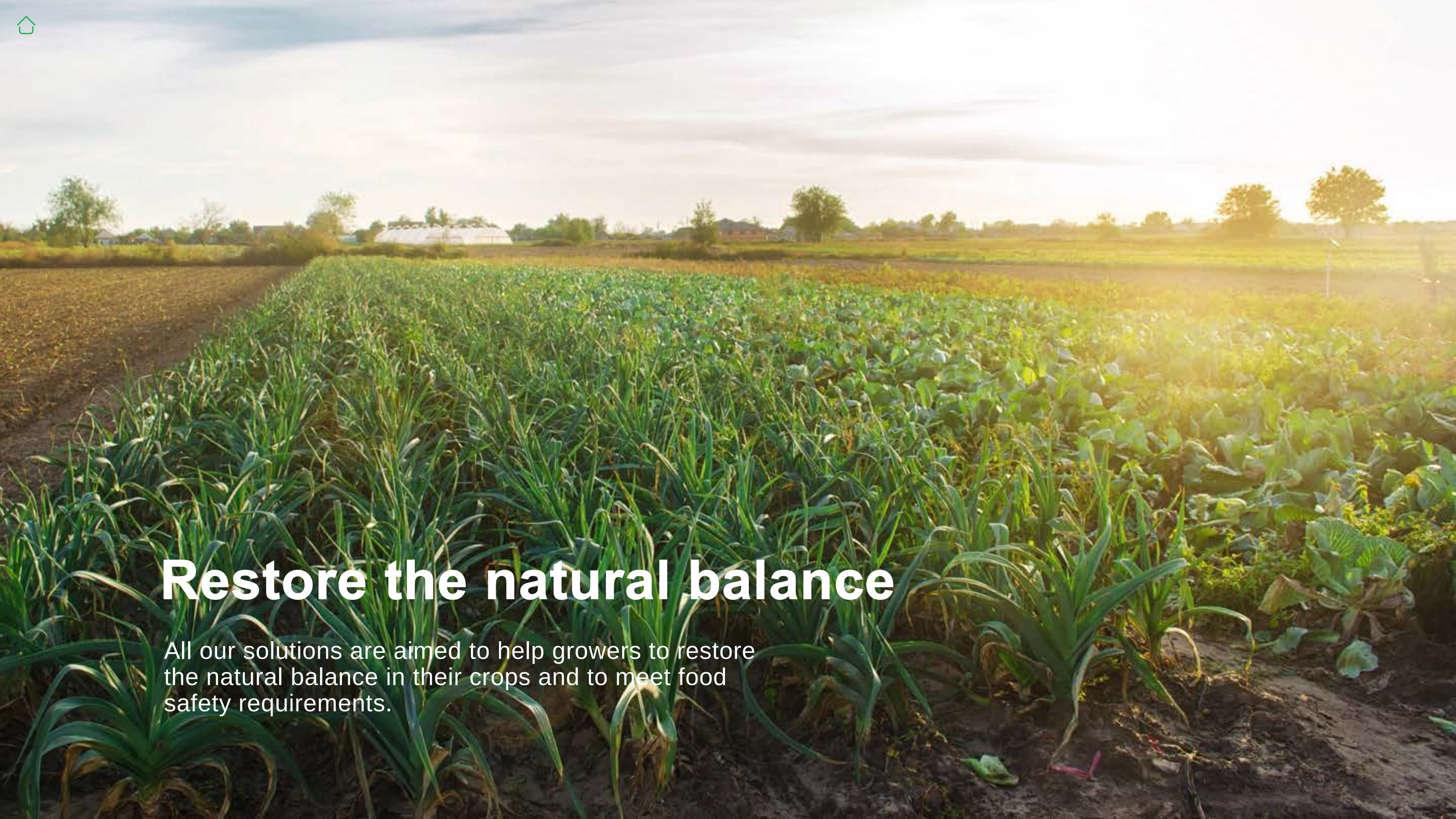
Microbials

Bacteria and fungi

- For sustainable production of plants and crops
- Used above ground and underground
- Combat diseases and pests, strengthen crops
- Improve the absorption of nutrients

Benefits the crop, environment and consumers

- Creating optimal growing conditions
- Maximizing crop resilience against diseases and pests
- Reducing use of chemical crop protection products and artificial fertilizers

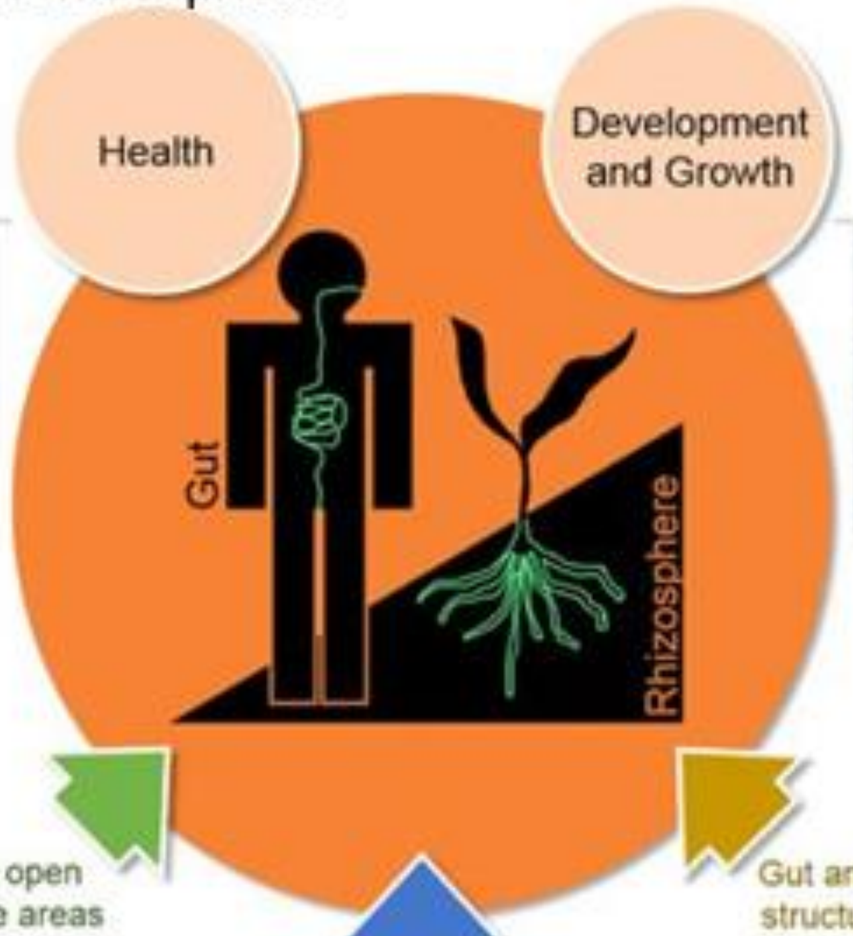


Restore the natural balance

All our solutions are aimed to help growers to restore the natural balance in their crops and to meet food safety requirements.

KOPPERT BIOLOGICAL SYSTEMS

Commonalities in the life support functions of the microbiomes of the human gut and the plant rhizosphere



- Protection against pathogens
- Production of enzymes and antibiotics
- Immune system modulation

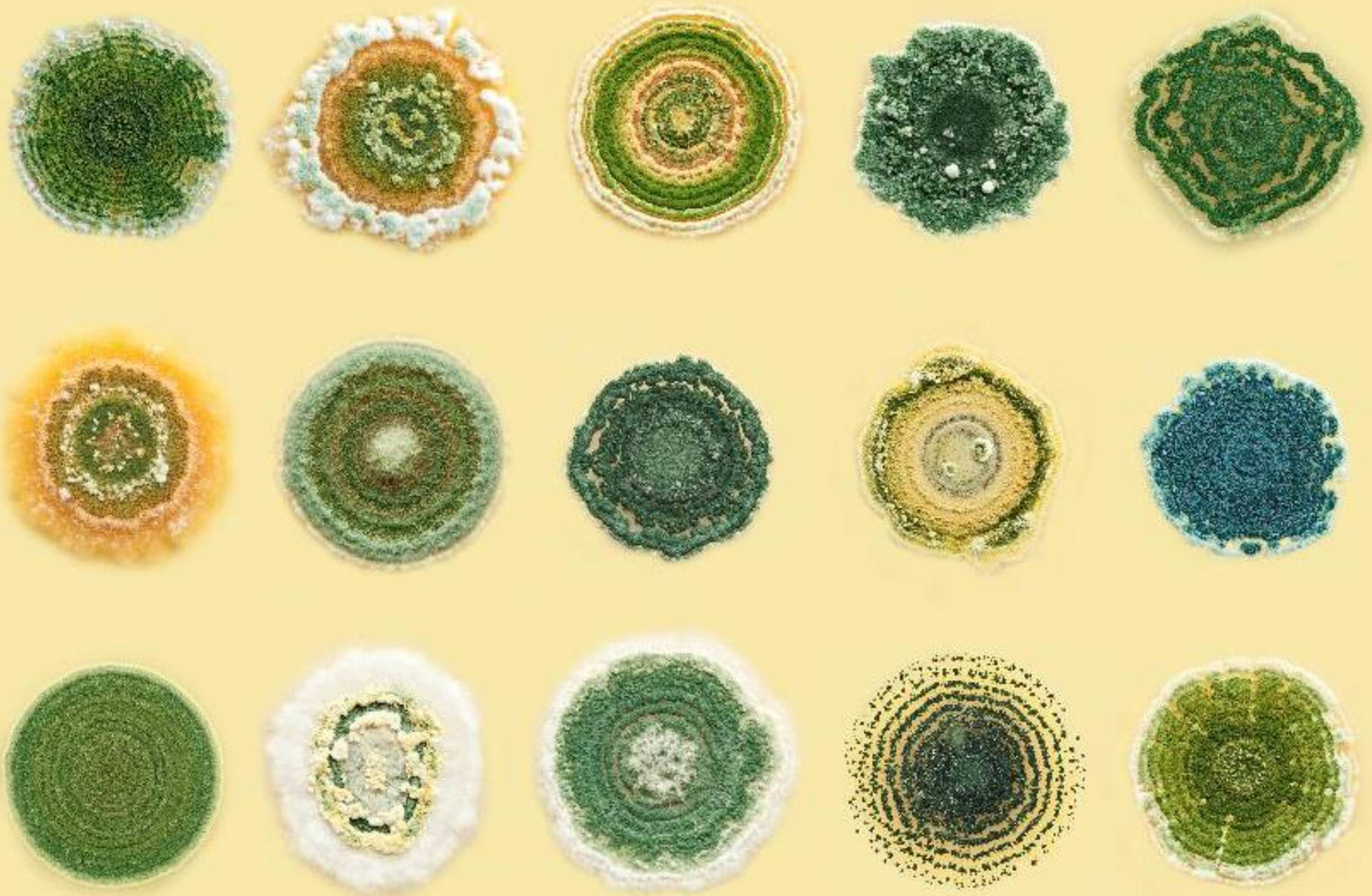
- Impact on physiology/metabolism
- Nutrient aquisition
- Production of amino acids
- Production of vitamins
- Production of growth hormones

Gut and rhizosphere are open systems with large surface areas overpopulated with microbes.

Gut and rhizosphere are characterized by a gradient of oxygen, water and pH resulting in a diversity of niches.

Gut and rhizosphere microbiome structures are shaped according to host genotype and age.

TRICHODERMAS ARE IMPORTANT MICROBIAL PRODUCTS



Woo et al., The Open Mycology Journal 2014

TRICHODERMAS

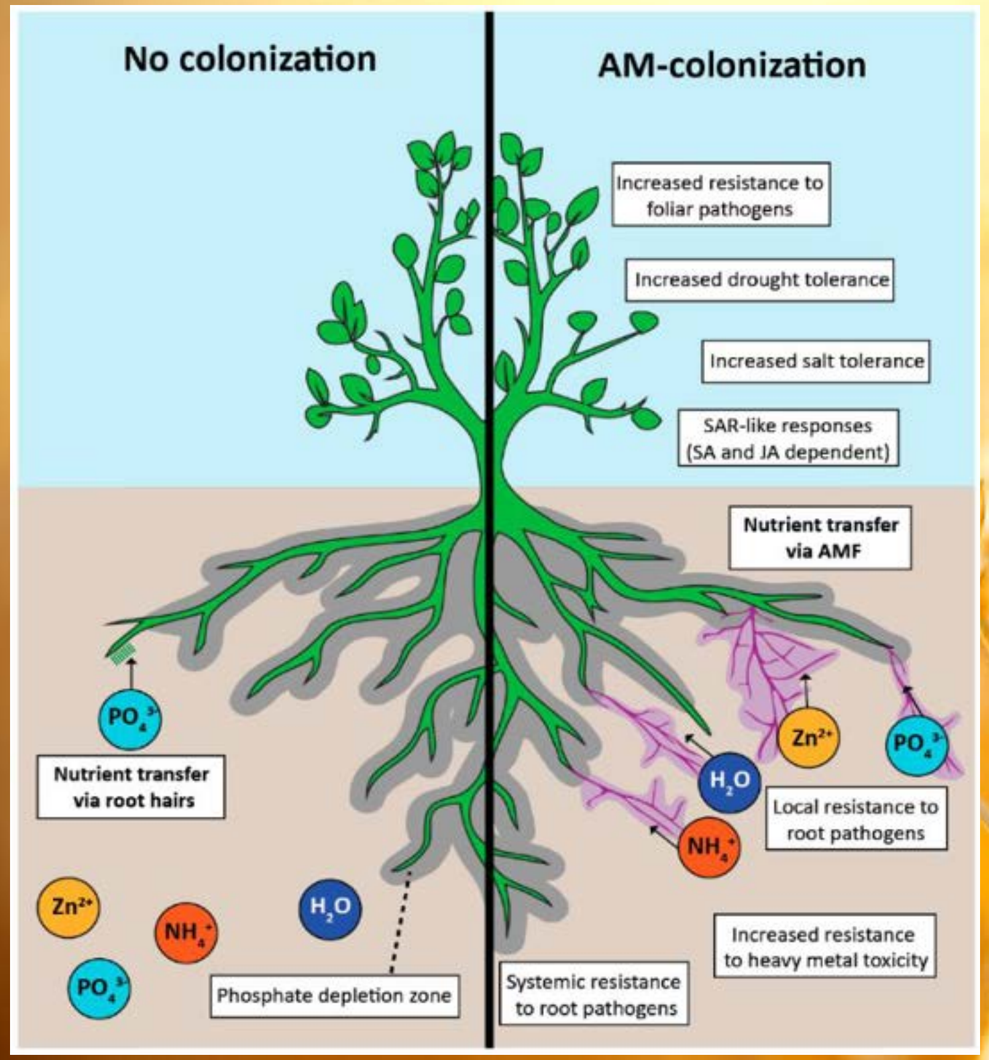
- Numerous species
- Beneficial soil fungi

PSB: *BACILLUS MEGATERIUM*

KOPPERT BIOLOGICAL SYSTEMS

- **PSB:** *Bacillus megaterium*
  - Makes insoluble form of P to soluble P
  - More root system, side roots and long hairy roots
  - Plant is better able to absorb nutrients and water
  - Improved crop growth

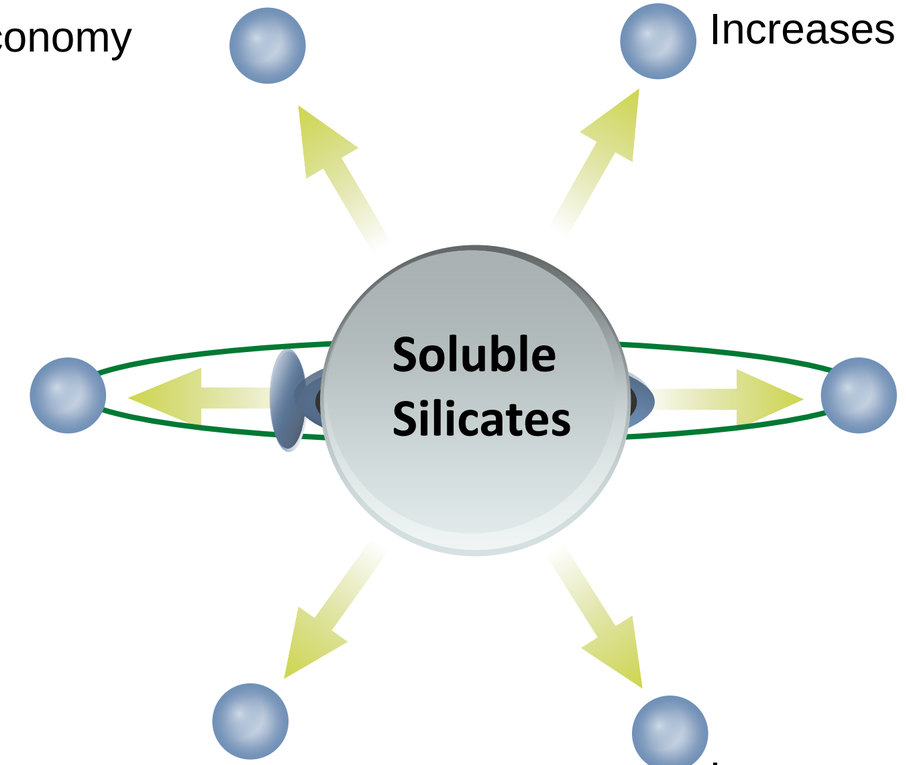
MYCORRHIZA BENEFITS



Source: CN Jacott et al., 2017

- Mycorrhiza colonization on roots protects the crop during the entire cultivation season
- Improves the surface area of plant roots and root mass
- Minimizes the transplantion shocks
- Improves absorption of water from deeper layer.
- Maintains and improves soil aggregation
- Plays a key role in nutrient recycling
- Supplies the essential nutrients from soil to the plants
- Improves the Phosphate and Nitrogen uptake in plants
- Protects the plants from drought and salinity
- Ameliorates the plants from biotic and abiotic stress
- Enhances the healthy plant growth
- Improves yields

SSB: *BACILLUS SPP.*



Improvement in water economy

Increases Soil Fertility

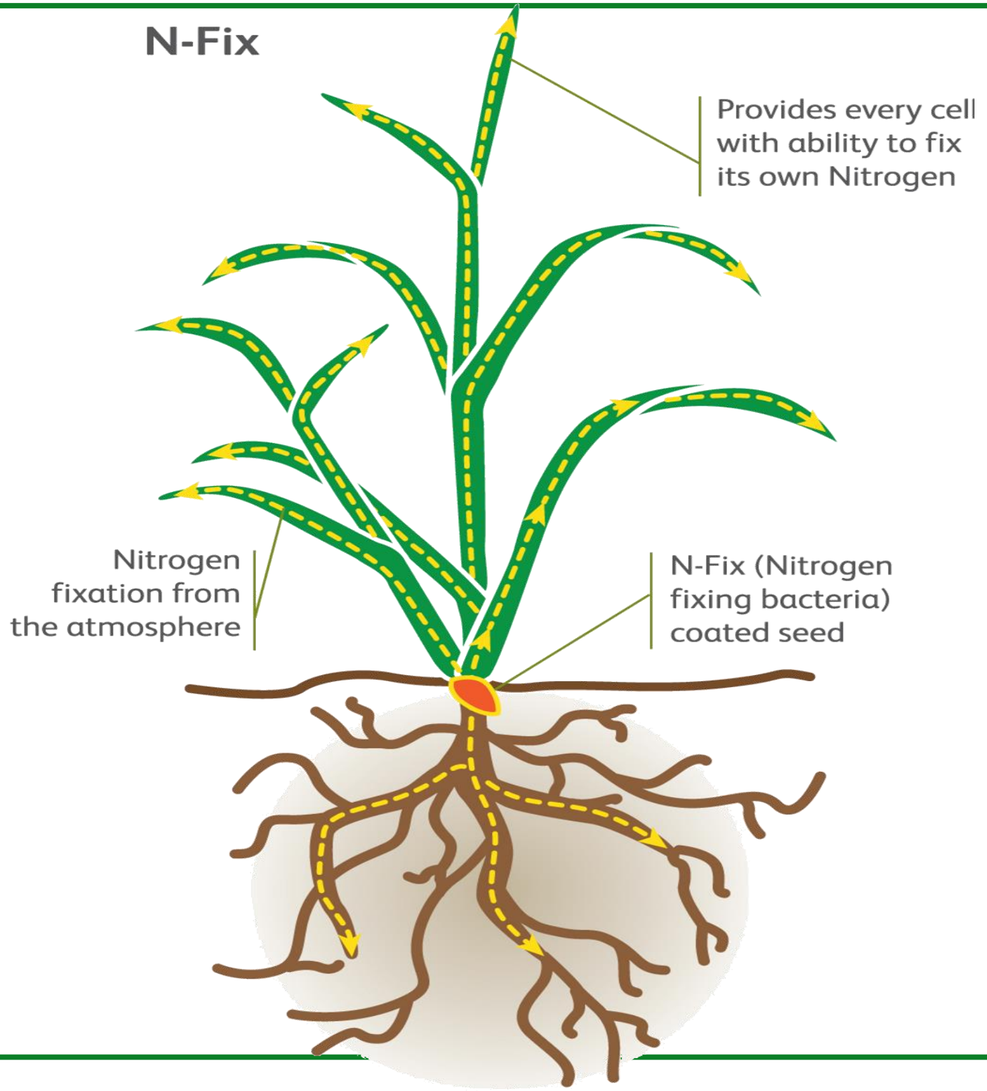
Induce resistance to Abiotic stress (drought, Al, Mn, Fe toxicity alleviation)

Induce resistance to Biotic stress(Pest & diseases)

Improves leaf and stalk erectness

Increases availability of Phosphorous

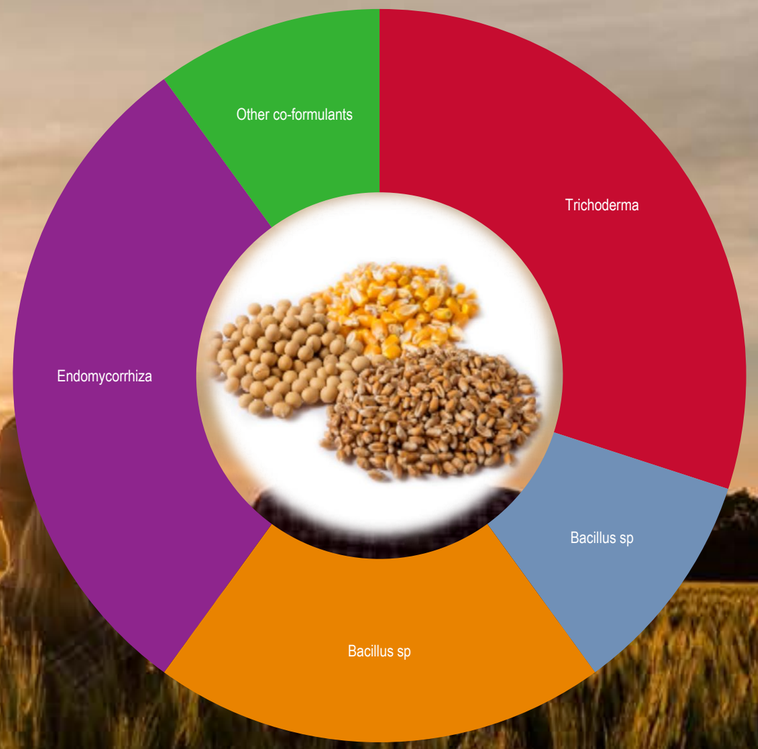
N-FIX : *AZOTOBACTER SPP.*



KOPPERT BIOLOGICAL SYSTEMS

TAILOR MADE SOLUTIONS:

- Creating the optimal mix for your crop and situation:
- SD, SP and GR formulation
- Depending on:



Crop

Soil type

Disease pressure

Soil temperature


KOPPERT
BIOLOGICAL SYSTEMS

PANORAMIX GR – CONTENTS

- PSB (Phos. Sol. Bac.), SSB (Silicate Sol. Bac), PMB (Potash Mobil.Bac)
- Mycorrhiza, Trichoderma spp., N-fix
- Soil Probiotic consortium - 2%,
- Organic Carbon - 38%,
- Seaweed Extract- 24%,
- Ascorbic acid – 20%,
- Amino acid - 9%,
- Myo inositol – 4%,
- Thiamine – 2% and
- Alpha Tocopherol – 1%.

APPLICATION METHODS

APPLICATION METHODS

PANORAMIX GR– APPLICATION RATES

Application

- Horticulture: 3kgs/acre (potato, tomato etc)
- Fruit crops: 50g per tree per season(Avocado, etc)
- Soft fruits: 3kgs/acre (Strawberry, etc)
- Cereals: 3kg/acre. Basal dose application (Rice, Maize,Wheat, etc)
- Perennial crops: 3 kg/acre. Apply at 4-6 months intervals (Tea, Coffee, Sugarcane etc.)

- Nurseries:

Horticulture: 500 g for one acre nursery plants at sowing

Tree crops: 15g per tree

RESULTS

Visual:

Greenness of the crop

Early booting/panicle/tassel initiation

Early maturity

Measurable:

Biological nitrogen fixation

Phosphorus and Silica solubilazation

Mycorrhizal colonisation

Root length and biomass

Plant Height

No. of tillers

Internodal length

Thickness of stem

No. of seeds per panicle

Panicle length

1000 grain weight

Fodder weight

Total yield

CROPS

PANORAMIX GR is suitable for application on

- ✓ Cereals – rice, wheat, maize
- ✓ Pulses
- ✓ Sugar cane
- ✓ Avocado
- ✓ Vegetable crops – all vegetables
- ✓ Fruit crops - grapes, strawberry etc.
- ✓ Coffee

CANOLA TRIAL IN SOUTH AFRICA: BETTER PLANT EMERGE

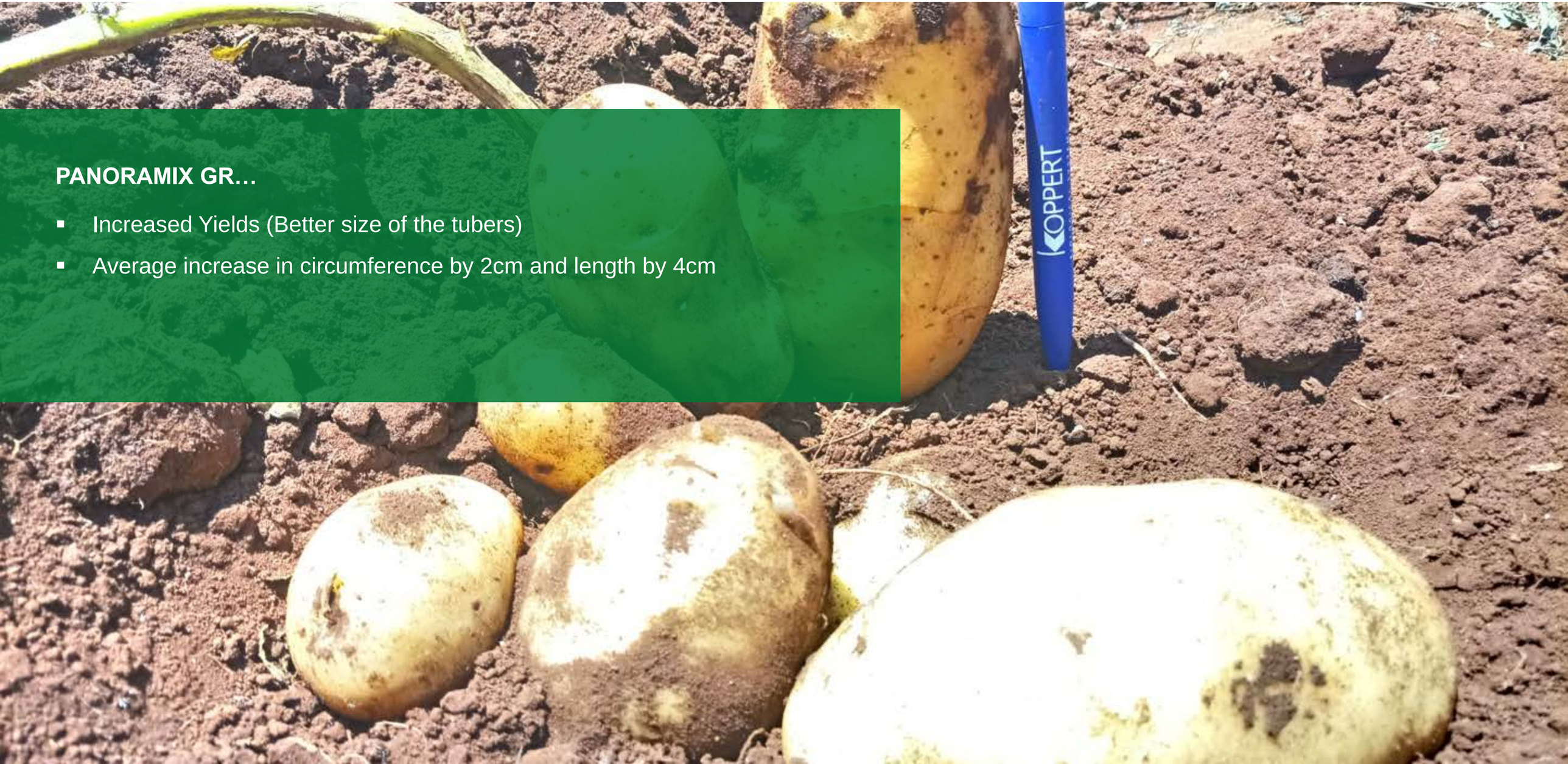
KOPPERT BIOLOGICAL SYSTEMS

RESULTS IN KENYA- POTATO

PANORAMIX GR…

- A stronger crop
- Healthy crop
- Good vegetative growth
- Better root growth

RESULTS-POTATO



PANORAMIX GR…

- Increased Yields (Better size of the tubers)
- Average increase in circumference by 2cm and length by 4cm

RESULTS - RICE (MWEA)

With Panoramix GR

Without

RESULTS- RICE (MWEA)

How do you partner with nature?

Koppert

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Innovation for Resilient Growth

THANK YOU FOR YOUR ATTENTION

DO YOU HAVE ANY QUESTIONS?

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