HELPING FARMERS GROW MORE WITH LESS

Sustainable Agriculture

WATEC ITALY 2018, October 25
Cremona, Italy

Naty Barak | Chief Sustainability Officer

Agenda

- **About Netafim**
- Global Challenges : Water & Food
- Sustainable Agriculture
- Best Practices
- Summary

By farmers, for **farmers**

We're farmers first and innovators second

We began over 50 years ago in Kibbutz Hatzerim – a community in Israel's Negev desert

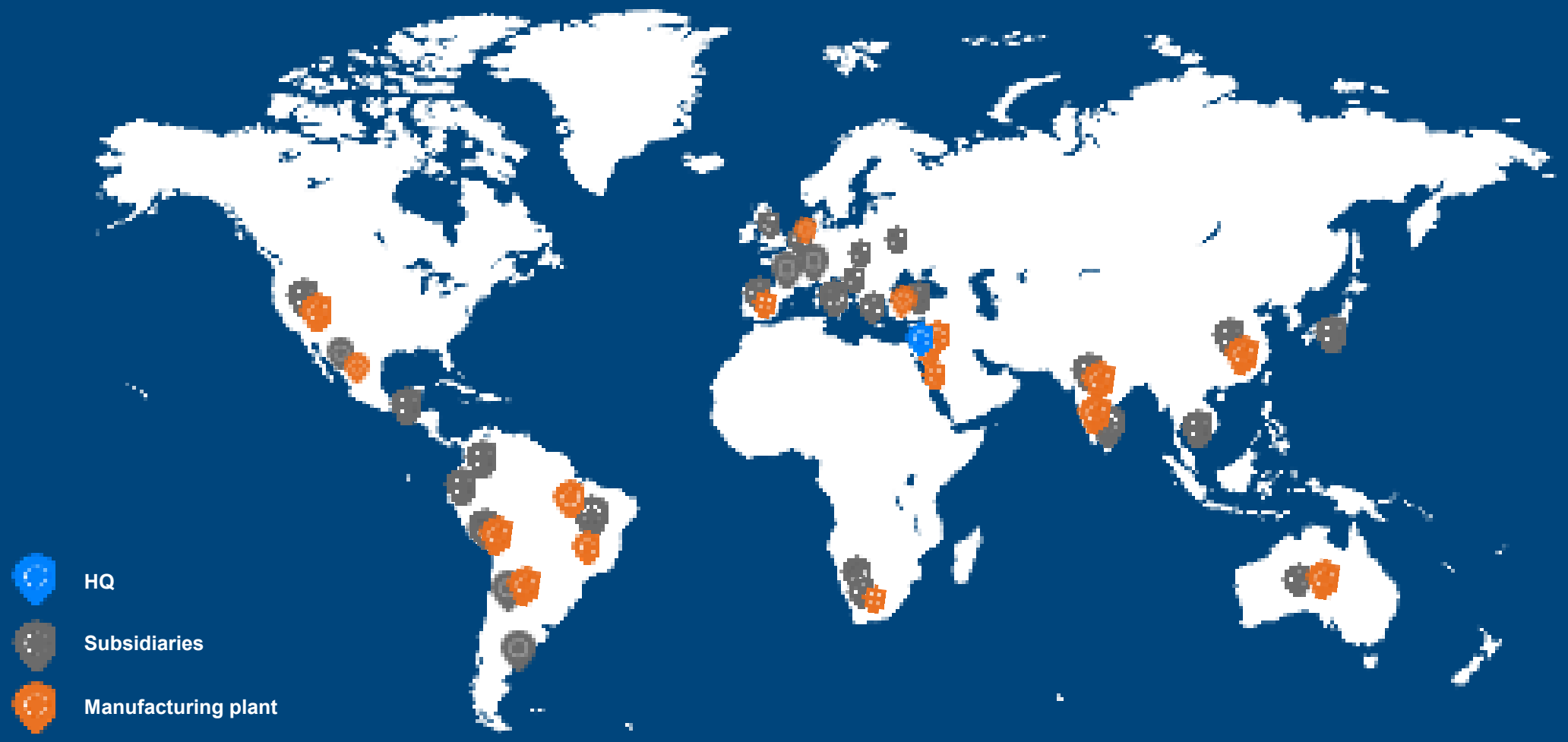
The struggle to grow crops in the poor, arid soil inspired us to think differently

And to find a new way to grow

So we **pioneered drip irrigation**

A solution that made us the **largest irrigation company in the world** we are today.

Global **presence**



Worldwide collaboration and recognition

We work with growers, companies, governments and aid organizations all over the world to bring sustainability and profitability together.

The CEO Water Mandate

SUSTAINABLE DEVELOPMENT GOALS

GLOBAL COMPACT

SIWI STOCKHOLM INDUSTRY WATER AWARD

Our technology: Drip irrigation – **irrigate the plant**, not the soil

- Optimizes moisture and aeration conditions
- Ensures precise quantities of water and nutrients directly to root zone
- Reduces release of gases to atmosphere due to imprecise fertilizer usage
- Increases yields and enhances productivity per unit of soil and water
- Modular design fits smallholder plots
- NUTRIGATION™

Agenda

- About Netafim
- **Global Challenges : Water & Food**
- Sustainable Agriculture
- Best Practices
- Summary

Key Issues & **Challenges**

- Food, fodder, fiber and biofuel: competing for the same resources
- Water: critical and limited resource
- Arable land: finite resource
- Energy: rising prices
- Social, political and environmental concerns: poverty alleviation, gender equality, urbanization
- Drip irrigation holistically addresses the point where all these challenges intersect.

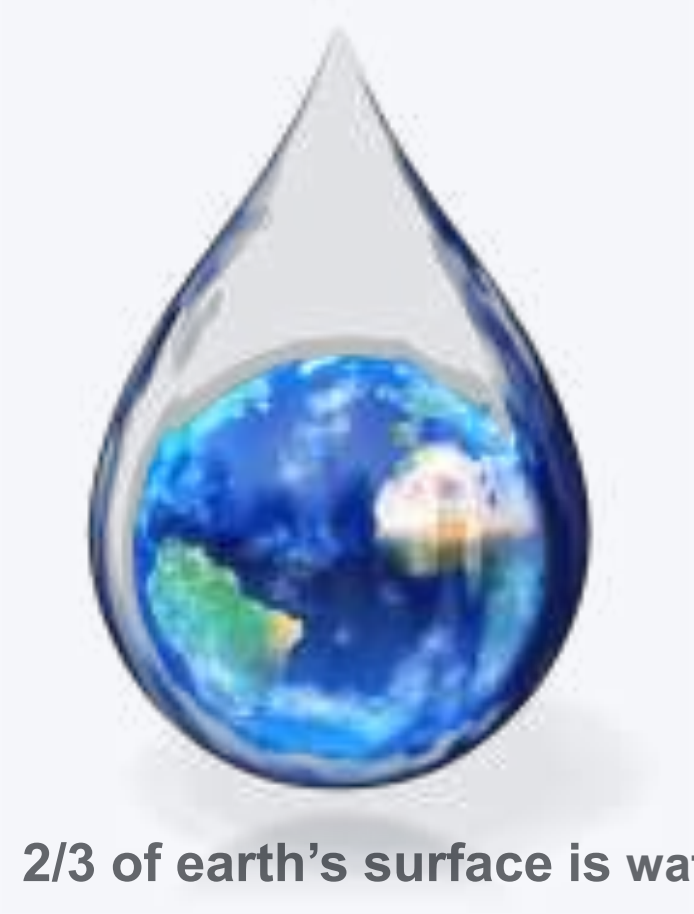
Food

Feed

Fiber

Fuel

Global **water challenges**



2/3 of earth's surface is water

2.5%
Fresh water

97.5%
Salty water

68.9% ice

0.9% swamp

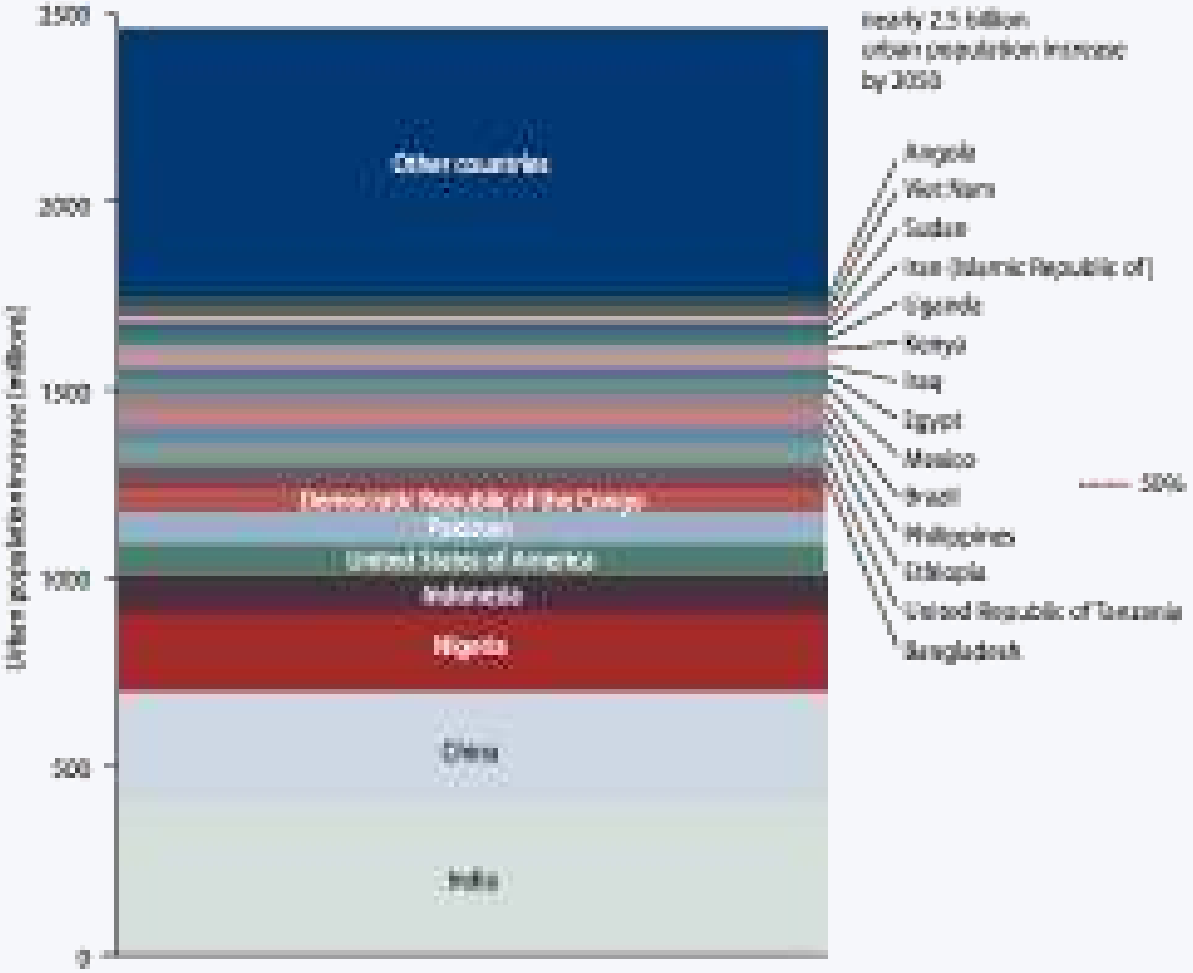
29.9% underground

0.3% rivers & lakes

0.007% of Total is Available (GW 99%)

Distribution of **urban populations** by Country: 2014-2050

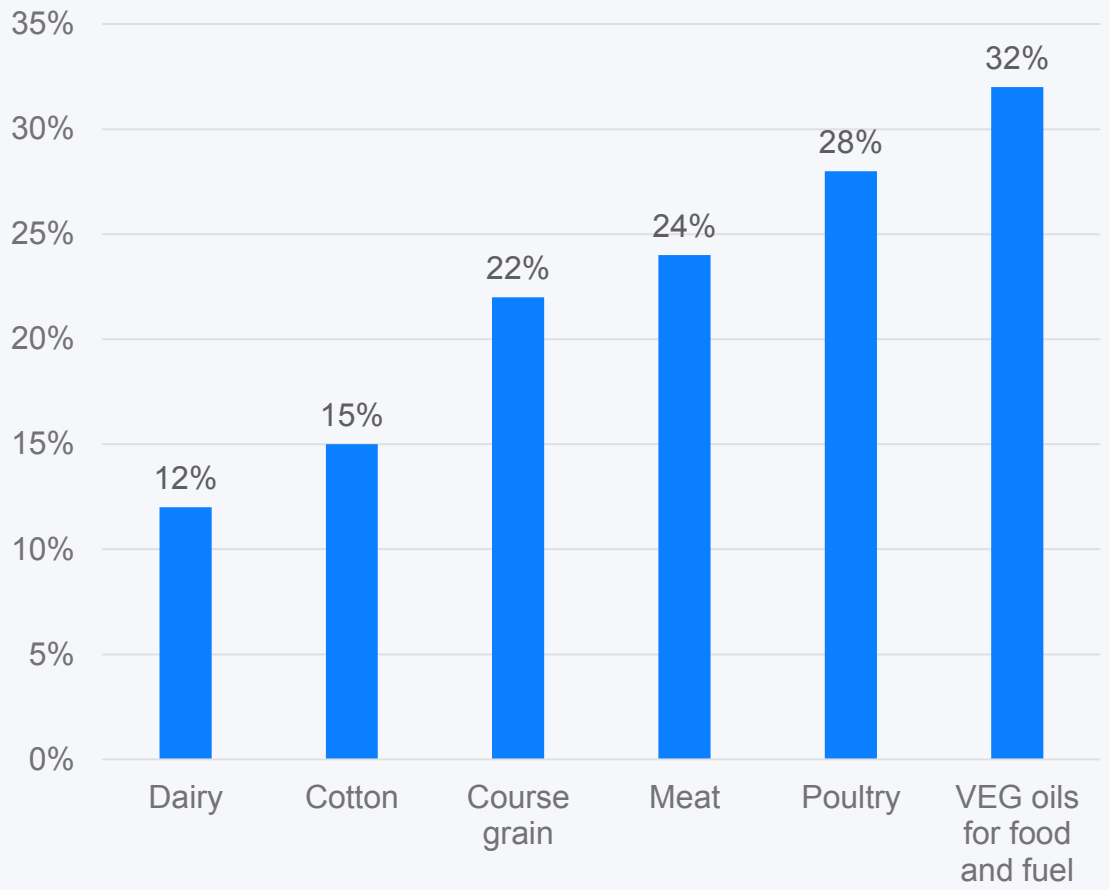
- Urban population growth will be concentrated in a handful of countries
- By 2025, China, India, and Nigeria are expected to account for 37% of the estimated 2.5 billion people living in urban settlements
- Urban areas in India are expected to grow by 404 million people, by 292 million people in China, and by 212 million people in Nigeria.



Source: United Nations, Population Facts, Our Urbanizing World, August 2014

Food demand in **developing countries**: 2013-2022

- There is a positive correlation between income wealth and changing diets
- In China alone, food demand for animal protein is expected to increase by 37% for meat, 44% for eggs, and 55% for milk
- Many of these developing countries, including China, are not expected to meet this growing food, feed, fiber, and fuel demand through domestic production



And our resources are **limited**

The World in 2050

25%
less water than we need

20%
less arable land per person

4 Billion
living under severe water stress

We are not efficient in how we use our **water** and **land**.

Global water withdrawal by sector

19%
Industrial

12%
Municipal

69%
of water goes to Agriculture

Irrigated area as % of arable land

Only **20%**
of the land is irrigated

~80%
not irrigated

Global irrigated area by method

6% Micro-irrigation

17% Sprinklers

77%
Flood

69% of the world's water use goes to agriculture

This water is used to irrigate only 20% of the arable land. The rest pray for rain.

Still, 77% of the irrigated land is done inefficiently, by flood irrigation

Source: ICID annual report 2016-17,
The Environmental Food Crisis, UNEP

Flood irrigation

- Water source depletion and contamination
- Excessive use of chemicals
- Greenhouse gases emitted to the environment, thereby boosting a warming trend

Water consumption for agriculture in the supply chain

- 1 Pair of jeans: 4100 liters
- 1 T shirt: 2700 liters
- 1 Glass of beer: 75 liters
- Apple: 70 liters
- 1 Liter of milk: 1000 liter
- Kg of rice: 3400 liter
- 1 Cup of tea: 30 liter
- 1 Slice of bread: 40 liter
- 1 Kg beef: 15,000 liter

Source: Blue Planet Run, R. Smolan, 2008

Agenda

- About Netafim
- Global Challenges : Water & Food
- **Sustainable Agriculture**
- Best Practices
- Summary

Sustainable Agriculture - Definition

Sustainable agriculture is the efficient production of safe, high quality agricultural products, in a way that protects and improves the natural environment, the social and economic conditions of farmers, their employees and local communities, and safeguards the health and welfare of all farmed species.

Source: SAI – Sustainable Agriculture Initiative Platform

Sustainable Agriculture – Farming Practices

Main elements of sustainable farming include:

- **Varieties:** suited to the local climate, soil, pests & diseases
- **Nutrients:** Crop nutrition calculated adequately. Nutrients stored considering environmental/safety risks
- **Pest management:** All key pests known. IPM (Integrated Pest Management) is applied. Pesticides are stored safely & securely
- **Irrigation:** Water resource management – supply rather than demand, economy of water, innovative technology

Sustainable Agriculture – Economy

Agriculture should ensure the economic viability of farming systems at the local farm level:

- To support an acceptable standard of living for farmers
- To ensure the annual investment needed to improve progressively the productivity of soil, water and other resources.

Sustainable Agriculture – Economy (Cont.)

Sustainable agriculture aims to explore how farmers can benefit from:

- Cost saving (e.g. using zero or minimum tillage)
- Increased yields (e.g. from increased soil fertility or better irrigation)
- Market mechanisms that favor production of quality raw materials
- Making a positive contribution to the public good (e.g. landscape)
- Availability of farming infrastructure, resources & renewable inputs
- Access to global markets

Sustainable Agriculture – Social

- Agricultural performance and profitability are closely linked to the well-being of farmers and rural communities. Poor social conditions and poverty can hinder farmers in delivering their inputs and exercising their skills.
- The challenge: To build attractive farming livelihoods and vibrant, adaptive rural communities, empowering them and increasing their self-reliance

Sustainable agriculture includes the objectives of:

- Improving social relations between farmers and rural communities
- Enhancing empowerment (e.g. by providing facilities to build a strong rural social infrastructure)
- Alleviate rural communities poverty
- Ensuring and possibly creating employment

Sustainable Agriculture – Environment

- **Our goal is to preserve the environmental resources**
- **Water:**
  - Is total water use for irrigation known?
  - Is water used in the most efficient way?
  - Is the water source for irrigation sustainable?
  - Are the impacts of fertilizers and pesticides considered?
- **Soil fertility/soil loss:**
  - How is soil fertility maintained?
  - Is soil erosion an issue?
- **Biodiversity:**
  - Are there natural habitats on farm
  - Are rare species of plant/animal threatened by growing the crop?
- **Energy:**
  - Are the major energy inputs known?
  - How can their impact on climate change be reduced?
- **Waste:**
  - Are the principles reduce, reuse, recycle, dispose understood?
  - Are pesticides/fertilizers disposed of safely?

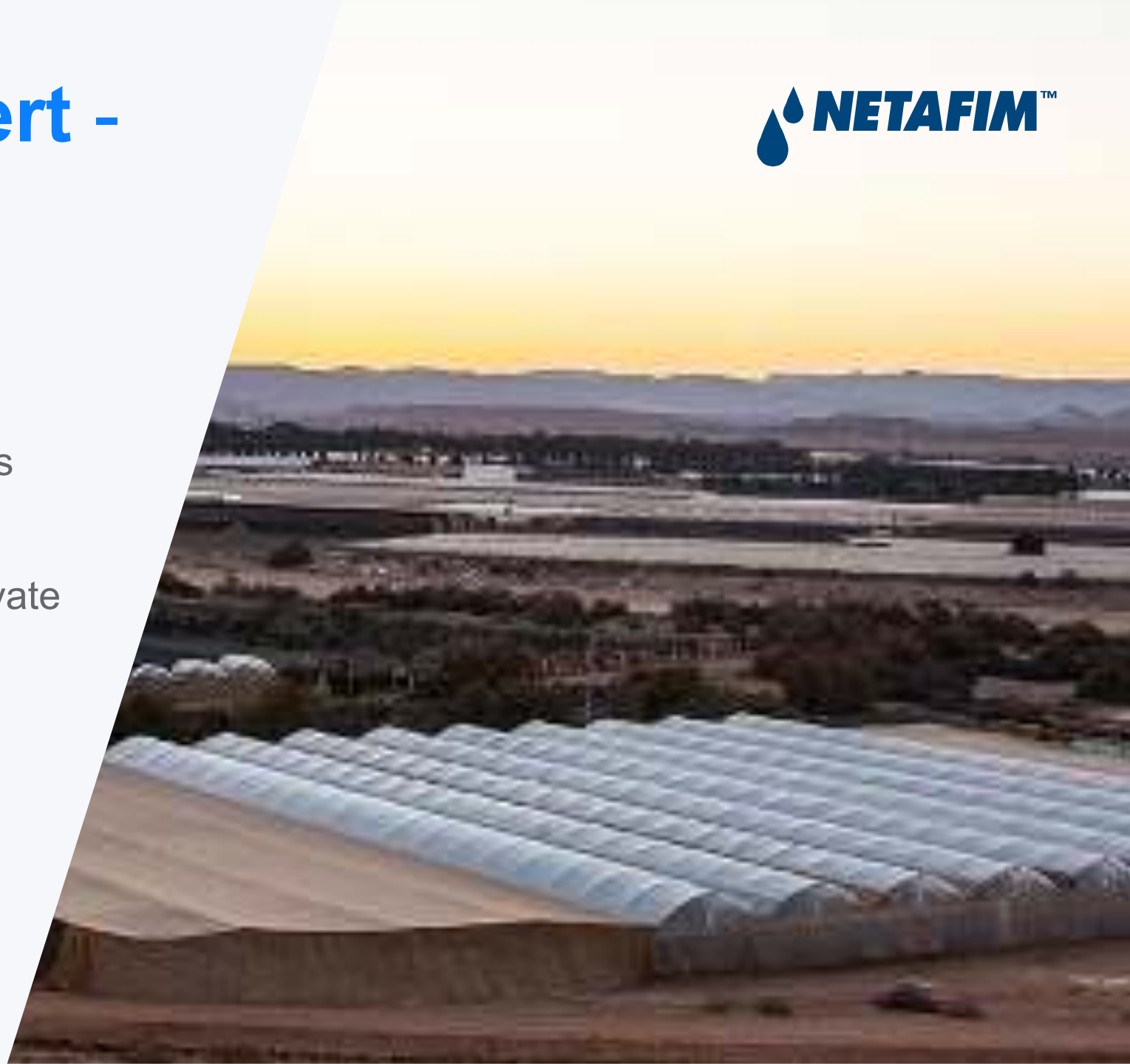
Agenda

- About Netafim
- Global Challenges : Water & Food
- Sustainable Agriculture
- **Best Practices**
- Summary

Best Practice: Israel

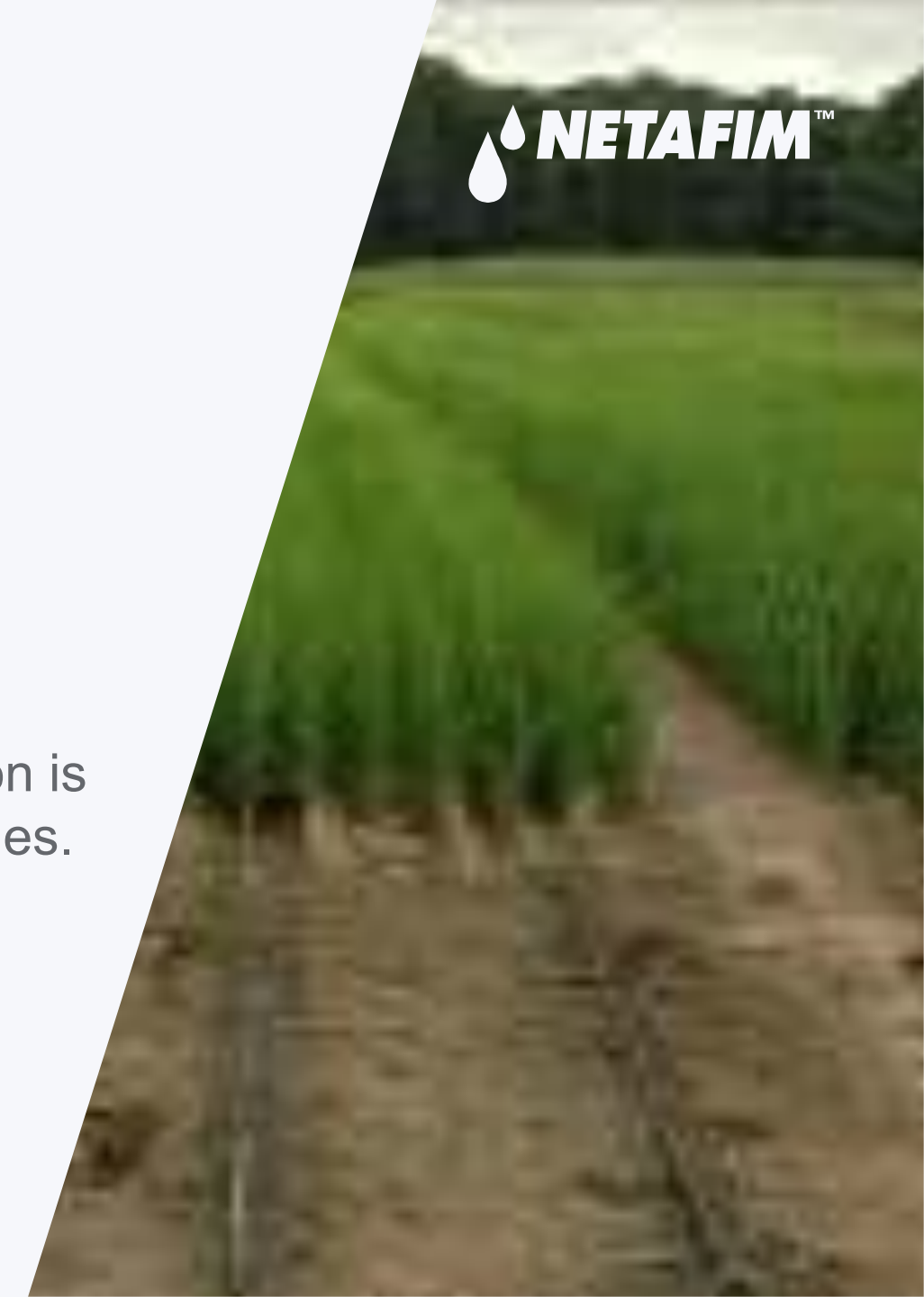
Israeli Arava desert - impact

- 4,500ha
- 20 farming settlements
- 65% of all Israeli vegetable exports
- Rainfall as little as 20mm/year
- Partners: Government, NGOs, private sector, local farmers



Best Practice: SDI in rice

- Since 2005 we study the application of SDI (Subsurface Drip Irrigation) on rice
- We see economical, agronomical, technical, environmental and health implications
- rice cultivation is responsible for about 35.6% of methane generation.
- Converting 10% of global rice fields to Drip irrigation is equal to the removal of 40,000,000 personal vehicles. 1Ha equals to removal of 2.5 cars



Best Practice: Italy
Aerobic Rice Experiment

Conducted in Italy from 2012 until 2018, in the provinces of Grosseto, Southern Tuscany; Vercelli and Pavia, Northern Italy.

Some of the topics and the results:

- Water use reduction - drip uses 45-50% less water
- Fertilizer use reduction - 30% less nutrients in drip
- Greenhouse gas emission reduction – 60% or more reduction in emissions of greenhouse gases (CO_2 and CH_4)
- Reduction in leaching and contamination of fertilizers
- Use of various soil types and topography
- Arsenic uptake and Rice quality – significant decrease in As accumulation. Last trials confirm As accumulation under the minimum measurable in laboratory, virtually no accumulation

Best Practice: Italy

Use of Wastewater from Biogas production

Experiments conducted in several locations in Northern Italy. Running from 2010 until 2018,

- This is part of Netafim's commitment to **Circular Economy**
- 5 Ha installed in corn for silage at Ferrara, at the Maiero Energia Farm
- We use a farm organic fertilizer resource
- Zero Chemical Fertilizer
- Efficient fertigation method in organic production
- Low nitrogen leaching and contamination, low GHG emissions

Best Practice: USA
Harrell farms, Halfway, Texas

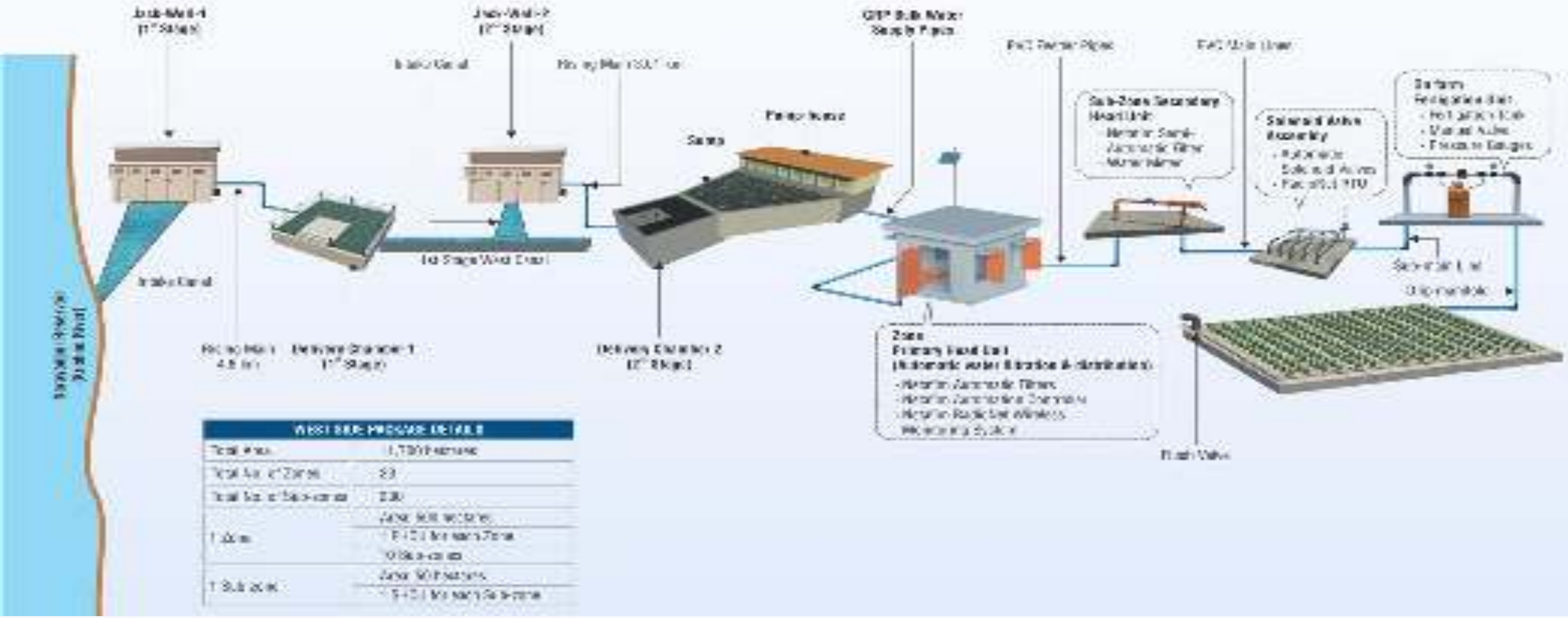
- Planting corn over cotton
- No tillage
- Sub surface drip irrigation
- Saving water, energy and labor
- Reducing GHG emissions
- Increasing yield

Best Practice: India

Ramthal project, Karnataka

- Netafim's West side package: 11,700Ha
- 23 Zones & 230 Sub-zones & 2340 operating units
- 6700 farmers in 22 villages
- Average land holding – 1.74 Ha, ranging from 1 acre to 10 Ha
- Total project cost is borne by the Govt. of Karnataka, India
- Robust & Complete automation from source to end

Schematic Diagram of Ramthal Project




NETAFIM™

Best Practice: California

De Jager farms, Reuse of wastewater in drip irrigation

- Application of dairy manure via sub surface drip irrigation
- The nitrates in manure can pollute water sources and pose a serious threat to water quality and the health of millions of Californians
- We developed product specifications for the successful implementation of subsurface drip irrigation (SDI) in dairy effluent applications, to irrigate feed corn on the dairy farm, creating management protocols for controlled blending of fresh and effluent water at balanced rates
- This application prevents millions of pounds of manure from polluting water sources, increases water use efficiency to address drought

Agenda

- About Netafim
- Global Challenges : Water & Food
- Sustainable Agriculture
- Best Practices
- **Summary**

SUMMARY

- Sustainable agriculture is a must. Climate smart agriculture in general, and drip irrigation in particular, can be further disseminated to developing countries and make a difference
- Drip irrigation touches most of the SDGs: Eliminating poverty and hunger, combating the negative effects of climate change, investing in women and girls, improving health, wellbeing and education, ensuring availability of clean water and sanitation and delivering inclusive economic growth.
- Adopting drip irrigation, combined with know-how, can lead to real change among rural poor by creating a more knowledgeable agricultural community
- Awareness is important. Private Public Partnerships are needed. Collaboration will bear fruits


NETAFIM™
Thank you