

Sharing Smart Cities

POPULATION, CLIMATE AND ROADS TO GREEN GROWTH

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Highlights

- Urban – rural linkages
- Population and agriculture
- Resource constraints
- Climate change
- Green growth economy
- Smart agriculture linkages with smart cities

City pressures and solutions

35% of city residents have
high anxiety levels.

Parks and street trees:

- improves emotional and physical health
- Improves air quality
- Reduces heat island effect





Community gardens:

- improves environmental awareness
- improves food security
- reduces food price



Greening buildings:

- efficient use of land, materials, energy, water





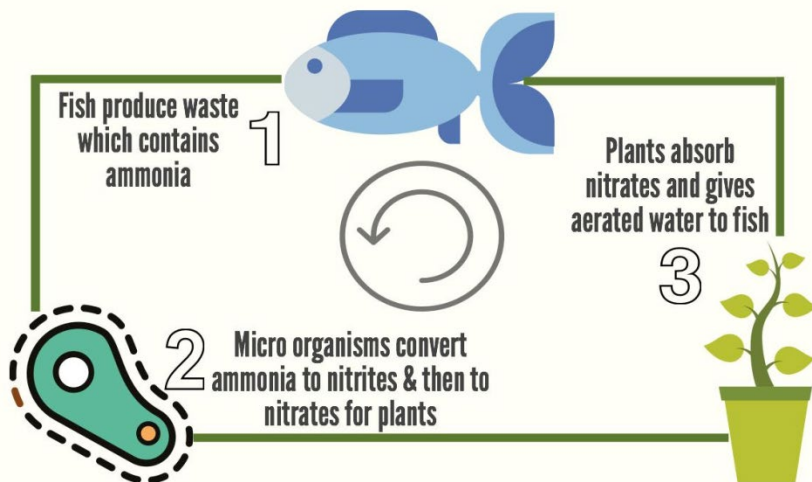
Green roof tops:

- reduces storm runoff

IoT - Smart indoor gardening



AQUAPONICS CYCLE



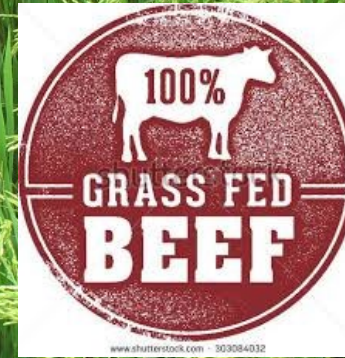


Cities and food

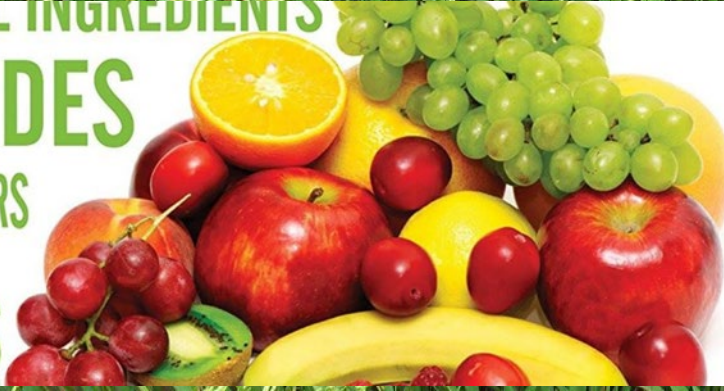
Food debates - protests



c. 80% consumers prefer sustainable products



100% NATURAL INGREDIENTS
NO PESTICIDES
NO CHEMICAL FERTILIZERS
NO GENETIC MODIFICATION
NO PRESERVATIVES



ORGANIC FOOD



Trust – food scandals

Honey laundering: fakes revealed

EXCLUSIVE

Adele Ferguson
Chris Gillett

Australia's biggest listed honey company and some of the country's largest supermarket chains face accusations of selling fake honey.

Testing at a leading international scientific lab that specialises in honey fraud detection has found almost half the samples selected from supermarket shelves were "adulterated", meaning the honey had been mixed with other sub-



Adulterated honey has been found in Australian supermarkets

stances. The adulterated samples were all products that blend local and imported honey.

Capilano's Allowrie branded Mixed Blossom Honey, which

sources honey from Australia overseas and markets itself as 100 per cent honey, showed to be "adulterated" in the major

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China melamine in milk

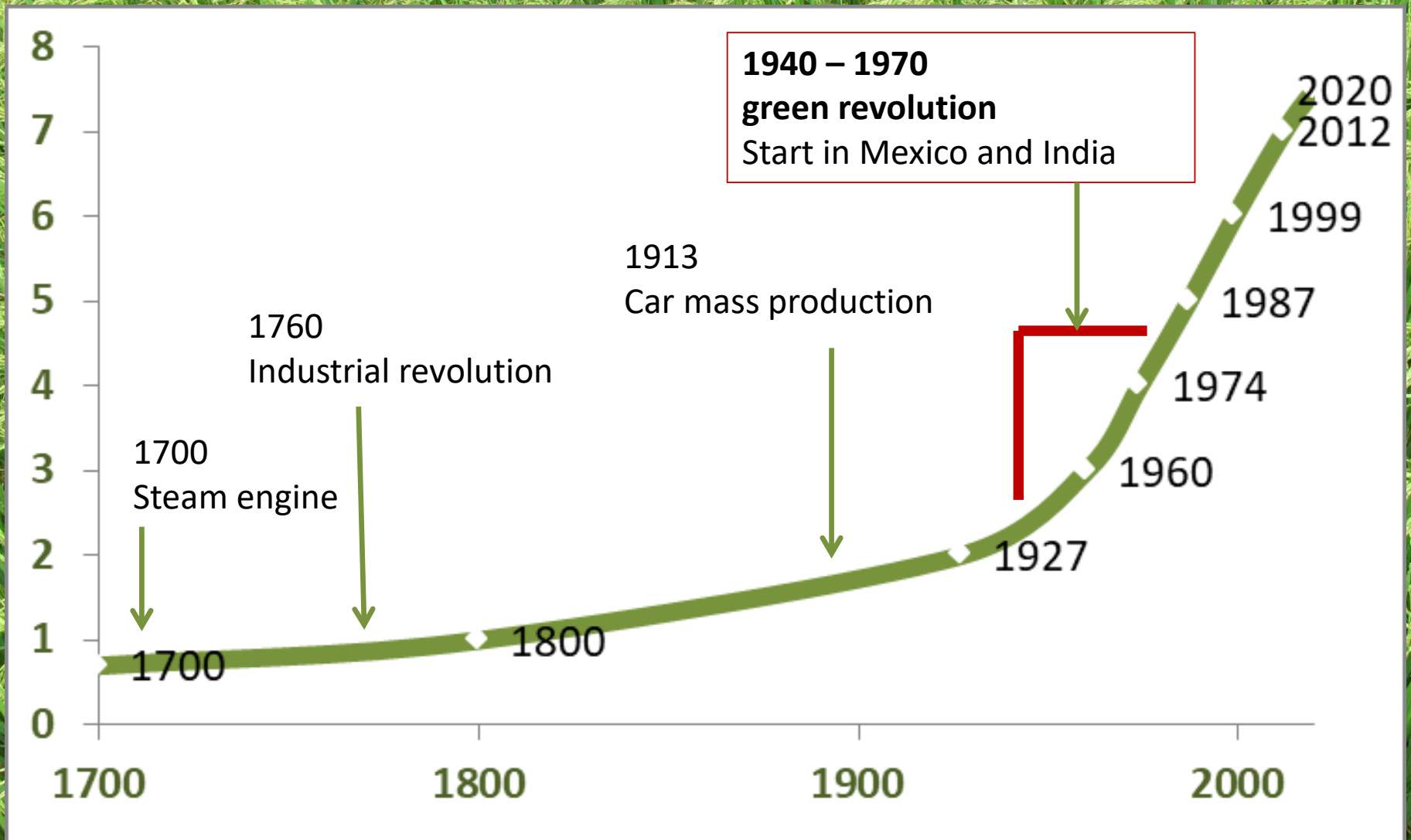


Horse meat scandal

A high-angle, close-up shot of a lush green rice paddy. The rice plants are densely packed, with their long, narrow leaves creating a textured, wavy pattern. The panicles (grain heads) are beginning to turn a pale yellow, indicating they are maturing. The lighting is bright and even, highlighting the vibrant green of the leaves and the subtle yellow of the grain.

Recent history of agriculture

Population (Billion people)



The Green Revolution

Global cooperation in
science and technology
to provide global food security



High yielding crop varieties



Chemicals - fertilizer and pesticides



Irrigation



Mechanisation

Developing countries

Continued mixed cropping



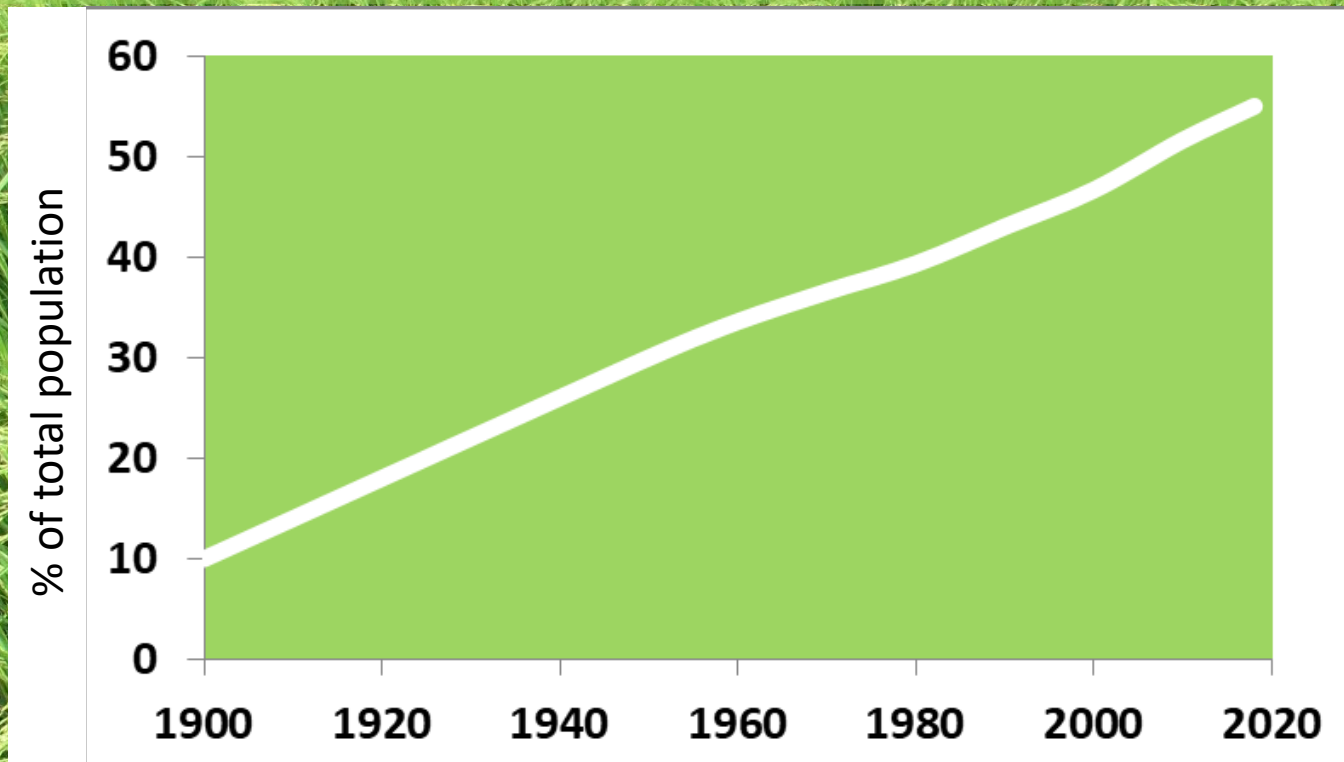
Developed countries
changed to large scale monoculture



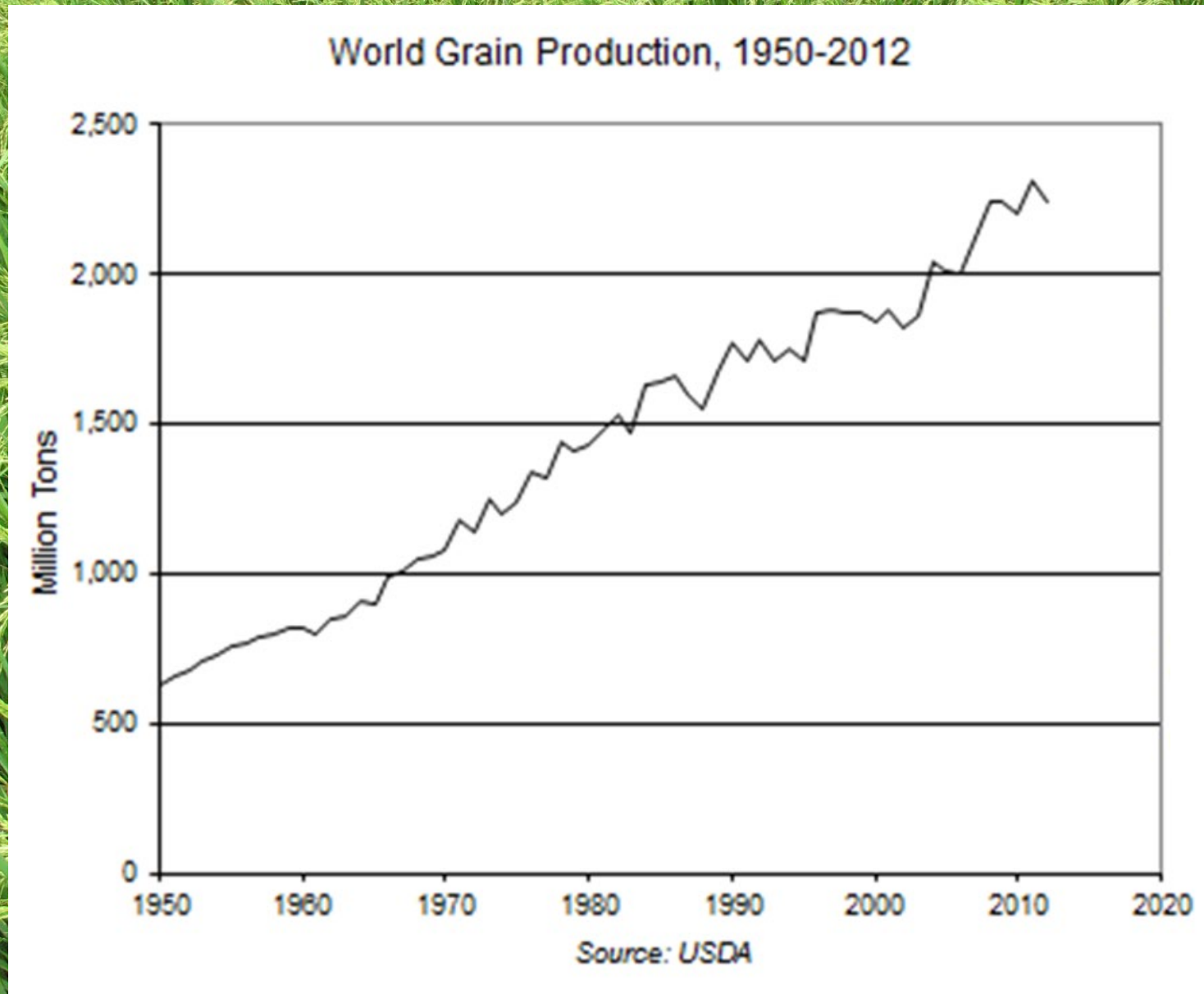
Labour needs reduced by 40%



Migration to Cities



Success – enough grain for all



A high-angle, close-up photograph of a lush green rice paddy. The rice plants are densely packed, with their long, narrow leaves creating a textured, layered appearance. The grain heads, which are the seed-bearing parts of the rice, are beginning to turn a pale yellow or light green, indicating they are maturing. The overall scene is vibrant and full of life, typical of a healthy agricultural field.

Declining resources

Water pollution

Main contributors:

- 80% city waste water untreated
- agriculture waste



Water shortage

By 2025:
60% of the world will be “water-stressed”



Salinity

20% crop land
lost



Soil erosion & soil pollution

Mining



Agriculture



Soil
Pollution

Household waste



Plastic



Wind

Soil
Erosion



Water



Deforestation



Coastal



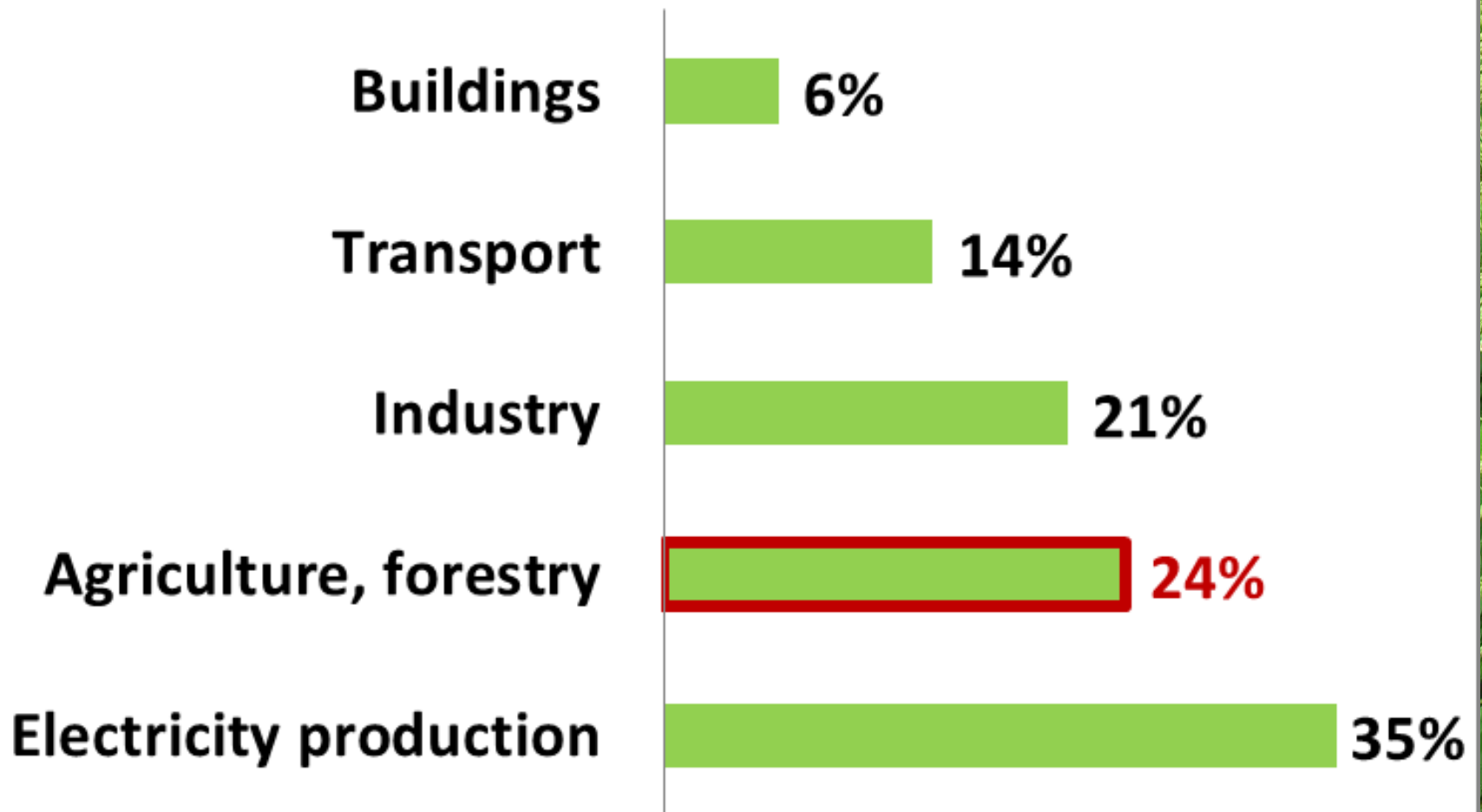
30% cropland lost



Climate Change

shared responsibility

Increased GHG emissions



Air pollution

- Crop residue fires – Deli



- Forest fires – Sydney

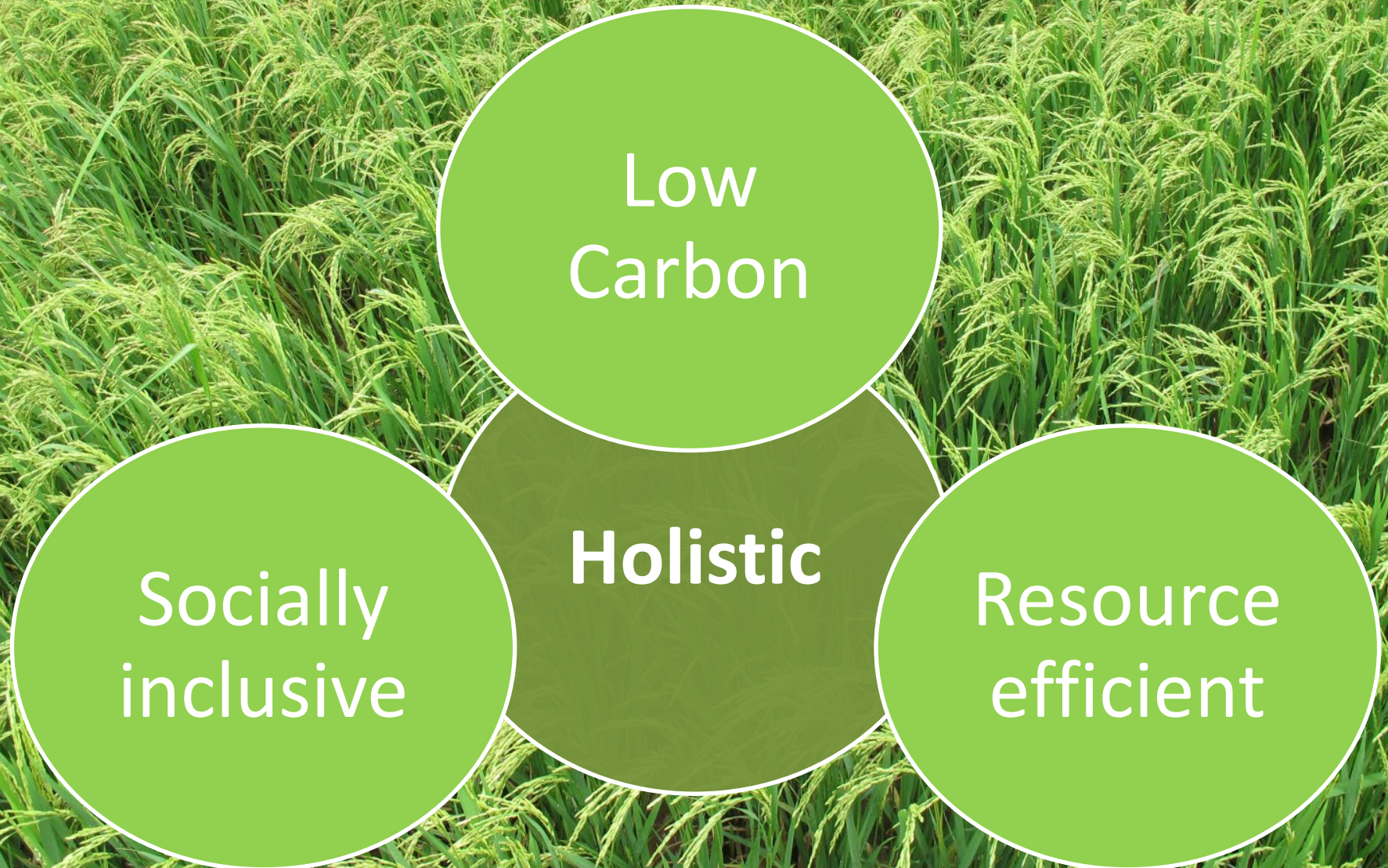


A dense field of green rice plants with yellowish-green panicles, likely a rice paddy field. The plants are lush and vibrant, filling the entire frame.

Need

Positive change

Green Growth – a new holistic economic approach



TODAY we need more innovators

Gottlieb Duttweiler – founder of Migros

Some key philosophies:

- 0.5% of revenue for social and cultural projects
- Organised as cooperatives (over 2million shareholders)
- All Swiss citizens can join and vote





Need Collaboration

Rural-urban links:

- sustainable agriculture
- sustainable eating

GG improve efficiency- food use

- 800 Million people undernourished
- 1.8 Billion adults overweight
- 30% of food production wasted



GG improve efficiency— **food production**

50% more food needed by 2050

GG improve efficiency – energy use



Solar water pumps

Energy consumption:

- Direct – electricity, fuel
- Indirect – chemicals

John Deere SESAM prototype

- 174hp continuous power
- 4-hour run time between charges
- 6R Series tractor chassis



Electric farm machines



Smart drones reduce inputs



**GG improve –
inclusion**

**80% of the worlds poor work
in agriculture**



Smart Agriculture:

**Meet consumer demand
using**

transformative approach

Develop sharing policies and strategies

- Smart:
 - mobility, transport
 - governance,
 - economy
- Use renewable energy technology

Use disruptive technologies

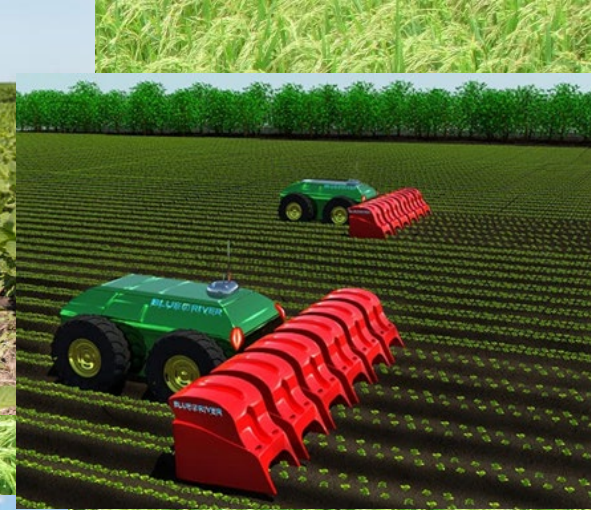
Internet of Things (IoT)



uses live data from sensors

Precision robots, drones reduce inputs:

- chemical
- water
- energy



Design research collaborations

that consider the needs of all stakeholders

farmers

consumers

producer organisations

farm suppliers

business

quarantine

logistics & transport

manufacturers

retailers

smart technology &
big data

government & policy NGOs

enforcement

start ups

health professionals

tourism

education & capacity

Professionals in ethics and
social

researchers

scientists

arts and history

Need

Enabling environments

- **Ethics in smart cities:** promote safety in products; GMO; transparency
- **Healthcare and human wellbeing:** influence consumers to consider nutrition



Need

Disruptive technologies

Changing demand for:

- **Alternative proteins:** plant-based meat substitutes; edible insects
- **Food sensing technologies:** test for food quality; prevent food fraud

Need

Value chain linkages to promote trust

- **Big data and analytics will:** promote service delivery
- **Internet of things will:** collect food product data along the supply chain
- **Block-chain enabled traceability will:**
 - enable easy sharing
 - store transaction data
 - aggregate and analyse data
 - provide transparency to justify cost of food

Conclusions

Goal:

People centered sustainable innovations

Solutions:

- The Green Growth economic model
- Linking smart agriculture and smart cities through sharing of:
 - resources
 - Ideas, research
 - policy development
 - communication

A high-angle, close-up photograph of a lush rice paddy. The image is filled with dense, green rice plants. The leaves are long and narrow, and the panicles (grain heads) are visible, showing a yellowish-green color, indicating they are ripening. The plants are growing in rows, and the overall texture is very busy and organic. The lighting is bright, suggesting a sunny day.

Thank You