Climate Change and Adaptation in Agriculture for East Asia and the Pacific Region: Issues & Options
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Conservation Agriculture for Climate Change Adaptation in East Asia and the Pacific

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- Introduction
- CA globally and regionally
- CA for CC adaptation/mitigation
- Policy and Investment
- Conclusions

- Challenge to feed the world
- Natural resource base dwindling
- Sustainability: no option but necessity; link/integrate production with sustainability
- One new strategic goal of FAO: Sustainable Crop Production Intensification (SCPI)
- CA is the core strategy of SCPI = applied sustainable agriculture

FAO definition: www.fao.org/ag/ca

Conservation Agriculture (CA)

is an approach to managing agro-ecosystems for improved and sustained productivity, increased profits and food security while preserving and enhancing the resource base and the environment. CA is characterized by three linked principles, namely:

1. ***Continuous minimum mechanical soil disturbance.***
2. ***Permanent organic soil cover.***
3. ***Diversification of crop species grown in sequences and/or associations.***

CA: more than just no-till: “never till”

- with other best practices (IPM, IPNM, IC-LS, agroforestry, ...) it is sustainable agriculture and ecosystem management
- organic matter and carbon recycling
- biodiversity (rotation, soil life)
- biological processes
- climate change adaptation and mitigation

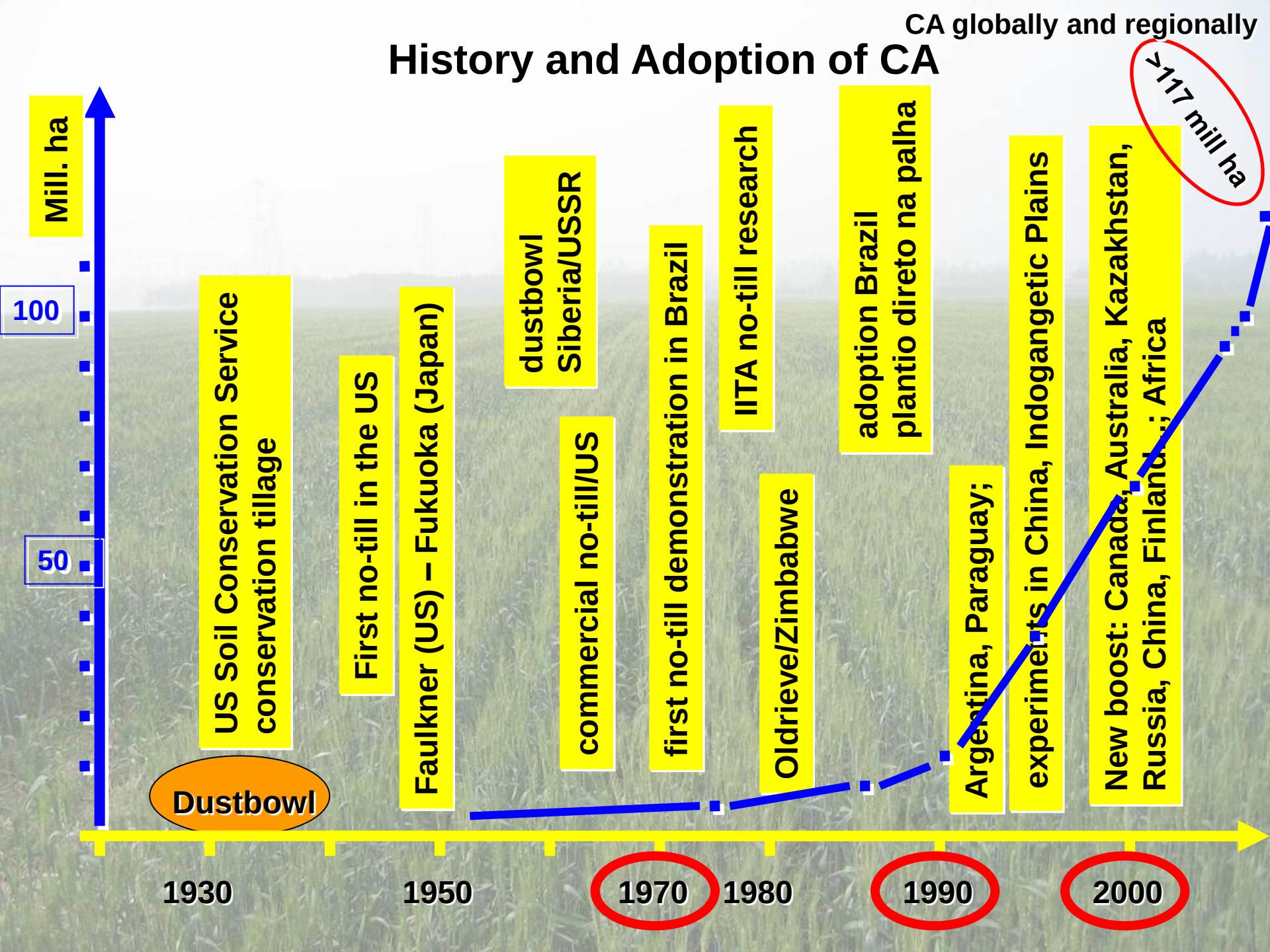
Advantages for the farmer:

Farmer's livelihood

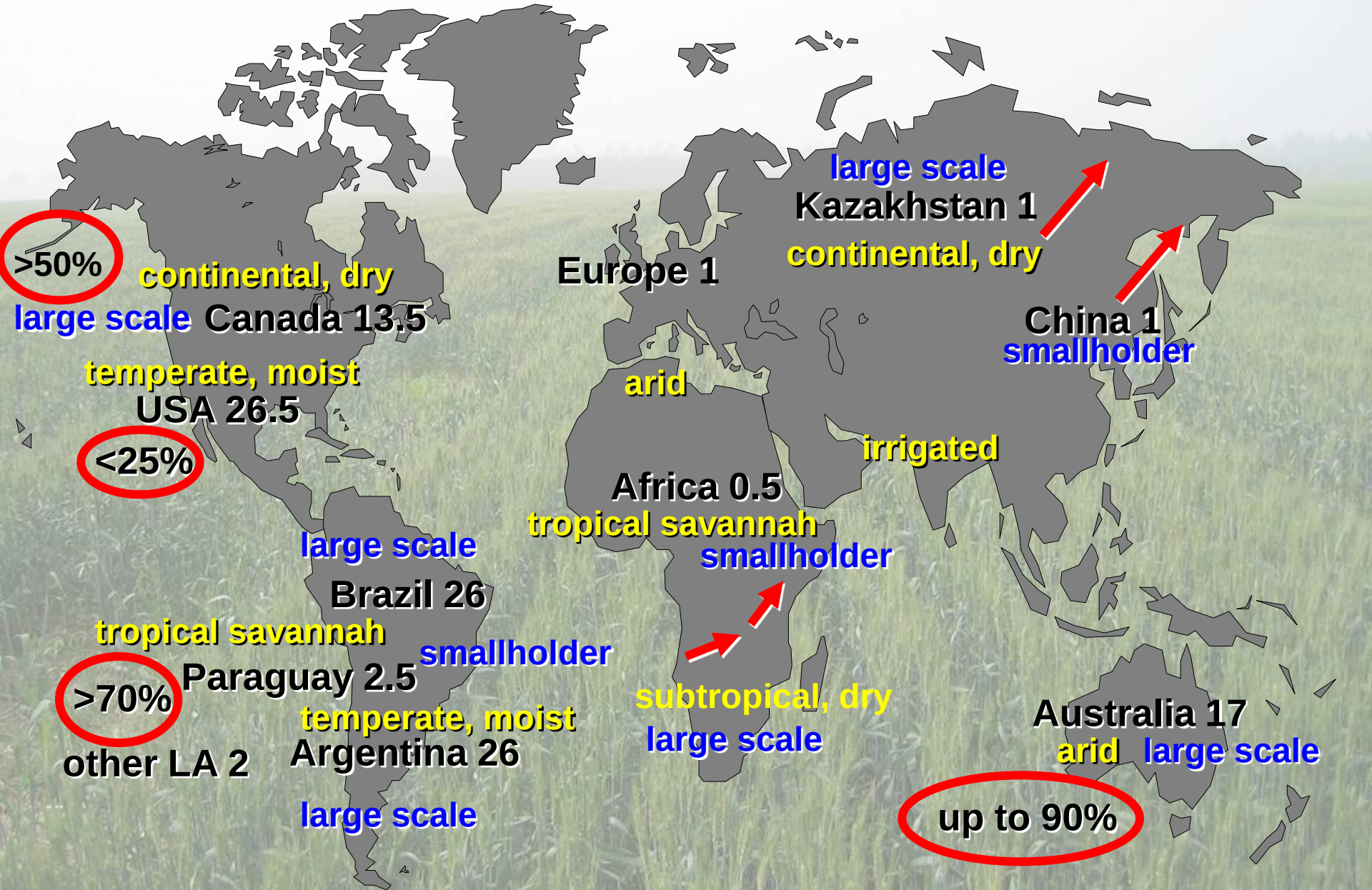
- less machinery cost
- 70% fuel saving
- 50% labour saving
- 20-50 % input saving
- less drudgery
- stable yields, food security

= better livelihood/income

History and Adoption of CA



Conservation Agriculture worldwide 117 Million ha



Climate Change: Higher variability

extreme precipitation

extended drought periods

= less reliable rainfall

Response strategy for Adaptation

Increase the resilience through:

- **diversity in the cropping**
- **diversity in the overall production**
- **higher flexibility/more timely operations**
- **agronomic practices that work for drought, rain, heat, cold, wind**

Diversity = rotations = long term profit

- different rooting structures
- pest and desease management
- weed management
- soil cover/residue managment strategy
- higher long term productivity, risk reduction

...maintaining soil cover in dry lands

...a challenge which needs a community solution!

Adaptation extreme events:

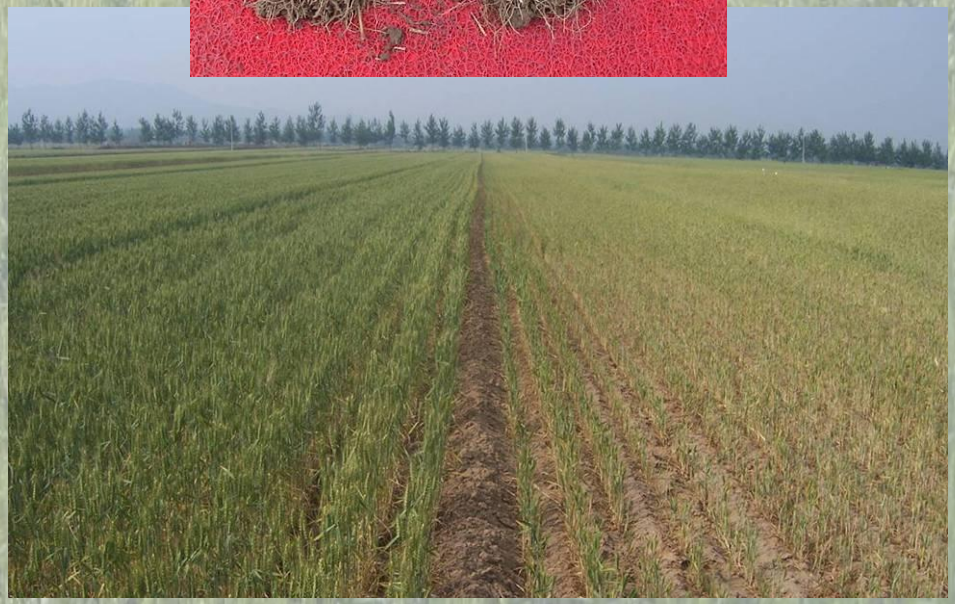
- **Erosion:**
  stubbel, mulch, crops
  aggregate stability (OM)

- **Heat: mulch**

- **Frost: mulch**

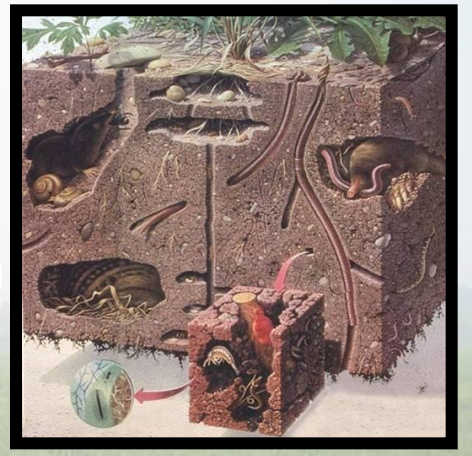
Adaptation to drought:

- better rooting
- snow catching with residues
- more water in soils (1 % OM = 150 m3/ha)
- reduced water losses (evaporation)
- better efficiency (water/crop -30%)



Adaptation to heavy rain:

- water recharge (biopores)
- water quality (leaching/erosion)
- better infiltration (flooding)



CA CC-mitigation options:

- **Sequestration:**
  Maximize soil as carbon sink
  - reduce soil carbon emissions
  - maximise biomass production
  - enhance soil carbon input
- **Emission reduction:**
  - Rice – methane (no flooding)
  - Nitrous oxide (N-, compaction management)
  - Fuel emissions
  - Emissions from input manufacturing

Experiences in DPR Korea and China

Soya

VENCE TUDO
SA 7300

Wheat

Rice
26.06.2007 15:14:

Potato

Maize

Cabbage

Policies:

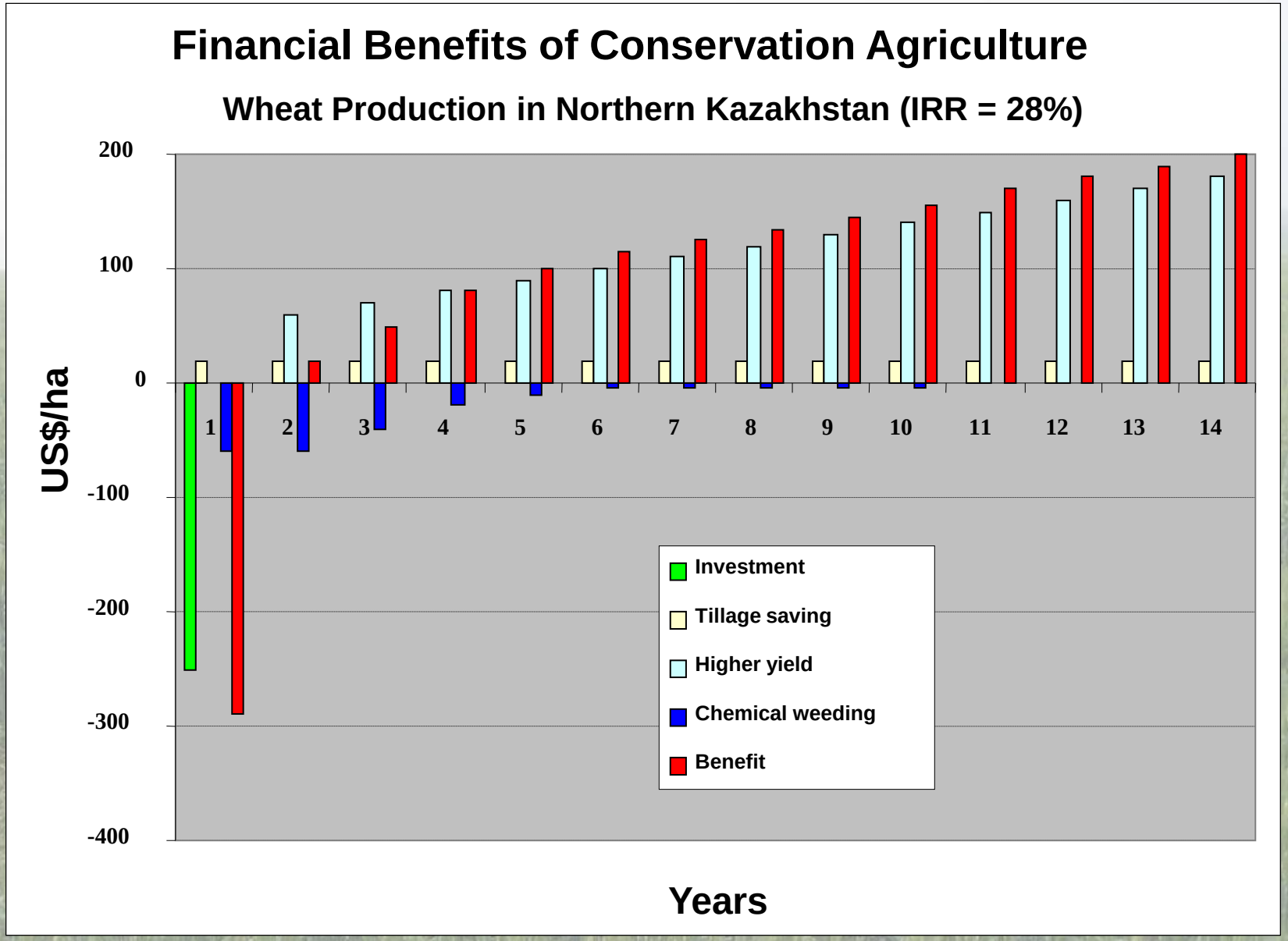
- **China: CA mentioned in number 1 party document**
- **CA promoted to prevent dust storms around Beijing before the Olympic games**
- **Subsidies for mechanization exclude ploughs; priority to no-till seeding equipment**
- **DPR Korea: CA promoted by Ministry of Agriculture and the Academy of Sciences as approach to sustainable and intensive agriculture**

Investments:

Overall CA is **profitable** for farmers

Initial investment requirements

- Capacity building: depending on extension (5 – 50 $/farmer; ± 100%?)
- Equipment: 100-200 $/ha for seed-drills (50% based on Chinese equipment; 10 years depreciation, 2 weeks planting window)
- evtl. soil rehabilitation: 50-200 $/ha (lime, herbicide, fertilizer, subsoiling)
- Investment offset: fuel and emission savings/carbon sequestration; disaster risk
- Total: China 500 mill. farmers, 140 mill. ha arbl. land
  DPRK 3 mill. farmers, 2.5 mill. ha arbl. land


Financial Benefits of Conservation Agriculture
Wheat Production in Northern Kazakhstan (IRR = 28%)
US$/ha
200
100
0
-100
-200
-300
-400
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Investment
Tillage saving
Higher yield
Chemical weeding
Benefit
Years

Conclusions:

CA -

- is universally applicable/location specific
- is really existing on 8% of farmland
- is growing exponentially
- is compatible with MDGs, UN conventions and FAO's strategic objectives
- is productive and sustainable (win-win)
- is responding to climatic challenges
- requires supportive policies for accelerated adoption

With CA
Agriculture can be part of the solutions, not of the problem!

Thank you for your attention!

More information:
http://www.fao.org/ag/ca