

**The climate crisis is a food crisis**

***Small farmers can cool the planet***

A way out of the mayhem caused by the industrial  
food system

GRAIN  
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# The global food system tomorrow.....

## Probable decline in yields by 2080 as a result of climate change

World: 15.9 per cent

Latin America: 24.3 per cent

Asia: 19.3 per cent

Africa: 27.5 per cent

# **Number of people living in highly water-stressed environments**

2010 - 2.4 billion

2050 - 4 billion

# Extreme Weather

- More droughts, floods, typhoons, wild fires
- Millions of hectares of farmland will be lost by 2050
- Storms caused by climate change will make an additional three million hectares of farmland in coastal areas vulnerable to inundation

## **Expected price increase by 2050 for major cereals**

wheat: up by 170 to 194 percent

rice: up by 113 to 121 percent

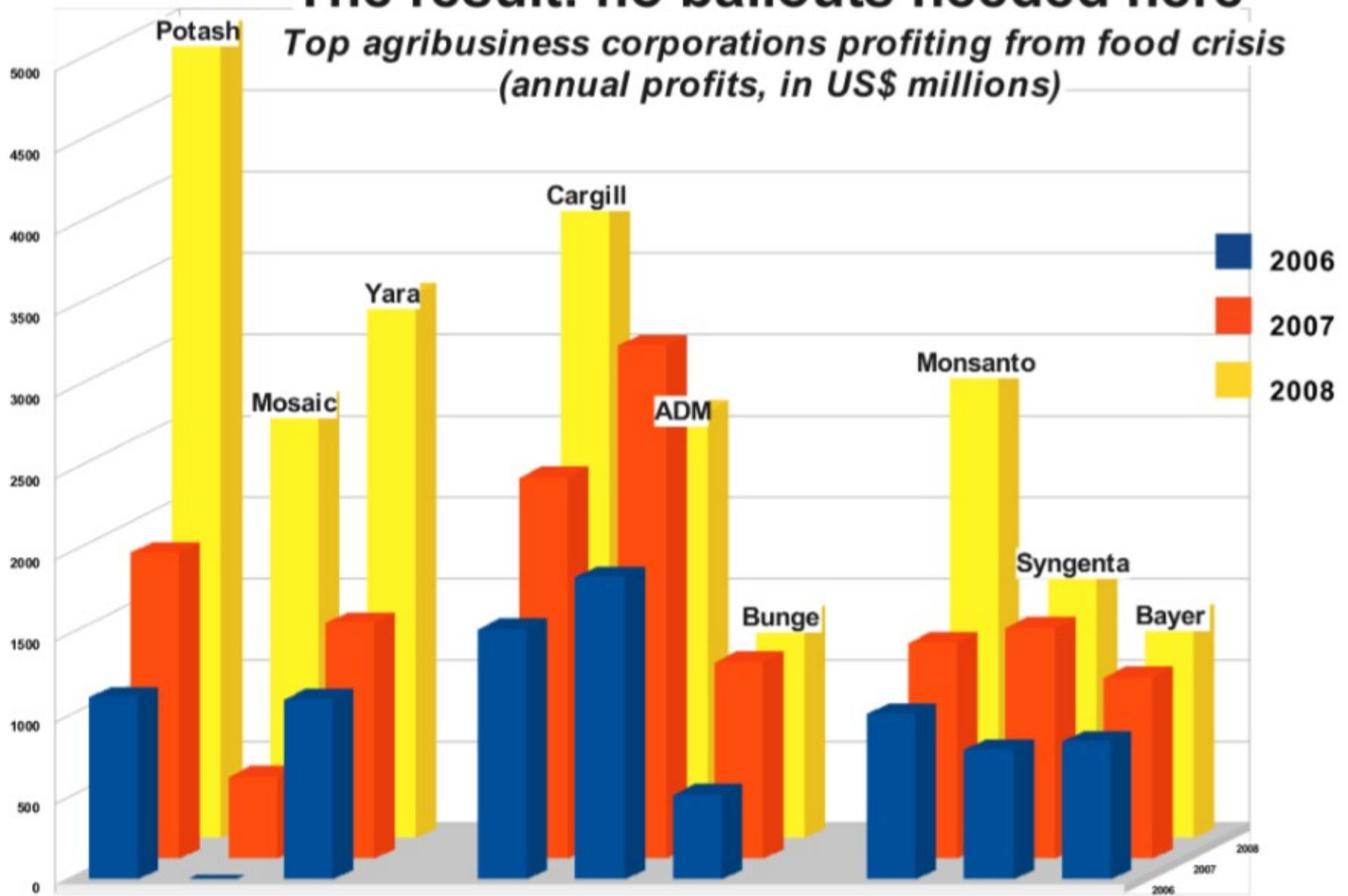
maize: up by 148 to 153 percent

# **What we know from the food crisis of 2008**

The corporations that control the food system used the crisis for extreme profit-taking

# The result: no bailouts needed here

*Top agribusiness corporations profiting from food crisis  
(annual profits, in US\$ millions)*



# What we know from the food crisis of 2008

The food crisis triggered a surge of private sector investment in agriculture and a global farmland grab, which threatens to push farmers out in a massive way.

## Global farmland grab

- US\$100 billion or more on the table
- 100 reported deals by Gulf investors alone
- 120 identified private sector investor vehicles for foreign farmland acquisition

# **Industrial agriculture and the industrial food system are major causes of the climate crisis**

Numbers on how these processes warm the planet are quite variable, but about global emissions we can say that:

- Agricultural activities are responsible for **11 to 15%**
- Land clearing and deforestation cause an additional **15 to 18%**
- Food processing, packing and transportation cause **15 to 20%**
- Decomposition of organic waste: **3 to 4%**

**Total emissions of the food system: 44 to 57% of total global greenhouse emissions**

# The soil solution

# **Soils are one of the Earth's most amazing ecosystems.**

Millions of plants, bacteria, fungi, insects and other living organisms are in a constantly evolving process of creating, composing and decomposing organic matter.

They are also the unavoidable starting point for growing food.

## **But soils are being destroyed at a rapid rate**

In the last 50 years, the massive use of chemical fertilizers and other unsustainable practices of industrial agriculture have caused an average loss of at least 30 – 60 tonnes of soil organic matter for every hectare of agricultural land.

The total loss amounts to a minimum of  
**150 – 205 billion tonnes of organic matter**

**What if we were able to build that back into the soil again?**

# The climate calculation

Amount of organic matter lost from the soils in the past 50 years  
150 – 205 billion tonnes

Amount of CO<sub>2</sub> that would be sequestered from the  
atmosphere if these losses were recuperated  
220 to 330 billion tonnes

Current excess CO<sub>2</sub> in the atmosphere  
718 billion tonnes

Rebuilding soil fertility to pre-industrial levels  
would capture 30-40% of current excess of  
CO<sub>2</sub> in the atmosphere

## Can this be done?

Yes!

GRAIN calculates that, by using existing sustainable farming techniques, we can increase progressively soil organic matter by 60 tonnes/hectare over the next 50 years.

In the process we would have captured more than two thirds of the current excess of CO<sub>2</sub> in the atmosphere!

## **And it would also achieve**

- Healthier soils on which farmers produce more food
- Living soils that capture and retain huge amounts of water
- Local communities that can make a living off the land
- A substantial reduction, if not elimination, of the amount of people that go hungry every day.

**Small farmers can cool the planet**

## **What if farmers around the world would return organic matter to the soil again?**

- Billions of tonnes of carbon would be captured in the soil
- Soils and landfills would not release nitrous oxides and methane into the air
- Fertilizers would become progressively unnecessary, as nutrients would be recovered in organic matter
- Soil fertility would progressively improve

**Just this measure could reduce or offset greenhouse emissions by 20 to 35%**

# **What if the concentration of animal production was reversed and a diversity of animals were integrated with crop production again?**

- Methane and nitrous oxide from manure heaps and slurry lagoons could be eliminated
- World transportation of industrial feed would not be necessary
- Massive long-distance transportation of frozen meat would not make sense
- Natural animal feeding could be improved, thus reducing methane production by cows, sheep and goats

**Total potential reduction of current global emissions:  
additional 5 to 9%**

# **What if most food was sold through local markets and people relied on fresh and seasonal food as the basis of nutrition?**

- Transportation of food back and forth around the world would be eliminated or reduced to a minimum
- Local transportation to buy food would also be reduced
- Refrigeration periods before sale would be significantly decreased or eliminated
- Food packaging would be simpler and less dependent on plastic
- Food processing would be done locally and at home
- Less refrigeration at home would be needed

**Total potential reduction: additional 10-12% of current global emissions**

# What if land clearing and deforestation were halted?

- By halting and reversing monoculture plantations
- By supporting diversified systems that integrate forest cover
- By increasing soil fertility through the incorporation of organic matter
- By decreasing consumption of non-food products based on plant raw materials
- By cutting excessive meat consumption
- By abandoning the madness of agrofuels and implementing decentralized forms of energy production

**Another 15 - 18% of current global emissions would be avoided**

# A world invaded by plantations

(in millions of hectares)

	1995	2007
soybeans	61	92
oil palm	5,5	13,2
sugar cane	18,5	22,7
tree plantations	137	185

**Today, plantations occupy over  
20% of total cultivated land**

Contrary to what authorities and agribusiness often say, small farmers are not deforesting the world. Industrial plantations are currently by far the major cause of land clearing and deforestation.

The world does not need more industrial monocultures; it requires many forms of diversified agriculture that can incorporate and cohabit with trees.

**In sum:  
emissions would be reduced or offset as follows**

By recuperating soil organic matter: **20 to 35%**

By reversing the concentration of meat production and re-integrating animal and crop production: **5 to 9%**

By putting local markets and fresh food back in the center of the food system: **10 to 12%**

By halting land clearing and deforestation: **15 - 18%**

**In total, these changes would provoke a reduction of  $\frac{1}{2}$  to  $\frac{3}{4}$  of current global emissions.**

If this is complemented by serious saving and reduction strategies in other economic sectors, the goal of zero emissions and even reducing current concentration of greenhouse gases in the atmosphere would become feasible

## **The solutions are not just technical or biological**

The necessary forms of organizing and carrying out these forms of agriculture require decentralized tasks and millions of persons, communities and organizations involved and making decisions on how to make the change possible.

They also require a sharp knowledge of local ecosystems and conditions, of seeds and biodiversity

Only small farmers and indigenous peoples around the world can fulfill such needs

## **So, major changes become urgent**

An end to current policies that promote the concentration of land, production processes, processing and retailing

An urgent and profound agrarian reform that redistributes and puts an end to land concentration around the world

Active decentralization of animal production and re-integration of animal and plant production

**Returning agriculture to its central role: food production**

Active support to agricultural techniques and practices based on diversity, local seed systems and agro-ecological processes

Food sovereignty policies through local markets and other short marketing channels, turning away from the commodity export model

Policies that support small farmers without tying them to industrial inputs, unnecessary regulations or provoking loss of autonomy and sovereignty

Cooling the planet requires small farmers and  
food sovereignty