

OUR ENVIRONMENTAL PROSPECT:

PROBLEMS AND OPPORTUNITIES



"Our Earth is one, our world is not"

OUR PLANETARY ECOSYSTEM: ITS ECONOMIC VALUE

All environmental goods and services—water, soils, species, genetic resources, wild timber and fish, watershed functions, climate, etc.—are reckoned to be worth
\$38 trillion per year
(compare the world's economy of \$37 trillion)

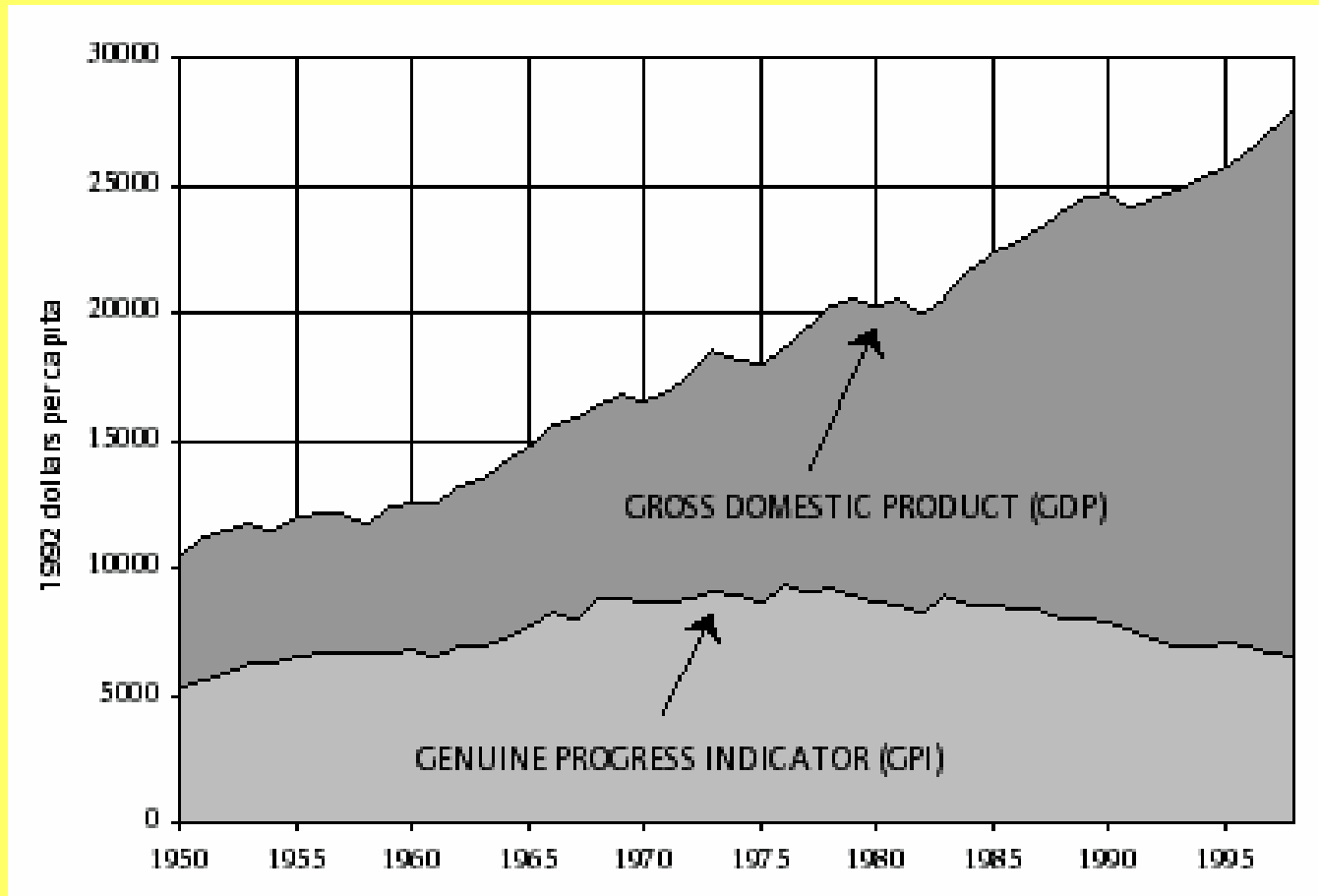
**Global natural product
is greater than global national product**

HUMAN IMPACTS

Humanity has:

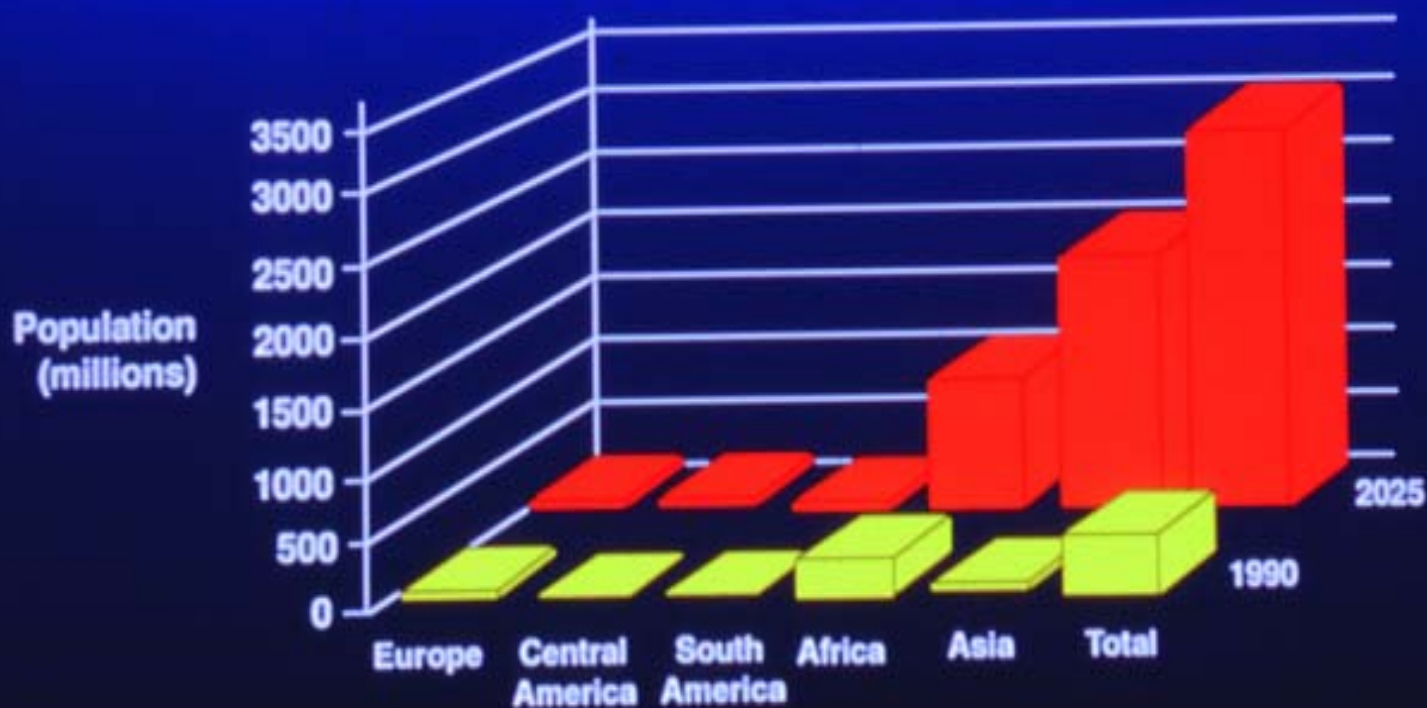
- **diverted 55% of net plant growth.**
- **appropriated over 50% of accessible freshwater.**
- **over-exploited at least 45% and fully exploited another 25% of marine fisheries.**

U.S. GENUINE PROGRESS INDICATOR



NUMBER OF PEOPLE LIVING IN WATER STRESSED COUNTRIES

defined as more than 600 people per flow unit of available water (one million cubic meters per year). Columns show the different continents and the gross total.



WATER ECONOMICS

**Amount of developing-nation disease due to
lack of clean water**

90%

Annual cost of workdays lost to sickness

\$125 billion

**Annual cost of supplying clean water and
water-based sanitation**

\$50 billion

WATER PRICES AS SHARE OF MARGINAL COST OF SUPPLY

Israel	60%-+
Egypt	20%
Pakistan, Indonesia, South Korea	13%
Philippines	10%
Thailand	3%
Bangladesh	1%
United States	17%

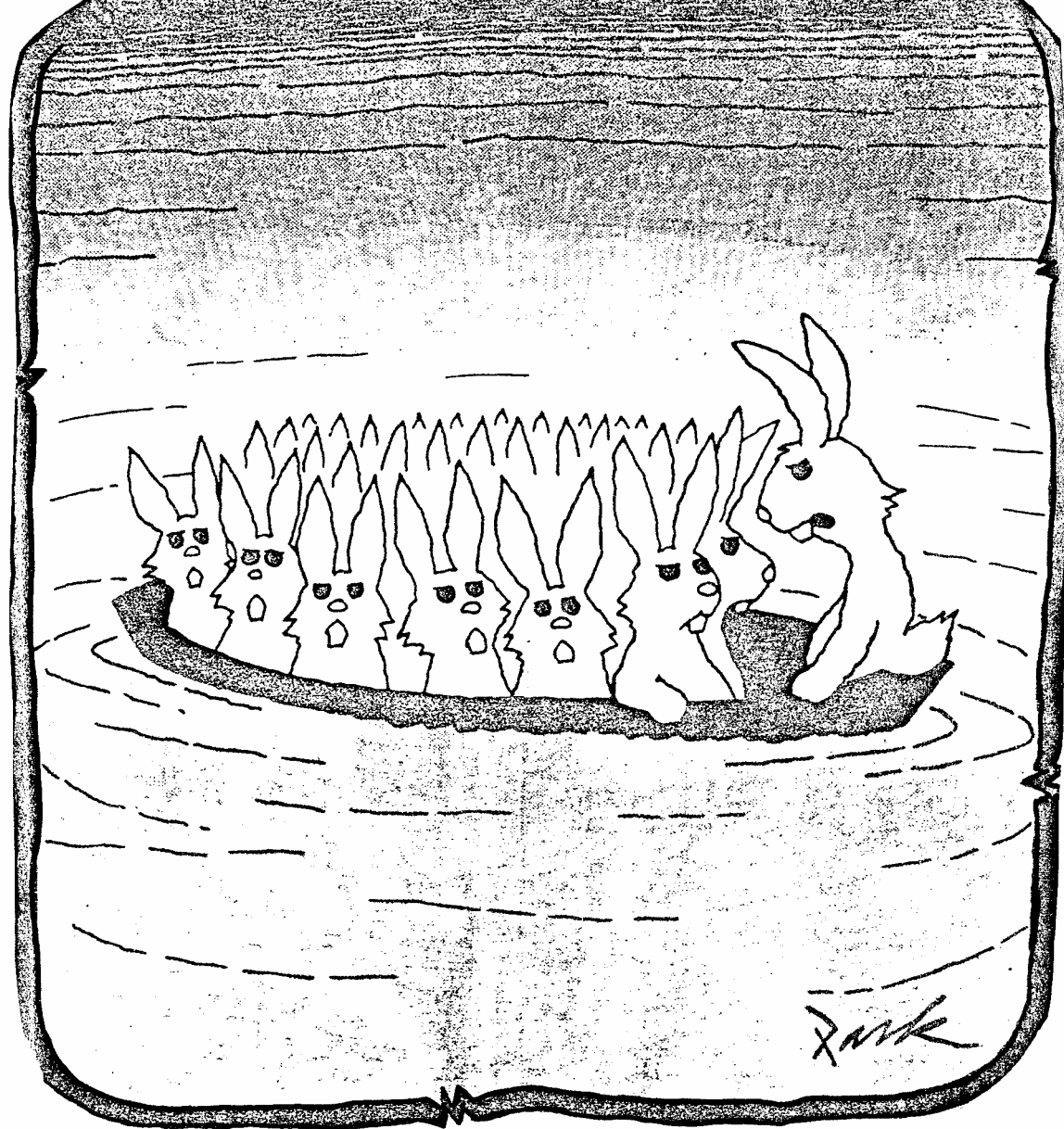
WATER SUBSIDIES

**Subsidies for water in
developing countries total
\$54 billion per year.**

**Compare the World Bank estimate of
\$60 billion per year
for minimum water investments
required in these countries
over the next decade.**

POPULATION AND RENEWABLE RESOURCES

	1990	2010	Total change	Per-capita change
	millions		%	%
Population	5290	7030	+33	
Fish catch (tons)	85	102	+20	-10
Irrigated land (ha)	237	277	+17	-12
Cropland (ha)	1444	1516	+5	-21
Rangeland/ pasture (ha)	3402	3540	+4	-22
Forests (ha)	3413	3165	-7	-30



“For the last time: our only chance is self control.”

BRITAIN, BANGLADESH AND CO2

Britain's population growth rate ...	0.1%
producing an additional ...	60,000 people per year
Bangladesh's population growth rate ...	2.0%
producing an additional ...	2.7 million people per year

Through profligate use of fossil fuels, each new Briton produces **50 times** more CO2 than each new Bangladeshi.

So annual population growth in Britain causes as many CO2 emissions as the **45-times larger** population growth in Bangladesh.

Ironically Britain could get down to ZPG merely by preventing **half of its unwanted births**.

PER-CAPITA CARBON EMISSIONS (TONNES, 1997)



ENERGY WASTE

U.S. power plants waste energy equal to Japan's total energy use.

Americans save **\$200 billion** worth of energy per year, but they still waste **\$300 billion** worth.

Better control systems for motors, lighting and temperature could save **half the world's electricity.**

RICH AND POOR

The rich world's

share of world population.. 20%

**share of CO₂, CFCs and
other global pollutants ... 74-87%**

During the 1990s the

43 million extra Northerners

polluted the world more than the

760 million extra Southerners.

Growth rates

- High
- Medium
- Low



Where we live:
the size of each country is
proportional to its population

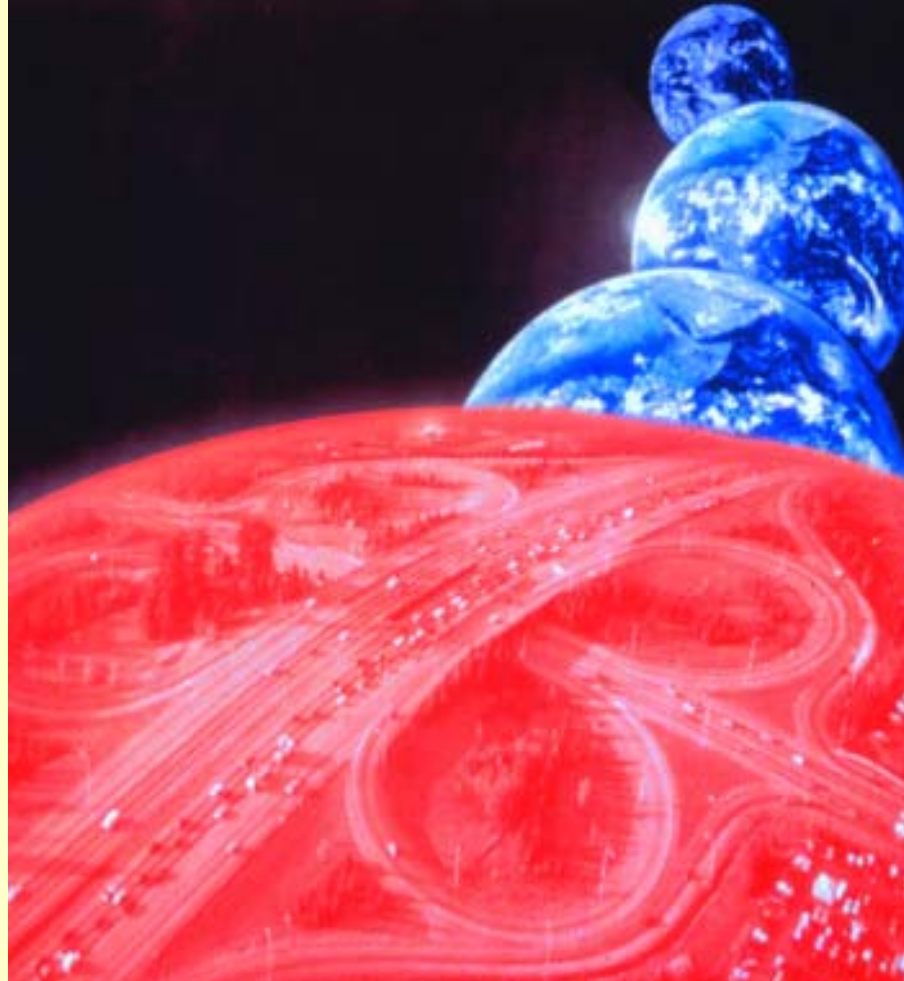
How rich we are:
the size of each country is
proportional to its wealth

Economies

- High-income
- Medium-income
- Low-income



**IF THE LIFESTYLE OF THE
INDUSTRIALISED COUNTRIES
WERE TRANSFERRED TO THE
WHOLE WORLD, AT LEAST
THREE OTHER PLANETS
WOULD BE NECESSARY**





YES, YES
WE NOTICED...
BUT IT'S YOUR
END OF THE
BOAT THAT'S
SINKING!

WORLD ECONOMY

INDUSTRIALIZED
NATIONS
SUMMIT

WHAT SHALL WE DO?

- 1. Swap GNP for an Index of Net Sustainable Welfare.**
- 2. Get the prices right, e.g. gasoline/petrol.**
- 3. Get rid of “perverse” subsidies.**
- 4. Expand eco-technologies.**

“PERVERSE” SUBSIDIES

billions US\$ per year

Perverse subsidies are those which are bad news for both the economy and the environment in the long run.

Agriculture --	510
Fossil fuels/nuclear energy --	300
Road transportation --	780
Water --	230
Fisheries --	25
Forests --	92
Total	1,950

By definition, these are funds going to support unsustainable development. Contrast the Rio Earth Summit budget for sustainable development, \$600 billion per year.

GERMAN COAL MINES

German coal mines are so heavily subsidized--\$76,000 for each of 90,000 miners per year--that it would be economically efficient to shut down all the mines and send the miners home on full pay for the rest of their lives.

Germans would further benefit through less acid rain, global warming and other types of coal pollution.

PERVERSE SUBSIDIES: SIZE

Perverse subsidies of \$2 trillion

**are larger than all but
the three largest national economies in the world.**

**They are almost three times as large as
global military spending per year,
larger than the top twenty corporations' annual sales,
and larger than the global fossil fuels industry.**

PERVERSE SUBSIDIES: THE BETTER NEWS

New Zealand has eliminated virtually all its agricultural subsidies.

India has slashed fossil fuel subsidies by 37%, Mexico by 53%, China by 56%, and Russia by 90%.

Singapore has no more subsidies for car travel.

South Africa, China, Australia and Mexico are making a start on full-cost pricing of water.

Brazil has ended subsidies for cattle ranchers in Amazonia.

FACTOR FOUR

Using technologies already available,
we could enjoy
twice as much material welfare
while consuming only
half as many raw materials
and causing
half as much pollution and waste.

Factor Ten is on the way.

FLUORESCENT LIGHT BULBS

These compacts use
less than one quarter as much electricity
as traditional incandescents.

Production has soared **ten-fold since 1988.**

The **1.3 billion** bulbs today lower electricity needs by
the output of **28 coal-fired power plants.**

Americans could **save almost \$2 billion per year**
if each household were to replace
just 3 traditional bulbs with compact fluorescents..



The Rocky Mountain Institute house and office are at over 2000 metres but are heated only by solar power. Inside is warm enough to grow bananas, yet they still have surplus electricity to export to the national grid.

THE HYPERCAR

In today's car with its weight and inefficient engine, ,
95% of energy moves the car and 5% moves the driver.

A "hypercar" will have a superlight,
low-drag carbon-fibre body, safer than steel, plus a gas
turbine or fuel cell for constant electricity,
and variable-speed electric motors
to capture braking energy.

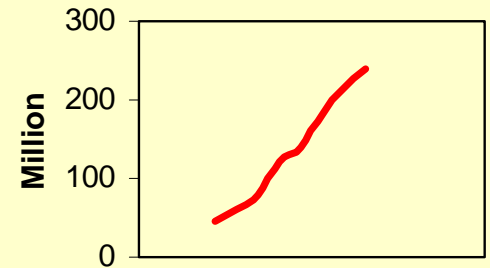
Because of its constant-speed engine, it will be
95% less polluting
and get **200 miles per gallon.**

TECHNO-ADVANCES ALREADY HERE

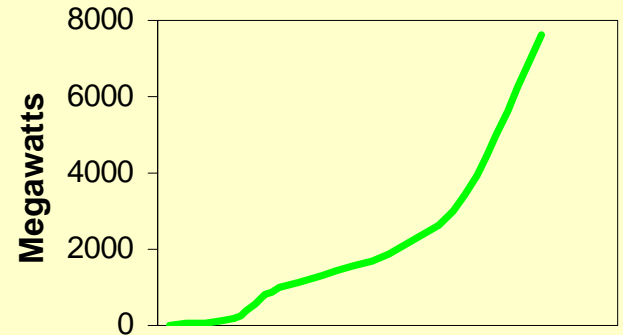
- Fuel-cell cars, with plug-in electric generators**
- Buildings that “manufacture” solar power, oxygen and water**
- Weeds supplying powerful pharmaceuticals**
- Cellulose-based plastics that are strong, and recyclable**
- Roofs, windows and roads that serve as solar-electric collectors**
- Wood: all our wood needs could be grown in an area the size of Iowa or Honshu**

World trends

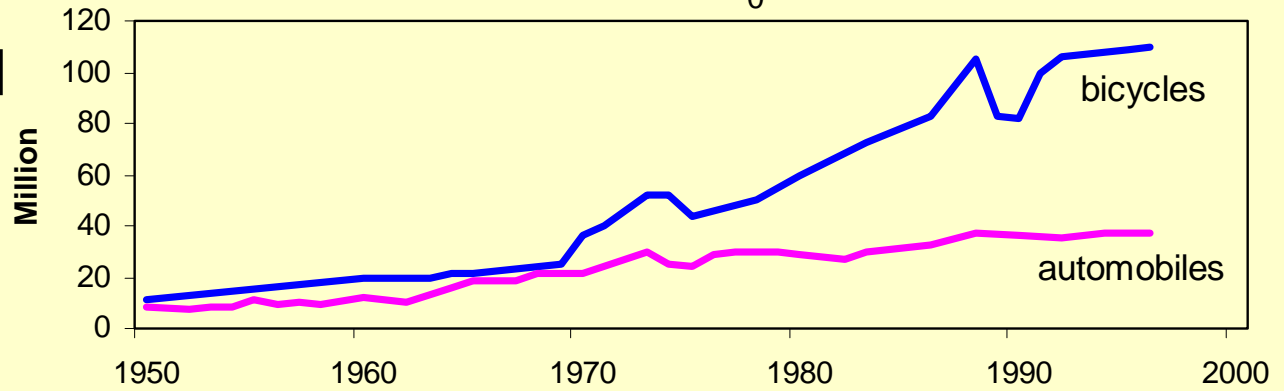
Sales of compact fluorescent bulbs



Wind energy generating capacity



Bicycle and automobile production



Source: adapted from State of the World, 1998

CHINA UNSUSTAINABLE

If per-capita consumption of beef, currently only **4 kgs.** per year, were to match the **U.S.'s 45 kgs.**, and if the additional beef were produced in feedlots, this would take **343 million tons** of grain, equivalent to the entire U.S. grain harvest.

Suppose China were to seek extra animal protein through seafood. If it consumed at Japan's per-capita level, it would need **100 million tons**, more than the entire ocean fish catch today.

If China were to match the U.S. **for per-capita cars and oil consumption**, it would need **80 million barrels of oil per day**, cf. global output of **65 million barrels**.

SUSTAINABLE NETHERLANDS

Aims to cut by 2030:

- **CO2 emissions from 12 tonnes per person per year to 1.7 tonnes.**
- **domestic freshwater use by 38%.**
- **cropland use from 0.45 ha. per person to 0.25 ha.**
- **timber use by over 60%.**
- **meat consumption by 70%.**