

HIV/AIDS: A thermometer for the future of the poor – India, a case study

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What makes HIV/AIDS unique

- Long asymptomatic infectious period (~10 years)
- Almost always fatal
- No cure or vaccine
- Sex and IV drug use – major transmission routes
- Stigma keeps risky sex and drug use underground
- Youth most vulnerable
- Poor marginalized populations most vulnerable

HIV/AIDS: a devastating modern pandemic

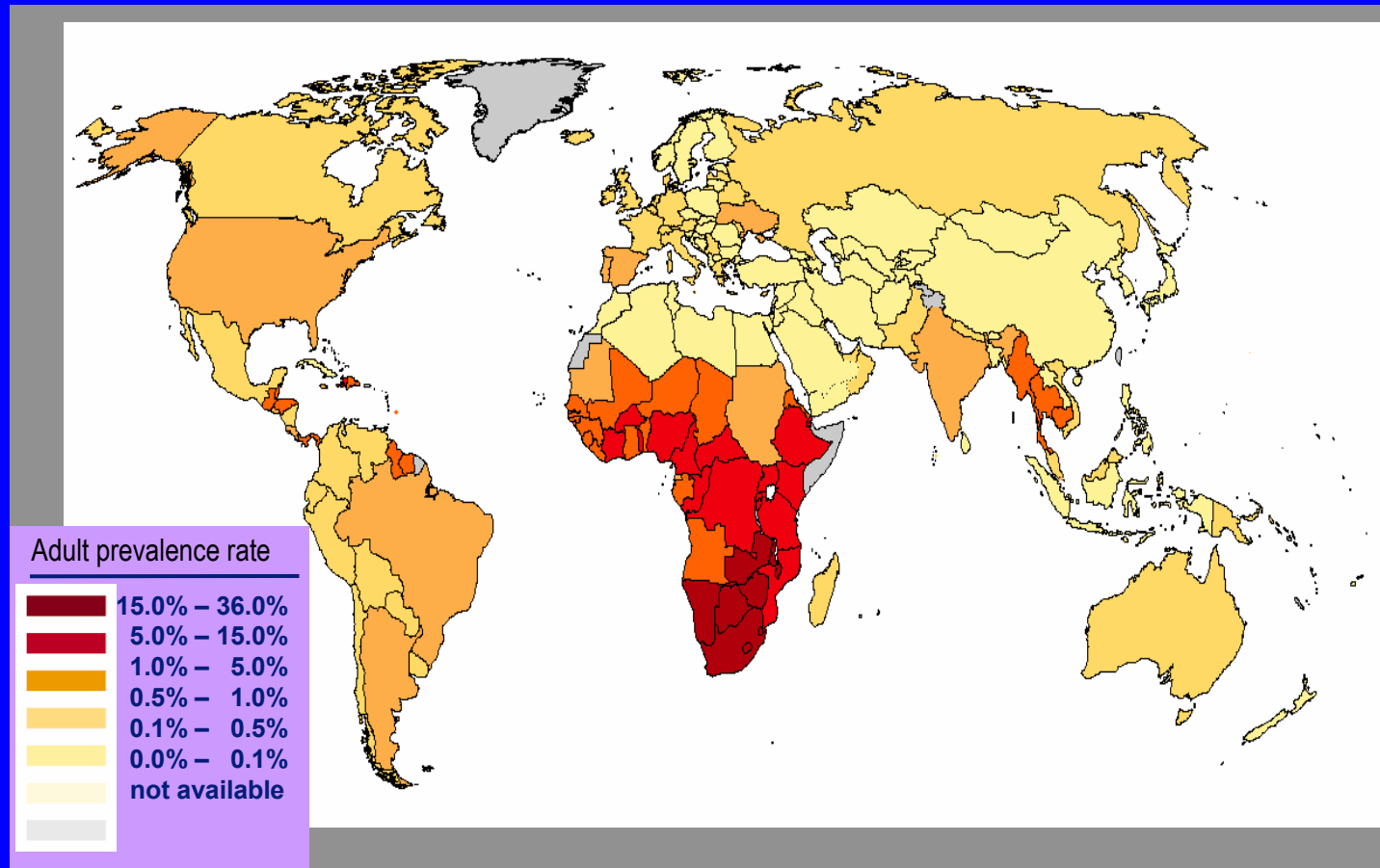


GLOBAL STATUS

2004

Global status of HIV infection

40 million people living with HIV/AIDS and about 30 million have died as of end 2004



SOURCE:
UNAIDS

Adults and children estimated to be living with HIV/AIDS as of end 2004



Total: 39.4(35.9-44.3) million

**SOURCE:
UNAIDS 2004**

Estimated number of adults and children newly infected with HIV during 2004



Total: 4.9(4.3-6.4) million

SOURCE:
UNAIDS 2004

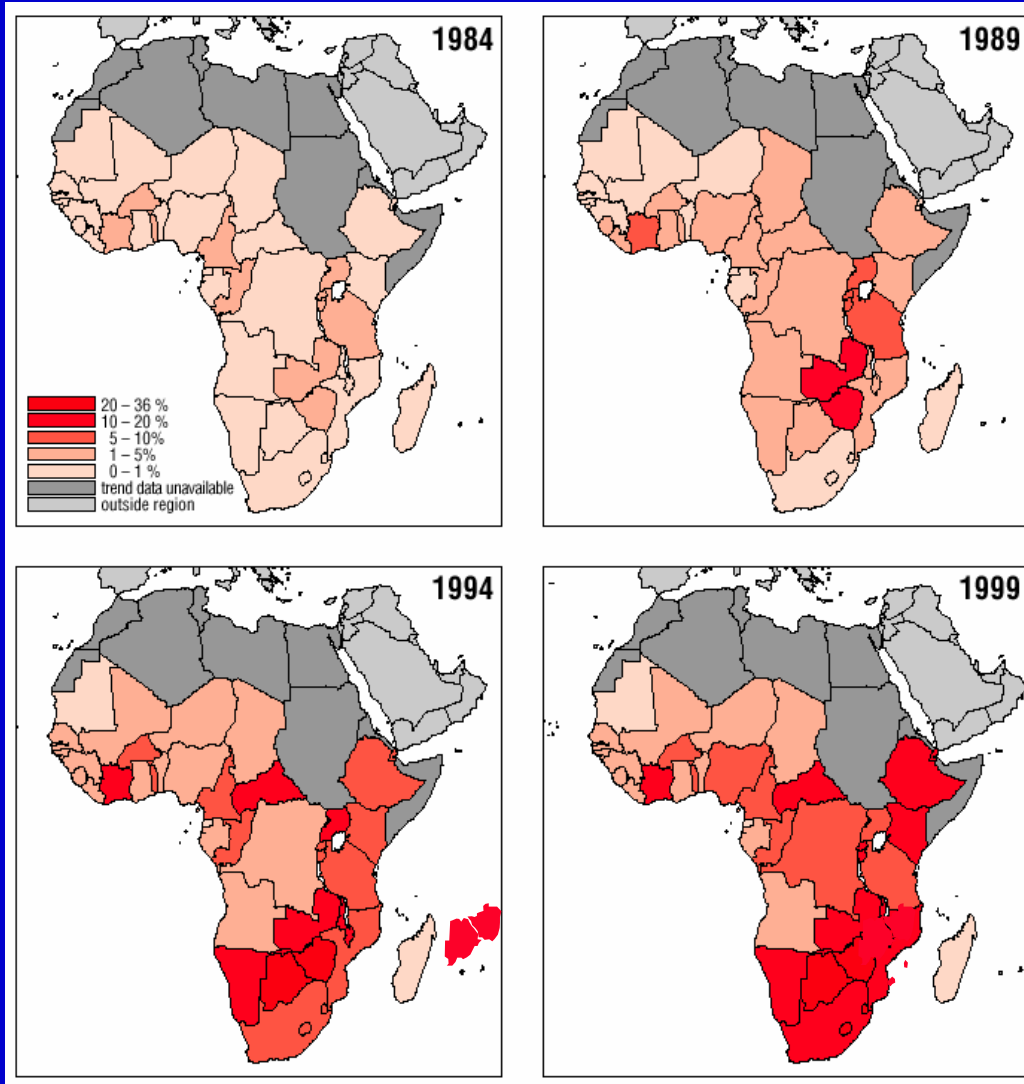
Estimated adult and child deaths from HIV/AIDS during 2004



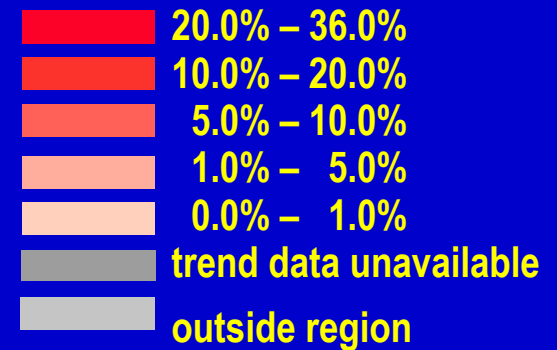
Total: 3.1 (2.8-3.5) million

SOURCE:
UNAIDS 2004

Fast Spread of HIV in Sub-Saharan Africa, 1984 to 1999



Estimated percentage of adults
(15-49) infected with HIV

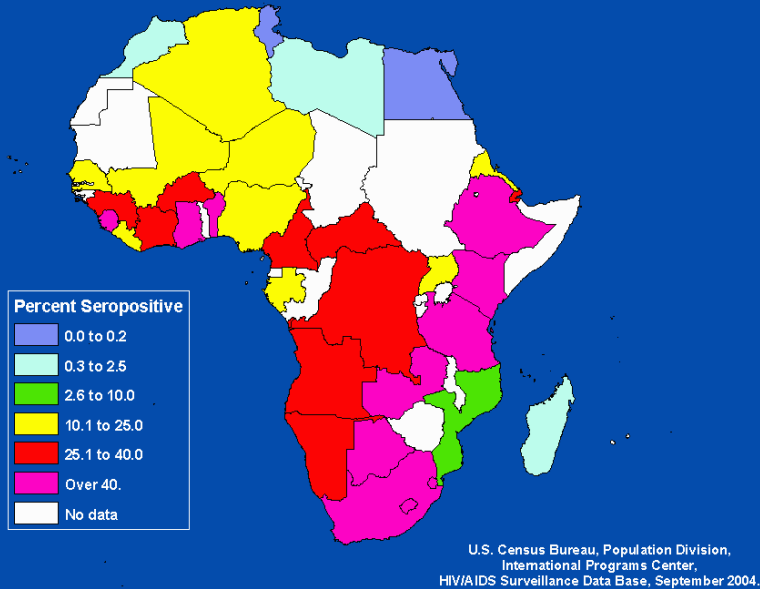


SOURCE: UNAIDS 2000

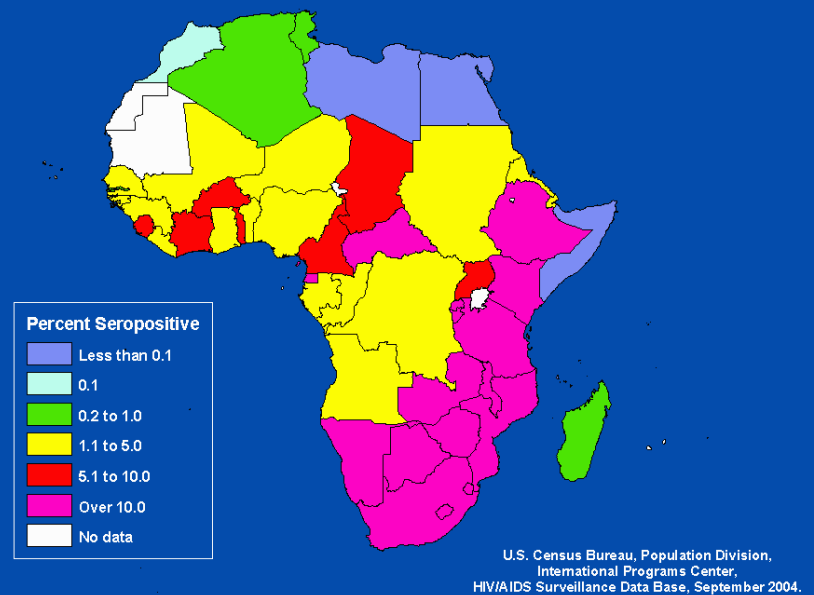
CONSEQUENCES

Africa: 1980-2004 a runaway pandemic

African HIV1 Seroprevalence for High-Risk Urban Populations



African HIV1 Seroprevalence for Low-Risk Urban Populations

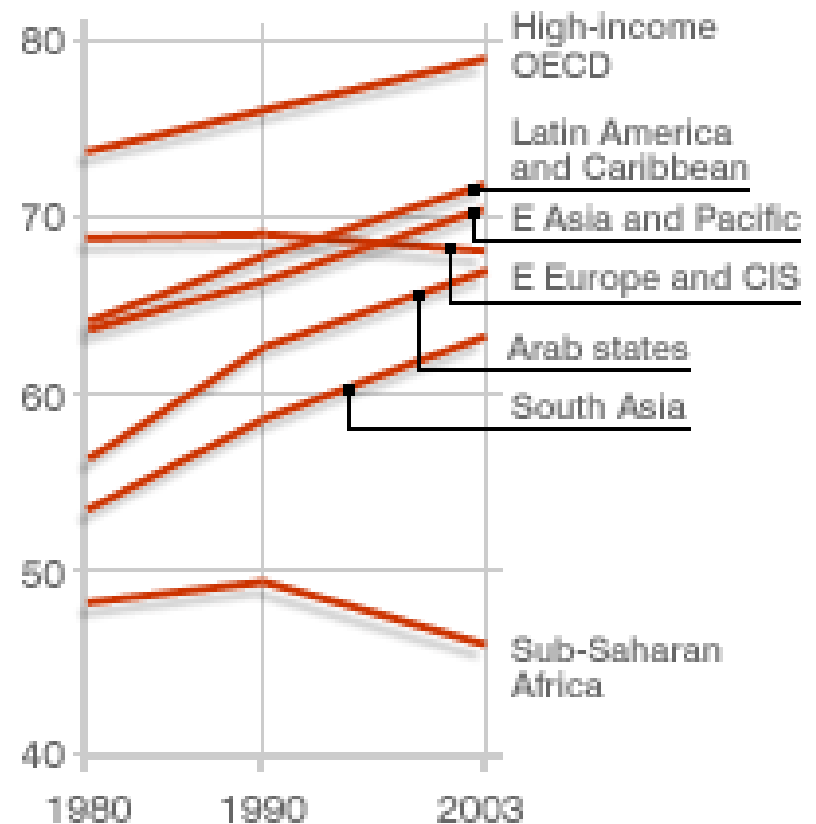


MOST PRODUCTIVE SECTOR (YOUNG ADULTS) LOST



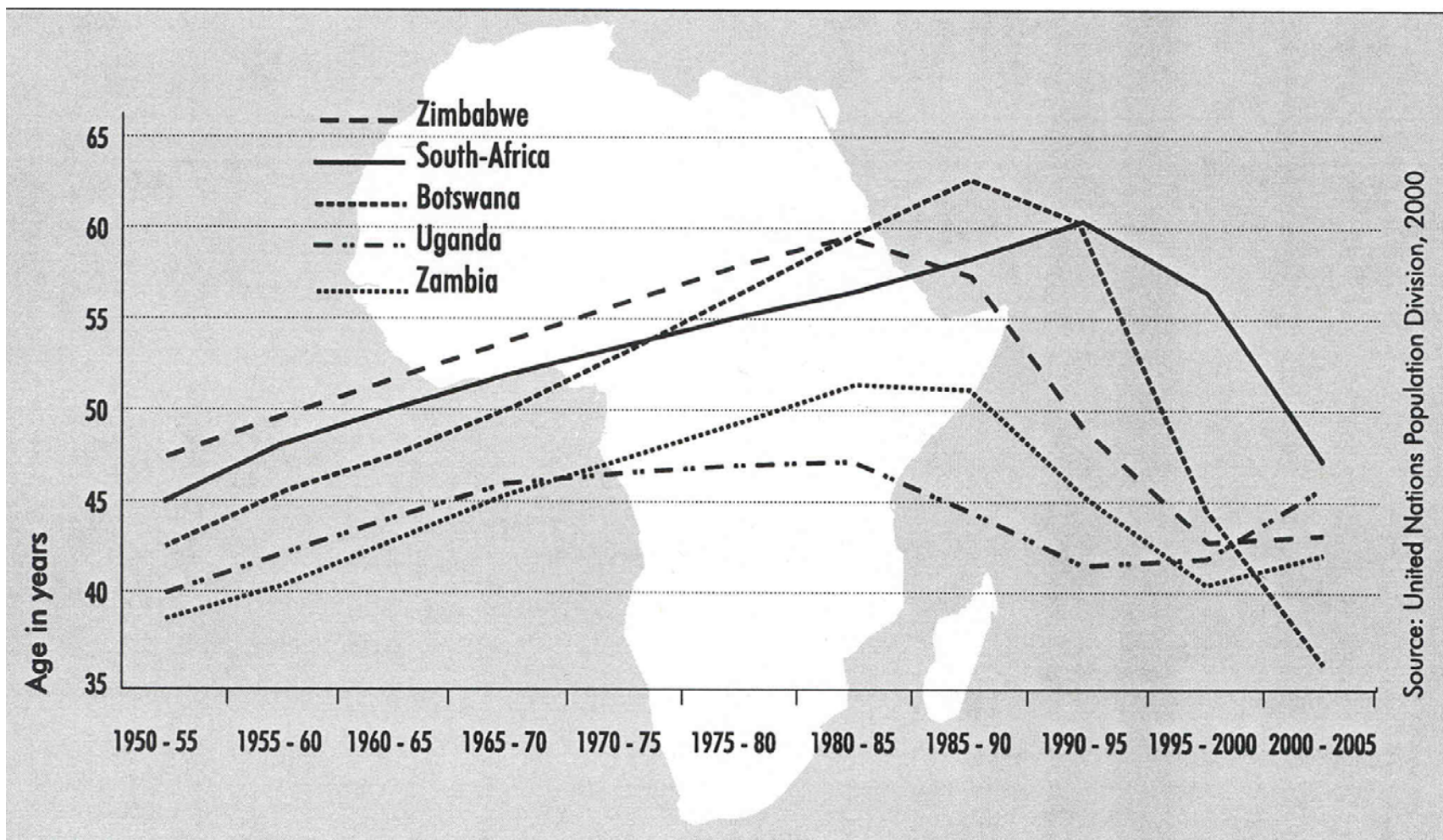
CHANGING LIFE EXPECTANCY

Life expectancy (years)



SOURCE: UN

DECREASING LIFE EXPECTANCY; KILLING THE MOST PRODUCTIVE



Source: United Nations Population Division, 2000

15 MILLION AIDS ORPHANS (2003)

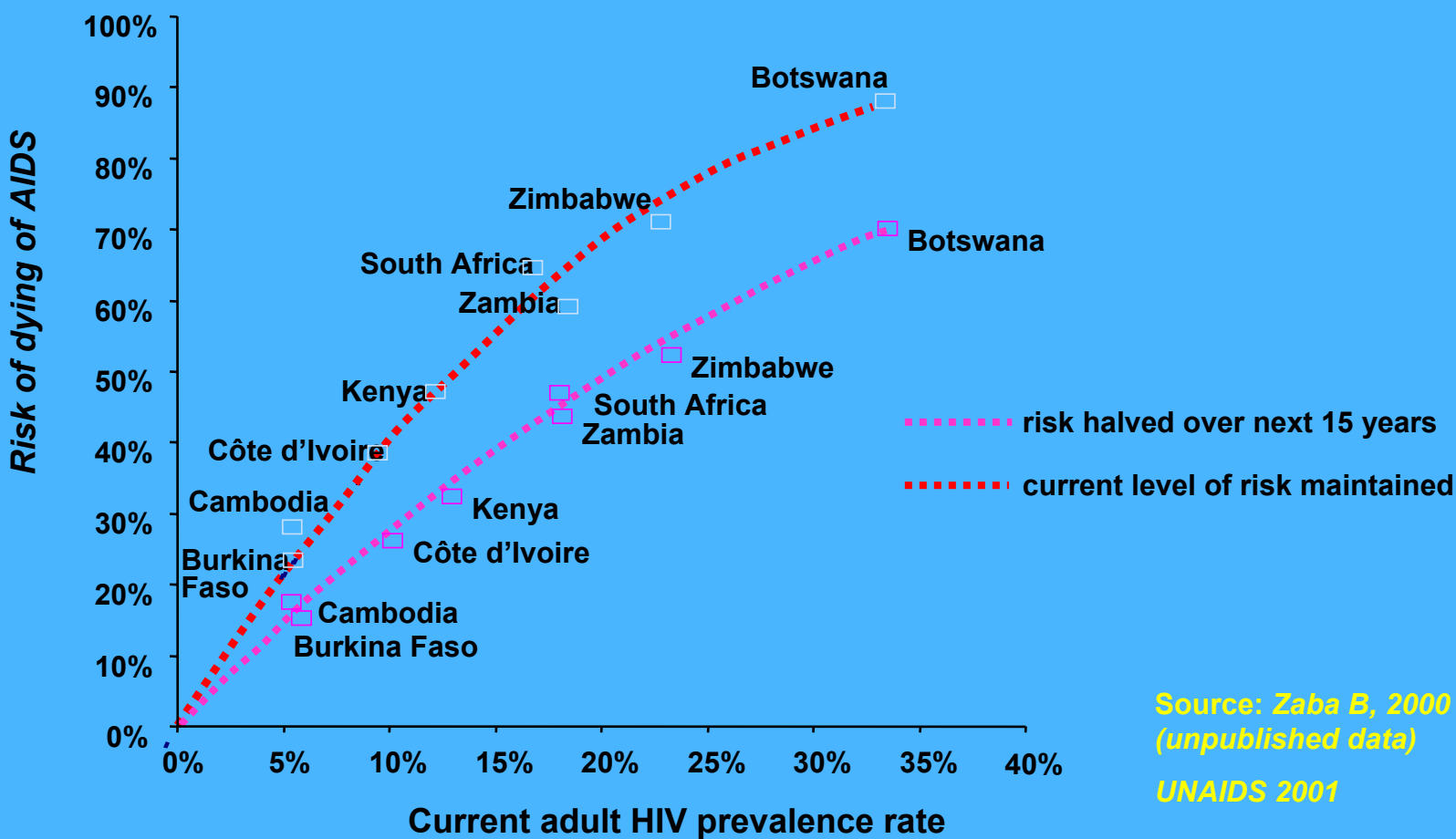


Source: James Nachtwey

What is their future?



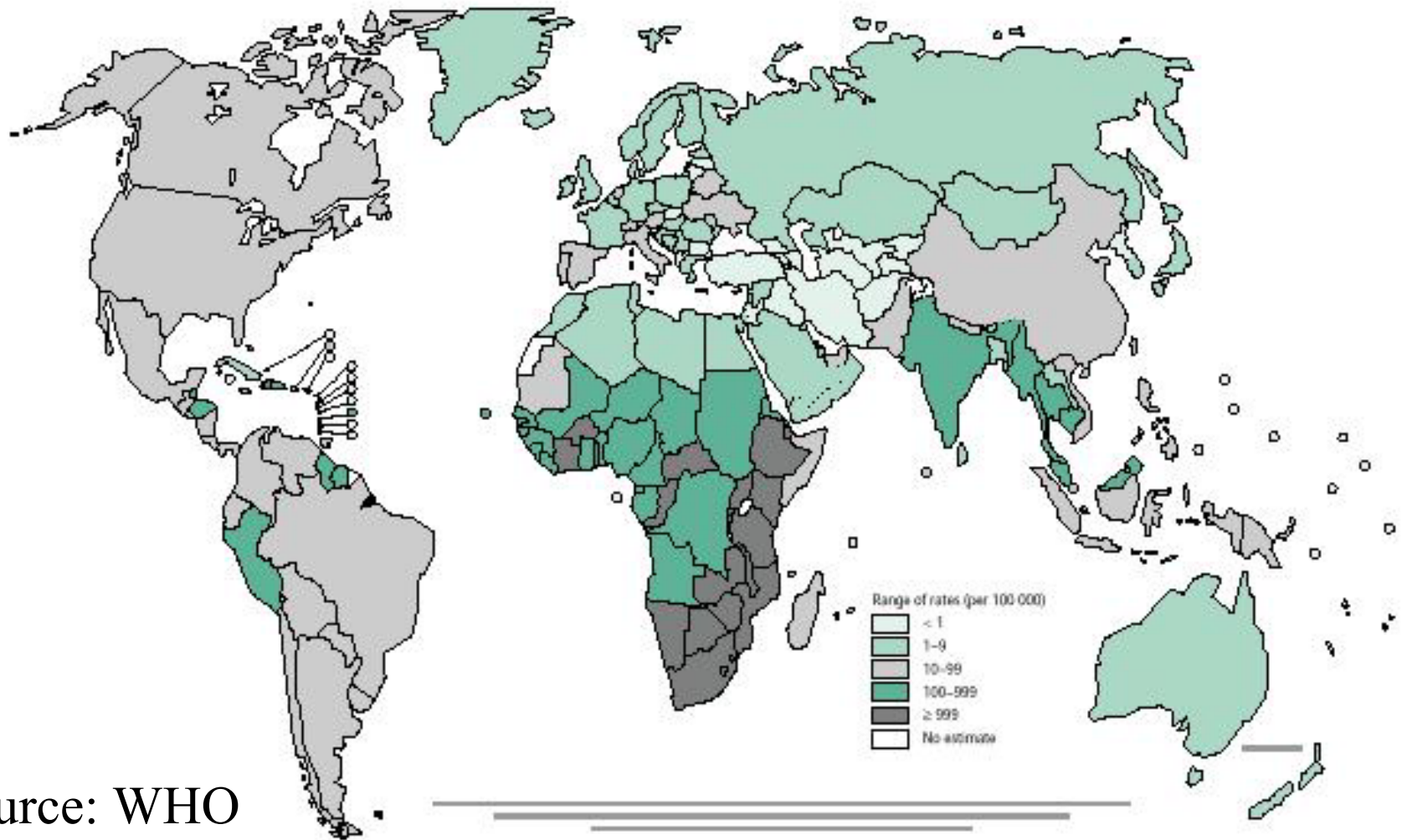
Lifetime risk of AIDS death for 15-year-old boys, assuming unchanged or halved risk of becoming infected with HIV, selected countries



Source: Zaba B, 2000
(unpublished data)
UNAIDS 2001

TB and HIV Co-infection

2. Estimated TB/HIV co-infection rates, 1997



Source: WHO

FUTURE

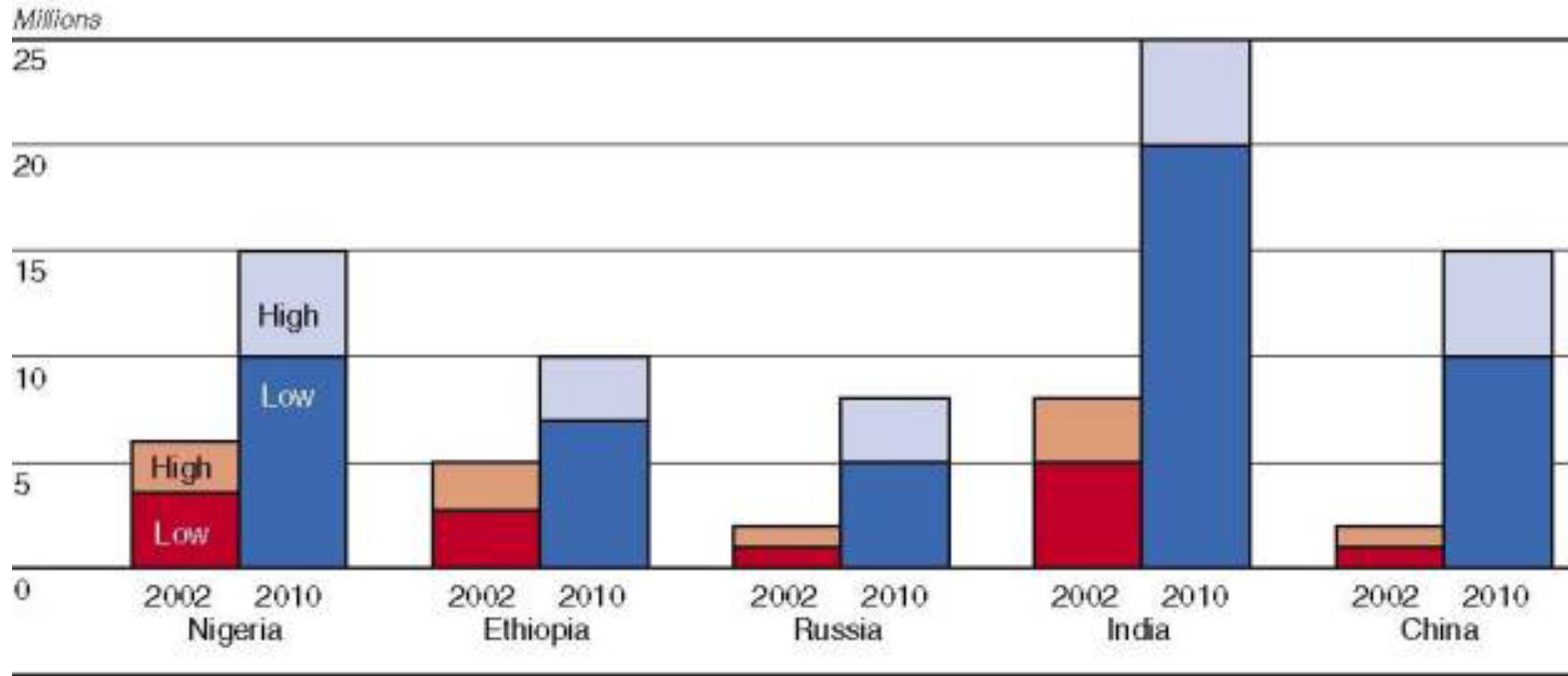
The Second Wave

The 2002 NSC/CIA report lists 5 important countries in the next wave

- **Nigeria**
- **Ethiopia**
- **India**
- **China**
- **Russia**

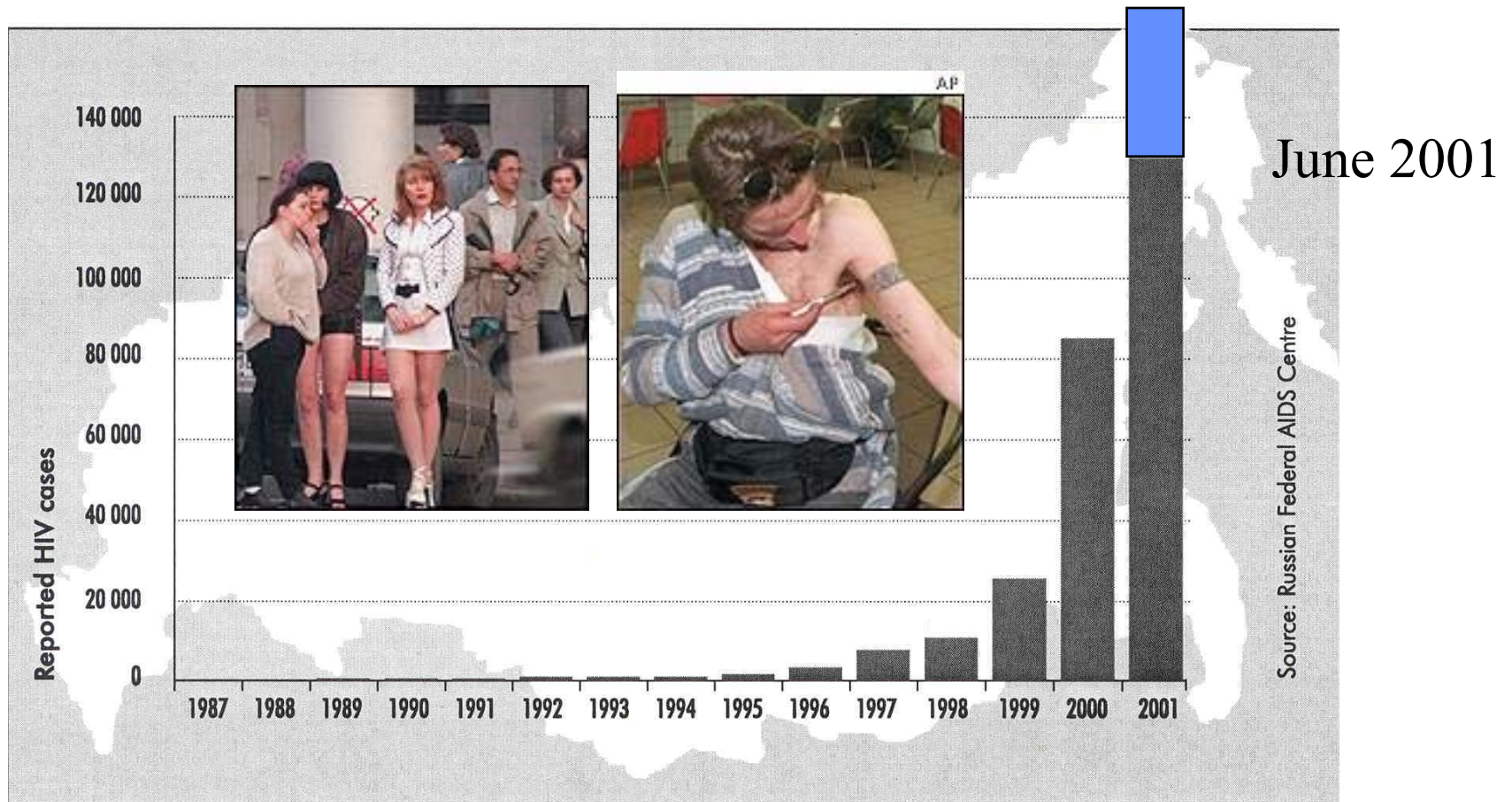
PROJECTIONS

Figure 1
High and Low Estimates of Current and Future
HIV/AIDS-Infected Adults in Next-Wave Countries, 2002 and 2010



Source: NSC/CIA report 2002

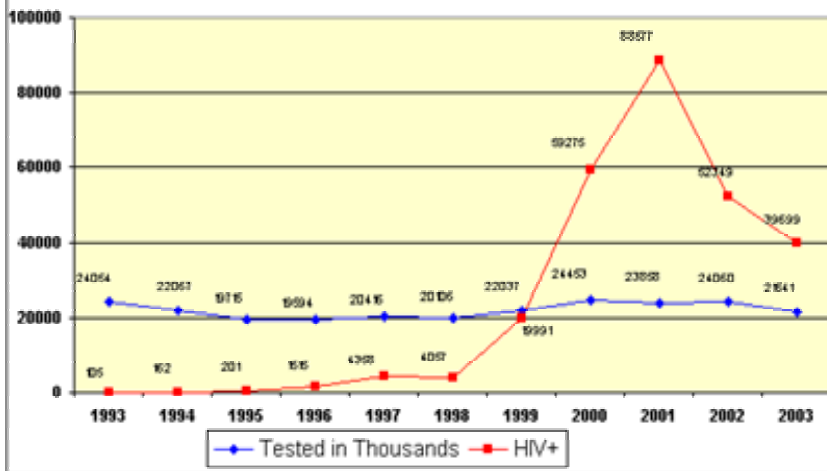
RUSSIA: NIC concluded that at this rate of growth, 10% of all Russians aged 15-49 will be HIV+ by 2010



Estimated Infections (2004) ~900,000

Russia: Health and Demographic Crisis

Figure 2: Annual HIV-Antibody Testing (in Thousands) and Reported HIV+ Incidence, Total Population, Russia: 1993 to 2003



Official HIV+ Numbers: 300,000

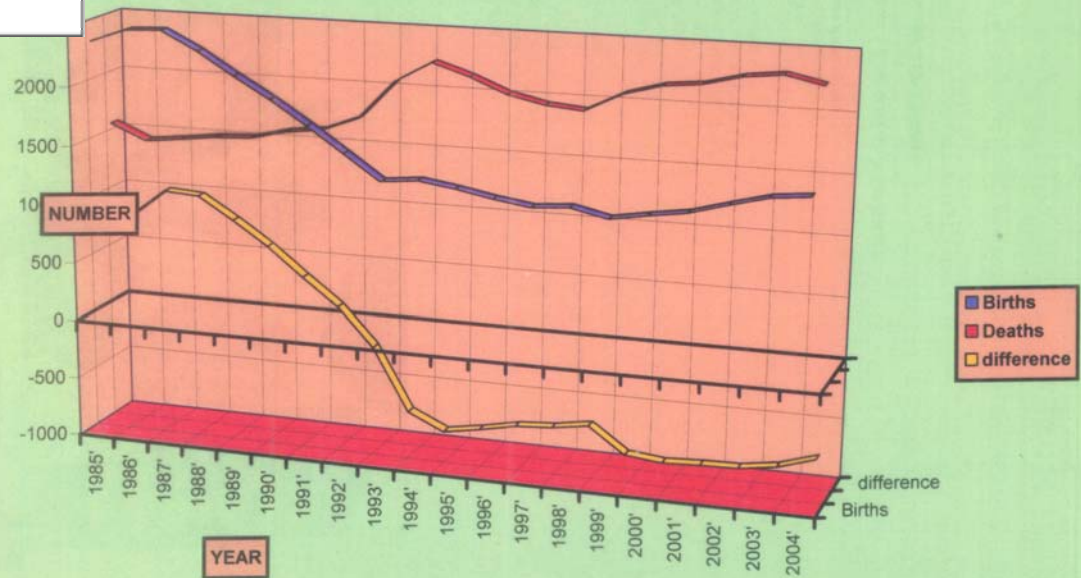
Expert Estimates: 900,000

M. Feshbach 05(WWCS)
HIV/AIDS in Russia.

Population decline
by ~ 800,000/year

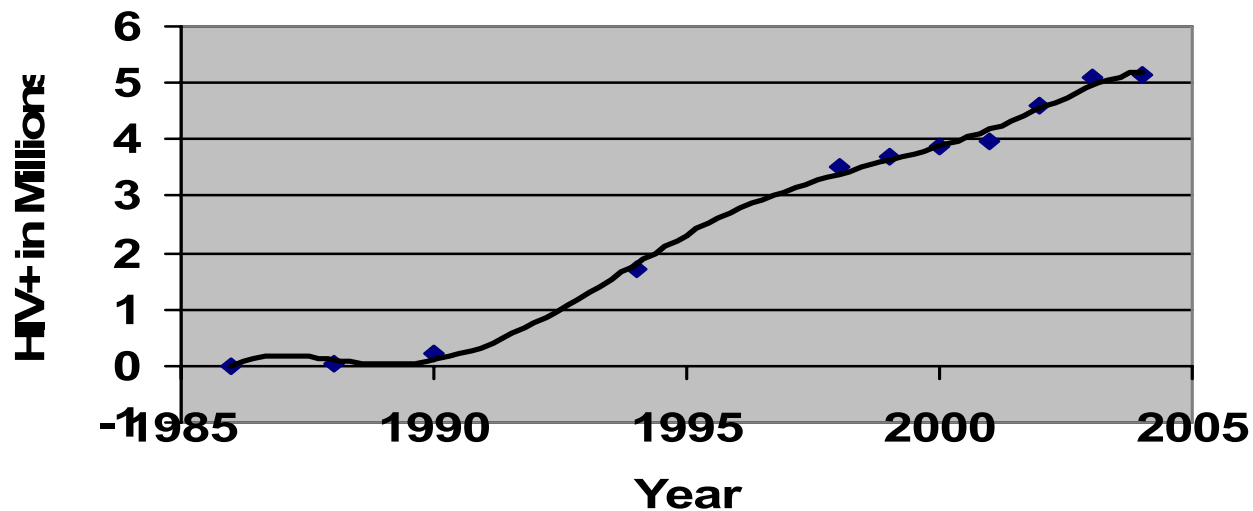
Life Expectancy M 60.5
F 74.0

BIRTHS AND DEATHS IN RUSSIA: 1985 TO 2004



| | 1985' | 1986' | 1987' | 1988' | 1989' | 1990' | 1991' | 1992' | 1993' | 1994' | 1995' | 1996' | 1997' | 1998' | 1999' | 2000' | 2001' | 2002' | 2003' | 2004' |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Births | 2375 | 2486 | 2500 | 2349 | 2161 | 1989 | 1795 | 1588 | 1378 | 1408 | 1364 | 1305 | 1260 | 1283 | 1216 | 1267 | 1312 | 1397 | 1477 | 1508 |
| Deaths | 1625 | 1498 | 1532 | 1569 | 1584 | 1656 | 1691 | 1807 | 2129 | 2301 | 2204 | 2082 | 2016 | 1989 | 2140 | 2225 | 2255 | 2332 | 2366 | 2298 |
| difference | 749.8 | 987.9 | 968.4 | 779.4 | 576.9 | 332.9 | 103.9 | -220 | -751 | -893 | -840 | -778 | -756 | -705 | -925 | -959 | -943 | -935 | -889 | -790 |

HIV Estimates: India



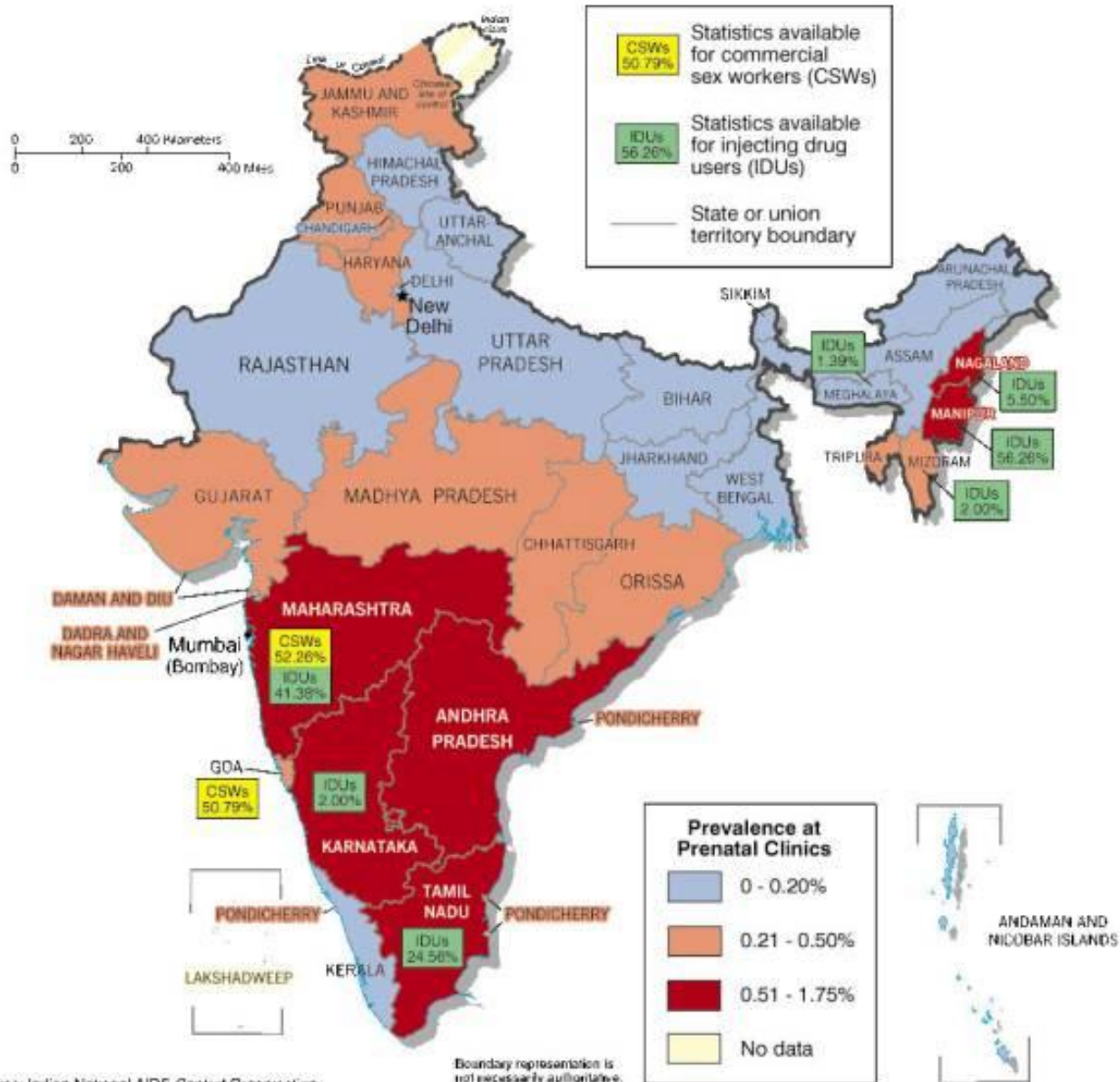
| Year | Total HIV positive persons |
|------|----------------------------|
| 1998 | 3.5 million |
| 1999 | 3.7 million |
| 2000 | 3.86 million |
| 2001 | 3.97 million |
| 2002 | 4.58 million |
| 2003 | 5.11 million |
| 2004 | 5.134 million |

Estimates of 5.134 million based on cumulative 111,608 reported cases!

No estimates of deaths

2004 anomaly due to change in analysis in 2003

India: HIV Prevalence Among Women Attending Prenatal Clinics, Commercial Sex Workers, and Injecting Drug Users, 2001




Source: Indian National AIDS Control Organisation.

India: Some Key Issues

- About 85% of infections are attributed to sex with sex workers (3-8 million). (soliciting is illegal; status of prostitution is ill defined. Poverty and stigma prevents their development)
- Truck drivers are major transmission vectors (5-10 million)
- Men having sex with men: No national figures ($\approx 5\%$) (Mumbai and Chennai surveillance show high prevalence)
- IV drug use: most focus is on Eastern states (Manipur, ...)
(IV drug use common amongst menial workers in all cities)
- Accidental spread due to needles/blood is claimed negligible.
(2005 study found that of roughly 3-6 billion injections 63% were unsafe and 1/3 carried risk of blood borne infections)
- Migrant workers: about 200 million in agriculture and industry
(most stay away from families for months at a time)
- Street kids — kids out of school (about 50 million)
Victims of sexual, physical, emotional abuse → Risky behaviors

Vulnerable to HIV/AIDS

- **Poor**
 - Survival dominates day to day existence
 - **Illiterate**
 - Hard to teach and motivate behavior change
 - **Marginalized**
 - Sex Workers
 - Men having sex with men
 - IV drug users
- 
- Risky
behavior
stays
underground**

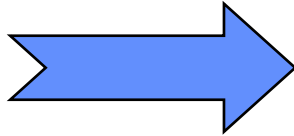
Rich versus Poor

- **Health care: do they have access to**
 - **Testing and counseling**
 - **Treatment and care**
 - **Anti-retroviral therapy**
- **Education matters**
 - **Prevention messages leading to:**
 - ☹ **behavior change**
 - ☹ **protection (condoms) (no vaccine)**
- **Livelihood (freedom to make safe choices)**

Two extreme worlds

One has access to the best, the other has little

With ART



Life is not the same or perfect but functional



1995

1999

No ART



Source: James Nachtwey

rajan@lanl.gov

<http://t8web.lanl.gov/people/rajan/AIDS-india/>

HIV, Poor, India

In developing countries HIV/AIDS will not be controlled as an isolated health problem.

We will need to simultaneously address issues of poverty and development.

Intervention will require a long-term holistic approach that builds local leadership and institutions

The continued spread of HIV/AIDS is an indicator of a much larger problem

THE VERY FUTURE OF THE POOR, THE ILLITERATE, AND THE MARGINALIZED

Challenge: people living under \$2/day

2 billion in 21st century

Resources
& Skills



1.5 B
people

3 billion in 18th century
(population growth is happening here)

Eight key enablers

- Governance – peace, security, equity, civil society
- Population – growth mostly in poor populations
- Health care – will the poor get even the basics?
- Education – will there be quality education for all?
- Jobs – in 21st century want jobs that add value
- Energy – will clean, cheap, copious supply of energy be available as conventional oil and gas production peaks?
Global climate change?
- Water – food security, nourishment, disease
- Environment – air and water pollution, severe droughts and storms, erosion, loss of ecosystems, poor depleted soil, and climate change will impact the poor the most.

India: a pivotal strategic region

- 1/6 of world population
- 1/4 of world poverty
- Strategically located
- Democratic, free, secular
- Values education:
English and math skills
- Rising middle class



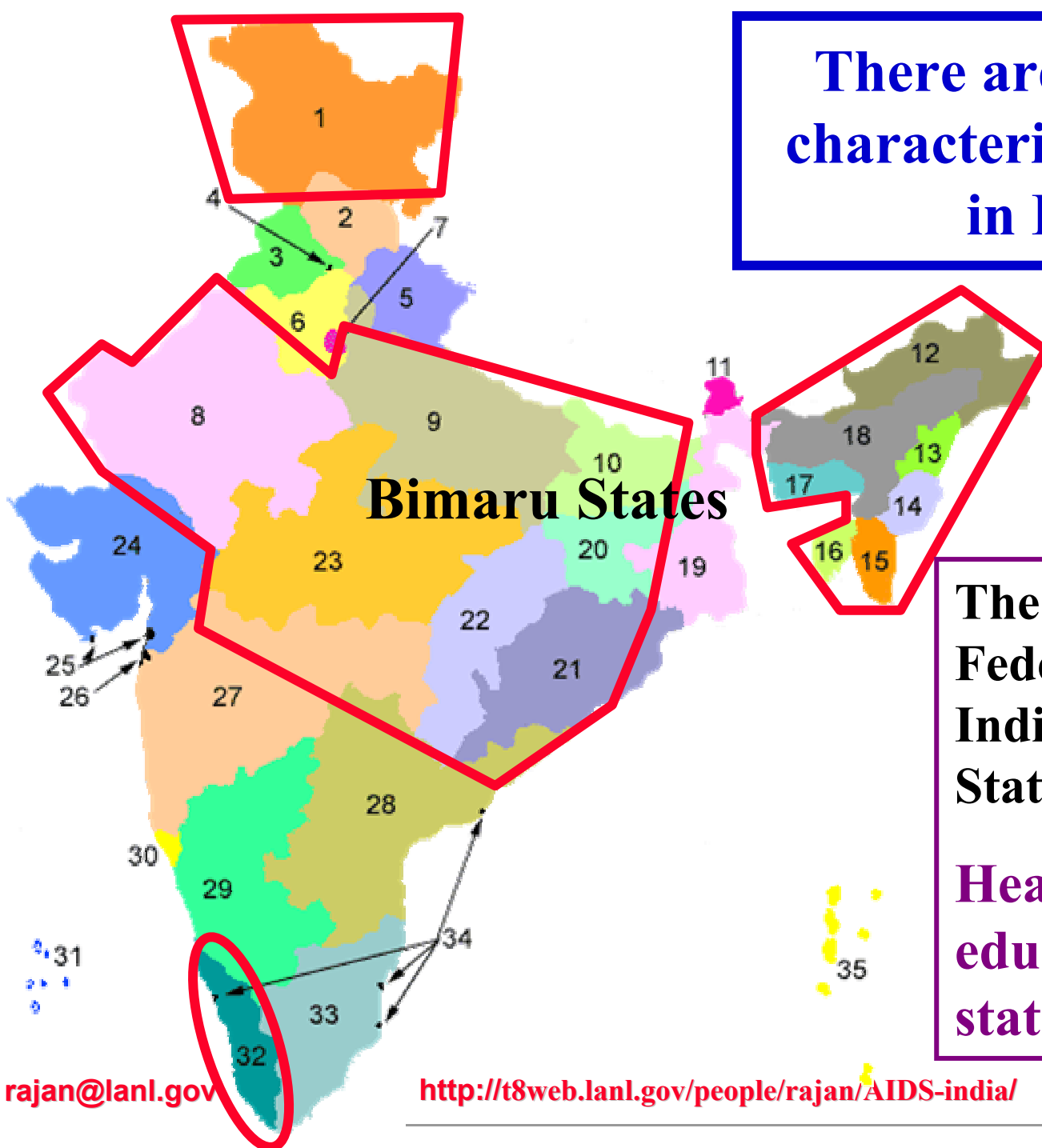
**Can India provide adequate resources
to 1.1 billion people?**

India: Political Landscape

- Few national parties (Congress, BJP, Janta Dal)
many regional parties
- Coalition governments: national+regional parties
- Caste, communal, religious card played often
- ❖ Many politicians have criminal records
- ❖ Corruption has become “normal”—a way of life
- ❖ Inflated, inefficient, corrupt bureaucracy

❖ *Rich muddle through; Poor are devastated*

**There are at least 7
characteristic regions
in India**



**The world sees the
Federal Govt –
Indians see the
State Government**

**Health Care and
education are
state subjects**

Demographics and Population Growth

**Population growth can be checked
if modern means are provided**

Projected population growth (PRB)

| | 2005 | 2025 | 2050 |
|----------------------------|-------------|-------------|-------------|
| N. America | 329 | 386 | 457 |
| C.A.& Caribbean | 186 | 235 | 269 |
| S. America | 373 | 467 | 536 |
| Europe | 730 | 716 | 660 |
| Oceania | 33 | 41 | 46 |
| Africa | 906 | 1350 | 1970 |
| Asia (-China) | 2617 | 3283 | 3888 |
| China | 1304 | 1476 | 1437 |
| India | 1104 | 1363 | 1628 |

Vulnerable population under 15

| Region | Population (Millions) | Population under 15 (million) | Vulnerable Pop. under 15 (million) |
|-----------------|-----------------------|-------------------------------|------------------------------------|
| Africa | 861 | 362 (42%) | ~290 (80%) |
| Cent. America | 144 | 50 (35%) | ~25 (50%) |
| South America | 358 | 111 (31%) | ~50 (45%) |
| West Asia | 204 | 73 (36%) | ~30 (40%) |
| S&C Asia | 1563 | 580 (37%) | ~350 (60%) |
| South East Asia | 544 | 180 (31%) | ~90 (50%) |
| East Asia | 1519 | 334 (22%) | ~110 (33%) |
| East Europe | 301 | 54 (18%) | ~11 (20%) |

Source: Population data are from Population Reference Bureau 2003
rajan@lanl.gov <http://t8web.lanl.gov/people/rajan/AIDS-india/>

HIV, Poor, India

Of the 3 billion living on less than \$2 (PPP) per day, about a billion are children below age 15 who

- live amidst violence and poverty
- have little or no family supervision
- are not part of the knowledge society
- will not have access to higher education
- lack distinction between right and wrong
- are vulnerable to diseases and poor health



Who will provide them hope and what will keep them from becoming destructive?

India: key statistics

- Population (millions): 1104 (2005); 1363 (2025); 1628 (2050)
- Population increase: (25-9 \approx 16) million per year
- Population below 15 years old: 36% \approx 400 million
- Rural population: 72% \approx 800 million

- Births by attendants: 43%
- IMR: 56/1000 live births (CIA, 2005)
- TFR: 3.4 (low 20%) 2.6 (mid 20%) 1.8 (top 20%)

- Vaccinated: 21% (low 20%) 41% (mid 20%) 64% (top 20%)

- Most used birth control: Female Sterilization

CAMPAIGN: Reproductive Health & Family Planning

Every man and women should have easy and free access to modern family planning and disease prevention methods (pill, IDU, condom, vaccines, ...)

Global Fund: Free "pills" and condoms. <\$15B per year

India: Health Care

- Central Budget (MOHFW) → INR 22+53 B ~ \$2 billion
 - ARV + care for 5 million HIV+ would require \$2 billion
- 75-80% of medical expenses are out of pocket
- *Generic (low cost) medicines are essential*
- Rural India served by about 22,000 Primary Health Care (PHC) centers. Most are dysfunctional
- Malnutrition in children ~ 43%
- Mental health: Essentially unknown
- Growing emphasis on research

Health tourism is a growth industry

India: Education (~4% of GDP)

- 24-25 million children born each year
- About 8 million clear 8th grade (33%)
- About 4 million clear 12th grade (17%)
- Quality
 - ~ 0.5 million sit for college entrance exams
 - About 25,000 get education of international quality in science, engineering, medicine
 - Another 40,000 graduate from foreign universities
- Most State run universities are failing
- Investment in centers and research institutes

Only 60/350 million kids (1990-2005) got high school degrees

Health and Education

- **Don't have enough doctors (500K), nurses (750K), or trained paramedics**
- **Don't have enough good teachers. Teaching is becoming less and less rewarding**
- **Good teachers, doctors, nurses can migrate to wherever they want. Who will serve rural communities? And how?**
- **Good health care and schools are fast reaching international costs**

Poor remain vulnerable to HIV/AIDS, TB, Malaria, Hepatitis, ...

Business Landscape

- A new breed of talented, confident, cocky entrepreneurs (post 2002)
 - Very global in outlook and willing to compete at all levels
 - Creating their own infrastructure (electricity, water) decoupled from public works
- India offers better opportunities for small businesses than China

3 Indias: Progressive, “Bimaru”, unstable states

Information Technology

PBS 1-800-INDIA



350,000 IT workers have put India on the Map

Exports (\$76 billion in 2004)

- Agricultural products
 - Textiles and Garments
- } ~ 20%
- Precious and semi-precious stones: \$11 billion
 - Pharmaceuticals: Generic drugs: \$3 billion
 - Chemicals
 - Engineering goods: \$18B (~15%↑ in 2005)
 - Automobile parts
 - Software and IT services: \$18B (34%↑)
 - Diaspora: 25 million → \$21.7B remittances

Financial Situation

- GDP \$692B (\$3363B PPP) (2004)
- Growth 6-7% over the last decade
- Revenues \$67B expenditures \$104B
- Exports \$76B Imports \$97B (WTO, 2004)
- Foreign Exchange Reserves ~ \$137B
- External debt is large – \$125 billion (2005)
- “Bimaru” states are in financial trouble
- Government debt, including borrowings by provincial governments, is 81 percent of GDP

Needs second round of structural changes

Rural India

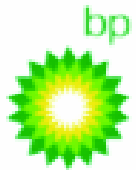
- About 650,000 villages – 750 million people
- 80% agricultural
- 1st Slogan: Roti, Kapra, Makan
 - (Food, Clothes, Shelter)
- 2nd Slogan: Sadhan, Bijli, Pani
 - (livelihood, electricity, water)

Needs transition strategy as agriculture becomes a business competing in a global economy.

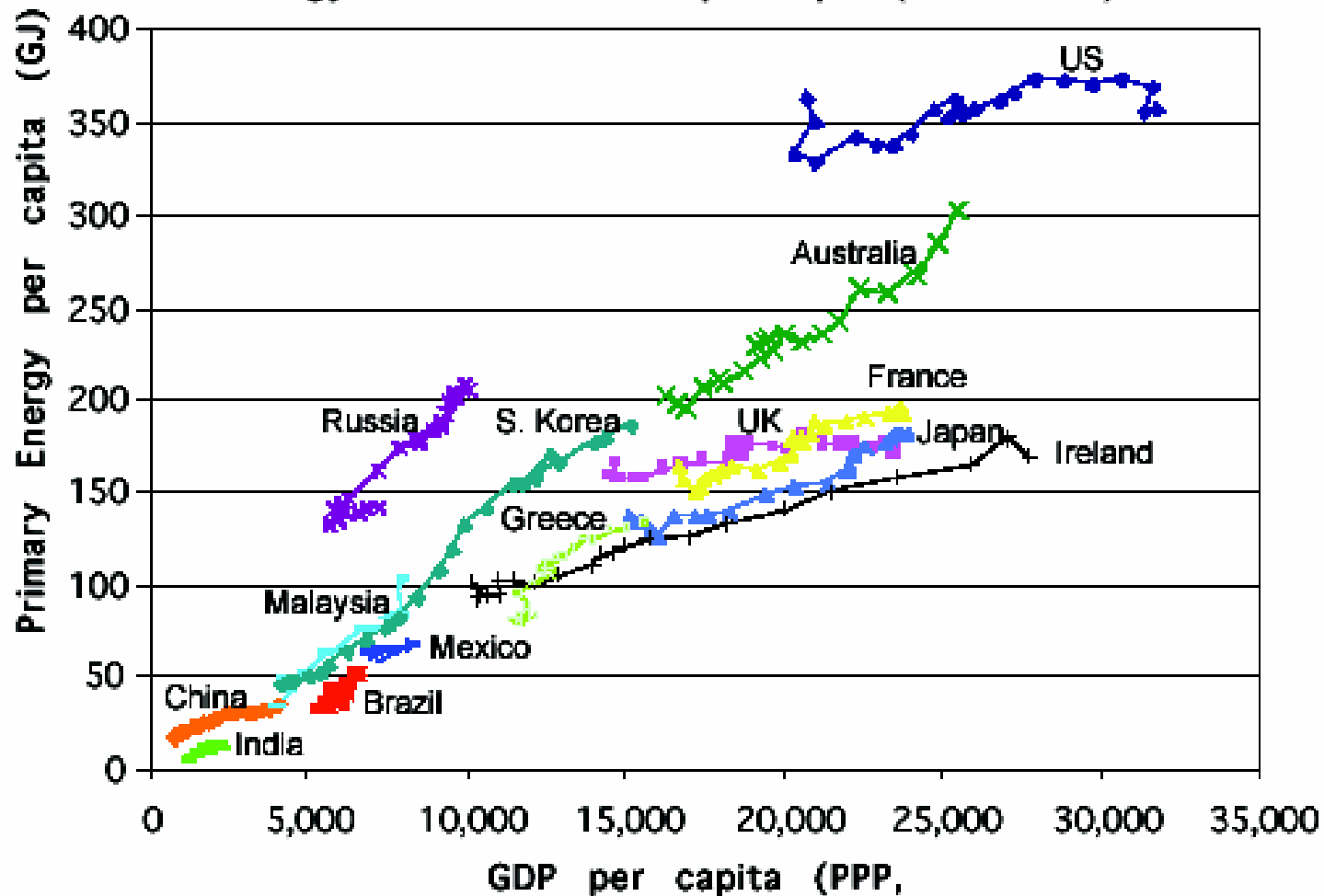
India: Energy a choke point

- In 2004 India consumed 2.4 M barrels a day
- Growth in demand $\sim 4\%$ per year
- Oil and gas reserves are small
- Importing 1.6 M barrels a day
 - Cost at \$60/barrel = \$35 billion
 - Consumes 47% of export earnings of \$74 billion
- Growth in use of coal will require strict pollution controls.

Energy use grows with economic development



energy demand and GDP per capita (1980-2002)



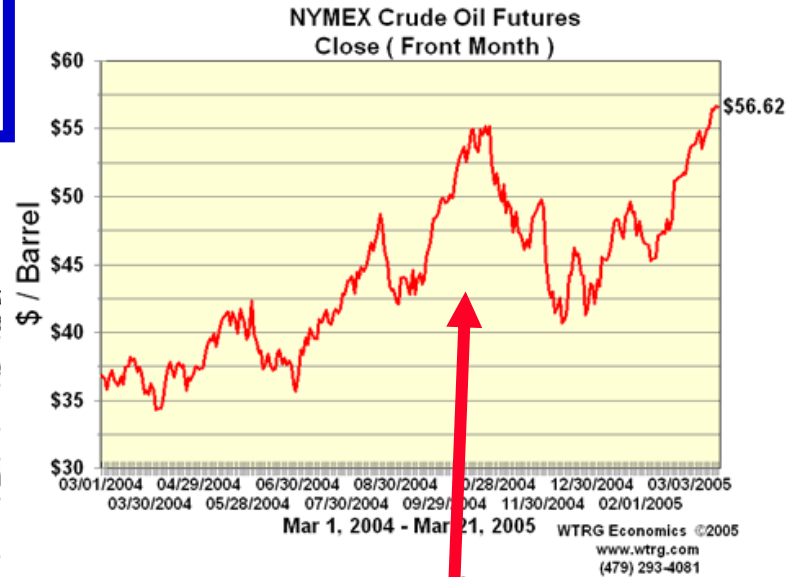
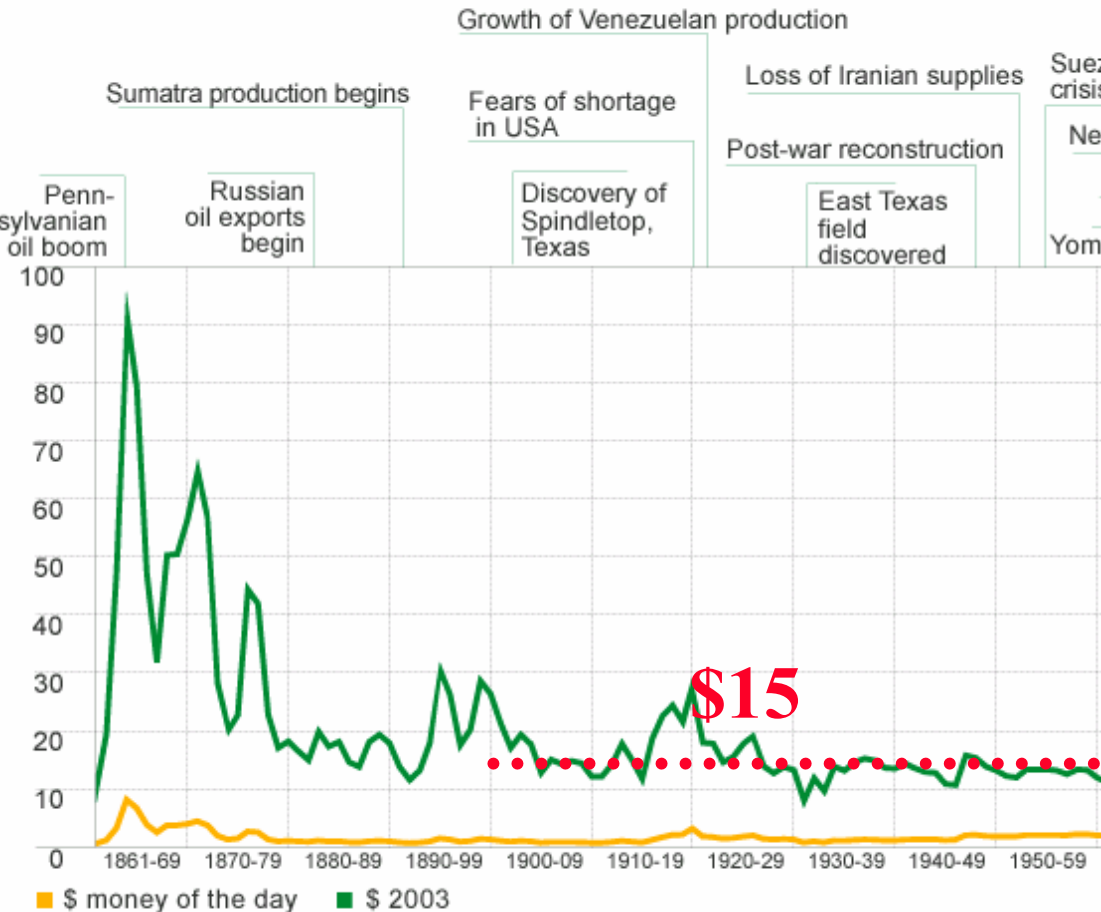
Source: UN and DOE EIA

ENERGY: Need cheap, clean, copious supply!

Peak oil → decline in supply
 ?? are alternatives in place??

US dollars per barrel

World events



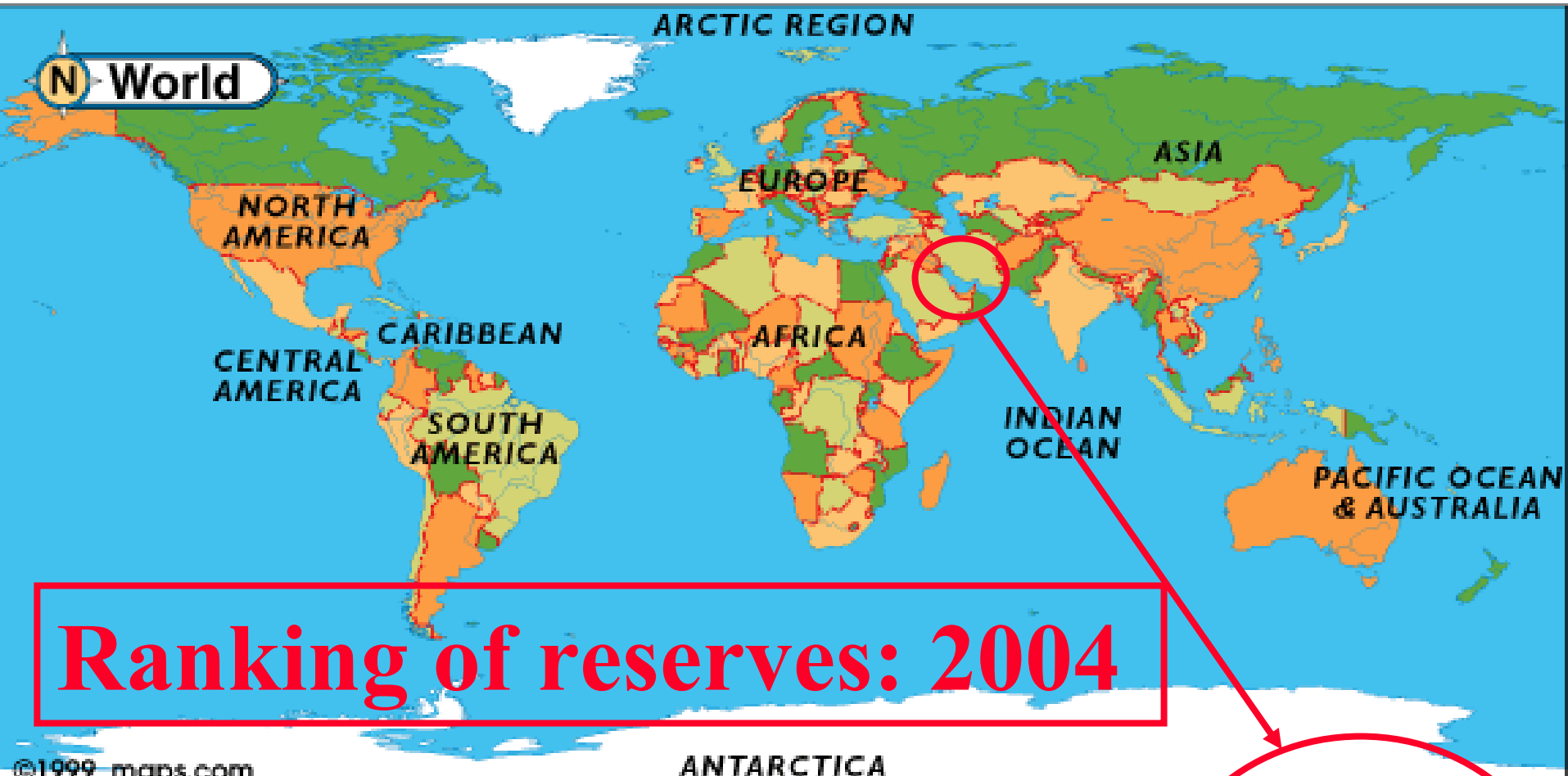
BP 2004

1861-1944 US average.
 1945-1983 Arabian Light posted at Ras Tanura, India
 1984-2003 Brent dated.

\$60?

\$30

\$15



Ranking of reserves: 2004

©1999 maps.com

USA 12,6,1

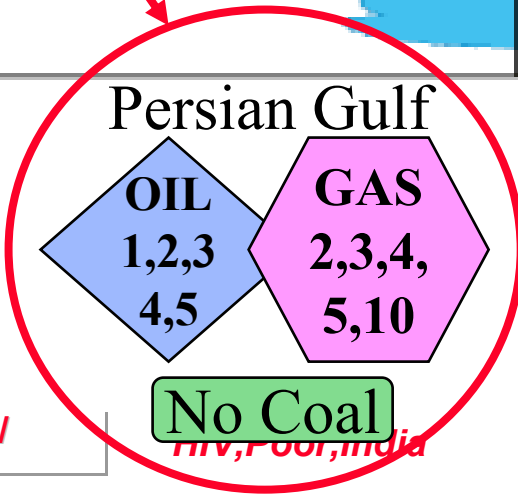
China 11,-,3

EU -, -, 6

Russia 8,1,2

India -, -, 4

AT -, -, -



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THV, P. 001, India



Fast forward to 2020

USA -, -, 1

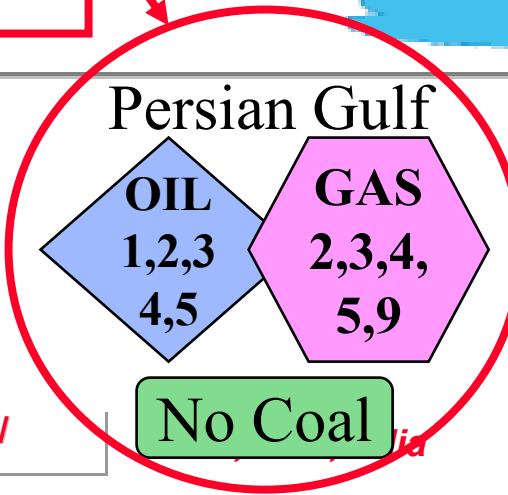
China -, -, 3

EU -, -, 6

Russia -, 1, 2

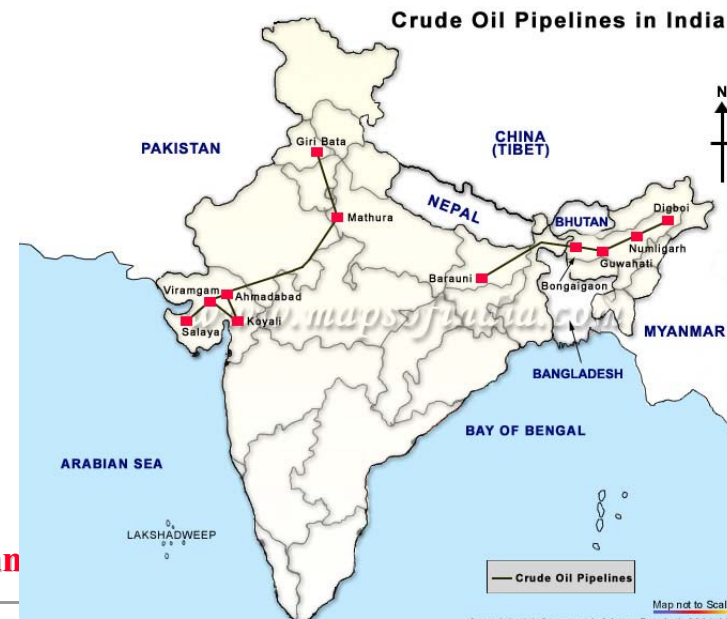
India -, -, 4

AT -, -, -



Energy Priorities

- Develop Iran, Pakistan, India gas pipeline (USA wants to isolate Iran)
- Develop refinery capacity for ME oil (happening)
- Promote renewables (wind, solar, biomass, small hydro) and distributed generation
- Develop nuclear power with advanced fuel cycle (Thorium)

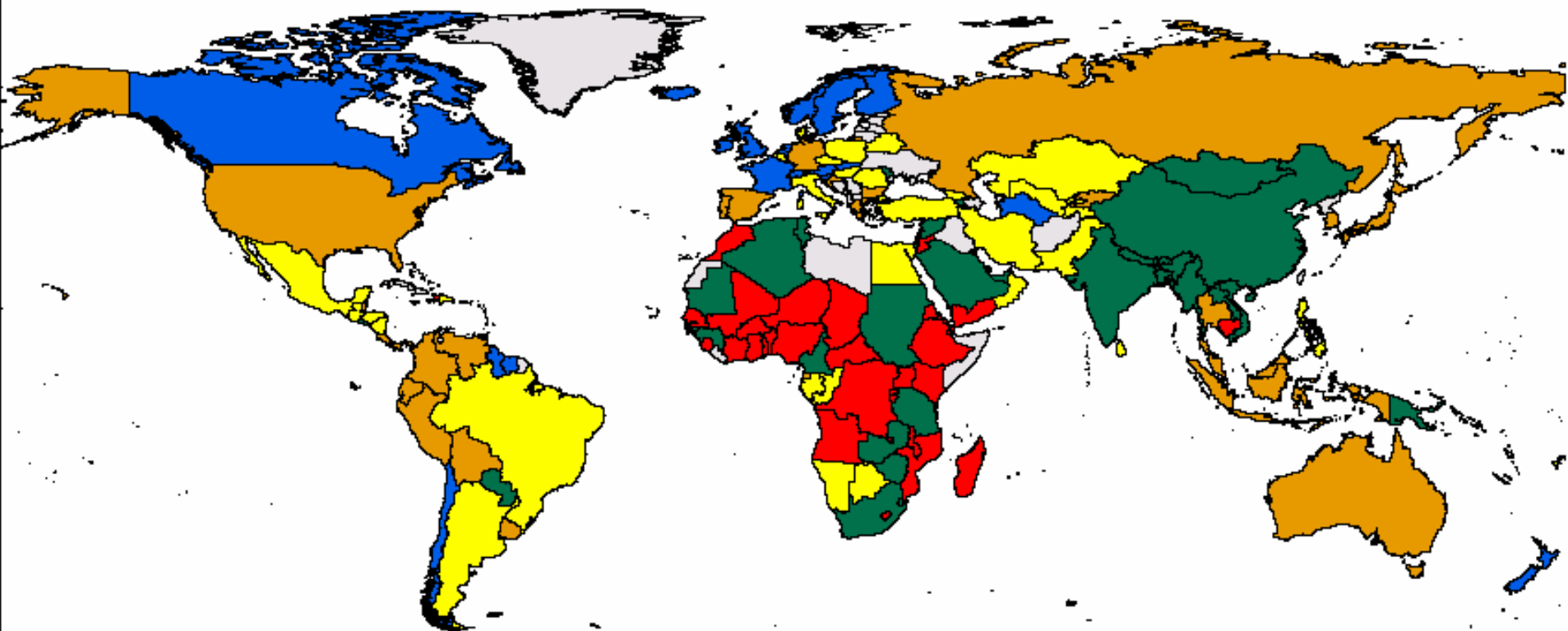


**Water
Soil
Environment**

A hidden crisis

Water Poverty Index (WPI)

The information illustrated here represents results of work in progress and must not be taken as definitive



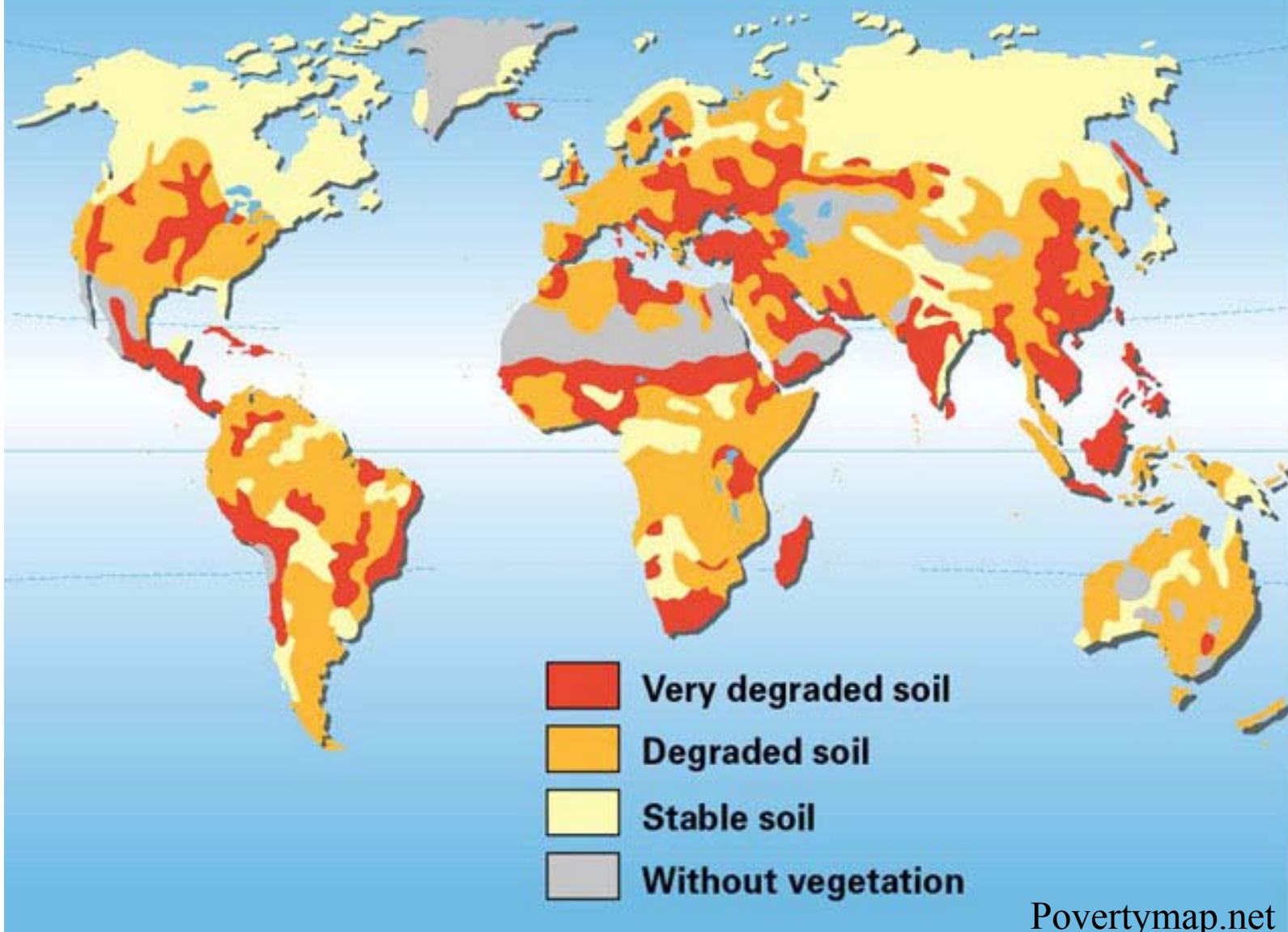
Water Poverty

(The lower the score the bigger the problem)



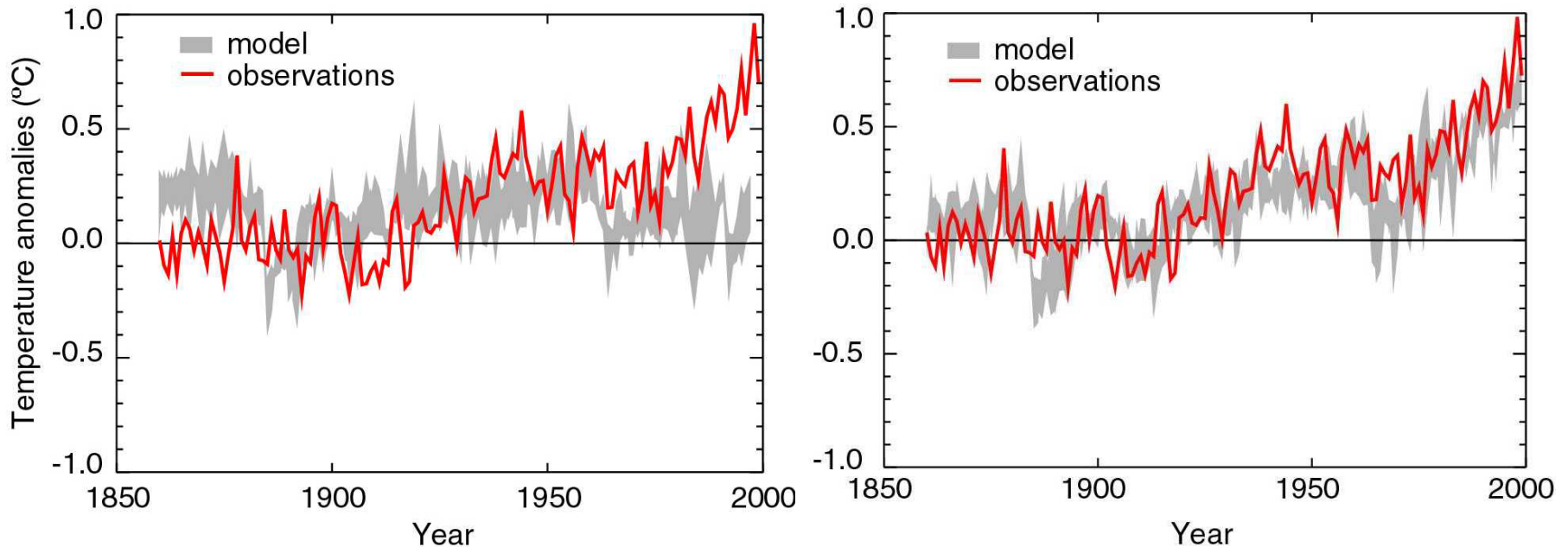
Key to WPI components: R - Resources, A - Access, C - Capacity, U - Use, E - Environment

Soil degradation



Povertymap.net

Climate change will impact the poor the most



“Simulations of the response to natural forcings alone ... do not explain the warming in the second half of the century”

Stott et al, Science 2000

“..model estimates that take into account both greenhouse gases and sulphate aerosols are consistent with observations over this*period” - IPCC 2001

India faces severe challenges

- Falling groundwater tables
- Air and water pollution
 - Pesticides, fertilizers, industrial and domestic waste in water
 - Crowded, polluted cities
- Deforestation, loss of ecosystems
- Increasing salinity of soil in irrigated areas
- Overuse of soil – depletion of nutrients
- Growth of cities without adequate resources or infrastructure

NEEDS

Thresholds are increasing rapidly

- Nurturing children fit for the 21st century takes very significant investment in time & money
 - Health care and nutrition
 - Education
 - Stable home environment (emotional health)
 - Healthy leisure time activities
- Infrastructure → job creation
- Access to energy and potable water

Poor cannot cross them without significant help

**GOAL: Providing each person
with a full complement of
childhood immunizations,
health care, adequate daily
food, and good education**

Deploy enabling Technologies

- **Medicines and vaccines**
 - **Global jackpot fund for essential medicines and vaccines**
- **Cheap, clean, copious sources of energy**
- **Quantity and quality of water**

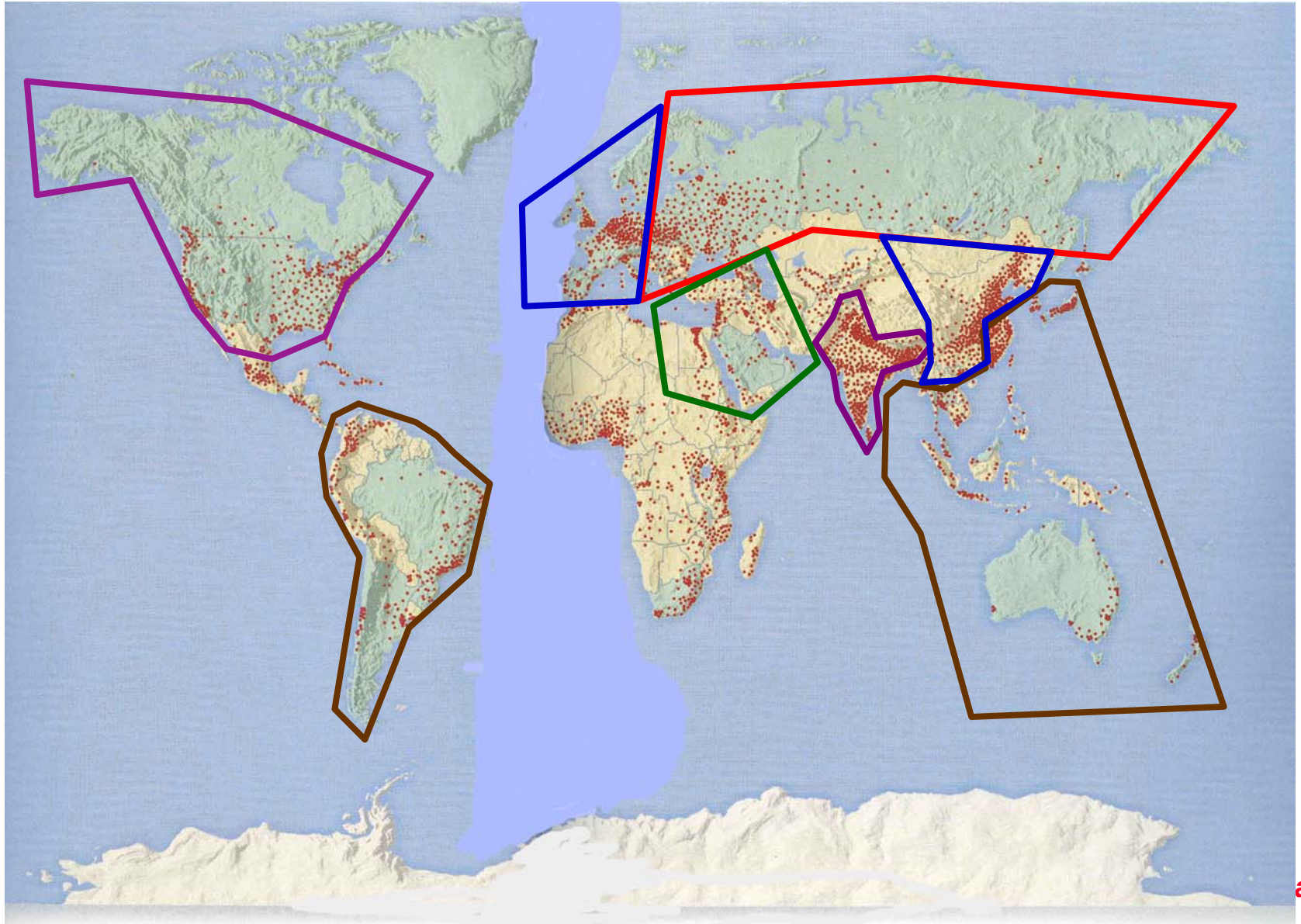
Migration and Reinvestment

- **Migration has created a global Indian community**
- **This community has skills, capital, entrepreneurship**
- **Many are keen to help**
- **Need to figure out a way to also engage them outside of IT (in poverty reduction)**
- **Help develop local leadership**

The number of good NGOs make India a hopeful case!

Scenario Under Business-as-Usual

Eight Economic Zones of about 400M “global” people



The more we ignore the
needs of the poor and
marginalized, the more
we empower the
despots, the sharks
and the barracudas!

Impediments to development: Sharks and Barracudas come in many guises

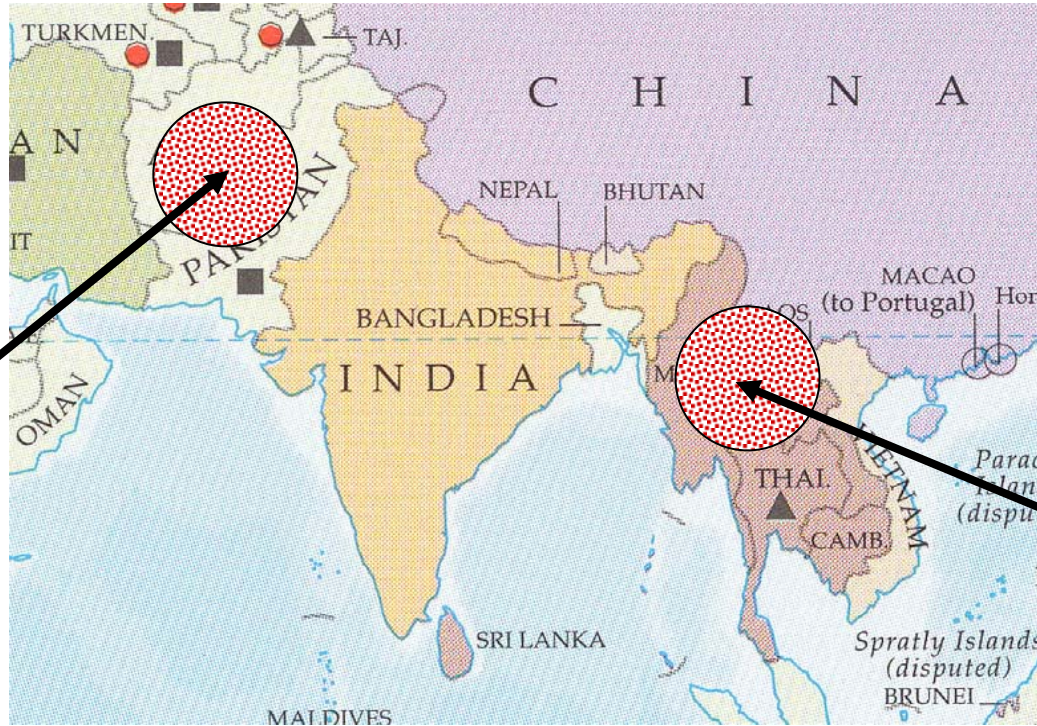
- **Despotic, corrupt governments**
- **National and transnational criminals**
- **Fanatics and terrorists**
- **Exploitative multinationals**

Confront criminal organization and rogue economies

- **Alcohol** (*major impediment to development*)
- **Tobacco**
- **Drugs**
- **Weapons**
- **Money laundering**
- **Corporate/government corruption**
- **Illegal trade in resources**

HEROIN THREAT


The golden
crescent
(~90%)



The golden
triangle
(~5%)

**India will increasingly be targeted
by drug cartels as prosperity grows**

In the absence of healthy leisure time activities people gravitate towards

- Shallow television
 - Gambling
 - Alcohol and drugs
 - Risky sex → HIV/AIDS
- 

Need education and meaningful jobs

Campaign: Ban international trade in cigarettes

- **Recognized health hazard**
- **Growth in smoking predominately in developing countries**
- **Advertisements target the youth**
- **Savings in health care costs will offset profit**
- **Moral victory for developed nations**

Conclusion

500 million Indians need health care, education, job skills, energy and potable water to develop