



Sustainable Development: Theory & Policy

Week 5

Driving Mechanisms & Cognitive Factors

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1. Theoretical Reminders





Discussion of Dimensions Master Variables

Population

Resources

Technology



5.2 Population Dynamics

Lowest Common
Denominator



Population

Activities & Conditions

Population Variables

- Size
- Composition
- Distribution
- Changes in Size, Composition or Distribution

Sustainability Problems

Social & Resource Constraints Relative to Demand

Gender and Age Specific Problems

- Structure of Distribution
- Type of Goods
- Gender Inequality
- Aging

Scientific & Technological Solutions

Fertility

Health Services

- Population Awareness Programs
- Fertility Control
- Technical
- Organization
- Orientation/Target Group

Social Economic, Political & Regulatory Solutions

Education

Improvement of Women's Opportunities and Skills

Age-Specific Support Programs

Safety Nets

- Type of Education
- Level of Education
- Public Awareness Campaigns
- Legal Status
- Job Opportunities
- Skill Improvement
- Empowerment Groups
- Elderly
- Children
- Low-Cost Health, Housing, Other Services
- Food Aid
- Income Redistribution System



Conventional vs. Emergent View

The problem is population growth

- rapid population growth (in developing regions) is the main source of strain- therefore we must bring the rates of fertility down
- the goal is to stabilize population (which meant to reduce fertility first of all)
- emergence of concerted population management policies
- politicization of population and of policies

The problem is the slowing of population

- questioning the built in positive feedback – driver – of demographic variables
- what does it mean that populations cease to growth
- whose? How? © 2003 Nazli Choucri- MIT

Consumption

Activities & Conditions

Consumption

Sustainability Problems

Resource Use & Depletion

Scarcity of Goods and Services
Livelihood & Production

Waste Accumulation

Forms of Waste
Type of Waste

Scientific & Technological Solutions

Waste Management & Minimization

Treatment of Waste
Waste Collection
Waste Minimization Behavior

Improving the Production Process

Social Economic, Political & Regulatory Solutions

Improved Conduct of Collective Action

Reduce Excess Consumption
Reduce Luxury Consumption
Purchase Multi-Purpose Goods
Purchase Goods that Require Less Input in Use
Substitution to Environmentally Sustainable Goods and Services
Maintenance

Effective & Civic Feedback

Market System
Regulations
Value Changes

Urbanization

Activities & Conditions

Urbanization

Sustainability Problems

Poverty Expansion

Social Stress

Urban Pollution & Natural Resource Shortages

Spatial Dynamics

Scientific & Technological Solutions

Solve High Density Problem/
Improve Urban Infrastructure

Density Management Strategies

Social Economic, Political & Regulatory Solutions

Waste Management

Urban Services

Strengthening Urban Communities

Expand Rural Services

Poverty "Imported" from Other Poor Areas through Immigration to Cities
Poverty Endogeneously Created in the City

Congestion
Marginalization
Mass Political Upheaval Potential
Conflict Due to Relative Deprivations

Pollution
Health Effects
Resource Constraints
Obstacles to Access Resources

Cities and Megacities
Encroachment on Non-Urban Areas

Type of Infrastructure
Targeted Areas

Intermediate City Development
Rural Infrastructure
Enlarging City
Urban Agriculture

City Planning and Management
Police Force/Law Enforcement
Health Services
Education
Functioning Market/Retail System
Others

Community Centers
Religious Organizations
Group Specific Activity Groups

Unmet Basic Needs

Activities & Conditions

Unmet Basic Needs

Sustainability Problems

Poor Quality of Life

Malnutrition

Health Hazards

Environmental Degradation

Scientific & Technological Solutions

Access to Technology & Infrastructure

Entrepreneurial Opportunities

Food Security

Social Economic, Political & Regulatory Solutions

Poverty Alleviation Assistance

Enhanced Capacity Building

Improved Health & Environment Conditions

Responsive Legal Systems

- Insufficient Personal Material Goods
- Lack of Healthy & Humane Environment
- Insecurity in Lifestyle
- Disease
- Gender Inequalities
- Income Constraints
- Market Failure/Distribution Failure
- Political Intervention
- Agricultural Failures Due to Annual Fluctuations (Temporary Effects)
- Technical Failures
- Limited Hygienic Measures
- Reduced Immunities
- Waste Management Measure
- Limitations of Laws to Protect Sound Rights

- Type of Technology & Infrastructure
- Scale of Technology
- Reduce Obstacles
- Type of Business
- Type of Support
- Technical Innovations
- Distribution Efficiencies

- Job Creation
- Improved Resource Access & Management
- Empowerment of Women
- Institutions
- Support
- Management Strategies & Mechanisms
- Public Administration & Regulatory Bodies
- Systems & Institutional Structures

- Tax Law
- Tenure Law
- Labor Law
- Property Law
- Business Law
- Informal Regulations

Migration & Dislocation

Activities & Conditions

Migration and Dislocation

- Type of Flow
- Direction of Flows
- Characteristics of Flows
- Status and Benefits

Sustainability Problems

- Stresses Related to Changes in Group Composition
- Changes in Density and Pattern
- Distribution Tensions
- Political Shifts

- Types of Changes
- Effects

Scientific & Technological Solutions

- Responsive Infrastructure Strategies
- Resettlement Strategies

- Losses from Conflict and Violence
- Problems from Wartime Conditions
- Imperialism and Colonialism
- State Building

Social Economic, Political & Regulatory Solutions

- Migration Policies and Strategies
- Safeguards to Human and Natural Habitats
- Migrant Support Programs
- Legal Status

- Political Discourse
- Restrictive, Selective or Open Policies
- Type of Migration Flows Admitted
- Maintain/Attain a Desired Population Distribution
- Designating Places Where People Cannot Live
- Particular Regulations for Vulnerable Areas
- Other
- Integration Support - To Acquire New Culture
- Programs to Protect Sending Culture in Receiving Area
- Enhancing Migrant Capacity

!!



5.3

Resources & Energy





Energy, Resources, & Sustainability – Illustrating Domains & Dimensions

- Energy Uses & Sources
- Forest & Land Use
- Water Use & Sources

Energy Use & Sources

Activities & Conditions

Energy Uses

- Direct Use (fuel wood, direct heat, steam & related)
- Production of Electricity
- Internal Combustion
- Distribution of Transportation

Sustainability Problems

- Depletion of Non-Renewable Resources
- Pollution

- Proven and Estimated Global Reserves
- Air
- Wastes
- Ecological/Ecosystem

Scientific & Technological Solutions

- Alternative Production Technologies
- Efficient Use
- Pollution Control
- Renewable Non-Polluting Resources

- Co-Generation, Improved Efficiency in Generation
- Improved Location and Extraction of Resources
- Generation Choice-Natural Gas, Clean Coal Tech
- Biomass
- Alternative Fuels for Vehicles, Hybrid Electric
- Energy Efficiency
- DSM
- Pre Combustion
- Post Combustion
- Solar
- Wind
- Geothermal
- Hydro
- Tidal
- Fuel Cells
- Hydrogen

Social Economic, Political & Regulatory Solutions

- Market Based Policies
- Direct Regulatory Control
- Government R&D

- Market Driven Changes in End-Use
- Culturally Driven Changes in End-Use
- Command & Control (CAA, CAAA, EPCACT)
- Government Programs (DSM, LIHEAP, eff standards, CAFE)
- Tax Credits for Renewables (PURPA)
- Technology Transfer

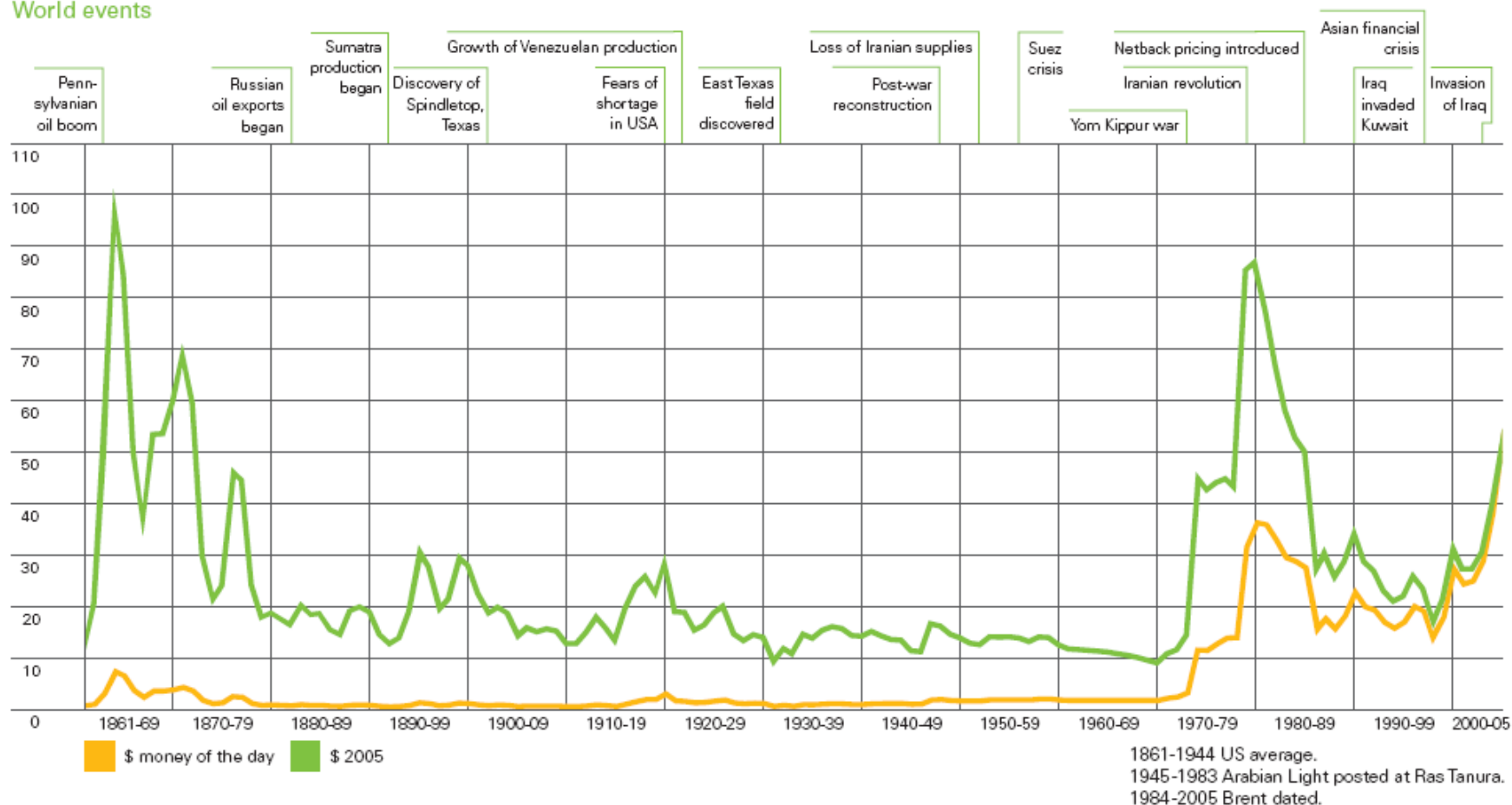


Crude oil prices since 1861

Crude oil prices since 1861

US dollars per barrel

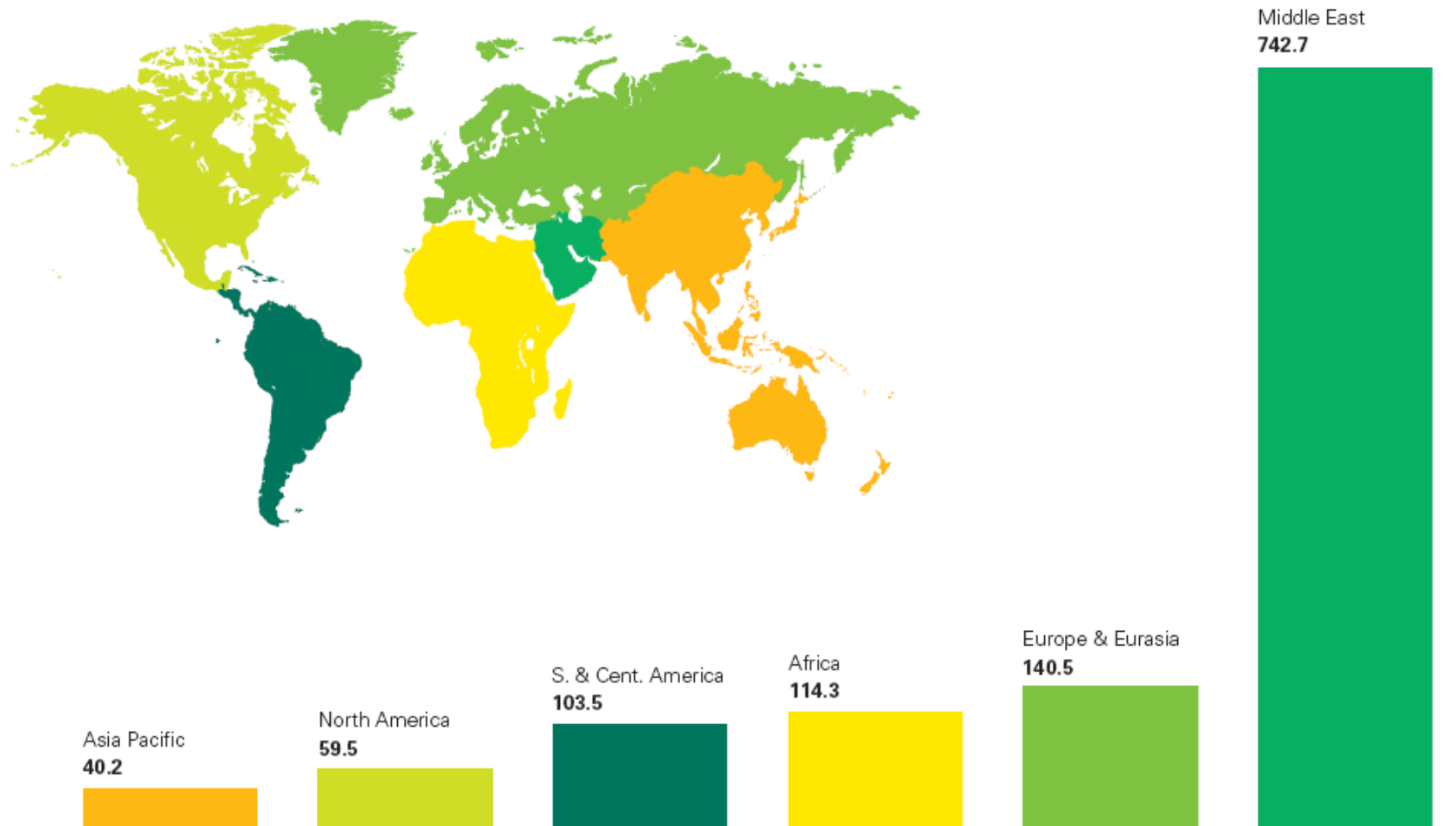
World events





Proved oil reserves at end 2005

Proved reserves at end 2005
Thousand million barrels



Courtesy of BP Statistical Review of World Energy 2006 and <http://www.bp.com/statisticalreview/>



5.4 Technology – Applications of Knowledge and Skills

Material as well as
organizational Skills





The Technology Revolutions

- Phases?
- Materials?
- Functions?
- Products – Processes?

Technology ‘Leapfrogging’

Technology & Sustainability