Safety and Health at Work and Sustainable Development*

Nicholas A. Ashford, PhD., JD
Professor of Technology and Policy
Massachusetts Institute of Technology

Presented at the conference on "Towards a Sustainable Working Life" 29-30 October 2009, Forum on New and Emerging OSH Risks, European Agency for Safety and Health at Work

The Importance of Work and the Workplace

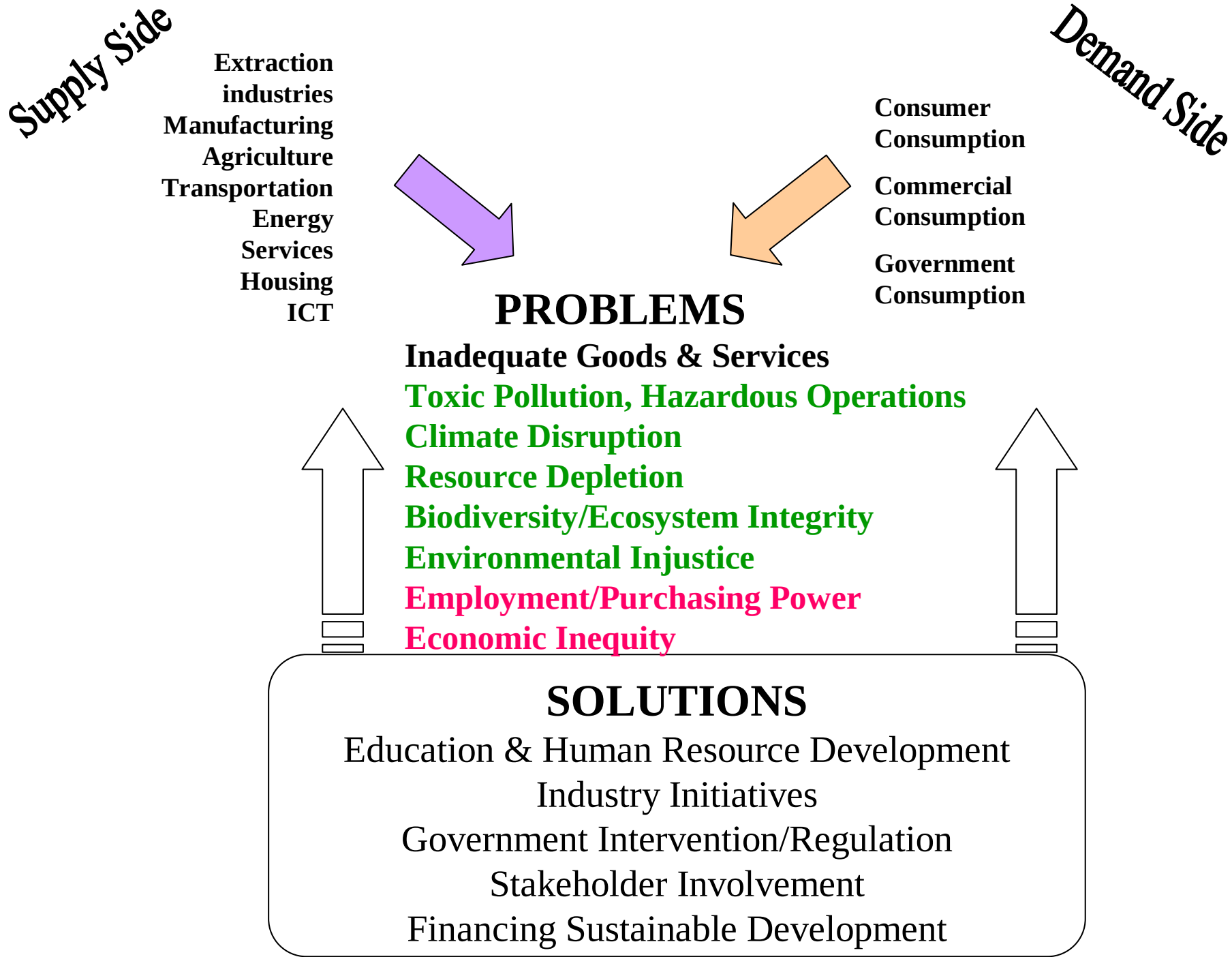
- It is combined with physical and natural capital to produce goods & services
- It is the place where *comparative advantage* is exchanged - i.e., a marketplace
- It provides a *means of engagement* in the society
- It provides an important *social environment* and mechanism for *enhancing self esteem*
- It is the main means of *distributing wealth and creating purchasing power*
- Industrial/economic policy and environmental policy have important consequences for employment and OH&S

The Changing Global Economy Presents Challenges for Labour and Government

- Serious implications for jobs, job security, wages, and OH&S
- Need for integrating concerns of industrial development and financial stability with those of employment, OH&S and the environment
- Need to re-conceptualize the basis of the industrial state within the context of globalization, i.e., to pursue sustainable development

Outline of Today's Discussion

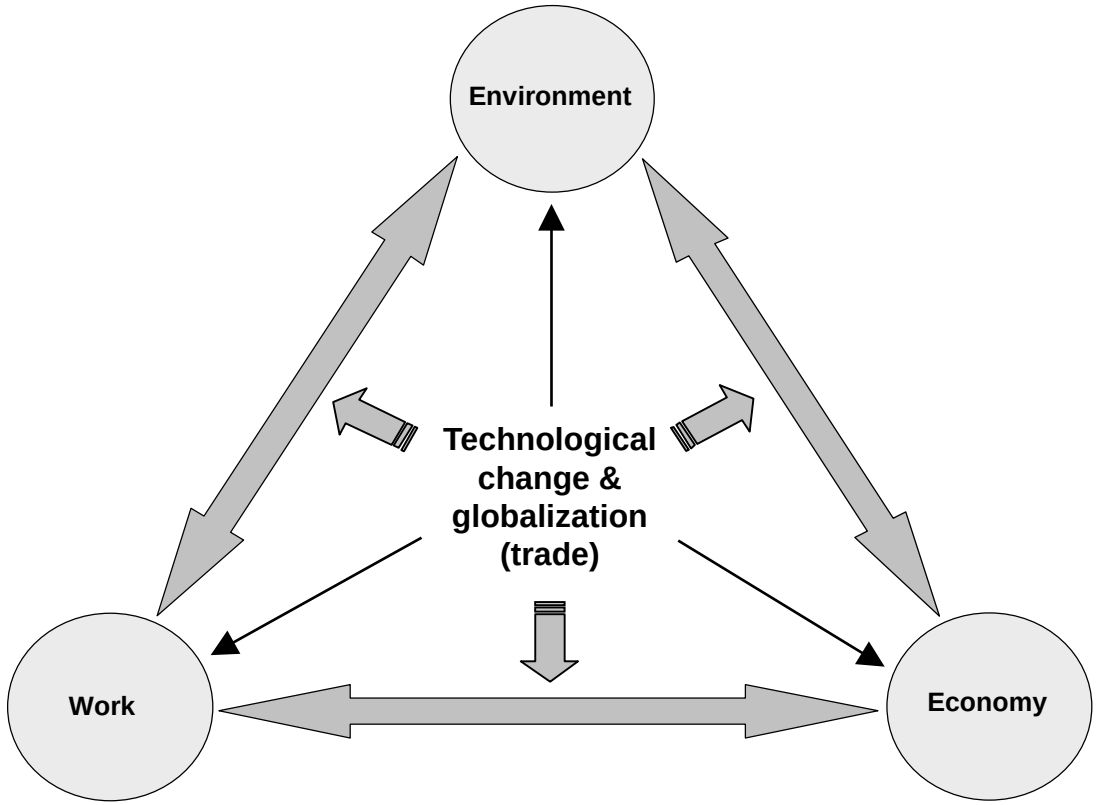
- Sustainable Development
- The economy, environment/health/safety, and employment are all inter-related – and must be addressed together
- The Importance of Technological Innovation
- Evolution of Approaches to Improvements in Health, Safety, and the Environment
- Environmental, health, and safety policies distinguished from sustainable development
- The need to integrate SH&E with productivity improvements through technological innovation
- The role of health, safety, and environmental professionals and others
- The role of national governments


Supply Side
Extraction industries
Manufacturing
Agriculture
Transportation
Energy
Services
Housing
ICT
Demand Side
Consumer Consumption
Commercial Consumption
Government Consumption
PROBLEMS
Inadequate Goods & Services
Toxic Pollution, Hazardous Operations
Climate Disruption
Resource Depletion
Biodiversity/Ecosystem Integrity
Environmental Injustice
Employment/Purchasing Power
Economic Inequity
SOLUTIONS
Education & Human Resource Development
Industry Initiatives
Government Intervention/Regulation
Stakeholder Involvement
Financing Sustainable Development

THE ELEMENTS OF SUSTAINABLE DEVELOPMENT

Development that:

- **is distinguished from growth (Herman Daly)**
- **avoids adverse effects of industrialization on subsequent generations, within, & among nations**
- **provides adequate, safe, and a fair distribution of goods & services, and**
- **a good environment (environmental justice), and**
- **(fair) working conditions/health & safety, and**
- **(fair and meaningful) employment, and**
- **(adequate and fair) purchasing power, and**
- **potential for self reliance, creativity, innovation and participation in society and the economy (i.e., social inclusion), and**
- **good governance**



Technological change and globalization (trade) as drivers of change within and between three operationally-important dimensions of sustainability

EVOLUTION OF APPROACHES TO HEALTH, SAFETY, AND ENVIRONMENTAL PROBLEMS

- **Dispersion of pollution and waste**
  - » ***Trans-boundary pollution; dumping of waste***

- **'End-of-pipe' Pollution Control**
  - » ***Reducing emissions & effluents, collecting wastes, workplace ventilation, protective equipment, safety controls***
  - » ***No fundamental changes in inputs, final products, or production technology***
  - » ***Media shifting: air and water pollution=> waste and workplace exposures***
  - » ***Problem shifting: toxicity => accident potential***

- **Industrial Ecology: waste & material exchange and consolidation**
  - » ***No fundamental changes in inputs, final products, or production technology***
  - » ***Worker hazards and transportation risks***

- **Cleaner and inherently safer technology**
  - » ***Eco-efficiency & energy improvements and fundamental technological changes***

- **System changes and Sustainable Development**

AGENDA	*Competitiveness*	*Environment*	*Employment*
Current	Improve performance Improve efficiency Cut costs	Control pollution Make simple substitutions/changes to products/processes Conserve energy and resources; find new energy sources	Reduce worker hazards Dialogue with workers Ensure supply of adequately trained people

These concerns are usually pursued separately by different ministries, different parts of industry, and different interest groups with little coordination and no integration.

TABLE 1: CHARACTERISTICS OF SELECTED CLEANER PRODUCTION TECHNOLOGIES

TECHNOLOGY	Type	External Pollution/ Waste Status	Worker Health Status	Accident Potential Status	Raw Material Use	Water Use	Energy Efficiency
Rapeseed oil extraction by enzymes	adverse for workers	++	--	+	++	-	--
Flame spray zinc	adverse for workers	+	-	(0,-)	n/a	++	(0,+)
Recovery of sulphated mother liquor	adverse for workers	+	-	--	++	++	(0,+)
Recycling of cyanide water	adverse for workers	++	--	--	++	0	(0,+)
Solvent substitution in paint	missed opportunity	+	0	0	+	0	n/a
Production of casting molds	missed opportunity	++	+	+	+	0	0
Hydrocarbon-based dry cleaning	missed opportunity & adverse for workers	++	0	(0,-)	n/a	-	-
Wood & furniture surface treatment	missed opportunity	+	0	0	+	0	0

Legend: ++ significant improvement; + improvement; 0 no change; - deterioration; -- significant deterioration; n/a not available

Traditional Approaches to Reducing Environmental and Workplace Risks

- Fragmented Standard Setting for Toxic Substances and Hazardous Operations that impose obligations on the employer, manufacturer, and user of chemicals
- Safety and risk management plans
- Health, safety, and environmental concerns are addressed separate from each other and separate from productivity concerns
- Worker and Community Right-to-Know
  - » Traditional focus is on identification of hazards & toxicity
  - » Stakeholders not involved in solutions and technology choices
- The Precautionary Principle

Two Approaches to Health, Safety & Environmental Problems

- Control/treat/restrict inputs, product content, emissions, effluents, waste, etc., otherwise leaving production processes and final products unchanged ~ traditional fragmented environmental and OH&S law

- Institute “an industrial policy for health, safety & environment” involving product and process redesign

- The ‘environment’ must be conceptualized comprehensively to include worker health and safety

AGENDA	Competitiveness	Environment	Employment
Current	Improve performance Improve efficiency Cut costs	Control pollution Make simple substitutions/changes to products/processes Conserve energy and resources; find new energy sources	Reduce worker hazards Dialogue with workers Ensure supply of adequately trained people

AGENDA	Competitiveness	Environment	Employment
Current	Improve performance Improve efficiency Cut costs	Control pollution Make simple substitutions/changes to products/processes Conserve energy and resources; find new energy sources	Reduce worker hazards Dialogue with workers Ensure supply of adequately trained people
Sustainable	Change nature of meeting market needs through radical or disrupting innovation (a systems change)	Prevent pollution through system changes Design safe and environmentally-sound products/processes Decrease resource & energy dependence	Radical improvement in human-technology interface (a systems change) & inherently safe (Also for workers) Create meaningful, and rewarding jobs

INTEGRATING CONCERNS FOR OCCUPATIONAL AND ENVIRONMENTAL HEALTH THROUGH CLEANER & INHERENTLY SAFER TECHNOLOGY

- Focus on Primary Prevention
- Integration of Accident Prevention with Pollution Prevention and Product Safety
- Expanding the concept of design and ‘design space’
- Environmental and OH&S Management Systems are not enough
- Technology Options Analysis, not just Technology/Risk Assessment

TRANSFORMATION PROCESSES

- Sustainable transformation processes go beyond the role and responsibility of just a single government department, e.g., ministries of environment, labour, or economic affairs.

- System changes cut across problem areas: competitiveness, environment, and employment -- and they therefore also cut across sectors and firm divisions, as well as government departments and missions.

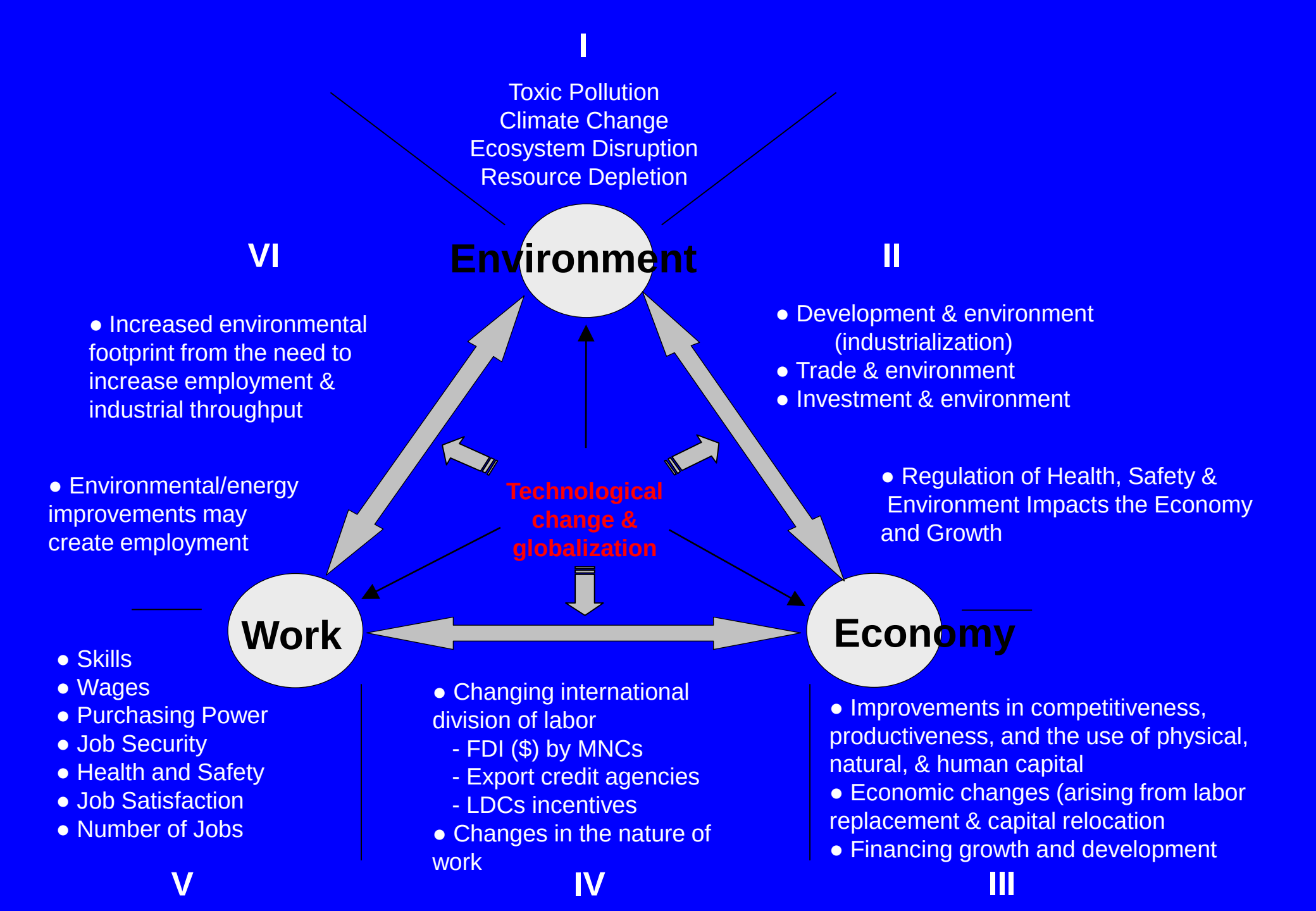
The Role for Health,Safety and Environmental Professionals, Material Scientists, and Industrial & Process Engineers

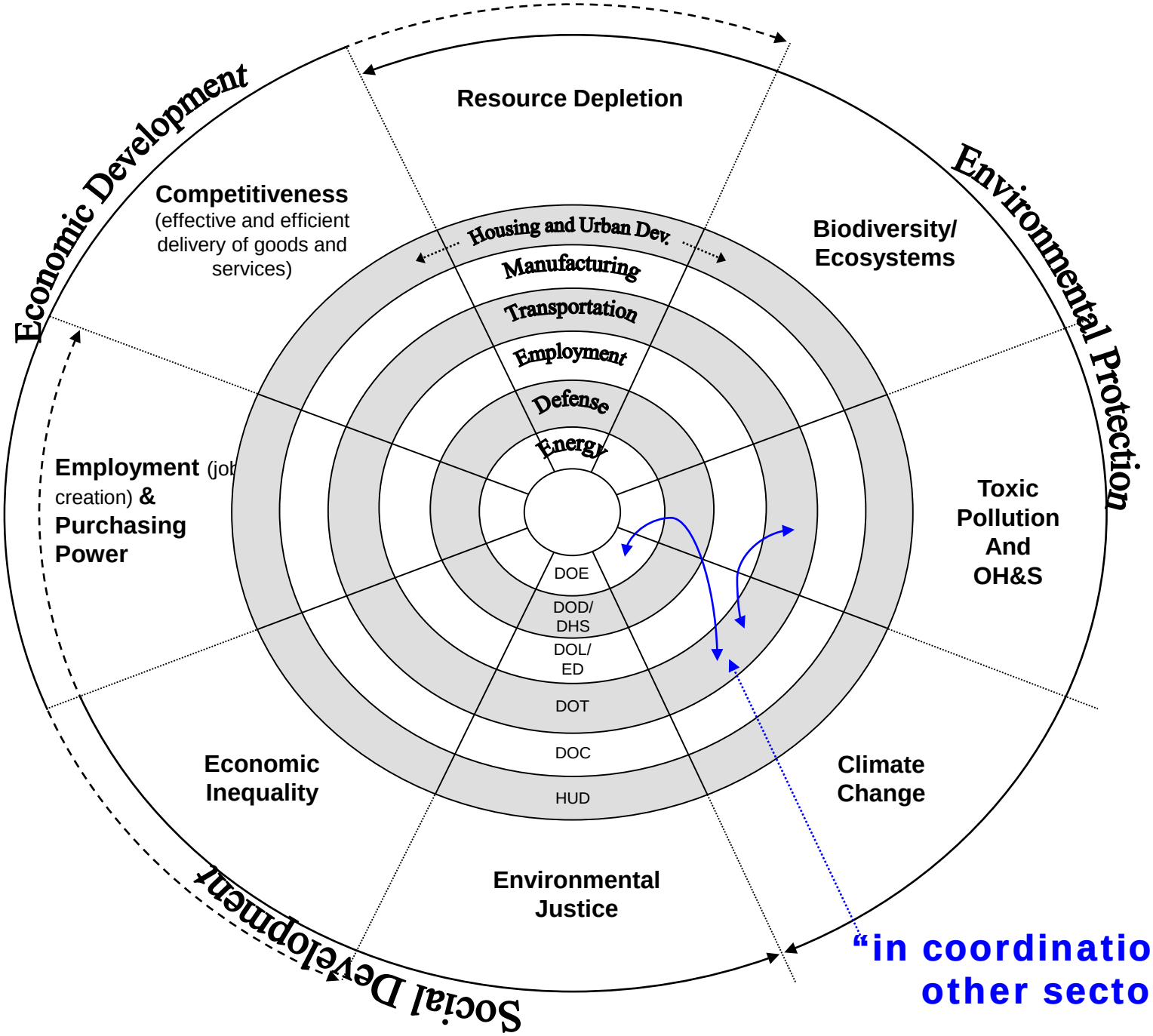
They need to include, but *go beyond simply improving health, safety or environmental (HS&E) characteristics of products and processes and*

- integrate occupational health & safety with environmental concerns and product safety
- involve themselves in fundamental process change incorporating improvements in both functional attributes and in EH&S
- explore the wider concepts of system changes
- contribute to visions for sustainable transformations

Government is Essential for Sustainable Development

- As a supporter of basic education and skills acquisition
- As a provider of physical/legal infrastructure
- To invest in path-breaking science and technology development – for both environmental & workplace improvement and for job design
- As an facilitator or arbitrator of competing interests to ensure a fair process
- As a trustee of worker and citizen interests to ensure a fair outcome
- As a trustee of new technologies & dynamic change
- As a force to integrate, not just coordinate, policies
- To change the basis of development


I
Toxic Pollution
Climate Change
Ecosystem Disruption
Resource Depletion
Environment
VI
● Increased environmental footprint from the need to increase employment & industrial throughput
II
● Development & environment (industrialization)
● Trade & environment
● Investment & environment
● Environmental/energy improvements may create employment
Technological change & globalization
● Regulation of Health, Safety & Environment Impacts the Economy and Growth
Work
Economy
● Skills
● Wages
● Purchasing Power
● Job Security
● Health and Safety
● Job Satisfaction
● Number of Jobs
● Changing international division of labor
- FDI ($) by MNCs
- Export credit agencies
- LDCs incentives
● Changes in the nature of work
● Improvements in competitiveness, productiveness, and the use of physical, natural, & human capital
● Economic changes (arising from labor replacement & capital relocation
● Financing growth and development
V
IV
III


Economic Development
Resource Depletion
Environmental Protection
Competitiveness
(effective and efficient delivery of goods and services)
Biodiversity/
Ecosystems
Housing and Urban Dev.
Manufacturing
Transportation
Employment
Defense
Energy
Employment (job creation) &
Purchasing
Power
Toxic
Pollution
And
OH&S
DOE
DOD/
DHS
DOL/
ED
DOT
DOC
HUD
Economic
Inequality
Climate
Change
Environmental
Justice
Social Development
"in coordination with other sectors"