

**INCORPORATING SUSTAINABLE
DEVELOPMENT IN ALL WE DO**

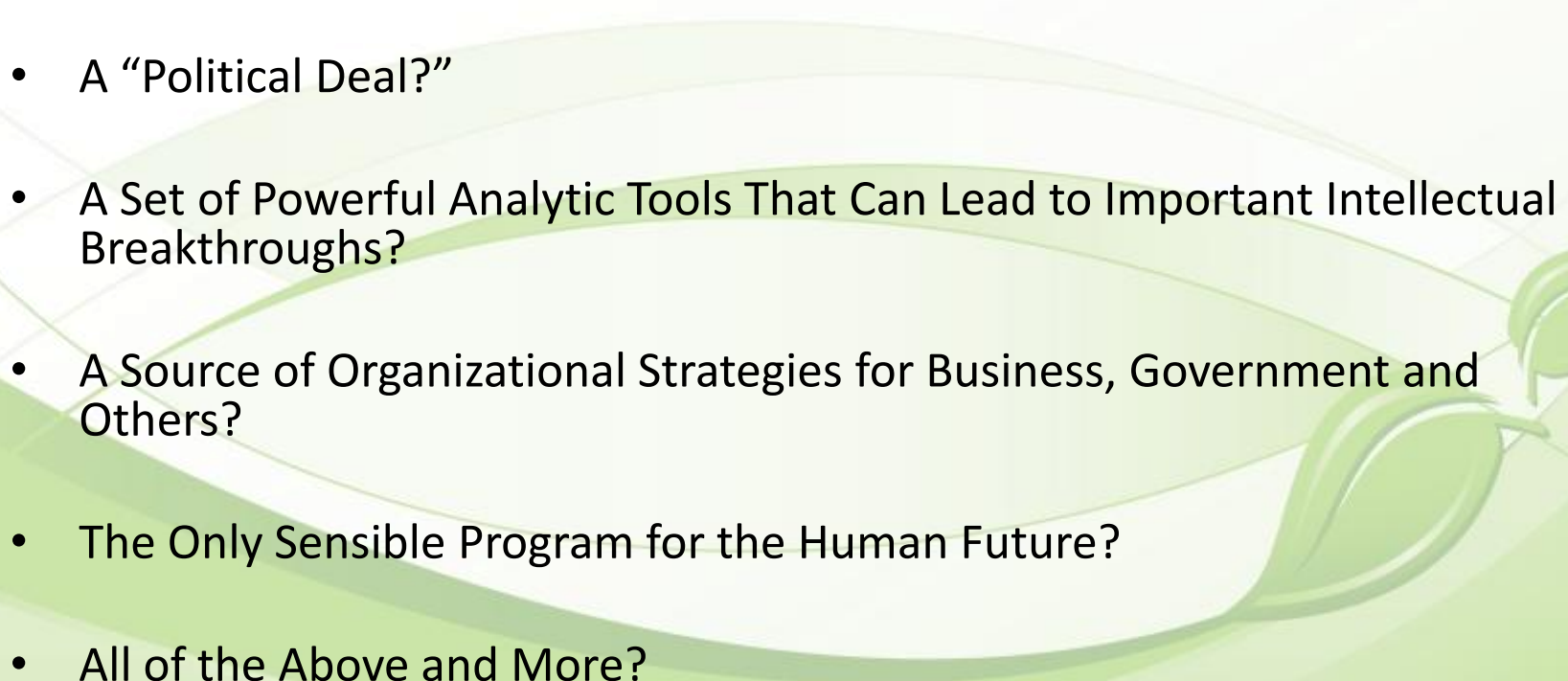
**EDUCATION FOR THE FUTURE OF THE
MINING AND MINERALS SECTOR**

**COLORADO SCHOOL OF MINES, April 27,
2010**

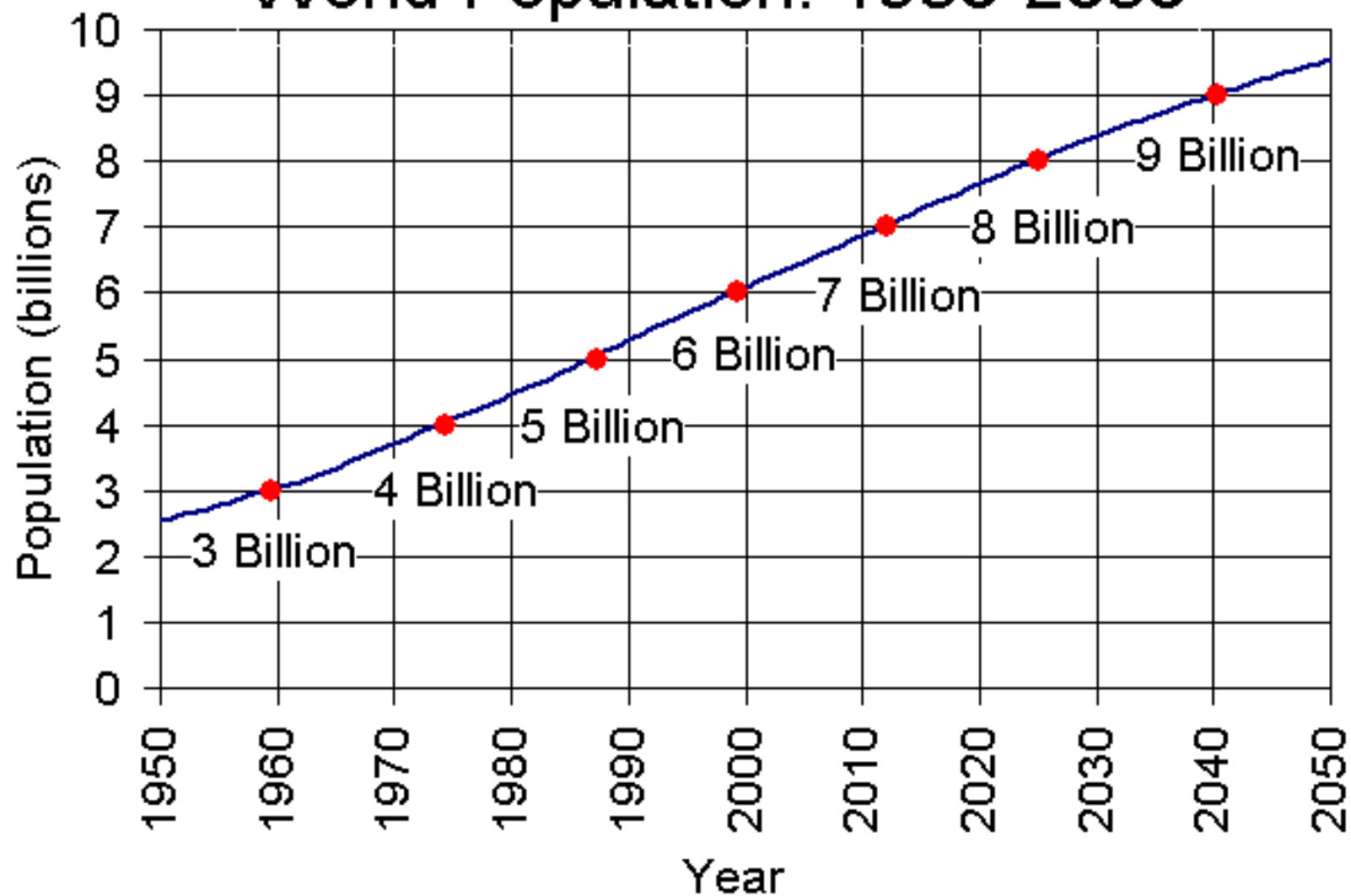
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WHAT IS SUSTAINABLE DEVELOPMENT?

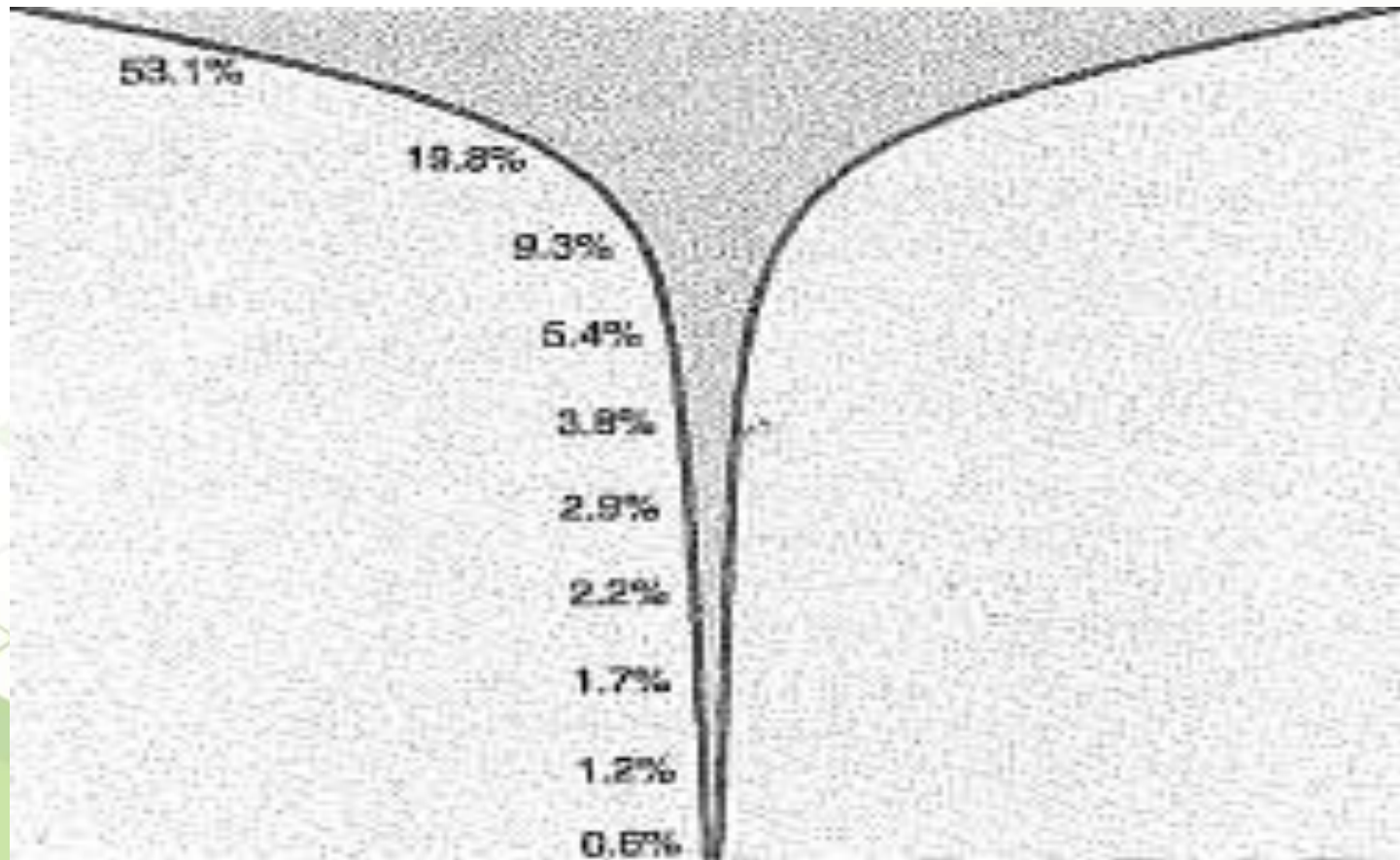
- A Product of a Collision Among Several Very Powerful Imperatives?
 - The Principal Global Program for the Human Future?
 - A “Political Deal?”
 - A Set of Powerful Analytic Tools That Can Lead to Important Intellectual Breakthroughs?
 - A Source of Organizational Strategies for Business, Government and Others?
 - The Only Sensible Program for the Human Future?
 - All of the Above and More?
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World Population: 1950-2050



Source: U.S. Census Bureau, International Data Base, December 2008 Update.

Global Income Distribution



“Trends in Global Income Distribution 1970 – 2000, and Scenarios for 2015,” United Nations Development Programme. Human Development Report Office Occasional Paper (2005).

A PRODUCT OF A COLLISION

- Ending extreme poverty is a moral imperative now that the means to achieve this age old dream are within our grasp. Failing to grasp this opportunity is morally indefensible.

See Jeffrey Sachs, *The End of Poverty* (2005)

- We have critical world problems of environmental stress – changes in ocean chemistry, loss of biological diversity, massive soil loss in agriculture, marine ‘dead zones,’ collapse of commercial fisheries, climate change – that threaten our ability to survive on the only habitable planet we know. If we don’t solve these problems, it won’t matter if we solve any of the rest.

See Herman Daly, *For the Common Good: Redirecting the Economy toward Community, the Environment, and a Sustainable Future* (1994).

- There is a widely shared idea that the more we reduce poverty, the more we stress environmental systems, and the more we protect the environment the more people must be doomed to poverty. **Is this choice necessary?**

PRODUCT OF COLLISION

We cannot end poverty without putting more materials in the hands of the very poor. There is no way out of poverty without electrification and no way to electrify without copper, and no point in producing the copper unless people have livelihoods.

Can we provide more materials, and more livelihoods, with less environmental footprint? **Or do we have to choose?**

TWO INSIGHTS

First Insight: Sustainable development suggests that we cannot solve any of these problems without solving all of them.

Second Insight: It is probably easier to solve them all than to try to solve them in isolation, because *the problems are not independent but related*.

THE PRINCIPAL GLOBAL PROGRAM FOR THE HUMAN FUTURE?

- Is there a shared program for the human future to which there is extremely broad agreement?
- It is sustainable development.
- 153 countries signed Agenda 21 and the Rio Declaration
- The idea of sustainable development is now imbedded in innumerable broadly agreed conventions and treaties, and in many countries (including our own) in national law as well
- *There is no more generally accepted concept around which to organize ourselves.*

A POLITICAL DEAL

- **One Position:** “The ecological crisis is caused by rich consumers in a handful of countries, whose overconsumption is appalling. Indeed, the way they have dealt with the poor countries as they have raced to plunder the Earth’s resources is largely responsible for poverty in the South. There is no reason poor people should lift a finger to deal with these problems, unless the moral imperative of poverty is addressed first.”
- **Another Position:** “People in the poor countries simply refuse to stop having children, or to protect the rainforest, or the few surviving pockets of wildlife habitat in their countries. They will not act to curb overfishing, illegal logging, or trade in endangered species. If we leave it up to them, the whole world will become a nightmare like Mexico City, Sao Paolo, or Jakarta. We have to act to solve the global ecological crisis whether the poor countries like it or not, and over their opposition if necessary.”
- **One solution:** *“And Samson said, “Let me die with the Philistines.” Then he bowed with all his might; and the house fell upon the lords and upon all the people that were in it. So the dead whom he slew at his death were more than those whom he had slain during his life.”*
~Judges 16:30
- **Another solution:** Sustainable development: a devastated environment can’t support us; a population in desperate poverty cannot protect the environment. **So we make a deal.**

A SET OF POWERFUL ANALYTIC TOOLS THAT CAN LEAD TO IMPORTANT INTELLECTUAL BREAKTHROUGHS

"Sustainable development is the only intellectually coherent, sufficiently inclusive, potentially mind-changing concept that gets even half-way close to capturing the true nature and urgency of the challenge that now confronts the world. There really is no alternative."

~Jonathon Porritt

A Source of Organizational Strategies for Business, Government and Others

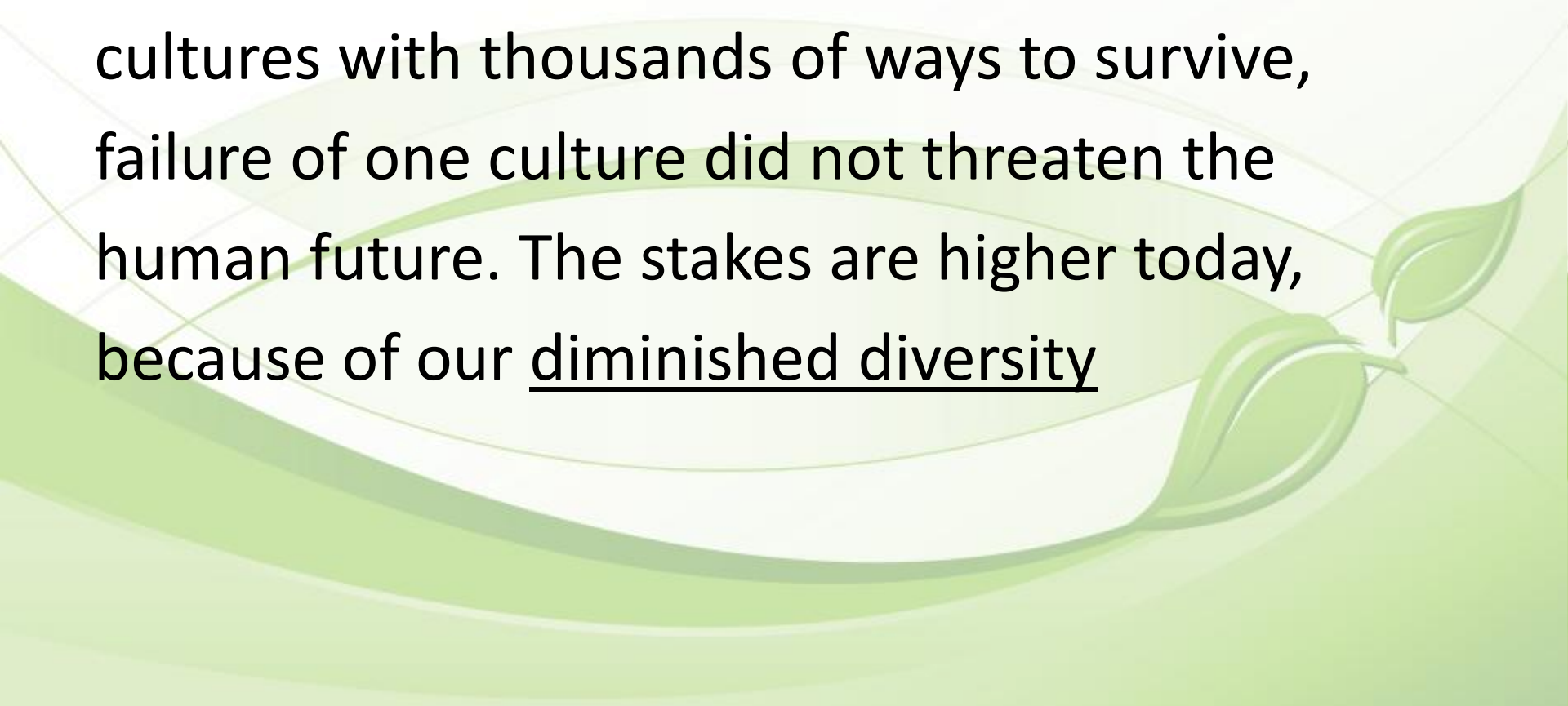
- "The amount of work you have to do to gain an edge to make money now is just so much greater. ... when I joined Goldman Sachs in 1967," Cooperman recalled, "I was the head of research and I hired analysts. In those days, a typical analyst covered seventy-five companies and maybe six different industries. I was recently talking to one of the analysts I had hired back then and he told me he was terribly overworked now because he had to cover twelve companies. I just laughed. Only twelve companies? But you have to look into those twelve companies so much more deeply now in order to get some edge that it takes up all of his time."

--Friedman, *The Lexis and the Olive Tree*, pp. 121,122.

- Sustainable development can provide an 'information edge.'

THE ONLY SENSIBLE PROGRAM FOR THE HUMAN FUTURE?

When there were thousands of different cultures with thousands of ways to survive, failure of one culture did not threaten the human future. The stakes are higher today, because of our diminished diversity

The background of the slide features a light green gradient with several large, stylized green leaves and swirling lines. The leaves are positioned on the right side, with one leaf at the top and two larger ones below it. The swirling lines are in various shades of green and white, creating a dynamic, organic feel.

“But the concept is not clear enough”

Gravity is a useful concept even though there is no concrete proof of the existence of gravitons.

“...scientists are still not sure exactly what dark matter is, since they have yet to identify it in a laboratory, [but] they said that the workings of the universe cannot be explained without it.”

~Washington Post, August 22, 2006.

Conceptual Definition

Truth is a useful concept even though we are still working on what it means after several thousand years:

*“The Socratic elenchus eventually gave rise to **dialectic**, the idea that truth needs to be pursued by modifying one's position through questioning and conflict with opposing ideas. It is this idea of the truth being pursued, rather than discovered, that characterizes Socratic thought and much of our world view today.”* <http://www.wsu.edu/~dee/GREECE/SOCRATES.HTM>

Sustainable development is also a useful concept even though we are still working out exactly what it means

WHY THE MINERALS INDUSTRIES?

1) The ecological footprint?

- Moves $>17.5 \text{ km}^3$ of material per year, more than anything but agricultural erosion
- Worldwide, uses $\sim 3\text{-}5\%$ of conventional energy to produce $\sim 1\%$ of economic output
- Often operates in relatively intact ecosystems with high biodiversity value

2) The economic impact?

- One of the few industries that brings investment and hope for economic growth to the poorest countries and regions

3) The human effects?

- A principal force in malaria control, sometimes a major force in spreading STDs
- Skill building and jobs in remote rural areas, etc. etc.

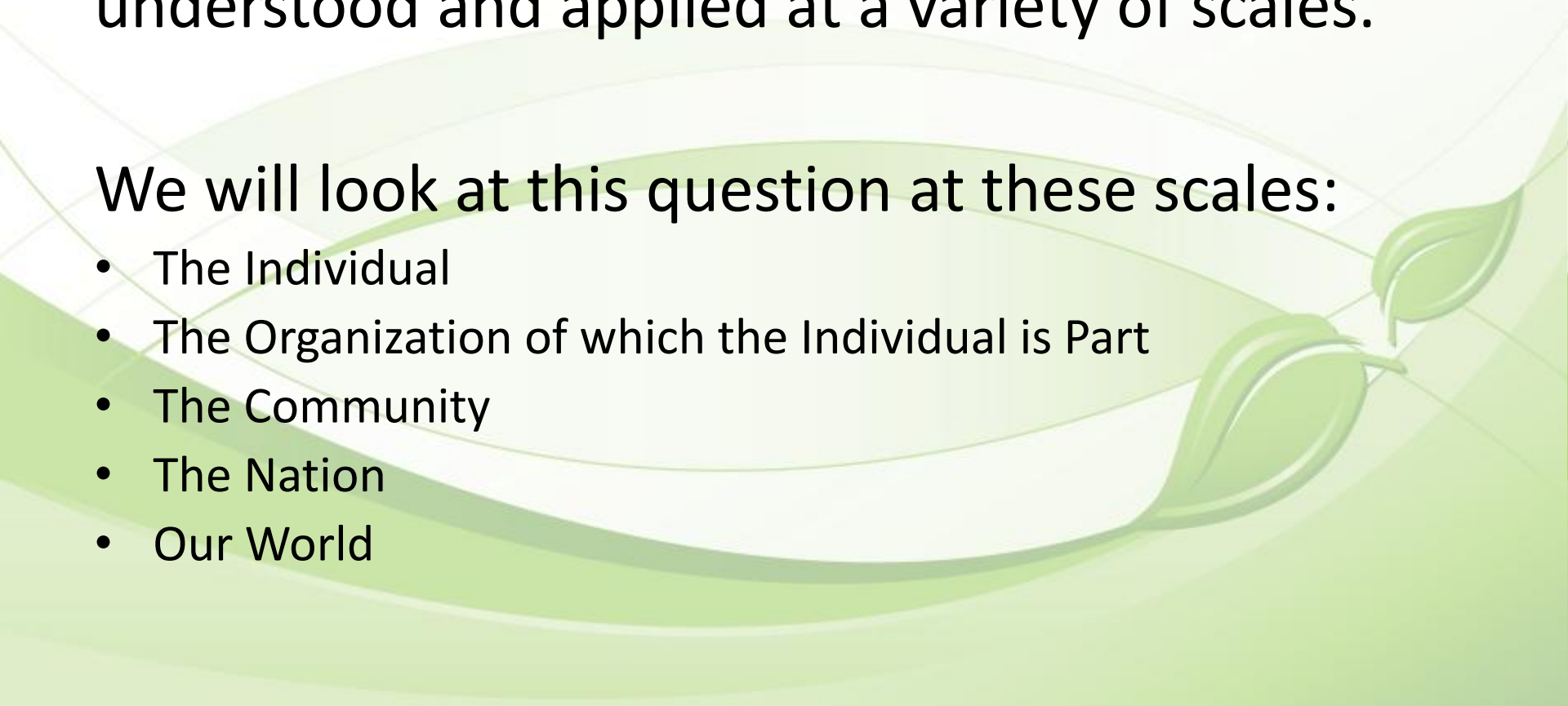
WHY THE MINERALS INDUSTRIES?

- Where else does a council of village elders in Papua New Guinea determine whether a Board of Directors in London succeeds or fails?
- And the Board of Directors has the ability to make profound changes in the life of the village – even to bring a culture to an end.
- All without having a common language, or common values, or understanding each other.

INCORPORATING SUSTAINABLE DEVELOPMENT IN ALL WE DO

Sustainable development needs to be understood and applied at a variety of scales.

We will look at this question at these scales:

- The Individual
 - The Organization of which the Individual is Part
 - The Community
 - The Nation
 - Our World
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EDUCATION AND SUSTAINABLE DEVELOPMENT AT THE PERSONAL SCALE

Higher education ideally produces individuals with both breadth and depth: a broad appreciation of the complex world around them, and highly developed skills in a professional field.

This serves society, but also serves the individual search for fulfillment and growth.

BREADTH

A minerals career gives people the opportunity to experience a variety of places, societies and cultures that can be offered by almost no other sector.

Is preparation to enjoy and grow in overseas assignments an issue? What do we need for people to succeed as individuals?

- Stronger language skills?
- Preparation to understand and appreciate differing cultures?
- A graduate who is interested in engaging with foreign societies more than retreating into 'expat enclaves?'

SOME INSIGHTS OR HYPOTHESES

First: A person with curiosity, an intellectual desire to learn, and an enthusiasm for different cultures is, particularly in the minerals sector, a happier individual.

Second: Educational preparation plays an important role in whether people thrive in a new environment, or retreat inward.

Third: Individual satisfaction has a great deal to do with satisfaction in the family, which has a considerable amount to do with stability in employment.

Fourth: An employee who is uncomfortable with the local culture, has no language skills, and is averse to contact with local people is less stable, and less valuable to his or her employer. An employee who is enthusiastic and reaching out to locals is going to be happier and more valuable.

Fifth: People who are uncomfortable with the local culture, have no language skills, and are averse to contact with local people can create considerable business risk for their employers, and the employers are waking up to that.

AN IDEA?

What about residential internships for students in community settings like Cerro de Pasco, Konkola, Witbank, or Red Dog?

If we can train Peace Corps volunteers to succeed in very different cultures, why can't we train mining engineers?

SUSTAINABLE DEVELOPMENT AT THE ORGANIZATIONAL LEVEL

- Most mining companies have formal management systems for environment
 - moving toward management systems aimed at sustainable development
- *ISO 9001(2000) and ISO 14001 (2004)*
 - implemented by more than one million organizations; 175 countries.
http://www.iso.org/iso/iso_catalogue/management_standards/iso_9000_iso_14000.htm
- *ISO 26000 (standard for social responsibility)*
 - *On its way for a Final Draft International Standard (FDIS) before being published as a ISO International Standard*
 - *Anticipated by end of 2010*

IDEAS?

- Implement, with students, a management system at the level of the Department or the School.
- Mines graduates will leave with a real world practical understanding of how to implement and operate within management systems.

REPORTING

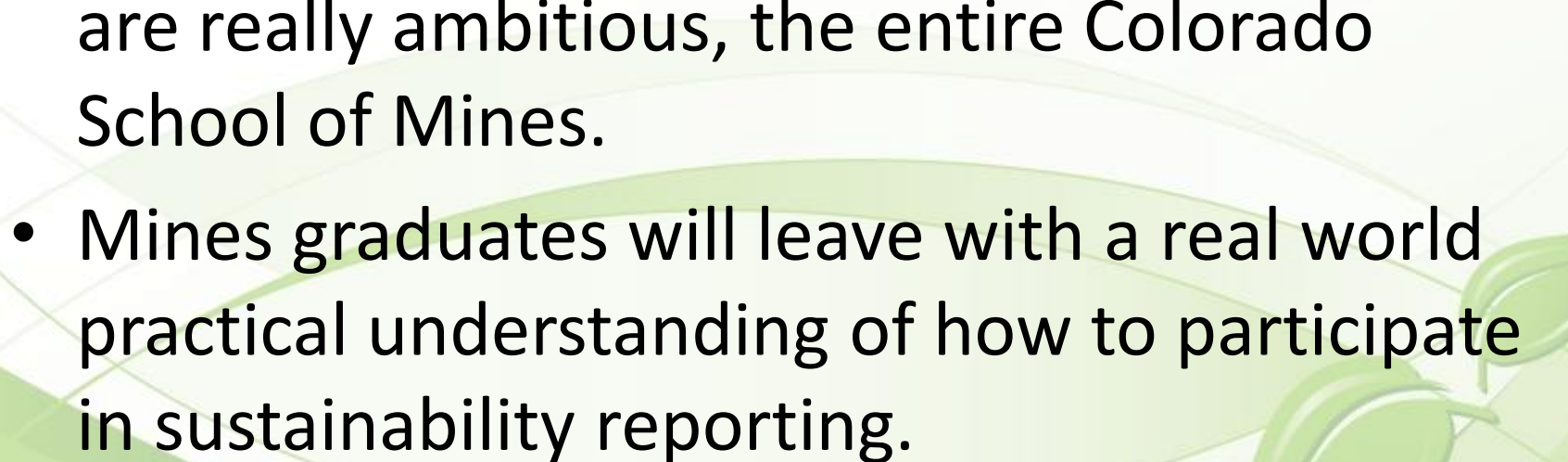
Most major mining companies now submit sustainability reports, many of them in the Global Reporting Initiative system.

- <http://www.globalreporting.org/AboutGRI/>
- <http://www.globalreporting.org/GRIReports/GRIReportsList/>
- <http://www.beyondthemine.com/2008/>

Issues:

- what to report
- why it should be reported
- what it can help achieve
- how to generate reliable data for reports
- lack of employee understanding

IDEA?

- Prepare an annual Sustainability Report at the level of the Department, the School, or if you are really ambitious, the entire Colorado School of Mines.
 - Mines graduates will leave with a real world practical understanding of how to participate in sustainability reporting.
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SUSTAINABLE DEVELOPMENT AT THE COMMUNITY LEVEL

- It is very important to minerals companies to have employees that engage positively with their communities.
- That is not something that they can easily learn on their own after graduation.
- The greater Golden community has some problems; students have skills and energy
- Do there need to be more opportunities for students to engage with their community?

SUSTAINABLE DEVELOPMENT AT THE NATIONAL LEVEL

- The United States is one of the few countries with no minerals policy institution
- Our country suffers from lack of a national minerals policy
- Lack of sophisticated and deep understanding of the issues is rife on all sides
- How can graduates be better prepared as citizens to participate in shaping policy?

SUSTAINABLE DEVELOPMENT AT THE GLOBAL SCALE

- Because mining investment is so widespread, and engages the rich with the poor, mining is at the cutting edge
- Mining is therefore deeply engaged in working out the new global economic and political architecture



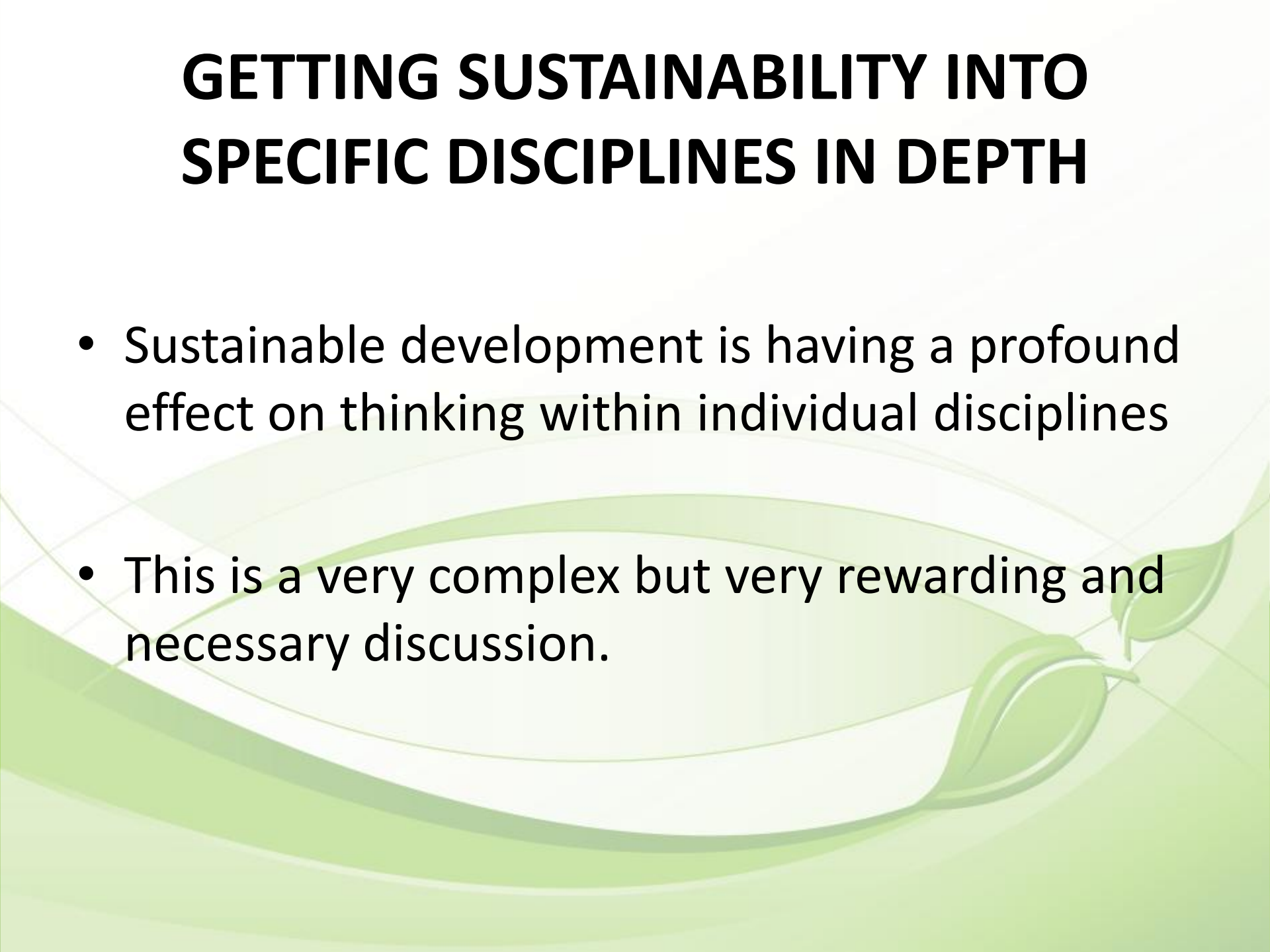
AN INDUSTRY OF FIRSTS

- The first home telephone
- The first showing of a movie
- The first potable water in the region
- The first environmental impact assessment
- The first sustainability reporting

This industry is at the front line of creating the new global architecture. **Are we prepared to do it right?**

GETTING SUSTAINABILITY INTO SPECIFIC DISCIPLINES IN DEPTH

- Sustainable development is having a profound effect on thinking within individual disciplines
- This is a very complex but very rewarding and necessary discussion.



SUSTAINABLE DEVELOPMENT AND THE LAW

One example of dozens:

The Old Way: Drafting agreements so that when commodity prices are down, the royalty goes to zero, to save money

The New Way: Drafting agreements so that the royalty never goes to zero, to save money

SUSTAINABLE DEVELOPMENT IN ACCOUNTING

The old way: mineral reserves carried at a value that gives no regard to social factors

The new way: ????

How much is the mineral deposit at Bougainville, or Tambo Grande (or Crested Butte) worth? What is the appropriate balance sheet value?

MINE CLOSURE AND SUSTAINABLE DEVELOPMENT

The old way: physical and chemical stabilization of the site.

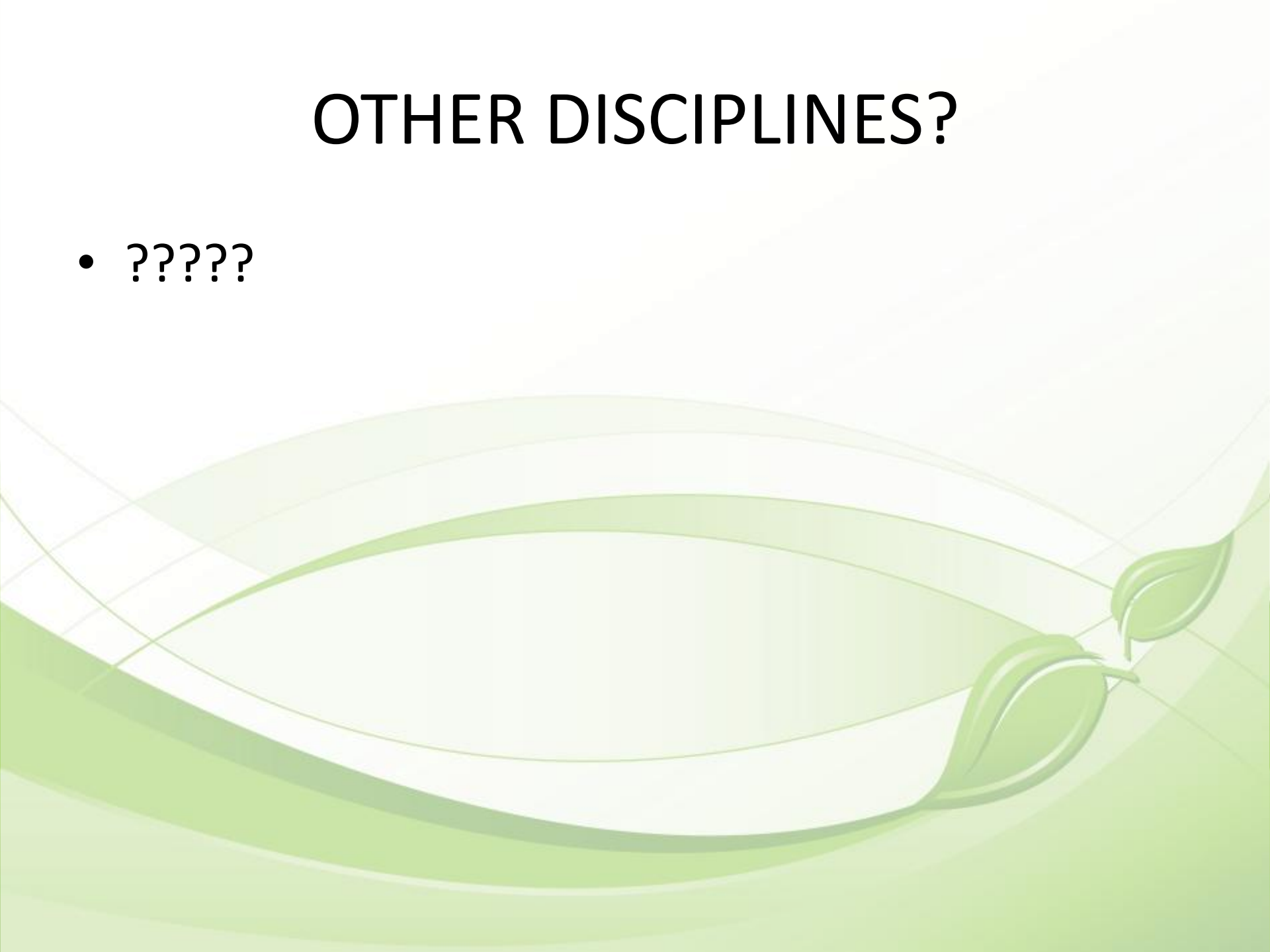
The new way: Integrated Mine Closure Planning.

<http://www.icmm.com/page/9566>



OTHER DISCIPLINES?

- ??????



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