

Science, Technology, and Sustainability

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2023: Lecture 6-7

Public Understanding of Science

Motto of **American Association for Advancement of Science** is:
“Advancing Science, Serving Society”

- Aim of S&T is to improve the human condition and promote their well-being
- We need to combine “significant advances in basic knowledge, in the social capacity and technological ability to use it, and in the political will to turn this knowledge into action” (Our Common Journey 1999).

Energy is particularly important to sustain development and sustainability of this earth [Holdren 2008]

Common Fate

Major ecological force having significant adverse impact on EARTH

Post 9/11 2001 – Peter H Raven during his Presidential Address to the 2002 meeting of the American Association for the Advancement of Science (published on 9 Aug 2002 in *Science*) on the theme ***Science in a Connected World***, emphasized the urgent need to find a way of reinstating stable relations between nations and finding common solutions to a human society that has outstripped the limits of global sustainability.

2019 Lecture of AAAS – **Science and policy: their Yin and Yang dynamic and global food security** by Prof Zeigler

<https://www.aaas.org/events/2019-aaas-charles-valentine-riley-memorial-lecture-dr-robert-s-zeigler>

2023 – Ukraine-Russia war and armed conflict in Europe is very different from a 9/11 scenario!

Peter Raven (2002: 954)

“Over the past half century, we have lost a fifth of the world’s topsoil, a fifth of its agricultural land, a third of its forests.”

“We have changed the composition of the atmosphere profoundly, driving global temperatures upward and depleting the stratospheric zone”

“we must adopt new ways of thinking that will serve our descendants well in a world that is crowded beyond imagining, a world in we shall always be the major ecological force; unless, of course, we destroy ourselves”

Raven (2002) Loss of Biodiversity

We fought hunger and fed an ever-expanding population...

“Habitats throughout the world have been decimated by intentionally introduced plants and animals...*most troublesome is the loss of biodiversity*...the actions that we carry out over the next few decades will decide the fate of millions of species of plants, animals, fungi and other micro-organisms, *the greater number of them completely unknown at present and likely to have remained so at the time of their permanent disappearance from our planet.*”

How to understand science and factor skepticism?

- Loads of information circulating
- Danish economist *The Skeptical Environmentalist: Measuring the Real State of the World* [Cambridge University Press, 2001]
- Book is “not” grounded in peer-reviewed scientific literature
- Science and factual analysis become self-contradictory and difficult to know [common person]

***** Our landscapes are changing drastically:

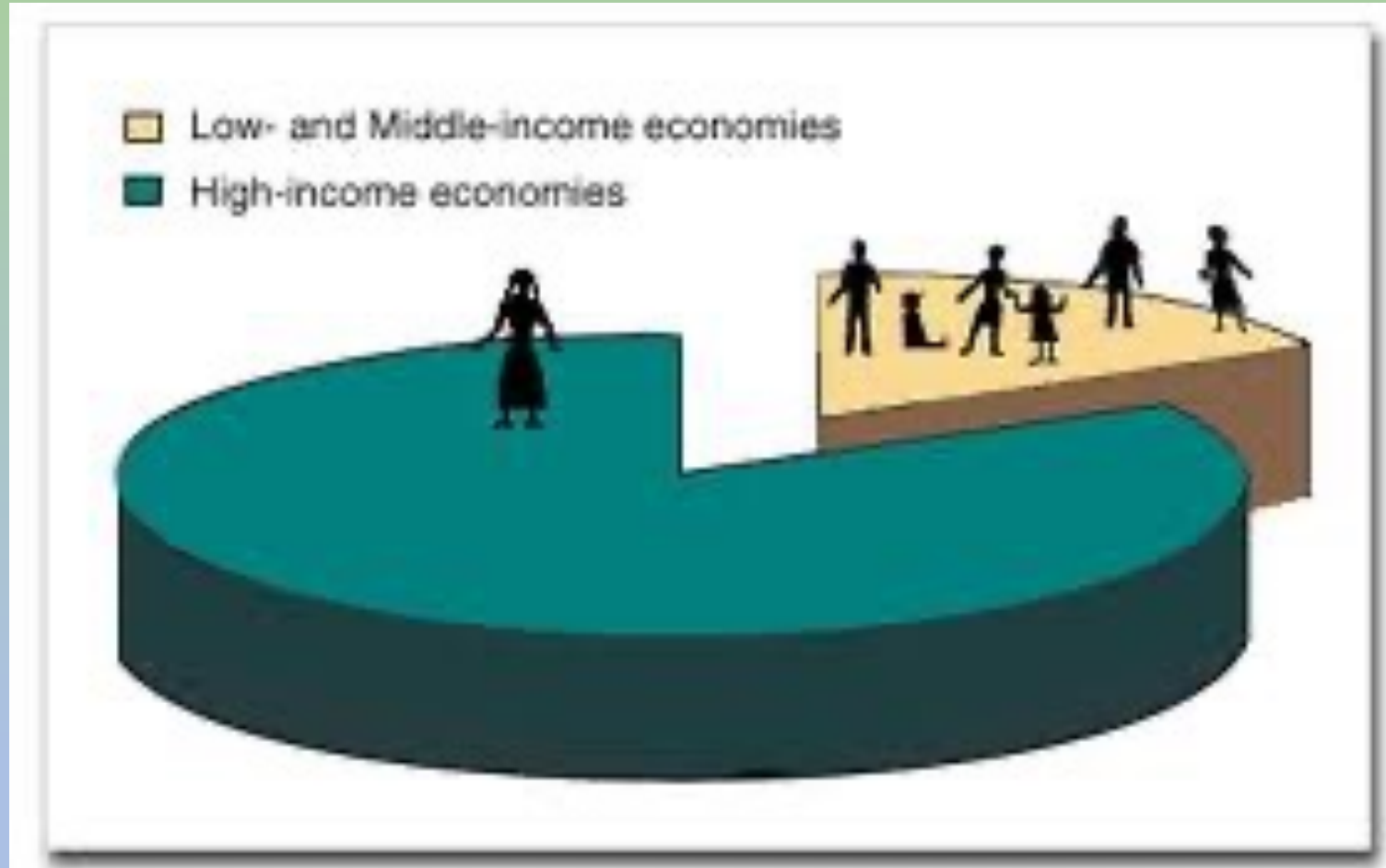
2022 lecture of AAAS – *Designing Pest Suppressive Agricultural Landscapes for a Changing World* by Dr D. Landis

<https://www.aaas.org/events/2022-aaas-charles-valentine-riley-memorial-lecture>

Not all world’s environmental scientists are “radical ecologists” or “dedicated greens”

20 % of the world consumes 80% of the worlds resources

80% of the world consumes less than 20% of the worlds resources



Key focus –
consumption
Who? What?
Where?

The Inseparability of Ecology and Equity

- USA contains 4.5% of worlds population but controls 25% of worlds wealth and releases 25% of total pollution
- 25% of people survive on less than 1 Dollar a day
- Over a third of worlds population lives in India and China
- India contains more than Billion plus and 40% of this population earns less than a 1 Dollar a day...
- 1 Billion people in this world do not have access to safe drinking water
- 1.5 Billion people are inhaling polluted air deemed unsafe by WHO
- Its not long before we will have to ration fresh life-giving air. Our access to life-giving water will be determined by where we live and by our income.

Way forward...search...

Our Common Journey: A Transition towards Sustainability

National Academy Press, Washington DC, 1999]

Board on Sustainable Development, National Research Council commissioned study

How to make a transition without further delay and without further drastic changes in the environment?

Question of Energy {how to generate, consume, and conserve} is particularly important for global sustainability

*Lester Brown book **Eco-Economy** [green energy (wind, hydrogen, solar, hydropower) as an alternative, 2001] ...today in 2023...that argument can be seen as part of business strategy everywhere*

Thought-Action-Solution loop

- Freedom as dreams and “goals/aspirations” as we search for meaning of development
- Large population will be living in cities
- Gap between the developed and developing world – how do we measure it or how do we bridge it?
- Transfer of technology is part of solution
- Building capacity by transfer of capital, technological know-how, and foster economic resilience
- Grassroots – activities, people’s involvement, and activism is going to sustain the sustainability paradigm
- Big Corporations as partners

Needs and Human Greed

We have the science and technology but the only way to build a secure world is to change both the world and our way of relating and thinking about the natural environment in order to develop a *sustainable world for our children and grandchildren*.

The President of AAAS ends his address by quoting Mahatma Gandhi and emphasizing the need of a making this world a better place:

“The world provides enough to satisfy everyone’s need, but not enough to satisfy everyone’s greed (M.K. Gandhi, cf. Raven, 9 August 2002, *Science*).

Raven [2002] and its relevance in 2023

- Is society advancing then towards what? Compounding development and environmental degradation at an alarming rate
- We live in an interconnected world – transmission of technology is controlled by national interest and commercial profit [Budget 2023 – focus was on infrastructure]
- Communications is a science and Science and technological advancement depends on communication – you are an important node and critical generation of young IIT undergraduates...shaping the future
- Extraordinary capabilities of science and technology are among our strongest assets [whether US or in India]

2023: Current population of India is 1.4 Billion out of 8 Billion persons [17.7% of total world population comprises Indian citizens]

What we do in India really matters for the world! What we think, what we do, what we eat, and how we live has a huge impact on world's future?

How?

Need to think Globally not locally.

Many Grassroots activities are promoting sustainable development – these fundamentally emphasize and reemphasize what was traditional & indigenous.

Case Studies will be taken up later in due course.