CLIMATE CHANGE, DEVELOPMENT, POVERTY AND ECONOMICS

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Structure

1. **Prosperity and the environment in history of thought**

2. **Why climate change is different: scale of change, risks, and dangers of delay**

3. **Analytical challenge: beyond the marginalist approach**

4. **Policy challenge: beyond incremental action**

5. **Conclusion**
Environment and development: a history of thought

• Economists have long recognised the link between environment and development:
  – Ricardo on land quality as a source of rent.
  – Malthus and Jevons (and later the Club of Rome) on resource constraints.
  – Hotelling on the management of natural resources.
  – The Brundtland Commission pioneering Sustainable Development.

• Environmental services were introduced into welfare economics:
  – Pigou on environmental externalities.
  – Samuelson, Arrow and Meade developing modern welfare economics.
  – Leading into economic valuation, green accounting and the economics of ecosystem services (e.g. TEEB).

• Economics has long informed environmental policy:
  – Pigou on corrective taxes.
  – Coase on (tradeable) property rights.
Environment and development: policy history

- Environmental economics **emerged as a discipline in the 1970s**, pioneered by organisations like Resources for the Future.

- The World Bank established an **environmental advisory unit in 1970**, which gradually grew into the Sustainable Development Vice Presidency of today.

- Pioneering work at the Bank and elsewhere on green accounting, genuine savings, pollution prevention and carbon trading and environmental policy.

- In the **Global Environment Facility**, there has been a dedicated financial mechanism for the global environment since 1991.

- But the natural environment continues to be underpriced and overexploited; poor people are both the victims and a cause of these trends.
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Climate change differs from the environmental problems of the past

- The structure of the science of climate change creates four major difficulties for public understanding and collective action:
  - Immense scale
  - Large risk/uncertainty
  - Long lags
  - ‘Publicness’ of the causes and effects
The science is robust and GHG concentration rising rapidly

• Climate science is built on two centuries of theory and evidence.

• CO$_2$e concentrations now around 450ppm (Kyoto gases).
  – Adding CO$_2$e at a rate of over 2.5ppm per year (likely to accelerate with little or weak action).
  – This is up from 0.5ppm per year 1930-1950, 1ppm 1950-1970 and 2ppm 1970-1990.

• Inaction could take us to 750ppm CO$_2$e over a century: strong possibility of eventual temperature increase of more than 4°C or 5°C increase in global average surface temperature above second half of the 19th century
The risks are unprecedented for humankind

• Damage from climate change intensifies as the world gets warmer:
  – Already 1°C at edge of experience of Holocene and civilisation.
  – Seeing strong effects now; yet small relative to what we risk.
  – Beyond 2°C is “dangerous” – risk of tipping points.

• Temperature increase of 4 or 5°C or more not seen for tens of millions of years (homo sapiens, 250,000 years):
  – Likely be enormously destructive.
  – The reasons we live where we do, would be redrawn (e.g. too much or too little water).
  – Potentially causing severe and sustained conflict with migration of hundreds of millions, perhaps billions of people.
What to do to hold warming below 2°C

• **Stabilising temperatures requires net zero emissions.** The lower the target temperature, the earlier the necessary achievement of net-zero.

• Necessary emissions path for 50-50 chance of 2°C:
  – under around 35Gt in 2030; under around 20Gt in 2050; zero before end century.

• Can do a little more earlier and a little less later and vice versa but shape of feasible paths similar, and costly to catch up if we postpone action (e.g. sometimes find 40Gt for 2030 for 2°C). It is integral of emissions that matters.

• Note **Paris COP21** specified a target of “well-below 2°C” and pursue efforts “to hold to 1.5°C” (which would require net zero emissions around 1080 and latter around 2050).
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The precautionary economics of climate change risks

• Climate change has **yet to enter mainstream economics**, but some economists have engaged with the problem early 1990s (e.g., Nordhaus, Cline, Edmonds, Schelling).

• Their models were mostly concerned with marginal adjustments from a (largely) exogenous growth path. They suffered from a poor evidence base. While helpful in building the logic and aspects of the argument for action, they are **profoundly misleading** in their representation and quantification of risks. This continues today. “Marginal models”.

• Traditional empirical analysis based on fairly recent past data cannot do much to help us to quantify historically unprecedented risks. We need to **look further back** into the history of the planet.
What marginal models miss

• On the damage side, marginal models miss the **scale and nature of risks**.
  – Damage functions usually relate GDP loss to current temperature changes (e.g. ignores damages to capital stocks or growth rates).
  – Models are calibrated to absurdly low levels of loss (e.g. only a 50% loss of GDP from 18°C increase above 1900 levels; or 5-10% at 5°C)
  – There is limited incorporation of the ethics of climate change.
  – Models do not value the co-benefits from a low-carbon transition.

• On the policy side, marginal models miss the **dynamic public economics of systemic change**.
  – Marginal abatement cost (MAC) models ignore the inherently systemic nature of transformative change.
  – They fail to model benefits of innovation and impacts on future prices or technology options.
The ethics of intervention

• The effects at issue are not potentially so large and far-reaching that we should go beyond standard economic consequentialism and consider duties, rights, virtues...from across moral philosophy.

• The ethics discourse in economics has **focused heavily on intergenerational equity** (discounting); little room for **intra-generational equity** and wider perspectives need for policy making.

• Discounting approaches have to differ between **goods** and **welfare**:

  – **Goods**: how do we value (today) goods consumed in the future? Should we discount the value of future goods because “people in the future will be richer”? It matters **which** goods. And **which** people?

  – **Welfare**: discounting future **welfare or lives, given assumption that the life exists**, weighs the **welfare or lives** of future people lower (irrespective of consumption/income) purely because their lives have begun later (discrimination by date of birth).
Incorporating intra-generational issues

• Equity question for international cooperation – **which countries should do what and when?**

• Context:
  – **World** must be around or below 2 tonnes CO$_2$e per capita by 2050 globally for 2°C.
  – **Developed countries**: 1 billion in 7 billion population; Responsible for around half of global emissions since 1850; Average per capita emissions still >15tCO$_2$e per year.
  – **Developing countries**: Responsible for around 2/3 of current emissions; will be responsible for most of future emissions; but per capita emissions still 1/3 to 1/2 of rich countries.

• Arithmetic implies faster cuts for rich countries. And if few people below 2 tonnes there can be few above.

• **Double inequity** – rich countries major responsibility for past emissions, poor people hit earliest and hardest.
Global Collaboration: The Paris Agreement

• **Remarkable achievement that 195 countries agreed** after years of debate and fundamental disagreements; **signed by 175 countries in April 2016** (most in history); drive to enter into force earlier than planned (2018 versus 2020).

• Compared to Bretton Woods: 44 countries (1 dominant); previous 30 years had 2 world wars and great depression.

• Foundation of agreement was **built on the understanding** of:
  – the **scale of risks and urgency to act**, and
  – **attractiveness of alternative path** as sustainable route to lasting development and overcoming poverty.

• Paris Agreement should be seen as a **turning point** to put the world on a low-carbon climate-resilient path. Forms the basis of **new, international, cooperative, long-term action** on climate change.
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Creating the supporting policy environment

• Climate policy is not about incremental initiatives that can be attached to existing development plans; it requires **deep structural and systemic change**, implemented over many decades.

• A long-term view of direction (with all its uncertainties) and instruments for getting there should be in some framework. An old lesson of “prices and quantity” approaches

• Requires policies that support economic dynamism and address multiple market failures: **greenhouse gases; RD&D; imperfection in risk/capital markets; networks, information, and co-benefits.**

• The **“horse-race”** between climate policy and development represents a **false dichotomy**; it is **possible to achieve both.**
Structural transformation and infrastructure investment

• We can see now key elements of structural transformation.

• The investments made now will determine the future development path and climate:
  
  − Balance of output shifting away from rich countries; very rapid urbanisation; building of energy systems.
  
  − Over next 15-20 years, investment of US$ 90 trillion will be needed for infrastructure. It must all be clean to meet the targets.
  
  − US$ 2 trillion per year in high-income countries, between US$ 3 - 4 trillion per year in low- and middle-income countries.

• Support and investment for R&D to drive the new “wave of innovation”.

• Energy efficiency will be close to half of the necessary action.
What about climate resilience?

• Focus is often on mitigation, but what about resilience? Even moderate amounts of climate change (e.g. those possible under a 2°C path) could pose risks to development, or reversal of development achievements.

• Current development path of many developing countries is shaping their future vulnerability to climate change (e.g. development on coastlines, design of infrastructure).

• Mitigation, adaptation, development intertwined: many examples in agriculture, water, transport, energy, buildings, cities...

• The direction and nature of economic development therefore matters, and it makes sense to tackle climate risks in lockstep with development planning and investment decisions.
Better Growth, Better Climate

• It is not about static and divisive “burden sharing”, it is about **working together** to incentivise, foster and finance change.

• In short-term, **infrastructure investment can boost demand** and growth by investing in the growth story of the future.

• In the medium term the transition to **low-carbon growth offers dynamic benefits**:
  – Potential to stimulate dynamic, innovative and creative growth
  – Great opportunities from most rapid technological change the world has seen: digital, materials, biotech...

• In the long term, zero-net-carbon is **the only growth story** that can be sustained.
Clear direction is needed…

- Spurring low-carbon, climate resilient growth requires the redirection of financial flows and investment over long periods.

- The consistency, clarity and credibility of development and climate policies are imperative. Policy makers need to set a clear, long-term direction of travel.

- Important to manage constructively dislocation and cost of change.

- If clear direction is provided new investments can lead to:
  - New sources of growth, lay the platform for long-term sustainability.
  - Create more resilient, efficient, less polluted, less congested cities.
  - Protect forests, land, ecosystems, water sources and biodiversity.
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A new development model

- Current development model has had many successes, but also led to exploitation of natural resources and the rise of new threats to development.

- The response to those threats is not the cessation of economic growth, but a departure from development business as usual.

- The only credible way to address the risks is through sustainable growth, advancing economic prosperity and combating climate change at the same time.

- Sustainable growth requires finance and investment, and it requires strong leadership and global collaboration.
A better economics

• The public policy that can deliver this shift needs to be informed by better, more thoughtful economics, indeed a more “dynamic public economics”.

• We need a radical deepening of economic analysis, where we tackle directly issues involving pace and scale of change in the context of major and systemic risks.

• The ethical issues are so large in this context that the arguments for explicit, broad and deep discussions of ethics are still more powerful than usual.

• Standard growth theory, general equilibrium and marginal methods have much to contribute but they are nowhere near sufficient.
A call to action

• Managing climate change and overcoming poverty are the two defining challenges of our century. If we fail on one, we fail on the other.
  – If we fail to manage climate change we will create an environment so hostile that lives and livelihoods will be destroyed.
  – If we try to manage climate change in ways which put barriers on poverty reduction we will not have the coalition we need.

• We have a clear idea of direction, instruments, technology and reforms. Certainly enough to begin urgently and strongly.
• The next 20 years are decisive. Delay is dangerous