‘Backcasting’ for Assam 2030

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Traditional approach to development

Based on **Forecasting**

- Relying on data from past/present
- Analyzing trends
- Projecting estimates of interest into the future
- Using methods such as regression analysis, trend projection, Delphi analysis

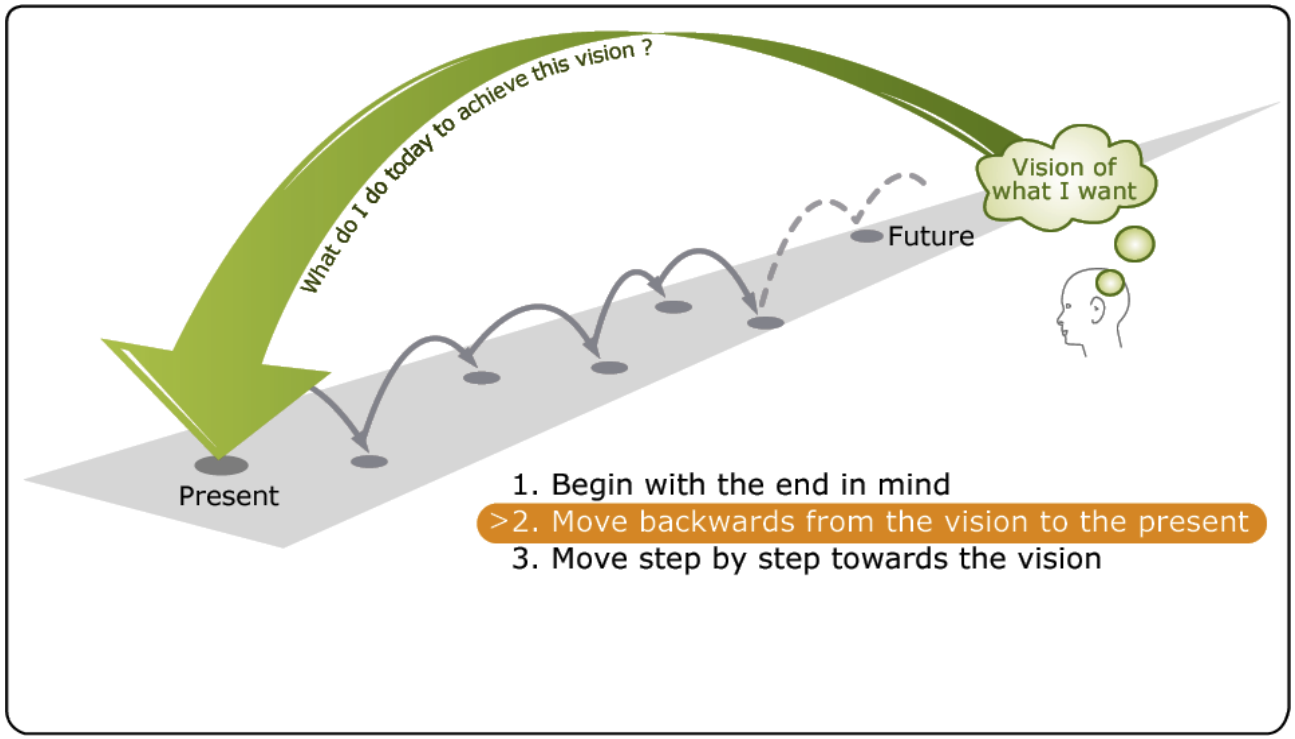
Formulating policies & programs to guide action in the future

Limitations of ‘forecasting’ method

- Heavily dependent on a range of assumptions – human behavior (rational actor, perfect information)
- Using models that necessarily reduce the complexity and inter-connectedness of the natural world and the social world
- Based on current knowledge/technology (that is subject to change) – limited knowledge of earth system dynamics – ’good enough only to the next question’
- Unduly weighted by the past – experience & institutional functions – ubiquitous trap

Backcasting Development
a new approach more suited for SD

- Desired outcome is imagined in the future
- Followed by the question: “What do we need to do today/next year/… to realize our vision of success?”



Some requirements

- How do we move from the ‘I’ to ‘we’ – what is the process, for example, of a collective effort across different agencies – question of institutionalizing and creating champions who own the process

- The ‘we’ gets more complex with the layering of needs-wants of societal stakeholders – NGOs, CSOs, private sector, universities etc.

- A mind set change required – ‘Nothing is Impossible’ – given adequate support, limited only by imagination (dynamic nature of technology, for example). How to cultivate temperament within (rule-bound) institutions where ‘taking risk’ is generally not tolerated

Multiple Challenges of Food Systems

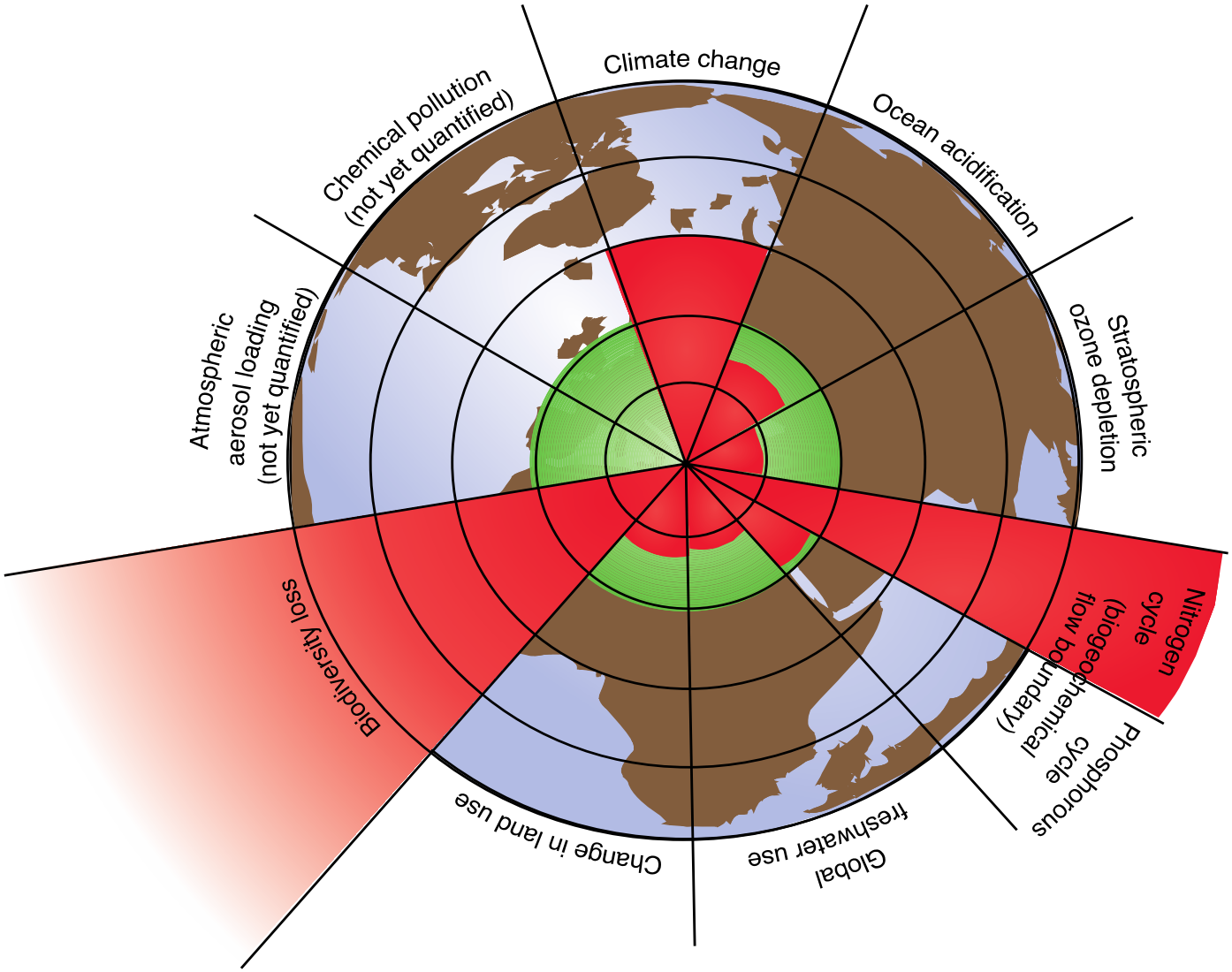
an example

- Productivity & sustainability depends on state of earth's natural resources: *soil, water, climate, and biodiversity, both terrestrial and aquatic*

- People survive and prosper by manipulating these fundamental resources to produce food - farming, animal husbandry and fisheries

- Contributing to breaching of 'planetary boundaries' / 'safe operating space for humanity'

‘Planetary Boundaries’



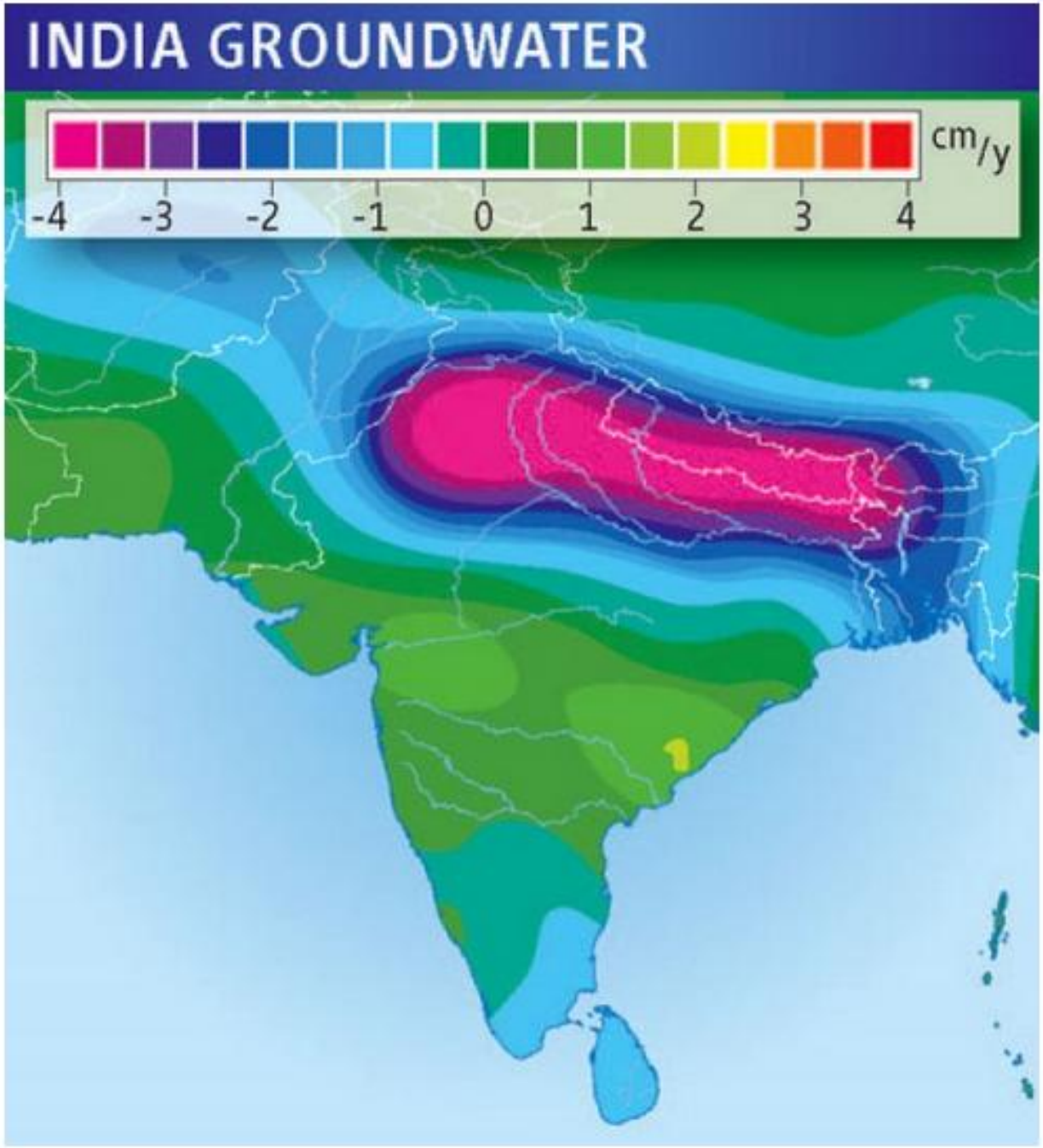
Source: Rockström et al 2009

Multiple Challenges of Food Systems

- Forests make way for agriculture (and urban growth) in response to population and income growth
- Agricultural land is degraded through deforestation, soil erosion, nutrient depletion, salinization, waterlogging, overgrazing, and industrial pollution
- Trade is a disruptor to ‘settled’ local market ecosystems
- Uncertainties are imposed by Climate Change

Sustainability Challenge of Food Systems

- Nutrients essential for plant growth lost - erosion and extraction
- Majority of freshwater extraction allocated to agriculture, where it is inefficiently used
- Unsustainable rate of pumping water pumped from aquifers and surface bodies
- Rivers and lakes overfished and polluted
- Biodiversity – the genetic foundation of our food system – in retreat; species and genotypes becoming extinct at an alarming rate
- Climate change threatens land and marine life support systems

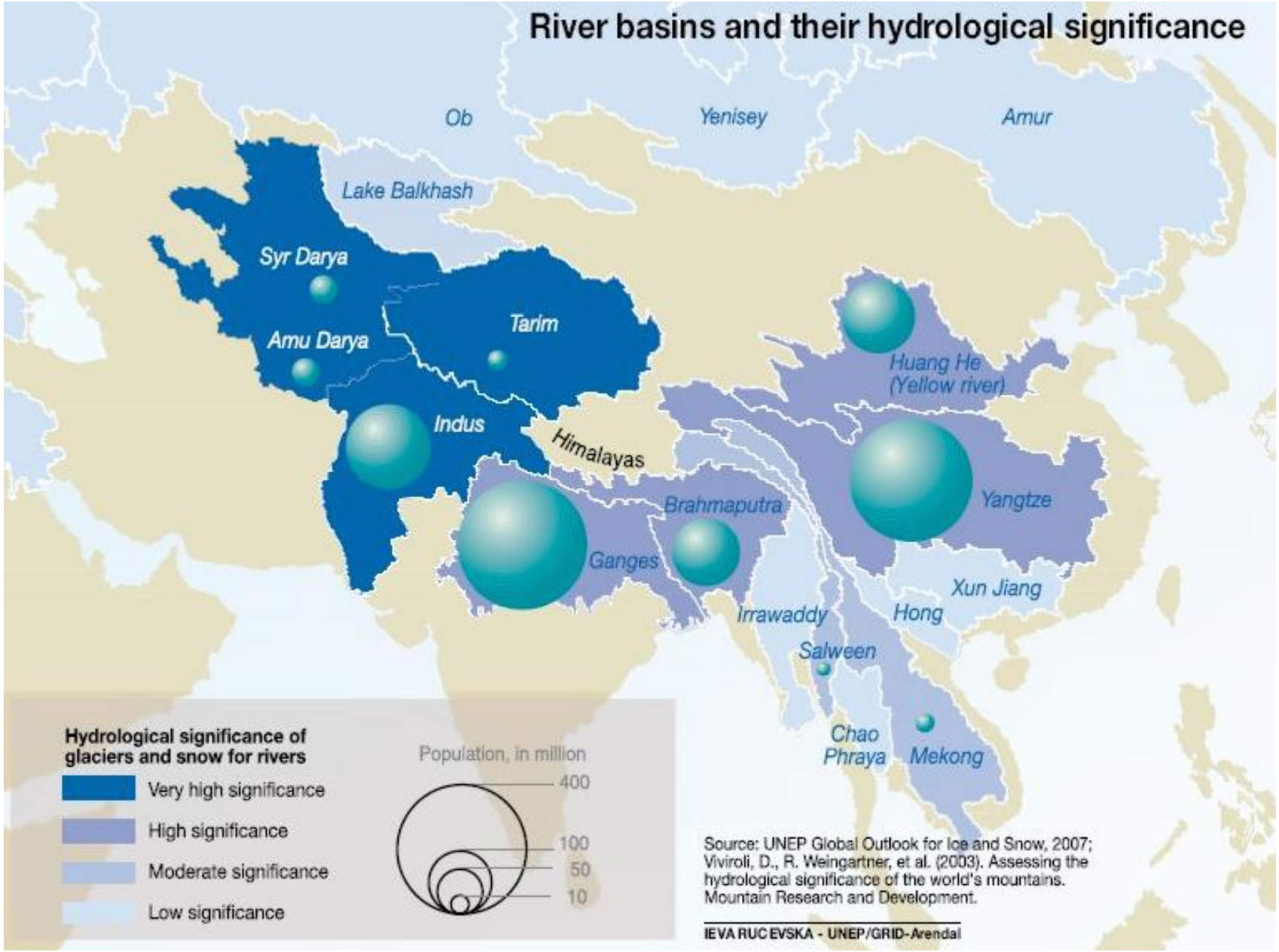


ADAPTED FROM V. M. TIWARI, *ET AL.*, NATIONAL GEOPHYSICAL RESEARCH INSTITUTE

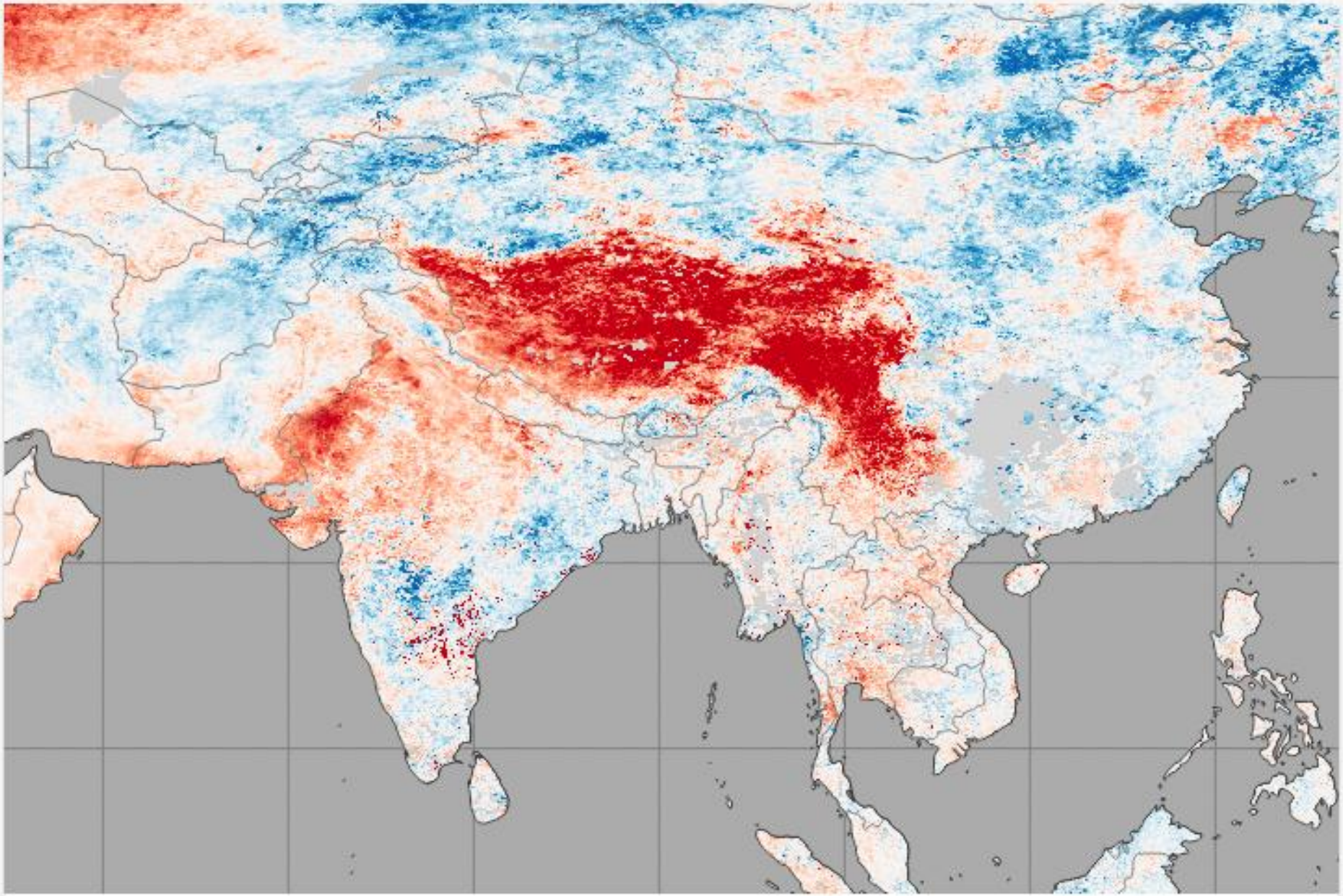
Groundwater Depletion based on GRACE satellite imagery, 2009

Availability, access, utilization, and stability of food & nutritional security impacted

- Reduced crop / animal productivity reduce local availability, and access through higher prices
- Poor families reduce consumption, shift to lower cost products, with adverse nutritional consequences
- Nutritional quality reduced by accumulation of toxins
- Reduced diversity of food results in low quality diets
- Declining water quality leads to diarrheal disease and inability to utilize the nutrients
- Climate change and variability affect system stability and sustainability



1.3 billion people live in these river basins and they account for half of Asia's cereal production and a quarter of the worlds



acquired June 2 – 9, 2014

Land Surface Temperature Anomaly (˚C)

-12 0 12

Contextuality of food system

Agricultural production and consumption systems are <u>continually</u> shaped by geography, climate, history, culture, economics, technologies, center-state relations, trade relations, policies and politics

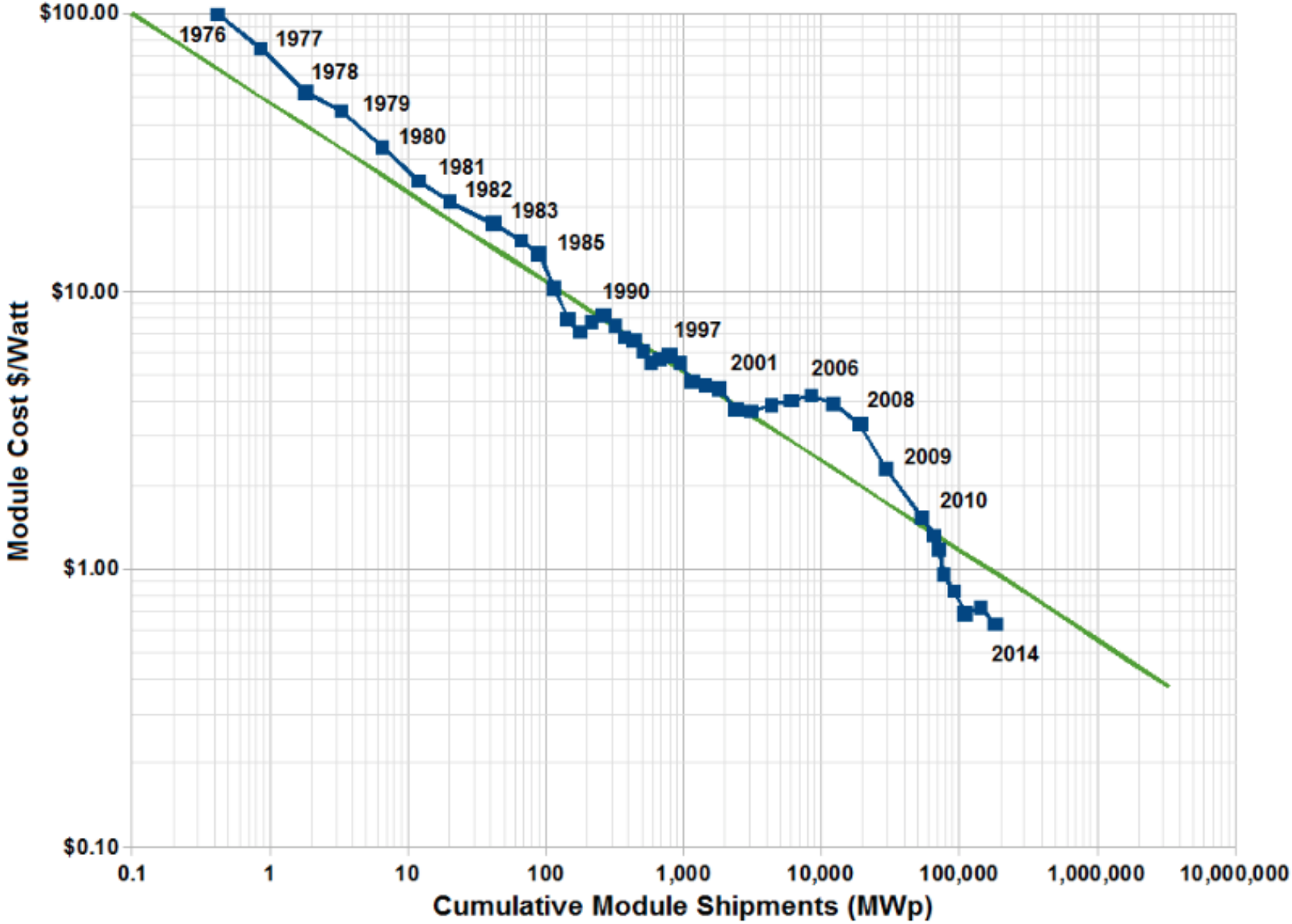
No universally applicable transformation pathways to a sustainable food system

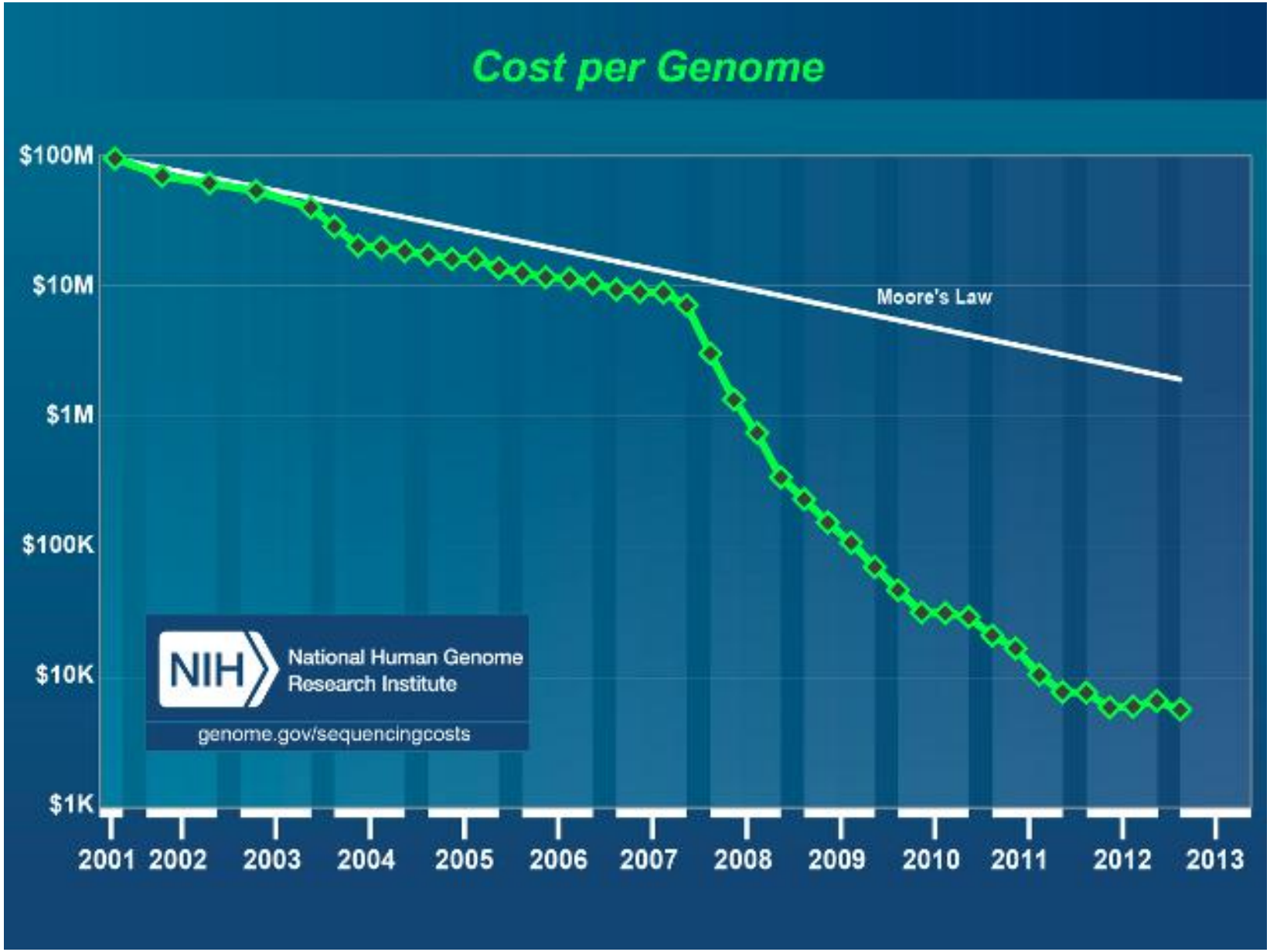
SDGs inspired goals + time-bound targets required, and to be made contextually relevant and useful

Contextuality of food system… (continued)

- Dominance of ‘marginal’ land holding (of less than 1 hectare) – productivity challenges
- Expectation of agriculture as employment absorbent – rural push
- Access to technology / knowledge enhancement – access, equity
- Self sufficiency and competitive advantage – emotional and political resonance
- Rapidity of technology change

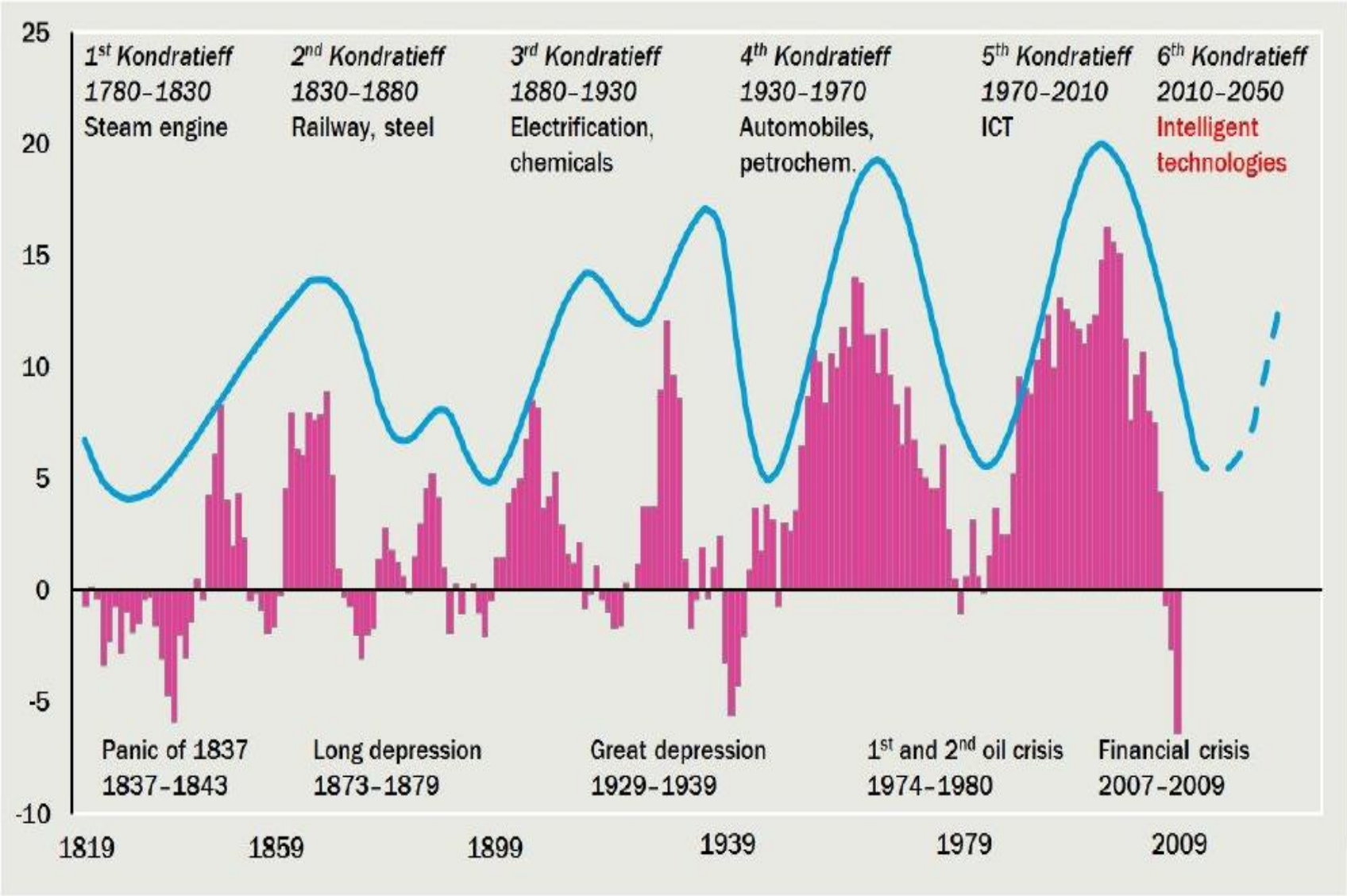
Price of Crystalline Photovoltaic Cells: from $76.67 per watt in 1977 to $0.36 per watt in 2014





HALVING OF COST ROUGHLY EVERY NINE MONTHS

Imperial Valley, El Centro California – Agriculture in a desert – NOT sustainable!



SIXTH WAVE SUSTAINBLE GROWTH BUILT ON DIGITAL REVOLUTION? **How do we plan for that?**

Strategy for Assam (sustainable food system) 2030

- Set goals and targets for 2030
- Identify pathways to success through **backcasting** (land & resource use specificity, public-private mix, technology options, fiscal options, institutions) – *collective of stakeholder interests, mindful of the changes and uncertainties*
- Formulate roadmaps (innovation, investments, participation) – *encouraging useful disruption/competition*
- Demonstrate success through prototyping – *ideally of competing ones with a view to learn / diversity portfolio*
- Scale-up of proven successes

'DIRECTED' INVESTMENT-LED GROWTH & DEVELOPMENT