

ESTIMATES OF THE COSTS OF ADAPTATION

Joel B. Smith

Stratus Consulting Inc.

Boulder, CO

Jsmith@stratusconsulting.com

July 28, 2010

Financial Costs not Damages

- Long history (for climate research) on estimating damages from climate change
 - Nordhaus, Tol, Mendelsohn etc.
 - Largely to indicate magnitude of risks
- Focus on financial costs of adaptation more recent

Typical Evolution

- One would expect that the evolution of a global estimates of adaptation costs would begin at national or sub-national and work up
- Instead, estimates have been mainly global
 - Maybe working their way down

Impetus for Global Adaptation Costs



- UNFCCC COP-12 (Nairobi) requested studies of total costs of mitigation and adaptation
 - Feed into negotiations leading to Copenhagen
- I am not aware of any national efforts to estimate adaptation costs

Uncertainties Too Numerous to List

- Baseline socioeconomic conditions
- How will climate change?
 - GHG emissions
 - Change in climate
 - Regional climate change
- How will adaptation occur?
 - Infrastructure; more expensive?
 - Softer, less expensive adaptations?
 - Site by site varying adaptations
- Interactions between all three factors

History of Global Adaptation Costs

- Three Basic Methods
 - Expert Judgment: % increase in total investment:
World Bank (2006): \$10 to \$40 B
 - Extrapolate from Bottom-Up e.g., NAPAs (Oxfam 2007): \$14 to \$33 B
 - Top-Down Rules
 - Universal modeling w/ simple assumptions
- UNFCCC (2007): Combination of 1 and 3
- World Bank (2009): Top Down

Focus On

- UNFCCC (2007)
- Parry et al. (2009)
 - Critique of UNFCCC study
 - Contended estimates far too low
- World Bank (2009)

Sector	United Nations (2007)	Parry et al. (2009)	World Bank (2009)
Agriculture, Forestry, Fisheries	7	7	6
Water Resources	9	Much higher	11
Human Health	5	At least 10	3
Coastal Zones	5	10	29
Infrastructure	2-41	65-154	29
Extreme Events	--	--	7
Fisheries	--	--	2
Ecosystems	--	33-40	--
TOTAL	28-67	> 134-230	80-90

Let's Look at Water Resources and Infrastructure



Water Resources

- UNFCCC: Top-Down Rule: Costs of building additional water supplies
 - No supply distribution, flood control, water quality
 - \$9 B/yr in 2030
- Parry did not offer a new estimate but pointed out missing elements
- World Bank estimated costs of new supplies and flood control
 - \$11 B/yr in 2030



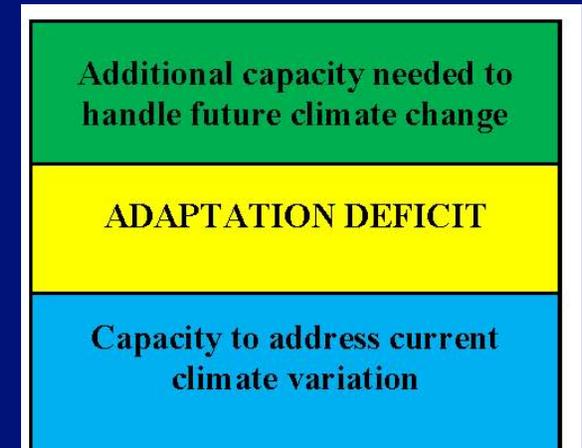
Infrastructure

- UNFCCC: % of current infrastructure investment sensitive to climate; assume 5-20% increase: \$2-41 B/yr
- Parry: Does not account for “adaptation deficit”
- Bank: Applied top-down rules based on costs in literature
 - Urban infrastructure and roads largest share
 - \$29 B/yr by 2030



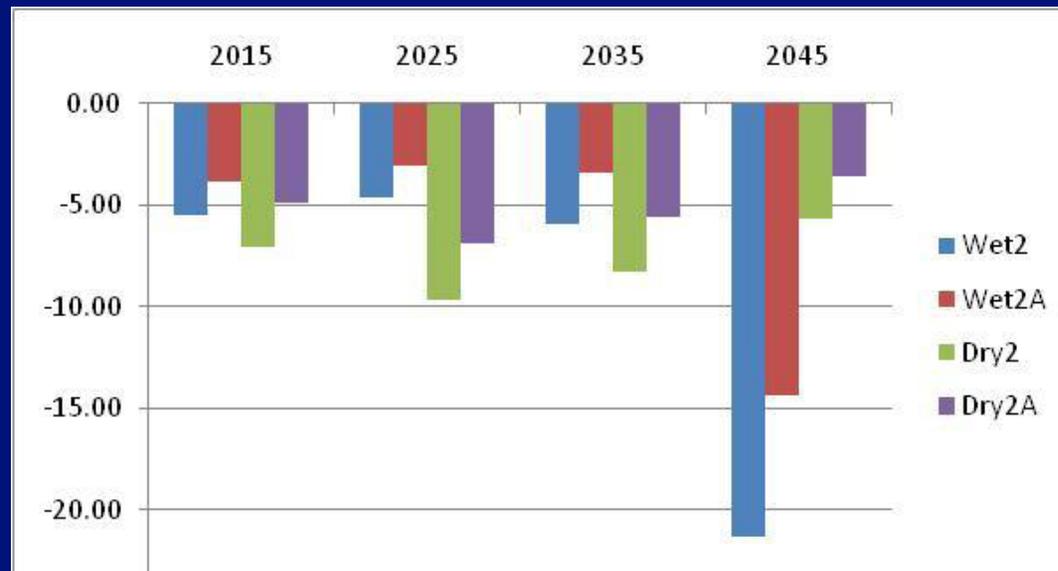
“Adaptation Deficit”

- “Development Deficit”
- Are developing countries underinvested in current climate protection?
 - Developing Countries suffer proportionally more losses; much more risk to human health
- Are marginal benefits of investments appropriate for level of development?
- Ultimately, is this a matter for the UNFCCC or for the development community?
 - False dichotomy between development and climate change



Sector	United Nations (2007)	Parry et al. (2009)	World Bank (2009)
Agriculture, Forestry, Fisheries	7	7	6
Water Resources	9	Much higher	11
Human Health	5	At least 10	3
Coastal Zones	5	10	29
Infrastructure	2-41	65-154	29
Extreme Events	--	--	7
Fisheries	--	--	2
Ecosystems	--	33-40	--
TOTAL	28-67	> 134-230	80-90

World Bank Country Analyses: Ethiopia



- Combination of top-down rules based approaches
- CGE modeling

Where Are We on Estimating Adaptation Costs

- Published estimates find \$tens B to perhaps > \$100 B/yr by 2030
 - No confidence in specific numerical estimates
 - Low to medium confidence on order of magnitude
 - Beware of “crackpot rigor” (Schneider)

Deeper Issues W/ Adaptation Funding

- Current funding levels well below estimated needs
- Assuming we have the “right” amount available
 - How ensure that the funding reaches those who need it, when they need, and in a form they can use it?
 - A lot of adaptation is “soft” e.g., reforms
 - Does a lot pot of money encourage large infrastructure projects?



Thank You!

jsmith@stratusconsulting.com