Ching-Cheng Chang

emily@econ.sinica.edu.tw

Ching-Cheng Chang received her Ph.D. degree in Agricultural Economics and Rural Sociology from the Pennsylvania State University. She was a Visiting Assistant Professor and Associate Professor at the Department of Agricultural Economics in Texas A&M University and received Deputy Chancellor's award in excellence and Vice Chancellor's award for industry/agency/assoc partnerships. She is now a



Research Fellow in Academia Sinica and has a joint appointment with the National Taiwan University, teaching mathematical programming and applications courses. D. Chang started her research on the natural disaster risk management and flood insurance policy design since 2003. She recently joined the National Center for Disaster Reduction as a Deputy Head of the Socio-economic System Division. Dr. Chang's research interests include:

- assessing the economic impact of public policies on natural resource usage and production decisions involved in agricultural sector.
- global climate change impact and related risk-reduction policies.
- methodological issues involved with micro-level and macro-level decision making, efficiency measurement, productivity growth, dynamic optimization, risk/uncertainty, and cost-benefit analysis in public project appraisal.
- trade policies and market structure of international commodity market.

Ching-Cheng Chang

emily@econ.sinica.edu.tw

Research Fellow, Institute of Economics, Academia Sincia Professor, Department of Agricultural Economics, National Taiwan University Taipei 10617, Taiwan

Position Paper for "Methods to Forecast Natural Hazard Occurrence and the Impacts on Societal System" in Us-Taiwan Mega-City/Mega-Disaster Workshop

Modeling mega-disasters of a natural catastrophic event poses very strong challenges to disaster research and all levels of government involved in preparedness, emergency response, infrastructure design, mitigation, impact assessment, and recovery management. Most of the policy recommendations have to be based on an integrated modeling effort and evaluations that are primarily designed to cope with a pre-existing situation or uncertainties in a known fashion.

I believe that before the some major discovery on forecasting natural hazards in the context of MC/MD are found, analysis on social-economic vulnerability can provide useful information for the government and society to prepare in advance and to mitigate their detrimental impact. Progresses have been made after recent catastrophic events. However, there are many unsettling questions raised by the existing approach on vulnerability assessment and its applicability. For example, community network has been considered as a critical elements affecting capacity building for recovery, but community data are either hard to find or hard to quantify. There is also skepticism on its applicability in the mega disasters because it is often difficult to pin down the most vulnerable site by extrapolating on previous experience.

Another impediment to effective decision making in the mega-city case is that risk perceptions can be so diverse among residents that it is hard to generate consensus to take drastic actions against mega-disasters. For example, there should be regulations to decide the removal, repair or retrofit the buildings in earthquake-prone areas. However, it is very difficult to coordinate homeowners in multiple-dwelling apartments even if the buildings are considered to be in danger. An extreme case was that during the 921 Chi-Chi earthquake, there were 84 fatalities in the Tonghsin building in Songshan district of

Taipei city. It took 10 years for the building to be rebuilt. Another example is regulations on information release concerning buildings located in the most dangerous land-slide or flood-prone areas. The public have the right to know the geological data collected by the government or research projects funded by the government. However, those who reside in the hazard-prone areas are afraid that such information will create a housing market collapse or they can no longer afford to buy insurance.

Finally, for MC/MD, precautionary principle may be relevant because there is obviously limited data available for scientific studies and lack of experience about preparedness, emergent response and recovery. We need to be well prepared for the conceivable worst-case scenario, but the questions are: at what cost and can we afford? An integrated model may be useful for understanding some of the outcomes of a mega disaster, but a rigorous methodology on cost-benefit and sensitivity analysis incorporating all aspects of the uncertainties in extrapolation from past observations should be developed for public policy decisions.