GLOBAL BLUEPRINTS FOR CHANGE

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The Global Blueprints for Change contain guidance for working together to improve the capability to identify indicators of physical, social, enterprise, and environmental vulnerabilities throughout the world and to select and implement realistic solutions to reduce them towards acceptable levels.

Theme C: LEARNING FROM NATURAL AND TECHNOLOGICAL DISASTERS
Topic C.7: Improving Risk Assessment Tools for Financial Risk Managers

"An Insurer's Perspectives on the Risk Assessment Tools Available for Financial Risk Management"

This contribution was created by Dennis Fasking
Allstate Insurance Company
Chicago, Illinois

AN INSURER'S PERSPECTIVE ON THE RISK ASSESSMENT TOOLS AVAILABLE FOR FINANCIAL RISK MANAGERS

Dennis Fasking[1]

Abstract: Like all Blueprints for Change, this one contains guidance for working together to improve the capability to identify indicators of vulnerabilities throughout the world with the goal to provide an appropriate basis for moving toward a sustainable built environment in all communities throughout the world that are threatened by primarily natural disasters. It will seek to answer the same two basic questions as all of the blueprints: a) What actions should be undertaken to achieve the desired change? and b) How should we go about implementing these actions in local, regional, national, and international contexts?

Background

But perhaps unlike many of the other Blueprints for Change, this one deals with suggested improvements in an already existing and reasonably capable set of modeling tools that have already been developed and are in use by a sizable and growing group of stakeholders throughout the insurance industry. For corporations who have made use of the results from such models, they are but one part of a more extensive analysis of their operations and how catastrophes impact their financial condition and ability to continue to serve their customers. In some cases, much more complex dynamic financial models are in use, with catastrophe modeling and subsequent post-processed projected catastrophe loss scenarios included as just one input thereto.

This Blueprint has the need for an educational component in that it will require the uninitiated to be educated on what are the best of these particular tools, on what are the needed practical improvements, and how they are likely to affect the subsequent management actions that are necessary. We will attempt to set the stage by setting forth:

1.) A working premise for this Blueprint;
2.) A set of preliminary working assumptions;;
3.) A defined scope;
4.) A list of the specific topical areas to be addressed; and
5.) A logical series of steps to be followed in addressing them.

Working Premise:

Catastrophe modeling is a very complex assimilation of the best available input data and the latest generally accepted sciences that are engineered into proprietary "black boxes" that need to be understood and whose credibility is very important to the users and other stakeholders. The modeled results are oftentimes just the beginning, in that their static snapshots must be further modified and projected within the users' own proprietary post-processing procedures and models.

[1] Allstate Insurance Co, Chicago, Illinois, , dfask@allstate.com

While there are immense complexities involved, the challenges of improving these financial tools and in working with users and other stakeholders will be exciting for those who choose to get involved. And the opportunities don't rest only with the catastrophe simulation models. This is understood by many who have already moved into the Dynamic Financial Analysis (DFA) modeling arena. DFA kinds of models use the science-based simulated catastrophe loss projections as just one key input into dynamic views of future financial result scenarios.

But those who wish to effect changes contemplated in this Blueprint, will understand that catastrophe simulation modeling is a crucial input to DFA for corporations with significant property loss exposure, whether they are insured or not.

The complexity of the matter suggests that work under this Blueprint must be carefully prioritized and then done in phases in accordance with those priorities.

Working Assumptions:

We will make a number of assumptions about the Workshop participants who will want to be involved in this blueprint for change.

We believe that they:

1. know the definition of a "model", as used in a catastrophe simulation and a loss estimation sense;
2. understand who are the primary stakeholders in mitigation;
3. have a basic understanding of what constitutes the kinds of catastrophe simulation modeling tools which are in use today;
4. are themselves either a risk manager or they have technical expertise to contribute to perceived solutions for the challenges that are raised herein, (including, but not exhaustively: rating agencies, insurers, reinsurers, consultants, and intermediaries);
5. understand that working toward improvements to the existing commercial model are much more achievable with less investment than attempting to recreate the entire wheel;
6. aware that improvements to the existing financial risk management tools are indeed desirable over time, but understand that denigration of existing models is bad strategy policy;
7. appreciate the users' unique perspectives, intentions, needs, and anticipated applications;
8. understand that there is a natural priority order for addressing the challenges raised and to rush into investment of financial and/or human resources to address the lower priorities for the key stakeholders and users could actually be counter-productive or result in a failure of the hoped for solution;
9. clearly see that the best groups with which to work are the leading commercial catastrophe modeling firms who are already working with the key stakeholders and users for many reasons which might include the following:

a) development of new catastrophe simulation models cost a tremendous amount of money and a variety of involved experts to create and maintain;
b) it is best to work to improve upon such key components as the underlying science, data, statistical estimation, and sampling techniques that would yield "key stakeholder specified" needed practical improvements, rather than starting over;
c) there is no desire to discourage the kind of scientific exploration that takes place on the chaotic frontiers of science, but there are very good reasons for not changing modeling until there is a good scientific consensus and the impacts of the change are fully and practically understood by the users and stakeholders; and
d) recognition of the very long learning curve and the users' and stakeholders' needs to integrate modeled results into an entire network of internal calculations and user-produced modeling built therefrom assumptions and with sufficient lead time to enable the users and stakeholders to adequately manage communication of the new results with their respective management and others who have interest in their corporation's management of risk.

10. Applied Insurance Research (AIR), Applied Research Associates (ARA), AON/Impact Forecasting (Catmando), Benfield/Blanch (Catalyst), and Risk Management Solutions (RMS) are leaders in catastrophe simulation modeling. Their models are in use as financial risk management tools that could be improved upon to remove some of the remaining uncertainty therein, but not without understanding the ramifications on the users and stakeholders.

Defined Scope

This Blueprint for Change will provide guidance for: purveyors of data and information that may be missing; scientists and other experts who can improve one or more of the key components of the financial tools themselves; and practitioners of dynamic financial risk analysis and other managers throughout the world, who are looking for new and improved dynamic financial analysis tools to assess the full range of potential impacts of the disaster agents generated by natural and environmental hazards. It is written primarily to encourage active interaction by those who need the information (users and stakeholders) and those who can effect practical and positive changes in the quality and usefulness of that information (the scientists, engineers, other experts, and data base managers).

The focus will be on improving the analytical tools used to model the physical phenomena and the use of the results of these models to form strategic policy decisions by users and stakeholders, either directly or in conjunction with other dynamic financial analysis (DFA) kinds of models.

Key Issues To Be Addressed:

Accuracy – The Blueprint should begin with an understanding of the evolution of the current accuracy of existing key components of catastrophe simulation loss modeling, including that of the input data, the underlying science and simplifying assumptions and ways of implementing the model to exposed portfolios. Participants should strive to understand when users and stakeholders can make effective use of the existing simplicity and accuracy built into the models and when it is necessary or prudent to effect improvement in key components of the model that make a greater difference. Because there is a large cost for new model development and maintenance as a state-of-the-science model is huge, the focus will be on improving existing models instead of creating new ones. Even for work done to improve the accuracy of a key aspect of the models, the cost of the additional accuracy must be compared to the benefit to be produced therefrom. Validation and logic checks of the key assumptions and applications to which the model outputs are used are of interest. "Accuracy" based upon the latest scientific consensus is an important requirement, since many of the interested financial risk managers will have a fiduciary or professional accountability to others who rely upon their work. Although many researchers tend to work independently, (or at least on a dedicated team with similar interests), and may wish to carve out a niche for application of their unique work, the most used and usable catastrophe simulation models are commercial models. This situation suggests that participants in this Blueprint will need to find ways to effect improvements in the accuracy of model output from these existing models for the use to which each is being applied.

Uncertainty – The existing models include a considerable amount of uncertainty imbedded throughout which could be reduced through the efforts of participants in this Blueprint. Even if the initial efforts are made to identify and quantify that the sources and levels of uncertainty for the users and stakeholders, it would be of considerable value. But ultimately, we would hope that the various component-wise and aggregated uncertainty of the modeled output that is used could be significantly reduced to improve the consistency of the direct modeled results, but also of the projected results and snapshots of future dynamic financial impact. Input quality, more detailed exposure information, better hazard detail, better selection of realistic theoretical distributions and sampling techniques, more realistic assumptions and aggregation techniques, better output quality all are important and possible areas to consider for improvement. One early area to address within this Blueprint would be to improve the insufficiency as to quality and detail of data and the appropriateness of the data for the intended usage of the modeling output and subsequent post-processing applications. Tackling the insufficiency of the collected exposure and damage information would be an important improvement, which itself will not be a non-trivial exercise but if very important to the cause of building sustainable communities (one home and business at a time)!

Applicability of Modeled Results – The Blueprint will want to ensure that whatever improvements are made will be applicable for the intended use of the modeled results. Whatever changes are made must be done in such a way as to accommodate changing usage over time. Meeting current usage requirements is important, but forward views of how the modeled results will likely be used in the future must be considered. For insurers and other financial risk managers, capital and exposure management

interests and product pricing will need to properly reflect changes that come from the impact of this Blueprint. The way proprietary software must be tweaked to improve its accuracy and to decrease uncertainty must not cause unforeseeable and unmanageable problems for the users and stakeholders. These could come from different versions of the model, changes of platforms (perhaps from mainframe to personal computer, or the reverse, or even from mainframe to supercomputing mainframe), necessary applications to fit real life needs of the users that force assumptions, methodology application simplifications, order of application of model steps, rounding of step-wise calculations, etc.

Managing Change (Including Corrections and Improvements, Not Just Mistakes or Bad Science!) - Consistency over time, even during a time of evolving model improvements, is very important for the participants in this Blueprint to keep in mind. This is because relatively small changes in results can have far-reaching ramifications for users and stakeholders and must be communicated and explained to non-technical senior management and other key stakeholders within and outside of the users' organizations. This Blueprint will discuss the ramifications of addressing corrections and improvements such as data bases and level of data detail used as input to the models (historical events, information on site conditions and hazards, and exposures at risk); improved tools for analysis; improved application of procedures and methodology to fit the needs of the "customers"; to accommodate anticipated changes in people resources involved over time; to understand and factor in the impact of the political considerations due to regulators and others who may not like the results from using better models and choose to attack the tools' effectiveness or credibility; and finally we will need to discuss ways to preserve the proprietary and confidential nature of the models' "black boxes" and effective procedures for "certifying" key components of existing models so that those areas needing attention can be identified and worked on by participants in this Blueprint without damaging modelers', users', or stakeholders' intellectual property rights. The latter item has been addressed in a variety of ways by the Florida Hurricane Modeling Commission and various other states' oversight authorities who have taken on the challenge of model reviews and certification. This should be approached as a barrier to be overcome, but not as an insurmountable one to be avoided.

Although setting the stage for the work of participants in this Blueprint, some of these topics may conjure up additional barriers to successful change through application of the Blueprint. We will choose to see them as obstacles to be overcome or as the defining boundaries within which it can be framed.

Steps to Take

Learning From What Already Exists, Then Establishing Objectives –

1. Workshops involving key participants, modelers, users, and stakeholders with the stated goal of accomplishing the following. The focus would be to bring key participants up to the same level of understanding of the latest developments and

current usage of such models and financial risk management tools. They would accomplish steps 2. Through 5.
2. Understand what has already been done and examine the paths followed by others who have gone before.
3. Understand the vast diversity of current usage and an evaluation of what can be expected for the future.
4. Identification of hidden obstacles and barriers to success.
5. Establishment of realistic long term, intermediate, and short term objectives.

Who's Who? Finding Potential Partners -

6. Working committee of key representatives from the key participant, modeler, user and stakeholder groups, who have a strategic understanding of their fields and what these financial tools can and do mean to progressive organizations and governments. This group will be needed both for the identification of the key change architects, but also to prioritize the opportunities and to address the other considerations, (steps 7. through 11., which probably will not be found to be exhaustive once the working committee meets and has a chance to consider what needs to be done and how.).
7. Identify the best user, stakeholder, modeling groups with whom to work to bring about efficacious change
    a) Ultimate key users and stakeholders and how they can be solicited to cooperate?
    b) Who owns the current processes and tools?
    c) Who is willing to collaborate and how?

Prioritizing the Work -

8. Prioritize the opportunities by peril, by hazard challenge, by concentration of exposures, by type of exposure (single family homes, small businesses, multi-location large commercial, etc.) rather than addressing at random

Other Considerations -

9. Understand the consequences – How good is good enough? Not acting may not cripple the user, but it does limit the breadth and depth of how far they can go with the results of improved catastrophe models and other financial risk analysis tools.
10. Identification of the risk versus reward equations for as many of the users and stakeholders as possible. Identifying what's in it for key users and stakeholders is a key outcome.
11. Smaller action teams would be needed to address various task-oriented activities, such as those described in the sample applications that follow.

Sample applications of the Blueprint –

Assume that the above steps have already been completed and that it has been decided that the absence of data is a top priority, in order to further the broader goal of motivating homeowners to make their homes stronger and safer against hurricanes and earthquakes.

Missing or inadequate data

There are perhaps many identifiable areas of missing or inadequate data, but two that come to mind are:

Exposure information –

How non-engineered structures have actually been built as respects the key structural components that are vulnerable to such natural hazard perils as hurricanes or earthquakes, which have large financial impacts on insurance and others involved in managing the attendant financial risk presented, remain largely unknown. It is possible that data base management companies may already have the missing information and/or be in a position to slightly modify their normal collection activities to obtain it. Home inspections might be modified to collect some key additional information that would be done at the same time as a new home or mortgage refinance required inspection is done, which information in their data base could become input for more precise model runs.

Another such need exists for the exposure information needed as input to the government's HAZUS models (both existing and under development). The better and the more complete the information, the better the estimates of damage for emergency response actions, for promoting mitigation, and for filing for and evaluating assistance requests. And the total exposed inventories used in the models would be more complete and accurate. The government might want to follow a similar path for their owned structures in order to get a whole cost picture of disasters.

Damage information after an event –

Calibration of damage curves used in existing models is done by a combination of the results of the post-event damage studies and from carefully structured agreements on sharing and evaluation of claims data from their clients. What if we could identify better damage or claim information through some sort of voluntary gathering of information at the industry level that was shared in some way that protected the proprietary interests of the insurers and the privacy interests of insureds, yet could put a wealth of structural damage information on key blocks of catastrophe exposed homes or businesses in the hands of researchers after certain catastrophes? Then the experts could analyze it and effect more improved results from future model and other financial risk management tools.

A dedicated team would be needed to openly and creatively address the opportunity and the many barriers to accomplish this in a voluntary program. They would be charged with coming up with new, innovative, and effective solutions at reasonable cost to accomplish the worthy pre-prioritized goal.

Motivating Homeowners -

There has been very little research into the way that individual members of the public could be motivated to choose to mitigate the future damage to their home from natural hazards, such as hurricanes and earthquakes, by seeing to it that it is built or retrofitted to be stronger and safer in such events.

If social scientists would work with key stakeholders, perhaps a strategy for making such strengthening and protection of life and property a higher priority could begin to make mitigation actions a selling point for homes in exposed areas. To date, few people are willing to demand and to pay for needed improvements, choosing instead to ignore the problem or to think that it is their insurer's or the government's problem.

One might rightly wonder how this could fit into a Blueprint for improving financial risk analysis tools. But the lack of importance that individual homeowners place on mitigation actually tends to cause there to be an absence of justification by the insurers and other key stakeholders to spend the money to change their systems and procedures to collect or store either exposure or loss information on key structural components. Such could ultimately lead to the financial risk analysis and management tools being improved and better analyses being done. So this aspect of motivating homeowners may be an important and integral part of the solution for the example discussed above.