The Early Warning of Humanitarian Disasters: Problems in Building an Early Warning System[1]

Susanne Schmeidl
Independent Consultant

J. Craig Jenkins
The Ohio State University

Early Warning Models (EWMs) have been successfully used to forecast natural disasters such as droughts, storms, and famines but are unproven in forecasting humanitarian disasters such as refugee migrations, state failures, and associated political conflicts. Recently, the United Nations (1992), the U.S. Department of State (1994), and several humanitarian assistance agencies have launched early warning efforts, and the White House (Gurr, 1995) has sponsored a formal early warning exercise on state failures. Numerous analysts (*e.g.*, Singer and Wallace, 1979; Clark, 1983, 1989; Gordenker 1986; Rupesinghe and Kuroda, 1992) have discussed the methodological problems in creating EWMs of conflict and humanitarian disaster, but they neglected the fundamental problem of "late warning," *i.e.*, the creation of warning signals after disaster has occurred. This is partially a problem of timeliness, but it is also a problem of perspective. Academic researchers typically take a retrospective approach to conflict and disaster while policy analysts take a prospective approach. Second is the political feasibility problem. This is generally conceived in terms of the problem of "political will" and coordination (*see* Loescher and Loescher, 1994), but neglected in these discussions is the fact that political will is often the product of humanitarian disaster itself (euphemistically referred to as the "CNN effect"). What, then, is the political feasibility of humanitarian early warning?

We argue that academics need to understand the implications of a prospective approach to conflict and disaster as well as develop new modeling and data development techniques to overcome the late warning problem.

Improved analysis of temporal processes, automated event data development, the integration of case study, and quantitative methods and greater clarity about units of analysis should create the capacity to provide timely and policy-relevant information. The dependence of political will on media coverage of humanitarian disaster (the CNN effect) will continue to be critical for humanitarian disasters that lack clear national security implications, but policymakers are increasingly confronted with conflicts and refugee flows that present clear and direct threats to national security (Dowty and Loescher, 1996). This, coupled with the mounting financial costs of humanitarian assistance, should reduce the political will problem. We discuss first the nature of humanitarian early warning, then late warning and related methodological problems and, in the conclusion, address the problem of political will.

WHAT IS EARLY WARNING?

An EWM is an analytic forecasting tool that has been honed by systematic evidence and can be used to identify the likelihood of specified events or conditions occurring in certain locations in the future. To be useful in filtering forecasting information, EWMs need to be guided by a theoretical model of the phenomena being forecast (*e.g.*, civil wars, refugee migrations) and disciplined by exposure to systematic evidence. In these exercises, we should formally distinguish between political risk assessment (*i.e.*, assessments of the structural factors that put certain countries or regions at risk of experiencing disaster) and early warning in the narrow sense (*i.e.*, dynamic analyses of proximate processes such as generalized violence likely to create refugee migrations and associated humanitarian disasters). Different techniques will be needed to generate relevant information and analyses. Policy analysts have traditionally relied on expert panels (*e.g.*, regional area desks, Delphi techniques to generate consensus judgements by area experts, reports by field monitors) as well as formal quantitative models, Bayesian or rule-based decisionmaking systems and extremal statistical formulas (*see* Sylvan and Thornson, 1980). Political risk assessments can rely on conventional cross-national indicators, such as those created by the World Bank and the International Monetary Fund, as well as customized indicators such as the Minorities at Risk measures of ethnic discrimination and separatism (Gurr, 1993). Narrow early warning has traditionally depended on field reports, news sources, and area desk experts, but it could draw on new automated event data systems and remote sensing information such as from satellites.

Despite these possibilities, current resources are not sufficient to develop strong humanitarian EWMs and associated information systems. Yet academ-

ics have considerable knowledge about the sources of conflict and humani-
tarian disaster which could be used. A sustained dialogue between academics
and policy analysts could make up for this lack of resources. However, this
dialogue is currently hampered by lack of understanding on the part of
academics about the needs of policymakers and, on both sides, about the dif-
ference between EWMs and traditional social science models (or SSMs).

Let us deal first with the needs of policymakers. Policymakers are pri-
marily concerned with positive objective knowledge that is prospective in
nature (*see* Andriole and Hopple, 1984:145–146). That is, they want to
know what events or processes are likely to occur in specific places and times
at certain points in the future. They are more concerned about positive pre-
diction –what is likely to occur – and less with negative prediction – what is
unlikely to occur. Their policy horizon is generally short term, *i.e.*, events less
than a year in the future, and they are typically concerned with specific actors
and delimited sections of the world. Although policymakers are generally
aware that early warning is an exercise in conditional probabilities, *i.e.*, iden-
tifying the likelihood of specific events, their main interest in early warning
is to reduce uncertainty. Hence false alarms are typically as damaging to the
credibility of EW analysis as false negatives, *i.e.*, failures to forewarn of disas-
ters that do occur.

They also want clearly interpretable timely analysis, which militates
against complex computer models and historical scenarios. Moreover, their
specific operational priorities are continually shifting, requiring highly flexi-
ble models that are rich but still filter information in policy-relevant ways
(Laurance, 1990).

Most important of all, there is a fundamental logical difference between
EWMs and SSMs. Policy analysis with EWMs is prospective, *i.e.*, works from
current conditions to future outcomes. In contrast, academic work on SSMs
is retrospective, *i.e.*, moves from past outcomes to originating conditions.
Thus, academic discussions of humanitarian disaster have typically focused
on predicting what factors (*e.g.*, poverty, ethnic problems, political violence)
led to refugee migrations in the past. However useful this may be in identify-
ing factors for monitoring, it is not sufficient to realize the ideal of humani-
tarian early warning, namely, identifying situations with sufficient advance
timing that preventive measures can be adopted which reduce the likelihood
or the severity of future disasters.

How might this be addressed? A first step is understanding the different
logic of EWMs and SSMs. Work on SSMs is retrodictive, *i.e.*, focused on pre-
dicting past events and therefore working from outcomes to antecedents. Our
assumption in moving from an SSM to an EWM is that the future will be

structured like the past. This is true regardless of the formal modeling method (*see* Sylvan and Thornson, 1980; Andriole and Hopple, 1984:chs.4–10; Gurr and Harff, 1996) or the specific events or conditions being forecast. If this assumption is violated, SSMs are not useful for early warning purposes. However, SSMs can provide early warning analysts with important information on the factors to be monitored and, insofar as their information is timely and relevant, the countries and regions more likely to experience humanitarian disasters in the near future.

Several have pointed to the formal similarities between humanitarian and natural disaster EWMs to argue the feasibility of humanitarian early warning. Yet important differences need to be recognized. Humanitarian EWMs have to contend with the reactiveness of human action, which bedevils forecasting as conventionally understood. That is, human actors can respond to the forecast itself in unpredictable fashions (including self-fulfilling prophecies) and thus may falsify as well as fulfill social science-based forecasts. Natural disaster early warning, in contrast, deals with likely events that will occur independent of human volition or action. Thus a forecast that a storm, flood, or famine is likely to occur will produce an attempt to prepare facilities, move populations to high ground, or evacuate. Such emergency planning is now routine in the field of natural disaster relief. Humanitarian disasters, by contrast, provide two options: 1) policymakers can engage in emergency preparedness, assuming that the disaster cannot be averted; or 2) they can engage in preventive intervention, attempting to prevent or at least ameliorate the disaster. Since humanitarian disasters are largely due to human agency, it is possible to negotiate or apply political pressure for peaceful (re)solutions. This, of course, makes humanitarian EWMs all the more appealing since they imply the possibility of prevention. Yet, this human reactiveness also means that humanitarian early warning is less certain than natural disaster early warning. It also means that relief agencies and political actors might oppose early warning, which either casts them in a negative light (*e.g.*, countries identified as human rights violators) or works against their political interests (*e.g.*, blocks attempts to weaken political rivals or reduces political pressures to fund humanitarian relief agencies).

Although we are skeptical that most humanitarian disasters are fully preventable, we do think that EWMs can help policymakers minimize such disasters and prevent some from occurring. Our main point here is that humanitarian EWMs are logically different from natural disaster EWMs. Instead of simply developing predictive models, the primary aim of humanitarian early warning is to foreshadow disasters and thereby inform policymakers and others, including interested publics, about likely humanitarian disasters.

This has major implications for what should be done. Because of the inherent reactivity of human action, the primary aim of humanitarian early warning is preventive rather than simple forecasting. In other words, our primary concern should not be simply the prediction of humanitarian disasters but rather alerting policymakers and the general public to intervene to prevent or ameliorate such disasters. This leads, of course, directly to the political will problem and the hazards of intervening in conflicts.

THE PROBLEM OF "LATE WARNING"

The problem of late warning is inherent in the logical contrast between SSMs and EWMs. Scholarly research is retrodictive and emphasizes accuracy and theoretical originality over timeliness. Scholars have greater time to construct their analyses and typically arrive at their conclusions many years after the events of interest have occurred. Policy analysts have a matter of days or weeks to conduct analyses, if necessary by crude techniques. SSMs will therefore always be "late warning" in that they will be dated. They may, however, be useful for identifying relationships and critical monitoring indicators. The key question is whether relationships that held in the past continue to hold in the future. The more dated the evidence, the greater should be concern about discontinuities. The end of the cold war, for example, created new political opportunities for ethnonationalist movements and thus may have altered the relevant sources of humanitarian disasters. Such historical discontinuities need to be included before SSMs can be used for building EWMs.

There is, however, significant reason to be optimistic about the dialogue between practitioners of SSMs and EWMs. First, recent advances in data gathering and analysis by academics should reduce the late warning problem. Andriole and Hopple (1984) argue that earlier attempts to bridge academic and foreign policy analysis in the field of political events data were undercut by reliance on conventional library research and human coding of news sources, which required months before event summaries were available. Given the strategic imperatives of policy schedules, policymakers cannot generally wait for more than a few days or weeks. However, recent developments in automated event data development and artificial intelligence (Schrodt, 1995; Mallery, 1991; Davies and McDaniel, 1993; Andriole and Hopple, 1992) have made it feasible to generate near real-time information on many political events of interest. The Global Events Data System (GEDS; see, Davies and McDaniel, 1996), for example, is currently capable of generating information on conflict indicators on a near real time basis for a limited number of countries or regions, using computer-assisted human coding. Even more promis-

ing is the automated coding associated with the Kansas Events Data System (KEDS; *see* Schrodt, 1995; Gerner *et al.*, 1994) and the Protocol on Nonviolent Direct Action (PANDA; *see* Bond and Bond, 1995; Bond *et al.*, 1997). These rely on sparse parsing techniques to code on an automated basis international interactions in the Middle East (KEDS) and a range of nonviolent to violent civil conflicts on a global level (PANDA) using Reuters World Newswire. These computer programs can be adapted to any electronic text, including internal communications (*e.g.* State Department cables) and alternative electronic news sources (*e.g., The New York Times, Africa Digest*). Bond (1997) has also created an integrated system (FRED for Find-Read-Extract-and-Display) that links automated event coding with standard microcomputer spreadsheets and graphics. Hence, the time lag between policy definitions of relevant information and the generation of political events analyses has been reduced to a matter of days.

These data systems still confront reliability problems. No single information source can cover all regions and events equally. For news sources, there are report biases linked to issue-attention cycles, the geographic location of report bureaus, perceptions about subscriber/reader interests, and the dislocation of reporters due to war and civil conflict. News reporters may also underreport protests and other conflicts that would be politically embarrassing to governments that could cut off access or even resort to repression. There is also the problem of underreporting in inaccessible and isolated areas, precisely where humanitarian disasters are more likely to occur (*e.g.,* Myanmar [Burma] or Afghanistan). Eventually, multiple sources will reduce these problems.

Some have argued for the creation of Internet-based early warning and discussion groups on which relevant information, policy discussions, and early warnings could be posted by humanitarian agencies, political advocacy groups, and independent scholars (Duffy *et al.*, 1996). The United Nations Department of Humanitarian Affairs has created ReliefWeb, which provides timely information on selected crisis areas updated twice daily, and the Centre for Refugee Studies, York University, has created EWNET-L, which is an electronic discussion group for posting early information and analyses. Both of these systems have centralized professional regulation, thus minimizing misinformation and insuring timeliness of information. These, however, cannot replace the need for systematic data gathering and analysis based on standardized information about humanitarian disasters and their sociopolitical sources.

A second source of optimism is the increasing knowledge about the sources of humanitarian disasters. While there is considerable work to be

done, there is a growing consensus that generalized violence is the major proximate determinant of refugee migrations (*see* Loescher and Loescher, 1994; Weiner, 1996; Schmeidl, 1995, 1997; Jenkins and Schmeidl, 1994, 1996), and academics have created a growing body of formal indicators of these types of violence (*e.g.*, geno/politicides [Fein, 1993, 1994; Harff, 1994]; ethnic discrimination and conflict [Gurr, 1993; Gurr and Haxton, 1996]; armed conflicts [Wallensteen and Sollenberg, 1995; Jongman, 1994]; and civil/interstate wars [Singer and Small, 1993]. There is also growing agreement that the root causes of humanitarian disaster are combinations of poverty and economic dependence, weak states, and ethnic discrimination along with international rivalries and foreign military interventions (Zolberg, Suhrke and Aguayo, 1989; Weiner, 1996; Schmeidl and Jenkins, 1998).

MODELING PROBLEMS: CONTEXTUAL AND TEMPORAL SENSITIVITY

Several modeling problems need to be addressed to create stronger EWMs of humanitarian disaster. First, we need to combine case information with general indicator models. Indicator models provide general information about factors that should be monitored, while case studies provide in-depth information about key personalities, issues, and events that are needed to gauge the prospects for conflict resolution. Traditional intelligence gathering and early warning efforts have been strong on case information but often lacked indicator information. Academic work is typically segmented into indicator and case studies with little bridging. As case analysts argue, formal indicators often lack the detail and precision to predict and, as indicator analysts claim, case studies often fail to identify generalizable factors (Ragin, 1987). Early warning analysts need to incorporate information from both social science traditions, following monitoring indicators that have been shown to predictive value while bringing case information to bear in anticipating responses.

   One measure is to improve SSMs from each analytic tradition. Indicator analysts have often found conjunctural causation (Goldstone, 1991), *i.e.,* outcomes depending on combinations of multiple factors. In our own indicator analyses (Jenkins and Schmeidl, 1996; Schmeidl and Jenkins, 1998), we found that weak states combined with ethnic discrimination generated refugee migration. Similarly, processes may have quite different meanings depending on their political context. For example, nonviolent protest in an authoritarian context might lead to state repression and thus refugee flight, while in a democratic or more open regime it might lead to political reform and thus constitute an alternative to flight. Hence, indicator analysts need to

examine such contextual effects. From the case study end, analysts provide rich stories that illuminate the personalities and issues behind conflict but often neglect general factors. While the former is needed for prevention, the general factors are essential for broader monitoring efforts. Thus, case analysts need to incorporate general factors along with their detailed studies and rely on induction to unearth previously ignored factors.

A second measure is for advocates of each tradition to better understand the idea of conditional probabilities. Indicator analysts often take a rigid view of their models, failing to recognize the probabilistic nature of their forecasts. At most they are showing that humanitarian disasters are more or less likely. Their forecasts will therefore be wrong in particular cases. Similarly, case study analysts often take an oversimple view of indicator models, claiming that false warnings invalidate them and, in more extreme critiques, that human behavior is unpredictable. No one can eliminate the hazards of false positives and negatives, but all would benefit by recognizing the probabilistic nature of early warning exercises.

Third is the need to combine multiple sources of information. Analysts often champion a single set of indicators rather than realizing the benefits of multiple sources of information. Indicator models need to be combined with information from field monitoring systems, expert panel assessments, as well as case-specific information. Field monitoring provides immediacy, rich detail, and otherwise unavailable information about "on the ground" developments that make it possible to formulate policies and devise preventive strategies. Such field systems need to be guided by standardized protocols backed up by training and periodic face-to-face meetings among field reporters to create standardized reporting. In-depth case studies provide invaluable contextual understanding as well as identify new factors to be monitored. In their work on geno/politicides and communal conflicts, Davies and McDaniel (1996) found that narrative histories were essential for interpreting event data series. Similarly, in an intensive case study of the genocide in Rwanda, Adelman and Suhrke (1996) found that the Western news media failed to carry accurate reports of the early genocidal events, correcting this only after the disaster had developed. Such studies will help improve indicator research and guide the assessment of policy options. They will also help link the concerns of social scientists, who worry more about generalizability, to those of policymakers, who are chiefly concerned with what will happen in specific places and times. Given that humanitarian disasters tend to be "all-or-none" situations, it may also prove useful to use categorical formal modeling methods, such as Ragin's (1987) Boolean algebra approach and log odds probability models (King, 1989).

A second problem is temporal sensitivity. We will never be able to predict the exact timing of events, if only because "each incident of forced migration has particular characteristics" (Gordenker, 1992:4), but we clearly need to distinguish long-term or "root" causes from medium-term or "proximate" factors and immediate or "triggering" events (*see* Clark, 1989). Root causes have typically been in place for years or even decades, while proximate factors develop within a year or less of major flight, and triggering events occur only weeks or days prior to disasters. Social science data collection, however, is typically organized around the country-year or longer time periods, which favors root cause assessment. Some contend that triggering events can never be identified and are so temporally proximate as to be useless for early warning purposes. Indicators need to be developed on a more flexible basis and appropriate modeling techniques devised to deal with variable temporal proximities to humanitarian disaster.

In our own research (Schmeidl, 1997), we have used pooled annual time-series regression and experimented with various time lags, up to two decades for root causes (Jenkins and Schmeidl, 1996) and "same year" versus lagged one year for proximate determinants. Schrodt (1996) has focused on annualized rates of change using departures from means to capture acceleration and deceleration of conflict. Event history techniques (Allison, 1984) may also be useful in capturing processes that lead to more rapid transitions toward disaster or reversals from such states. Overall, there has been little formal modeling of temporal processes, and there is little guidance on how long it takes for certain processes to lead to a humanitarian disaster. Given the importance of timing to policymakers, this is an area where considerable attention needs to be invested.

Some have argued for the use of "crisis-sequence" models which focus on standardized event sequences that lead to crises or other developments of interest (Singer and Small, 1993; Sherman, 1994). Gurr (1994) even claims that such "crisis-sequence" models constitute an alternative modeling approach to indicator or correlational methods. However, it seems likely that as correlational work becomes more sensitive to temporal dynamics by using time-series, event history and similar methods, the distinction between stage or crisis-sequence models and correlational models will disappear.

AVAILABILITY OF DATA

The major problem confronting indicator-based early warning efforts is developing appropriate high quality data with sufficient flexibility to be useful in changing circumstances. We have simplified the problem by focusing on

humanitarian early warning where the policy objectives are relatively stable. Hence the demand for greater flexibility and detail alongside the conflicting demand for greater simplicity and filtering (*e.g.*, Laurance, 1990) is less likely. However, humanitarian early warning faces major data availability problems.

First, many of the countries which have expelled refugees are not represented in standard cross-national data sets. Because of their international isolation, there are no good indicators of economic development, fertility and population structure for countries such as Pakistan, Burma, Vietnam, and Cambodia. Indicators that we suspect are highly relevant, such as severe economic inequality or imports of small arms and explosives, are lacking. Hence, quantitative analyses are often based on excluding some of the most important cases or interesting variables that lack adequate coverage. Aside from creating new data and formally modeling missing data (by including a missing data variable as a control variable and using mean substitution), the best solution is developing plausible proxy variables. In attempting to estimate the effects of income inequality on humanitarian disaster, for example, we substituted the change in child mortality over two decades net of controls for the simultaneous growth in GNP per capita (Schmeidl and Jenkins, 1998). Our argument was that, after controlling for economic growth, an increase in child mortality indicated severe economic inequality.

Existing indicators also have significant measurement problems. For example, existing data on wars (Singer and Small, 1993) and geno/politicides (Harff, 1994; Fein, 1993) provide only the general time period in which violence occurred. Hence, the temporal link to humanitarian disaster is crude. In our analysis (Schmeidl, 1997), we relied on the simple annualized presence of civil war and geno/politicide as opposed to the severity of violence. The Armed Conflict Project (Wallensteen and Sollenberg, 1995) provides annualized measures of violence after 1989 but, for broader analyses, needs to be reconciled with other pre-1990 data sets such as Correlates of War (Singer and Small, 1993) and PIOOM (Jongman, 1994).

Finally there is the question of the appropriate unit of analysis. Indicator research has largely worked with whole countries, but subnational regions or specific groups are often more relevant. The breakup of the former Soviet Union, Yugoslavia, and Ethiopia have made it clear that information on specific groups and subnational territories is central. The Minorities at Risk project (Gurr, 1993) has collected information on the exposure of named groups to discrimination which can treated on a group level or aggregated to a country level. Similarly, political event data systems such as KEDS/PANDA and GEDS have been refined to identify specific group actors and targets as well as regions within particular countries (*e.g.*, the Kashmir region of India, East Timor). A fur-

ther refinement will be to develop information on the vulnerable populations at risk (*e.g.*, indigenous peoples, ethnic groups, women, children, the elderly) so that monitoring can be linked more directly to the populations at risk.

CONCLUSIONS

Despite these problems, the promise and need for humanitarian early warning is considerable. There are new sources of data and methods for analyzing humanitarian disaster. Policymakers and academics have recognized the irrelevance of simplistic "prediction" ideas about early warning and shifted to conditional probability thinking. Although there is a major shortage of resources, academics working on various SSMs relevant to humanitarian disasters and conflict have generated tested models and data that have helped guide policy analysts working on EWMs. A major step is to sustain the ongoing dialogue between academics and policy analysts dealing with humanitarian disaster so that knowledge transfers occur in both directions. Our aim in this research note has been to highlight the misunderstandings preventing this dialogue and identify possible solutions.

In an ideal world, EWMs will be able to 1) address a global reach in terms of the number of countries and time coverage; 2) make positive as well as negative warnings about humanitarian disasters; and 3) incorporate information on subnational regions and specific groups at risk as well as whole countries. With suitable refinements, we should be able to use the reactivity of humanitarian disasters to our advantage by providing timely information that can be used prospectively for policy purposes as well as retrospective academic analysis.

We should be cautious, however, about overselling the potentials of early warning. As we have argued, we cannot predict specific events in terms of their timing or location but rather identify conceptual models that specify the probability of specific events or conditions. If we are successful, our measure of success will be in terms of disasters avoided or ameliorated. This means that proof of success may be elusive. It is much easier to document the number of people assisted than to convince policymakers that we have avoided or reduced certain disasters. Although we do not foresee early warning researchers working themselves out of a job, it would be a good sign if they were able to furnish timely warnings that provided for preventive and ameliorative efforts.

There are also major political obstacles to humanitarian early warning. First is political opposition. Humanitarian early warning is de facto associated with human rights monitoring, which inevitably identifies a responsible party for violations. Responsible actors can be expected to oppose such

reporting of their transgressions. Second, humanitarian early warning also puts limits on state sovereignty by demanding that countries respect basic human rights and accept external evaluation and interventions to protect these standards. Third is the mixed interest from those within the humanitarian relief community. In addition to skepticism and lack of understanding about the meaning of formal EWMs, humanitarian relief agencies may lose resources if early warning is successful. The avoidance or mitigation of disaster may thus threaten their budgets.

A more pressing problem is political will. Often this is conceived in terms of responsiveness to humanitarian need as opposed to national security interests. If humanitarian early warning was successful, then the political pressure created by dramatic and heart-wrenching human disasters transmitted by the news media (the CNN effect) would be blocked. Hence, the political will to support early warning research and to pay heed to early warning signals will be nil, and policymakers will wait until disaster has occurred to intervene. While this may accurately describe the recent reluctance of the United States and European powers to intervene in several recent disasters, it is also true that policymakers would like to avoid major disasters. Many humanitarian disasters also have threatened national security interests, thus provoking interventions by NATO and neighboring states (Weiner, 1996). Faced with escalating disaster costs and national security risks, humanitarian early warning may appear a good investment.

For humanitarian early warning to develop, we need credible analysis systems that are independent from narrow political interests. Thus the lodging and sponsorship of any early warning system is critical. Early warning should be formally separated from political advocacy groups and, while it shares much in common with emergency preparedness, it is formally distinct by focusing on longer range developments and options. While the scholarly community has much to offer, it is unlikely to speak with one voice and will be slow to respond to new developments. Policy analysts will need to recognize this diversity of opinion and play off the normal competition among academics to generate stronger information and advice. Second, humanitarian early warning differs from traditional intelligence (Adelman and Suhrke, 1996). The latter presupposes a clear national interest to be protected, but humanitarian early warning is based on protecting interests of others who are at risk. Therefore multilateral agencies with professionalized staff, such as the United Nations Department of Humanitarian Affairs, the OECD, the OAU, the European Union and the OSCE, are more suitable. Preventive intervention is also likely to depend on these bodies, which are less dependent on the CNN effect and less constrained by narrow national security definitions.

Recently, several centers for early warning research have developed with the United Nations Department of Humanitarian Affair's HEWS, the Food and Agricultural Organization's Global Information and Early Warning System (GIEWS), and similar units within several IGOs and INGOs. Another initiative is the Forum on Early Warning and Early Response (FEWER), which brings together academics and policy analysts from the various INGOs and NGOs involved in humanitarian relief to develop early warning signals and information. There are also positive developments among national governments. With the end of the cold war, many have argued for a broader conception of national security that includes prevention and early warning of humanitarian disaster. National security analysts have begun to discuss early warning and prevention of "conflicts other than war" and have become concerned with peacekeeping and humanitarian problems. We therefore are optimistic about the long-range prospects for humanitarian early warning and convinced that, if we recognize the barriers that have traditionally prevented effective dialogue between academic and policy analysts, a new basis for humanitarian early warning and preventive intervention can eventually be developed.

REFERENCES

Adelman, H. and A. Suhrke
1996 *Early Warning and Conflict Management: Genocide in Rwanda.* Joint Evaluation of Emergency Assistance to Rwanda. Toronto: York University Centre for Refugee Studies.

Allison, P.
1984 *Event History Analysis.* Beverly Hills, CA: Sage.

Andriole, S. J. and G. W. Hopple
1992 *Applied Artificial Intelligence.* New York: McGraw-Hill.

_____
1984 *Revolution and Political Instability.* London: Pinter.

Bond, D.
1997 *FRED.* Weston, MA: Virtual Research Associates.

Bond, D. and J. Bond
1995 *PANDA Codebook.* Cambridge, MA: Center for International Affairs, Harvard University.

Bond, D. and B. Vogele
1995 "Profiles of International Hotspots." Cambridge, MA: Center for International Affairs, Harvard University.

Bond, D., J. C. Jenkins, C. Taylor and K. Schock
1997 "Mapping Mass Political Conflict and Civil Society: The Prospects of Automated Development of Conflict Event Data." *Journal of Conflict Resolution,* 41:553–579.

Clark, L.
1989 *Early Warning of Refugee Flows.* Washington, DC: Refugee Policy Group.

1983 *Early Warning of Refugee Mass Influx Emergencies*. Washington, DC: Refugee Policy Group.

Davies, J. and C. K. McDaniel
1996 "Dynamic Data for Early Warning of Ethnopolitical Conflict." Paper presented at International Studies Association, April, San Diego, CA.

1993 "The Global Event-Data System." In *International Event Data Developments*. Ed. R. L. Merritt, R. G. Muncaster, and D. A. Zinnes. Ann Arbor: University of Michigan Press.

Dowty, A. and G. Loescher
1996 "Refugee Flows as Grounds for International Action," *International Security,* 21:43–71.

Duffy, G., T. R. Gurr, P. A. Schrodt, G. Mayer-Kres and P. Brecke
1996 "An Early Warning System for the United Nations: Internet or Not?" *Mershon International Studies Review*, 39:315–326.

Fein, H.
1994 "Tools of Alarms: Uses of Models for Explanation and Anticipation," *The Journal of Ethno-Development*, 4(1):31–36.

1993 "Accounting for Genocide after 1945: Theories and Some Findings," *International Journal on Group Rights*, 1:79–106.

Gerner, D., P. Schrodt, R. Francisco and J. Weddle
1994 "Machine Coding of Events Using Regional and International Sources," *International Studies Quarterly*, 37:91–119.

Goldstone, J.
1991 "Explaining Revolution." In *Revolutions of the Late Twentieth Century*. Ed. J. Goldstone, T. G. Gurr, and F. Moshiri. Boulder, CO: Westview. Pp. 1–17.

Gordenker, L.
1992 "Early Warning: Conceptual and Practical Issues." Pp. 1–15. In *Early Warning and Conflict Resolution*. Ed. K. Rupesinghe and M. Kuroda. New York: St. Martins Press.

1986 "Early Warning of Disastrous Population Movement," *International Migration Review*, 20(2):170–193.

Gurr, T. R.
1995 "The State Failure Project." Paper presented at the International Studies Association meeting, Chicago, IL. College Park, MD: Center for International Development and Conflict Management, University of Maryland.

1994 "Testing and Using a Model of Communal Conflict for Early Warning," *The Journal of Ethno-Development*, 4(1):20–25.

1993 *Minorities at Risk*. Washington, DC: U.S. Institute of Peace Press.

Gurr, T. R. and B. Harff
1996 *Early Warning of Communal Conflict and Genocide*. Tokyo: United Nations University Press.

Gurr, T. R. and M. Haxton
1996 "Minorities Report: Ethnopolitical Conflict in the 1990s." Paper presented at International Studies Association meeting, San Diego, CA. College Park, MD: Center for International Development and Conflict Management, University of Maryland.

Harff, B.
1996 "Early Warning of Potential Genocides: The Cases of Rwanda, Burundi, Bosnia and Abkhazia." In *Early Warning of Communal Conflict and Humanitarian Disaster*. Ed. T. R. Gurr and B. Harff. Tokyo: United Nations University Press.

———
1994 "A Theoretical Model of Genocide and Politicides," *The Journal of Ethno-Development*, 4(1):25–31.

Jenkins, J. C. and S. Schmeidl
1996 "Ethnic Inequality, Weak States and Economic Dependence: The Root Causes of Refugee Migrations, 1975–1990." Paper presented at International Studies Association meeting, San Diego, CA.

———
1994 "Flight from Violence: The Origins and Prospects of the World Refugee Crisis," *Sociological Forum*, 28:63–82.

Jongman, A. J.
1994 "The PIOOM Program on Monitoring and Early Warning of Humanitarian Crises," *The Journal of Ethno-Development*, 4(1):65–72.

King, G.
1989 *Unifying Political Methodology*. New York: Cambridge University Press.

Laurance, E. J.
1990 "Event Data and Policy Analysis: Improving the Potential for Applying Academic Research to Foreign and Defense Policy Problems," *Policy Sciences*, 23:111–132.

Loescher, G. and A. D. Loescher
1994 *The Global Refugee Crisis*. Santa Barbara, CA: ABC-CLIO.

Mallery, J.
1991 "Semantic Content Analysis: A New Methodology for the RELATUS Natural Language Environment." In *Artificial Intelligence and International Politics*. Ed. V. M. Hudson. Boulder, CO: Westview Press.

Ragin, C.
1987 *The Comparative Method*. Berkeley: University of California Press.

Rupesinghe, K. and M. Kuroda, eds.
1992 *Early Warning and Conflict Resolution*. New York: St. Martins Press.

Schmeidl, S.
1997 "Exploring the Causes of Forced Migration: A Pooled Time Series Analysis, 1971–1990," *Social Science Quarterly*, 78(2).

———
1995 *From Root Cause Assessment to Preventive Diplomacy: Possibilities and Limitations of the Early Warning of Forced Migration*. Ph.D. Dissertation, Department of Sociology, Ohio State University, Columbus.

Schmeidl, S. and J. C. Jenkins
1996 "Early Warning *Indicators* of Forced Migration: In John L. Davies and Ted Robert Gurr (eds.), *Preventive Measures: Building Risk Assesment and Crisis Early Warning Systems*. Boulder, Co.: Romer and Littlefield.

Schrodt, P.
1996 "Implementation and Methodology," *Mershon International Studies Review*, 32:319–320.

———
1995 *KEDS: Kansas Events Data System*. Lawrence: University of Kansas, Department of Political Sciences.

Schrodt, P. and D. Gerner
1994 "Validity Assessment of Machine-Coded Event Data Set for the Middle East, 1982–1992," *American Journal of Political Science*, 18:132–156.

Sherman, F.
1994 "Sherfacs: A Cross-Paradigm, Hierarchical and Contextually Sensitive Conflict Management Data Set," *International Interactions*, 20:79–100.

Singer, J. D. and M. Small
1993 *Correlates of War Project: Data Files*. Ann Arbor: The University of Michigan.

Singer, J. D. and M. D. Wallace
1979 *To Auger Well: Early Warning Indicators in World Politics*. Beverly Hills, CA: Sage.

Sylvan, D. and S. J. Thorson
1980 "Choosing Appropriate Techniques for Socio-Political Forecasting," *Policy Sciences*, 12:265–282.

United Nations, General Assembly
1992 "An Agenda for Peace: Preventive Diplomacy and Related Matters." A/RES/120. 91st Plenary Meeting. December 18.

U.S. Department of State
1994 "RADARS: Reporting, Analysis, Decision-Making and Response." Washington, DC: Africa Desk, U.S. Department of State.

Wallensteen, P. and M. Sollenberg
1995 "After the Cold War: Emerging Patterns of Armed Conflict 1989–94." In *States in Armed Conflict 1994*. Ed. M. Sollenberg. Report No. 39, Department of Peace and Conflict Research, Uppsala University. Pp. 7–23.

Weiner, M.
1996 "Bad Neighbors, Bad Neighborhoods: An Inquiry into the Causes of Refugee Flows," *International Security*, 21:5–42.

Zolberg, A., A. Suhrke and S. Aguayo
1989 *Escape from Violence: Conflict and the Refugee Crisis in the Developing World*. New York: Oxford University Press.