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Complex Emergencies and Human Development: A Quantitative Analysis of Their Relationship

Rosilyne M. Borland

Increasingly, the world's poorest and most marginalized are also those most affected by armed conflict. The complicated interactions among modern conflicts, poverty, hunger, and disease have led to the emergence of the notion of the "complex emergency." The widespread occurrence of complex emergencies in the world's poorest countries, where development efforts are the most needed, has grave consequences for human development. Through an application of quantitative methods, this paper examines the relationship between complex emergencies and development using the human development index developed by the United Nations Development Programme and the typology of complex emergencies developed by the United Nations University World Institute for Development Economics Research. The study demonstrates a relationship between levels of development and types of complex emergencies and suggests that an index which considers the multiple manifestations of complex emergencies would provide a better measurement than a single quantifier. These results point to the need to situate development efforts in the context of complex emergencies in order for them to meet the needs of the world's most vulnerable populations.

Rosilyne M. Borland recently completed a Master of Arts at the School of International Service, American University (r_borland@msn.com).

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The challenges faced by those who work in the field of international development might be greater now than ever before. In many of the world's countries, a combination of violence and poverty is contributing to extensive human suffering. The World Bank estimates that more than half of all low-income countries have experienced significant conflict since 1990, with devastating effects on their potential for sustainable development and an improved quality of life (World Bank 2002, 153). Many authors have noted the link between conflict and underdevelopment (see Stewart 2000), particularly in the case of internal conflicts, which have become the most common type of war in the world today (Kumar 2001; Anderson 1999). According to the Organization for Economic Cooperation and Development (OECD), 95 percent of the casualties in civil wars are civilians (Kumar 2001, 6). Distinctly different from the wars of the past, most of these conflicts are fought between "identity groups" divided by ethnicity, language, culture, race, religion, or regional roots (Maynard 1999, 6). These wars often involve tactics such as mutilation and rape as part of "a deliberate strategy to demoralize communities and destroy their social structures" (WHO 2002, 22). Those who are not killed are often forced from their homes.

Poverty and violence tend to reinforce one another. In the words of one expert: "Warfare . . . produces massive social and economic dislocation that is likely to increase the levels and depths of poverty and vulnerability in the society significantly" (Klugman 1999, 4). Conversely, according to the World Bank, the likelihood of conflict "rises as poverty is concentrated in a group—distinct by ethnicity, religion or region" (World Bank 2002, 156). In its 2002 report on violence and health, the World Health Organization (WHO) noted that "fragmentation and marginalization of some countries and groups, the intense competition for resources, and the widening inequalities" are likely to "create conditions in which violence will erupt" (WHO 2002, 23). The complicated feedback between poverty and internal conflict can lead to situations known as "complex emergencies."

According to the United Nations University World Institute for Development Economics Research (UNU/WIDER), complex humanitarian emergencies are "multidimensional phenomena that are not only accompanied by wars, but also by other forms of human suffering including forced migration, hunger and disease" (Klugman 1999, 1). For the purpose of this study, a complex humanitarian emergency (hereinafter referred to as a complex emergency) is defined as an armed conflict which causes or is accompanied by a mixture of the following: massive displacement, famine, disease, human rights violations, and political or social collapse

(Maynard 1999, xi). Complex emergencies are often characterized by "extreme brutality, widespread citizen involvement, and societal implosion" (Maynard 1999, 6). These "deep social crises" result in the deaths of large numbers of people because of "war, displacement, disease and hunger" (Klugman 1999, 1).

Protracted conflicts that develop into complex emergencies subject civilian populations to years of suffering (Klugman 1999, 2). They are associated with high levels of communicable disease (WHO 2002, 22), the destruction of food production capacity (Maynard 1999, 51), and the breakdown of "the institutional framework that enables people to get the most out of life and to work together towards sustainable development" (World Bank 2002, 153). In her book, *Healing Communities in Conflict: International Assistance in Complex Emergencies*, Kim Maynard discusses the many ramifications of complex emergencies, including economic and food security concerns, human rights issues, and environmental repercussions (Maynard 1999, 50-55). She notes that such conflicts tend to result in vast economic devastation:

> During the course of a crisis, national financial resources are usually depleted through expanded military expenditures, looting, corruption, and, in some cases, humanitarian assistance to citizens. Complex emergencies also undermine domestic economic production by destroying livelihoods, discouraging investment, disrupting trade and commerce, and hindering capital formation. Ultimately, this process ruins individual and national economic solvency and undermines the country's ability to sustain itself (Maynard 1999, 8).

In addition to the extensive economic destruction and the immediate loss of life, war also causes incalculable psychosocial damage, assaulting social capital and "undermining trust and social networks" (World Bank 2002, 154).

As the development field continues to undergo a profound paradigm shift (Chambers 1997, 188), moving away from a purely economic focus toward "true human development" (Suu Kyi 1995, 18), it is important to analyze the interaction among conflict, poverty, and development. Scholars have begun to focus on human needs and human development rather than solely on per capita income (Seligson 1998, 444), but there is not sufficient discussion of the causes and effects of conflict.

Complex emergencies are clearly detrimental to development, undermining progress and creating new problems that complicate future development efforts. Beyond this simple observation, however, it is important to

recognize that international assistance (be it relief, development, or some combination of the two) does not exist in a vacuum. As one scholar notes: "When international assistance is given in the context of conflict, it both affects and is affected by that conflict" (Anderson 1999, 37). Projects created by the international community to address the many crises associated with complex emergencies either strengthen local capacities for peace or reinforce conflict through the direct and indirect effects of resource transfers and through their "implicit ethical messages" (Anderson 1999, 38). Responsible, accountable development must acknowledge ongoing conflicts and strive to gain a greater understanding of the interplay between complex emergencies and human development in order to prevent (rather than promote) further conflict.

Complex emergencies are caused "to an important degree by failed development, political and institutional policies, as well as botched responses to initial crises" (Klugman 1999, vi). According to the WHO, "the world is still learning best how to respond to the various forms of collective violence" (WHO 2002, 21). One way to build upon existing knowledge is to apply quantitative statistical analysis. While quantitative methods have many limitations and qualitative methods are often appropriate for development work, quantitative analysis is extremely important, especially in identifying patterns (Samarasinghe 2002). In the words of Mary Anderson:

> Where patterns exist it becomes possible to predict how things go wrong. And if we have enough information and understanding to predict negative patterns, it is also possible to find programming options—other ways of working—that avoid them. . . . A better understanding of the patterns in which aid and conflict interact makes it possible to design aid programs that relate to and support local capacities for peace. (Anderson 1999, 37-38)

How are conflict and development related? Is it possible to quantify the negative consequences of complex emergencies on human development? Through the use of quantitative methods, this paper analyzes the relationship between complex emergencies and human development.

Methodology

Complex emergencies and human development are concepts which incorporate a variety of factors, making them difficult to quantify. The UNDP has created the Human Development Index (HDI) as a measure of some manifestations of the quality of life experienced across cultures,

specifically economic well-being, education, and health. According to the UNDP, the human development index was constructed to reflect the most important dimensions of human development: "A composite index, the HDI contains three indicators: life expectancy, representing a long and healthy life; educational attainment, representing knowledge; and real GDP (in purchasing power parity dollars), representing a decent standard of living (UNDP 1995, 12).

While the HDI is a more complete measurement of the quality of life than a single economic indicator, such as economic growth at a national level, it is "not a comprehensive measure of human development" (UNDP 1995, 12). The HDI falls short of capturing all aspects of human development, but "is useful for simplifying a complex reality, which is what the HDI sets out to do" (UNDP 1995, 15). In quantitative analysis, it is often necessary to use the best measures available, with the understanding that the variable being measured is more complicated in reality than in the simplified analysis.

Complex emergencies, which involve cycles of violence, poverty, and marginalization, are also difficult to quantify. However, UNU/WIDER has recently developed a typology for analyzing the level of complex emergency. As part of *The Wave of Emergencies in the Last Decade* research project, Raimo Väyrynen created a typology based on what he calls "the four scourges of humanity: war, disease, hunger and refugees" (Klugman 1999, 2).[1] Väyrynen selected four indicators—the number of war casualties, under-five mortality, under-five malnourishment, and the number of displaced persons—which aligned with these scourges to create a ranking of complex emergencies. His results are reproduced in Table 1.

Table 1:
Complex Emergencies Typology

Country	War	Disease	Hunger	Refugees	Type
Afghanistan	x	x	x	x	Acute
Mozambique	x	x	x	x	Acute
Angola	x	x	x	x	Acute
Somalia	x	x	x	x	Acute
Rwanda	x	x	x	x	Acute
Liberia	x	x		x	Serious
Burundi	x	x		x	Serious
Sri Lanka	x	x		x	Serious
Sierra Leone	x	x		x	Serious
Sudan	x		x	x	Serious
Ethiopia		x	x	x	Serious
Myanmar		x	x	x	Serious
Tajikistan	x			x	Violent
Colombia	x			x	Violent
Azerbaijan	x			x	Violent
Armenia	x			x	Violent
Georgia	x			x	Violent
Iraq	x			x	Violent

Source: *Klugman* 1999.

Part 1—Analyzing Conflict and Development as Categories

In this paper's analysis, the levels of development (low, medium, high) and the types of complex emergency (acute, serious, violent) are ordinal data. Therefore, the statistical analysis uses methods appropriate for this scale of measurement. HDI rankings from 1996 are used to correspond to the data used in creating the complex emergency typology (see Table 2).[2] Throughout the analysis the level of conflict is the independent variable and human development is the dependent variable; that is, it is assumed that the complex emergency is affecting development.

Table 2:
Human Development Levels

Country	Development Level
Afghanistan	Low
Mozambique	Low
Angola	Low
Somalia	Low
Rwanda	Low
Liberia	Low
Burundi	Low
Sri Lanka	Medium
Sierra Leone	Low
Sudan	Low
Ethiopia	Low
Myanmar	Low
Tajikistan	Medium
Colombia	High
Azerbaijan	Medium
Armenia	Medium
Georgia	Medium
Iraq	Medium

Source: *Human Development Report,* 1996.

These ordinal data were organized into frequency tables in order to summarize the information and look for possible relationships. These results were graphed into pie charts (Figures 1 and 2).

Figure 1: Level of Complex Emergencies – 1996

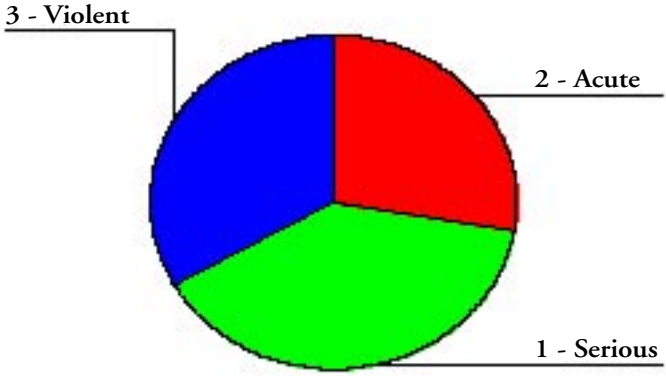
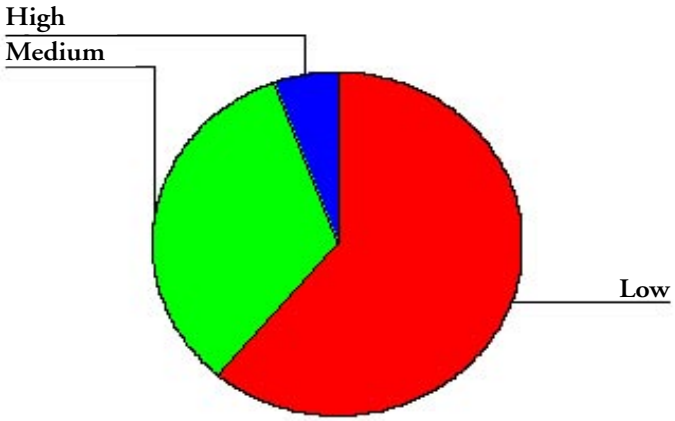


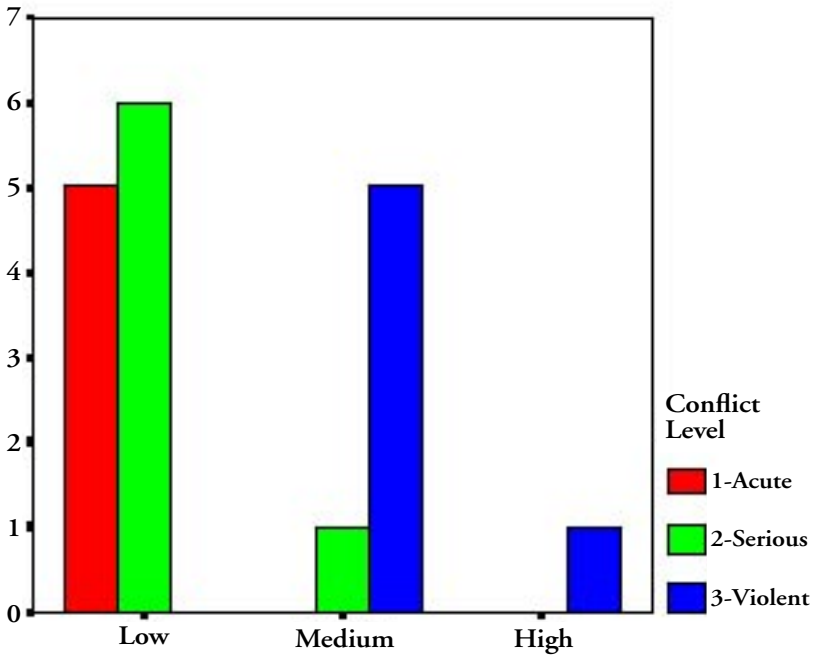
Figure 2: Level of Human Development – 1996



Next, cross tabulations (charts which compare categorical data such as "low, medium, and high" and create a table of numbers which can be used in further analysis) were generated to summarize the data and prepare it for statistical analysis. The cross tabulation is represented graphically in Figure 3. From the cross tabulation both a chi square test of independence

and a Fisher's exact test were performed to test whether the two variables were independent.

Figure 3: Development and Conflict



These tests determine whether two variables appear to influence each other, by examining whether or not the data support the null hypothesis that the two variables are unrelated. Results are assessed using p-values, which indicate the probability that the observed data would be seen by chance if the null hypothesis held and the variables were unrelated. As the chi square analysis tests for the presence of a relationship but does not indicate either its direction (i.e. higher level of complex emergency leads to lower development) or its strength (i.e. X level of complex emergency leads to Y drop in development), further analysis is required to understand fully the implications of the findings.

In this case, bivariate measures of association were calculated, including lambda and Cramer's V. Lambda is a bivariate measure of association that measures the proportional reduction in error obtained when the value of the independent variable is used to assist in the prediction of

the dependent variable. Cramer's V is a measure of the degree of association of two variables and ranges between 0 and 1 for arbitrarily-sized contingency tables.

Part 2—Analyzing Conflict and Development with Numbers

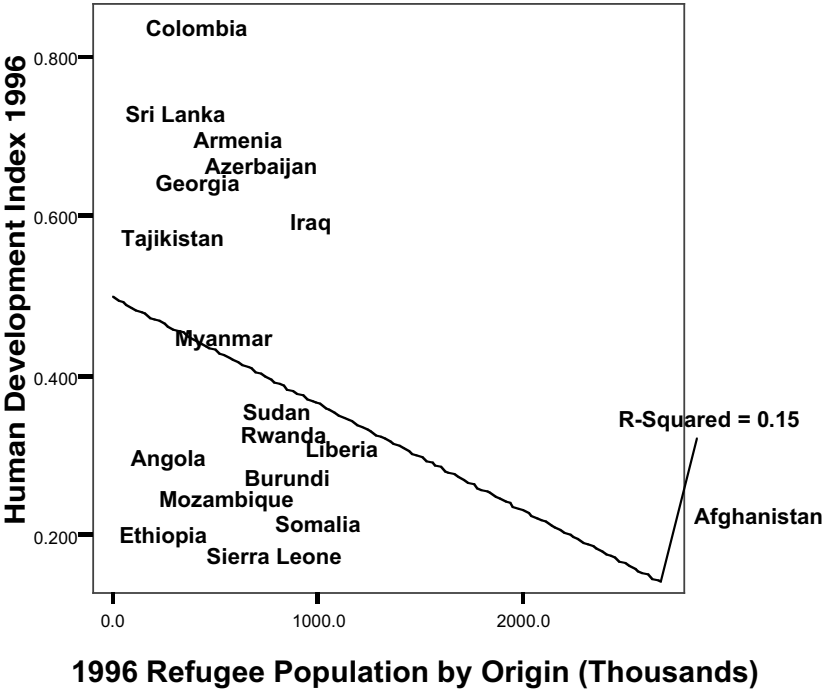
In order to further examine the relationship between human development and complex emergencies a second analysis was carried out, using numerical instead of categorical data. The HDI is also calculated as a number; therefore that indicator was retained for this part of the analysis. For complex emergencies, a new numeric indicator was used. (To the author's knowledge, no index exists which quantifies the various factors that create complex emergencies.)

For the purposes of this study, displacement was chosen as a manifestation of complex emergencies, and the number of refugees by country of origin, as published by the United Nations High Commissioner on Refugees (UNHCR), was selected as an indicator of displacement. The indicator of displacement was selected over other potential metrics for this study due to the relative ease in accessing data on refugees. While displacement is only one of many effects of complex emergencies, it is an especially devastating and common result of them. As one expert notes: "The plight of refugees is a tragic illustration of the convulsions that plague the planet. They are evidence of the war, famine, and oppression that force millions of displaced people out onto the roads of exodus. Over the past few years, the multiplication of conflicts and violent situations has swollen the ranks of refugees and displaced populations to over fifty million people" (Jean 1997, 42). The countries studied in Part One were also studied in Part Two, although in Part Two the analysis extended over a ten-year period (1992-2001).

For each year a scatter plot was generated as a first step in a linear regression analysis and to establish whether or not there appeared to be a relationship between the variables (one example is reproduced in Figure 4). Linear regressions were then calculated using the computer program SPSS. The level of complex emergency (represented by displacement) was once again defined to be the independent variable and the level of human development was defined as the dependent variable. For each year a bivariate linear regression was calculated in order to determine the presence of a relationship, its strength, and its direction. For each regression, both the Pearson Correlation Coefficient (Pearson's r) and the Coefficient of Determination (R-squared) were calculated. Pearson's r measures the

strength and direction of an association between two variables, while R-squared measures the proportion of variance in the dependent variable that is explained by the movement of the independent variable.

Figure 4: Linear Regression of Human Development on Refugee Populations



Results

Part 1

Visual inspection of the categorical data (Figures 1, 2, and 3) suggests that a relationship between development and conflict exists. In Figure 3 it is easy to see that higher levels of complex emergency tend to correlate with lower levels of human development. Statistical tests confirm this observation: the variables are not independent of one another. The chi square analysis compares predicted frequencies with actual frequencies. In this case, the p-value of 0.006 indicates that there is a less than one percent chance that these results would occur by chance, allowing rejection of the null hypothesis that the variables are unrelated. Because chi square tests can occasionally yield unreliable results when sample sizes are small, Fisher's exact test was also performed to test for an association between the two variables. This test also identified a significant relationship (p-value = 0.001). Taken together these results confirm the hypothesis that a relationship between complex emergencies and development exists.

Further statistical analysis also supported this relationship. According to the calculations, the value of lambda when human development is dependent on the level of comfort emergency is 0.714. This indicates that knowing the level of complex emergency improves one's ability to predict the level of development by 71 percent (the proportional reduction in error). This measure shows a fairly strong correlation between the two variables, as predicted. The Cramer's V calculation had similar results, with a value of 0.635. This measure found a reasonably strong relationship between human development and level of complex emergency. Based on these calculations, the hypothesis of this study—that higher levels of conflict are associated with lower levels of development—is accepted.

Part 2

The second phase of analysis also indicates that human development and complex emergencies are related, despite the shift to a simpler measure of complex emergencies. The results of the regression analysis are summarized in Table 3.

Table 3:
Summary of Regression Analyses

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Pearson's r	-.287	-.464	-.431	-.416	-.391	-.236	-.347	-.426	-.409	-.379
R-squared	0.083	0.216	0.185	0.173	0.153	0.056	0.120	0.181	0.167	0.144

The use of displacement as a measurement of complex emergencies seems to have weakened the strength of the identified relationship, as many of the calculated correlations are only marginally significant at the 10 percent level. However, the calculated relationship is relatively consistent in terms of both direction and strength over a period of ten years, which strongly suggests that a significant relationship exists. The correlation coefficient ranges from -0.236 to -0.464. The fact that the relationship is consistently negative indicates that the level of human development decreases as the level of displacement rises. This result is consistent with the literature.

The regression analysis revealed R-squared values ranging from 0.056 to 0.216. This indicates that 6-22 percent of the movement of the dependent variable (development) is explained by the movement of the independent variable (displacement). This amount of explanatory power is reasonable given the selection of only one variable to represent complex emergencies in the regression analysis.

Analysis

The statistical comparison of the HDI and complex emergency typologies supports the literature in clearly showing a strong relationship between higher levels of complex emergencies and lower levels of development. It would appear that knowledge of the level of complex emergency being suffered by a country would allow one to predict the development level of that country with a great deal more accuracy than one would be able to do without that information. This illustrates the link between poor quality of life and violence that was discussed at the beginning of the paper.

Such broad comparisons are only the first step, however, to understanding the interaction between conflict and development. The second level of analysis also revealed a link between complex emergencies and development, although the relationship was weaker in that case. Over a time period of ten years, in the same countries analyzed in Part One, a statistical relationship between conflict and development was identified. Most notably, reducing the measure of complex emergencies to only one of its components led to a weaker correlation between the variables under study. This result suggests that while displacement is an important element of conflict, it is necessary to use other indicators in order to reflect the multifaceted character of complex emergencies. Logic would lead to a similar conclusion: the very complexity of complex emergencies requires a mix of indicators. Only through measures which attempt to quantify the multiple variables present in protracted conflict will it be possible to further quantify the relationship between development and war.

While it is clear from this analysis that a negative relationship between human development and complex emergencies exists, the strength of this relationship is unclear. The first part of the study revealed it to be quite strong, suggesting a clear link between development and conflict. The relationship was also found to be negative in the second part of the study, but its strength diminished because of the change in indicator.

Limitations

Sound data on development are difficult to obtain and, in situations of conflict, the difficulty only increases. The numbers used in this study were obtained from the UNDP, the UNU/WIDER, and the UNHCR. In most cases some estimation was done by those who published the data. While this estimation is necessary in order to have complete data sets, it may lead to errors in the statistical analysis. Furthermore, some countries report their data as part of national surveys, and in some cases this data is less than reliable.

As noted previously, often data on desired indicators are not readily available and less accurate substitutes need to be used. In this analysis, for instance, it would have been preferable to use internal displacement numbers in order to more accurately quantify the displacement that is caused by protracted conflict. However, these numbers were not available and, therefore, the indicator of refugees by country of origin was chosen.

Statistical methods enable one to identify patterns of relationships, but they cannot prove causality. Additionally, significant thought must be given to the specification of the statistical model and to its external validity before attempting to generalize the results. Contextual differences among countries undergoing complex emergencies and previous development trends in those countries could easily have affected the outcome of this study. Future studies should include an analysis of trends in both development and conflict within an individual country in order to study this relationship more specifically. Expanding the simple linear regression into a multiple regression to test for the varying importance of displacement, poverty, and other components of conflict would also be a logical extension of this analysis.

Conclusions

The theoretical understanding of both development and conflict has changed considerably over the past decade. Development, a concept closely related to quality of life, is now defined more holistically, but it remains difficult to measure. Conflict is no longer necessarily seen as a

battle between states with a clear beginning and end, but instead is often viewed as a drawn-out struggle involving poverty, marginalization, and displacement—in other words, a complex emergency.

Based on this study, a typology such as that created by UNU/WIDER appears to more accurately capture the manifestations of complex emergencies than the use of one indicator, such as displacement. What is urgently needed is some measure of complex emergencies, perhaps a composite index similar to the human development index. This sort of measure could dramatically improve research on the cycles of violence and poverty which are devastating much of the world's poor. Despite the limited data available and the imperfect nature of quantitative statistical analysis, it is imperative to create more accurate measures of complex emergencies. Only with a greater understanding of the patterns of violence and poverty that affect the lives of millions will it be possible to create effective and appropriate development strategies. Development professionals must strive to understand the complicated interplay between poverty and violence if they are to have any chance of improving the quality of life of the world's most vulnerable people.

Despite the protracted conflicts which devastate generations, development work continues. In many parts of the world, development needs *are* emergencies—with crises of infectious diseases like HIV/AIDS and crises of violence such as sexual violence against women. The results of this study suggest a need to situate development efforts in the context of complex emergencies in order to effectively address these and other crises. Policies must take into account the realities of development work today, which include mass displacement; the complete destruction of social networks; and regional, rather than national, crises. A health project cannot be blind to the fact that the majority of women in a given community may have been affected by sexual violence in the context of war. Reintegration programs must be designed for communities who have nothing left; a micro-credit project for ex-combatants or returnees, for example, can cause problems when the general community has fewer resources than the recipients of the project. The complexity of the challenges is daunting. The development of better tools for analysis is one small way to move towards reaching those most in need with effective and appropriate interventions.

NOTES

[1] Research for *The Wave of Emergencies of the Last Decade* was conducted during 1996-7 by UNU/WIDER with the co-sponsorship of the Queen Elizabeth House of the University of Oxford.

[2] Both sets of data were published in 1996 but reflect a composite of the best available data, including data from previous years. See Klugman's article and the HDI report for more details.

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