NAVIGATING POST-CONFLICT ENVIRONMENTS
Humanitarian Information Management

Rapid Humanitarian Assessments – *How Rational?*

A Value-of-Information Study of Two Assessments in Iraq

Vietnam Veterans of America Foundation
iMMAP
INFORMATION MANAGEMENT & MINE ACTION PROGRAMS

Summary

"Speed kills" vs. "Victims cannot wait"

During the most recent Iraq war, speed became a topic of significant focus, mixed with the aura of precision weaponry. Even for a subject as mundane as supply chain management, the Harvard Business Review used the dramatic title *"Speed kills"* (Morales & Geary 2003) in relation to activities in Iraq. The expectation of rapid achievement extended into the post-war period, and into non-military aspects, until both of them were painfully slowed by ever-increasing insecurity.

The humanitarian community, not exempt from this climate, strained to execute a running start in their delivery of relief to the Iraqi people. This included attempts at rapidly displaying an operational picture. The tools summoned to this task had been around for many years prior to the spring 2003 emergency. They valued speed for a different reason – the premise that victims cannot wait. One of these tools – rapid assessments – had been part of the humanitarian toolbox for decades. In Iraq, however, some of the rapid assessments created a fabric of information so dense that they offered an unusually close look at the trade-off between speed and other desired qualities. This study investigates the trade-off in more general perspectives of humanitarian information management, using data from actual assessments in Iraq.

Information demands in post-conflict emergency relief and rehabilitation settings are heavy and are difficult to meet within useful timeframes, and with acceptable reliability and precision. Over the past few years, the community of humanitarian practitioners has started to build standardized systems of information collection, analysis and use. These systems are meant to facilitate information transfer across sectors and phases of the relief and development process, and ultimately enhance the baseline information available to peacekeepers and development agencies. They all struggle, in varying degrees, with the basic fact that war destroys information, and that, as a result, the units on which they are expected to deliver substantive information are themselves not completely known. Some of the countries subject to the ravages of wars and subsequent interventions by the humanitarian community have not had a

For whom this report is meant:

The majority of the professionals working in humanitarian information management in recent years have been database and Geographic Information Systems (GIS) specialists. Many were involved in the design or support of rapid assessments. These disciplines are not normally trained in survey process quality management and in value-of-information estimates, concerns that we address here.

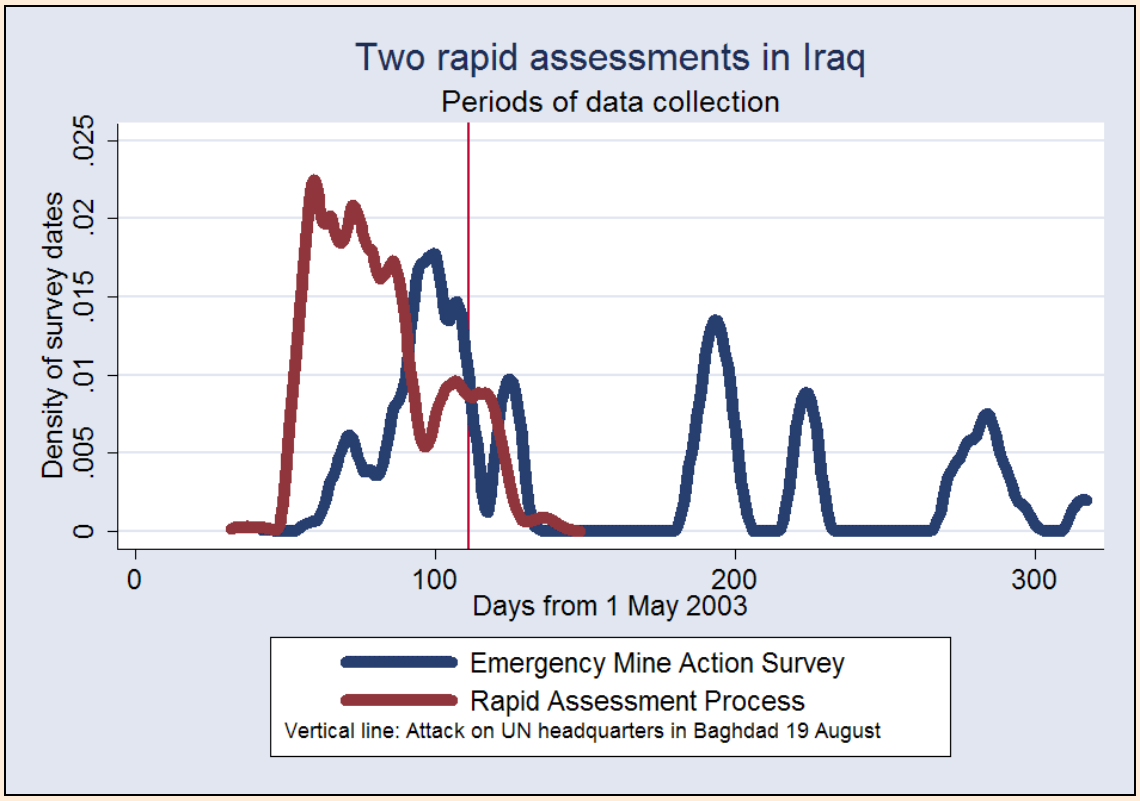
The second group whose reactions we invite are survey specialists and policy scientists who may have relevant competencies in the aforementioned domains but little exposure to post-war situations. These and other types of turbulent environments undermine the kind of stability that is taken for granted for much of normal social science research, including surveys. We hope that by learning from both sides humanitarian practitioners will be able to translate their inputs into better assessment tools.

reliable population census in many years; moreover, the destruction of records, the ”brain drain” of experts, and population displacement have made much of the pre-existing data inaccessible or obsolete.

Security, survey productivity and rationality

On 1 May 2003, President Bush declared the end of major combat operations in Iraq. On 19 August 2003, a bomb devastated the United Nations headquarters in Baghdad. Rapid assessments are highly vulnerable to insecurity. In relatively secure environments – shown here as the period prior to the attack on the United Nations – productivity fluctuates primarily in response to internal reorganization. New regional offices may be opened, and new survey workers are recruited and trained. When security is poor, data collection may entirely cease (red line) or become intermittent (blue).

Figure 1: Survey productivity over time



Some of the productivity spikes may reflect efforts to retain trained staff in secure regions that otherwise might not be a survey priority, awaiting improved conditions in priority areas. Ultimately, the value of the assessments depends on the use of the incomplete information in practical decision-making. From this viewpoint, we ask whether the rapid assessments were rational – how much information they acquired, and in response to what factors, both internal ones and the external signals that their changing environment sent.

“Rapid assessments” have gained currency as stopgap measures to fill urgent information needs in turbulent post-war situations. However, they are not exempt from that turbulence. They are expected to produce rapid results, such as on levels of malnutrition, locations of displaced populations, or the status of basic infrastructure, with the minimum of

foundational information existing and with very short set-up time. The new addition to this process has been the requirement to collect foundational data. These include a listing of populated places visited, complete with names, geographic coordinates, administrative status, and current population estimate. Such data are basic to the reconstitution of a community gazetteer. The gazetteer, which in the lingo of sample surveys is nothing else but the community frame, in turn is critical for concurrent population and facility surveys, project tracking and avoidance of duplication of effort.

Standardization and quality

Some of the initiatives to create standardized information systems were closely associated with the United Nations-executed Humanitarian Information Centers (HICs), of which there have been several, including in countries undergoing recent military interventions by Western powers. These centers have been involved in rapid assessments, with responsibilities ranging from supporting independent assessments to coordination of multi-party data collection efforts to implementing them directly. For example, the HIC in Kosovo assembled a well-publicized rapid assessment from contributions by a variety of relief agencies, mapping the housing stock in war-affected villages and the needs for urgent winterization measures before the cold season in 1999-2000.

Little is known about the quality of rapid assessments. There is an obvious conflict between speed and completeness, frequently compounded by lack of security and/or access. Some domains, notably nutrition, rely on cross-culturally validated protocols, but many rapid assessments use instruments that have not been adequately pre-tested, and are administered by data collectors who were minimally trained. It is safe to assume that, from a survey quality perspective, sampling error, however serious, will often be outweighed by measurement error. It is equally safe to say that, for a good part, if not most, of the assessments, by the time results reach the intended users, they no longer deserve the predicate "rapid." In some cases, the rapidity is more descriptive of the users, who have left the scene or have morphed into a different policy landscape by the time the data are available for analysis, or findings are ready to inform decisions.

Such considerations have prompted us to study the rationality of rapid assessments in greater depth. We are attempting this on two levels. First, we guide the readers through some of the more abstract points that have surfaced in the literature. The question *"Why rapid?"* may be easy to answer – in emergency response, delay is universally seen as policy failure. "Rapid" is also seen in an inter-organizational context. Early collaboration in surveys and assessments signals that coordination processes are being established amongst disparate responders and reflects well on the humanitarian community.

Beyond that, several trade-offs remind us that the most rapid is not necessarily the best. Speed may compromise completeness, as mentioned above, but also other information standards such as reliability and validity. Its relationship with cost is far from straightforward; few are so naive as to believe that "rapid" means "shorter", and therefore "cheaper". Other trade-offs are categorical. Rapid assessment planners need to decide on the basic units of information collection and analysis – will they conduct population (e.g. household), community or facility surveys, or some combination thereof? Speed has

often suggested community-level assessments. These make an important presumption that the differences between communities are more important than those within, or that policies may neglect differences within for the time being.

Iraq as a test case

This report contains a strong empirical part. We test rationality claims – such as the use of pre-existing information, the respect for policy, and dynamic adaptation during fieldwork – with recent data from Iraq. This country makes for an attractive case study because of the pre-meditated nature of the war and parallel preparations undertaken by the humanitarian community – including for rapid assessments. After a long build-up, the campaign unfolded as a kind of *blitzkrieg*, with the United Nations and non-governmental organizations (NGO's) anticipating that their assessment missions would execute a running start while the smoke of battle was still clearing. As an added boost, the coalition forces civil affairs command agreed to use the same format for their own assessment requirements, thereby hinting at the possibility of much greater coverage than would normally be expected.

Our material is from two rapid assessments. It permits us to shed light on some quality questions, primarily the selection of communities that assessment personnel made during fieldwork. The first of these data collections, using pre-war assets, achieved an exceptionally dense coverage of local communities, and did so rapidly, although limited chiefly to regions in the north. Known as the Rapid Assessment Process (RAP), and operated by the HIC, it returned basic data on a broad scope of institutional domains. The second assessment was specific of a particular domain, covered an area largely inscribed in the first, and at the behest of the United Nations was carried out by a British charity, with assistance from Vietnam Veterans of America Foundation's (VVAF) Information Management & Mine Action Programs (iMMAP). Called the Emergency Mine Action Survey (EMAS), this assessment of landmine and unexploded ordnance contamination was slowed by the deterioration of the security situation and was orphaned, halfway through, by the departure of its major data user, the United Nations Mine Action Program (MAP), from northern Iraq.

The combined analysis of these two data bodies is enlightening. With its massive coverage of 5,700 populated places, the RAP offers a kind of gold standard against which the selection of

Three research opportunities

VVAF, like most humanitarian NGOs, does not have a budget for stand-alone research. However, in three subsequent emergencies, we have been able to recycle data from practical assessments to highlight hitherto undocumented patterns in conflict dynamics and/or humanitarian behavior.

In **Kosovo**, data on the sequence of danger area clearance activities was used to evaluate the influence of priority-setting by a central body on the actual behavior of multiple clearance agents.

As a sideline to a contamination assessment in **Afghanistan**, community reports on victims of violence from two periods of time – one year before 11 September 2001, and the time when the Taliban regime was being overthrown – were used to gauge historic vs. contemporary factors in the distribution of civilian victims.

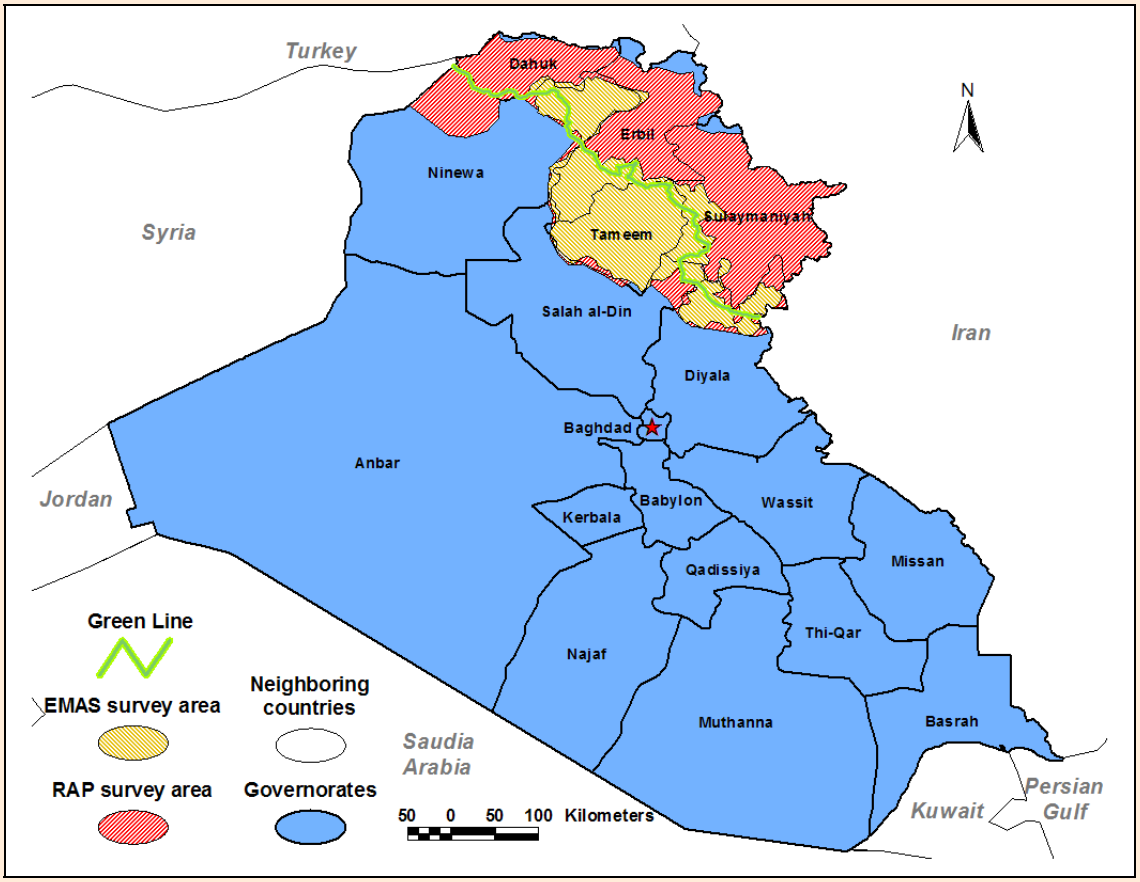
This current study exploits VVAF's involvement in two overlapping rapid assessments in **Iraq**. This allows for substantive information collected in the first assessment to help explain the dynamics of the second.

communities made under the EMAS can be evaluated. EMAS visited a total of 1,760 communities. We model the EMAS decision to visit or not in terms of substantive community attributes, including some that the RAP collected. Their influence is revealed in addition to the intrinsic criteria that the landmine survey applied, chiefly in response to reports of suspected contamination. Such an evaluation opportunity, as far as we know, has not presented itself in previous post-war rapid assessment contexts, or, if it did, has not been analyzed in the professional literature.

An analysis straddling two former political regimes

The two assessments were undertaken in several regions of Iraq, including the south. Data from densely surveyed contiguous districts is available for the northern portion only.

Figure 2: EMAS and RAP survey areas in the North



To the advantage of this analysis, the area covered by the Emergency Mine Action Survey (EMAS) happens to be almost completely wrapped inside the multi-sectoral Rapid Assessment Process (RAP) area. Both assessments straddle the so-called "Green Line", the de-facto line of control separating government-controlled and autonomous Kurdish zones prior to the 2003 war.

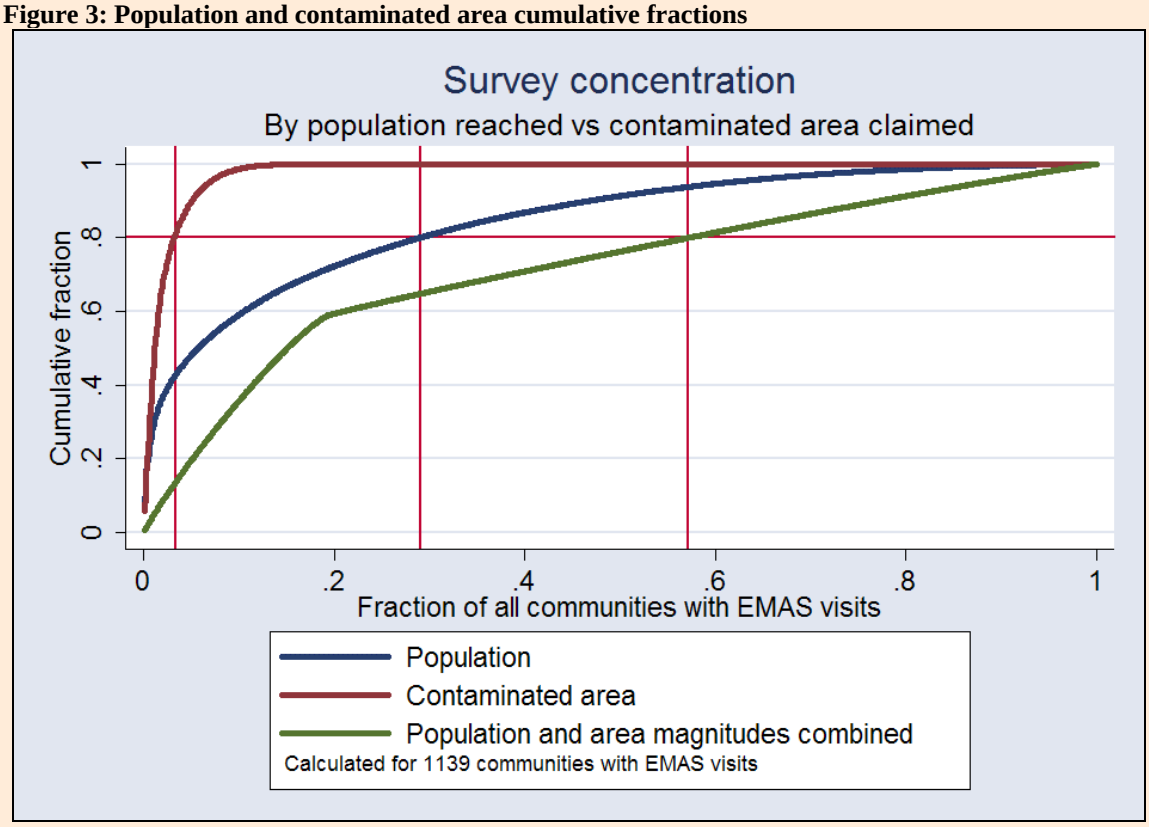
The statistical model predicts which communities EMAS visited to check for contamination and those it did not. We estimate the model for 2,425 RAP-surveyed communities in 16 districts of northern Iraq in which EMAS had significant activity.

EMAS visited 1,139 of these. The model classifies 79 percent of the 2,425 communities correctly as to whether EMAS visited or not – both the positive predictive value (EMAS visited) and the negative (did not visit) are strong. To our knowledge, this is the first such behavioral study of a rapid humanitarian assessment. It became feasible because one of the modern tools of humanitarian information management – Geographic Information Systems (GIS) – allows the two assessments to communicate with one another.

The value of information over a large number of survey points

Only 3.3 percent of all EMAS visits were needed in order to record 80 percent of the total contaminated area claimed by local informants. To reach this threshold for the cumulative population, 29 percent of the visits would have sufficed. However, these measures are inappropriate to evaluate the extent of under- or over-surveying. The prior information on which samples could be stratified (e.g., pre-war population statistics) was scant.

Figure 3: Population and contaminated area cumulative fractions



Moreover, the survey result that a community is in fact not contaminated has value for humanitarian planners. Taking that into account, a measure that combines the claimed magnitudes of population and contamination (see page 82 for detail) leads to a more relaxed position vis-à-vis information over-acquisition. By this measure, it takes 57 percent of all visits to attain 80 percent of the total possible informational value.

Nevertheless, a sharp drop in the marginal utility of further visits is conspicuous after the first 20 percent most relevant communities have been visited (the kink in the lowest line). Such considerations in principle can be translated into more efficient survey plans, combining prior information and, during fieldwork, adaptive sampling rules. In practical life, these must be balanced with expectations of inventory against which users can begin assigning remediation resources.

Our findings are that EMAS survey behavior was compliant with policy guidance (and sensitive to the lack thereof during certain periods), but also showed significant adaptive sampling in response to the detection of affected communities. Surprisingly, the effect of prior information and of local expert opinion is not manifest in the manner expected. The contamination information that coalition forces shared through the United Nations was discarded by EMAS as obsolete. But the data show that by not using the Tactical Minefield Database (TMFDB) segment shared with EMAS, the search for affected communities was considerably less efficient. Assessment teams did visit communities near reported new contamination areas, but then multiplied visits beyond to a degree motivated more by staff and local helper incentives than by rational survey planning. In doing so, they relied heavily on local experts, particularly health care officials and police. These were effective for the safety of the EMAS staff and for a dense coverage of communities under a full-census approach. But this does not mean that a full census was warranted.

Two special circumstances, however, argue in defense of rationality. Extensive community visits were prompted also by a need to aggressively scout for newly repopulated communities about which the local experts and the foreign entities knew close to nothing. Second, in times of lingering hopes that the security situation may improve in areas yet to be surveyed, it can be economical to retain a trained survey workforce in a safe holding area, at the price of over-surveying some areas. Whatever the case, ultimately rapid assessments like the EMAS require rational stopping rules for the acquisition of information.

Concerns for future humanitarian assessments

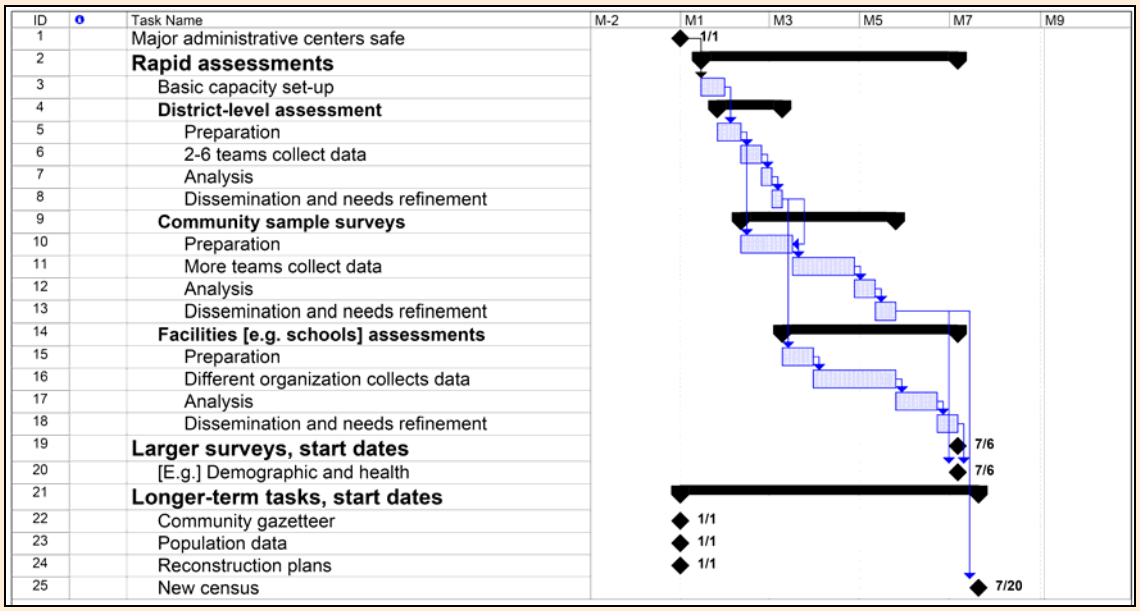
While our analysis demonstrates variably rational behavior under conditions of insecurity, repeated regrouping and incomplete gazetteer information, it also points a critical finger to the kind of small-community rural bias that Kent (2004: 12) accuses much of humanitarian programming of harboring.. By going to large numbers of very small rural places, both rapid assessments in this case study over-acquired information, in terms of the value they created for their consumers.

However, the RAP and EMAS illustrate the different consequences that over-acquisition may entail: EMAS fed its survey returns into demining agencies continuously, which did use it while security allowed them to work. Its over-acquiring behavior, if any, therefore is akin to the classic newsboy problem in information economics – the seller stranded with part of his perishable wares because fewer customers than expected show up. By contrast, the RAP almost suffered catastrophic loss. It was configured for one-time processing when data were complete, but was overtaken by security and political events. Its analysis work would eventually take place in exile and with incomplete data.

A proposed sequence of early assessments

The schematic proposes a notional sequence of rapid assessments as well as a rough division of labor with other, equally important information management tasks. Essentially, the initial rapid assessment of basic service provision should be small, shallow (interviews in district headquarters only) and emphatic on refining needs for any following assessments with strong input from users. After the initial assessment, a dovetailing may be appropriate between multi-sectoral community surveys and in-depth sectoral assessments, which may be carried out by organizations with specific expertise.

Figure 4: Timeline of initial assessments



Also, while mutual information exchange among the assessment organizations is desirable, the capacity for close substantive coordination may be modest. Similarly, assessment organizations should work with the entity responsible for the reconstitution of foundational administrative information (gazetteer and population data). As a fundamental practice, GPS readings should be taken of the center points of all assessed communities as a means of sharing, linking and compiling data, and this information should be shared promptly with the gazetteer maintenance unit. Where such a unit is active, the assessment organizations should not be burdened with gazetteer verification as part of their substantive data collections.

Work on foundational information should be started early, by a unit that has the flexibility to associate with surviving elements of statistical offices, local governments, and academia. Large and complex surveys may be delayed until after foundational work and substantive assessments have produced a baseline of information and knowledge that helps adapt their designs to reconstruction issues.

Task categories and time periods are indicative only, but the implication is that after the shallow initial rapid assessment subsequent assessments would take longer. This scheme may not be appropriate for certain kinds of post-war situations such as in the case of large epidemics or refugee returns and needs review in the light of the substantive issues at hand.

We discuss possible consequences from our findings for the future practice of rapid humanitarian assessments. These include reflections on necessary adaptability. Practically, we recommend decoupling the community gazetteer work from substantive assessments. While it may be advantageous to collocate the groups managing the gazetteer work and some of the rapid assessments, assessment teams in the field should continue to apply standard geo-referencing to the level of detail appropriate to the survey, but should not be slowed down with gazetteer verification. Also, we see a need to develop urban assessment tools, and to make economies by compressing rural samples. On the urban side, the World Bank has occasionally promoted the development of appropriate methodologies, e.g. in Colombia, but a systematic restatement has not yet appeared prominently.

An important practical question concerns the extent to which the humanitarian community can and should build analytical capacity into the units that perform rapid assessments. The HICs, for example, have been lacking in social survey expertise. Strengthening this expertise will improve reliability during data collection, save cost and time through controlled sampling, and produce findings faster and more cogently. These aspirations will have to be checked with a continued emphasis on simplicity, consensus and stakeholder participation, but the investment will pay off. Beyond the roles of specialists, we believe that additional benefits can be gained if the training of humanitarian professionals stresses their ability to critically assess the value of information that they help to collect and analyze for – one hopes – better decisions under emergency pressures.

We are not alone in these hopes. We have used the empirical part of this study to demonstrate the dynamics of assessments *inside* a turbulent country and to suggest methodological improvement. There is movement also in the *global* institutional environment that defines rapid assessments.

For example, in response to political pressure on the World Bank to engage sooner in the reconstruction process, a high-level partnership between the Bank, United Nations entities and the German government has begun to systematize the tools of so-called Post-Conflict Needs Assessments (PCNA).

A PCNA country exercise is expected not to exceed 20 weeks (Kievelitz et al. 2004). The methodology is intended to build common minimum standards for data, fast-track the agencies' professional response and lower the cost of information through standards and coordination. If feasible, this will bring forward the transition from a standoffish "watching brief" mode to an active planning mode in the assessment rhythm that these powerful players follow. In time, this will affect the way rapid assessments are done in the immediate post-conflict period.

Dedication

This report is dedicated to the memory of Leen Assad Al-Qadi , Ihssan Taha Husain and Martha Teas, staff members of the Humanitarian Information Center for Iraq who lost their lives in the attack on the United Nations headquarters in Baghdad on 19 August 2003. We also recognize Ian Rimmel, a worker with our partner organization Mines Advisory Group, who was killed in an ambush in northern Iraq on 4 September 2004.

Credits

We thank the following persons who provided detailed comments on draft versions of this report:

Maxine Dakins, University of Idaho, Idaho Falls
Daniel Eriksson, European Commission's Joint Research Center, Ispra
Reto Haeni, Center for Security Studies, Zurich
Richard Kidd, U.S. Department of State
Al Luloff, Pennsylvania State University, University Park,
Lawrence Moulton, Johns Hopkins Bloomberg School of Public Health, Baltimore
Ben Wisner, London School of Economics

The cover photo was provided by John Brown, VVAF Country Representative in Iraq.

Abbreviations and Acronyms

BGN	Board on Geographic Names
CBU	Cluster Bomb Unit
CPA	Coalition Provisional Authority
DART	Disaster Assistance Response Team
DFID	Department for International Development
DNC	Domestic Names Committee
EMAS	Emergency Mine Action Survey
ERW	Explosive remnants of war
ESTI	Emergency Survey Tool for Iraq
FNC	Foreign Names Committee
GICHD	Geneva International Center for Humanitarian Demining
GIS	Geographic Information Systems
GNS	GEOnet Names Server
HIC	Humanitarian Information Center
HMA	Humanitarian mine action
HOC	Humanitarian Operations Center
iMMAP	Information Management and Mine Action Programs

IMSMA	Information Management System for Mine Action
IO	International organization
JHIC	Joint Humanitarian Information Center
JNEPI	Joint NGO Emergency Preparedness Initiative
MAC	Mine Action Center
MAG	Mines Advisory Group
MAP	Mine Actions Programs
NCCI	NGO Coordination Committee in Iraq
NGA	National Geospatial Intelligence Agency
NGO	Nongovernmental organization
NID	National Immunization Days
OCHA	Office for the Coordination of Humanitarian Affairs
OFDA	Office of Foreign Disaster Assistance
OFFP	Oil-For-Food Program
PCNA	Post-Conflict Needs Assessments
RAP	Rapid Assessment Process
RMAC	Regional Mine Action Center
TMFDB	Tactical Minefield Database
UNDG	United Nations Development Group
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNOHCI	United Nations Office of the Humanitarian Coordinator for Iraq
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development
UXO	Unexploded ordnance
VAM	Vulnerability Assessment and Mapping Unit
VOI	Value Of Information
VVAF	Vietnam Veterans of America Foundation
WFP	World Food Program
WHO	World Health Organization

Table of contents

Tables and Figures

Information needs in post-conflict situations

Recent humanitarian crises in war zones such as Kosovo, Afghanistan and Iraq, among others, have been test beds for assessing the opportunities and benefits of an increasing application of information resources and practices. Post-conflict environments are complex, fast moving, and rife with uncertainty – in one word: turbulent. Creating a common operational picture for and about a host of actors in this sort of environment is a recurring challenge.

The observation that

> *"Amidst the chaotic and rapidly changing situation, no single organization or entity has all of the necessary information. Making this core information available to the wider humanitarian community not only reduces duplication of effort, but also enhances coordination and provides a common knowledge base so that this critical information can be pooled, analyzed, compared, contrasted, validated, reconciled and mapped"* (King & Dilley, 2001),

has become the starting point for much of the organized effort to improve humanitarian information management.

Post-conflict information needs can be thought of in many ways. Practitioners often think in terms of the programs and projects they implement. These projects are parsed into broad themes such as relief, reconstruction, rehabilitation, governance, development, political/military. These are then further subdivided into "sectors" such as health, education, food security, infrastructure, with many repeating across the thematic groups. Originally considered to be sequential activities, these thematic areas increasingly intermingle in post-conflict environments.

These thematic groups largely represent donor budgetary and legal classifications and implementing agencies' organizational mandates. Defined by the quality of the money that funds them, projects and programs tend to run their course in relative isolation from other groups and endeavors. The informational activities that they spawn are similarly isolated. It is quite common for multiple surveys to be conducted concurrently, all assessing the same objects. Such compartmented thinking colors how organizations think of information.

The issue at heart is that information is fragmented by the number of organizations and the number of different projects they implement, in a competitive market for funding and media attention. There is currently no relief or development strategy that seeks to provide information "oversight" or consolidation. In fact, there is no strategy or practice that looks at recovering critical government data as a foundation for stability and restored governance.

Not that this problem has gone unnoticed. For example, the Humanitarian Information Center (HIC) concept, pioneered by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), is a progressive new organizational form meant to reduce the information chaos. However, OCHA is a minor player in the concert of United Nations agencies, and HICs have been short-lived, politically unable to look at issues beyond the humanitarian agenda, and technically lacking in the ability to produce quality data and analyses. And once development begins, donors and aid organizations leap to large-scale surveys that waste significant funds and time in independently reconstructing sampling frames, rather than building on the work of the humanitarian community.

If the fragmentation during the relief period and the hand-over from relief to reconstruction and development remain problematic, a positive aspect that one may note is the capacity and resolve to prepare for humanitarian information management while a crisis looms have grown. Some critics will dispute that, either on the grounds that the humanitarian community has largely remained immune to the demands of evidence-based policy, or with a critical look at the co-evolution of humanitarian and military actions. Thus, a recent study by the Humanitarian Policy Group at the Overseas Development Institute in London, evaluating the role of information in the decision-making process, found that

> *"The humanitarian aid system has to date faced comparatively little pressure to demonstrate that its interventions are evidence based, even in the more limited sense of being based on known facts about the scale and nature of the problem it is tackling. That said, the demand for accountability against results achieved for the funds invested – a demand for both effectiveness and efficiency – is growing; and it seems likely that the demand for evidence will grow accordingly"* (Darcy & Hofman, 2003, 10).

Others (prominently Duffield 2001), pointing out that the modern humanitarian system has been profoundly reshaped in the wake of the western military interventions in the Balkans, Afghanistan, and twice in Iraq, believe that the capacity to act in post-war arenas has been transformed by gains in technological savvy and professionalism as well as by losses of independence and neutrality.

Both trends affect humanitarian information management. The security risks that preoccupy relief organizations and the stabilization concerns of occupying powers both create incentives for stronger information exchanges between the humanitarian and military communities. Technologies such as Geographic Information Systems (GIS) and Internet-based databases and discussion lists, increasingly used within the humanitarian community, have transported a good part of these boundary-crossing exchanges as well.

On the cultural front-end, values that have long pervaded military culture – preparedness, early warnings, forward bases, desk-top exercises – have been used to energize humanitarian action. Not surprisingly, they have helped to shift the leading dimension of humanitarian information management. From a criticism of the social (too many nongovernmental organizations [NGOs] in the theater) and substantive dimensions (no

agreement on what data to collect), an awareness of the temporal (late is worthless) has grown stronger. The above-cited authors of a report on "Structured Humanitarian Assistance Reporting" expressed this emphasis on time when they wrote:

> *"Time in the early phases of an emergency is one thing that is always lacking. The less time it takes to collect, organize and process critical information, the more time can be dedicated to saving lives and helping the victims of the emergency. Much of the core baseline information, such as population distribution, existing transportation infrastructure, location of health centers, demographic health indicators, etc. can be collected, analyzed and distributed prior to the onset of an emergency"* (King & Dilley, op.cit.).

This puts us aptly on the stage of this study: speed and rapidity, and ultimately the rationality of information management that claims to accelerate humanitarian action – seen through the lens of a typified activity, "rapid assessments".

Rapid assessments

Why rapid?

Political timetables

Emergencies create a generalized expectation of speedy response. This extends to the speed at which information to guide responder decisions is to be assembled. Timetables for interventions are politically imposed. Delays will be seen as policy decisions themselves, or as policy failure. Although it is questionable whether emergency responders actually hold off on their key decisions until they know the results of formalized information collections, undoubtedly these are molded by similar time pressures. These "limit the applicability of standard research methods which have self-imposed requirements for sample size, statistical confidence or corroboration of evidence" (Thomas, 1998: 1).

Several professional traditions

As substitutes, and in deference to the perceived time pressures, traditions of so-called "rapid assessments" have formed and have found numerous expressions in recent humanitarian interventions. The literature on rapid assessments has grown as well. A Google search for "rapid assessment" produces 84,400 hits. Adding the term "humanitarian" returns 8,150, still an impressive figure. It is important to point to the diversity of methodological traditions, some of which have roots outside the post-war emergency field. Activists and researchers in rural development and in other arenas of chronic poverty reduction have been perfecting methods of "rapid appraisal" for many years (Chambers 1981 is seminal; significantly, Google returns 18,300 hits for "rapid assessment" and "rural"). In these more placid and slowly moving organizational environments, "rapid" refers more to repeated waves of participatory information sharing and analysis rather than to due-diligence concepts of emergency responders.

Closer to humanitarian interventions, medical epidemiology and nutritional surveillance have built rapid assessment protocols over the past thirty years (Smith, 1989; Scrimshaw & Gleason, 1992; Manderson & Aaby, 1992); some have become "essential tools of disaster management" (Bradt & Drummond, 2002: 178). Much of the toolbox consists of sampling techniques suitable for local estimates (such as of vaccination coverage), but it may be noted that some of these methods speak to value-of-information concerns with an explicitness that is still absent in the post-war relief community discourse. MacIntyre (1999), for example, evaluated the trade-off between cost and precision for different sampling plans in Ecuador. She concluded that rapid assessments were three times more efficient than the large sample with prior household enumeration. The use of computer simulation to evaluate sampling scenarios in Expanded Programs of Immunization surveys dates back to 1985 (Lemeshow et al. 1985). Industrial quality control sampling methods, used in public health since the mid-eighties, have diffused to humanitarian information management selectively such as in the search for missed mine-affected communities.

A cultural lag in humanitarian action?

One might, therefore, suspect that the humanitarian mainstream shows a 10 – 20 year cultural lag in the adoption of concepts that underpin rapid assessments in professionally focused fields. However, the apparent lag is compounded by donor preferences in response to population-based phenomena versus project/inventory requirements. Donors who accept a sampling approach to nutrition and immunization, even shelter, would not accept probability as justification for repair and support of health care facilities.

Also, the "cultural lag" is in part made up for by the wider use of powerful multi-purpose technologies, notably GIS. These may better cope with the challenge that emergency needs assessments in part resist standardization, and may support data integration with pre-war information, current surveys from other sectors or gradually filled-in foundation data. As a consequence, rapid assessments may benefit from opportunistic redesigns that consider local specifics beyond established domain-specific protocols.

Trade-offs between speed and other desirables

Speed – a value in itself?

No matter how suitable internationally recognized protocols are for rapid assessments, speed in humanitarian information management seems to be a value in itself. This is true in a double sense. The sooner the needed information is collected, analyzed and presented the more numerous are the decision situations for which it is useful. In addition, with greater lead time for any particular decision, decision makers have more time to debate the bases and to combine information from a greater number of sources and formats. Knowing *now* that a particular region of the country is showing exploding rates of malnutrition is more valuable than knowing so in a few weeks. Some more focused local assessments may still be feasible while a broad decision is taken to design interventions for the suffering region.

Yet, it is obvious that speed can compromise a number of other values that are commonly summoned as criteria for good information. The frequent conflict between speed and coverage has been mentioned earlier. Lower coverage may result in lesser precision (smaller samples go hand in hand with wider confidence intervals), or in bias – the excluded units were systematically different from the realized sample.

Validity

Similarly, conflicts may arise between speed and validity, speed and reliability, speed and cost. Validity is compromised when the design of the assessment produces operational definitions that fail to measure the intended concept. In Iraq, for example, it took the international community (humanitarian and United Nations agencies, as well as the Coalition Provisional Authority (CPA) and the coalition forces detailed to civil-military support roles) considerable time to grasp the difference between schools as buildings and schools as organizations. With two or three completely separate school administrations sharing a building (through use during different times of the day and night), assessing building damage was not a valid way to count functioning schools.

In more general terms, we may assume that the construction of mental maps of the humanitarian problem to assess takes time, and so does the validation of those operations that probe the organizational environments for values on the constructed variables. This time cannot be indefinitely telescoped into short deadlines. Higher speeds may be decreed for conformity with action timetables, but they will go increasingly at the expense of adequate questionnaire translation, training and pre-testing before the main data collection. In the other extreme, validity may suffer from attempts to safeguard it by building in control variables from too many other subject-matter areas. For example, Bennett et al. (1994: 1282) observe that the immunization-derived sampling protocols, while effective for simple prevalence studies, may not work for complex designs that seek to explain the association of health with socio-economic factors.

Reliability and precision

In terms of speed and reliability, two concepts have to be kept apart. The first is measurement error in the sense that repeated measurements of the same variable on the same unit would return different values. There is hardly anything special about measurement error and its mitigation in rapid assessments that would not be found in a book on ordinary survey quality. The time pressures that rapid assessments face, of course, tempt to cut corners in instrument development and testing, in training and supervision. These stresses are a natural part of the post-war landscape and are resisted by advance planning, professional conscience and the ability to keep designs simple and samples small so that enough time can be set aside for adequate quality assurance measures.

Precision, the second aspect, is sometimes confused with reliable measurement. Precision is a function of sampling variation and, except for full enumerations, will be imperfect even in the absence of measurement error. Some proponents of rapid assessments have extolled this to a virtue:

> *"It should never be forgotten that on the birth certificate of RAPs, a tradeoff was inscribed - the trade-off between research duration, on the one hand, and the quantity and accuracy of collected information, on the other hand. This trade-off is not an original sin. It rather is the original blessing with which these procedures have entered a world in great need of knowledge but always short of time. Yet speed of acquisition, even when proudly worn on the sleeve, has cognitive costs, not only benefits.*
>
> *[..] two principles [for rapid assessments] must follow for rationalizing and keeping under control such cognitive costs. These two principles are "optimal ignorance" and "appropriate imprecision." Indeed these are [..] acceptable and necessary principles, with an in-built balance coming from their paradoxical wording"* (Scrimshaw et al. 1992).

Instead of waxing lyrical about imprecision, one should soberly ask what it does to the value of the information that the consumers will employ in their decision-making. And the other side of this coin, of course, is the cost of rapid assessments.

Cost of information

The most intriguing relationship, in fact, is the one between speed and cost. At first thought, one might assume concurrence rather than conflict. Speedier assessments should mean savings on the duration and cost of survey machinery. Practically, the movement of prices for survey inputs during the scramble of post-war players and returnees may reverse the correlation. While empirical regularities may be hard to find, some conceptual pointers are available. Much of the existing survey literature concerns itself with how different sample sizes and error structures affect bias and precision in survey results[1]. This is true also of the methodologically more sophisticated works on rapid assessments. In other words, the perspective is on the survey *consumer*.

Philipson (1997) takes a refreshing look at surveys as activities that take place in markets for observations. The interviewees and data collectors are the *producers* of the observations that the survey organizations demand. This view leads to the analysis of search costs, costs that may increase disproportionately if sample members withhold their observations, and replacements have to be recruited by the rules of systematic sampling, rather than the cheapest and fastest sample that could supply the observations. Philipson analyzes the marginal cost of interviews conducted in several major US surveys and finds for most of them steep increases during survey lifetimes. He also finds a very significant correlation between average costs and response rates. The latter variable closely parallels area coverage in rapid assessments.

The analogy is relevant but incomplete. It is incomplete because, according to many of our observations, rapid assessment teams replace unavailable sample members quickly

[1] And rightly so. One of the most prevalent and most underappreciated types of errors in this context is correlated interviewer error (see Biemer and Trewin 1997: 609-612), particularly in assessments in which several organizations participate in data collection, with systematic differences in the interpretation of questions and scales due to ad-hoc questionnaire revisions or differences in interviewer training.

and dynamically, in an attempt to keep resources busy at a satisfying load and with little thought for the variables of interest on which the left-out units might differ from the replacements. In fact, some cluster sampling methods have rules for instant replacement of unavailable sample members.

Consequences of non-response

It is relevant because rapid assessment teams have little incentive to return complete answers to all or most of the questions that they are made to collect information on. In survey lingo, *item* non-response rates are high, in addition to *unit* non-response and measurement *error*, which may also be high. For an illustration, RAP teams in northern Iraq were expected to ask a battery of questions regarding suspected contamination with mines and munitions. For almost half of the surveyed communities (46 percent), the information is missing. In many assessments, the nature of the missing information – the question was not asked, the interviewee refused to answer it, did not know the answer, or the data entry personnel entered only positive responses – is not evident. Particularly with binary variables, the analyst often has no choice but to treat missing values as zeros or "No", short of discarding all information.

The consequence is that the value of the sample information for the decision maker is very difficult to assess. Suppose that, in a fictitious extension of the above-mentioned Kosovo housing stock assessment (page 4), the United Nations High Commissioner for Refugees (UNHCR) decided to urgently buy $10 million worth of material for winterization aid, plus an added $ 1 million for every percentage point of housing destruction that the rapid community assessments established above an impressionistic first estimate of 25 percent. It is obvious that the uncertainty affecting the size of the bid grows disproportionately with the number of communities for which the housing stock was not reported. The more communities are left out, the greater the margin by which the UNHCR may wind up under- or over-procuring.

Supervision and incentives

By implication, the extra cost of better supervision, training and staff incentives are likely to be small over a large range of unit and item response rates, compared to the consequences of decision error. The extent to which quality-improving measures would slow down the assessment, however, is difficult to speculate about in this fictitious example. In the real world of commercial enterprise, as Gramopadhye et al. (1997) have demonstrated for aircraft inspection, survey practice approaches an optimum balance between speed and accuracy. Overly rapid inspections overlook problems, some of which will later cause expensive aircraft downtime (or worse). Overly thorough inspections place aircraft back in operation too slowly.

Such incentives may be missing for most of the workers hired for rapid humanitarian assessments (although a cynic may muse that they should be guiding managers intent on pursuing an international career in which they are bound to run into the same consumers of their products repeatedly). Nevertheless, if we look at rapid assessments from a value-of-information perspective, it is reasonable to assume that efforts to improve quality make an inverse-U-shaped contribution to their value. Below a minimal threshold of

quality, the irritation from having to consider assessment claims may be costlier than no information. Higher-quality assessments are appreciated because they credibly reduce uncertainty. Eventually further efforts will delay results and cause policy and action timetables to frustrate their practical applicability.

What is assessed?

Essential data

Some readers may dismiss much of the foregoing discussion, observing that questions of time and speed are much less decisive for the value of humanitarian assessments than the question of *what* it is that is being assessed. Interestingly, there is no firm doctrine on the subject matter priorities, despite decades of humanitarian interventions. The lack of such a consensus may have to do with the diversity of emergency situations. It may have just as much to do with the fact that these theaters are not within states with a strong rule of law where private persons, as citizens and as insurance takers, may pursue actionable claims, and where disaster response agencies therefore are mandated to observe well-defined assessment procedures.

In some focused areas, such as post-disaster health coordination (Bradt & Drummond, op.cit.), there may be accepted "minimum essential data sets" that every assessment is expected to collect. However, these become operative *after* a decision is made to conduct such a type of information collection. Pending that decision, a more fundamental question concerns the levels of social organization at which data is to be collected. Of similar paramouncy is the decision to sample or to conduct a full census of the objects of interest.

Populations, communities, facilities

In a first approach, one may distinguish between population, community and facility surveys, and likewise for rapid assessments. Population surveys seek to determine the numbers of persons who meet a relevant definition, and the distribution of attributes within this set. Community surveys speak to aggregates of persons, defined mostly by distinct settlements, although the defining attributes may be more complex or even a deliberate survey artifact. Facility surveys rest on the concept of goods and services produced in distinct types of institutions and formal organizations that data collectors can access as separate and individually countable units.

These definitions are naive, and many survey types will combine levels even though neither the informants nor the users may be conscious of the mix of references. Thus, a survey taking inventory of all mine-affected communities may collect information on blocked roads; however, the inventory may be restricted to previously gazetted communities, and the blockages only reported for roads that connect to some administrative center, to the exclusion of small hamlets and farm roads.

Of particular interest for rapid assessments are substitution processes when the source of the sampling frame or the inference are on a level different from that of the data collection. For example, samples of health care facilities to assess have been drawn from

the set of all facilities that some previously sampled and interviewed households said they were using, rather than from Ministry of Health lists, perhaps to avoid facilities that do not serve the target population. Conversely, quick-to-observe community attributes may be used to estimate population characteristics, which otherwise would have to be established through slow and expensive household surveys. We will give an example further below (page 27). Here we want to make the reader wary of distinctions that appear too neat and simple.

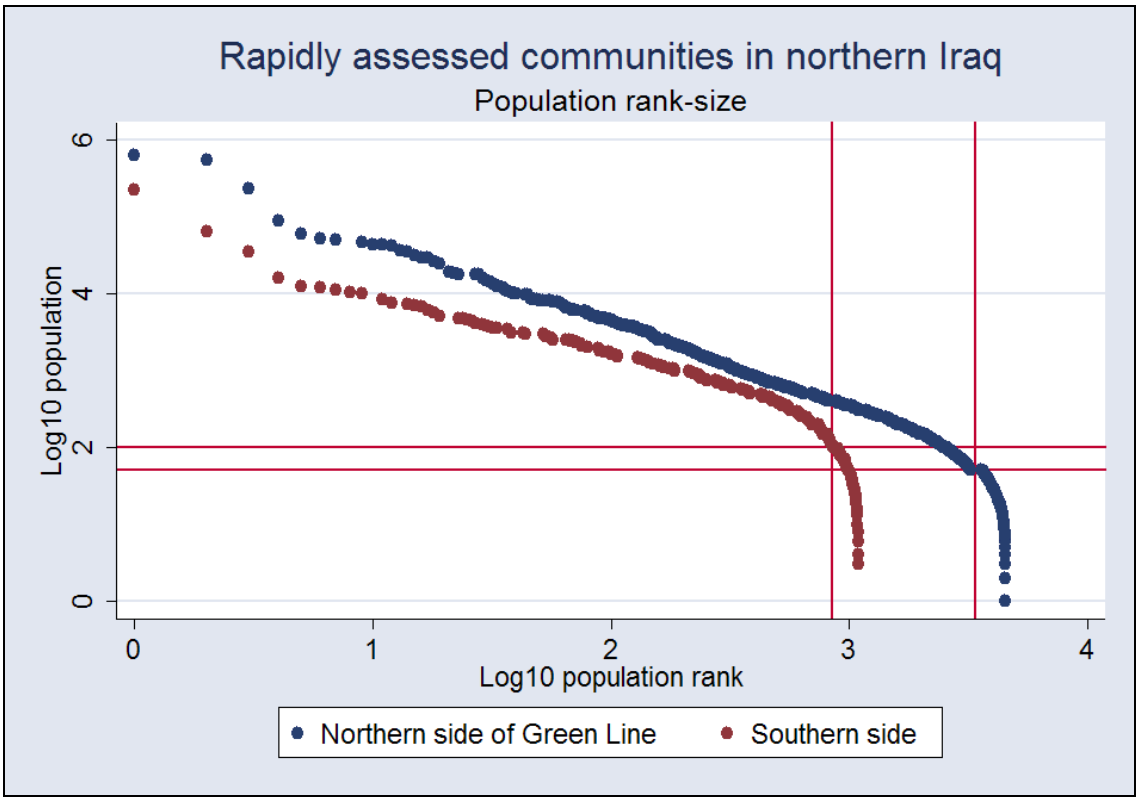
Population-level surveys are essentially about natural persons and households and as such do not usually pose major definitional problems. That, of course, has to be taken with a grain of salt when it comes to counting moving populations, or mixes of populations that resist easy identification. Assessments of facilities call for subject-matter experts; these may be expected to settle definitional issues if there are any. The most vexing problems are to be expected in community surveys. In many developing countries, official definitions of administrative entities below the district level are non-existent, or limited to urban municipalities.

Issues of definition

Lists of local communities may exist – see the discussion of the gazetteer for Iraq, page 44 -, but if their locations are known at all, then usually as points rather than as polygons that are mutually exclusive and completely filling the territory of the next higher administrative unit. As a result, the status of small settlements is difficult to determine; they may be included in frames and samples - or not. The selection may be opportunistic, depending on assessment teams' workload and payment mode. Practically, below a certain threshold, small settlements will stand a fast-decreasing chance to be recorded as distinct local communities in their own right. These thresholds may differ even within one and the same rapid assessment, as the following rank-size graph from the Rapid Assessment Process (RAP) in northern Iraq demonstrates.

Definitional issues, therefore, are bound to pop up repeatedly during community-level surveys and assessments. On the other extreme of the size distribution, large cities may not yield much useful information if only one assessment is done per city. Cities can be broken down into pre-defined or opportunistic neighborhoods. These may need pre-surveying, for fear that key informants and assessment organizations may assume boundaries that in reality are different. The methodologies for conducting rapid assessments of large communities have not been well developed although some may disagree with this sweeping claim (For a voice from the US, see Ervin, 1997; for examples from Bangladesh and Tanzania, Garrett & Downen, 2002).

Figure 5: Rank-size distribution of populations north and south of the Green Line



The Green Line was the de-facto line of control separating the government-controlled area from the Kurdish region 1992 – 2003; for a brief history, see the footnote on page 36.

The populations of local communities in northern Iraq provide almost picture book-perfect illustrations of Zipf's Rule, a linear relationship between the logarithm of the populations and the logarithm of the communities' ranks when arranged by descending population (Zipf 1949). The factors making for different intercepts and slopes between the two sides of the Green Line are unknown and immaterial to this analysis. However, the points at which the lines are kinked downwards are of interest because they reflect genuine differences in assessment behavior. On the northern side, teams were considerably less likely (compared to the Zipf expectation) to record settlements as their own communities when they estimated fewer than approx. 10 ^ 1.7 = 50 inhabitants. This inflection point is higher for assessments on the southern side, in the neighborhood of 100 persons.

We know that this was due to two factors. In Tameem Governorate, a new local organization was inducted to the RAP. RAP managers at the same time changed incentives in such a way that teams would get paid for assessments of communities with at least 20 households only. This graphically attests to the importance of principal-agent considerations in survey management, as emphasized by Philipson (op.cit.). Some of the differences may be due to historical circumstances. The more permissive security and political environment on the northern side allowed the Kurds to resettle in areas from which the 1988 Anfal campaign had driven them, perhaps resulting in a greater number of very small settlements. This, however, is entirely speculative.

Rural bias

Randolph Kent, a long-time observer of the humanitarian world, has diagnosed a "rural bias of much relief programming" (Kent, 2004: 12). The comparative ease with which physically distinct rural communities serve as assessment units may be a contributing factor. Contiguous urban neighborhoods will sooner or later pose tricky attribution challenges, particularly where the catchment areas of different services diverge – hospital service areas versus, say, school districts. Should a school and a hospital, both on the same block, be counted as attributes of the same, or of two different, neighborhoods? Or rather, should we calculate accessibility scores for each neighborhood with regards to different services? On the upside, most urban communities have some kind of commonly shared territorial definitions from pre-war times; rapid assessments should be able to ascertain them during their short design period.

Sample surveys vs. full enumerations

Reasons for choosing

The choice between sample surveys and full enumerations is related to the levels of social organization for which the rapid assessments are designed; and our discussion is limited to this aspect. Note that this has nothing to do with the politicized debate in the U.S. over whether the Census Bureau should be allowed to use sampling methods. The criteria in humanitarian information management are purpose, time and cost, not the political consequences of counts vs. sample estimates.

Population-level assessments, for what little we know from the published ones, always are sample surveys, pending the first full post-war population census. Such a major undertaking usually awaits secure conditions and a recreated national capacity and is beyond the means of the immediate post-war relief community. Moreover, most information needs can be met by way of sample surveys. Initially – this is the point of rapid assessments – the sample surveys will be relatively small. Later, in more settled conditions (which include better sampling frames!), large-sample household surveys may work well. Some follow internationally recognized formats, such as the United States Agency for International Development (USAID)-sponsored Demographic and Health Surveys or the World Bank's Living Standards Measurement Surveys. Mock et al. (2002) focus on these larger surveys in post-conflict and transition countries, but their premise that large sub-national variability among conflict-affected populations makes the "collection and analysis of data on the local household/individual level particularly important" (ibd., 2.1.) is less than compelling. We return to this claim in a moment.

Full censuses, or enumeration exercises, are taken of special populations in need. Refugees and internally displaced persons are frequently the objects – and occasionally, thanks to their internal social organization – the subjects, of such data collections. These full enumerations, however, are not necessarily an exception to the above-described regularity. They only extend to samples – or the known full set - of locations that shelter elements of the group in point. Brown (2001) discusses rapid population assessment methods within refugee camps, using area sampling methods.

This leaves community and facility surveys as being capable of full enumerations in post-war rapid assessment settings. We admit our lack of familiarity with facility surveys, except to note that they almost always seem to involve supplementary data collections bearing on related, but different objects. For example, health care facility assessments come with service provision components, which, practically, involve sampling patients for exit interviews. These select on the user group. Recognizing this limitation, additional data may be collected on facility use, health care expenditure, and socio-economic status among samples of households in the service areas. Community attributes will also be considered to an extent, notably the eligible population. The result, regardless of whether the facility survey proceeds to full enumeration or not, is a set of relational tables, of which some hold sample survey data. If these are aggregated to the facility level, the new variables inherit the sampling variation from those levels. The question can be posed whether assessment organizations have the requisite analytic skills for complex studies of this kind.

What to do in community assessments?

What about the suitability of local communities for full enumerations? At first glance, this seems to be an attractive option, for a number of reasons. Communities seem suitable as focal points for many types of assessments, on the needs as well as on the capacity side, because most have readily available and knowledgeable key informants. An initial investment in a census of local communities thus promises dividends for the future. Subsequent surveys will benefit from a complete sampling frame. Data from different sources and on different topics can be linked via the community, assuming it can be attributed to communities by means of aggregation and a common reference. And most importantly, communities come in finite numbers and seem, weather and security permitting, within the reach of rapid assessment budgets and timetables.

On closer inspection, other pros and cons appear. Under favorable circumstances, community-level attributes can proxy for individual and household-level attributes. Kusumayati and Gross (1998) correlated remote sensing data on Indonesian villages with survey data and found strong predictive power in the former:

> *"Multiple linear regression tests were executed, and the resultant equations were tested for their validity in predicting communities with poor nutritional status. Among geographical and ecological indicators used, distance to the nearest market, main soil type, rice field area, and perennial cultivation area were found to be most useful predictors for the ranking of the communities by nutritional status. Among non-ecological determinants, food consumption, health service status and living conditions were also found as predictors. The highest correlation was found if total population was also taken into account in the regression model (R-2 = 0.69; p < 0.0001)"* (ibd., 408).

The ability of community surveys to substitute for lower-level data mitigates the urgency of large surveys at these levels, but this says little about the pros and cons of full enumerations relative to sample surveys. These are determined by the purpose of the

assessments, in addition to cost and time. As a general rule, assessments that aim at estimating the prevalence and dimensionality of humanitarian problems may be more efficient as sample surveys. Assessments that will feed into databases serving look-up and local prioritization purposes may need to reach out to all communities. For example, if the question is whether most communities are still without functioning schools, and the suspicion is that teachers cannot draw their salaries in their work places, reports from a sample of communities may suffice. If the challenge is to establish a list of communities with functioning schools so that United Nations Children's Fund (UNICEF) may ship school kits in time for the next term, all communities may have to be touched, perhaps in combination with a facility assessment[2].

Beware of complicated designs

The latter qualifier, "perhaps in combination with a facility assessment", is treacherous and contains some of the strongest objections to full community enumerations. Although the teacher salary scenario is innocuous, it points to the tendency for community surveys to collect data on objects that are not in a one-to-one relationship with the community in focus. Using database lingo, it can be said that communities have zero to many schools, and each of these has, in theory, one to many teachers, who, across the country, may be paid by one to many different school authorities. In a naive survey design view, these complexities can be suitably reduced by eliciting counts, sums, and "most important" among the related objects. However, the design and analysis of such reduced-form surveys still calls for a measure of subject-matter expertise. From here it is a short step to advocating better validation through sectoral assessments that drill down to the detail of entities other than the local community. The complications are well illustrated by humanitarian mine action. In the Emergency Mine Action Survey (EMAS), as well as in the slow-moving landmine impact surveys in other countries, stakeholders understood that professional clearance organizations would not use these surveys unless they produced records of individual suspected areas, with at least minimal visual inspection. Thus, a dangerous area level was built into the community survey designs. Filling this module takes additional time.

It is the build-up of subject-matter concerns that helps to slow down rapid assessments. Insecurity, of course, applies much stronger brakes than subject-matter complexity, and in many situations, it will be impossible to divvy out the relative influence that the length of questionnaires or the volume of data to enter had on the speed and numbers of completed community assessments. But even assuming perfect security, full enumerations in rapid assessments need to be argued on a case by case basis.

Assessment organizations

Most aid organizations conduct their own assessments. NGO, International Organization (IO) or United Nations agency assessments are non-refundable investments in assembly of sufficient data aimed at convincing donors to fund their programs. Because

[2] These are intrinsic criteria and somewhat academic. In the political reality of relief and reconstruction, donors eschew general support projects. The form of assessments then largely is a function of the funding parameters of the specific programs that they are meant to inform.

assessments are closely linked with funding, there have always been suspicions and claims that the results were less than credible. Hence there have also been efforts to promote better standards defining what a humanitarian need is and how it is measured. Efforts such as the SPHERE project (King & Dilley, op.cit.; The SPHERE Project, 2004) and SMART AID (Mock et al., 2002) detail standards and required information elements. A desire for standardization (and its result, more efficient information exchange) is also at the center of the HIC concept.

Humanitarian Information Centers

The HIC as an organizational form is relatively new. Hosted by OCHA, it received endorsement by the United Nations Interagency Standing Committee on Humanitarian Aid in 2003. This means that the HIC has been officially recognized as a key element in the conduct and support of humanitarian relief efforts. It is operated as a common service to the humanitarian community.

As such, the HIC supports aid organizations in their use of timely and accurate information as a means to promote greater efficiency and effectiveness. The HIC is a small organization with only a few staff members and acts as a clearing house that actively seeks out new data sources and makes these available to relief providers. For example, HICs have successfully branded the compilation and creation of the place code index or gazetteer as an essential product. We will return to his in greater detail (page 44). The HIC also provides a range of other services and products designed to meet the needs of relief organizations. These include map products such as administrative boundaries and thematic displays, and technical advice to organizations to help them manage and apply data and information.

Prior to the current Iraq emergency, HICs had been selectively used in several countries, including Kosovo, Sierra Leone, Afghanistan, Eritrea, and southern Africa. Established by OCHA, and working under the United Nations Office of the Humanitarian Coordinator for Iraq (UNOHCI), the HIC Iraq operated with funding and support from a number of groups, including United Kingdom's Department for International Development (DFID), USAID's Office of U.S. Foreign Disaster Assistance (OFDA), Vietnam Veterans of America Foundation (VVAF), the NGO Coordination Committee in Iraq (NCCI), and the Iraq Joint NGO Emergency Preparedness Initiative (JNEPI).

While HICs had not previously undertaken contract surveys, the HIC for Iraq engaged in the collection of relief-critical information through a community survey activity known as the Rapid Assessment Process (RAP). We will describe the design, politics and results of the RAP as one of the two case studies farther along in this document.

Recently, USAID and DFID commissioned an evaluation of HIC achievements. The report (Sida and Szpak, 2004) is public; it includes case studies of the HICs in Liberia, Afghanistan and Iraq. Key recommendations are for early deployments by way of a core team from OCHA headquarters, the addition of analytical capacity (but not necessarily residing within the HIC), and greater user involvement in HIC governance.

Other assessment organizations

Other organizations also conduct assessments. For example, in Iraq these included the individual United Nations agencies, IOs and NGOs as well as for-profit entities under contract to CPA. Such organizations were either directly engaged in reconstruction activities such as Bechtel or were contracted like Creative Associate International Inc. and Abt Associates, specifically to support ministerial functions and provide inventory type surveys of assets and facilities. On top of these activities, military Civil Affairs and other units, as well as the U.S. Army Corps of Engineers similarly engaged in data collection exercises to support provisional governance efforts.

Iraq 2003 as an attractive case study

An announced war and humanitarian preparations

Iraq, despite the hampering of reconstruction by continuing insecurity,, is an attractive case for the study of rapid assessments in post-war conditions. The run up to the March – April 2003 war is the story of an announced war; the humanitarian community took advantage of that time for extensive preparations. These included resources and systems for humanitarian information management and, within this sector, for rapid assessments.

Mac Ginty, in a well-informed piece with the provocative title *"The pre-war reconstruction of post-war Iraq"* (Mac Ginty 2003), stresses the point that while the reconstruction planning was led by the United States, both the U.S. and the United Nations had extensively reviewed the experience of recent post-war situations and were ready to apply lessons to the planning for post-war Iraq. U.S. civilian and military leadership, extrapolating from Afghanistan, was convinced that humanitarian relief could be initiated while fighting continued. The United Nations, while distancing itself from the war and withdrawing personnel from Iraq, nevertheless prepared for a role under the philosophical banner of synergistic coexistence of all components of humanitarian assistance – relief, reintegration of displaced persons, and reconstruction.

For the anticipated rapid assessments, the implications were that they should contribute information in a multi-sectoral format, and that there would be no time to debate and test formats. OCHA canvassed other United Nations agencies for pre-war data from which it built a hierarchical gazetteer detailed enough for a running start to community assessments once relief agencies were free to roam inside the country. Similarly, although in some self-elected isolation from the OCHA efforts, the United Nations Office for Project Services (UNOPS) spearheaded the design for the EMAS. It resolutely closed debate in February and had the data management hard-wired into an application that subsequently resisted needed modifications in the field – a danger that Mac Ginty saw more widely where needs were "presumed rather than assessed" (ibd., 601). This liberated the humanitarian planners to concentrate on the practical demands of pre-positioning staff and equipment and of recruiting subcontractors who would execute pieces of the pre-emptive action plan.

The humanitarian information landscape

Before the war

Available public information on Iraq was exceedingly sparse. This was surprising for a modern state with a high degree of urbanization and a substantial technical infrastructure. In fact, most ministries were using computerized data management applications including high-end engineering software in the 1980's, on par with the trend in most western countries. So what happened to such data?

As with most authoritarian regimes, control of information was an integral part of state power and internal security. Ministries did have access to record and manage data, but regular citizens did not have access even to maps. Starting with the Iran-Iraq war, even tourist maps, a normal product in most countries, were banned from publication and sale in Iraq. *"During Saddam Hussein's reign, only high-level loyalists had access to maps that showed where roads, hospitals, and sewers were located. And those maps were 10 years out of date"* (Kharif, 2003). The result of this was that when the aid community arrived in Iraq in 2003, they found that most government entities were using hand drawn sketch maps. These were not products of a cartographic design process but of a simple requirement to visualize basic information in a spatial context.

Interestingly, the culture of secrecy transferred to the international relief efforts for Iraq. These had continued since the end of the 1991 Gulf War. The much-maligned United Nations' Oil-For-Food Program (OFFP) began in 1996 after the supply of frozen Iraqi assets, which had been used to fund relief efforts, began to slow.

In early 2003, it was known that significant information was recorded in various databases regarding health, education, population and many other critical elements of Iraqi services and infrastructure. However, these data were never released. For example, the Public Distribution System, a general food aid distribution program dating from the Iran-Iraq war, held data on registered recipients of food aid down to each local distribution agent and neighborhood. The United Nations' World Food Program (WFP) prevented other agencies, including OCHA, from accessing the raw data. After the war, the CPA did show an interest in it, but could never organize sufficiently to identify, acquire and release copies.

Similarly, health facility and school data were released, but never explained by the in-country United Nations team to the responding headquarters emergency team. The frequent statement made was that the data was the property of the Iraqi government. This argument prevented the release of minefield data from northern Iraq as well as significant geospatial data sets held by United Nations entities in the north. In Erbil, UNOPS had set up the Joint Humanitarian Information Center (JHIC) as early as January 2001; by the time hostilities commenced in 2003, the JHIC had built an extensive regional gazetteer.

The United Nations was constrained in preparing for a post-conflict intervention in a member state during the run-up to a war that had not been declared. This meant that United Nations agencies could not *officially* begin planning for relief operations.

Unofficially, it had to, and did, prepare. However, there were greater challenges internally. United Nations agencies operating in Iraq and funded by the OFFP became classic examples of co-optation. Those units working in the government-controlled regions identified with the Iraqi authorities. The same entities in the north became closely associated with the Kurdish authorities and suspicious of their colleagues in the rest of the country, a situation that had existed in Iraq as long as the UN programs.

Hidebound in this culture, the large United Nations agencies remained uncooperative even after the outbreak of hostilities, refusing to share data with sister agencies and partner NGOs. The situation only began to be resolved once the OFFP was terminated in November 2003.

After April 2003

It did not take the humanitarian community very long to determine that coalition forces also restricted data. These forces embargoed all satellite imagery over Iraq during and immediately after the war. Imagery for town plans that would have rapidly assisted aid agencies in documenting needs and coordinating response, were classified "Secret". The coalition also held significant amounts of geo-referenced data on Iraqi infrastructure.

These targeting databases could have been used by the military as the foundation for immediate assessments. The data could have been declassified, if need be by sending a military team to the site of the "classified" sewage treatment plants, electrical substations and other economic infrastructure and manually collecting a new coordinate with a GPS. Unnecessarily restricting such commonplace data undermined effective planning and coordination. On a positive note, the military did agree to release data regarding cluster sub-munitions and other aerial-delivered explosive ordnance. These data began flowing in a steady stream nine days after the commencement of hostilities. A VVAF representative was officially authorized to receive the data on behalf of the mine action community.

In May 2004 there occurred a surge of United Nations teams from their headquarters. These staff did not see eye to eye with the staff in the north or in Baghdad. The result was a series of compartmented data sets and little inter-organizational sharing or validation. On top of this, the United Nations and the CPA did not trust each other. Things were not made any easier by the reborn Iraqi ministries seeking to reestablish their authority amid the fighting between CPA and United Nations agencies.

Some of this became moot after the August 2003 bombing of the United Nations headquarters and the evacuation of United Nations personnel from Iraq. A peculiar consequence of the political discord for humanitarian information management persisted in geographic data sets. Internal administrative boundaries in Iraq remained disputed and unclear. While politically disputed areas were well known, most data sets available had significant errors and did not match with any Iraqi point of view. It was not uncommon to see different boundaries used among United Nations agencies, and between them and the CPA, with neither version endorsed by Iraqis.

Two assessments

The United Nations Rapid Assessment Process

Rationale and execution

In the tradition of interagency assessments

The common or interagency assessment process is a frequently applied tool for building consensus, a common understanding of needs and an interagency coordination process. The Rapid Assessment Process (RAP) was the term adopted for this effort in Iraq.

In concept, the RAP was to serve as a summary data tool, providing a format for recording a subset of information that organizations would already be collecting in the course of their own assessments. While technical assessments would take a while to get underway and even longer to report results, there was need for a triage tool to quickly record the observations of need, or lack thereof, and keep track of what had been assessed in order to reduce duplication of effort.

In this regard the RAP was intended to provide an essential set of geo-referenced data that could be assembled into an immediate picture of evolving requirements. The RAP would also facilitate the coordination of more detailed sector based reconstruction surveys. Specifically the RAP would supplement, summarize or replace common data requirements when organizations were collecting concurrent technical assessment data.

By contrast, the RAP was *not* intended to:

- Replace more thorough *technical* surveys in specific sectors
- Be used for assessing *locations other than communities*, such as hospitals
- Require any type of *household survey or physical count of the population*.
- Support *real time reporting* of time sensitive data such as population movements or market prices

The politics of designing a form

The development of the RAP tool was requested by OCHA and UNOHCI in January 2003. The responsibility for this was delegated to the nascent HIC for Iraq. In practice the HIC served as secretariat to multiple players from the United Nations agencies and elements of USAID in Washington, DC and Kuwait, as well as some NGO stakeholders. USAID also shared the document and comments with coalition Civil Affairs elements, which were also seeking a standard assessment form. The initial design resulted from a canvassing of United Nations Agencies and NGOs for elements of information they would like to see in the “common assessment”.

At this early stage it was envisaged that two two-page forms would be used. One form would focus on rural communities while the other was focused more on urban areas.

Expectations surrounding the tool varied. Policy makers saw the tool as providing a means of promoting the coordination mandate, function and service of UNOHCI and the Humanitarian Coordinator. Some United Nations agencies were wary of such a survey encroaching on their territory, while USAID saw it as an opportunity to get others to conduct their surveys with full details. In interagency discussions it was made clear that sector leading agencies would be assembling their own surveys. Thus the World Health Organization (WHO) was moving forward on a health facility survey while UNICEF was working on similar tools for water and sanitation, as well as for education.

Throughout the design process there were competing demands for inclusion of more data, exclusion of data and a simultaneous requirement to shorten the form. Demands to make the forms more compact resulted in one three-page form to serve both rural and urban areas. USAID demanded that the form be condensed to one page, but the participating organizations were unwilling to specify which questions should be eliminated. The struggle for an acceptable version continued for considerable time, with the number of pages becoming an issue of its own right, regardless of content, useful information and enough room to record what was required. HIC staff struggled to avoid simplifying the questions to the point where the data would have no utility. UNOHCI and NGO representatives in Amman endorsed the final form. There was an unsavory parallel with the manner in which the instrument for the EMAS (see below) was being developed, with a great deal of agency politicking crowding out what little social survey expertise was there to begin with.

During April the HIC produced and gave numerous training presentations to NGOs, United Nations agencies, coalition forces liaison persons and donor teams in Amman, Kuwait City and Larnaka, Cyprus. It quickly became apparent that despite support and assurances from a broad range of partners, organizations on the ground would make little use of the form. There were two primary reasons for this failure. First, the follow-through portion of the process was not clearly explained to them during the training. Questions about who the form should be given to, when the data would be processed (and by whom), and how long it would take to produce products remained unanswered.

Second, the form, as designed, was intended to collect information about a community as a whole. This was in keeping with integrated recovery and assistance planning principles. The OFDA Disaster Assistance Response Team (DART), the military and others, however, tried to use the form for assessing unique locations such as hospitals, warehouses or port facilities. Understandably, they found the form lacking.

Goal displacement and design modifications

In early June 2003, as the governing authority's status became clearer and reconstruction became the focus of international efforts, the HIC was tasked by UNOHCI and the United Nations Development Group (UNDG) to compile all available information in support of the Development Conference that was held in New York in the second half of June. Even though the United Nations agencies were directed to comply and provide all data to the HIC, the resulting data were very disappointing. United Nations agencies'

previous insistence that they had all the data they needed to design and monitor their programs was proven incorrect and their credibility with the UNDG tarnished.

Taking advantage of this situation, the HIC offered the RAP as a potential tool to meet multiple requirements from the United Nations reconstruction planners with a single quick survey. Earlier objections by the United Nations agencies were muted after their failure to produce. The results of the RAP held the potential to provide a straightforward and easy-to-use data set on current conditions at settlement, district, and governorate levels for the entire country.

At the end of June 2003, the HIC formulated a plan to implement a modified RAP. It proposed that the RAP be contracted by the HIC rather than the earlier approach of inviting voluntary data collection activity from organizations already operating in Iraq. Under an additional objective, the RAP was also to validate the accuracy and completeness of the settlement database; data slots for this were already on the form. Minor modifications were made to several RAP questions based on early field-testing in northern Iraq. Major conurbations were to be omitted in order due to insufficient resources to cover urban as well as rural areas. Major changes were avoided, over concern of upsetting the fragile interagency consensus. The overarching goal was that the results of the modified RAP would provide information for donor reconstruction conferences.

Dedicated United Nations survey staff in the North

In early July the JHIC, headquartered in Erbil, began implementing the RAP in the three northern governorates of Erbil, Dahuk and Sulaymaniya. The JHIC enjoyed a dedicated survey unit; it trained 64 surveyors and 21 area team leaders for the task. The teams were organized out of the main office in Erbil and the two sub offices in Dahuk and Sulaymaniya. All the surveyors and area team leaders were experienced surveyors, who were either from or familiar with the areas they were asked to survey. The area team leaders were responsible for daily work plans, quality control, and data entry. The forms were entered into a separate database in each of the JHIC offices.

All surveys and quality control checking was conducted during the months of July and August. The JHIC surveyors were also able to complete the RAP in two districts in the Ninewa Governorate (Akre and Shekhan/Al Shikhan) and two districts in the Diyala Governorate (Kifri and Khanaqin). The surveyors covered every small grouping of residential structures.

Different arrangements elsewhere

Due to funding resources and time constraints the RAP was implemented differently in south and central Iraq. Local NGOs and independent, experienced surveyors were identified and trained, most of them drawn from universities, underemployed ministry staff and former United Nations staff. They were instructed to only survey settlements that had over twenty structures or a Mosque. The value of the RAP as a tool to verify the HIC maps became apparent and surveyors were asked to mark any name or location changes on the provided HIC maps. All forms were checked for accuracy by the local

RAP coordinator and then sent to Erbil for data entry. One other significant difference was that these surveyors were paid on a per form basis unlike the JHIC who were paid a flat daily rate for their work in the three northern governorates.

By mid-August the RAP had started in Tameem Governorate and several districts of Ninewa and Salah al-Din Governorates. In Baghdad surveyors had also been trained and were beginning work in the areas around Baghdad and in the south of Iraq. It was at this point, on August 19th that the HIC Baghdad Office was destroyed in the Canal Hotel explosion and soon afterwards all United Nations non-lifesaving activities were suspended throughout Iraq. The HIC did not attempt to continue the RAP due to the ongoing security risks and fears that working on the RAP might endanger the surveyors through their association with the United Nations. The surveyors recruited in Baghdad were reported to have continued their work but to what extent remains unknown. The JHIC staff in Erbil were reportedly attempting to locate the surveyors and collect their data. Although the project was severely interrupted by the cessation of United Nations activities, the RAP was completed in all the districts of Tameem Governorate, Tooz district in Salah al Din, and Telafar district in Ninewa. Data entry was completed by the end of September 2003 in a separate database in Erbil. The two databases were then compiled.

Results and uses

A galaxy of places and data

We limit the review of RAP results to northern Iraq because of its more complete coverage that makes analysis feasible. Here the RAP collected information in over 200 substantive variables from 5,694 populated places. Excluding missing values, more than 852,000 data points were entered into the database. Only part of this huge collection has been analyzed. Publicized findings (Benini & Ross 2003) concern the population, access to services of various kinds, plus two quality-of-life indicators. Because of geographical imbalances, some of the more advanced analyses were restricted to a subset of approx. 3,700 communities. Together, these claimed a combined population of more than 4.1 million.

The detailed analysis concerns the 2.2 million people living outside the capitals of the three governorates of Erbil, Sulaymaniya and Tameem. Communities on the southern side of the Green Line[3] typically were farther removed from health care and commercial

[3] The "Green Line" is a de-facto line of control that resulted from the aggregation of a number of events. There is no agreement or resolution that established this line of control:

- Kurdish-led uprisings in spring 1991 reached a stalemate in their fighting with the Iraqi forces in the areas around Erbil and Sulaymaniya.
- The 1991 Coalition-led intervention in northern Iraq established a security zone that enclosed most of Dahuk Governorate. Military-to-military contacts negotiated withdrawal of Iraqi forces from Dahuk itself to a line north of Mosul near the Faydah military training base. Imposition of no-fly-zones only covered the northern half of the autonomous area with the southward extension in Sulaymaniya reaching beyond the cover of the no-fly-zone.

services (such as petroleum sales points). These differences were less pronounced for access to education, piped water and electricity. Moreover, clusters of highly serviced versus underserviced communities would form within each governorate. Underserviced communities prominently clustered in the northern parts of Tameem and some southern parts of Sulaymaniya, close to the Green Line. We illustrate this with a map showing proximity to health care and commercial services.

Multiple imbalances

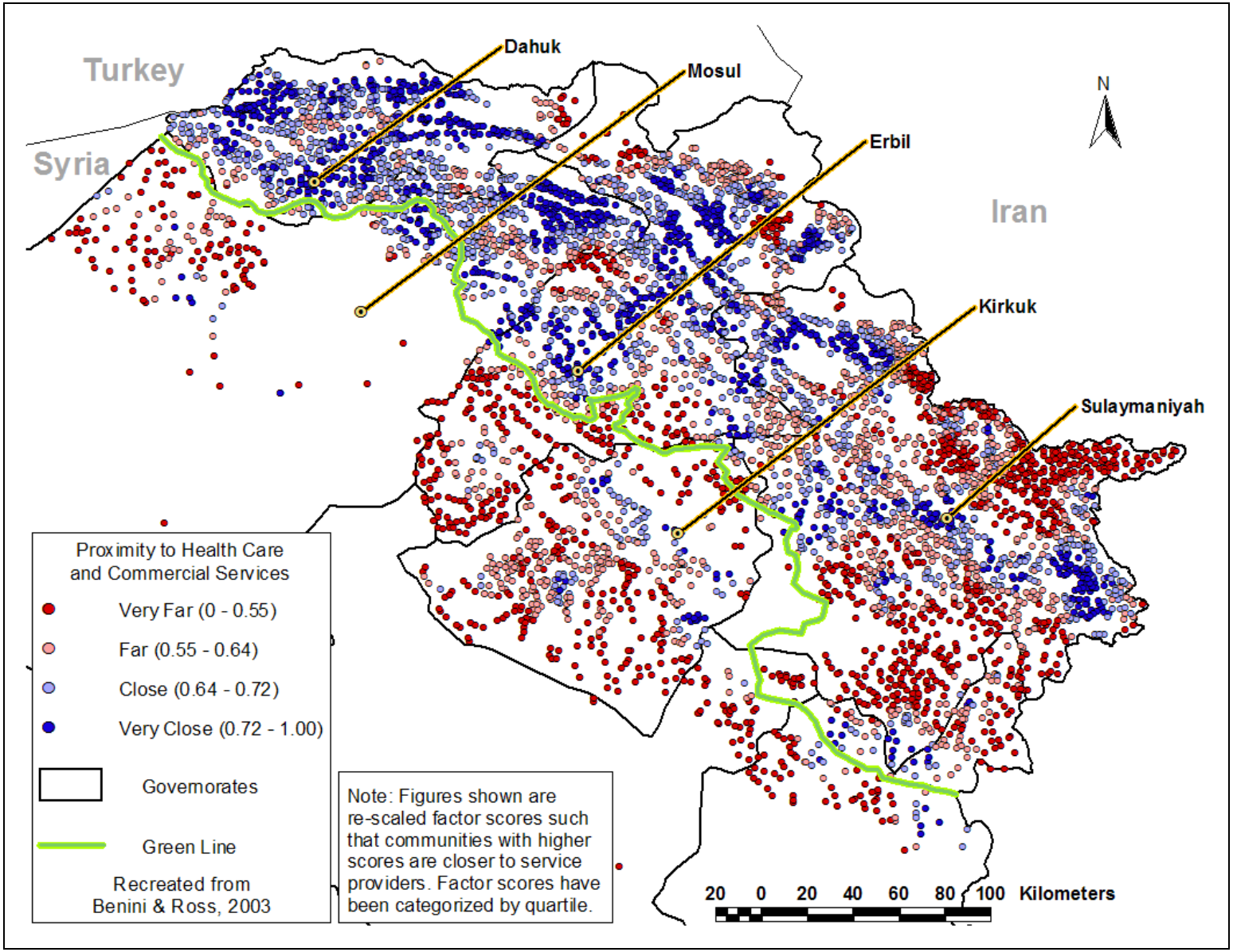
In retrospect, the analysis revealed a number of limitations in design and data collection. Coverage was uneven, both geographically and in filling the substantive variables. Gaps in geography were due to the distribution of rapid assessment personnel on the two sides of the Green Line – the Kurdish-controlled part readily marshaled a trained survey force; on the southern side, data collection was in part contracted out to unproven local agencies – as well as to the changing and worsening security situation.

On the substantive side, the "politics of designing a form" meant that many of the agencies whose buy-in was sought threw in their wish lists for things to collect, without anyone in charge of an analysis plan at the time of design. Little care was given to separate structure, performance and outcomes in specifying the variables, and their relation to needs and capacity measures were vague. We were able to validate the relevance of the "proximity-to-services" measures, using ex-post structure-and-behavior models, but this was an accident of the group who met for the analysis months later rather than a design feat.

The assessment was guilty also of the rural bias that Kent (op.cit., 12) laments. Incentives for data collectors were such – they were paid by piece – that a very large number of small settlements were elevated to local communities in their own right. Also, the treatment of large cities was inconsistent, with some split into separately assessed subdivisions, and others taken as a whole. Therefore, cities had to be excluded from most parts of the RAP analysis.

- Starting in 1992-93 the Iraqi regime imposed an internal embargo on the northern-controlled territory. The line of embargo was created along the southern side of the security zone and the stalemate line west and south of Sulaymaniya. In some cases the Iraqi forces withdrew to more secure positions, creating a frontier no-man's land between themselves and the Kurdish led forces.

Figure 6: Communities in northern Iraq - Proximity to health care and commercial services



Overwhelmingly, access to health care and commercial services was better north of the Green Line, with, however, large clusters of underserviced communities in Sulaymaniyah governorate.

Access to services as a key reconstruction factor

Nevertheless, the RAP results are potentially relevant for reconstruction policies in this part of Iraq. The statistical significance of the behavioral models that the data enabled strongly suggests that improving access to, and the effectiveness of, various kinds of services, is a key variable for revitalizing rural communities. This holds particularly for those in the ethnic friction zone that runs alongside the Green Line. The RAP has laid a first foundation for a better understanding of this region of Iraq.

However, disseminating the RAP findings from the United Nations agency running the HIC to agencies taking a lead role in later phases of the relief-to-development continuum has been a challenge. OCHA made an effort at careful data transition to UNDP, but a UNDP subcontractor commissioned to conduct a large rapid assessment at the household level in 2004 did not receive the stored HIC gazetteer and RAP information and rebuilt a gazetteer of northern Iraq from diverse local sources (Pederson 2004).

Make or buy?

With hindsight, the overall verdict is that the HIC for Iraq did not have the capacity to conduct a quality survey. The RAP should have been contracted out to a professional survey organization. The RAP was institutionally hampered by OCHA's penchant for the "free" voluntary aspect of distributed collaborative data collection and the cost-saving lure of do-it-yourself management. Most of the implementation decisions were founded not on survey practice but on what type of contracts the supporting UN administrative service would endorse. However, it is very clear that voluntary or contracted, if such survey approaches are to work in future humanitarian settings, it will take a much better prepared and professional approach to market, support and sustain the effort.

In the early stages this includes the design of persuasive output product examples. These should focus on supporting the decision making process on issues such as prioritization of resources, relative need, and inter-organizational self-correcting coordination. Such products are critical to convince participating organizations of the benefits to expect. Concomitant with product design is a well conceived and supported ability to follow through, discipline participants and bring products to market in time.

The Emergency Mine Action Survey

Rationale and execution

Specifics of the contamination

Significant landmine and unexploded ordnance (UXO) contamination was known to exist in parts of Iraq from the 1980-88 war with Iran and the 1991 Gulf War. In the Kurdish-controlled region, the United Nations, through UNOPS, and several NGOs had been engaged in landmine/UXO survey, clearance, mine risk education and survivor assistance.

The scale of these activities prior to the 2003 war was considerable, resulting also in the creation of local humanitarian mine action (HMA) NGOs.

That this war would create newly contaminated areas was actively pursued in humanitarian preparations. During winter 2002-2003, UNOPS relied on the Geneva International Center for Humanitarian Demining (GICHD) to create an adapted data management tool for an emergency survey to be started up as soon as post-war conditions would permit. Its design incorporated, in a lesson learned in Afghanistan, a concern for abandoned and hazardous ordnance sites. Such sites were dangerous, even where they did not block access to resources, in that they could supply armed opposition movements or other unauthorized groups and individuals, or would draw scrap and explosives scavengers seeking to supplement their meager incomes.

At the same time, the traditional objective of ascertaining the impact of the contamination upon the livelihoods of local communities was augmented by a link to immediate resource mobilization and priority setting.

As a result, the EMAS design differed from that of a traditional Landmine Impact Survey both in substance and in process. Suspected areas became entities in their own right, not necessarily subsumed to an affected community. That the ability to discern affected communities might be limited was recognized by a double link to the surveyed community (whose center point coordinates the data collectors would determine in the field) and to some nearby town from an imported community gazetteer.

An expectation of speed

On the process side, EMAS was expected to advance much faster than impact surveys do in settled post-war conditions. In the spirit of a rapid assessment, data was to be handed over from survey organizations to UNOPS at short intervals, as opposed to being evaluated in total at the end of the data collection. This would split responsibilities for collection and analysis between different organizations.

UNOPS had this division hardwired into the EMAS database by equipping data collecting NGOs with a “mobile module” and reserving a “head office module” for itself. It closed the window for NGO input in the design in February 2003 and later resisted the majority of substantive requests to adapt the database structure in accordance with field pre-test findings[4]. Moreover, the “design committee” did no even consult the only Mine Action NGO that had operated in Iraq continuously since 1991, longer than the UN’s own effort. In fact, changes that implementing NGOs and UNOPS field personnel unanimously voted at a national review meeting in July, were summarily rejected by the New York headquarters, other than allowing some reduction in the size of the instrument.

[4] The application was known as the “Emergency Survey Tool for Iraq (ESTI)”. It was designed at the Swiss Federal Institute of Technology in Zurich by the authors of the well-known Information Management System for Mine Action (IMSMA) tool. Some initial bugs were eliminated, and a number of user-defined fields were provided that UNOPS field managers could enable. These changes were minor compared to the problems that the field tests revealed. One of the strong points of the ESTI was that it allowed field users to edit, and append new records to, the community gazetteer (imported from the HIC) as the teams verified location names and coordinates during data collection.

For the rest of its data collection period, field managers had to reconcile the tension between a rigid data entry structure and the working definitions that data collectors followed in administering the questionnaire.

Implementation in the North

In the north, UNOPS tasked the United Kingdom-based charity Mines Advisory Group (MAG) with the data collection. MAG, in turn, asked VVAF to coordinate the technical execution of the survey. Set-up and fieldwork took nine months, from June 2003 until March 2004. The survey workforce counted six permanent expatriate team members, and a national staff ranging from 32 to 86 at different periods of operations. Notably, MAG filled the four field team leader positions with Lebanese personnel that had gathered experience as supervisors in the Landmine Impact Survey in their native country. These Arab-speaking expatriates were crucial for the accelerated training of the national staff and for translating feedback to survey management.

The national staff worked in a variety of positions ranging from data management and data collection to support staff. Borrowing a proven tool of the landmine impact surveys, MAG supported each field team leader with a (national) field editor, who would monitor the quality and completeness of the data collected. Each team leader was responsible for four or six data collectors working in pairs.

Sequential assignments

Survey areas were assigned sequentially and with varying precision. *North* of the Green Line, UNOPS intended MAG to visit, to a depth of five kilometers from the Line, all communities that had not already been surveyed before the war. UNOPS would designate one or two priority districts at a time and compile the lists of communities already surveyed. These MAG was to avoid.

There were exceptions to this rule. In July, MAG was invited to survey Chamchamal district to a greater depth. Later, when UNOPS closed its office in Erbil in November, the exclusion list ceased altogether. As a result, MAG wound up surveying over 300 communities in the district where it had just begun work, Akre.

However, the major survey ambitions were aimed at the recently contaminated areas to the south of the Green Line, in districts and governorates that, before the war, the Iraqi government controlled. From this region, the mine action center at UNOPS Erbil in general had no information specific to the community level and, except for a one-time request to look at six villages that were the object of a specific risk communication, did not direct MAG to address or avoid specific communities. District assignments were relegated to MAG's own good judgment in view of security constraints and the availability of local experts.

Switching to a full census

UNOPS and MAG did have a body of prior information on possibly affected communities south of the Green Line. This was an excerpt from the Tactical Minefield Database (TMFDB) which the coalition forces made available, through maps and a

spreadsheet of contaminated sites, as early as May 2003. This information was not used for practical survey priorities although it was reviewed in coordination meetings with force representatives. By July, both UNMAS and MAG felt that the May TMFDB excerpt was outdated. For security reasons, updates that the Coalition had promised could not be collected from division headquarter in Tikrit and Mosul, and by August, MAG switched to a full census approach to the communities south of the Line, which it called "comprehensive coverage methodology". Alternatives – such as visiting all communities close to TMFDB sites and sampling remote communities – were no longer considered because local expertise had increasingly become available:

> *"The collaboration with the health sector developed into an instrumental part of the comprehensive coverage methodology because health department personnel were, for understandable reasons, the most welcome social service arm of the local administration. Furthermore, in terms of knowledge of location and size of communities at the local level, health department personnel were potentially the best informed stakeholders. In April 2003, and again in June 2003, health workers had reportedly attempted visits to every household in every settlement as part of World Health Organization (WHO)/UNICEF sponsored National Immunization Days (NID's). Hence, their knowledge and records of communities were likely to be the most inclusive and recent. In addition, at Governorate and district levels, the secondary and tertiary care hospitals were the key sources that provided useful information regarding munitions victims, and the communities they hailed from, the latter being a "marker" for an affected community.*
>
> *In collaboration with mayors and/or Mukhtars (the elected/appointed representative), police and security chiefs, and health officials at sub-district levels, an exhaustive list of all communities would be generated, including information about the prevailing security situation and best possible access routes. Armed guards and/or local guides would be requested when and where necessary. It must be stressed that these guards/guides (who would be remunerated for their time and effort) served as a very efficient source of knowledge concerning location, access, and key informants at community level"* (Shaikh 2004b: 15-16).

While that may appear as a tactical field decision, in terms of information economics the census approach was to be of considerable consequence, as we shall demonstrate later. On a more immediate practical side, its implementation was punctuated by prolonged halts of survey activity, as the security situation dramatically deteriorated, with the attack on the United Nations headquarters in Baghdad in August, and the murder of a MAG expatriate advisor in September.

The major user withdraws

The institutional landscape too changed during the life of the EMAS. Shortly after the August attack, the United Nations withdrew most expatriate personnel from Iraq, including those who worked in the UNOPS Mine Action Program (MAP) in Erbil. The MAP Mine Action Coordination Center (MACC) was finally shuttered in November, concurrent with the end of the Oil-for-Food regime. Starting in August, MAG would

hand over fortnightly data sets to a working group composed of the transitional government's Regional Mine Action Center (RMAC), coalition force representatives, UNOPS local planners (until November), five local mine clearance NGOs and MAG itself. De facto, the RMAC presence was limited to a database manager supplied by VVAF, and the interpretation of survey data and practical work planning for the northern region fell upon MAG. Thus, the departure of the United Nations reversed the separation of survey use from data collection responsibilities.

Results and uses

A detailed notion of the problem

EMAS surveyed 1,760 communities in 11 districts of the six northern Governorates. It found 290 communities (16.5%) contaminated, with an estimated 263,780 residents. This population was living close to 574 distinct dangerous areas with a total surface, according to the claims made by local informants, of 627 square kilometers. Where the danger impeded access to resources, it primarily affected grazing land (in 154 or 53% of the affected communities), cropland (121; 42%), repatriation (68, 23%), as well as water resources (62 communities, 21%) (Shaikh 2004b: 7).

Among the 290 affected communities, 58 (20%) reported a total of 122 recent victims (43 killed and 79 injured) from contamination-related accidents. These persons had come to harm between the end of March 2003 and their respective dates of survey by EMAS (ibd., 27).

A surprisingly low ten percent of all dangerous areas were reportedly contaminated during the recent war. Most of these were south of, or close to, the Green Line; some were littered with cluster bomb units (CBUs). This finding is relevant in the context of rapid assessments because it may reflect the low degree of key informant knowledge in situations of rapid post-war population shifts. Many of the affected communities had undergone ethnic reversal, with Arabs moving out and leaving their places to Kurds who were not yet well acquainted with the local extent and history of contamination.

Concurrent fieldwork and data use

Contrary to the RAP, EMAS data was put to practical use during its lifetime. As mentioned above, MAG would transfer data in fortnightly sets, at first to UNOPS, then to the U.S. Department of State-supported RMAC, which took over from UNOPS. By 1 March 2004, as a result of this survey, among other factors, clearance and disposal work was either complete or ongoing in 122 (22%) of the identified dangerous areas. Completed tasks included 128 battle area clearance tasks, 142 explosive ordnance disposal tasks, 24 minefield tasks, and destruction of 73,141 UXO items and 1,635 CBUs. The cleared surfaces totaled 13.6 square kilometers (ibd., 35) or roughly two percent of the area that local informants claimed to be contaminated. Assuming that in northern Iraq, too, the ratio of claimed dangerous area to areas actually contaminated is somewhere between 5 and 10, then between 10 and 20 percent of the area was cleared, from

prioritized dangerous areas, including hazardous and abandoned munitions sites, which usually were small.

In the major statistical model used for this report, we will investigate the dynamics that propelled EMAS data acquisition and create a measure for the comparative value of its numerous survey points against which that dynamics can be evaluated.

The struggle for a viable gazetteer

Lists, sampling frames, gazetteers

As may have become amply clear by now, one of the deficiencies bedeviling both assessments in northern Iraq was the absence of a complete, reliable (in spelling and geographical coordinates) and commonly recognized list of local communities. In survey lingo, this would be noted as an imperfect sampling frame, with attendant difficulties in drawing samples of communities and later creating valid inferences from sample data. Although this may not always be recognized immediately, the poor quality of prior information does not in-an-of itself recommend a full-census approach (on the grounds that systematic samples may not be feasible). And if such an approach is taken, as it was in northern Iraq, there is no guarantee that it will be successful.

In the humanitarian arena, statistical concepts are less current, and the term most commonly used for this issue is the "community gazetteer". A gazetteer in this sense is a list of geographic names, together with references to their locations and other descriptive information (Alexandria Digital Library Gazetteer 1999). With the ascendancy of GIS as a technology for data integration, there have been a number of global initiatives to standardize gazetteer information. Some have been driven by the United Nations; others are centered in academia and in government agencies.

As described on page 29, the United Nations have carried out such efforts in a series of post-conflict situations, through its Humanitarian Information Centers. The HIC for Iraq continued this line of work, combining information from a number of institutions and map collections and focusing essentially upon places that represented populated towns. It also built on the work of the regional HIC for the Kurdish area, the JHIC in Erbil.

Gazetteer sources

As a result, the best available Iraqi settlement data currently comes from the OCHA HIC place code (P-code) database. The term "P-code" is a branding device that simply refers to a gazetteer data set that that is created by a Humanitarian Information Center and refers *only* to point locations of populated places. This is simpler than a gazetteer with a type classification that can accommodate also other locations like hospitals, food distribution facilities, provinces, districts and the like.

The initial Iraqi P-code data set was created from four primary data sources:

- The United States National Geospatial Intelligence Agency's (NGA) GEOnet Names Server (GNS),
- United Nations Office for Project Services (UNOPS) Joint Humanitarian Information Center (JHIC) gazetteer,
- Digitized point features from Russian topographic maps, and
- The World Food Program's (WFP) Vulnerability Assessment and Mapping Unit (VAM) gazetteer.

The VAM gazetteer is a combination of WFP and GNS source materials. The VAM office in Cairo, Egypt served also as the venue for the production of the initial HIC gazetteer during January and February of 2003.

By contrast, a comprehensive data set maintained by the previous regime has not been identified.

Producing the community gazetteer

Each of the elements that went into producing the final P-code data set required substantial cleaning and reformatting before they could be combined into a single useful data set. Most of the P-code source materials did not appear to conform to any clearly defined standard for data collection and had little or no accompanying documentation.

The gazetteer producers handled several challenges with respect to retaining or eliminating records from the various raw materials:

- *National languages:* Have the place names in one data set been collected in Arabic while those in another set have been collected in Kurdish or are they some combination of both?
- *Transliteration to English:* Are the differences in similarly spelled place names due to spelling errors or inappropriate transliteration from Arabic or Kurdish to English (e.g., Al-Shikan, Shikan, Shiekan, Sheikan, Shikan, Sheikan)?
- *Russian topographic maps:* Transliteration issues were particularly difficult in that the place names that place names extracted had previously been translated from Arabic and or Kurdish to Russian (Cyrillic script) and then re-translated from Russian to English.
- *Multiple instances:* In the case of exact name matches of several locations, do their coordinates values place them near enough to each other that they should be considered duplicate records or, are they located far from each other and really different places altogether or do they represent the same place with coordinates that have been collected in different coordinate systems or is this simply a case of data entry error?

A system of preferences was implemented to help determine which name and coordinate combination to keep and which to eliminate as a duplicate (described in detail in the appendix, page 84). Each of the data sets was ranked according to how well it was believed to represent the true situation on the ground.

Settlements vs. local communities

At various points in this report we have alluded to the ambiguous uses of the (physically distinct) settlement and (socially defined) community concepts. We cannot resolve the daunting problem of how to create a valid set of communities in humanitarian information management in general, and even our quantitative models in this report are built on variables and data extracted from a region for which this ambiguity had barely been tackled, let alone resolved.

However, we do want to recognize this as an issue and at this point simply document how EMAS set about handling it practically:

> ***"What constituted an individual community was primarily dependant upon how local informants – generally, an individual from the community - perceived their settlement. Some recognized local leader, such as a Mukhtar, teacher, health worker, religious leader, or political party leader would generally speak for a community. However, in the training stage team leaders and field staff were also given information concerning different possible scenarios: to look for other community attributes such as a common water source, grazing area, common communal facilities such as a community center, a religious place such as a church or mosque, etc.***
>
> ***Where communities were being newly populated, interviewers might find only one or two families, and no recognized leader. In such instances team leaders and field staff were advised to look for other proxy indicators, as listed below, that might help ascertain mutually exclusive/individual communities:***
>
> - ***History/Length of Settlement/Re-settlement;***
> - ***History of Land Usage/Occupation, Future Plans, Seasonality;***
> - ***Distribution and Pattern of Land Usage;***
> - ***Sharing or Otherwise of (common) Resource Facilities;***
> - ***Self-Described/Asserted Status;***
> - ***Description by Surrounding/Neighboring Communities, and;***
> - ***Description by Local Administration.***
>
> ***In large urban areas, communities required visits to smaller subdivisions and neighborhoods. The survey leadership, however, made these decisions together with local authorities or other key informants"*** **(Shaikh 2004b: 16-17).**

Limited coordination capacity

When the United Nations established a HIC office in Baghdad, work on the community gazetteer was continued inside Iraq. The current P-code data for Iraq is in its third or fourth iteration. Most of this data is still from the three northern governorates of Dahuk, Erbil, and Sulaymaniyah, north of the Green Line, reflecting the early start of JHIC work. The settlement data produced by the JHIC is the most comprehensive, but it is not clear how complete it is.

Until the end of the OFFP in November 2003, the HIC encouraged relief NGOs to send in updates and corrections of settlement information. The JHIC in Erbil handed out form templates for such reports. In addition to others, MAG, through EMAS, participated in this effort.

EMAS identified 522 new communities not previously included in the HIC gazetteer; 93 communities previously included were found to be abandoned and 157 communities were

found to have a significantly different name and/or coordinates than those recorded in the gazetteer.

EMAS passed batches of such form reports to the JHIC on a regular basis (Shaikh 2004a: 3). Confronted with a volley of reports from government offices and NGOs implementing the RAP at the same time, the JHIC was not in a position to consider the contributions from participants outside the RAP. As was later found, the 522 new communities were not incorporated into the gazetteer, nor were the other corrections absorbed.

Rather than being a nit-picking account of a single episode, the request by the HIC to help with the gazetteer effort and subsequent inability to consider all contributions are indicative of coordination limits inherent in humanitarian information management. Often organizational capacity limits interact with conceptual and political issues. In countries with contested administrative definitions, the producers of the community gazetteer may not be able to resolve the ambiguities between settlements and communities. We were told that the JHIC had been well aware that its 6,000+ location gazetteer was exceeding any reasonable maximum number of local communities and had sought, long before the war, to collapse the set of points to a consensus set of communities with the help of local authorities. This initiative was allegedly stopped by its superiors in New York, lest a JHIC-approved community gazetteer be construed as recognition of Kurdish autonomy.

Similar coordination limits tend to surface after the gazetteer has been produced, at a time of institutional transfer. There is an indication that the HIC gazetteer is not being used as foundational data in a large-scale rapid assessment commissioned by UNDP (Pedersen 2004). The conclusion is that, depending upon how fractured the humanitarian information landscape presents itself in a post-war country, the relief and reconstruction communities may need to moderate their expectations of seeing the HIC produce or maintain a durable community gazetteer and to combine very imperfect versions with lists that individual agencies create on ad-hoc bases.

A predictive model of community selection

Selection in a turbulent environment

To survey or not to survey

The first graph in this report (page 3) showed a fluctuating productivity curve. A mixture of internal and external factors determined survey returns over time, as one would trivially expect. Larger inputs during the initial set-up and training period might have boosted returns per day to higher levels, but the periods of forced regrouping and even idleness in the wake of major incidents would simply have immobilized a larger workforce. The attacks upon, and subsequent departure of, the United Nations affected the survey as “lumpy events” redirecting its entire work.

The decisions to survey a local community, or not, were more finely grained although the survey dynamics in time and space were, of course, intertwined. Nevertheless, if and when data collector teams were working inside a district, the selection of communities was made based upon considerations that were local, compared to such major events in Erbil or Baghdad as would at times starkly redirect the program. Happily, the relative strength that various local factors exercised in the actual sample selection can be estimated. The explanatory information is provided in part by the survey that preceded the EMAS and encompassed it in coverage, the RAP; another part is contained in the EMAS data itself. How these two elements played together is explained in the following sections. This chapter, therefore, is more technical than others.

In a controlled sample survey, each member of the sampling frame has a known probability to be selected, and the probability for a given sample member to actually be surveyed is independent of the others. This is not at all the scenario that guided the EMAS. Its workers struggled with a community gazetteer that was known to be highly defective (the RAP results were not available until October 2003). Moreover, the instructions were to visit all communities in suspected areas not covered by an earlier UNOPS Landmine Impact Survey.

Expert opinion

UNOPS had surveyed only on the northern side of the Green Line, but despite years of coexistence with the (also UNOPS-executed) JHIC, its mine action center had not looked at the existing gazetteer. More importantly, the new contamination resulting from the 2003 war was almost exclusively on the southern side. Expert opinion regarding suspected communities in this region came from two sources, as described on page 41. Prior to EMAS establishment, coalition forces shared with UNOPS and MAG an excerpt from their TMFDB. In the end, this information was not used. During fieldwork, EMAS relied heavily upon sub-district health care and security personnel for nominations of suspect communities. But because of the full-census approach adopted by then, it is no longer fully appropriate to speak of systematic expert opinion collection discerning between suspected and unsuspected communities.

That is another way of saying that MAG created its own community list as its workers fought their way through regions that were suspected to possess contaminated areas, and about which UNOPS had no active knowledge. Since the countryside was littered with settlements of all sizes, their ordering into “local communities” to be visited was itself a dynamic process. It was guided by mental maps of where to expect contaminated areas, the minimum population size to qualify as a community, the capacity of EMAS teams to do more or fewer separate assessments, and the quality of the opinion that those consulted in the local administrations or met en route offered. One would expect, for example, that the propensity to visit was higher near communities that had already been identified as affected.

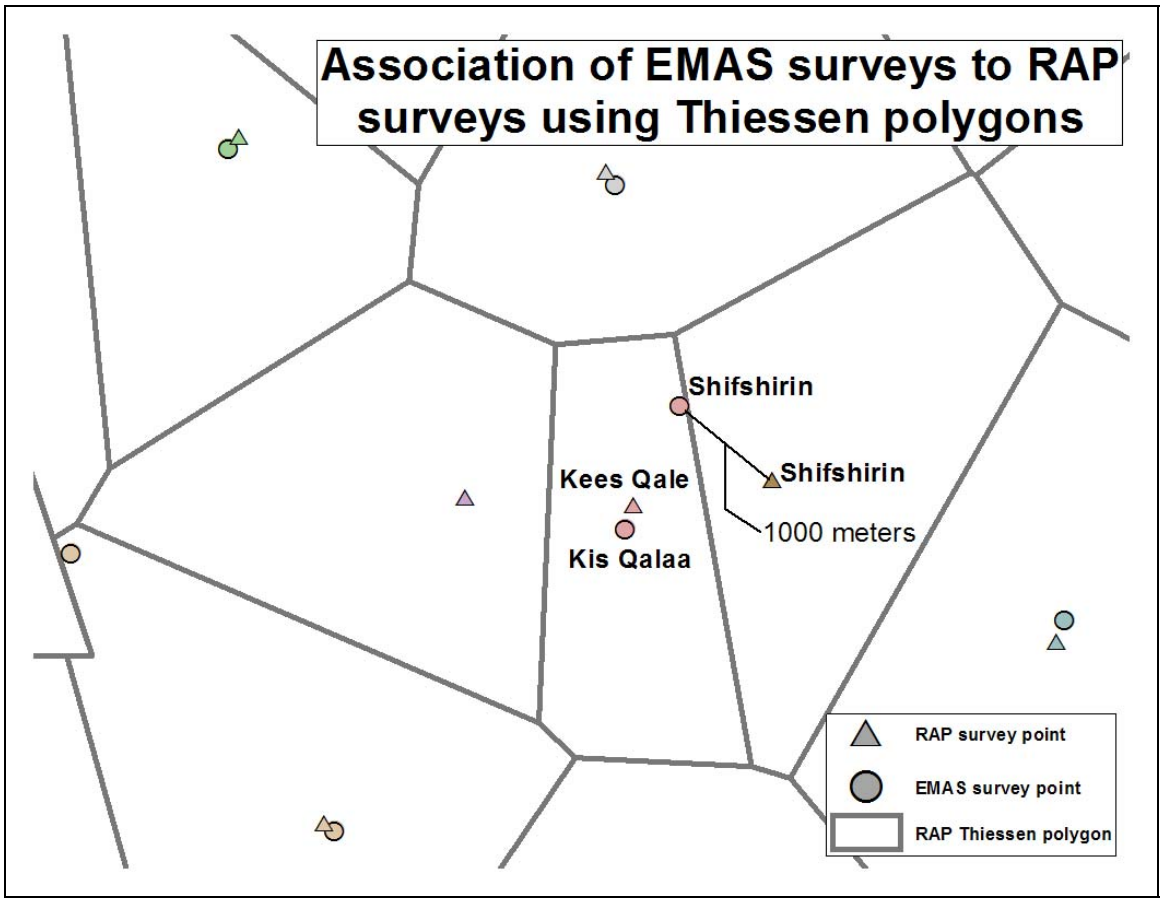
What does *“near a community”* mean?

It is sheer analytic luck, not the fruit of coordination between the two rapid assessments, that in the end the EMAS area came to be almost completely contained inside the area

covered by the RAP. Moreover, the RAP produced a very dense set of community point coordinates (with minor exceptions, particularly in eastern Tameem). This allows us to consider the number of EMAS survey points "near" each RAP point as the outcome of decisions that EMAS workers made, rather than as a measurement or classification problem due to gazetteer inconsistencies. A positive number of EMAS survey points reflects the decision to visit this RAP-indexed community. Zero indexes two possible states: EMAS decided not to visit, or was unaware of the local community. We have no information to distinguish between the two states. Under the full-census approach, one would assume that once EMAS staff recognized a settlement as a community, they would visit it. The decision not to visit is at least theoretically conceivable, and practically perhaps not that rare if we soberly recognize that EMAS managers could hardly monitor such situations. All we can do is to transform the number of EMAS survey points attached to a RAP-community into a binary variable, expressing the decision to visit or not.

"Near" a RAP-assessed community is defined, for the purpose of this analysis, as lying inside the Thiessen polygons that form a tiling of each district around its RAP points. The following schematic illustrates the concept. A RAP polygon may contain zero, one or several EMAS points, each representing a community that EMAS visited and recorded separately.

Figure 7: Association of survey points by the Thiessen polygon method



EMAS survey points were associated with those of the RAP by the method of Thiessen polygons. All points inside Thiessen polygons are closer to its defining point than to any defining points of the surrounding polygons. This method was chosen for lack of an efficient name-matching method. For example, the community at the center was transliterated as "Kees Qale" and as "Kis Qalaa" in the two assessment databases. Moreover, there are many RAP Thiessen polygons enclosing several EMAS points. Name matching is pointless in such situations. The schematic also demonstrates the risk of misplacing EMAS points. EMAS and RAP workers located the community of Shifshirin at points 1000 meters apart. The EMAS point lies outside the Shifshirin polygon. As a result, Kees Qale scores two EMAS visits, and Shifshirin none, in our RAP-polygon-based prediction model. Nevertheless, the polygon method was the only efficient association algorithm at our disposal. Also, discrepancies between coordinate measurements, such as the one kilometer for the Shifshirin points, do not necessarily reflect measurement error, but rather different interpretations that data collector teams made of community features, including central points from which to take GPS readings.

Restricting the analysis to districts that have substantial numbers of RAP as well as EMAS survey points (the district list is given in the appendix, page 75), we find the following variability in the point count per polygon:

Table 1: RAP polygons by the number of associated EMAS points

EMAS survey points inside a RAP polygon	Number of such RAP polygons	Percent	Total number of EMAS survey points
0	1,286	53.03	0
1	817	33.69	817
2	223	9.20	446
3	57	2.35	171
4	18	0.74	72
5	8	0.33	40
6	3	0.12	18
7	4	0.16	28
8	3	0.12	24
12	2	0.08	24
13	2	0.08	26
15	1	0.04	15
32	1	0.04	32
Total	2,425	100.00	1,713

Less than six percent of RAP polygons enclose more than two EMAS survey points. Therefore, we simply consider the question whether EMAS conducted any visits - or none – attributable to a RAP community through the Thiessen polygon method[5].

Factors that guided the survey staff

We hypothesize three important factors capable of generating community visits – the mental maps that guide the survey staff, the policy guidance that they received, notably from the United Nations (and the absence of such guidance during certain periods), and the density and quality of expert opinion and local key informants. In order to accommodate the observed EMAS behavior in a meaningful model, we are obliged to expound these factors by a theoretical detour:

The relevance of policy for survey managers and field workers is obvious, although the extent to which it is followed will be a function of principal-agent constellations, as Philipson (op.cit.) has pointed out. Similarly, one expects survey designers to take account of prior information for several purposes, including response categorization and unit sampling. One may further distinguish between global information, most of it received before the start of data collection, and local information, which the field workers may or may not share with management. Global information may prompt stratified sampling; local information may be used in adaptive sampling; and it is the extent of

[5] We also do not consider, for the purposes of this model, the difference between a simple visit and a full local survey. When EMAS data collector teams were told that the local community was not affected by landmines or UXO, they would normally not sit down for a discussion with community key informants, but might – and often did – check this claim out in 2 – 3 other, physically separate conversations within the locality. Claims of contamination, whatever their magnitude and nature, would trigger a group interview, plus the visual inspection, from safe viewing points, of some of the claimed dangerous areas.

documenting prior plans and later adaptations that distinguishes controlled estimation from mere convenience sampling.

The reasons for using mental maps as an explanatory concept are the least obvious. Mental maps enter the equation because they are a known element in stopping rule behavior during information search (Browne and Mitzi 2003). In this line, survey workers terminate the search for more communities to visit when the results obtained so far satisfy an operating stopping rule. Formally, these can be of different nature (op.cit., 10-12):

- *Magnitude threshold:* The survey worker determines that the information that he/she has collected exceeds the total amount of information expected of him (e.g., he has visited all suspected communities plus a multiple of unsuspected ones).
- *Difference threshold:* The worker determines that the marginal value of additional visits is falling below a satisfactory level (e.g., the last ten stops on his circuit did not produce a single contaminated village).
- *Mental list:* The surveys done to date supply information of sufficient diversity (e.g., he finally found a village with recent victims).
- *Representational stability:* The worker determines that, with the information so far collected, he can confirm the assumptions that his training conveyed concerning landmine/UXO problems (e.g. he had been told that affected communities tended to cluster and now in fact did not find a single affected community after moving out from known clusters more than 10 km).

The formal rules that EMAS workers invoked are not observed, but some of the global assumptions under which EMAS started are known and are used here.

Each of these three concepts in turn is measured by three variables. Their operationalization is detailed in the appendix (page 77).

Mental maps

- EMAS set out in the understanding that contaminated areas would be particularly dense near the Green Line, on both sides.
- Prior to the start of fieldwork, EMAS had received dangerous area information from an early version of the coalition forces' TMFDB. Waiting in vain for updates, EMAS deleted this information from its image of the contamination south of the Green Line.
- Explosive remnants of war (ERW) are known to cluster in space. Since the contamination is not directly observed, survey teams presumably generated more community interviews near *affected* communities.

Policy guidance

- One of the objectives was to define a detailed picture of contamination from the recent war. Most, if not all, of this had happened south of the Green Line. We therefore expect communities in the formerly-government controlled areas to have a higher probability of some EMAS visits than those in the Kurdish areas.

- EMAS was told to remain clear of communities already surveyed by UNOPS. These communities were on the northern side of the Green Line, and most of them at some distance from it. We model the effect by interacting the distance from the Green Line, as defined above, with being on the northern side. We expect fast distance decay in the north, whereas on the other side EMAS teams would venture south as far as expert opinion and security encouraged them.
- UNOPS closed its Mine Action Center in Erbil in November 2003. This created a policy vacuum. For districts north of the Green Line, MAG could no longer obtain lists of communities already surveyed. As a result, and benefiting from the good security on this side of the Line, EMAS took to surveying all communities in Akre district.

Local experts and key informants

- EMAS teams were directed towards communities that local experts singled out as likely to be contaminated. Experts were available more readily in administrative centers and in health-care institutions that cared for landmine/UXO victims. We expect that contaminated communities were more notorious if they enjoyed greater access to these centers and institutions. We use two different measures, one aligning access to health care and commercial services, the other concerning education and utilities. On both, we expect better access from the RAP points to result in more likely EMAS visits.
- Similarly, population size is expected to increase the chances that EMAS workers recognize a settlement as a local community in its own right and stop to visit it. Larger communities will be better known to begin with, and they may even be subdivided for separate key informant meetings to warrant detailed enough local knowledge. The effect, though, is expected to be less than proportionate to population; we use the population magnitude.

Hypotheses and test

The following table recapitulates the direction in which the modeled factors, as manifest in the specific variables, are expected to exercise their influence on the probability for EMAS teams to visit some point within the RAP polygon:

Table 2: Summary of hypotheses

Factor	**Variables / *Nutshell rationale***	**Making it more (+) or less (-) likely that EMAS visits**
Mental maps	Distance from Green Line: *Communities farther away have fewer dangerous areas*	**-**
	Distance from nearest TMFDB point: *Affected communities should be close by, but EMAS chose to disregard this information.*	**0**
	Distance from nearest affected community: *Dangerous areas cluster*	**-**
Policy guidance	Southern side of the Green Line: *Priority area*	**+**
	Green Line: Distance x northern side: *Avoid UNOPS survey area*	**-**
	Akre district: *For lack of specific guidance, survey entire district.*	**+**
Local experts and key informants	Better access to health care and commercial services: *Community better known among service providers*	**+**
	Better access to schools and utilities: *Similar notoriety*	**+**
	Population size: *Larger communities are better known, may attract multiple visits*	**+**

The model is estimated as a logistic regression. Detailed output is presented in the appendix. In the following section, findings are presented in a non-statistical language.

Findings

Mental image: Not what you expect

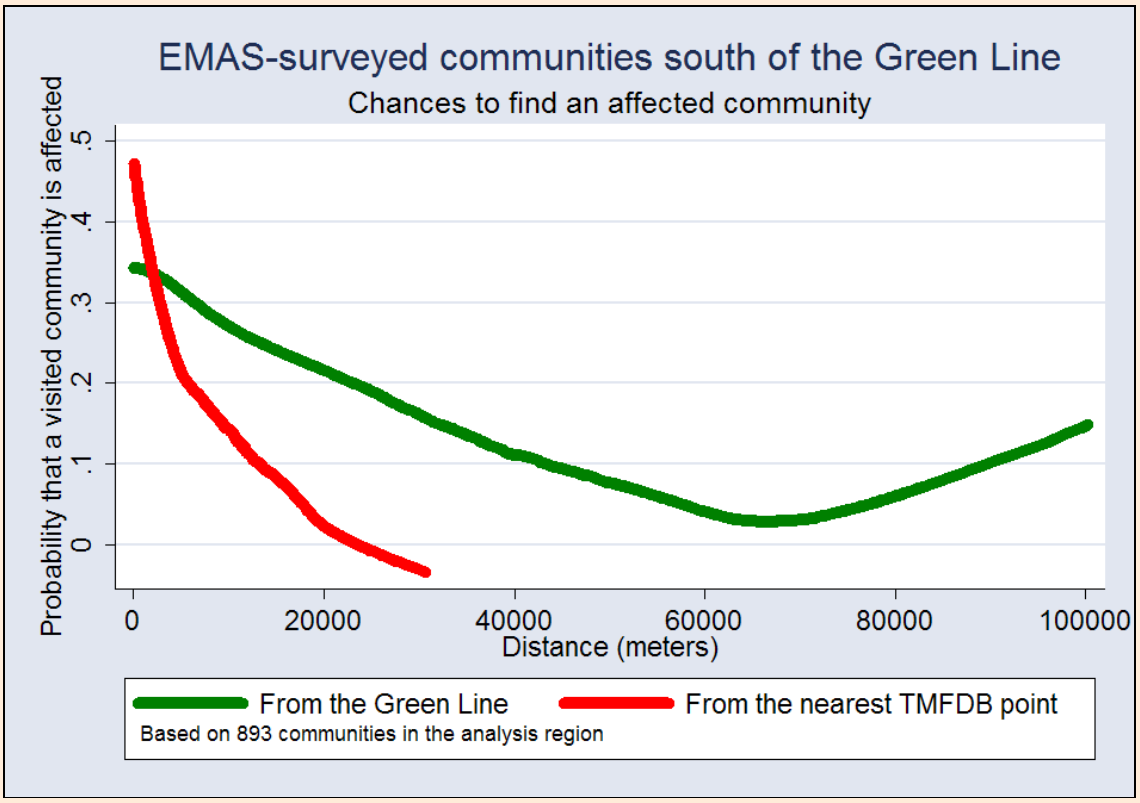
In the actual practice of the EMAS, the mental maps that staff had at the beginning persisted in part only, and were updated as the survey progressed. On the southern side of the Green Line, EMAS workers advanced into Tameem to a maximum of about 100 kilometers off the Line, expecting to find fresh contamination. Numerous communities on these southern fringes were visited, but very few affected ones were found. Remarkably, this did not deter EMAS' commitment to a full-census approach. In fact, on the southern side, the propensity to visit increased with the distance from the Line.

The clustering assumption remained a guiding orientation throughout – the detection of an affected community would dramatically improve chances for its neighbors to see EMAS teams visit to check for contaminated areas.

Deleting prior information from the mental image

EMAS spent a great deal of effort scouting for contaminated communities south of the Green Line. This was justified by the belief that the 2003 war had created fresh contamination near the Green Line as well as much farther south. EMAS was indeed successful in identifying a cluster of affected communities toward the edge of its southernmost activities from the Line.

Figure 8: Affected communities and prior information



EMAS also had some prior information on suspected areas from the coalition forces, as a segment from the Tactical Minefield Database (TMFDB). It chose to discard this information as outdated. By disregarding it, EMAS rendered its search for affected communities far less efficient.

The line graph represents the outcomes of non-parametric regressions of the survey outcomes (affected / non-affected) on the distance measures. This procedure accounts for the (incorrect) negative probabilities in the red line for distances greater than 22 km.

The most surprising finding is that EMAS field staff visited local communities more densely in areas *far* from TMFDB points. Most of them would not have known this information, but neither did they behave indifferently to it – the statistics imply strongly that they were actively repelled from these points. The interpretation is not obvious – one is that survey workers escalated their commitment to finding affected communities far south where there were very few. We will offer a different interpretation below, in connection with incentives offered to local helpers.

Both policy and its absence are significant

The influence of policy, as captured in the "Stay clear of UNOPS surveyed communities" instruction, and of a vacuum of such policy (full coverage of Akre District) is powerful. On the northern side of the Green Line, excepting Akre, the propensity to visit drops steeply with distance from the Line. In other words, closeness to the earlier UNOPS Landmine Impact Survey region effectively repelled EMAS activity.

However, this is not true of the expectation that EMAS would scout the southern side of the Green Line with priority. Approximately 55 percent of EMAS visits occurred there. Security pressures and the detection of affected communities not yet surveyed by UNOPS kept survey teams busy on the northern side for longer than policy would suggest.

Local experts were used, but incentives were not productive

It is in the area of expert opinion and local experts that our hypotheses are clearly refuted. Larger communities do stand slightly better chances for an EMAS visit than smaller ones, but the coefficient is not statistically significant. However, it is the local communities with *poorer* access to services that wind up being visited by EMAS more frequently, other things being equal. This runs counter to the common-sense assumption that communities with better access would enjoy greater notoriety among the health care and security personnel that EMAS canvassed in administrative centers, and among key informants in the visited communities.

This is surprising all the more because EMAS had good contacts with health care workers. Some of them drew up lists of places from which they had received landmine and UXO-injured patients. That EMAS used such information can be shown statistically; closeness to health care and commercial services has a significant effect on being visited *and* identified as affected. But EMAS also used the very comprehensive lists of villages that health workers had compiled for their vaccination campaigns. These lists were complemented by information from local police and guides.

This resulted in a significant number of visits to communities that were far from service providers, and thus had very low access to services. This tendency was reinforced when EMAS realized that a considerable number of communities were undergoing ethnic reversal, and survey workers were told to aggressively scout for remote settlements where new inhabitants might need to be told about contaminated areas.

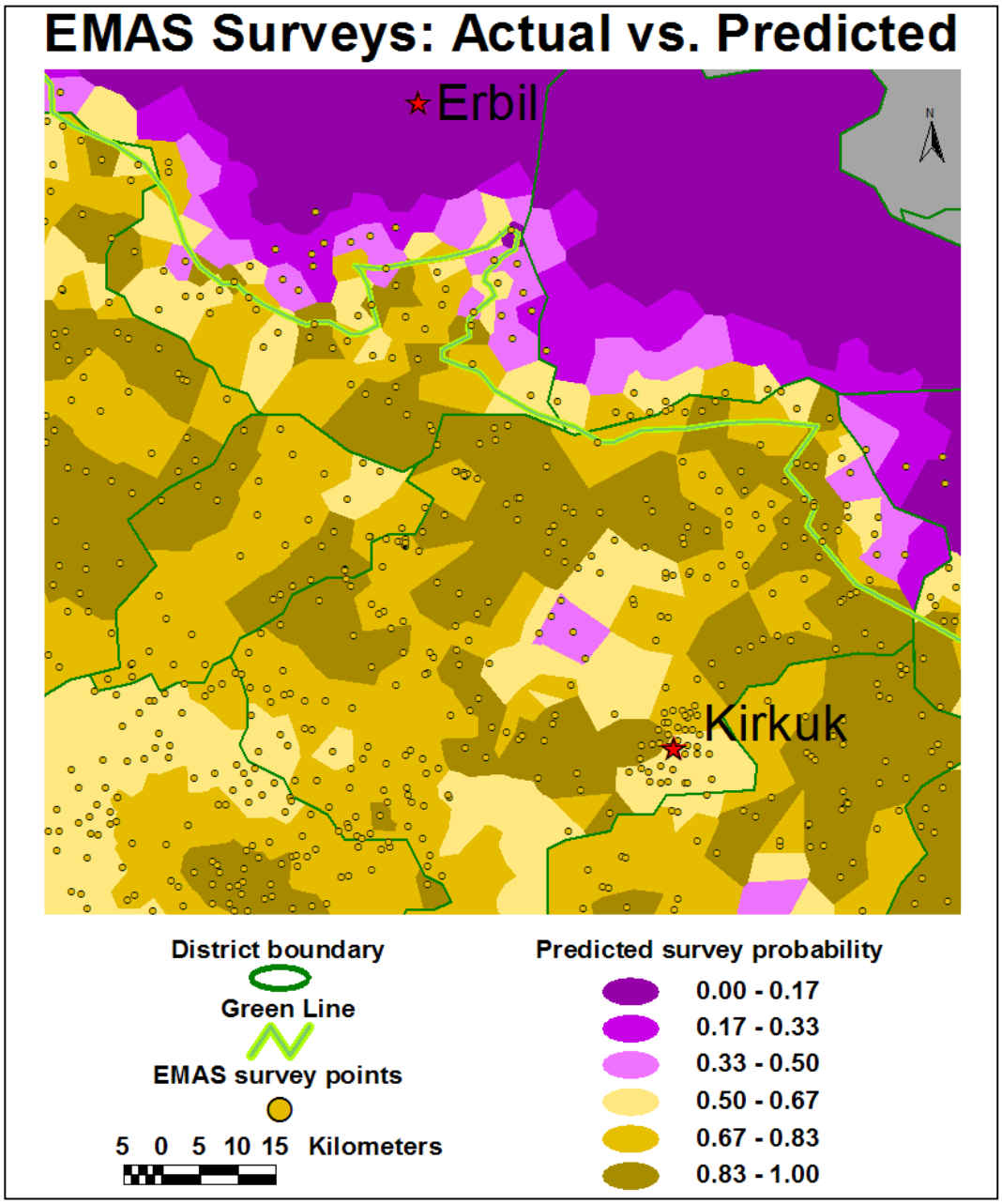
A double principal – agent problem?

The resultant set of communities visited by EMAS was a mixture of communities selected on the basis of prior information and those visited as a result of adaptive sampling in the field. The priors consisted of different types of information – distance from the Green Line, and absence from the lists of communities surveyed before the war. The adaptive sample part resulted from intensified searches around affected communities, from local expert opinion, and from scouting for newly repopulated or ethnically reversed communities. They were helped in this activity by local guides whom EMAS paid for

services. It is reasonable to assume that this incentive, together with survey workers' desire to prolong their employment, was in part responsible for the intensive coverage afforded areas far from any affected communities, TMFDB points or the Green Line.

The point that we want to stress is the active role that data collectors have in sample construction given the incompleteness of the prior sampling frame and the variable security. Also, EMAS staff did not have the list of RAP survey points to which we have matched their visits – the EMAS survey points were the result of decisions using different sources of information, not the RAP. There was a double information asymmetry at work, between the principal (UNOPS) and the agent (MAG), and between managers and field teams, that fashioned ultimate sampling outcomes – and one would expect such constellations to occur in most turbulent post-conflict rapid assessment environments.

Figure 9: Probability map of EMAS visits



For a segment straddling the Green Line, RAP polygons have been colored with the predicted probability that some EMAS visit took place. The polygons were then superimposed with actual EMAS visit points. Ochre areas are those for which surveys were predicted; purple predicts no surveys (more correctly: the probability is smaller than 50 percent). To the north of the Green Line, the gradient falls steeply. The southern side shows a patchwork of areas of high and very high probabilities. There are two small purple "sinks" to the northwest and southeast of Kirkuk city; the one in the northwest obviously marks an area where the model under-predicted. Overall the model predicted correctly for 79 percent of all RAP polygons in the analysis area whether an EMAS visit took place there or not. The model is described in the previous pages; and statistical output is offered in the appendix.

Lessons for Future Assessments

Requisite adaptability

The paramount finding in this study of two rapid assessments is the adaptive behavior that the assessment organizations manifested during data collection, modifying any pre-existing sampling plans at several scales. They adapted in response to large, cataclysmic events in the turbulent post-war environment as well as to finely-grained signals from the local task settings. The security situation forced the starkest adaptations. Entire projected survey regions had to be written off or were retreated from after only a sprinkling of point visits had been achieved. Less well acknowledged is the turbulence that throws the organizational continuity of the assessment organizations or of some of their major stakeholders into unforeseen predicaments. The anticipated end of the Oil-for-Food regime caused the UNOPS Mine Action Center in Erbil to fold, removing the principal user of EMAS results before the assessment was completed.

A similar, though with hindsight more positive, change occurred in the RAP when the fiction of NGOs voluntarily collecting data collapsed, and the Humanitarian Information Center was forced to hurriedly mobilize dedicated in-house capacity and suitable paid subcontractors. Although all these major developments were specific to the Iraq 2003 environment, one may legitimately ask whether any rapid assessment continued for more than a few months will survive the uncontrollable changes to which its political premises fall prey in the rapidly changing post-war environment. This has consequences for the way rapidity should be ignored, encouraged, or even enforced – a discussion that is more political than methodological and cannot be deepened in this article.

We are more concerned with fine-grained local adaptive behavior. While policy (and its temporary absence) had strong effects on the actual selection of sample points, it is beyond doubt that samples of communities visited were continuously adjusted in the field. In fact, the concept of sample is misleading because there was no strictly fixed set of objects from which to sample, given the poverty of maps and gazetteers. Adaptive sampling of course was not the prerogative of the EMAS rapid assessment; in the slow-moving Landmine Impact Surveys some provisions for adaptive sampling have been followed in a number of countries, some of which possessed respectable community gazetteers.

In other domains, adaptive sampling has been more strictly formalized, with a view to safeguarding unbiased estimates of population mean and variance. In ecology, for example, such sampling situations may include *"whale surveys in which the research vessel temporarily leaves the selected transect to close in on sighted whales, surveys of rare bird species in which initial observations are made at systematically selected sites and additional observations are made in the vicinity of any site at which sufficiently high abundance is observed"* (Thompson, 1991: 1103).

In the humanitarian area, epidemiological surveys may marshal unbiased methods, but other disciplines will not likely have the necessary tools at their fingertips. They produce partial inventories of objects for which they observe values on the variables of interest. These are useful for minimum magnitude and location reports but should not tempt users to infer overall prevalence. EMAS, for example, reported 290 local communities contaminated in its survey area, with a combined population of 264,000. Given its adaptive sampling, it is not possible to estimate the total affected population for the survey area, let alone for larger tracts, nor would such estimates be particularly helpful for the survey users.

What does "sampling" mean in rapid assessments?

Samples are constitutive of much of social surveys. Samples are subsets of a universe of items in focus and practically are drawn from a list of such items, the sampling frame.

In rapid assessments, actual practice may differ from basic norms of sampling in several ways, and often data collections which use survey methods will not use the term at all.

Most often frames are imperfect. Samples are adapted depending on values in realized sample members, often to include new units that did not figure in the initial frame.

Sampling may be indirect when direct information on the units to be surveyed does not exist, but proxy information can be tapped. For example, community lists may be incomplete, but coordinates of bombing points may be available around which teams can scout for affected communities.

Finally, units may not be mutually exclusive. Teams may sample one-day circuits from a large variety of circuits that a road map suggests and then decide to do an interview whenever they stop near a settlement. Given the network shape in which they sample their efforts, circuits and communities as secondary units will overlap to a degree. Communities may be surveyed multiple times, by teams who stop in different villages and hamlets.

While all assessments de-facto make samples, organized sampling is often difficult to recognize and may not be reported as such.

Nevertheless, the question must be raised as to what degree the data collection efforts were rational. By most standards, the RAP, visiting 7,000 settlements and returning surveys on 5,700 in a relatively small portion of the country, was overkill. This evaluation seems justified, given the lack of an analysis plan, supervisors and analysts in different phases. Still it is unfair – who knows how the RAP might have evolved in a less chaotic security environment. Similarly, the efficiency of the EMAS can be challenged when we consider that it took 1,760 community visits in order to identify 290 affected communities. In part, this is excused on the grounds that the EMAS management had reason to believe that the priors on dangerous areas – the TMFDB information – was obsolete. Else it could have used that information to make the search for affected communities more efficient. Both assessments clearly confirm the rural bias for which Kent (op.cit.) chastises much of humanitarian action.

With a view to greater efficiency, the existing knowledge of adaptive sampling should be reviewed for its applicability to rapid assessments in the humanitarian arena. We make some specific suggestions in the next paragraphs.

The construction of community gazetteers

It is by now tedious to repeat that neither of the assessments that we studied could rely upon a community gazetteer useful in terms of completeness and reliability. In fact, both were expected to contribute to the refinement and validation of extant gazetteer information. The RAP survey pursued this aspect as one of its chief *raisons d'être*, and EMAS followed special arrangements to contribute to the effort. The JHIC in Erbil failed miserably at integrating gazetteer update elements that EMAS collected, reinforcing doubts about the coordination abilities to advance this endeavor collectively, doubts that the behavior of other agencies also raised.

Community gazetteers are inscribed into hierarchical administrative systems, with sub-districts, districts, provinces, and regions grouping them into larger sets within the national territory. As a rule of thumb, district gazetteers can be found for most countries, with extents that humanitarian information managers acquire from paper maps, if not digital sources. Post-war redistricting or competing classifications abound. Approximately 15 percent of the RAP settlement points were mismatched to the governorates and districts; there were numerous discrepancies between the affiliations that local interviewees reported, and the polygons and point coordinates that determined membership for the analyst. The bottom-line – that a district exists, and that every community is inside some known district - however, is not usually contested.

This is not the case for local communities. If lists of communities exist at all, and, in the improbable case, that locations are known as well, they come as points. Area definitions of local communities are generally unavailable outside urban municipalities, and they may not be meaningful for local societies that share large tracts of pasture and forest between neighboring villages, and sometimes with groups from far away. A mappable tiling of districts with community areas is one of the undervalued achievements of peace, of the rule of law and rational bureaucracy and will simply be missing from the toolbox of humanitarian information management.

Rapid assessments and also the larger, slower surveys will need some practical definition of local communities with which they can work, by reducing the complexity of human settlement to a tractable number and shape of entities from which relevant data can be extracted, or to which it can be attributed. However, such working definitions, together with rules for data collectors to decide ambiguous cases during field circuits, will produce sets of communities different from those needed later for population censuses, administrative reform, or facility siting during reconstruction. The effort that should go into building the community gazetteer in the immediate post-conflict phase should remain limited pending a clarification of purpose, legal definitions and varying settlement patterns across the country.

As for the existing foundation data, the available bodies should be compiled and disseminated using standard notation such as the P-code system, and district and higher-unit gazetteers should be completed in GIS format. An exhaustive field survey of local communities should not at this stage be attempted for gazetteer purposes, and in most situations not for other purposes either. Instead, gazetteer development and substantive

data collection should generally be separated for any resolution below the districts. Large, well-defined settlements could authorize exceptions, and one of them is the subject of the next paragraph.

Rural bias and urban tool boxes

Little experience as yet with urban assessments

Much of the development critique in recent decades was about urban bias, privileges in terms of subsidized services and other non-market benefits that politics and aid bestowed on some urban groups. A reversal of this concept in the evaluation of humanitarian practice will therefore rouse astonishment. However, Kent's criticism is based on the anticipation of strong urban growth also in countries prone to humanitarian disasters over the next decades. "Urbanicide", the willful destruction of cities and their inhabitants, is still a term used timidly, but Grozny , and to a lesser-extent, Kabul, have created a precedent, and together with instances of massive destruction of cities in natural disasters such as earthquakes, this type of situation may be mutating from very rare events to possibilities that warrant some typified scenario-buildingby humanitarian information managers. Short of such extremes, responders and policy makers in urban emergencies may still benefit from rapid assessments; this is one of the things that, under different names such as "windshield survey" and "preliminary damage assessment", civil defense and emergency services do in many countries.

The published literature does not suggest that well-developed toolboxes are ready to be applied in these situations in countries with weaker administrative systems, including post-war countries. Exceptions are few. The World Bank supported a rapid assessment in Cali, Colombia, to inform an ongoing city development strategy in 1999 and 2000 (Hentschel 2004). Its approach relied on household interviews and on a full sampling frame from the national census, tools rarely available to the types of assessment in our focus. It is nevertheless noteworthy that between the sampling of 1,900 households and the presentation of results in a large stakeholder meeting, the exercise took less than five months and ran up under $40,000 in local costs.

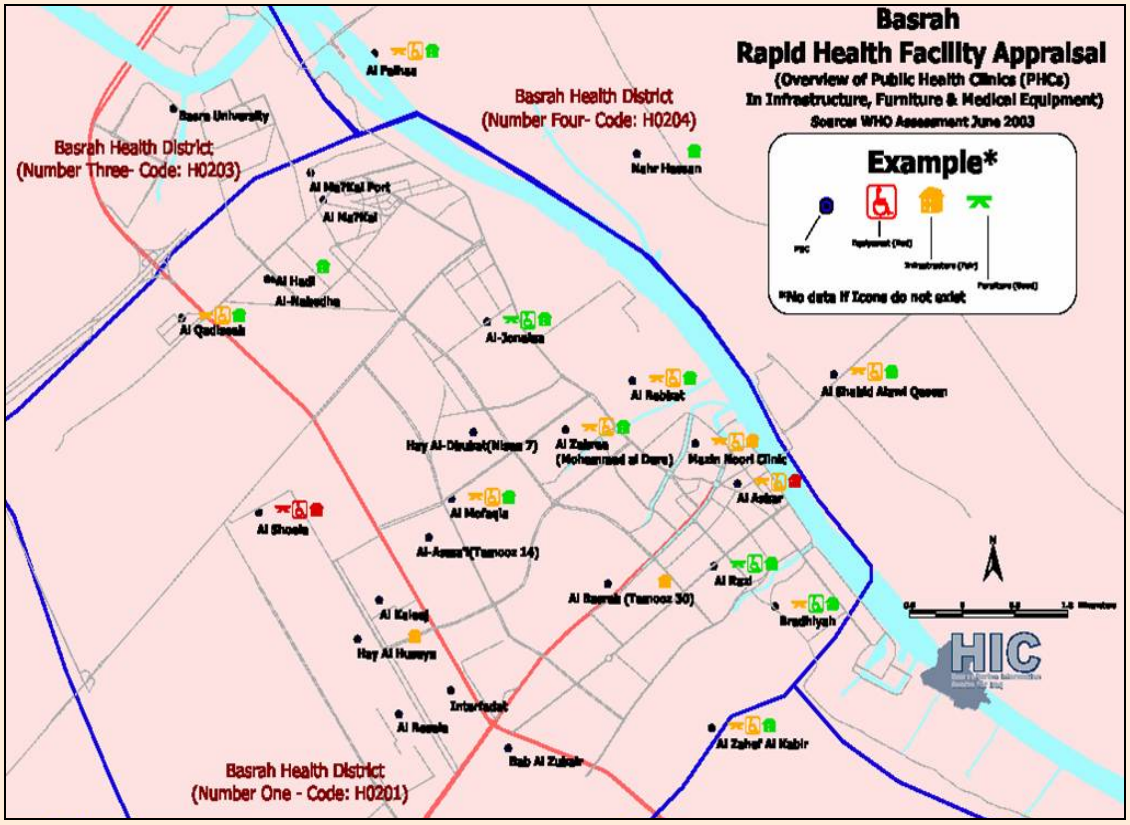
The mental maps, questionnaire templates and training syllabi for national data collectors seem to require the comfort of villages and small towns that are physically separate, and to which institutional traits can be attributed unambiguously. There have been successful distinctions made of urban subdivisions in assessments – in southern Iraq, a rapid assessment of health facilities in Basrah was mapped using special health districts (see inset) – but not much is known about how they were validated, and how useful the results were.

Urban assessments: Basrah Rapid Health Facility Appraisal

In May 2003, hundreds of aid organizations, joined by US contractors, rushed across the border from Kuwait into southern Iraq to conduct assessments of health facilities, each using its own forms and formats for recording information. As a result, many facilities were assessed multiple times, while others were never visited. The interim solution promoted in the health sector was a "new" standard form to which all organizations would be required to transfer their old assessments, and which would be used for all new assessments. This quickly led to rising tempers and contention. This threatened to engulf also the coordination efforts among those working in the health care sector in the largest city, Basrah.

The root problem revolved around assessment objectives and uses. Organizations were assessing for project design. However, in the collective coordination process, the importance was to classify what the various players in the fray knew about each place - and share it. Walking the stakeholders through an informal requirement definition process, HIC staff in Basrah quickly understood that volumes of data on electrical wire, plumbing fixtures or itemized drug lists were not necessary for the greater coordination process. Neither was there the time nor the resources to manually type all such information into a database that was yet to be designed. What was needed was a quick executive summary.

Figure 10: Map of health facilities in Basrah



The Sector needed a master index of uniquely identified health facilities. They needed to know what facilities existed, whether they had been assessed, the findings, and which organization was going to fix the problem(s). Of paramount concern was uniquely identifying a facility with a code, the official facility name and its exact geographic coordinates. The stakeholders quickly defined the three minimum essential data elements as : the condition of the structure; the status of medical

equipment ; and, the status of furniture, all classified against a standard definition and scale. Management was captured by geographically defining the boundaries of health districts, which were not the same as administrative districts. With this simple format, organizations quickly extracted their data to spreadsheets. These were compiled and rapidly returned in table and map formats by the end of June. Within 45 days of agreement, there was a common operational picture of health care status in Basrah city.
The map shows results of Basrah health facility assessments. The absence of symbols indicates no assessment in that area. Red/amber/green indicates a simple three-way classification with red being the worst.

To further illustrate the difficulties of grappling with urban communities, in the RAP data analyzed for northern Iraq only 103 communities were subdivided into several assessment areas, 5,367 were not. The city of Zakho, population 113,000, attracted 26 neighborhood surveys; Kirkuk, with an estimated 750,000 residents, was worthy of one global assessment. In this article, it is only possible signal a need to develop rapid assessment methods for large settlements. While there have been sporadic advances, such as in the use of remote sensing for estimating populations in otherwise inaccessible cities (Alspach & Kariuki 2002), and a focused competence center in urban reconstruction exists at the Post-war Reconstruction and Development Unit at the University of York, United Kingdom, a thinking-through in terms of humanitarian information management still awaits its day.

Savings in rural areas

Meanwhile, informational economies in the rural areas may be feasible. In the early stages of post-war humanitarian intelligence, quick accounts of essential-service provision levels in the towns that form the district administrative centers may be enough as first shorthand to characterize the relative levels of hardship through which the district populations are going. This can be combined with creative elicitation and analysis of expert opinion, as done by El-Guindi et al. (2003) on district poverty estimates in central and southern Iraq. *After* this first cut is analyzed, disseminated and transformed into a new assessment plan, extensions in scope and in geography can be undertaken.

For example, the rapid service provision assessment might, in its second round, extend to all communities assumed to have at least 1000 residents, or, alternatively, to all market towns. To give this some perspective from Iraq, Benini and Ross (2003) analyzed a sub-region of the RAP that had complete information regarding market towns and the surrounding communities that used them. Approximately 3,600 catchments (communities other than the market towns themselves) were relying upon a mere 87 market towns. The former communities were mostly small, totaling one million residents. The market towns, by contrast, combined 2.9 million people within their boundaries.

Building in shorter learning cycles

If resources permit, a concurrent validation exercise might lead assessment teams in two or three experimental districts to administer the instrument to all communities with 100 residents or more. Alternatively, facility surveys in priority sectors such as health care or farm supply businesses might touch every community known for a pre-war facility, collecting also site coordinates and a small amount of community-level information. Copies of this data would be integrated at the HIC.

The essential point here is not to prescribe a particular sequence of survey types and assessment organizations. Rather, the Iraq experience suggests keeping the initial assessments small, manageable, and, above all, rapid. Speed is valued not only because earlier results will be appreciated during an emergency (intelligence from speedy reconnaissance can in fact be misleading), but because more learning cycles can be built in. Except for cross-culturally validated instruments, particularly of the medical sort, pre-tests are necessary learning points, and assessments strung out into several phases, with renewed testing and retraining in-between are bound to produce better results than mammoth data collection exercises sent rampant after a brief establishment phase.

As an additional lesson, the EMAS experience suggests that the design and testing of assessment tools should benefit not only from subject-matter experts but also from survey researchers, plus, where they require new data management tools, information systems designers and occasionally even business engineering experts.

The qualitative side

Moreover, the valid interpretation of information collected with highly standardized instruments may *"need to be backed up with other, perhaps more qualitative information"* (Woodhouse 1998: 136), for which interviewers with special skills may need to be assigned, and their products integrated into the assessment debates. By way of anecdote, in a community south of the Green Line, the local notables pointed to their primary school, which they said they had had for a very long time. The RAP interviewers dutifully checked off the item on their schedule, but were not equipped to register the comment that an elderly man volunteered. He modified the claim to a long tradition with the admission that the government had not sent any school supplies since 1973. Similarly, in thousands of other communities, the presence or not of schools was elicited in interviews without any account for their different significance depending on which political regime surrounded school operations.

Sometimes the media, during its intense coverage of the weeks following the formal end of hostilities, produces panoramas of local society and personal stories that yield useful illustrations for presenting the results of the first round of rapid assessments or for updating subcategories for later rounds. From Iraq, for example, efforts to keep drinking water supplies running were featured both at the producers' end (crumbling municipal plants) and the consumers' (water lines and the hardship of family life in the summer heat), in some technical as well as personalized detail. Media criticism of early relief operations can also conceivably influence assessment agendas, for example, for a denser account of logistics and accessibility. The political resonance that the media reporting finds before public attention recedes would also militate for very brief initial assessments and an early chance to revise objectives and designs.

Value of information

Costs are certain, benefits not

The EMAS cost slightly more than US-$ 1 million, not counting the cost of the UNOPS structure that used the information for clearance taskings. The cost of the RAP is not known, and with the tragedy of 19 August 2003 that killed its coordinator and several other staff in the United Nations headquarters, it seems obscene to try to monetize the total bill. A different question concerns the ability of the humanitarian and reconstruction community to make use of the rapid assessment information once it is ready, and of the benefits that will accrue to its users and, ultimately, to the groups that they serve.

In the case of the EMAS, the information did inform priorities of clearance, and a broad estimate of areas in the survey region that were cleared by the end of fieldwork in March 2004 is possible. In principle, using area and victim figures, some model calculation of lives saved could be attempted. However, VVAF does not place a monetary value on a life, and therefore at most a cost-effectiveness indication may come forth. It would be belittled by the fact that mortality from the active use of explosives is much higher in contemporary Iraq than from passive, victim-actuated old devices.

An importance metric for survey points

To investigate how the value of information fluctuated over the lifetime of the EMAS, we created a measure expressing the importance of each survey point visited. It was based on two attributes – the population and the claimed contaminated area. The metric is approximately multiplicative in their magnitudes. For example, a town of 10,000 residents reporting a 1,000 sq m minefield receives a score similar to that of a 100-person village claiming that 1 sq km of its pastureland was littered with CBUs (because, expressed in logarithms, 4 x 3 = 2 x 6). The minutiae are documented in the appendix.
This measure is purely ad-hoc, for didactic purposes of this report, and based on the reasoning that a survey point's importance is amplified by the scale of the affected population AND the danger areas. The motivation is to illustrate the spread of information value in space and time, not to rate communities for mine action priorities (which was done already during the EMAS, using socio-economic and contamination indicators).

The RAP's case is different. As a post-war baseline account of local communities in one of the hottest ethnic friction zones, it should keep a measure of relevance for better days when institutions of resettlement and property compensation can go to work. By this time, it may be useful only as an element in yet another sampling frame – one that could be stratified by the discrepancies in service access immediately after the war. This is unlikely to happen although OCHA put the report into the public domain in October 2003, and an edited database has been available for replication. Not only in Iraq, but also in Afghanistan has the transfer of rapid assessment data to successive United Nations agencies been difficult.

These political and institutional factors are the major drivers or show-stoppers in the rapid assessment environment. Compared to their power, social science considerations seem meek and negligible. Nevertheless, the donors who pay for this information want to see it produced and applied effectively, and with them "value-of-information" arguments should find an inclined audience.

A rigorous evaluation

This school of thought, which has gained currency in many fields from medical testing to ecological risk management, attempts a rigorous approach to the collection and use of information when decisions must be made under high uncertainty. More information helps to reduce the uncertainty, but also costs more. If the consequences of different decision outcomes can be monetized, the value of the information can be calculated. Although Dakins's (1999: 281) programmatic statement that

> *"Value Of Information (VOI) analysis is useful because it makes the losses associated with decision errors explicit, balances competing probabilities and costs, helps identify the decision alternative that minimizes the expected loss, prioritizes spending on research, quantifies the value of the research to the decision maker, and provides an upper bound on what should be spent on getting information"*

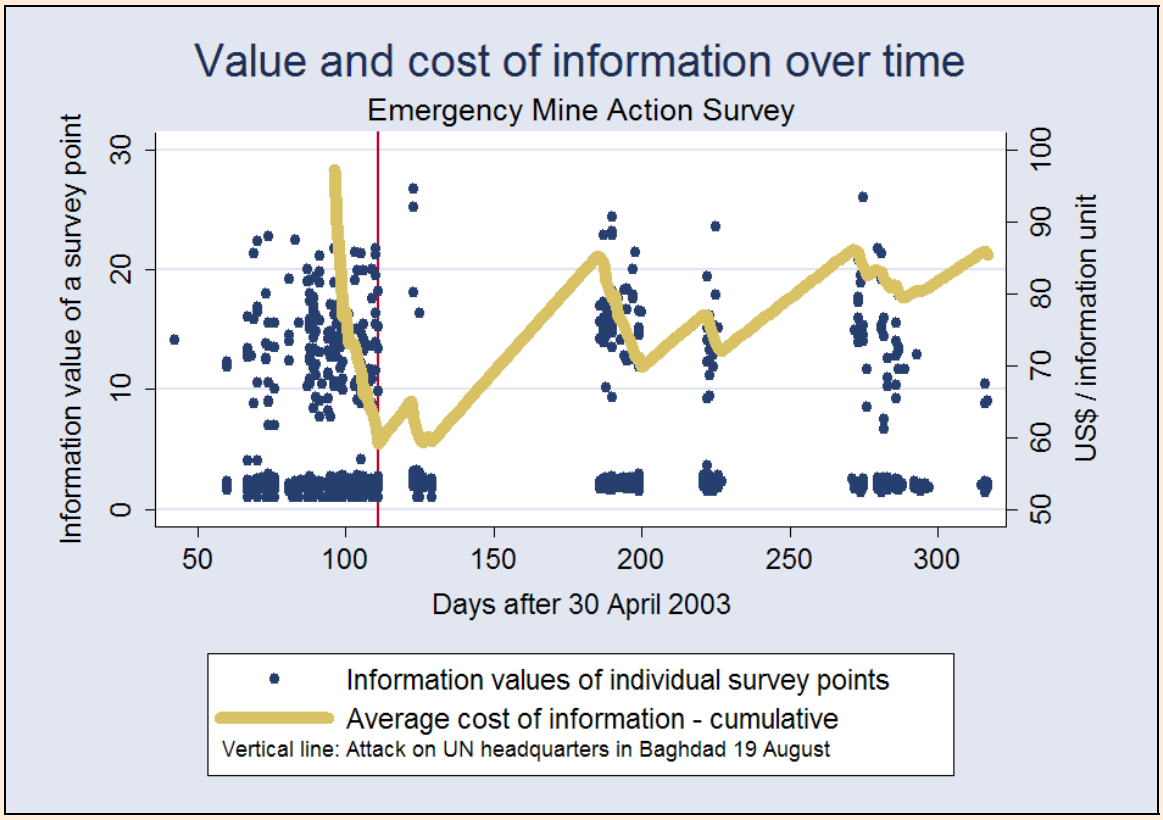
is an oversell if applied to humanitarian information management, there is merit in thinking through the costs and benefits of rapid assessments in more serious "what will this do for our decision-making?" terms. Obvious first targets for evaluation are sample sizes and production times. The 5,700 populated places surveyed under the RAP will be remembered as a stark magnitude. Some will use this figure as a deterrent because of the lack of practical application; others will take it as a demonstration that rapid large-scale data collections can be achieved. Both will agree that assessment protocols are necessary, with stopping rules that kick in at the appropriate points to say: "Enough!" Some of these questions can be deepened in the laboratory, by using computer simulation, and such models might become a useful element in the training of humanitarian information management specialists.

Value and cost of information over time

Philipson (op.cit., 59) demonstrated that, for large surveys in the US such as the National Longitudinal Surveys and the General Social Surveys in the early nineties, average costs tended to increase during the lifetime of each survey. The main cost drivers were the escalating efforts to replace sample members in strata with high refusal rates.

We analyze survey cost and returns for the EMAS over time. Since sample member replacement was not an issue, but downtime due to insecurity was, we take a different approach. We score sample points by an importance measure based on claims to population and to affected areas as described in the appendix (page 82). We make the simplifying assumption that in-country costs are constant per day during the 317 days from the officially declared end of major combat operations to the last field visit and are no different during downtime. We calculate the ratio of cumulative in-country cost to cumulative information value from assessments returned.

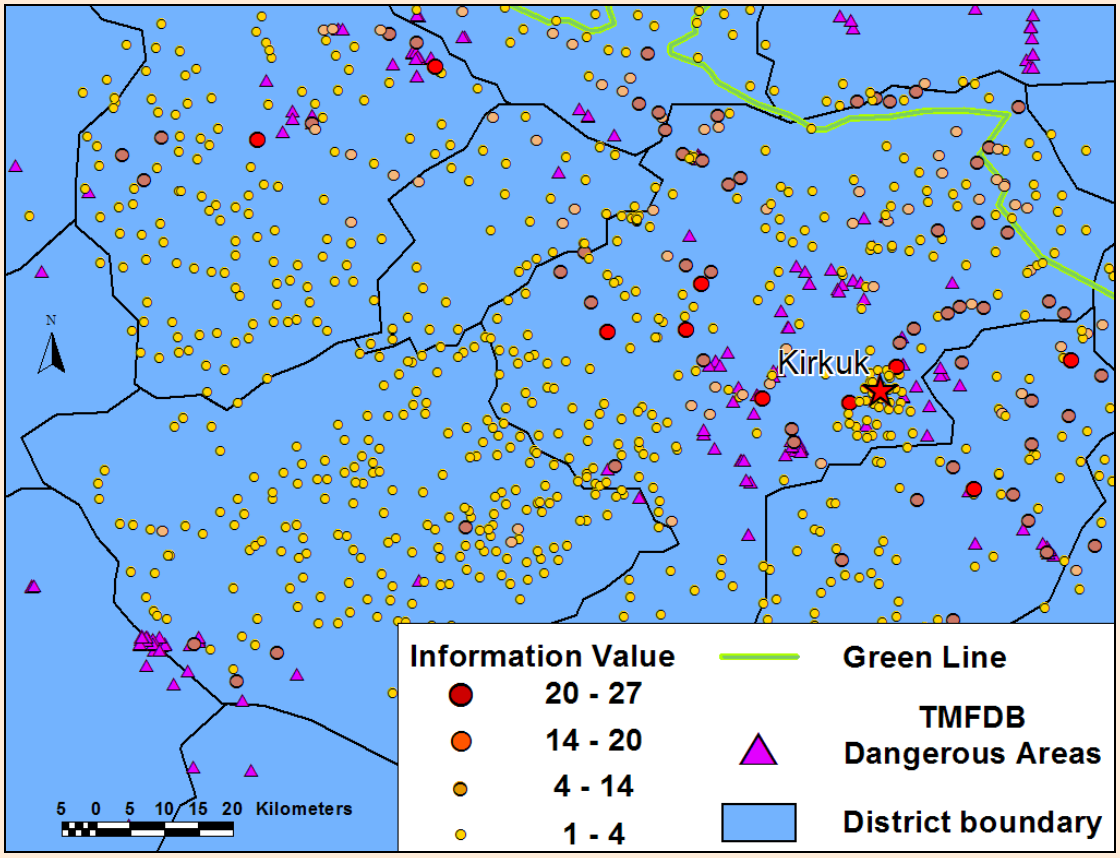
Figure 11: Information value and average survey cost



Our calculation assumes that a total of $800,000 was spent in Iraq, but the shape of the cost curve is indifferent to this amount. After the initial set-up, EMAS started returning significant cumulative information value in early July and by beginning of August had brought the average cost of an information unit below the $100 mark (start of the thick line). Subsequent downtimes obviously would drive those values up each time, and they would fall again when fieldwork resumed. However, after 200 days, the reversals in average costs were minor. With the benefit of hindsight, and applying very crude cost-minimizing thinking, one is tempted to suggest that the exercise should have been terminated around day 150. But the changes in security and in the value and cost of the next batch of assessments, if any more were feasible, were not predictable at that point. However, by day 250, an analyst looking at cost, population and contamination data already known would have been able to make a better informed recommendation. In all this, one has to keep in mind that the decision to stop is faced with an ethical dilemma – between the risk to overlook some affected communities and the humanitarian benefits that cost savings in might produce.

The average cost was driven also in part by the addition of a large number of survey points with low information values (because these settlements were small and were not affected). These points tended to cluster in space, particularly in southwestern Tameem. The map shows a vast cluster (left side). Visiting these communities contributed little value to the survey.

Figure 12: Information value of individual surveys in part of Tameem governorate



It also shows points of prior information, i.e. dangerous area coordinates from the coalition forces' TMFDB. EMAS discarded this information as obsolete. De facto, some affected communities were found within 10 km of most TMFDB points.

A heuristic – a simple search rule - directing assessment teams to do circuits within a given distance from TMFDB points and then terminate their search unless an affected community was found would have economized the assessment effort.

More analytical capacity?

But, then, is value-of-information analysis more than yet another fad? After all, the RAP survey grew so large because it was not clear *from what* to sample. This needs to be clarified first. Pragmatists – people who work to *solve* problems – will want to find working definitions and rules that reconcile the challenge with the resources at hand – such as, in an earlier suggestion, by selecting only from among the larger communities. Sometimes this does not work, such as when the uncertainty-reducing information points to the other end – to a host of small communities that are near known contamination areas.

Social scientists – generally people who make a living by *reformulating* problems – are trained to collect data reliably and for valid measurements. They are typically less competent to do so rapidly. Also, they do not agree on very many things. When it comes to surveying local communities, these are real for some, and are social constructs only for others. But even ingrained constructivists show realism in front of a mine field, and the most hardboiled realists are wary of applying remotely sensed classifications to local community definitions.

Both would probably agree, in the words of the above-cited book *"Finding out fast"* (Thomas, op.cit., 11) that *"the necessity for rigor is if anything intensified when finding out fast"*.

Appendices

Bibliographical references

Alspach, Andrew & Lucy Kariuki, 2002. Population Assessment Using Very High Resolution Satellite Imagery Mogadishu, Somalia. Nairobi, Kenya, UNHCR Regional Spatial Analysis Lab (RSAL).

Benini, Aldo A.; Lawrence H. Moulton & Charles E. Conley, 2002. 'Landmines and Local Community Adaptation', *Journal of Contingencies and Crisis Management* 10(2): 82 - 94.

Benini, Aldo & Andrew Ross, 2003. 'Humanitarian Information Center for Iraq: Results of the Rapid Assessment Process (RAP). Report for the UN Office for the Coordination of Humanitarian Affairs'. Vietnam Veterans of America Foundation. http://www.hiciraq.org/assessments/RAPID/HIC%20RAP%20Iraq%20report%2003%2010%2022.pdf. [Accessed: 5 May 2004]

Bennett, S.; A. Radalowicz; V. Vella & A. Tomkins, 1994. 'A Computer-Simulation of Household Sampling Schemes for Health Surveys in Developing-Countries', *International Journal of Epidemiology* 23(6): 1282-1291.

Biemer, Paul P. & Dennis Trewin, 1997. 'A Review of Measurement Error Effects on the Analysis of Survey Data', in. Lars Lyberg, op.cit.: 603-632.

Bradt, D.A. & C.M. Drummond, 2002. 'Rapid epidemiological assessment of health status in displaced populations--an evolution toward standardized minimum, essential data sets', *Prehospital Disaster Medicine* 18(1): 178-85.

Brown, Vincent, 2001. 'Rapid Assessment of Population Size by Area Sampling in Disaster Situations', 25(2): 164 - 171.

Browne, Glenn J. & Mitzi G. Pitts, 2003. *Stopping Rule Use During Information Search in Design Problems*. Lubbock, TX, Texas Tech University: Rawls College of Business Administration.

Chambers, Robert, 1981. 'Rapid rural appraisal: Rationale and repertoire', Public Administration and Development 1: 95-106.

Dakins, M. E., 1999. 'The value of the value of information', *Human and Ecological Risk Assessment* 5(2): 281-289.

Darcy, James & Charles-Antoine Hofmann, 2003. *According to Need? Needs Assessment and Decision-Making in the Humanitarian Sector, HPG Report 15, September*. London, Overseas Development Institute.

Duffield, Mark R., 2001. *Global governance and the new wars : the merging of development and security*. London ; New York: Zed Books.

El-Guindi, Tarek; Hazem Al Mahdi & John McHaris, 2003. *The extent and geographic distribution of chronic poverty in Iraq's Center/South Region*. Cairo, UN-FAO.

Ervin, A.M., 1997. 'Trying the impossible: Relatively "rapid" methods in a city-wide needs assessment', *HUMAN ORGANIZATION* 56(4): 379-387.

Garrett, J.L. & J. Downen, 2002. 'Strengthening rapid assessments in urban areas: Lessons from Bangladesh and Tanzania', *HUMAN ORGANIZATION* 61(4): 314-327.

Gramopadhye, A. K.; B. J. Melloy; M. Gopinath & M. Budgavi, 1997. 'An evaluation of economic and performance feedback in an inspection task with explicit economic consequences', *International Journal of Industrial Ergonomics* 20(4): 327-337.

Hentschel, Jesko, 2004. *Using Rapid City Surveys to Inform Municipal Social Policy – An Application in Cali, Colombia. World Bank Policy Research Working Paper 3369, August 2004*. Washington D.C., World Bank.

Kent, Randolph, 2004. *Humanitarian futures: practical policy perspectives. Network Paper 46*. London, Overseas Development Institute. Humanitarian Practice Network (HPN).

Kharif, Olga, 2003. 'Plotting the War on Terror and Disease'. BusinessWeek Online, 19 August 2003. http://www.businessweek.com:/print/technology/content/aug2003/tc20030819_8703_tc126.htm?tc. [Accessed: 24 August 2003]

Kievelitz, Uwe; Thomas Schaef; Manuela Leonhardt; Herwig Hahn & Sonja Vorwerk, 2004. 'Practical Guide to Multilateral Needs Assessments in Post-Conflict Situations. A Joint UNDG, UNDP and World Bank Guide'. Eschborn: German Agency for Technical Cooperation (GTZ). http://lnweb18.worldbank.org/ESSD/sdvext.nsf/67ByDocName/PracticalGuidetoMultilateralNeedsAssessmentsinPost-ConflictSituationAJointUNDGUNDPandWorldBankGuidepreparedbyGTZwiththesupportofBMZ/$FILE/PCNA.Tool.pdf. [Accessed: 30 September 2004]

King, Dennis & Maxx Dilley, 2001. 'Structured Humanitarian Assistance Reporting (SHARE). Background paper for the Symposium on Best Practices in Humanitarian Information Exchange Agenda, Geneva, Switzerland, February 7-8, 2002'. United Nations Office for the Coordination of Humanitarian Affairs (OCHA). http://www.reliefweb.int/symposium/SHAREarticle.htm. [Accessed: 30 September 2004].

Kirkwood, Craig W., 1996. *Strategic Decision Making. Multiobjective Decision Analysis with Spreadsheets*. Belmont, Duxbury Press.

Kusumayati, A. & R. Gross, 1998. 'Ecological and geographic characteristics predict nutritional status of communities: rapid assessment for poor villages', *Health Policy and Planning* 13(4): 408-416.

Lemeshow, S.; A.G. Tserkovnyi ; J.L. Tulloch ; J.E. Dowd ; S.K. Lwanga & J. Keja 1985. 'A computer simulation of the EPI survey strategy', *International Journal of Epidemiology* 14(3): 473-481.

Lyberg, Lars, et al. (eds.), 1997. *Survey Measurement and Process Quality*. . New York, John Wiley and Sons.

Mac Ginty, R., 2003. 'The pre-war reconstruction of post-war Iraq', *Third World Quarterly* 24(4): 601-617.

MacIntyre, Kate, 1999. *Rapid assessment and sample surveys: trade-offs in precision and cost*, Health Policy and Planning, 14/4: 363-373.

Manderson, Lenore & Peter Aaby, 1992. 'An Epidemic in the Field? Rapid Assessment Procedures and Health Research', *Social Science and Medicine* 35(7): 839-850.

Mock, Nancy ; Ellen Mathys; Bob Drapcho & Eric Kenefick, 2002. 'Survey Resource Manual For Post-Conflict And Transition Settings [Prepared for: The CERTI/MEASURE Evaluation Project]'. Tulane University School of Public

Health and Tropical Medicine. http://www.smartindicators.org/docs/MeasureDocs/CERTI%20RM_1.doc. [Accessed: 19 July 2004]

Morales, D.K. & S. Geary, 2003. 'Speed kills: Supply chain lessons from the war in Iraq', *Harvard Business Review* 81(11): 16-.

Pedersen, Jon, 2004. *IMIRA in the northern governorates*. 28 July 2004 E-mail to Aldo Benini. Oslo, Fafo Institute for Applied Social Science.

Philipson, T., 1997. 'Data markets and the production of surveys', *Review of Economic Studies* 64(1): 47-72.

Scrimshaw, Nevin S. & Gary R. Gleason, Eds., 1992. *Rapid Assessment Procedures - Qualitative Methodologies for Planning and Evaluation of Health Related Programmes*. Boston, MA: International Nutrition Foundation for Developing Countries (INFDC) [Digital version: http://www.unu.edu/unupress/food2/UIN08E/UIN08E00.HTM, accessed 4 June 2004].

Shaikh, Irshad, 2004a. *Different Surveys, Different Results - Implications for Gazetteer: A Case Study from Northern Iraq [Draft]*. Washington DC, VVAF.

Shaikh, Irshad, 2004b. *UNOPS/MAG/VVAF Emergency Mine Action Survey (EMAS). Project GLO/02/R72 Contract PS 130171. Final Technical Report*. Manchester UK and Washington DC, Mines Advisory Group (MAG).

Sida, Lewis & Chris Szpak, 2004. 'An Evaluation of Humanitarian Information Centers including Case Studies of HICs for Iraq, Afghanistan, and Liberia'. USAID Office of U.S. Foreign Disaster Assistance (USAID/OFDA) and the UK Department for International Development (DFID). http://www.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/resources/pdf/Evaluation_HIC2004.pdf. [Accessed: 7 September 2004]

Smith, Gordon S., 1989. 'Development of Rapid Epidemiologic Assessment Methods to Evaluate Health Status and Delivery of Health Services', *International Journal of Epidemiology* 18(4): S2-S14.

The SPHERE Project, 2004. 'Humanitarian Charter and Minimum Standards in Disaster Response'. Geneva. http://www.sphereproject.org/. [Accessed: 29 September 2004]

Thomas, Alan, 1998. Introduction. In: Thomas, Alan; Joanna Chataway & Marc Wuyts, 1998, 1-18.

Thomas, Alan; Joanna Chataway & Marc Wuyts, 1998. *Finding out fast : investigative skills for policy and development*. London ; Thousand Oaks, Calif.: Sage Publications in association with the Open University.

Thompson, S. K., 1991. 'Adaptive Cluster Sampling - Designs with Primary and Secondary Units', *Biometrics* 47(3): 1103-1115.

Woodhouse, Philipp. People As Informants. In: Thomas, Alan; Joanna Chataway & Marc Wuyts, 1998, 127-146.

Zipf, G. K., 1949. *Human Behaviour and the Principle of Least Effort*. Reading, MA: Addison-Wesley.

Methodological appendix

Data

Data on the Rapid Assessment Process (RAP) communities figuring in this analysis is from the Humanitarian Information Center for Iraq, as analyzed by Benini and Ross (2003) in Amman in October 2003.

Data on the Emergency Mine Action Survey (EMAS) is from Mines Advisory Group (MAG) and Vietnam Veterans of America Foundation (VVAF), as described in Sheikh 2004b.

Data from the coalition forces' Tactical Minefield Database (TMFDB) was obtained from the Coalition Humanitarian Operations Center (HOC) in Kuwait in May 2003 and was shared with the United Nations Mine Action Program and with MAG, the survey-implementing nongovernmental organization (NGO), in Erbil.

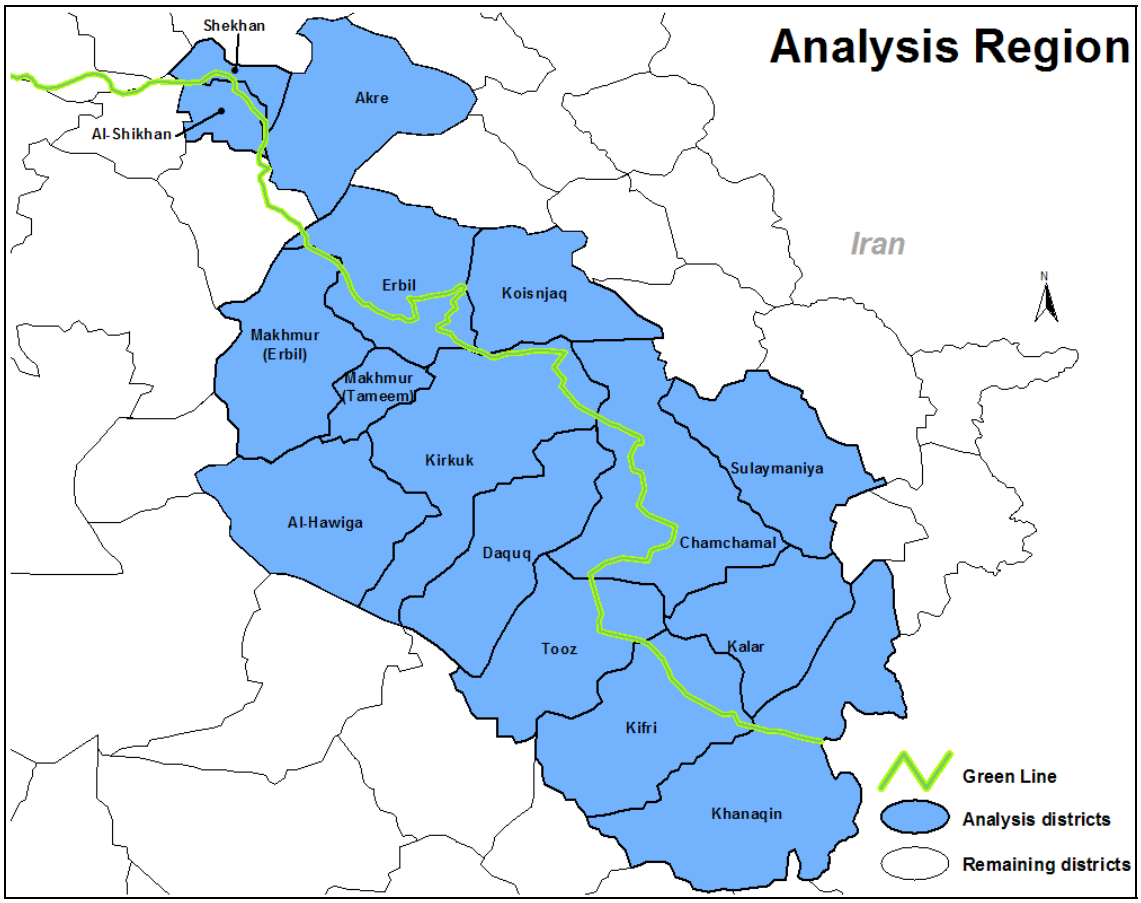
Analysis region for modeling the EMAS coverage

The set of districts, and their affiliation with governorates, as shown in the following table and map, may since have been changed. Districts used in the statistical analysis are those showing figures for RAP surveys. They were chosen for having substantial numbers of surveys in the RAP as well as in EMAS. This map shows the analysis region only; a different map showing the extent of overlap between the full areas of the two assessments in northern Iraq is found in the introduction to this report.

Table 3: Analysis region - Districts and RAP communities

Governorate	District	All RAP	Analysis region
Dahuk	Amedi	341	
	Dahuk	133	
	Sumel	139	
	Zakho	195	
Diyala	Khanaqin	110	110
	Kifri	71	71
	Baladrooz	1	
Erbil	Choman	194	
	Erbil	221	221
	Koisnjaq	137	137
	Makhmur	158	158
	Mergasur	141	
	Shaqlawa	199	
	Soran	328	
Ninewa	Akre	346	346
	Al-Hamdaniya	18	
	Al-Shikhan	82	82
	Hatra	1	
	Mosul	15	
	Shekhan	68	68
	Sinjar	9	
	Telafar	136	
	Tilkaif	9	
Salah al-Din	Tooz	72	72
	Al-Daur	3	
	Al-Shirqat	3	
Sulaymaniyah	Chamchamal	192	192
	Darbandihkan	73	
	Dokan	156	
	Halabja	217	
	Kalar	151	151
	Penjwin	153	
	Pshdar	222	
	Rania	166	
	Sharbazher	348	
	Sulaymaniya	290	290
Tameem	Al-Hawiga	179	179
	Daquq	103	103
	Kirkuk	213	213
	Makhmur	32	32
Undetermined		69	
Total		**5,694**	**2,425**

Figure 13: Analysis region cut by the Green Line



Regression model

One of the core analyses offered in this report rest on a logistic regression model. The property of each RAP polygon in the analysis region to enclose at least on EMAS survey point is expressed as a binary variable. This is regressed on a number of variables, which, substantively, are justified in the main body. Here we give descriptive statistics as well as comments on some variable transformations, followed by the estimation results and classification statistics.

Table 4: Descriptive statistics for the regression model

DEPENDENT VARIABLE:	Obs	Mean	Dev.	Min	Max
EMAS conducted at least one visit within RAP polygon	2425	0.470	0.499	0	1
EXPLANATORY VARIABLES;					
Is on northern side of Green Line	2425	0.632	0.482	0	1
Distance to Green Line (kilometers)	*2425*	*28.9*	*20.3*	*0.021*	*100.2*
Distance to Green Line (meters, log10)	2425	4.296	0.468	1.332	5.001
Distance to nearest affected community (kilometers)	*2425*	*12.5*	*10.9*	*1.9E-04*	*57.3*
Distance to nearest affected community (meters, log10(x+1000))	2425	3.966	0.410	3.000	4.765
Distance to Green Line (log10) x Is on northern side of Line	2425	2.692	2.086	0.000	4.833
Is in Akre District	2425	0.141	0.349	0	1
Distance to to nearest TMFDB point on the southern side at pre-survey time (kilometers)	*2425*	*26.4*	*18.2*	*0.048*	*75.9*
Distance to to nearest TMFDB point on the southern side at pre-survey time (meters, log10(x+1000))	2425	4.311	0.368	3.021	4.886
Access to health care and commercial services score	2425	0.609	0.123	0.238	1.000
Access to schools and utilities score	2425	0.692	0.138	0.116	1.000
Current population (log10)	2425	2.293	0.603	0.477	5.799

Variable transformations

The effect of several variables is assumed to be non-linear and roughly proportionate to their magnitude. Therefore, we use their logarithms as shown in the above table.

A constant (1,000 meters) was added to two of the distance measures before transforming them to their logarithms. This assumed that at very small distances (< 1 km) from a point designated in the coalition forces' TMFDB, resp. from the GPS measurement point of a community found contaminated, the propensity would not differ markedly – survey teams would, with a high probability, visit all communities that they could find in that radius.

This constant was not added to the distance from the Green Line (taken perpendicularly from the RAP point to the Line). This is inconsistent since this measure is thought of as an important part of the survey managers' mental map. We later tested for both specifications and found that the results were very similar. In fact, only about one percent of the RAP points lie closer than 500 meters to the Line.

Note that distances to the nearest coalition forces tactical minefield point are distances to the nearest such point on the *southern* side of the Green Line. This is *true also of communities on the northern side*. This transformation was necessary in order to avoid commingling with pre-war dangerous areas in the north that United Nations Office for Project Services (UNOPS) had surveyed, and which had been included in the coalition forces database, but in which EMAS clearly had no business. We tested the robustness of the model also by setting the distance for all communities on the northern side equal to 200 km; the results were very similar. What this variable measures is the influence on survey probabilities of the information that the EMAS management had received, *prior* to field visits, from the coalition forces concerning contamination on the southern side. Most of this contamination was supposed to be new. Thus we used the table received in May 2003 and did not use any of the later updates.

Note also that the distance to the nearest affected community is measured as the logarithm of the distance from the RAP point to the nearest EMAS point of an affected community *regardless of whether the EMAS point inside or outside the RAP polygon*. As mentioned above, it was modified by a 1000-meter threshold to reduce the leverage of very small distances. The non-exclusion of EMAS points inside the RAP polygon, for purposes of this distance calculation, causes bias (because this admits a number of self-referrals that overstate the degree of clustering among affected communities). We calculated an alternative model, using the distance from the RAP point to the nearest *other* RAP point to which at least one affected EMAS point had been attributed. The coefficient then attenuates by 46 percent, but the significance is still very high (z = -8.26). This model classifies 77.9 percent of all cases in the analysis region correctly, down from 79.4. We conclude that the model is largely robust to the distance measurements and retain the original version.

Some of the population values were imputed, primarily for aesthetic reasons (avoiding holes in the maps). The imputation model used was a linear regression:

Table 5: Imputation of missing population values

Number of obs	=	5255
F(3, 5251)	=	2067.43
Prob > F	<	0.0001
R-squared	=	0.5415
Adj R-squared	=	0.5413
Root MSE	=	0.42552

Dependent variable: Log10 current population						
	Coef.	Std.	t	P>|t|	[95% LCB	UCB]
Service provision factor 1 score	2.851	0.057	49.730	< 0.001	2.739	2.963
Service provision factor 2 score	1.736	0.031	56.900	< 0.001	1.676	1.796
Is on northern side of Green Line	-0.276	0.015	-18.770	< 0.001	-0.305	-0.248
Constant	1.304	0.023	57.120	< 0.001	1.259	1.349

where the service provision factor scores were retrieved from an unpublicized factor analysis of the presence of services in the RAP communities performed as part of the RAP analysis in October 2003. These factors summarize the *presence* of the services in the very localities (as different from the *proximities to nearest providers*); their predictive power for population is implied in much of central-place theory in human geography (communities that produce a greater diversity of services likely have larger populations).

As a result of the imputation, as far as the analysis region is concerned, 58 records received imputed populations:

Current population	Obs	Mean	St.Dev.	Min	Max
Excl. missing values	2,367	1,223	17,447	0	629,832
After imputation	2,425	1,198	17,238	3	629,832

[Note: The minimum after imputation is higher [3 > 0] because for the one community with reported zero population, the log10 transformation produced a missing value, prompting an imputed value for this record.]

Access to services

We use the access-to-services scores that the RAP computed for each of its points (see Benini and Ross, 2003 for details). There are two distinct access factors – one with which health care and commercial services are aligned, the other concerning education and utilities. The scores were the results of a principal component analysis of the [log-transformed] distances to the nearest providers of eight different kinds of services.

Results

See the detailed regression output on the following page first. For space reasons, the classification results are on this page:

Table 6: Classification results

Classified + if predicted Pr(D) >= .5
True D defined as number of EMAS visits within RAP polygon > 0

Sensitivity	Pr(+ D)	84.11%
Specificity	Pr(-~D)	75.19%
Positive predictive value	Pr(D +)	75.02%
Negative predictive value	Pr(~D -)	84.23%
False + rate for true ~D	Pr(+~D)	24.81%
False - rate for true D	Pr(- D)	15.89%
False + rate for classified	Pr(~D +)	24.98%
False - rate for classified	Pr(D -)	15.77%
Correctly classified		79.38%

Table 7: Detailed regression output

Logit estimates			Number of obs	=	2425
			LR chi2(9)	=	1215.05
			Prob > chi2	<	0.0001
Log likelihood	=	1068.901	Pseudo R2	=	0.3624

Dependent variable: AT LEAST ONE EMAS POINT WITHIN RAP POLYGON	Coef.	Std. Err.	z	P>|z|	[95% LCI	UCI]
MENTAL MAPS:						
Distance to Green Line (meters, log10)	0.826	0.166	4.98	< 0.001	0.501	1.151
Distance to nearest TMFDB point (meters, log10(x+1000))	1.278	0.255	5.02	< 0.001	0.779	1.777
Distance to nearest affected community (meters, log10(x+1000))	-2.647	0.195	-13.58	< 0.001	-3.029	-2.265
POLICY GUIDANCE:						
Is on northern side of the Green Line	8.917	1.037	8.60	< 0.001	6.885	10.948
Distance to Green Line (log10) x Is on northern side of Line	-2.719	0.256	-10.63	< 0.001	-3.220	-2.218
Is in Akre District	3.089	0.192	16.06	< 0.001	2.712	3.466
LOCAL EXPERTS AND INFORMANTS:						
Access to health care and commercial services score	-2.178	0.526	-4.14	< 0.001	-3.210	-1.147
Access to schools and utilities score	-0.880	0.485	-1.81	0.070	-1.831	0.071
Current population (log10)	0.073	0.121	0.60	0.548	-0.165	0.311
Constant	4.131	1.215	3.40	0.001	1.750	6.511

P-values < 0.10 are grayed.

The influence of position vis-à-vis, and distance from, the Green Line

The interpretation of coefficients in an interaction model is not always easy, and certainly is prone to confusion in this model. A visual interpretation may be easier. We calculated the contribution to the logit as shown in this graph. The lines connect points from individual observations, in other words represent the range of distances on both sides of the Line.

Figure 14: Green Line, distance and probability of an EMAS visit

It is obvious that other things being equal, the probability decreases steeply as we move away from the Line on its northern side; it increases, although more slowly, with the magnitude of distance on the southern side.

The contribution to the logit was computed using the regression coefficients such that, in STATA syntax:

```
distBLeffectOnLogit =
_b[bluddistlog] * bluddistlog + _b[ BLUEZONE] *  BLUEZONE +
_b[BlueLineInteract] * BlueLineInteract ]
```

An informational importance measure for EMAS survey points

Rationale

This section explains the importance measure used for the graph on page 7.

The decision alternatives that EMAS consumers pondered are not known; and even if they were it would be impossible to attach monetary values to them. For example, there is a very large number of subsets of mine-affected communities that each could potentially be selected for priority clearance, but by arbitrarily selecting a subset, we would not be able to quantify the benefits of clearance in monetary terms (although perhaps in terms of the total population for whom the risk was removed). This limitation rules out some forms of value-of-information analysis, including a strict cost-benefit analysis of the rapid assessment.

Steps towards a less demanding cost-effectiveness analysis may still be feasible. For this, it is necessary to define a plausible utility for individual community assessments. Again, value functions are difficult to specify, and EMAS may not have the data to return some of the more plausible ones (e.g., crops lost from blocked access to farmland), a milder version of an importance measure is used here. We create it essentially for didactic purposes, and therefore do not care much about validation and calibrating.

We assume that the information that EMAS returned on affected and non-affected communities is all the more valuable for decision makers the larger the local population, or the larger the claimed contaminated areas, are. Further, we assume that these properties interact to increase the value of the local information. And, that the information that a community has no current residents, or that it reported no contamination, also has value in the humanitarian decision-making context.

In landmine impact models run on several country datasets (Benini et al. 2002), the magnitudes of the affected population and of the contaminated area each significantly increased the risk of incidents. We use this insight to take the logarithms to form this measure, after standardizing by the means of the logs:

Point_importance =
(1 + log10(pop + 1) / meanlog10(pop + 1)) * (1 + log10(area + 1) / meanlog10(area + 1))
A limitation to the validity of this measure comes from the insight that abandoned and hazardous munitions sites do not necessarily occupy large surfaces, but are nevertheless important. Our formula does not capture this special status and its importance.

Distribution

The measure was calculated for two data representations:

First for RAP polygons with EMAS visits. This representation was used for the concentration graph on page 7 as well as for correlations with some distance variables. The measure and its arguments are described by:

Table 8: Descriptive statistics and examples of the information value measure

Variable	Obs	Mean	Std.Dev.	Min	Max
Log10 population	1139	2.372	0.555	0.477	4.699
Log10 contaminated area (sq meters)	1139	1.036	2.181	0.000	7.499
Survey point importance	1139	3.953	4.153	1.254	20.494

For illustration, the seven RAP polygons with the highest importance values are:

Governorate	District	Community	Estimated population	Claimed contaminated area (sq m))	Survey point importance
Diyala	Kifri	Kifri	29,321	2,199,115	20.49
Ninewa	Akre	Gorava	6,500	2,356,194	18.61
Ninewa	Akre	Chustayi	6,000	2,356,194	18.50
Tameem	Kirkuk	Yaychi	2,000	7,068,627	18.17
Ninewa	Akre	Dinarta	3,674	2,748,894	18.02
Erbil	Makhmur	Gamesh Tappa	1,000	15,707,963	17.96
Tameem	Daquq	Yahyawa	800	17,420,132	17.73

The second representation used the EMAS dataset directly. It was used for the temporal perspective, i.e. the calculation of average costs as shown in the graph on page 68. In this representation, the measure and its arguments are distributed thus:

Variable	Obs	Mean	Std.Dev.	Min	Max
Log10 population	1756	2.174	0.869	0.000	4.886
Log10 contaminated area (sq meters)	1756	0.842	1.994	0.000	7.481
Survey point importance	1756	4.011	4.886	1.000	26.686

As our purpose is to demonstrate the relative concentrations in terms of various attributes (population vs. contaminated area vs. this mixed measure) and to indicate the shape, over time, of a reasonable average cost function, value functions reflecting the preferences of

decision makers (such as those used in multi-objective value analysis, see Kirkwood 1997: 61) and alternative weightings are not considered here.

The community gazetteer for Iraq

A note on sources

Joint Humanitarian Information Center

The Joint Humanitarian Information Center (JHIC) was established in January 2001 under the auspices of the United Nations Office of the Iraq Programme (UNOIP) with funding from the Oil-For-Food Program (OFFP). The JHIC's area of responsibility was limited to areas north of the "Green Line" and for this reason very little data for other areas of the country are contained in this data set. Of the 6,143 points contained in the JHIC data set less than 100 did not qualify for inclusion in the final P-code data set. The extent of the data set coverage can be seen in the map shown below.

National Geospatial Agency's GEOnet Names Server

The National Geospatial Agency's (NGA) GEOnet Names Server (GNS) is a product of the United States Board on Geographic Names (BGN). The BGN was first established in 1890 and is composed of two standing committees: the Domestic Names Committee (DNC) and the Foreign Names Committee (FNC). The DNC works to standardize place name spellings within the 50 States and U.S. territories. The DNC does not actively name features but prescribes overall policy and assists in the resolution of geographic name disputes.

The FNC is charged with the development of standard place name spellings for features outside the U.S. and its territories. The FNC relies heavily on native mapping, census reports, official bulletins, and other foreign material to collect and standardize foreign geographic names for use by United States government agencies. In cooperation with its British counterpart, the Permanent Committee on Geographical Names for British Official Use, the FNC has developed systems for the conversion of non-Roman writing systems (e.g., Greek, Cyrillic, Arabic) to Roman script in order to convert non-Roman-script geographic names to Roman-script forms in a consistent manner.

A number of geographic name products are available as a result of the Board's work. Access to both the domestic and foreign geographic name databases is available on the GEOnet Names Server (GNS).

The initial GNS data set contained approximately 29000 named locations in about 2260 feature categories including everything from first order administrative divisions to zoos. Out of the original 29000 locations approximately 15500 were designated as populated places which were extracted and retained.

Russian topographic map locations

At the time of the gazetteer construction complete country map coverage was only available from a dated 1:250,000 Russian topographic map series. Approximately 5000 populated place features were hand digitized from these maps and translated into English from Cyrillic which were translations from Arabic and Kurdish them selves.

World Food Program/Vulnerability Assessment Mapping Unit

Little is known about the size and scope of this data set. However, it is known that this data set was a combination of and earlier version of the GNS data set and proprietary data collected by World Food Program (WFP) as part of their food distribution activities under the OFFP.

Preference order for resolving duplicates

A system of preferences was implemented to help determine which name and coordinate combination to keep and which to eliminate as a duplicate. Each of the data sets was ranked according to how well it was believed to represent the true situation on the ground.

The first preference for retention was given to the JHIC gazetteer. The JHIC had been actively collecting and maintaining their gazetteer data since the beginning of the OFFP so it was reasonable to assume that this represented the most up to date data source in terms of both names and coordinates however, it was geographically limited to the three northern governorates that make up the Kurdish region so it had no real use outside of those areas.

The WFP data set was given the second order of preference. WFP had also maintained an ongoing data collection and maintenance effort since the beginning of the OFFP.

The NGA data was given third order of preference because it tended to be updated less frequently that the JHIC or WFP data but was more current than the Russian topographic map data.

The Russian topographic map data was given last order of preference due to the fact that the data was extracted from topographic maps that were at least 20 years old.

Disclaimer

The Vietnam Veterans of America Foundation (VVAF), as well as any other persons or organizations named in this article are not responsible for the views expressed by the authors. Neither those organizations nor the authors are responsible for the accuracy of international borders displayed in maps or implied in the data. The term "Green Line", as used in this report, is a purely factual concept; and neither its geographical accuracy nor the position of all assessed settlements vis-à-vis this line are warranted.

Author addresses

Corresponding author:

Aldo A. Benini
abenini@vi.org

Co-authors:

William Barron
Charles Conley
Joseph Donahue
Lauren Gaum
Shawn Messick
Irshad Shaikh

Vietnam Veterans of America Foundation /
Information Management and Mine Action Programs
(VVAF / iMMAP)
1725 Eye Street, NW
Washington DC 20006-2412, USA
Phone: (202) 483-9222

The "Navigating Post-Conflict Environments" series

is an occasional series of reports published by the VVAF / iMMAP unit. Previous issues included:

- Decision Support for Mine Action
- Landmines, War and Victim Dynamics: Contamination Assessment of Afghanistan

available at http://vvaf.org/.