

# Uncertainty and Information Flows in Humanitarian Agencies

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*Humanitarian agencies struggle with high uncertainty. The focus here is on uncertainty that grows out of the internal complexity of the agencies themselves, rather than simply emanating from their war-ridden environments. This is illustrated with a study of uncertainty management and information processing in two UN agencies working for the victims of the conflict in southern Sudan. Data from 1995 relief distributions are used to simulate aspects of uncertainty; paradoxically, uncertainty increased with growing success of the relief operation. The finding is in tune with observations from the same region that Jok (1996) reported in this journal. While uncertainty may remain difficult to reduce, co-operation among agencies and public confidence in their work provide functional equivalents for certainty.*

## Introduction

The philosopher Bertrand Russell likened the early stages of nuclear physics to an attempt to draw a street map of the city of London when all you can do is to observe the kinds of cargo that pass through the mouth of the river Thames. The utter inaccessibility of direct measurement that confronted physicists must have been daunting, throwing them back on highly indirect inference modes and vast unremovable uncertainties.

The situations with which humanitarian agencies struggle are often marked by similar extremes. The central African refugee crisis in November 1996 provides a vivid illustration. Organisations searched for hundreds of thousands of Hutu refugees and Zairian civilians displaced by hostilities and the break-up of camps. According to a USAID report:

UNHCR announced on November 21 that photographs and reconnaissance flights show the locations of Rwandan refugees in Zaire. UNHCR claims that 700,000 refugees remain in Zaire: roughly 200,000 refugees are located 75km to the north of Bukavu; 250,000 others are situated 75km to the south of Bukavu; and the other refugees are scattered further north, or to the south of Uvira, or further inside the country, to the west. ICRC estimates the number of refugees and displaced people still in eastern Zaire at 800,000 (1996).

The agency claims were vehemently disputed by others, notably Rwandan and US officials, who put the number of refugees still remaining in eastern Zaire as low as 100,000. One of the arguments was that as no census of the camps was ever completed, it was perforce impossible to know the number of people scattered in flight.

Such vast discrepancies in the estimate of populations in need threaten the credibility of the humanitarian community. As Harrell-Bond (1992: 206) has pointed out, 'an apparently obvious basic requirement for procuring and delivering the needed material assistance to refugees is to know the numbers of potential beneficiaries ... [and this has] dominated policy, planning, implementation and evaluation'. The specific uncertainty about the refugees in central Africa was created by divergent interests of the humanitarian and political actors and by the turbulence in work environments, but fairly high degrees of uncertainty can persist in humanitarian actions that have lasted for an extended period of time, have become well routinised and know at least some areas of cognitive consensus.

War and its associated scourges create uncertainty. Humanitarian agencies treat such uncertainty as a quality of the work environment, always expected if sometimes crippling. Illustrating the point, Keen and Ryle, in their introduction to *Disasters'* special issue on Information in the Disaster Zone, state:

The nature of contemporary disasters in Africa ... militates against the rapid collection of ... data. By the same token reliable base-line statistics that pre-date the crisis are seldom available. Parties to conflict may attempt to manipulate information about the populations under their control; and relief agencies, in the rush for funding, may promulgate statistics that owe more to guesswork and imagination than to research (1996).

By and large, however, uncertainty is an attribute of the agencies' environment; and more, better and faster information appears to be the remedy for it.

This paper offers a different perspective. It sees uncertainty in humanitarian actions as growing out of the internal complexity of the agencies themselves and of the actions that they perform in the war-ridden environment. Little attention has been paid to the fact that humanitarian agencies, just like other organisations, direct the growth of their structures towards sources of information that are triggered by uncertainty. Over time, subparts of the agencies come to use information differently and may fall into disagreement, and even outright conflict. Uncertainty becomes the nemesis of the agencies' information systems that have set out to reduce it. To this may be added uncertainties where the action is so successful that it stirs up local turbulence that makes it harder to see what is going on in the environment.

My thesis is that there is a trade-off between effectiveness and certainty. Agencies strive to field effective assistance, such as food that saves the starving, or medical care that reaches the injured and sick. The more the agencies succeed in that, the less certain their claims become about certain types of information deemed central, such as the number of beneficiaries. Agencies, therefore, may want to learn how to manage uncertainty rather than concentrate on reducing it.

I shall illustrate these processes with examples drawn from a recent review of the Operation Lifeline Sudan (OLS), a United Nations-led multi-agency endeavour to assist victims of the armed conflict in southern Sudan. OLS is a pertinent case of an

operation steeped in deep uncertainty. For example, one of its programmes supported 1,200 village schools in 1995. By early 1996, it was able to confirm the existence of only 200 schools, the remainder being putative units.

For the purposes of this paper, ‘uncertainty’ is not directly concerned with insecurity, which is a special type only, i.e. threat- and violence-driven uncertainty. After briefly exploring themes of uncertainty in the humanitarian community, I offer some observations from general epistemology. Concepts from the sociology of organisations are added. A case study in the intricacies of humanitarian monitoring will show the transformation of external into internal uncertainty. Data from this context is used to simulate the relationship between effective intervention and measurement error. Finally, substitutes for certainty are considered for humanitarian management.

## Uncertainty concepts

Where can the reader gain a first, intuitive access to our subject? Of all places, might the Internet help? In fact, a quick search on the Worldwide Web using the keywords ‘uncertainty *and* humanitarian’ (MetaCrawler, 1996) retrieves a diversity of perspectives that attest to the crescendo of players positioning themselves in the humanitarian arena. Surprisingly — some might say: sadly — only a minority concern themselves with the uncertainty befalling the disaster victims. When that is the case, uncertainty is mostly understood as a psychological condition in refugees yearning to return or resettle in safety and dignity. More common are statements about the uncertainty in which organisations active, or likely to become active, in humanitarian assistance, or even their auxiliary organisations, find themselves. This uncertainty is felt less from the insecure disaster environment than from changing policy and fiscal climes. Thus the US armed forces complain of great uncertainty about the new roles and missions that the military may be assigned. The uncertain length of deployment in overseas peace-keeping and humanitarian missions as well as the threat of domestic budget cuts are seen as destabilising. The very expansion of armed forces mandates is suspected by some outsiders to contribute to, rather than reduce, uncertainty. The ICRC has wondered aloud that

this indiscriminate use of the word ‘humanitarian’ seems to be an indication of increasing uncertainty as to the different roles and responsibilities within the international community, and this leads ... to the fundamental question of whether the real problem of emergency co-ordination is still a problem of the humanitarian agencies or rather a problem of politicians and generals (Fuchs, 1995).

Several faith communities also offer their reflections for humanitarian users. For example, commenting on the Pope’s visit to Bosnia, the Vatican’s *Osservatore Romano* wrote of ‘the tragedy of these peoples, the uncertainty and differing opinions of the great powers, and the daily fatherly anxiety of the pope’ (Holy See, 1995), a distant reminder of the classical traditions that contrasted the *certitudo* of salvation with the — futile — *securitas* of worldly empires.

Obviously, the ‘certainty’ and its antonym ‘uncertainty’ are highly polysemic concepts. Several academic disciplines have endeavoured to clarify them and to estimate the consequences on knowledge and action. Beside others, mathematical

information theory, analytical statistics and epistemology enhance the theoretical bases of decision-making under uncertainty whereas scholars of cognitive psychology, micro-economics and the sociology of organisations have done most of the empirical research. Here input is sought briefly from epistemology for some clarification and, more extensively, from organisational sociology for the hypothesis of agency-induced uncertainty.

Smithson (1989) has anchored uncertainty within a wider taxonomy of ignorance. Uncertain statements, as his table shows, belong in a subclass of incomplete statements and in turn contain their own subordinant types: vague, ambiguous and probabilistic statements.

Smithson went on to apply his concepts to the management of disasters (Smithson, 1990). The gist of his argument seems to be that traditional approaches for reducing uncertainty that simply call for more data collection or better communication will not do. He borrows a distinction that social planning theorists have made between 'anticipation' — advanced, fixed planning for known contingencies — and 'resilience' from unanticipated difficulties. Resilient disaster managers know when and where they are ignorant, communicate an area of ignorance actively and in it find room for innovation. On the other hand, they require a high level of public trust in their organisations. If that trust is not given, ignorance will be seen as weakness or attempt at deceit, and resources may be withheld. For example, in the African Great Lakes disasters, Western diplomats have expressed suspicion that humanitarian agencies have vested interests in publicising very high numbers of Rwandan refugees remaining in Zaire, presumably to attract larger donor contributions. But even trusted agencies must submit to a dilemma: 'Beyond a certain system size, precision and relevance in the description of the system become incompatible', he paraphrases uncertainty management. By the time ignorance of problems and effects 'has been reduced, it is too expensive and difficult to change the system' (Smithson, 1996). Again the refugees in the Zairian forest spring to mind. Assuming that their number exceeded 100,000 — the lowest of all rough estimates in late 1996 — although not



**Figure 1** The place of uncertainty in Smithson's typology of ignorance (1989)

knowing by how many, more precise data was irrelevant *vis-à-vis* the speed of obtaining consensus on international action. Delaying action under the pretext that the available information on the tragedy was not sufficient deprived an uncertain, but certainly large, number of refugees of timely assistance and protection.

Smithson's definition of uncertainty is wider than the use that the late Frederick C. Cuny (1995) has popularised in humanitarian management. In a course taught through the University of Wisconsin, Cuny, an eminent practitioner, distinguished decision-making under conditions of uncertainty, 'when a manager is faced with reaching a decision with no historical data concerning the variables and/or unknowns and their probability of occurrence', from conditions of risk for which probabilities can be estimated. This is relevant here because for a long time approaches to uncertainty management tended to focus on what Cuny termed risk, either as a frequentistic measure of randomness or in terms of subjective measures of confidence that satisfy well-circumscribed and eventually quantifiable propositions (Krause, 1993: 3). Many of these are amenable to algorithmic treatment; and in branches that have closely cooperated with artificial intelligence science, computer-aided uncertainty management has made great strides ahead. Financial management and medical diagnostics are cases in point. Within the humanitarian realm, early conflict warning appears to offer applications that at present come closest to the algorithmic tradition (Brecke, 1996). And as with the expanding role of information technology relief agencies generate and absorb ever-increasing amounts of data, new methods for handling uncertain information will knock also at their door. Commercial seminars that introduce the uninitiated to 'Uncertainty in Information Systems' (e.g., UNICOM in London, 1996) speak for a growing industry, born apart from the humanitarian culture, but increasingly available for continuous education and management advice. Exposure to such tools may improve the sensitivity that the organisational cultures of relief agencies have for various types of uncertainties; the use of complex technical tools like the artificial neural networks that Brecke favours for early conflict warning will be much further down the road.

## Organisations and uncertainty

The sociology of organisations comes from a different tradition. For its development since the late 1950s, studies using the 'system and environment' perspective have been centre stage (Warriner, 1984). Uncertainty then is the likelihood that the environment behaves differently from how the system expects. But the way researchers have conceptualised organisational environments have themselves varied. Objectivists see organisations embedded in environments that exist independently (for a seminal work, see March and Simon, 1958; other research in this perspective is reviewed by Aldrich, 1979). A disaster event that conforms well to this concept is, for example, an earthquake, which no organisation can control.

For other researchers, the environment of the organisation is what its managers perceive of the ambient world. While the world still exists independently, uncertainty is more a product of flawed knowledge of the organisation's members (Duncan, 1972; Perrow, 1970). An earthquake may destroy a hospital because its directors, not registering they were in a fault zone, had neglected mitigating action.

With the growth of corporations, the idea of independent environments became obsolete. How organisations manipulate their environment is the theme of the enacted

environment school (Chamberlain, 1968; Weick, 1977, 1988). Environments are created (enacted) by interaction. In the case of very powerful organisations, their expectations and products may be imposed on entire societies. An example that we all know is the Windows technology that Microsoft has marketed into a quasi-universal standard. A type of enacted environment better known to the readers of this article is relief dependency. Agencies, while responding to a perceived need, create new conditions in their work environment. From the enacted environment perspective, the actions of organisations contribute to the uncertainty that they feel about their environments. For example, Jok has described how, amid serious power differences between relief agencies, local military and groups in need, the needs assessment process has taken a life of its own, satisfying nobody, yet overwhelming the agencies with inaccurate data (Jok, 1996).

The double character of the environment has long been recognised (for many others, see Luhmann, 1987: 252): when humanitarian agencies see it primarily as a resource, they face dependency ('Give us more money, and we can do more for the victims'); conversely, when they treat their environment as information, its change potential will be the source of uncertainty ('we do not know if the money comes forth; therefore we cannot pre-position the relief'). A number of strategies are employed to minimise environmental uncertainty. Internally, humanitarian agencies may employ buffering (e.g., food stocks), smoothing (variable triage of victims), forecasting (nutritional surveillance), rationing and other devices; externally, they vary organisational interdependence (e.g., donor's creation of their own operational wings such as EU-ECHO, co-optation of NGOs, negotiated access agreements with belligerents and others). However different the strategies may appear on the surface, they all serve to protect central processes of the humanitarian agencies from environmental fluctuations (Bedeian, 1980: 145).

For the organisation, the environment is not an integrated whole. Relevant information is available from distinct social locations. The needs of victims are communicated from the field, or through partner agencies who survey them, or through the media. Financial information comes from head offices or from donor representatives in the country. Legal documents and security clearances are obtained from political and military authorities. In all but the smallest agencies, distinct environmental sectors are worked upon by different parts of the organisation. These workers or even departments set up information systems that grow towards sources of news about crucial uncertainties. And as different departments deal with different sectors and thus different uncertainties, their information systems differ, too. This is the central thesis of Stinchcombe's *Information and Organisations* (1990).

According to Stinchcombe, the direction of organisational growth is determined by the need to manage differentiated uncertainties; and the integration of knowledge, where it is necessary at all, produces tension while the participants struggle to comply with a 'negotiated information order' (Heimer, 1985). In such an order, power-based exchanges decide what information is needed, which parts have priority, who is to collect it and who pays for the collection. Heimer (and before her, Knutz, 1984) found that typically collection stopped at the point where the information satisfied the more-powerful partners. This would often short-change the weaker units on information which they needed to discharge their tasks properly. In other words, social rather than technical criteria prevail. Weaker units might try to remedy the situation by creating their own, private, information buffers. I shall return to this at the end of the case study.

Besides the social and technical dimensions, the time factor is also important. Some parts of the humanitarian agencies will see the quality of their information improve with operational experience. For example, in persistent disasters, the local food economy may become progressively better understood (this view is challenged by Jok (1996), who maintains that relief agencies are poor at transmitting knowledge), and with it the victims' 'coping ability' and their residual needs for outside assistance. Other sectors are concerned with information that remains of the same value. The minds of those in the military who decide security clearances for relief workers may be as unreadable after five years of co-operation as it was on the first day. Tolerance for flexibility will also vary within humanitarian agencies. Departments working with self-assertive NGOs will be challenged to organise information in shifting categories; for example, UNICEF's demand to keep tabs on patients by gender was resisted for a time by NGOs working in southern Sudan who held that this type of knowledge was useless in an emergency situation. On the other hand, headquarters financial tracking systems exercise constraint on the use of categories, emphasising auditable paper trails and constancy through programme years. Differences may become accentuated between departments that provide information that can guide the activities of other departments, and those whose information moves in closed loops. For example, fielding relief through NGOs who have close contacts with farmers may encourage the logistics department to purchase some commodities locally. The experience of large aircraft pilots, on the other hand, may remain a plant-specific skill, a subculture isolated from the rest of the organisation and largely immune to the demands of others.

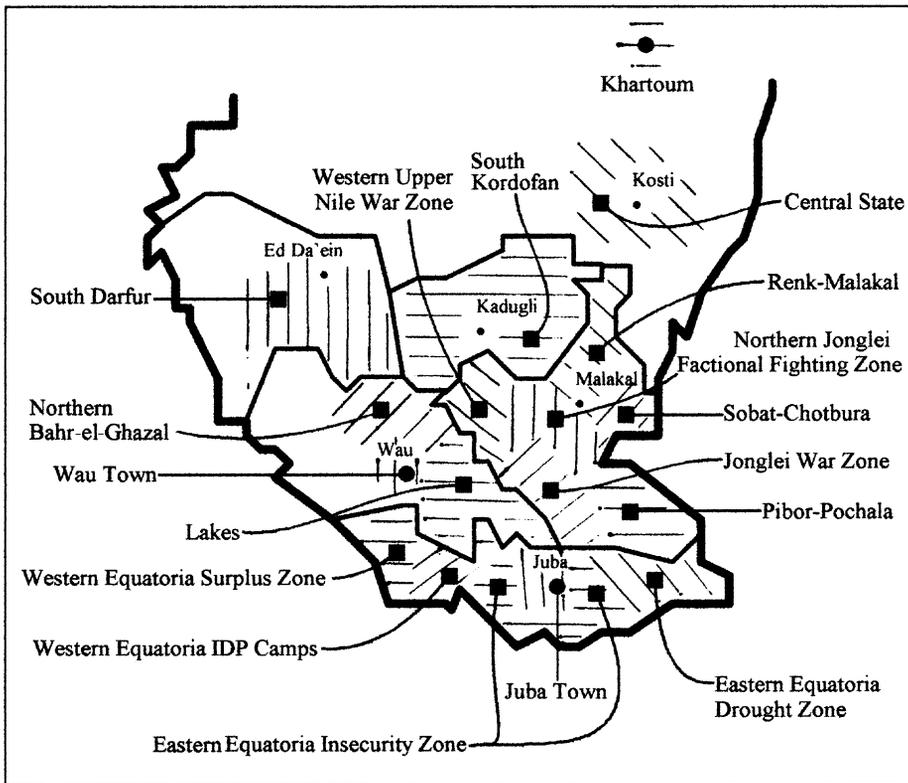
The information systems operating within humanitarian agencies can thus vary in several dimensions. In the following case study, the interaction is emphasised particularly between the information behaviour of field monitors — whose needs assessment help to prioritise fielding decisions — logistics units — who, among other things, keep track of flight destination approvals, commodity badges and shipments — and the monitoring units tasked to present beneficiary and relief totals for donor and host government information. While the agencies have become increasingly successful in dealing with one particular bad type of uncertainty — field access — the claims that they stake on their success lead to paradoxes similar to those evoked by Smithson, creating new uncertainties regarding donor and host government support. Equally importantly, the case study will show that the internal handling of information creates uncertainty. Moreover, as the action expands in some places thanks to better field access, and more people receive food, the movement of people in the enacted environment also adds a new strain of uncertainty. A kind of Heisenberg Uncertainty Principle (see Paulos, 1992: 119–20, for a brief explanation) seems to obtain in humanitarian action. It purports that the sum of our ignorance about groups in need and the uncertainty generated by the agencies once relief gets under way for those people always exceeds a certain minimum. When one decreases below that threshold, the other grows, and vice versa. The rationality of humanitarian agencies, just as of other organisations, remains bounded.

### **Uncertainty management in Operation Lifeline Sudan**

OLS, begun in 1989, has been one of the largest humanitarian actions that the United Nations, the Red Cross movement and NGOs have undertaken, with donor

contribution exceeding half a billion US dollars for the three-year period 1993–5. Its experience has been significant also because it pioneered the concept of negotiated access for assisting internally displaced and war-affected civilians during an ongoing conflict within a sovereign country (Karim et al., 1996: 1; Duffield, 1996a: 25). Over time, two distinct sectors formed, the northern sector working ex-Khartoum to reach out primarily to government-held areas, and a southern sector that relied on cross-border activities, chiefly from Kenya, to take supplies and personnel to areas controlled by armed opposition movements. Other than for supplying nearby areas in Equatoria Province, the southern sector made heavy use of air transport. Cross-line operations have also known substantial, if sharply varying, importance, notably through barge convoys on the Nile. In 1995, a magnitude of 6.4 million people was given for the population among whom OLS was active in the South, the Transitional Zone and in the Khartoum camps for displaced people.

On the United Nations' side, the World Food Programme (WFP) and UNICEF have been major players, the latter also being the lead agency for the entire southern sector operation. The number of NGOs is considerable, both international and Sudanese. The southern sector alone counted some 35 different NGOs in 1995. WFP essentially acts as a one-product firm (food relief) plus logistics provider for other OLS agencies:



Source: Author

**Figure 2** Areas in which relief agencies were active in 1994 or 1995

UNICEF and most NGOs are multi-sectoral, with major programme components in health and immunisation, water and sanitation, food security and education. These agencies share a history of extremely chequered access to regions in need. Travel and flight permits were often and for extended periods refused by one or the other party to the conflict. Sometimes blanket interdictions would remove entire regions from assistance, in recent times access was more often denied to specific locations, chiefly by the Government of Sudan (GOS).

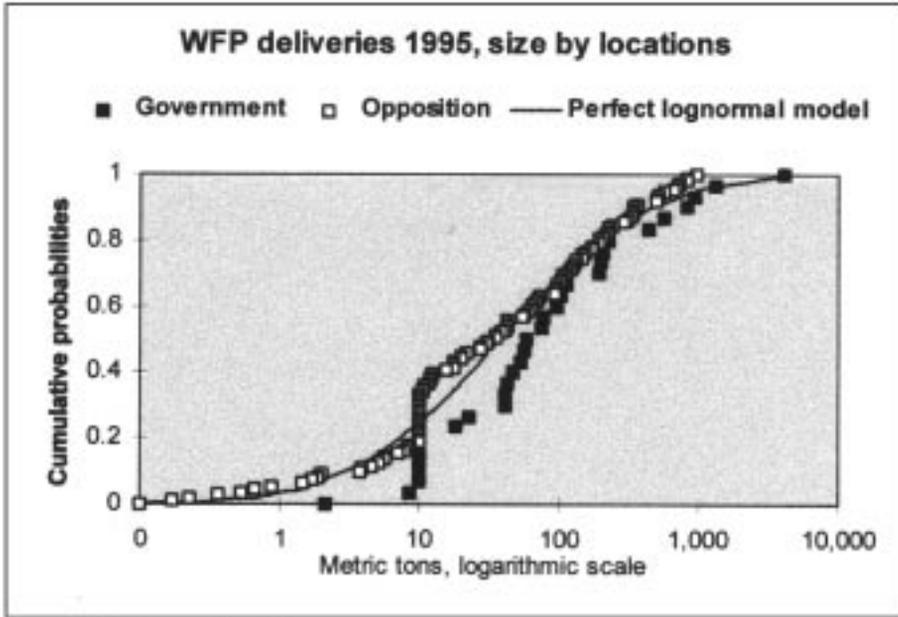
OLS reacted to the unpredictability of clearances by developing more and more access locations and by applying for flight clearances to more locations than its monthly work programmes would require on a strictly technical basis. This was helped by waves of bush airstrip clearance that local commanders and chiefs in the movement-controlled areas supported, attracted by the promise of relief as a means of political mobilisation (Duffield, 1996a: 21). Airstrip proliferation is, of course, a particularly graphic instance of an enacted environment. In many areas, then, the agencies would obtain, by inexplicable fiat, permission to fly to some locations while neighbouring ones remained shut out. Groups of beneficiaries would walk to open sites, sometimes congesting them while waiting for relief. A finely grained pattern of access evolved, smoothing the provision of relief over many places most of which handled small volumes during the course of a year only. A comparison of WFP distributions in 1994 and 1995 is particularly instructive in this respect.

Mainly for political reasons, 1993 and 1994 were years of strong growth for OLS. In 1995, it was seized by a new political crisis that reduced access to populations in need and subsequently relief volumes. WFP-resourced food distributions shrank from 91,320 metric tons in 1994 to 23,914 in 1995. Despite this reduction, more locations with active relief at one time or another during the year emerged. In opposition-movement areas they increased from 88 to 109 while in areas under government control they contracted slightly from 35 to 32. Within each sphere of control, the volumes of food delivered to the various locations followed a lognormal distribution pattern, modified only by a cumulation of 10-ton drops from Nile barges. The following graph demonstrates the separation of the two distribution behaviours neatly. The series of white and black squares do not cross anywhere, meaning that in each rank interval deliveries in opposition country were always smaller than on the government side.

WFP did have 10 fairly big distribution points in opposition areas, but it cushioned itself against the loss of any of them by developing a large number of minor points. Similarly, UNICEF built up its network of access points considerably through 1993 to 1995. As a result, particularly for the WFP in the southern sector, when access became more difficult in 1995, people who could not be assisted in a particular location would often be able to move to an adjacent spot. The multiplication of delivery points thus helped to serve the beneficiaries at a time when the total relief volume had dropped. But, as we shall see, it created higher uncertainty in monitoring the numbers. My case is built on material collected during the independent review of OLS (Karim et al., 1996), in which I participated.

### **Disputed population figures and number paradoxes**

Part of the difficulty is that the war had thwarted reliable censuses. Population figures were a highly politicised matter. Relief flows were determined by, among other



Source: Benini, own calculations

**Figure 3** Distribution of risk in relief deliveries

factors, estimates of populations in need, and these tended to be correlated with total populations. Moreover, humanitarian agencies commonly reported under whose administration their beneficiaries lived. In that light, OLS statistics of populations assisted came to serve as substitute indicators for the populations that either the GOS or the opposition movements claimed to be controlling, and thus assumed significance for the legitimacy of the belligerents. This produced many conflict-laden claims — all of which the humanitarian agencies regarded with extreme caution. But the two OLS sectors have exercised different kinds of caution. A planning paper in the South devoted no fewer than five pages to the methodical caveats and the comparison of various census and local NGO estimates before venturing an estimate, 'for planning purposes, [of] the population in southern Sudan ... at 4 million' (OLS, 1995: 12). Southern sector workers stressed that they did not claim that this many people were accessible to OLS assistance. Going one step further, UNICEF Nairobi ruled out the concept of an estimate of the total population serviced. It did give estimates, however, of populations reached by particular sector programmes. For example, the population 'potentially with access to health care facilities' (ibid.: 14) was reckoned to be 1.13 million in 1995, down from 1.5 million in 1994 due to insecurity. That amounts to 28 per cent of the population having access to health care services.

The northern sector, too, used caution in determining populations. A northern sector 1994 assessment document stated:

Estimated population figures were primarily reported by local authorities in the areas assessed. The figures were not confirmed by the assessment teams and no

census or headcount was undertaken as part of the assessment exercise. No accurate population figures are presently available for most of the areas covered. Frequent population movements further complicate the demographic picture in the assessed areas. Therefore, the population figures included in this report are only indicative of actual civilian populations in the assessed areas (UN, 1995: 6).

In spite of that, UNICEF Khartoum made very ambitious claims. Its 1995 programme review stated categorically that 3,690,000 displaced and war-affected people were accessible from Khartoum (UNICEF, 1995: 2–3); 2.5 million were targeted for UNICEF assistance, and over 2.0 million were effectively reached.

There are problems with the definition of somebody assisted as well as with the methods of counting beneficiaries. UNICEF counted the entire population deemed accessible as being assisted. But even if the statistics had been based on programme-specific outputs, it would be virtually impossible to calculate the union of all sets of people who ever during the year benefited by this or that component programme. When all the figures produced by the two big UN agencies were put together, a paradox appeared: the people who received assistance outnumbered those in need. For example, UNICEF (both sectors together) assumed that 2.5 million war-affected people were in need of humanitarian assistance, and that it reached, during 1995, as many as 3.1 million. The excess of people supposedly assisted over those in need demonstrates an irreducible uncertainty in counting and estimating populations. And the fact that the UNICEF leadership in Khartoum continued to publicise total beneficiary figures despite that high uncertainty attests to Heimer's claim that information behaviour follows criteria of satisfaction that are socially determined. It suited the UNICEF leaders to show vast field success, despite the problems of calculating figures internally and doubts about their validity that donor agencies expressed externally.

### **Information flows within the agency**

WFP ran into the same paradox, but for it, the population issue was slightly different. Claims to total population or access-to-population (as opposed to effectively assisted) were not made. The validity of beneficiary claims was more intimately connected with the flow of information from the field to the country offices.

In its annual work cycle, WFP would project emergency food needs on the basis of field assessments made prior to the consolidated UN inter-agency appeal to donors. During the programme year, the populations in need were, where possible, reassessed. Some areas were reassessed several times, depending on logistics and the need to continue assistance for several months. Monthly delivery plans would break deliveries down by locations and weeks. In the southern sector, most of the locations were reached by air. Flight permits were sought for these, often with a number of spare locations included should access to the primary destinations be refused.

For logistics reasons — to document which locations were actually used, to calculate hours for aircraft billing, etc. — delivery reports would state locations, quantities and beneficiaries present at distributions (multiplied with an average family size where appropriate), not the areas used in assessments. In the southern sector, when the reports reached the Nairobi office, beneficiary and commodity data were

processed separately. Commodity data were copied to the logistics section, which followed up each commodity separately. Logistics had no concern for the particular areas or locations serviced as such; its major worry was to be able to close shipping instructions so that reporting requirements towards donors could be satisfied, and to keep track of those lots for which customs exemptions needed renewal within a 45-day deadline. The commodity reports were then copied to Khartoum for integration by the information and monitoring unit. The beneficiary figures were handled by the programme unit, who would also copy them to Khartoum, but in separate communications.

As a result, Khartoum kept beneficiary statistics and deliveries in separate files (each file, though, held data on both northern and southern sector activities). Over time, this separation encouraged a number of anomalies. First, in the northern sector, beneficiaries sometimes would not be people actually served during the reporting month, but rather, people reassessed as being in need but supplied later or, if access to them was lost, never actually served. Statistically, the distinction between what *ought* to be done and what *was* done disappeared. In the process, as many as 39 out of 177 locations in the WFP 1995 data files came to have beneficiaries, but did not show any deliveries. The obverse case — distributions reported, but no beneficiaries in evidence — also obtained, probably due to changes that the reports underwent while moving through different sections.

Second, while beneficiary statistics had monthly entries (more precisely: a spreadsheet cell was reserved for each location and each month), deliveries to a location were added cumulatively (as part of the formula for one cell per location) over the course of the year, leaving no monthly entries with which to verify beneficiary claims. It was done this way because the Nairobi commodity reports did not total up the weight of all commodities for each location, and the Information Section in Khartoum was left with the tedious job of adding weights commodity by commodity by manual entry into cells of individual location records. Although technically not inevitable (creating columns for deliveries in each month would have been a simple and obvious solution), this practice was followed for convenience and because of the limited data-handling skills of the Information Section staff.

Moreover, the calculation of beneficiary figures was affected by the tendency for groups in need to come to shifting distribution points depending on the vagaries of approved destinations. Since the statistics were based on the number of beneficiaries at each distribution point, some of the people would be reported under several locations during the month, or under location A in this month, B in the next (in addition to the practice of reporting reassessed but not yet supplied groups). The formula used to calculate annual beneficiaries then added all monthly figures for a location and divided by the number of months with entries (whether supplied or only reassessed). This built in a systematic doubling effect — unchecked, of course, since the information on commodities actually delivered had been separated.

Worse, the Khartoum-based monitoring unit could not correlate activity reports (groups actually served and quantities delivered) with the populations assessed to be in need. Khartoum had scant knowledge of the exact positions of many of the delivery points serviced by the southern sector. This knowledge was personal, with a handful of workers in Nairobi and the Lokichokio support base; a public mapping of locations (the basic unit for delivery reports) into assessment areas did not exist. Eventually, WFP abandoned attempts to calculate the degree of needs fulfilment. For the 1995

annual report, the monitoring unit roughly recopied the figures for populations in need in order to estimate populations actually assisted, topping them up with an additional 500,000 people assisted from barges, and 200,000 served by NGOs from Kenya and Uganda.

The difficulties were compounded by the diversity and seemingly arbitrary succession of computer applications. Sometimes several systems were used concurrently, affording little or no automated interfacing, requiring multiple entry of the same data and limiting convenience and analytical power. The WFP logistics office in the southern sector is a case in point: WFP Lokichokio used a programme written in Dbase to keep track of air operations. Dbase was used also by WFP Nairobi logistics office for air-cargo reporting. However, commodity tracking went different ways. For the WFP regional operation, it was done with the help of a WFP proprietary system introduced by the Transport Co-ordination Unit (TCU) in Kampala and different from the one that WFP Khartoum used. Neither of those systems was used for WFP southern sector. Instead, yet again two still different applications were used side by side: for certain types of food, fuel and aircraft reports, logistics officers would rely on their own personal programme written in Access. Reporting on the same food commodities against shipping instructions was done in a spreadsheet application, Lotus 1-2-3. Thus we find the kinds of conflicts between information systems that Stinchcombe and Heimer pointed out raging not only between departments (e.g., logistics and information), but even within fairly small units.

## **Effectiveness and uncertainty**

The margin of uncertainty in our example, WFP beneficiary figures, was thus considerable. That in spite of the growing knowledge of their working environment that OLS agencies built when their programmes expanded in 1993 and 1994. In fact, when we turn to the local dynamics of relief accounting, it is the very expansion of an operation that can make for less certain knowledge about it. The organisational factors causing tonnage and beneficiary numbers to be separated have already been mentioned. Reports thereby became very confusing. When the review tried to analyse delivery data in meaningful local areas, in only one out of 18 clusters (see Figure 2) was it possible to reconstruct the number of monthly beneficiaries for the most important relief centres. This concerns northern Bahr-el-Ghazal, one of the areas with notoriously bad security and large relief needs. I use data on this cluster for a computer simulation of uncertainty although, of course, the error margins were much larger for clusters with worse records.

International shock about a major famine in northern Bahr-el-Ghazal in 1988 was one of the events prompting OLS. The area, populated by an estimated 960,000 mainly Dinka people, has remained in need of relief since then, but access for humanitarian agencies has been very irregular. Since 1993, however, the WFP increased the number of airstrips and drop zones to which it could switch when there were problems in some areas. Such problems arose mainly from withdrawal of permission to fly to certain locations, and from militias that targeted relief food, food stocks and standing crops, creating new needs and making it harder to meet old ones. Alternative distribution points were used also in order to counter the ‘“relief centre syndrome”, where the existence of a single centre attracted people from a wide radius, and where the

effective distribution of food diminished the further one moved from the [main distribution centre]' (Karim et al., 1996: 162).

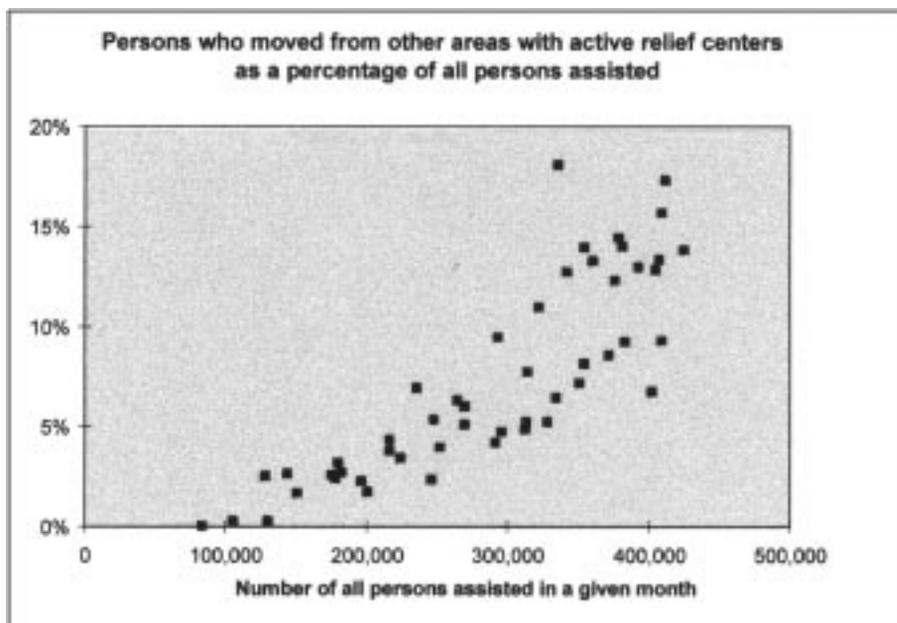
For 1995, food relief needs for northern Bahr-el-Ghazal were estimated at 10,675MT. Due to access and air-cargo capacity problems, WFP was able to deliver 3,303MT or 31 per cent of the objective. WFP reported deliveries from Kenya to 15 locations, using airdrops as well as lifts. For the 10 most important locations (3,173MT), the numbers of people assisted are available. For the period February through September, they ranged from 22,000 to 130,000 per month for the entire area.

Although WFP reports do not speak of it, its ability to use alternative locations when security problems cropped up as well as the tendency for people to move between relief centres is borne out by data correlations. The 10 places lay within a circle with a 60km radius from Gogrial, the base of the most disturbing militia. In 60 per cent of all distributions, a centre was activated only when its nearest neighbour could not be used. In any month, a minimum of three, and a maximum of six centres were open. And people moved; during months when the neighbouring centre was closed, a centre would on an average receive 19 per cent more relief seekers. Distances between nearest-neighbour centres ranged between 12 and 58km.

Obviously, when more centres are open, and people can move to receive food, the action is more effective. As part of the beneficiaries are counted here in this month, and, as they have to move again elsewhere in the next, uncertainty about total numbers also grows. Some people may even move between areas with active relief centres in the same month. As a very minimum, then, the proportion of people moving between concurrent active locations is a measure of the counting error, and this is a part of the difficulty of knowing what is really going on with the operation.

To simulate the proportion of people moving in search of relief, the model has to stay close to the observed 19 per cent difference in distribution attendance depending on whether the nearest relief centre is also open or not. Respecting that, and with additional assumptions that are not detailed here for space reasons, the model increased the possible relief centres to include all locations in the cluster bounded by the railway line and the eighth parallel, adding all airstrips marked on the Action International contre la Faim map for the area. For a total of 18 locations, sets of active relief centres were chosen randomly. Numbers were then calculated for the people assisted locally, those attracted from areas without relief and those moving from areas with concurrent centres.

Strikingly, all model variations agreed that the proportion of people moving in from other areas with active relief centres increased sharply as the relief effectively reached more people. As more centres were opened, the need to move far to collect relief decreased, but the opportunities for people not served near their homes or trying to receive from several points multiplied faster. This proportion would typically grow by a factor of two to four when the population served doubled from 200,000 to 400,000. The ability to estimate valid beneficiary totals over periods of several months, such as for a yearly report, decreased correspondingly as more and more people from active areas were counted elsewhere. The following graph brings out that relationship for 50 simulated combinations of between two and 12 active relief centres. Such simulated models have to be taken with more than one grain of salt, but the point is that they suggest a measure of uncertainty that operates in the environment created by the agency, in addition to all its internal uncertainty. Counting beneficiaries in northern



Source: Benini, own calculations

**Figure 4** Uncertainty growing with success

Bahr-el-Ghazal is compounded by migration and other factors regardless of how smoothly information is exchanged between the field monitors, their supervisors based in Kenya and the information unit in Khartoum.

The reverse may also be true: as a humanitarian action matures, methods for local assessments and activity reports are improved, but the needs and procedures of their various consumers in the organisation drift apart, re-creating uncertainty internally, as Stinchcombe predicted. The disjointed treatment of delivery and beneficiary data in WFP exemplifies this outcome.

But the view that assessment methods actually improved has been challenged by Jok (1996), himself an insider of northern Bahr-el-Ghazal. He identified another mechanism why expanding relief there created uncertainty: high turnover of WFP monitors. Under short-term contracts, more monitors were hired, 'starting their jobs from scratch'. In Stinchcombe's terms, different uncertainties were addressed by the programming (monitoring food needs) and human resources departments (continuity of monitors), compounding each other. The ignorance of novices discredited the assessments in the eyes of the population; an unreceptive population exhausted monitors, who would have to be replaced after short missions, often by novices. Another factor is at work, in line with Heimer's argument: the public with whom the field monitors work is less powerful than other partners of WFP, the donors and the host country authorities. The information system is therefore not primarily geared towards the monitors' needs. The monitors and other programming unit staff can retrieve from the logistics and information units only a small part of the information that they had supplied on deliveries and assessments earlier (contrast this with commercial organisations whose sales representatives have instant access to customer

histories!). The spree of assessments not only responds to the changing situation of the groups assisted, but also serves the reconstitution of knowledge.

### **Substitutes for certainty: co-operation and trust**

If theory and case study show uncertainty to be such an irreducible problem, I wish to conclude with some observations, necessarily more speculative, about mechanisms that can, to an extent, replace the need for certainty. Western civilisation — of which international humanitarian agencies are part — places ‘trust in numbers’ (Porter, 1995). Over centuries, statements that use numerals have come to enjoy greater credibility than merely qualitative descriptions do. This expectancy holds sway also over the social realms, including the humanitarian. Capacity for the agencies to process quantitative information has certainly grown, as it also has in other sectors of society. But collection of reliable information keeps being hurt by war and disaster environments, and the ability to interpret figures validly may not have kept pace with the modern revolution in computers and telecommunications. Moreover, organisational dynamics can bedevil the way information is integrated. These limits may become more constricting as funding competition threatens the continuity of knowledge and workers in individual agencies and donors subcontract humanitarian work to a variety of NGOs whose common cognitive frames are smaller than those of unitary organisations. The quest of rich nations’ armed forces for new mandates may also, in ways as yet unforeseeable, impact on information systems in the humanitarian community, such as by the military’s predilection for standardised service packages.

The new humanitarian landscape may eventually force changes in the way agencies seek and treat information to reduce uncertainty. For one thing, the media’s speed will put on more pressure to simplify indicators. In lieu of victim counts, in whose fictitious precision nobody believes, binary (yes/no-type) information may be easier to produce and may characterise the problem with equal validity. For example, in the civil unrest that plagued the northern part of Mali in the early 1990s, counting people who had fled into the desert was not possible. But monitoring which of the weekly rural fairs were open, and to which men from the opposed ethnic group had free and secure access, revealed the spread and intensity of the conflict. Such information was readily available from itinerant traders, refugees and local NGO personnel (Benini, 1992). As a radical consequence of certain situations, agencies may find themselves obliged to distribute relief without any beneficiary estimates. Their numbers may be replaced with surrogate indicators such as the number of locations served, the continuity or not of monitors in those locations and the timeliness of qualitative reports. For OLS, the number of barge voyages on the Nile, supplemented with commodity and security incident reports, is a better indicator of the service that UNICEF was able to extend to the riverine groups in southern Sudan than all the figurework on locations ever accessed and beneficiaries supposedly served there.

In a second development, parts of the humanitarian information management may be contracted out to specialist organisations. Outside services can help reduce organisation-related uncertainty by mustering professional competence for specific problems. These opportunities will be multiplied by satellite telephony and by the Internet. Mapping services, Web sites for missing persons, and logistics firms exemplify this nascent trend. In future operations of the kind of WFP’s in OLS, it may

become feasible to entrust the maintenance and analysis of beneficiary and delivery data to a research institution. This will require that WFP's concerned units have ready access to data and reports. Also the quality of the reports must be such that the data suppliers have an incentive to co-operate. Such an arrangement will free the agency's information unit for other tasks.

Third, standardised service packages and widespread subcontracting of services to NGOs may have consequences for information management. Service packages impose procedural rationality over the rationality of objectives formulated for unique local situations. They assume, as one ICRC staff member put it deftly (Dolder, 1996), that 'what worked in Goma will work everywhere else'. They will predispose for the collection of those kinds of information that are relevant to working with available packages. Agencies will enact their work environments so as to ensure the success of their packaged services and will form blind spots to other aspects. Subcontracting services to NGOs creates a hierarchical situation for control, thus uncertainty absorption, while helping donor and UN agencies to save on the cost of their own machinery (Duffield, 1996b; for a theoretical elaboration on markets and hierarchies, which is beyond the scope of this paper, Williamson, 1985). The certainty that hierarchisation buys may be offset by problems of enterprise culture, organisational turnover and co-ordination.

Regardless of technical and management progress, it is in the nature of humanitarian problems that agencies will most of the time stay burdened with very serious kinds of uncertainty. It is important to realise that it is not control, but trust, that can substitute for certainty. Trusted agencies will be supported to work in highly uncertain environments, and this trust will forgive also uncertainties in their own behaviour. Their logic of occasionally saying 'We do not yet know what to do because we do not yet know the situation' will be echoed by those who trust them with: 'They do not know for good reason.' As in financial markets, the liquidity of well-funded, trusted agencies replaces foresight. Such agencies can buy useful redundancy, in the form of extra mobility or of personnel overqualified for their routine tasks, which in time will help them to reduce uncertainty in non-routine situations.

The stewardship of public trust will do more for the toleration of uncertainty than improved information systems do for reducing it. This realisation was indirectly made in the debate on humanitarian co-ordination. It is ironic to find control vs. trust positions championed in two contributions, side by side, in the UN Department of Humanitarian Affairs 1995 retrospective devoted to co-ordination issues. Levine, an insider to OLS, underlines the control view that

Effective co-ordination requires that the lead agency and all other actors have enough information to make informed decisions. For this, a prerequisite is a credible and effective information system which allows decisions to be made based on a common understanding of needs and priorities (Levine, 1996: 12).

Walker, who, as a policy planner for the International Federation of Red Cross and Red Crescent Societies, represents a multi-actor worldview, extols the art of relief, which 'is to make hard decisions under pressure and with minimal information'. Placing co-operation over co-ordination, whatever you know or do is acceptable as long as

all actors accept some basic common guidelines and standards. Not so many as to adversely restrict independence and innovation and not so few as to allow for destructive chaos (Walker, 1996: 15).

It is impossible to prefer one view to the other. Demands for better accountability and cost-effectiveness philosophies in humanitarian funding (Hallam, 1996) will maintain pressure for detailed, quantitatively oriented information systems. New kinds of disasters will reward innovation, lowering those requirements temporarily. The power of the media raises the value of images and speed over text and patient analysis also in humanitarian information systems. Regardless of how they respond, humanitarian agencies are condemned to struggle with uncertainty everywhere: from the crises to which they respond; from the work environment that they create themselves; from their internal structure; and from their own success and effectiveness. Only he who does nothing is certain.

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