In the aftermath of major humanitarian crises, whether caused by natural disasters or conflicts, the international community has pledged increasingly large amounts of aid to help rebuild devastated regions. All donors—public and private—of aid programs have a strong interest in ensuring that their resources are well spent. To address that concern and capture the flow of the resources, *tracking systems* have been developed and applied. Today, several database systems exist, most notably the Development Assistance Database (DAD), which has been used in more than 15 countries. The results have been mixed, and a large variation in the performance of existing database systems is apparent.

This note is part of a broader effort to provide reliable postdisaster financial information and analysis. In particular, it reports on international experience with the financial database systems, but with a particular focus on the post-tsunami DAD, as well as systems that could be potentially suitable—for example, the Bulgarian Development Cooperation Information System. This note analyzes the performance of most established reconstruction database systems and their management structures, and it highlights the challenges encountered when reconstruction money is tracked through these database systems.

I. THE CASE FOR TRACKING THE MONEY

In the immediate aftermath of major natural disasters and conflicts, developing countries have received large inflows of aid that are often uncoordinated and require immediate disbursement. For instance, the 2004 Indian Ocean tsunami led to an estimated US$12 billion in aid commitments from international donors, governments, and nongovernmental organizations (NGOs). More than half of this sum was committed to Indonesia (Aceh and Nias), as the most badly affected country, with most of the remaining aid going to Sri Lanka, the Maldives, and India. Other disasters that have also drawn large amounts of aid include the 2005 Pakistan earthquake, with pledged funds of US$5.4 billion; Hurricane Mitch in Central America in 1998, with US$6.3 billion; and the 2003 Iran earthquake, with US$1 billion. Postconflict reconstruction in Lebanon and Sudan has drawn US$7.6 billion and US$4.5 billion in pledged funds, respectively (Table 1).

Although affected countries normally draw up reconstruction plans, the plans can rapidly become ill-adapted as the situation on the ground evolves. Consequently, the provision of reliable information is critical in managing effective reconstruction. The combination of large amounts of funding and the need for rapid action creates an environment in which reliable information and analysis on the progress

Table 1   Major Reconstruction Programs (US$1 billion or more, 1998–2006)

NATURAL DISASTERS Event Pledges	Reconstruction Program Pledges	(POST-)CONFLICT Event	Reconstruction Program
Central America / Hurricane Mitch (1998)	US$6.3 billion	Iraq (2003)	US$32 billion
Aceh and Nias tsunami (2004)	US$7.7 billion	Lebanon (2006)	US$7.6 billion
Pakistan (Kashmir) earthquake (2005)	US$5.4 billion	Sudan (2005)	US$4.5 billion
Sri Lanka tsunami (2004)	US$3 billion		
Iran (Bam) earthquake (2003)	US$1 billion		

Note: Dates when pledges were agreed—Aceh and Nias: January 2005; Sri Lanka: May 2005; Pakistan: November 2005; Iran: 2004; Central America: December 1998; Lebanon: January 2007; Sudan: April 2005; Iraq: October 2003. Pledging data are based on donor conferences. Pledges for most countries consist of donor grants and loans, although in the case of Aceh and Nias the pledges also include funds from the government of Indonesia and NGOs.

of the reconstruction effort are vital. Despite the criticality of good information, often many important decisions, particularly funding decisions, are taken at short notice and based on weak data analysis.

The importance of reconstruction finance information notwithstanding, the record in delivering such information is poor. Indeed, even within the World Bank—formally known as the International Bank for *Reconstruction* and Development—it is surprising just how little is known about reconstruction situations and their financing. Significant documentation exists concerning individual World Bank projects and their disbursement, but there is a dearth of information on aggregate reconstruction programs. The Aceh and Nias reconstruction program is the first instance in which there has been a serious attempt to provide such comprehensive information on a regular basis.

One key challenge in providing credible information is the lack of reliable financial information and well-functioning database systems. There is an emerging literature on the subject of reconstruction finance and public financial management highlighting the power of robust monitoring systems, flexibility in budget management, and attention to sectoral and spatial inequalities in resource allocation.[1] This note takes a somewhat narrower focus and looks more specifically at existing database

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1   See Fengler, Ihsan, and Kaiser (2007) on reconstruction public financial management (PFM) and Fengler (2007) on the reconstruction expenditure methodology developed in Indonesia. See also www.reconstructionindonesia.org for updates and analysis on the Aceh, Nias, and Yogyakarta reconstruction process.

systems, analyzing their structures and highlighting the challenges encountered when tracking reconstruction funds. This note reviews available database systems that have already been used and those that are potentially suitable for tracking reconstruction financing in postdisaster situations (e.g., the Bulgarian Development Cooperation Information System [DCIS]).
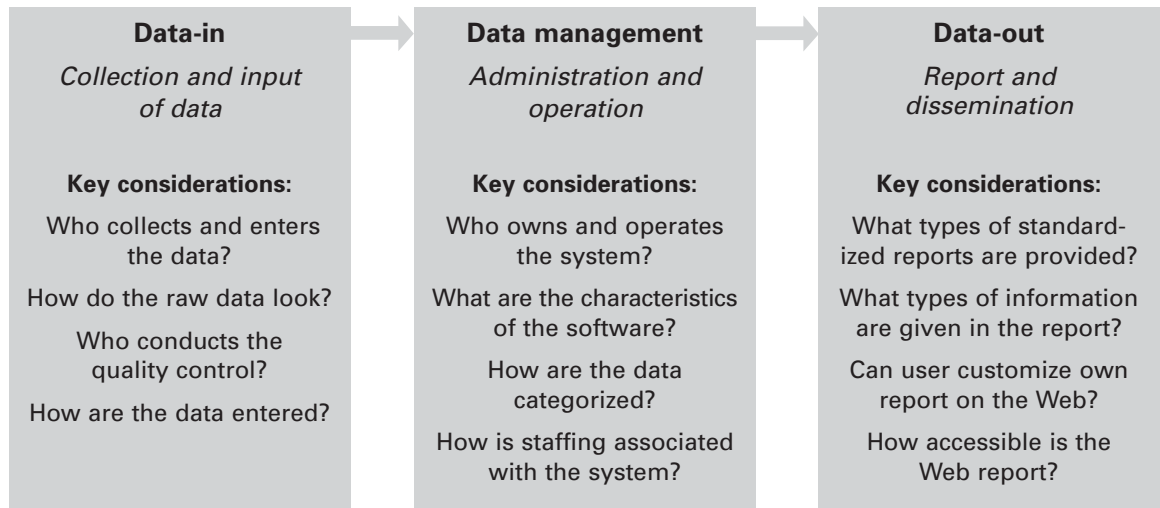
II. HOW TO TRACK RECONSTRUCTION FINANCE

Reconstruction programs differ from regular programs in that they demand more specialized financial tracking systems.[2] This specialization is due to certain characteristics of reconstruction processes: (i) Aid that flows to postcrisis countries normally consists of emergency aid and reconstruction and development aid. Emergency aid is typically only for a short-term period and is often not in the form of cash, whereas reconstruction and development aid is for a more prolonged period and thus needs to be treated separately in the data-cleaning process. (ii) A financial tracking system in a postcrisis situation should be able to track the progress of reconstruction in each sector and each geographical area and measure how this progress compares with the needs assessment. The difference between available funding and financing needs can be used to highlight possible funding imbalances in each sector and area, that is, instances of over- or underfunding. (iii) Reconstruction aid comes from multiple sources including the central government, donors, and NGOs. A system capable of tracking aid flows of both on- and off-budget funding to multiple-level players is necessary to avoid double counting.

Tracking reconstruction finance data consists of three basic steps. These three steps are categorized into data-in, data management, and data-out (Figure 1). This categorization can help to sharpen the focus on technical issues when a financial tracking system is set up.

- *Data-in.* Data collection, raw data type (standarized questionnaire/template), quality controls, data entry (manual, Web-based data entry).

- *Data management.* Ownership and operation of the system, specifications of the software (common international platform or customized local/international provider solution), staffing.

- *Data-out.* Standardized data and frequency of reporting, selection of indicators, spatial/administrative disaggregation, flexibility of users to customize Web-based reports, access to Web-based information (including passwords for the general public or system partners).

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2   For a review of reconstruction PFM compared with regular budget processes, see Fengler, Ihsan, and Kaiser (2007).

Figure 1   Data and Information Process

Data-in	**Data management**	**Data-out**
Collection and input of data	*Administration and operation*	*Report and dissemination*
Key considerations:	**Key considerations:**	**Key considerations:**
Who collects and enters the data?	Who owns and operates the system?	What types of standardized reports are provided?
How do the raw data look?	What are the characteristics of the software?	What types of information are given in the report?
Who conducts the quality control?	How are the data categorized?	Can user customize own report on the Web?
How are the data entered?	How is staffing associated with the system?	How accessible is the Web report?

It is crucial that the first step in this data process (data collection and input) be set up in the first few weeks after a disaster to avoid losing any important information. In this period, informal information on donor and country pledges normally starts to appear. Generally, a formal donor conference is held after a disaster to gather information on the types of donor commitments and their level of support. Further data collection from institutions other than donor countries (i.e., NGOs) can be done within a time frame of one to two months. Once the financial tracking system—with its relevant instruments, such as project concept note and questionnaire, as well as coordination with donors and NGOs—becomes more established, the regular data process will consume less time and the output can be produced within two to four weeks.

Generally, data management is conducted by government agencies. Among the benefits of having data managed by the government are the following: (i) having the capacity to oblige donors and NGOs to provide financial data, as well as being able to provide rewards and sanctions for those that do and those that do not provide data; (ii) having the capacity to map and link the data with the overall framework of government policy on budget allocation or to the overall government management information system when available; and (iii) having access to the information on the progress of project approvals. The latter is especially important during the data analysis process.[3] However, there are concerns about the limited government resources available to manage databases. Lack of staff availability and low capacity to develop a methodology and other relevant instru-

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3   Data processing and cleaning should take into account only those projects that have been approved by the government.

ments, all of which are necessary for analyzing the data, are major concerns that can arise when the system is set up in an emergency situation with inadequate time for preparation and planning.

III. PERFORMANCE OF EXISTING DATABASE AND TRACKING SYSTEMS

Several tracking systems have been developed recently because the types and scale of aid have become more varied and significant. Tracking systems are needed not only by countries affected by disaster and conflict, but also by countries that receive aid to support their economic, social, and political development. To accommodate the needs of each aid-recipient country, systems have been designed in a variety of formats ranging from simple MS Excel formats to sophisticated software applications. Although this note focuses on reconstruction financing, systems that track financial aid in general and that can potentially be used in tracking reconstruction financing are also discussed.[4]

This note will specifically examine five financial tracking systems. The Development Assistance Database is the most prominent and widely used in reconstruction settings. In addition to the Development Assistance Database (DAD), this note reviews the Aid Management Information System (AMIS), the Aid Management Platform (AMP), the Cambodian Disbursement System, and the Bulgarian DCIS (Table 2).

Development Assistance Database [5]

The DAD is a Web-based aid management system that has recently been applied in countries under reconstruction following natural disasters and conflict. Currently, the DAD has been implemented in more than 15 countries, including four tsunami-affected countries and two conflict-affected countries. As a Web-based system, the DAD has an advantage in providing accountability and transparency to the public. The system works to collect, track, and monitor the aid given in recovery and reconstruction projects. Apart from tracking donor assistance, the DAD can be used to track financial flows and project progress, if requested by the host country. The system can also be adapted to track finacial flows and reconstruction progress down to the lowest subnational government level.

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4   See Gabriel Accascina (2004) and (2006) for an overview of aid information systems.
5   Information on DAD specifications is available on the Synergy website (www.synisys.com), which also provides links to DAD country websites.

Table 2   Types of Tracking Systems and Country Application

Monitoring System	Countries	Main Focus
Development Assistance Database (DAD)	Indonesia, Thailand, Sri Lanka, the Maldives, Pakistan, Afghanistan, Vietnam, Iraq, Lebanon	Reconstruction; general aid managment possible (see Vietnam)
Aid Management Platform (AMP)	Ethiopia, Bolivia	Aid management and coordination
Aid Management Information System (AMIS)	Fiji, Syria, Egypt	General aid projects
Council of Development of Cambodia (CDC) Official Development Assistance (ODA) Disbursement System	Cambodia	ODA disbursement
Bulgarian Development Cooperation Information System (DCIS)	Bulgaria	General aid projects

Note: See Annex 2 for a full summary of monitoring systems and their features. Country and information systems are not limited to the cases above. Other countries have developed their own database systems to track aid, such as in India (Tamil Nadu Province) and Tanzania. However, research in this study focuses only on some of the database systems because several databases could not be reviewed online.

Experience in implementing the DAD has been mixed. In Aceh and Nias the DAD system has run into a multitude of problems and has rarely been able to deliver credible data and analyis (Fengler and Ihsan 2006). Many development partners have become discouraged with the system and disengaged from it, further reducing the effectiveness of the DAD. In Sri Lanka, data reliability is a major concern. That has led to a stock-taking exercise to identify the quality of data coming from each agency and reveal which agencies were failing to update their data. Vietnam has benefited from the experience of others, learning from the post-tsunami DAD lessons and allowing itself more time to prepare its system. Consequently, the Vietnamese DAD was supported by a comprehensive information manual and a clear statement of the methodology. The Vietnamese DAD also enables users to conduct a time-series analysis by providing historical ODA data in the database.

The DAD offers a sophisticated IT application that allows users to filter, group, and sort various indicators. It has an on-demand query and searching capability. The system provides users with a wide range of analytical functions, including querying, reporting, charts, and geographic information system (GIS) functions. It operates under Microsoft's Structured Query Language (SQL) application and uses an "Intelligent Data Manager knowledge builder" for database modifications.

Box 1   Country Experiences with the DAD[6]

Indonesia

The Indonesian DAD is known as the Recovery Aceh-Nias (RAN) database. The system took about three months to prepare and is currently managed by 13 people, who are divided into outreach and data-entry teams. Training was given to the database team before the system was implemented. However, further onsite training for management, as well as for major partners, was deemed necessary because of the complexity of the data and the system. As it is a self-entry system, the data quality and validity are major concerns as a result of insufficient quality control. An attempt was made to sanction partners by not granting visas to enter Aceh for those not updating their data, but even this has failed to resolve the problem.

The RAN database is equipped with reporting tools based on the MS Access application, but is accessible only on the government intranet. The database does not have an online archive folder to conduct a time-series analysis. Users must save their own data for each time period to conduct a time-series analysis. At the request of the Aceh-Nias Rehabilitaiton and Reconstruction Agency (BRR), the RAN data are classified into sectors following BRR's organization structure. A methodology for cleaning and processing data, including funding-gap data, is still lacking. A clear link to a user manual and a definition of terms (glossary) are also not provided.

Sri Lanka

The Sri Lankan DAD was launched September 2005 and is currently managed and maintained by the Sri Lanka Reconstruction and Development Agency (RADA). Daily database management is operated by a team of six. The Sri Lankan DAD through the RADA website provides a package of information consisting of a user manual and a glossary of main terms. Further training for those appointed by each partner to input data on how to work with the database is also provided. On the reporting side, the database team has been able to provide monthly predefined reports that are distributed electronically to partners. A housing module report has also been developed. The DAD report series is accessible to the public in the form of MS Access. An enhanced version of reporting in the RADA website enables users to have better access to information and reports.

In addition to regular DAD reports, the Sri Lankan DAD gives regular technical updates that provide information on updated data, the quality of data, and the name of agencies that update/do not update data. By disclosing this type of information to the public, RADA encourages those agencies that are not reporting their data to start doing so.

Vietnam

The Vietnamese DAD is managed and implemented under the Foreign Economic Department (FRED) by 6 full-time and 2 part-time staff. Unlike the DADs of the tsunami countries, the Vietnam DAD is adapted to track official development assistance (ODA) flows. Although in better shape than the Aceh and Sri Lankan DADs, the Vietnamese DAD still faces some challenges relating to data processing, quality control, and technical functions, such as the data-entry system, Internet connection, and maintenance of the system.

A user manual, methodology, and glossary complement the database. The Vietnamese DAD provides a link to Vietnam's development goals and incorporates historical ODA data that allow users to conduct a time-series analysis. In addition, a help desk is available to provide training and assistance and to incorporate feedback and input from the partners. The Vietnamese DAD printed a report twice yearly for the mid-CG and full-CG meetings. The report has been updated regularly on the DAD website; the latest pre-prepared report available on the MIP website is dated June 2007.

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6   Exercise based on website examination, desk review, as well as interviews. For specific country information, see http://rand.brr.go.id/RAND, http://dad.rada.gov.lk/dad/, http://www.rada.gov.lk/portal/, http://dad.mpi.gov.vn/dad/. Helena Kekki (helena.kekki@undp.org) of UNDP Vietnam also provided important inputs.

Table 3 Advantages and Disadvantages of DAD Based on Countries' Reviews: Summary Assessment

Advantages	Disadvantages
Transparency. Web-based system, accessible to all users.	*Complex* design, layout, and system programming.
Detail. Data can be broken down for multiple-level players and indicators.	*Lack of methodology.* Manuals, definitions, and terminology often not disseminated.
Adaptable for on- and off-line data entry.	*Inflexible* program modification for local clients. Developed using proprietary system.
Multiple-user functions, including generating tables, charts, and maps (GIS).	*Poor speed performance* compared with alternative tracking systems.

The DAD is a comprehensive system with the ability to track multiple-level players and indicators. Although it allows users to generate reports from the collected data, it does not provide a user-friendly format to enable users to link data. This is pertinent particularly because the system captures a large amount of information and users are often unable to generate reports according to their needs. A clear methodology of how the data are collected and processed is not provided by the system's management. The system is also inferior to some other monitoring systems in regard to speed of performance (Table 3).

Aid Management Platform [7]

The AMP is a Web-based, information-sharing tool that is designed to improve the aid management and reporting capabilities of developing countries. It was implemented for the first time in May 2005 to assist the government of the Federal Democratic Republic of Ethiopia to better allocate and coordinate aid. The system was launched by, and is located in, the government's Ministry of Finance and Economic Development. However, the information is not yet fully available to the public.

The functionality of the AMP is similar to that of the DAD, whereby it tracks aid at the project level and allows analysis by sector, donor, currency, and year. The AMP provides a simple mode for users to filter, sort, and generate reports from the available data. It enables users to track the

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7 Information on the AMP and a system demonstration are available on http://amp.developmentgateway.org and http://amp-demo.devgateway.org. Inputs have also been provided by Nancy Choi (nchoi@dgfoundation.org) from the Development Gateway Foundation.

Table 4   Advantages and Disadvantages of AMP Based on Countries' Reviews: Summary Assessment

Advantages	Disadvantages
Good speed performance. Web pages can be downloaded as fast as other websites (based on the application demo).	*Limited* in providing information and analysis for multiple-level player.
Integrated: Data are directly linked to the financial planning and national budget process. Integration of monitoring and evaluation in the information system.	*Unavailability* of terminology, manual, and technical descriptions. The package cannot be found on the website.
User-friendly design, layout, software/program, and report construction.	*No predefined reports* available, making regular reporting time consuming.

progress of specific indicators and projects and to associate a level of risk to each indicator through its monitoring and evaluation dashboard. The system monitors all externally funded (i.e., off-budget) government projects, allowing them to be analyzed and then factored into national budget planning. In Ethiopia, the system provides a budget integration module that enables the AMP and the government's public financial management system to integrate official development assistance (ODA) data into the government's budget planning and execution process.

The AMP provides greater opportunities and flexibility for clients to customize the system. It is developed using open-source applications and Java-based tools. Clients can modify the layout, structure, and the overall program to suit their technical capacity. Technical support and capacity building are also provided by the system developer as part of the suite of integral AMP components.

Aid Management Information System [8]

The AMIS is intended to collect information on aid projects from donors and recipients and gather and provide information on grants and aid-in-kind. It was first implemented by Fiji in 1996 to strengthen the capacity of the Fiji government to manage and coordinate external assistance. The system is located and hosted on the government intranet. Access to the information is provided to authorized partners only and is not accessible to the general public. Other than by Fiji, AMIS has also been used by the governments of Syria and Egypt. The database collects donor and recipient financial information by sector and subsector.

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8   Information on the AMIS is available at http://www.devaid.org/index.cfm?module=ActiveWeb&page=w&s=AMIS.

Table 5   Advantages and Disadvantages of AMIS Based on Countries' Reviews: Summary Assessment

Advantages	Disadvantages
Simple technical function and facilities.	*Limited functions;* it does not allow multiple-level players or indicators.
Provides government accountability and support; the monitored aid is related to the line ministries project proposal.	*Incomplete and unclear* methodology.
Cost-effective; the system is locally developed.	*Lacks time-series and funding gap data.* Funding needs versus available funding as well as trend data could not be found on the website.
Availability of predefined reports. Reports are distributed to stakeholder and interested parties.	

The Fiji AMIS was developed at a time when the number of Web-based monitoring systems was still limited. The system was built locally and uses MS Access as its application. It supports user queries through Microsoft's SQL, uses Microsoft TCP/IP as the network protocol, and adopts Microsoft's NT server as the server operating system. A package consisting of a user manual and related documents was provided for users, and training sessions were conducted to familiarize government staff with the system.

The AMIS is designed to be a simple monitoring system. In Fiji, to ensure the integrity and consistency of data, the management allows only selected units to enter and update the data. Data entry is designed to be an ongoing process, and a graduate trainee has been trained to take full responsibility of data entry.

Council for the Development of Cambodia ODA Disbursement System [9]

The royal government of Cambodia developed its own ODA disbursement monitoring system in 2005. The system is Web-based and replaced the previous Data Coordination Analysis System developed by the UNDP. The ODA disbursement system was designed and developed by a team of Cambodian IT experts and is located and maintained by the CDC. It is accessible to the general public, promoting government accountability.

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9   Information on the Council for the Development of Cambodia can be found at http://cdc.khmer.biz/.

Table 6   Advantages and Disadvantages of CDC Based on Countries' Reviews: Summary Assessment

Advantages	**Disadvantages**
Detail. Data can be broken down for multiple-level players, although information is limited.	*Rather complex query pages.* There is duplication of function between query and reporting pages.
Cost-effective. It is locally developed and promotes the competency of local technical exertise.	*Lack of concise reports.* It does not provide a brief summary of overall donor commitments and disbursements.
Speed performance. Downloading time is fast.	
Complete manual and methodology package.	*No funding gap data* by sector and location.

The system collects data on ODA flows and provides project-level information on commitments and disbursements by funding agency and year and can be further down broken into sector and geographical allocations. The data are displayed on the website based on the latest commitment and disbursement data reported by each development partner. At first, the CDC requested partners simply to verify and update the data in hard-copy form, before entering the data itself. Now, the CDC requests partners to input their data directly onto the website. The system has been used to provide official development reports and now offers greater flexibility following system enhancements.

The system has been locally developed and performs in a way similar to a standard Web page. The system allows users to generate and submit queries in the website. It also provides complete and clear information on the website on how to use the database, what the data represent, and how they have been categorized. The Cambodian government has stated that it will make the software available free of charge to other developing countries that plan to develop Web-based ODA monitoring systems.

Bulgarian Development Cooperation Information System [10]

The DCIS was developed by the Council of Ministers of Bulgaria to collect and coordinate information on all assistance provided to Bulgaria. The data are broken down into project level, from all

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10 Information on the DCIS can be found at http://www.devco.government.bg/LANGen/public/portal/index.php/.

Table 7   Advantages and Disadvantages of DCIS Based on Countries' Reviews: Summary Assessment

Advantages	**Disadvantages**
Detail. Data can be tracked into municipal level by sector and subsector.	*Limited analysis of multiple level players.* Given multiple source of funding, there is a risk of double counting.
Good speed performance. Fast downloading time.	*Lack of regular and concise reports.*
Complete package of manual, terminology, acronyms, and useful links.	*Lack of options to transfer data* into Excel or Access and also to create charts.
Enabling time series analysis. Historical data are available.	*Lack of funding gap data* by sector and location.
Flexible database modification. Developed using open-source application	

sources (central government budget, bilateral and multilateral donor, and NGOs). The DCIS supports the Bulgarian government's efforts to synchronize aid with government priorities in development programs. It also promotes the government's commitment to transparency and accountability by adopting an Internet Web-portal that can be accessed by the general public. Open-source technology was used to develop the database, which allows for cross-references on various given variables and parameters.

The system seems to be very comprehensive, but it does not overwhelm users with too many features. Although the front page looks like a general ministerial website, further exploration shows extensive information on financial assistance. Information on financed projects is provided at the national, district, and municipal levels from 1984 to the present. Projects are classified into sectors and subsectors according to the OECD sector classification. The system enables users to obtain information on development partners' profiles, and it provides these partners' strategic documents. Users are also provided with useful links and a complete list of terminology, acronyms, and sector descriptions to guide them through the website.

IV. CHALLENGES AND REQUIREMENTS OF TRACKING SYSTEMS

Although the systems have been carefully designed, some common problems need to be addressed by developers, host countries, and database teams during the setup and implementation stage of the system. Addressing methodological, technical, and reporting problems are among the key challenges for effective monitoring systems. These are described below:

Methodology [11]

Most tracking systems do not employ a standard methodology, which contributes toward unreliable data. The methodology is particularly important for analyzing data and translating them into program- and policy-planning outputs. Only a few tracking websites provide information on methodology that clearly explains the data selection rationale and the purpose of the selection categories. To ensure that there is no ambiguity when tracking data are entered and used, a clear methodology is vital. The host country managing the database is responsible for developing the methodology, and the system developer is responsible for adapting and incorporating that methodology into the system. Seven critical issues need to be considered when a methodology is developed:

Sector classification. Tracking systems should provide users with a clear description of how sectors are classified. Some tracking systems classify sectors based on the OECD DAC sector classification; others classify sectors based on the agency's organizing structure in the country in which the system is installed (for example, the line ministry). This latter option creates a risk should the agency restructure its departments, because the sector classifications could also change. That could result in inconsistent sector classifications in the database. Mapping sectors with the established financial database system can also be done if the country sets up the system before any disasters. By classifying and mapping the sector with the existing national database system, a consistent analysis and report can be achieved, and integrated decision making and policy making related to sectoral allocation of on- and off-budget flows can be undertaken.

Separation of data. In the case of postdisaster and postconflict environments in which a country receives emergency or relief assistance, a separation between emergency assistance (short term) and reconstruction assistance (medium to long term) is needed. Although the separation of data is not provided directly in some systems, it is generally possible to separate data manually outside the database system. However, when the database consists of a large number of projects, the manual separating of emergency and reconstruction data can be very time consuming.

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11 For a complete methodology review on tracking reconstruction financing, see Fengler 2007.

Multiple-sector projects. Most systems do not provide users with an explanation of how projects covering multiple sectors are treated. In cases in which a country does not allow multiple-sector projects, that is not an issue. However, if there are no regulations or guidelines on such matters, then an over/underestimation of aid allocated to individual sectors can occur.

Double counting. A system that records data from numerous projects and from various and multiple levels of players is vulnerable to double counting. The potential for double counting funds exists when projects are not implemented solely by the managing government agency or solely by donors (i.e., when both the funding and managing agencies input data).

Funding-gap assessment. Identification of funding gaps in sectoral and geographical categories is important to identify shortfalls in funding allocations based on reconstruction needs. A funding-gap analysis can provide guidance for stakeholders in allocating and channeling assistance more effectively. However, funding-gap analyses are not always available or provided in the tracking websites. In postdisaster or postconflict environments, a funding-gap analysis can be generated by matching sector data from the needs assessment with sector allocations in the database. This approach requires equivalent sector classifications between the needs assessment and the database.

Trend analysis. Effective databases in general have data archives. However, some of the tracking databases lack archived data. The reason is that when some tracking databases are backed up, the result is that all the old data are replaced with the new data. As a result, these systems cannot provide time-series comparisons and analyses, requiring users to periodically save their own data to undertake such analyses.

Auditability. The absence of archive data makes auditing difficult and requires the use of date stamping. Date stamping data updates enables users to understand how current the displayed data are. That helps to increase the transparency of the system, allowing for greater accountability. Recording the date of the latest data update also helps database management when the accuracy of the data is followed up and confirmed with partners.

IT Performance

The database system needs to be compatible with the existing IT infrastructure. The hardware and software application, Internet connectivity, and the technical capacity of the human resources all need to be assessed before designing and implementing a tracking system. Field testing would help the system developer and host country team in assessing and addressing any deficiencies in the system before it becomes operational. Some factors that contribute to the overall performance of the IT infrastructure include speed, data entry, and training:

- *Speed.* One of the technical concerns that can be quickly recognized is the speed of responsiveness of the system over the Internet. Although most of the systems perform well, some are significantly slower than others. For example, it takes 30 to 60 seconds for the DAD system to download data.

- *Data entry.* Systems that require partners to self-input data have a higher risk of containing unreliable data than systems that appoint a specific unit for data entry. The problem arises particularly when partners fail to enter data. In addition, self-input data, particularly with online data-entry systems, require an Internet access, which is not always available in the postdisaster or postconflict regions. A proactive data-gathering approach and strict management quality control are important in ensuring the integrity and consistency of data under the self-entry approach.

- *Training.* Appropriate IT training for the local system team is critical before system implementation. That is important particularly if the application requires specific technical knowledge relating to nonstandard technology. Most tracking systems are backed up with continual IT support. However, a complete package of IT support for database management and data entry and for main partners in general is rarely available. In addition, many countries adopting tracking systems have limited capacity in sophisticated IT applications.

Reporting

The compiled data will be of use only if they are reported back to the relevant stakeholders. The reported data need to be adapted to cover the various needs of the different types of stakeholders in a clear and user-friendly way. The database system should also provide stakeholders with reporting tools to support the dissemination process. Most systems and databases are equipped with the capacity to generate reports. Nevertheless, because each system has its own reporting tools, some additional instruments help to deliver a clearer message, including system interface and users' manual, definition of terms, and ready-to-use reports:

- *System interface and users' manual.* The uniqueness of tracking systems necessitates the writing and dissemination of system-user guides for those entering, analyzing, and reporting on data, including those appointed by partners to input data (if it is a self-input system). Often manuals are unavailable or difficult to obtain; for example, they may be located on different Web pages without corresponding link.

- *Definition of terms (glossary).* Tracking systems should provide users with a clear definition of terms and indicators used in the database, such as "committed," "disbursed," "total cost

request," and "expended." The existence of such a glossary ensures that users are not misled when interpreting and analyzing data. One simple example of how a term can be misinterpreted is with "disbursement." A disbursement can be defined as (i) disbursing funds to projects, (ii) disbursing to implementing partners, or (iii) disbursing from a donor's accounting department to the donor's project unit internally, without the funds being disbursed to the implementing partner. Clearly defined terms are therefore essential in ensuring reliable and consistent data.

- ◼ *Ready-to-use reports.* Although most systems allow users to generate their own reports, a predefined set of reports that summarizes all data in a concise and straightforward manner would help policy makers plan their activities and programs. Predefined reports that provide clear summaries of all projects and programs by sector, location, and type of donor would support an efficient and effective budget-allocation process. Regular distribution of concise reports would be useful for host governments, and it would also help other contributors map and plan their activities.

V. CONCLUSIONS

Reconstruction financing has emerged as an important discipline in recent years, particularly after the 2004 tsunami. However, the implementation of financing tracking systems has been mixed, partly because many database systems have focused too much on IT and too little on user-friendly analysis and effective dissemination. There are six broader lessons that can be drawn from the experiences described in this note.

Data-In

First, strict quality control and a proactive data-gathering approach are vital in ensuring the sustainability of the database system. Failure to manage quality control during the data-cleaning process can seriously jeopardize data quality and, in turn, the subsequent analysis. Quality can be maintained best by establishing a close working relationship between the database team and the donors/NGOs during the process of collecting, updating, and verifying data and discussing any issues and problems related to data.

Second, a financial tracking system works best if donors/NGOs are obliged to submit all their project details. Establishing a system in which such an obligation exists can help to support the process of data collection and input. One way of achieving this can be through a policy whereby donors and NGOs are required to submit their project concept notes to the government. These project

concept notes should then include all the funding information for the project. In that way integrated initial information on funding commitments and allocations from all sources can be collected.

Data Management

Third, the database system should be kept simple. Highly sophisticated systems have often failed, particularly in poorer countries with weak infrastructure. It is necessary to focus on the specific objectives of the database system when collecting data and avoid being overambitious by trying to capture all the available information. Being selective in precisely which data can feasibly be used in the database helps to maintain data quality.

Fourth, altough informational technology can help, ultimately, people need to track the money. A dedicated labor-intensive team responsible for collecting, updating, and analyzing the data is more effective in scrutinizing the data and minimizing errors (e.g., double counting) than a self-input data mechanism. Cleaned data can then be stored and displayed for the general public and stakeholders by using a variety of database systems ranging from a simple MS Windows Access database format to more developed database technologies that allow for the creation of tables and charts.

Data-Out

Fifth, aggregate, analyze, and communicate. Links between data collection, analysis, and reporting need to be established. Good data alone are insufficient because the database requires the participation of stakeholders to update and validate them. Through this interaction, real information in the field can be verified and further processed, analyzed, and improved. Finally, the analysis results need to be packaged and communicated in a simple, yet comprehensive manner. Dissemination of the information through clear charts and tables can simplify delivery and improve stakeholders' understanding of the findings.

Sixth, solid reporting can play a crucial role in decision making. Providing an accurate picture of projects and their performance can have a major impact on the planning and budgeting processes of the government, donors, and NGOs. Reports based on reliable data can become the basis for reconstruction players to allocate funds most effectively. Clear mapping of sectoral and geographical funding can provide information on where additional projects may be needed, while also avoiding project duplication. Having reports that identify top players/projects and show the highest allocation of funds by sectors and players is a highly effective fund-mapping tool. One such example can be seen in Aceh; a list of the top players showed that 85 percent of funding came from the top 10 of more than 200 players involved in the Aceh reconstruction process.

ANNEX 1 FEATURES OF EXISTING DATABASE AND MONITORING SYSTEMS[12]

Monitoring System	Adopting Countries	Developer	Cost	User Manual	Methodology
Development Assistance Database (DAD)	Indonesia, Thailand, Sri Lanka, the Maldives, Pakistan, Afghanistan, Vietnam, Iraq, Lebanon, etc.	Synergy International System	US$200,000–US$500,000 (depending on customization and capacity-building needs)	Available but sometimes difficult to find.	Partly available: definition of main terminology is available in some countries.
Aid Management Platform (AMP)	Ethiopia, Bolivia	Development Gateway	US$250,000 (depending on customization and capacity-building needs)	Stated as available, but the user manual document cannot be found on the website.	Somewhat available: it provides standardized terminology and classification across govern-ment and donors. However, further details cannot be found.
Aid Management Information System (AMIS)	Fiji, Syria, Egypt	Governments of Fiji, Syria, and Egypt and UNDP.	US$15,000	Available	Somewhat available: explanation on a few main termi-nologies provided
Cambodian Aid Management System	Cambodia	Government of Cambodian IT experts		Available	Available
Bulgaria Development Cooperation Information System (DCIS)	Bulgaria	Government of Bulgaria and UNDP	US$20,000	Not available	Not available

12 This compilation is based on the review of websites and database teams.

Technical Support and System Applications	Strengths	Weaknesses
• IDM Knowledge Builder • Technical support: available • Training: available (but unclear who is eligible to receive training)	• *Transparency.* Web-based system, accessible to all users. • *Detail.* Data can be broken down for multiple-level players and indicators. • *Adaptable* for on- and off-line data entry. • *Multiple-user functions*, including generating tables, charts, and maps (GIS).	• *Complex* design, layout, and system programming. • *Lack of methodology.* Manuals, definitions, and terminology often not disseminated. • *Inflexible* program modification for local clients. Developed using proprietary system. • *Relatively slow* Internet speed performance.
• Open source using Java application • Technical support available based on the agreement • Training available to user, database administrator, and system administrator	• *Good speed performance.* Web pages can be downloaded as fast as other websites (based on the application demo). • *Integrated:* Data are directed to link with the financial planning and national budget process. Integration of monitoring and evaluation component in the system. • *User-friendly* design, layout, software/ program, and report construction.	• *Limited* in providing information and analysis for multiple-level player. • *Unavailability* of terminology, manual, and technical descriptions. The package cannot be found on the website. • *No predefined reports* available, making regular reporting time consuming.
• Microsoft ODBC • Technical support available • Training available to users and data-entry staff ∑	• *Simple* technical function and facilities. • *Provides government accountability and support*; the monitored aid is related to the line ministries project proposal. • *Cost-effective*; the system is locally developed. • *Availability of predefined reports.* Reports are distributed to stakeholder and interested parties.	• *Limited functions;* it does not allow multiple-level players or indicators. • *Incomplete and unclear* methodology. • *Lacks time-series and funding gap data.* Funding needs versus available funding as well as trend data could not be found on the website.
∑ ∑ ∑ ∑	• Detail. Data can be broken down for multiple-level players, although information is limited. • Cost-effective. It is locally developed and promotes the competency of local technical exertise. • Speed performance. Downloading time is fast. • Complete manual and methodology package.	• Rather complex query pages. There is duplication of function between query and reporting pages. • Lack of concise reports. It does not provide a brief summary of overall donor commitments and disbursements. • No funding gap data by sector and location.
• Open source • Technical support available • Training available to data entry staff and database management team. ∑ ∑	• *Detail.* Data can be tracked into municipal level by sector and subsector. • *Good speed performance.* Fast downloading time. • *Complete package* of manual, terminology, acronyms, and useful links. • *Enabling time series analysis.* Historical data are available. • *Flexible* database modification. Developed using open-source application	• *Limited analysis of multiple level players.* Given multiple source of funding, there is a risk of double counting. • *Lack of regular and concise reports.* • *Lack of options to transfer data* into Excel or Access and also to create charts. • *Lack of funding gap data* by sector and location.

ANNEX 2 COUNTRY COMPARISON IN RECONSTRUCTION FINANCE TRACKING[13]

Country	Technical Support
Indonesia	Training is given to data administrator. On-the-job training for outreach team is also given. A wider coverage of training still needs to be given for government officials, data focal points from each organization, and main users in general.
Sri Lanka	Training is given to administrators, as well as to agencies' data focal point staff.
Maldives	Training for civil servants or selected government officials who are most closely involved with DAD implementation will be given in 2007. This is given to ensure sustainability of the system, particularly because the support of the system has been dependent on international consultants.
Thailand	Intensive training and mentoring have been given to staff in the Thailand International Development Cooperation Agency (TICA). The government ownership of the system has been indicated by a formal handing over of all DAD-related equipment to the Thai government in 2006. Apart from tsunami-related aid, DAD Thailand will be continuously used to monitor international donor support in the future. Training is also organized by TICA and UNDP for agencies' focal point staff. Additional assistance is provided on aid management and coordination supported by UNDP.

13 Information on the latest progress information of DAD implementation in tsunami-affected countries is obtained from ADB technical assistance consultant's report prepared by Aidan Cox (2006). Inputs on some countries' DAD has also been provided by Alison Rose (alison.rose@undp.org).

Methodology	Reporting
The management team does not provide an explanation of methodology adopted in processing and collecting the data. A funding gap analysis is also not available, while information on damage and loss assessments as well as master plan information is only available outside the database. On-budget data are currently not available in the tracking system.	Reporting tool has been developed and available. However, access still limited to government. A concise and simple report to summarize the ongoing activities is not available. Definitions of terminology and a user manual are not available on the RAND website or the BRR website, although it is available elsewhere.
The management team provides a brief explanation on how to avoid double counting. However, explanations on sector classification, and multi-sector projects classification are not available, while funding gap analysis is available but the content is empty.	Reporting tool and housing module have been developed and are accessible to public. Reports developed with this tool have been posted on the RADA website, making it easier and faster for users to access the report. A CD-ROM is also provided for off-line distribution. A regular technical update report is also provided by the management team to identify the data that have been updated, the quality of data (data quality score card system), agencies that have updated their data, and agencies that have not provided or updated any data. Manual for data entry and a definition of terminology used in the database are available in the RADA government website.
No description on methodology is provided. However, funding gap data are made available by the management team within the DAD website. On-budget aid information is not available in DAD website. However, discussion is currently ongoing on how to adapt it within the DAD.	A web portal to post the pre-prepared report has been planned but still has limitations on the IT side. Hard copy reports are available for distribution on request. At the moment, pre-prepared reports on the website have not been updated (August 2005). User manual and terminology are not available within DAD website and government website, but are available elsewhere. DAD Maldives has been linked with TRIAMS project, which monitors the project output progress.
A brief explanation on double counting is provided in one package, together with definitions of terminology and guidance on how to use the DAD. Sector classification, multisector projects, and funding gap data still cannot be found on the DAD or government website.	DAD reports are available on the government (TICA) website. DAD Thailand is established mainly to ensure transparency of donor assistance, which is only 10 percent of the overall reconstruction fund. Government reports are also available on the TICA website because the government supports 90 percent of reconstruction funding in Thailand.

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