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Available Data on Disaster Related Transport & Logistics in Ethiopia

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Introduction

The purpose of this report is to detail findings of a recent UNDP-EUE evaluation of the existing information systems in Ethiopia pertinent to transport and logistics in times of disaster. The primary purpose of this evaluation is to assist the MATTF Working Group on Transport and Logistics to develop a 'Transport and Logistics Master Plan':- a part of the Disaster Prevention and Preparedness Commission (DPPC) of Ethiopia's implementation of the National Policy for Disaster Prevention and Management (NPDPM).

To carry out this evaluation visits to relevant government, UN and NGO offices were made to expand on UNDP-EUE's background knowledge related to transport and logistics. The visits were used to assess the present status of various information systems and databases with regard to content, operation, usefulness and accessibility. Leading from these visits, this report attempts to identify gaps and necessary improvements required to ensure that all information requirements for disaster prevention and preparedness related to transport and logistics are accurate, up to date and easy to access by operational organisations in emergency scenarios.

This report details existing information systems and recommendations for changes under the following topic headings:

- Geographical and climatic data,
- Geographic vulnerability,
- Population data,
- Roads, bridges and infrastructure,
- Road vehicle fleets,
- Other transport fleets,
- Ports,
- Storage facilities,
- Communication facilities,
- NGO operations,
- Fuel depots.

Each topic includes details on background, concerned organisations, information systems and information flow. The latter's importance has to be stressed as the primary data collector is not always the organisation that requires the information in order to make informed decisions in times of emergency.

This report includes numerous organisation and technical acronyms, a list detailing these terms is included as an appendix to this document.

Geographical and Climatic Data

Geographic information regarding Ethiopia is not directly relevant to this study except for the purposes of locating road transport routes and strategic points such as bridges, airstrips, warehouses, etc. Information systems related to these topics are discussed in later sections of this report.

Primary geographic data is collected and stored by the EMA, Ministry of Water Resource's river basin master plan projects (Omo-Ghibe, Baro- Akobo, Tekezze, Blue Nile) and the Ministry of Agriculture's Woody Biomass project. At present EMA have printed maps that cover the whole country at 1:250,000 scale and about 25% of the country at 1:50,000 scale as well as many specialised maps of various scales and purposes. EMA does have a digitizing capacity but at present does not release digital map data. The river basins and the Woody Biomass projects are actively engaged in digitizing geographic data for a large proportion of the country; information regarding flood zones (location, time during year, population\ roads affected) is of obvious use.

The major source of climatic data is the NMSA that has received daily digital satellite data from METEOSAT and NOAA satellites since 1991. Coupled with rain gauge data around the country NMSA release a report every 10 days detailing vegetation maps, estimated rainfall maps that compare to expected rainfall patterns and a written assessment of vegetation and rainfall conditions. This report is distributed to concerned NGO's, government authorities and international agencies and adequately covers the dissemination of timely climatic data for disaster planning. The USAID FEWS project also receives regular US satellite data which is forwarded to the Early Warning departemnt of the DPPC. The research division of DPPC Planning and Policy Dept. have been investigating flood zones and collecting survey data from known areas detailing historic instances of floods and the damage caused. It is planned to enter this information into a simple database\ spreadsheet.

EMA are currently constructing a new 'GIS' building and hope to start using more computer based cartographic techniques. There is a proposal linked to the Prime Minister's Office to try and integrate all river basin project data, appears to have been on hold for a long time. Requests for data from the Ministry of Water tends to be a laborious process.

Recommendations

There is a general need to integrate existing paper and digital map data for Ethiopia from the sources listed above, but this is of little relevance to this report. DPPC and other major relief organisations should keep copies of the 1:50,000 and 1:250,000 EMA maps of Ethiopia for emergency planning purposes.

The DPPC flood zone data should be checked and augmented from the River Basin projects that have much more detailed information. Accurate maps displaying the extent of known seasonal flood zones should be prepared by the river basin projects for DPPC use and related information concerning times, severity, populations affected, etc. entered into a simple database at the ITC of DPPC.

A capacity to analyse geographic data using a GIS located at the ITC of DPPC would also be advantageous to allow transfer of digital mapping data from other organisations.

Geographic Vulnerability

Organisations involved in assessing geographical areas vulnerable to disasters (risk mapping) include the Early Warning Dept. of DPPC, WFP, FAO, EU, USAID FEWS, and NGO's such as SCF and CARE. A loose 'umbrella' group comprised of these and other interested organisations meets under the title of the Needs Assessment Steering Committee (NASC). Tasks being undertaken by NASC include the standardisation of methodologies and indicators and the collation of a list of useful data sources. Little of this type of information is of direct relevance to transport and logistics concerns; instead it is the output of such research in predicting shortages and projecting needs that has to be speedily passed on to decision makers concerned with transport and logistics. As the organisations involved in

vulnerability assessment are also the primary organisations in distribution, there seems little need in establishing any formal external data flow.

The NASC group has been revitalised to become the Early Warning Working Group (EWWG) under the chair of the Early Warning Department of the DPPC. It continues to follow the same objectives as the NASC. WFP Vulnerability Assessment & Mapping (VAM) unit have produced zonal agro-elevation maps of much of the country. VAM in conjunction with UNDP-EUE have done some exploratory work to identify areas of the country with difficult access to major settlements \ markets. The Policy Planning department of DPPC are starting to use GIS to identify historically vulnerable areas.

Population Data

A knowledge of the country's population distribution and composition is of obvious importance in logistics planning. At present the most accurate available population statistics exist in the form of the CSA 1984 census; the changes over the last 12 years however make these figures extremely unreliable - even if extrapolation techniques are used. The 1994 census was carried out around 18 months ago and the results are thought to be accurate for all areas except regions Two (Afar) and Five (Somali). The 1994 census data has just been partially released for regions 1, 3, 4, and 14 by the Electoral Commission; a decision on the other regions is expected soon. CSA have recently issued maps giving the new administrative boundaries for all regions except Two (Afar), Five (Somali) and Southern. The establishment of a set of universally accepted region, zone and wereda boundaries is necessary to avoid unnecessary jurisdictional disputes that may arise during relief operations.

Census data for all regions except Somali (R5) has been released, Somali region currently being redone. Basic population and household data at the PA / kebele level is available from the UNDP-EUE in digital database form. UNDP-EUE is hoping receive more socio-economic variables at wereda level from the census in the near future.

UNDP-EUE have a digital set of maps of the new wereda boundaries, based on the CSA regional maps. These are available but it should be stressed they are UNOFFICIAL, APPROXIMATE and regional borders are in places very inaccurate. EMA are currently creating a map of Tigray weredas and a national zonal level map, no output expected soon. Some river basin projects have created wereda maps of their own area of interest.

Refugee camp populations and resettlement statistics are kept by UNHCR, the primary organisation involved in refugees' welfare. UNHCR and WFP logistics are concerned with the supply of these camps and the movement of refugees.

Recommendations

Governmental organisations should make efforts to enable all of the 1994 census data to be released as soon as possible, along with a definitive government approved administrative boundary map.

To enable population distribution analysis using GIS or statistical methods, the census data should be released by CSA in digital format. As the population information is relatively static, copies of the population data tables should be stored at the major relief organisations. CSA will remain responsible for updating the census figures.

The ARA and DPPC should be kept updated on a monthly basis of the refugee camp populations.

Roads, bridges and infrastructure

Location and condition of roads, bridges and other transport related infrastructure are of primary importance to the development of a transport and logistics master plan. The ERA is the responsible government body for all new road construction and the maintenance of existing major highways and related structures. District offices of the ERA are currently being transferred to the regions of Ethiopia and will assume responsibility for the maintenance of rural roads. At present technical data and maps related to road construction and improvements are stored in a variety of formats, depending on materials submitted by the contractors or ERA staff responsible for the work. No systematic database or GIS system at present is used to track road conditions. Such information is currently known

informally by the ERA surveyors responsible for particular areas. ERA is currently engaging a consultant to perform a 2 year survey of existing road conditions and usage.

A team of consultants completed a 1995 survey of major roads for a large World Bank project to upgrade Ethiopia's roads over the next 5 years. The consultants' report details existing conditions of major roads (construction type and maintenance status), priority areas for improvement and includes national scale maps to illustrate these findings. Digital maps of the roads from USAID sources have been upgraded by WFP's VAM unit to include road conditions; however this task identified the inaccuracy of such data for minor roads and the lack of good information regarding road conditions. The actual location of roads used in desert regions is especially sketchy. The Ministry of Water Resource's river basin master plan projects have collected some detailed digital information regarding roads and infrastructure in their respective geographic regions. The Tekeze Gorge project is using GPS equipment that gives coordinate and altitude accuracy to within metres.

ERA are expected to tender very soon for a management information system that would incorporate a GIS element to track road conditions and maintenance work. The road use and condition survey is being carried out at present by a French firm BCEOM. At present the best digital road source is the 1984 (GC) road map, it contains no condition attributes but has approximately 25,000 km of roads.

An old route database (distances from various major points to other major points) of WTOE exists at UNDP-EUE and includes distance and estimated driving times between most major locations in Ethiopia and Eritrea. This database exists in common PC formats and is in need of updating to include new roads constructed over the last 4 or 5 years; the task is not major as most of the information contained is relatively static.

Recommendations

The major and obvious need here is the establishment of a GIS \ database information system at ERA to accurately map and register the roads, bridges and related infrastructure of Ethiopia. Such a system could utilise the existing Unisys mainframe computer at ERA (presently only lightly used) to minimise hardware costs. The use of existing digital road data detailed above and the provision of GPS equipment to surveying teams would enable the relatively quickly mapping of Ethiopia's roads and bridges, altitude readings, if accurate enough, could be used to give gradient data. The linking of this information to site observations of conditions and maintenance activities would provide an invaluable tool in planning transport operations and development projects.

The system should also incorporate seasonal climatic data to indicate roads and bridges which become impassable to various types of vehicles due to floods or waterlogged condition. Sources of existing flood data have already listed in the Geographical and Climatic Data section of this report.

Such a system could easily output detailed data that is presently included in the old route database; in the short term the Transport and Logistics Department of DPPC could quickly update the route information and disseminate this information to transport related organisations. The proposed ERA system would probably take 1 to 2 years to setup and become functional. Much of the work involved could be done by existing ERA staff with appropriate technical assistance, perhaps using skills and personnel from other GIS projects that currently operate in Ethiopia. As the condition of rural roads is of critical importance to relief operations, the inclusion of related information should be updated centrally, despite the devolution of rural road maintenance responsibility. This would allow for the provision of assistance to the regional road maintenance bureaux for emergency preparedness purposes.

Useful output from such a system such as seasonal road maps of vulnerable regions should be made available to organisations including DPPC, WFP, GTZ, JTO, RTA and the Ministry of Transport and Communications amongst others.

Road Transport Fleet

Currently the road transport fleet accounts for over 90% of goods arriving in Ethiopia and is split approximately 90% government \ national NGO \ cooperative \ privately owned, 10% international NGO \ DPPC owned. The ownership of the latter is currently in a state of flux, as the NGO and DPPC

fleets (many of which previously were part of the WFP Transport Operation Ethiopia (WTOE)) are being privatised. Concerns over the short term availability of these trucks while in limbo and the difficulty in finding buyers have been expressed. The long haul truck capacity of the country generally seems adequate to meet the demands of transporting goods from the ports. During busy periods (seasonally March - July for food aid and fertiliser) it can be difficult to persuade private hauliers to operate away from the port corridors. More serious concerns have been expressed over the lack of short haul 4 wheel drive trucks, capable of moving emergency supplies into remote areas over roads in poor condition where long haul trucks could not operate. The overall capacity of the country's truck fleet should not be over-estimated as it can be assumed that many registered trucks are not in an operationally useful state of repair.

The primary information system related to road transport is the RTA's vehicle registration system, operating on an IBM AS400 mainframe computer. The system was recently upgraded from an older IBM AS36 mainframe and is only operational in the RTA central Addis Ababa office. The present mainframe and linked workstations cannot directly output digital data that is compatible with PC or UNIX based systems. However conversion methods are currently being investigated at the RTA to allow users to produce reports from the database running on a PC independent from the operational database.

For each vehicle the database includes details of its owner, make, model, age, type, capacity, tyre size and the history of its ownership and annual inspections. The vehicles location can be traced as far as the region of registration and owner's address. The vehicle type includes all the different categories of trucks (including 4 wheel drive) and the vehicle's capacity in either passengers, quintals or litres. Each vehicle should undergo an annual inspection for road worthiness; these inspections are recognised to be cursory, however the system can at least detail vehicles which have been inspected each year and thus be operational to some extent.

The RTA system is historically accurate up to 1991, however after 1991 responsibility for registration has passed to the regional transport and communication bureaux who are not obliged to forward records to the central office. Despite much informal pressure, the only regions passing on all records are Amhara, Addis Ababa and Dire Dawa. Of the others the Southern region pass on some records and the Afar region has the capacity only to issue Addis Ababa license plates. The RTA central office estimates the database to contain about 80% of the total vehicles, from the logistics planning perspective the following points need to be considered:

- All International NGO, UN, Red Cross and diplomatic vehicles are registered via the Addis Ababa office, regardless of operational base and are thus included,
- Government vehicles are normally purchased via tenders organised by the central RTA office, who include basic data on these vehicles in the system,
- As NGO and government truck fleet privatisation goes ahead these vehicles may not be registered if bought by regional bodies or individuals,
- Large national or regional NGO truck fleets such as that formerly owned by REST in Tigray may not be included,
- Many haulage companies operate out of Addis and register their trucks in the region 14 office,
- Very few foreign registered trucks regularly operate within Ethiopia.

There is no current plan to upgrade the RTA's vehicle registration system. The UNDP-EUE acquired a November 1996 list of 4 wheel drive trucks that are thought to be operational in Ethiopia. Due to incompatibility of the computers the date had to be re-entered, it includes trucks listed by owner, age and capacity. Many of the GTZ TOR truck fleet has been relocated to the Great Lakes region of Africa.

Other information sources related to the road traffic fleet include the NGO vehicle data entered into the DPPC NGO database (see NGO operations section) and data collated (hard copy only) by the NGO Truck Privatisation Office of DPPC. The latter consists of a list of long haul vehicles currently being auctioned in the first phase of DPPC's privatisation plan. It contains basically the same information as the RTA system with additional comments, purchase value, duty status and condition (graded A, excellent - D, scrap). The Logistics Information Tracking System (LITS) of DPPC records details of each truck leaving Assab with relief goods and includes license plate. This database could easily be filtered to produce a discrete list of long hauls trucks that have been actively operational on the main Assab corridor since 1994.

Recommendations

The vehicle registration system at the RTA seems adequate for the primary logistics information requirements; the critical problem here, which will increase with time, is the lack of vehicle data from the regional bureaux. Little can be done without senior political influence to encourage some of the regions to pass on records. A donor project to computerise and capacity build in these regional offices may help matters in this respect. A significant subset of the registration data (excluding privately owned vehicles) should be exported on a monthly basis in digital format to the Transport and Logistics Department of the DPPC. A method to export data from the RTA system in PC compatible format should be quickly developed by the RTA.

To gauge the condition of heavy road vehicles, data relating to vehicle condition from the annual inspection should be included in the system. However this step requires the RTA to enforce its inspection requirements; at present many vehicles avoid the inspections without problem and RTA has little capacity to enforce its regulations.

There seems little value in collecting vehicle data directly from the NGO's for the DPPC NGO database or attempting to computerise the data from the NGO Truck Privatisation Office of DPPC. Instead the DPPC should attempt to use regular data exports from the RTA and DPPC LITS system to identify the major truck fleet operators (private or NGO) and establish emergency preparedness plans based on this information. Extra effort should be made to keep up to date the location and condition of all 4 wheel drive trucks available for emergency operations over poor roads.

Other Transport Fleets

• Air Transport

Data on existing aircraft in Ethiopia including make, payload, age, etc. is maintained at the CAA and includes the aircraft of ETA, ADMAS (crop spraying services) and MAF. The need for detailed information here is of little concern as in emergency situations bulk cargo aircraft may be flown in from surrounding countries in a matter of hours without regard to the intervening terrain. The leasing of bulk cargo aircraft is a complex business and is best organised by major relief organisations such as bilateral donors and WFP.

MAF operate light aircraft that are primarily used for routine humanitarian related transport into remote areas of Ethiopia. Their pilots routinely update information on all airstrips visited and enter such details into a small Access database along with other flight schedule data. The table relating to airstrips is extremely valuable and provides GPS coordinates, runway length and condition, suitability for bulk cargo aircraft, known hazards for landings and takeoffs, sketch maps and present MAF fuel caches (200 litre drums). This table is regularly updated and copies distributed to the CAA and UNDP-EUE.

MAF provided an updated list of Ethiopian airfields they use in November 1996.

Recommendations

Little improvements appear to be needed in this area; MAF should continue to update the airstrip data as they are the only organisation that regularly visit all these locations. Monthly updates of the database should be distributed to the CAA and DPPC to keep these organisations aware of the geographic locations accessible by air and those airstrips that are in need of basic maintenance to continue operation. MAF did mention they have little or no information on airstrips in the Afar and the north west of Amhara region - areas they do not routinely visit. It should be verified by MAF from available sources that all airstrips in these areas have been included in their database.

• Shipping

Despite being a landlocked country since the secession of Eritrea, Ethiopia maintains a commercial shipping fleet. These vessels operate on scheduled commercial routes and may be used for relief food and fertilizer shipments, however the organisations of such shipments are usually arranged by the

bilateral donors. Details of scheduled arrivals are passed to WFP who in turn maintain a shipment database in Access that has been operational for a number of years. This database maintains details of ships' expected time of arrival, country of departure, donor, consignee, commodity and quantity carried for the ports of Assab, Massawa and Djibouti.

It is the responsibility of the donors to give advance notice to WFP of such shipments; occasionally shipments from minor donors arrive without notice. As ships approach within 72 hours of arrival they contact by radio ERSTAS, the Eritrean shipping agency, who release a daily bulletin of expected arrivals. This information is faxed by WFP in Massawa and Assab back to Addis, communication links to the principle port Assab are good but unreliable to Massawa; data from the latter often takes a week to reach Addis.

This database is digitally transferred to the ITC of DPPC on a monthly basis and WFP issues reports for the fortnightly WFP shipping meeting of DPPC, UN agencies, donors and major NGO's. WFP contacts the principle donors on a weekly basis for scheduled shipping arrivals. Port capacities are considered in the port and storage facilities sections of this document.

Recommendations

Again little improvements appear to be needed in this area regarding information systems as WFP maintain the information on a regular basis and disseminate to relevant organisations. Late arrival of ships by over 2 weeks is common (about 10% of arrivals). If the ERSTAS arrival bulletin included a little extra information regarding whether the cargo is food aid and if so the donor, it would give WFP a couple of days extra notice of accurate ship arrival times. Problems in communication links to Massawa appear to be caused by the Adigrat - Asmara link; a new digital line along this section, due to become operational soon, may resolve this issue.

• Railways

The only railway line operational in the country is the Djibouti - Dire Dawa - Addis Ababa line, operated by the Chemin de Fer Djibouto-Ethiopien company, jointly owned by the 2 countries it operates between. The railway's bilateral ownership makes it less flexible to change, however if problems with the main supply routes through Eritrea arose its use could become vital. The system is in a rather dilapidated condition and numerous studies have been carried out for proposed upgrading by the EC, IBRD and other donors. At present it handles less than 10 % of Ethiopia's imports, WFP uses the railway for about half of its imports from Djibouti. To logistics operators the railway is seen to be slower, unreliable, geographically less versatile and no cheaper than road transport. Lack of warehouse storage close to the Dire Dawa station requires the use of trucks to transfer stock from the train to the warehouses nearby, no capital investment funds are available for railway unloading and storage facilities.

Ministry of Transport and Communication figures estimate the current railway rolling stock at 8 locomotives, 4 shunting locomotives and 429 wagons of average 40 MT capacity each. Each locomotive can pull a train of about 10 wagons (about 400 MT capacity) at one time.

Recommendations

There appears to be no need for additional information systems relating to the railway line, information can be obtained from the studies already carried out. The railway does have a greater capacity than is currently being used; its increased use in emergency situations to free up road trucks for use elsewhere should be considered for contingency planning purposes.

Ports

Storage Facilities

The location, capacity and up to date stock information of storage facilities is an area that has many related information systems, none of which give an overall view for disaster prevention and preparedness logistics planning. Most attempt to track details of stock movements and distribution figures for a particular organisation's own operation only. In this section information systems related to warehouses and stock tracking systems are considered separately.

• Warehouses

The capacity for storage at the 3 major ports (Assab, Massawa and Djibouti) is generally adequate for short term bulk storage requirements. At dockside Assab can store 265,000 MT, Djibouti 60,000 MT and Massawa has 20,000 sq. metres of open space:- short term open air storage in these arid locations would not normally be a problem. More details regarding the Eritrean ports' handling capacity and improvement plans are given in IBRD studies conducted over the last 12 months.

No central list of all warehouse facilities currently exists, except for a database compiled by the UNDP-EUE (then the EPPG) in 1989 / 1990. This dBase database included warehouse location, owner, use, dimensions, capacity and various other fields for over 800 sites over Ethiopia and Eritrea. To be updated the database would need to include details of the following facilities:

- arrival ports as mentioned above,
- CDDP's 3 national warehouse locations,
- CDDP Regional Bureaux' warehouses and local storage sites,
- EGTE's 16 principle storage warehouses,
- EGTE's local grain collection and purchasing points (covered yards) that exist in most weredas,
- EFSR's 4 national warehouse locations,
- ARA's sites for refugee camp deliveries; known as extended delivery points (EDP's) by WFP there are 3 warehouses for the western camps and about 10 locations (transfer only not storage) for the eastern camps,
- NGO's warehouses and storage locations (including the Ethiopian Red Cross),
- Private warehouses and storage locations,
- CDDP, NGO or Ethiopian Red Cross portable or semi-permanent warehouses in storage such as Rubb Halls or Flow Span structures.

The Ministry of Education is currently trying to geo-reference all 9,500 schools in Ethiopia. This coupled with school attributes (building state, number of classrooms) could be of use in logistics micro-planning.

Recommendations

The Transport and Logistics Department of the DPPC should take responsibility for compiling the static warehouse information into an Access database, using the old UNDP-EUE database structure as a starting point. Each entry from the facilities listed above should be geo-referenced to allow the information to be linked to a GIS system, along with major point's stock data. A standard data collection form should be constructed for distribution to the above mentioned organisations and in the case of the NGO's replace and expand on the current NGO database questionnaire section related to office, assembly, storage and garage space (form CBT/0057 q 18.1). Information on permits issued by the Ministry of Trade and Industry to private warehouse operators should be used to trace and include these facilities in the database.

The major task in compiling such a database would be in the data collection, as design and data entry tasks would not be large. An estimated 3 to 6 man months depending on how the various organisations cooperated would be required to construct this database from present sources. Half yearly updates of such a database should be distributed to organisations involved in logistics planning such as DPPC, ARA, WFP and UNHCR.

Stock Tracking Systems

The current stock tracking systems are generally designed to confirm that stock movements and distributions are actually made, to prevent fraud and enable accountability to the donors. Warehouse

inventories are taken at regular intervals (often monthly) and cross checked against running totals that account for incoming and outgoing consignments. Truck departures are logged and arrivals cross checked before payment is allowed to the haulier. The latter often involves warehouse 'goods received notes' being presented to the controlling office. As many data transfer elements of these systems currently do not use electronic transfer, central offices' latest stock data is usually at least one month old. The exact details of these systems are not considered at length here as such tracking, although important to the organisation concerned, is not of direct relevance to overall emergency logistics planning.

- The WFP shipping database tracks donor pledges and port stocks and offtakes as well as ship arrivals (see Other Transport Fleet section for the latter). Pledges by donor to each of WFP's programs and the current quantity delivered for each donor are reported on a weekly basis. The weekly report also contains a breakdown of weekly stock and daily port offtake figures for each of the ports of Assab, Massawa and Djibouti. The weekly port stock figures give totals on board ships at anchor and actually in the port storage areas for WFP food aid, NGO food aid, EGTE food, fertilizer and general cargo. The daily port offtake figures gives for Assab the quantity of total cargo, food aid and fertilizer leaving the port, presumed to be Ethiopia bound. The other ports give only daily food aid offtake figures. For Djibouti they are spilt by road, rail or air transport, for Massawa the food aid figures are split by destination (Eritrea or Ethiopia). The data is faxed backed from WFP port offices to Addis for compilation into the Access database which is used to produce weekly reports, due to problems with phone lines to Massawa this information is usually a week old on report issue. Fortnightly shipping meetings are held for interested organisations, the weekly report widely distributed and the database transferred by modem to the ITC of DPPC on a weekly basis.
- The Logistics Information Tracking System (LITS) run by the DPPC Logistics and Transport Department of the DPPC is primarily concerned with the tracking of DPPC food consignments from arrival in Assab to delivery point via the DPPC national warehouses. Data is transferred by modem from the DPPC Assab office and imported into an Access database in Addis. Port dispatch data sent includes a record for each truck leaving Assab with food aid, non food aid or fertiliser bound for all relief consignees (NGO's, WFP, EGTE, DPPC, etc) - not just DPPC consignments. Each record (over 40,000 in the last 2 years), gives details of the consignee, cargo, quantity, primary destination, haulier, waybill and truck license plate. The system continues to track DPPC consignments for internal accountability reasons at the national warehouses and details of regional DPPC requisition requests (warehouse dispatches). The DPPC is currently configuring new equipment to allow the national warehouses' stock and dispatch information to be transferred via modem to Addis. The LITS system originally was intended to include NGO consignments' arrival data, however this part of the system required the NGO's to report all arrivals back to the DPPC and quickly became unused. Weekly and monthly reports are output to the DPPC commissioner and in theory to the ITC of DPPC; however the latter stated that LITS reports did not arrive at the ITC for inclusion in their own more general information reports. There is no data transfer from LITS to the FAIS system of the ITC of DPPC. If directed by the commissioner's office of DPPC, reports may be prepared for external organisations.
- The Food Aid Information System (FAIS) of the DPPC's ITC is used to track food aid stocks and distribution figures on a monthly basis for NGO's and the regional bureaux of DPPC. It includes details of indirect WFP food distribution via NGO's and government run programs such as food for work and school feeding. It does not include refugee camp distributions and stock held in the refugee camps' extended delivery points. The latter is due to DPPC's mandate not extending to refugees, the relevant government agency here is the ARA. Each month actual and estimated distribution figures detailing quantity, food type, number of beneficiaries, distribution program and wereda are entered into the Access database. Food stock data by region, zone and wereda are also given each month detailing quantities of food types held. About 80% of the major NGO's with distribution programs contribute data; it is often 2 to 3 months old, especially for actual distribution figures. DPPC regional bureaux data is routed to the ITC via the Aid Programming, Implementation and Monitoring Department of DPPC, often it only given details at regional or zonal level. The shipping database of WFP is incorporated digitally into the FAIS on a monthly basis. Regular reports of stock and distribution figures are issued and circulated to the DPPC commissioner and concerned organisations.
- The Food Commodity Tracking System (FACT) of WFP takes WFP consignment data from the shipping database (see above) and tracks all consignments via intermediate warehouses to delivery to implementing partners such as NGO's, DPPC, government programs, EFSRA, EGTE and the ARA. The WFP standard Clipper based database system tracks food aid consignments via

waybills issued at the ports and outputs monthly distribution reports as well as serving internal monitoring requirements. Most food aid distribution recorded by the system is also reported by the DPPC FAIS system as WFP rarely distribute directly. In theory, to get a full picture of food aid distribution, the food aid reported as delivered by WFP to the ARA at the extended delivery points for refugee consumption needs to be summated with the FAIS cumulative distribution figures. Monthly distribution reports are circulated to concerned organisations and include a breakdown of food aid delivered by region, internal programme, donor consignment and refugee camp.

- The Ethiopian Food Security Reserve Administration is currently implementing an Access database named the Stock Tracking and Monitoring System (STMS) to replace the present paper based system of tracking. The EFSR's role is to maintain a national reserve of food stocks, thus the STMS is of primary importance to disaster preparedness. Paper records of stock movement are sent via post from the 5 EFSRA warehouse offices to Addis Ababa, taking 7 to 10 days to arrive. ODA may fund the installation of computers and modems in the warehouse offices to speed up this process later this year. The database has the ability to output reports related to current stock levels at the warehouses, loans, recycling, transfers and donations to the EFSR. The controlling technical committee of EFSRA comprises members of WFP, DPPC and various major donors so output reports from the system should be readily available.
- The Ethiopian Grain Trade Enterprise (EGTE) aim is to stabilise retail grain prices in the country via local purchasing of surplus and the subsidised sale of international grain donations if necessary. Although commercial in nature the EGTE, its stock levels and storage capacity are of importance for disaster prevention and preparedness. The EGTE has 5 regional offices that record stock input from the numerous local EGTE purchasing points, price information and monitor stock transfers and overall stock levels in their major warehouses throughout the country. The stock data is entered onto computers at the regional offices and then transferred to the central office in Addis Ababa. Stock data is transferred by phone or radio every fortnight, with extra details being sent later by post. A DOS based computer database is maintained with the stock data in the central office and regular reports issued for internal use to the board of directors and the Prime Minister's Office. Being a commercial organisation they are reluctant to freely distribute their price and stock data; however they will issue reports to DPPC on request.
- NGO's and bilateral donors also maintain stock tracking systems for their own internal use, however these systems are not of direct relevance for national emergency planning.

Recommendations

Due to the number and complexity of the systems described in this section, it is difficult to recommend a definitive set of changes. Most of the systems listed above are used for internal monitoring purposes of the controlling organisation. There is definitely overlap of information collated between the DPPC LITS and FAIS and NGO database information systems and a need for much better information flow between them. As all utilise Access databases and are operated by the same organisation it would make sense for these systems to be centrally operated from one point, pooling resources and manpower. The natural point to do this would be the ITC of DPPC, this department currently has plans to port databases onto a new server running Oracle RDBMS. However the operational gain in doing this seems minimal for the extra cost and experienced personnel required.

FAIS reports detailing distribution and stock figures could usefully combine the LITS data regarding consignments departing ports. Rapid dissemination of this information to NGOs to assist them in tracking their stock would encourage better information flows between the NGO community and DPPC. The merging of FAIS and LITS is certainly possible and would help to achieve this goal.

A new addition to one of the systems should be the capacity to monitor the current food aid stocks of all the major warehouses and ports, regardless of owner. Most of the locations and their current stock positions are tracked in one of the systems listed above. The database of warehouses proposed above should be expanded to include weekly stock levels and ideally linked to a GIS for geographical analysis. Stock data flow should be facilitated by the establishment of formal data transfer mechanisms between concerned organisations and the use of electronic data transfer for all of the major warehouses. The pooling of resources in the major towns concerned (Assab, Mekelle, Nazret, Dire Dawa, etc.) would help to achieve these objectives.

The DPPC or EFSRA could develop and operate such a system. However it is of critical importance that the information collated is made freely and quickly available to all organisations concerned with disaster planning. The DPPC's present track record for information sharing (as parts of this report

demonstrate)needs improvement; their management information dissemination system needs to be thoroughly reviewed. An alternative to this would be the expansion of the STMS system at the EFSRA to monitor warehouse stocks. As the EFSRA's role is to maintain a food security reserve, it would be appropriate for them to monitor other major food stocks in the supply system. The joint management of the EFSRA by WFP, DPPC and donors would also ensure the dissemination of information collated. Extra manpower would be required to develop and maintain such a system; at least one information system specialist and a data assistant would be required permanently.

Communication Facilities

Communication facilities that exist are of intrinsic importance to facilitate the operation of information systems related to transport and logistics. Details of ETA's present network of locations accessible by telephone is given in the ETA's annual statistical bulletin. The latest copy available (1995) includes tables listing the location and type of approximately 500 telecommunication stations around the country. The majority of these stations have either manual or semi-automatic exchanges which are suitable for voice traffic only. The use of facsimile and electronic mail \ data transfer is restricted to the approximately 30 towns equipped with automatic digital or analogue exchanges. UNDP-EUE is currently geo-referencing these locations to produce a national map of places connected via telecommunications.

The major towns are linked by microwave transmitters for telecommunications, a system which should be less vulnerable to natural disasters than landlines. Remote regions are vulnerable to total communication breakdown if telephone lines or roads are disrupted. No complete inventory of locations equipped with radio facilities currently exists. In previous emergencies, the UNDP-EUE and ETA have helped to provide radios to the DPPC for use in remote areas such as the flood zone of the lower Awash river in the Afar region. Reliable telephone 'hot lines' have also been setup to allow reliable communications between principle centres such as Addis and Weldiya during the 1994 food shortage in Wollo.

The donors EU, CIDA, USAID and SDR are currently involved in supplying radio equipment to the DPPC.

The ETA Internet service became active in January 1997 and is being widely used by organisations in Addis Ababa. Reliable access to websites such as the UN Department of Humanitarian Affairs 'ReliefWeb' and email have been provided. Currently the UNDP-EUE is trying to load its prototype website onto the ETA server, it contains many of the datasets mentioned in this document available for download via FTP. The ETA server via web data, email circulars or newsgroups could be used to quickly disseminate routine or latest information. Mechanisms for such would have to be established with the ETA..

Recommendations

The ETA annual statistical bulletin adequately covers the information needed regarding telecommunications in Ethiopia. For emergency logistics and the early warning system amongst numerous others, there is an urgent need to promote a 2 way radio capacity in first zones, then weredas not accessible by reliable telephone connections. The DPPC should thus conduct a survey using their own local offices to find out which locations have an operational 2 way radio, technical details and which organisation at the local area operates it. This information would be extremely useful to bilateral donors and UN agencies that are currently interested in supporting rural communications infrastructure projects. ETA should provide an inventory of emergency radio equipment available for use in remote areas to the DPPC. Improving communication capacities from remote areas would have obvious benefits to these areas, as well as improving the logistics information flow in emergency scenarios.

NGO Operations

The capacity of NGO's to assist in avoiding and alleviating disasters is important information that requires collation due to the large number of operational NGO's in Ethiopia. The CRDA produces an annual booklet that contains basic data and project listing (description and location) of many NGO's. The DPPC has utilised it's mandate of NGO coordination to collate information from all NGO's operational in Ethiopia. Over the past year data has been collected, verified and entered into an Access

database. It includes tables of information related to NGO's organisational structure, active and recently terminated projects, major activity areas, food aid distribution statistics, budget and funding details, personnel composition and assets.

The assets section is broken down into categories including building space, transport, office equipment, agricultural tools, water drilling equipment, surveying equipment and other miscellaneous items. The location and capacity of NGO warehouse space cannot be obtained in detail from the information collated as only the total area and value of NGO buildings was asked for in the questionnaire. The vehicle section details the numbers of units of each vehicle type but does not include tonnage capacities and vehicles' condition. The project section lists each NGO project's location by wereda, value, duration, government counterpart and beneficiary numbers. Although the NGO's sectors of project activities are listed in general, it does not classify each project by activity type. Despite the information having been collated over 6 months ago, no organisation outside of DPPC has had access to output reports from this database.

The CRDA NGO activity database is available in digital form from the UNDP-EUE. Status of the DPPC NGO database is currently unknown, UNICEF who funded its development have not been given access to it. Linking NGO activities to geographic locations via GIS would be useful for emergency planning.

Recommendations

The NGO coordination office of the DPPC should continue its activities in updating information on NGO operations in Ethiopia; inclusion of a 'project category' type for each listed project would aid in the utilisation of such information for planning purposes by both DPPC and the NGO's themselves. There appears to be no need for including new food aid distribution figures in the NGO database as this data is collected on a monthly basis from NGO's for the Food Aid Information System (FAIS), maintained at the ITC of DPPC. The asset section should be expanded to include an inventory of all NGO warehouses (type, locations, space and capacities). This would enable the NGO database questionnaire to act as a principle point of information for use by other information systems concerned with warehousing capacities. There is no need to collect NGO vehicle fleet data as much more detailed information is already available from the RTA (see road vehicle fleet section); this could be incorporated into the NGO database by creating tables based on those used by the RTA and imported directly on a quarterly basis.

To allow NGO's themselves as well as donors and UN agencies to plan their operations effectively, the data regarding NGO projects and operations should be disseminated widely. It is recognised that projects are constantly changing, however this should not prevent the DPPC from circulating regular reports of current NGO operations in Ethiopia.

Fuel Depots

The capacity and location of fuel depots and stations is of obvious importance in planning transportation operations in what are often geographically remote areas. As mentioned in the air transport section, MAF maintain their own fuel cache levels at the remote airstrips they frequent in an Access database. The UNDP-EUE collated in Feb. \ March 1996 a list of all commercial fuel stations in Ethiopia. The information was entered in Access and includes location, geographic coordinates and capacities of diesel storage tanks for each station. The list has been linked to a GIS to produce a display map of the fuel station locations. The Ministry of Trade and Industry is the responsible authority for issuing fuel station permits; thus they should be able to produce a similar list of active fuel stations.

The Ethiopian Petroleum Corporation (EPC) is the national company responsible for importing oil products into Ethiopia. A report detailing commercial fuel distribution patterns and consumption trends was produced by the planning department of the RTA in June 95. It describes the geographic supply routes and distribution centres used as well as estimating tanker fleet capacities and retail prices depending on location. The border areas to the west and south, and much of the Somali Region have no formal distribution system. Thus fuel shortages are rationing are known to be a problem in some areas such as the north west around Gondor. The EPC have planned the construction of high capacity regional fuel depots to ease these problems, funding for this project is currently being sought.

Recommendations

The DPPC logistics and transport department should take over the update of the fuel station database from the baseline set of information collated by UNDP-EUE, utilising the list of permits issued by the Ministry of Trade and Industry if available. It should be expanded to include central commercial depots' capacities and perhaps monthly stock levels from the EPC. Non commercial storage capacities and stock reserves should also be investigated and included from all transport related institutions. As the location and capacity of fuel depots is relatively static, this task should not require extra resources to keep updated. Fuel depot information should be freely distributed to concerned logistics department to aid in contingency planning activities and prediction of major shortages.

Summary

This report appears to demonstrate that the major components required for an integrated logistics and transport information system for disaster prevention and preparedness planning exists. The fact that elements of such a system are scattered across many organisations should not present major obstacles if the following general recommendations are observed:

- overall coordination of information flow is controlled by the DPPC working in close liaison with the international organisations.
- Formal mechanisms for data transfer and flow are established and adhered to.
- That discrete elements of the system are maintained and kept updated by the relevant organisations detailed in this report, centralised updating of information should not be attempted.
- Currently many information systems are purely used for auditing and accounting purposes. Regular reports are often circulated and filed without any use being made of these systems ability to aid in planning and management decision making. System use and any further enhancements developed should be considered jointly by both technical and managerial staff.
- Management of involved organisations, and in particular DPPC, need to resolve information access issues between organisations and information flow between regional and national levels. Failure to do so will inevitably emasculate the envisaged master plan's purpose.
- Data collation should not be done for its own sake. Systems should be reviewed with this principle in mind to minimise the wastage of efforts and resources.
- Communication difficulties may be alleviated if the sharing of resources within geographic regions is attempted. Collaboration on communication infrastructure projects for both emergency and general development purposes should be encouraged.

The following specific recommendations, already made in this reports, should be considered as those demanding the most immediate attention:

- Establishment of a GIS linked information system related to road infrastructure at the ERA.
- Detailed review of food flow and stock monitoring systems, leading to the establishment of a national warehouse and stock monitoring system.
- Senior management intervention to be taken to address the problem encountered by the RTA in gaining access to regional vehicle registration data.
- *Links be established between ETA and the DPPC to investigate the use of the Internet Service for the dissemination of emergency logistics and transport information.*
- A review of existing communication infrastructure in disaster prone area be undertaken, to identify gaps and thus direct donor assistance.

A short seminar attended by concerned managerial and senior technical staff of MATTF members would be useful to discuss issues and recommendations raised in this report. Comments on this idea and any on any of the report's contents are encouraged and should be forwarded direct to the UNDP-EUE.

The author wishes to express his thanks to all the people who helped supply information used in the compilation of this report. The report's content should be considered as a subjective view only of the present systems and not the authorised opinion of any organisation mentioned.

Appendix

Acronyms included in this document:

• MATTF	Multi Agency Technical Task Force
• DPPC	Disaster Prevention and Preparedness Commission
• ITC	Information Technology Centre of DPPC
• ERA	Ethiopian Roads Authority
• RTA	Road Transport Authority
• NMSA	National Meteorological Services Agency
• EMA	Ethiopian Mapping Authority
• ETA	Ethiopian Telecommunications Authority
• CAA	Civil Aviation Authority
• ARA	Administration for Refugee Affairs
• EGTE	Ethiopian Grain Trade Enterprise
• EFSRA	Ethiopian Food Security Reserve Administration
• WFP	World Food Programme
• UNHCR	UN High Commission for Refugees
• JTO	Joint Transport Operation (of SCF and Oxfam)
• MAF	Mission Aviation Fellowship
• GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
• GIS	Geographic Information System
• GPS	Global Positioning System