EASTERN INDONESIA'S SEA TRANSPORTATION SYSTEM

By Michael Romanos

The Region's Dependence on Sea Transportation

Transportation plays a pervasive role in national and regional development. Inadequate or inefficient transportation systems -- infrastructure, modes, and operational structures -- have been shown to perpetuate regional reliance on subsistence agriculture, discourage industrialization, impair trade, and be disincentives to attracting private investments into a region; in other words they can constrain economic growth, as well as the development -- participation in economic opportunities and social maturation -- of the regional populations. On the other hand, as transportation systems expand and improve, they not only increase accessibility to jobs, services and economic opportunities, but they also cause far-reaching changes in the economic, cultural, social and political structures and the physical environment of their broader regions, as greater access alters the relative location of a place and restructures the pattern of communications, thus instigating social change.

This close relationship between transportation and development supports the position that transport is a factor of development with a major instrumental role in development planning and should therefore be directly taken into account in the formulation of regional development policies. For example, locational decisions that alter the spatial distribution of production generate new needs for transport infrastructure and services; while changes in the transportation system, whether autonomous or induced, often have different effects on the opportunities for exploiting the economic, as well as the social and political potentials of a given area. It follows that regional economic development targets need to be translated into spatial regional requirements with an eye on the needs for, and the possibilities of alternative transportation modes, and these in turn need to be translated into transportation system restructuring needs for maximum system efficiency. From this simple reasoning, two basic premisses are established: (a) that transportation, as a system whose demand is derived from the functions of the economic, social and spatial system it serves, must be planned within, and as part of the overall regional development plan; and, (b) that inefficiencies or inadequacies in the regional multimodal transportation system will have considerable negative effects on the economy and the social development of the region.

While the above review applies equally to the eastern and the western parts of Indonesia, Eastern Indonesia has several characteristics which give transportation accessibility an especially critical role in the region. Eastern Indonesia in this paper is defined as the region containing the nine provinces of: North Sulawesi, Central Sulawesi, Southeast Sulawesi, South Sulawesi, West Nusa Tenggara, East Nusa Tenggara, East Timor, Maluku, and Irian Jaya. It consists of four major island complexes -- Sulawesi, the Tengaras, Maluku, and Irian Jaya -- each consisting of a large number of islands. This region:

- Is the most remote part of Indonesia in terms of distances separating its provinces from each other and the region as a whole from the rest of the country. (See Table 1 for an indication of airline distances among regional provincial capitals and between them and the two major economic centers of the country). The island complexes are separated by large expanses of open sea, which much of the year are extremely rough and dangerous;
- Suffers from external remoteness, being far from the national decision-making center of Jakarta and the national economic center of Java. For example, from Jakarta it is about 2270 km to Dilli, 2560 km to Ambon and 3950 km to Jayapura. With the possible exception of Ujung Pandang, no major economic centers of more than local importance exist in the region presently;

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Table 1
Eastern Indonesia: Airline Distances Among the Provincial Capitals, Surabaya and Jakarta (in km)

City	1	2	3	4	5	6	7	8	9	10	11
1. Manado N. Sulawesi	*** ***	608	945	630	1440	1260	1080	675	1755	1620	2160
2. Palu C. Sulawesi		*** ***	450	428	923	1058	1013	968	2295	1035	1575
3. Ujung Pandang S. Sulawesi			*** ***	360	518	720	743	990	2340	765	1508
4. Kendari SE. Sulawesi				*** ***	878	675	585	630	1980	1125	1755
5. Mataram WN. Tenggara					*** ***	833	1035	1418	2768	504	1080
6. Kupang EN. Tenggara						*** ***	270	855	2025	1238	1935
7. Dili East Timor							*** ***	608	1778	1418	2115
8. Amobon Maluku								*** ***	1373	1755	2385
9. Jayapura Irian Jaya									*** ***	3105	3735
10. Surabaya										*** **	675
11. Jakarta											*** ***

Source: Estimated from "Map of Indonesia" , printed by PT. Pembina Praga, Jakarta 1990

- Suffers equally from internal remoteness, with vast distances separating its provinces from one another, as well as separating the various islands and districts within provinces. Within the province of Maluku, for instance, the island of Morotai is about 1150 km from the island of Tannibar. Within Irian Jaya, it is some 1325 km between the capitals of Merauke and Sorong;
- Experiences great barriers to integrated development because of the poor conditions of its road network, limited as it is to only certain islands[1], and the scarcity, unreliability, and cost of air and sea transport[2] between the more sparsely populated islands and districts (UNDP,1990,p.1);
- In addition contains many small and larger islands which have a partially or totally undeveloped interior, with most of the population and productive activity thinly distributed along their coasts, making small craft sea and air transportation the only feasible means of transport;
- The economy of most of its islands is very weak, with little that can be exported, and even little that is produced locally to satisfy domestic demand.

These characteristics make the region particularly dependent on non-ground transportation systems, mainly air and sea transport. And given the high cost of air transport, for both passengers and cargo, sea transportation emerges as a dominant mode of interprovincial and coastal transportation in Eastern Indonesia.

Reliance of the Region on Sea Transportation

The provinces of the region rely largely on sea transportation for imports of consumer commodities, construction materials, equipment, and general industrial supplies, as well as for exporting regional commodities, especially forest and marine products, to the rest of Indonesia and overseas. The most systematically organized of these export activities -- plywood, frozen seafood, extracted minerals, and oil

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1 *The transport system in Indonesia exhibits considerable variation among the major modes. A major aspecs is the road network, wich comprised 175,000 km in 1983, roughly 40% of it asphalt. Road transport is clearly dominant, with over 87% of all passangers and 70% of all goods transported in Indonesia accounted for within the road system during the mid-1980s.*

2 *The second most dominant mode within the Indonesia system is maritime transportation. Roughly 95% of all freight movement and 75% all person trips between the islands are handled by sea. Intra-island cargo traffic, especially is Eastern Indonesia, is handled by coastal shipping, wich accounts for nearly 60% of the market (Leinbach, T.,1989, p.27)*

and natural gas -- make use of specially equipped ships and/ or special port facilities.

The many remote areas of the region not served by roads rely on sea transportation almost exclusively for access to the rest of the region. This is true for both cargo and passengers, especially low income ones, who constitute the majority of the region's population, and who cannot afford air transportation even if it is available in their areas.

But an additional factor that should not be undervalued is the cultural role of the sea in the lives of the Eastern Indonesian populations. The presence of the sea has historically been a dominant factor in the life and development of the region, and so sea transportation is today, and is expected to continue to be a major mode of transport for the peoples of the region and their products.

Each of the provinces and island regions of Eastern Indonesia has its own special transportation characteristics and requirements. Sulawesi has a reasonable, and improving, ground transportation system, consisting of the trans-Sulawesi highway, regional links, and local access roads, but the system is still not complete, parts of it are still missing, parts of it do not connect to each other, and the physical characteristics of the terrain make road improvements very costly. (See Table 2 for an illustration of ground accessibility among the region's provincial capitals). Coastal areas are isolated from each other, ports with facilities are located far apart, and the coastal line is long and arduous. Air transportation is quite developed in the island, and Ujung Pandang to a certain extent plays the role of a regional air transportation hub, but there are major complaints about the poor scheduling of air operations and the inadequacy and inefficiency of air service.

Irian Jaya has many of the same characteristics, but has also an almost complete lack of roads and an almost impenetrable interior, which is only accessible by small aircraft, provided in many locations by the missionary air service. Its coastal areas are long and the settlements along them are very isolated, and the prospects for road access among them in the short run is highly unlikely. Irian Jaya lacks intra-provincial access, making coastal transportation essential. Most kabupaten capitals and kecamatan capitals are connected among themselves by sea -- and to a lesser extent air -- transportation. Sea transportation is especially important for Biak, where kabupaten Biak Numfor contains four kecamatans located on separate islands and only connected among themselves by *perahu*.

The Maluku archipelago presents a different set of problems, for its over one thousand islands are scattered over a very large sea area, and create serious problems of communication of all types, including education, health services, and administration. Much of the year, adverse weather conditions make sea communication very difficult, and each year tragic incidents of deaths from

Table 2

Eastern Indonesia: Ground Transporatition Among the Provincial Capitals, Surabaya and Jakarta (in hours)

City	1	2	3	4	5	6	7	8	9	10	11
1. Manado N. Sulawesi	*** ***	48	72	80*	0	0	0	0	0	0	0
2. Palu C. Sulawesi		*** ***	36	42*	0	0	0	0	0	0	0
3. Ujung Pandang S. Sulawesi			*** ***	21*	0	0	0	0	0	0	0
4. Kendari SE. Sulawesi				*** ***	0	0	0	0	0	0	0
5. Mataram WN. Tenggara					*** ***	0	0	0	0	0	0
6. Kupang EN. Tenggara						*** ***	8-10	0	0	0	0
7. Dili East Timor							*** ***	0	0	0	0
8. Amobon Maluku								*** ***	0	0	0
9. Jayapura Irian Jaya									*** ***	0	0
10. Surabaya										*** **	14-18
11. Jakarta											*** ***

Nota: * Includes a 12 hour ferry ride

starvation or disease are reported, mostly caused by the remoteness and the lack of access to the islands.

Similarly the Tengaras consist of a very large number of large and small islands, most of which are also very poor in terms of soil, water, natural resources, and infrastructure, and which rely on sea transportation almost exclusively for interprovincial communications.

Shortcomings of the Present Sea Transportation System of Eastern Indonesia

We can consider the sea transportation system of Eastern Indonesia as consisting of:

- a set of modes -- ships, boats, ferries, other craft
- a network of nodes and links -- main, collector, and local ports and their cities and surrounding regions, and sea lines traveled by the vessels in the system, and
- operations -- travel, loading/unloading, use of port facilities, rules and regulations, costs and fares, and system maintenance.

For the region to rely on this system and use it towards achieving its regional development goals, it is important that all system components function at optimal efficiency levels. But studies and sample surveys of the system, and interviews with port authorities, shipping companies and shippers during the last four years reveal that there are several problems associated with the conditions of the nodes and modes, and with the way operations are being conducted (Robinson and Dick, 1990; Harris et.al., 1990). These problems can be grouped under three categories:

- Inadequate, infrequent, and unreliable ship connections to the ports of the region, which discourage increases in production and cause losses to current producers;
- Low quality of port facilities and navigational aids; and
- High costs of shipping, especially regarding cargo, both in terms of fares and in terms of damage to property.

a. Low level and quality of service

Cargo ship service to many of the region's ports is mostly irregular, especially after the 1988 Paknov deregulation, which freed shipping companies from the obligation to serve less profitable ports, as a form of cross-subsidy imposed by the central government as a condition of route licensing. Under the emerging pattern of service, many of the secondary ports of the region are served by tramper ships rather than by regular liner service, and while this does not necessarily affect the total number of port calls and the total dead weight available, it does affect the ability of shippers to plan their cargos based on reasonable expectations of ship arrivals[3]. The switch from liner to tramper service has of course

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3 *For example Makasar, the commercial and export port for Ujung Pandang, South Sulawesi, has historically been the most important port in Estern Indonesia. Soon after the Paknov 1988, meny regular shipping companies shifted their home base from Ujung Pandang to Surabaya, because many of the larger ships, both domestic and foreign, changed their routes and now sail directly to Surabaya, preferring to wait there for cargo, rahter then visit individual smaller ports on the way, and because port facilities in Surabaya are better, and thus costs to the shipping companies are lower. Small ports in Indonesia, especially in the eastern provinces, appear to have been even more negatively affected by deregulation in terms of volume and type of activity, and/or had small amounts of cargo to be shipped out. These companies now sail to Eastern Indonesia ports only when they have a full cargo to deliver (Bappenas, 1990, p.10).*

been caused by the weak economy of many of these port regions, and has resulted in higher shipping companies efficiency. But at the same time it has added an element of uncertainty to the shippers and their production and export operations, and in several cases it has created a disincentive to further expansion of production. It is generally known among the region's shippers that reliability of service, even before the *Paknov* deregulation[4], was very low, and that often cargos had to be stored for long periods of time, or be returned to their origins for inadequate storage space, because a ship did not arrive when it was supposed to. But it is also considered that the present system of tramper service is too unreliable to allow an adequate system of interisland trade to expand, under the present conditions of absence of advance information about ship arrivals and departures scheduling.

b. Low quality of facilities

The studies mentioned above consistently found poor conditions and limited capacity of ports facilities in Eastern Indonesia to be deterrents for shipping companies to send ships to those ports. Problems specifically mentioned and repeatedly appearing in the lists of needs and priorities of local port authorities include:

(a) Inadequate wharves.

Expansion of port docking space is a priority need for all the ports in Eastern Indonesia. In Jayapura, the present wharf is only 12 meters long, and has space for only one ship at a time. If a ship is berthed, new arrivals must wait their turn at anchor off-shore. Since passenger ships always have priority in docking, cargo ships often incur considerable delays in turn-around time. According to the Jayapura port authorities, the port needs a total wharf extension of 225 meters. The situation in Biak is even worse, because its existing wharf is in such poor condition that it often causes damage to the vessels' bodies while they are docked. In NTT many wharves are so crowded that ships generally tie up alongside one another in a "tender" fashion.

(b) Inadequate and insecure warehouses.

Warehouse problems in Eastern Indonesian ports consist of: (1) poor building conditions and lack of maintenance funds. Most warehouses in Eastern Indonesia are very old, dating from the Dutch period, and have received very little, if any, maintenance in recent years; (2) Poor management of available space. Management and administration of warehouse space is often poor and unorganized. In several ports, warehouse space is indiscriminately used for the storage of all types of cargo, without regard to its content; and (3) Inadequate space. The space storage problem is exacerbated further by various "special arrangements" made with private companies for long term use of part of the available space. In the port of Makassar, for example, the shortage in covered warehouse space is made more acute by a 'special' leasing arrangement between Perumpel IV and a shipping company, according to which the company controls a large percentage of the port warehouse space, which remains empty most of the time, while the rest of the port warehouses are full and space is at a premium. This problem occurs in other ports as well; in the port of Biak, out of 1300 square meters available, 900 is permanently leased, while in the port of Ambon 1000 square meters out of a total of 3050 square meters available are rented directly to a private company.

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4 *Deregulation in the sea transportation was implemented with the issuance of Government Regulation No. 17, 1988 (paknov 1988). This regulation was further elaborated in the Ministerial Decree No. KM 79, 1988, issued by the ministry of Transportation. Basiccaly the new regulation permits shipping companies to determine their own routes and schedules of operations, both regular and irregular, including overseas routes. The regulation is expected to have impacts of varying severity of the number of shipping companies, the industry mix between foreign-chartered and domestic vessels and between liners and trampers, the level and frequency of service by routee, and the rates charged by route, as well as on the number of stevedoring and freight forwarding firms and their quality of services (Bappenas, 1990, p.5). Implementation of Paknov 1988 appears to have affected Indonesian ports in different ways depending on the port's size, location and level of cargo handling. It seems that only large export ports (Tanjung Priok, Tanjung Perak and Belawan) have clearly benefitted from the deregulation. There is a clear and obvious tendency among shipping companies to select the most profitable routes for their operations. Less profitable routes because of the weak economic base of the candidate regions --such as is the case for much of Eastern Indonesia-- are less likely to be chosen for regular liner service, but are more likely to be served irregulary and with less frequency (PERHEPI, 1991, p.56).*

(c) **Shortage of open storage.**
Little open space is available for temporary open storage, and where it exists, it often is so limited, that trucks do not have enough space to maneuver around the warehouses for loading/unloading. In many ports, even if open space is available, it is often not paved, and during the wet season this causes serious damage to commodities touching the ground.

(d) **Limited equipment and containerization.**
Eastern Indonesia ports are very poor in equipment, and even more so in container facilities. Even the port of Makassar has only one container lift for 20-foot containers. In other ports, containers are lifted by whatever means are available, usually employing ship winches. Jayapura has two small forklifts for the lifting of 20-foot containers, while Ambon has only a 2-ton container handling capacity.

(e) **Passenger terminals.**
This is not a general problem, but it is an important priority in some ports, such as Jayapura, which totally lack passenger waiting, arrival and ticketing space.

(f) **Navigational aids.**
This is mostly a problem of smaller ports, but is obviously a serious one for many of them, and some of the larger ones as well. Much of the problem is caused by the difficult locations of the ports, in coasts with short distance visibility, or with very high tides. There is a lack of navigational landmarks, no lighthouses or other navigational aids for the orientation of ships, and ships have difficulties finding some of the ports.

(g) **Support by an adequate ground transportation network and/or a small boat network.**
Port facilities are not adequately supported by a ground transportation network or an inter-island/coastal small boat network which could facilitate transportation of commodities to ports for shipment. Transporting cargo to the port, and from the port to the hinterland by road is a costly activity, which is at present almost totally neglected. In some areas, especially in Maluku and Irian, there are no roads connecting shippers with ports, and cargo going to and from the main port is moved by small boats. But even where road access to the port is available, it is often via roads in poor condition, unable to support large trucks, without bridges, and causing damage to cargo. Even the port of Makassar has poor access to the rest of the region, including the airport and the industrial estate. In NTT, subsidiary roads serving minor centers and villages, and sometimes also between some major centers are very poor, and often consist of rough tracks barely negotiable by 4-wheel drive vehicles in good weather. Except on main roads there are often no bridges, and access to many areas is restricted to the dry season when rivers are crossable over bare stony beds (Barlow, 1990, p. 16).

(h) **Poor management of port facilities and operations.**
Inefficient operations in the ports of the region, such as long waiting times for ships to tie up, long turnaround times, poor conditions of the facilities, high cost of operations, and operation of the ports at a financial loss, are all incidental of bad management practices.

c. High cost of shipping

Sea transportation in Eastern Indonesia is a high cost mode of transportation, especially compared to the provinces's ability to pay. Factors contributing to this high cost are the adverse weather conditions prevailing much of the year, the large number of islands to be accessed and served, the long distances between ports, the inadequacy of port and navigational facilities, a discriminatory rate structure through which shipping companies are attempting to reduce possible losses, and loss of cargo caused by delays, poor handling, and damage during frequent transshipments.

• **Adverse weather conditions**: seas in the region, and especially the Banda and the Arafura Seas, are notoriously dangerous. Ten to fifteen small boats --mainly pinisis -- are lost in these areas annually, mostly during the monsoon season. Increased danger and risks of sinking hike shipping costs to the area's destinations.

• **A large number of islands to be accessed and served**: economic production and its cargos, as well as passengers, are scattered among large numbers of islands, making it more difficult and time consuming to reach, especially since many of these ports lack essential facilities.

• **Long distances between ports**: the relative time between sailing and port loading/unloading is very high, and makes the total fair too high for low value, high volume commodities.

• **Inadequacy of port and navigational facilities**: many ports of Eastern Indonesia lack navigational aids allowing night entry and exit. Many ports lack lights for night loading and unloading. As mentioned above, the majority of ports have poor storage facilities, and lack loading equipment such as cranes and forklifts.

. **A discriminatory rate structure**: uncertainty about the availability of return cargo at the ship's

destination, induces shipping companies to assume that their ships will return empty, and thus charge higher unit rates for Eastern Indonesia destinations. Thus, shipping companies' risks are minimized at the expense of the shippers. Often, however, such higher costs to the shipper, and/or empty-return ships could be avoided at a gain to all parties, if advance information about ship scheduling were available.

. **Loss of cargo**: This is often caused by delays, especially in cases of sensitive cargo with time constraints, by poor handling of the cargo, which may result in breakage and other destruction, and by damage during frequent transshipment at intermediate ports. Related to this problem is that of port labor.

. **Inefficient port labor force**: Costs of port labor in Eastern Indonesia are higher than for the nation as a whole. This by itself might not be a cause for higher overall shipping costs, if the productivity of that labor force were higher than that of other ports in the country. However, the opposite appears to be true currently. Labor in the ports of Eastern indonesia work two rather than three shifts, thus causing a 50 percent delay in ship turnaround time, and in addition port workers have gained a reputation among shippers that they do not know how to handle cargo, causing considerable damage during shipment and transshipment. Lack of incentives for stevedoring companies.

. **Poor port management**: Because of poor management practices in most ports of the region, cost-effectiveness has not been a consideration of port authorities or freight forwarders. Port facilities use fee structure is not designed to encourage shippers to complete their operations as soon as possible and free the port facilities. As a result, there are no incentives for shippers to speed up truck loading operations, and this delays ship turn-around time, and increases overall shipping costs. Because of such inefficient port pricing practices, overall use of port facilities, including open and covered storage and use of equipment, are been underutilized and cause delays in ship turnaround times which are translated into higher shipping costs[5].

. **Inadequate information**: Port administrations rarely know well in advance when a ship is scheduled to arrive, and even when they do they rarely have a system for dissemination of that information to shippers. Similarly, there is no central clearinghouse of information on cargo awaiting at ports, and thus ships do not know ahead of time if they will be able to load once they have reached a port. This lack of information extends to all other functions of ports. For example, producers have no way of knowing if storage space is available in the port. Often they have to keep their cargo in the trucks for several days while awaiting the ship's arrival, or are forced to seek private storage space outside the port, and unload and load their cargo again when the ship arrives.

Suggestions for an Improved System of Sea Communications

Eastern Indonesia's reliance on its sea transportation system is likely to continue, and indeed to expand in the future. If we follow existing analyses and proposals for the development of the region, we would expect its economy to grow in certain directions, the dynamics for social and cultural proximity to intensify, and the needs for physical accessibility to increase.

With regard to economic expectations, the types of products now been produced in the region are likely to continue being produced at a larger scale in the future. For example, agriculture, forestry, and fisheries are sectors which have been identified as growth potential sectors. By the nature of their products, these sectors will rely on sea transportation to an even greater degree as they expand. As such, geographical areas and economic sectors in which growth will be expected and/or planned will need to be determined, and their links with the transportation system in terms of needs should be defined.

The provinces of Eastern Indonesia have economies exhibiting great diversity and much potential growth. In order to allow these economies to maximize their potential, the transportation system in general, and sea transportation in particular should be responsive to this diversity. As the productive capacity of the region grows, Eastern Indonesia will also rely more

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5 *Turnaround time: Total port time (turnaround time) for interisland vessels in 1989 in Eastern Indonesian ports ranged from 54 to 99 hours (averaging 75). This compares with 23-26 hours for similar vessles in Singapore (Romanos et al, p.62).*

on sea transportation as a way to bring in intermediate goods as inputs in the production of processed goods, at least in the short and medium term, until that is Eastern Indonesia builds its own capacity to produce these goods. For most of them sea transportation is the most efficient mode.

With regard to the region's physical characteristics and conditions as were discussed earlier, neither the geographic nor the climatological features are likely to be altered, while more and more requirements for physical proximity and accessibility are expected to emerge. These requirements would make regional reliability on sea transportation in many respects paramount, at least in the short and medium term.

Finally, for political, social and cultural reasons -- integration, *Wawasan Nusantara*, participation of the local population in opportunities outside own area -- proximity as achieved by physical accessibility will be expected to play a major role in the development of Eastern Indonesia, because it is the only practical way to bring the provinces closer to each other and make them operate as part of the same national social and cultural system.

This reliance of the region on sea transportation for both its economic growth and its physical and social development makes it imperative for the sea transport sector to evolve correctly within the region's framework for regional economic and spatial development, and in coordination with the region's public and private investment programs. Several interventions to that development can be identified:

- **Multimodality of the transportation system.** The transportation system in Eastern Indonesia should be multi-modal, because different parts of the region are best suited to the use of different modes, and often a combination of modes is necessary to create a complete system. Thus ground transportation, sea transportation, air transportation, and intracoastal water transportation should all be considered as viable options as the region's transportation system is being put in place.
- **Priority to port and navigation aids facilities development.** The facility problems identified in Section III above should be addressed, especially those regarding the main port operations -- size of wharves, equipment and containerization facilities, esp. lifts, cranes and scales, provision/improvement of navigational aids, and construction of passenger terminals -- because without them these ports will become less and less attractive to shipping companies. Other needed facilities such as special loading equipment, cold storage, ice making, and feedlots, could have immediate growth impacts on their regions, for they would allow rapid increases in productivity and exports.
- **Establishment and funding of a regular maintenance program.** One of the main reasons for the poor conditions of the port facilities in the region, is that there exists practically no maintenance program for these facilities presently. Maintenance is supposed to be the responsibility of the local Kanwils, which however do not have the resources to perform even rudimentary fixing and general repairs. Maintenance should become a separate line item in the annual budget of the Ministry of Transportation, and port authorities should be required to prepare and carry out annual maintenance and repairs programs.
- **Design, adoption and implementation of a management system.** This system should address all three components of good management practices, i. e., increase operational efficiency, achieve financial efficiency, and increase productivity of workers, staff, and equipment. Port operations, shipping unloading and loading, storage, and coordination with other transportation modes should all be covered by the management program. To accomplish this, a training program should be designed to educate port authority staff, especially those in managerial and decision positions, on the essentials of proper management.
- **Preparation of a national port development plan.** Eastern Indonesia is a very large region, with a great number of ports of all sizes and levels of activity. To decide which ports will be developed, at which level, with what facilities, and in what order of priority, a port development plan containing a clear set of criteria for port investments is needed for the whole of Indonesia, but is an urgent requirement for Eastern Indonesia, since many islands, towns and villages will continue to rely on sea transportation as their only means of communication with the rest of the country for some time. The plan will need to identify main and collector ports, the levels and types of their operations, and the service areas, both sea and land, which they will support. A detailed Maritime Sector Strategy Plan covering fleet development, perintis service, port development (gateway ports), route planning (RLS system), and development of a management information system was prepared in 1982 under the auspices of the World Bank (Netherlands Maritime Institute, 1982) but it is not clear if, and to what extent it is being used by the Ministry of Transportation and Communications.

- **Development of a systematic procedure for port investment allocations.** The current system is not based on a plan or a systematic assessment of problems. As a result, there are no systematic procedures for the evaluation of requests for improvements in the sea transportation system, and especially the improvement, expansion, and/or construction of new port facilities. As part of the national/regional sea transportation development plan, and based on the Eastern Indonesia development framework, systematic port investment evaluation and prioritization procedures should be developed, perhaps using cost/benefit and project cost/effectiveness techniques, and adopted by the responsible central government agencies.

- **Improvement of the port labor force.** The low quality of work skills among port workers in Eastern Indonesia is a major source of concern to both shippers and shipping companies, as well as to freight forwarders. Workers need to learn how to handle different types of cargo, how to load and unload a ship efficiently, how to deposit and secure cargo, and how to perform their tasks safely. Currently, the Port Workers Cooperative (Koperasi Tanaga Bongkar Muat, KTBM) which is controlling port labor in Indonesia is in charge of training programs. Unfortunately, because of lack of funds, these programs seldom take place. Suggested increases in worker wages and other compensation may allow the imposition of a training fee to workers, or the shipping companies themselves could be charged a training fee by the Cooperative, or port profits from ship visits and use of storage facilities could be used to establish and fund more systematic and effective worker training programs at the local port level.

- **Coordination with the development of a ground transportation support network.** Sea transportation needs to be supported by a ground transportation network connecting the ports with the interior of the productive areas and providing access to the regional output. Poor quality access roads need to be improved and become all-weather ones, for the tropical climate of Indonesia imposes tremendous strains on materials and structural elements.

- **Coordination with the development of a small craft interfacing system.** Since so much of the region consists of islands with little access other than sea transport, and coastal areas not accessible by road, the already existing small boat inter-island and coastal system should be supported to develop and provide an alternative to road access, for these areas where roads are not available. The system consists of a fleet of small but sturdy and sea-worthy craft making the routes among several coastal and island small ports, and connecting them with the collector ports in their area.

- **Establishment of a regional information system and clearinghouse for shippers and ships.** The system would contain and disseminate general information on commodities currently produced and production potential for each province, as well as on cargo currently awaiting to be transported (shipping needs) and port/loading facilities required for these commodities. This information would be matched with information on shipping availability by type of ship, ship schedules by port, and ship space availability. A computer network could be established in each Perumpel port to disseminate this information on-line for clients having access to a computer terminal, and by daily bulletin to all others.

- **Establishment of coordinating mechanisms among regional development and modal agencies.** To succeed in such intermodal support targets, plan, program and operations communication and coordination among local government agencies, vertical agencies, port authorities, shippers, shipping companies, and stevedoring companies, and cooperation and coordination among regional transportation modes are urgently required. Despite the existence of coordinating central government ministries, and in spite of the organization of all the modal directorate generals within the Ministry of Transportation, still today there is minimal joint planning and coordination among the major modal systems at the national level, or between them and the coordinating and planning ministries. Ports investment policies are made without reference to pricing policies, access roads are built without consultation with port development plans, and fleet development decisions are made implicitly without knowledge of the financing capabilities of the private sector. Such uncoordinated decisions cause inefficiencies in public and private investments, low quality operations, shipment delays, and increased transportation costs. The proposed national sea transportation plan should provide direct and explicit mechanisms to link the sea transportation system and its development program with any existing ground and air transportation plans and with any locally completed plans.

- **Initiation of institutional improvements.** Many things can be done in this area, to encourage local initiative and stimulate more efficient use of limited resources. for example, at the central

government level, the Inpres roads program *(propinsi and kabupaten)* could be expanded to cover small port development, especially ports which serve as local traffic hubs for islands and coastal areas with no access to roads. Or, public corporations could be encouraged to form in the island provinces, open to small local investors, which would supply small boats for localized inter-island and coastal transportation. Or finally funds from the newly established Regional Development Account could be made available to local cooperatives to allow them to purchase such vessels.

Some Further Points

Clearly the sea transportation system in Eastern Indonesia is currently performing at sub-optimal levels, and there are several problems that need to be addressed if it is to improve that performance within a reasonable period of time. Given the magnitude of the system's needs, however, and the expected slow pace of funding for its improvement, every effort should be made to assist the current system to function at its maximum possible level, by **first** giving priority to the improvement of the performance of the human factor --port labor, port authority staff, and port management -- by embarking in intensive and well designed training programs at all levels. This effort is the least costly, it will produce results quickly, and will raise staff and workers' attitudes and moral. **Second**, management procedures must be devised without delay, to ensure that existing resources are utilized to maximum advantage. Many problems and system inefficiencies can be corrected through improved management procedures and efforts. **Third**, funds must be allocated to system component maintenance, so that whatever is available and working can continue to perform at the highest level possible.

But the transportation system alone cannot solve the problems of Eastern Indonesia. The region has structural economic problems and infrastructure and human resource deficiencies that need to be addressed without delay, in order to cut short the patterns of underdevelopment prevalent in its provinces, in spite of the large size of past and current government assistance. It is encouraging to observe, however, that many of the components of the desired solutions are not dependent on funds availability but rather on institutional reform. Major among them is the need to eliminate restrictions of various sorts, which impair production, monopolize trade, and create barriers to entrepreneurship. Also important is to allow local freedom and flexibility in the issuance of incentive rules for the attraction of investments and initiatives into the region. A third focus should be the emphasis by local governments on marketing, promotion, and innovative mechanisms for the marketability of the region's unique cultural and natural characteristics. And last but not least, a more directed pattern of public investments on infrastructure and services should be adopted, focusing on the development of these locations within the region with the most growth potential, to reverse the low effectiveness of investments characteristic of the region up to now.

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