

Distr.  
GENERAL  
E/ESCWA/TRANS/2000/2  
11 December 2000  
ENGLISH  
ORIGINAL: ARABIC

**ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA**

**METHODOLOGICAL FRAMEWORK OF THE  
INTEGRATED TRANSPORT SYSTEM  
IN THE ARAB MASHREQ**

**VOLUME I  
GENERAL OUTLINE AND MAIN FEATURES**

United Nations  
New York, 2002

02-0421

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## Preface

Pursuant to the recommendations of the Economic and Social Commission for Western Asia (ESCWA) Committee on Transport, which held its first session at United Nations House in Beirut on 9 and 10 February 1999, a statement was issued at the twentieth ESCWA session, held on 27 and 28 May 1999. In that statement, Commission members agreed to begin work on the development of an integrated transport system in the Arab Mashreq and the adoption of an international transport network for that system (see the map issued) in June 1999 by the Transport Section of the ESCWA Sectoral Issues and Policies Division (SIPD). The annexes to this volume include four maps adapted from the map of the Integrated Transport System in the Arab Mashreq (ITSAM), which show the road network, the rail network, the ports and the airports respectively.

A comprehensive methodological framework is required in order to develop the integrated transport system in the region and achieve specific goals in line with a comprehensive and integrated analytical method that can be applied in a systematic and sustained manner. As part of its programme of work for the biennium 2000-2001 the Transport Section has therefore begun preparation of that methodological framework, in two volumes. Volume I is entitled *General Outline and Main Features* and volume II *A Policy-sensitive Model for Predicting International Freight Flows (Trade)*. Volume I draws a broad outline of the proposed methodological framework and reviews the main hypotheses, variables, relationships and groups used in the analysis, together with the options, anticipated effects and prediction process. It also deals in some detail with the main features of the proposed methodological framework and development priorities.

The introduction to Volume I provides general background information on the region and on the role of the ESCWA Transport Section. Chapter I reviews the general features of the proposed methodological framework, while chapter II provides a general description of that framework. Chapter III describes the main aspects of the methodological framework for policy formulation and analysis used in the development of ITSAM; chapter IV reviews some of the major issues and priorities related to the development of the network; and chapter V consists of a conclusion.

Volume II reviews a mathematical model for predicting international freight flows (trade) in the Arab Mashreq. The review describes the basic hypothesis of the model, the method used to represent the integrated transport network in order to apply that model; and the results obtained, using an example that demonstrates the capacity of the model to predict freight flows over the network and analyse policies and options for improving performance levels and increasing demand for international freight transport.

Volume I was prepared by Mr. Nabil Safwat, Chief of the ESCWA Transport Section and immediate supervisor of the study. Mr. Safwat was also involved in the preparation of Volume II, together with Mr. Mohammed Kamal Hassan, First Economic Affairs Officer in the Section from March to July 2000. Mr. Ahmed Farahat, Chief of SIPD, was responsible for overall supervision of the study.



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## Introduction

The principal objective of ESCWA is to increase the effectiveness and efficiency of sustainable social and economic development activities in the Western Asia region by developing and strengthening regional cooperation and integration between the 13 ESCWA member countries, namely, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

In 1997, the total population of the ESCWA region amounted to some 155.6 million, which represents some 58 per cent of the population of the Arab world and 2.6 per cent of the total world population of 5.8 billion. Approximately 34 million or 21.8 per cent of the ESCWA total, regional population lives in the Gulf States. Excluding the Palestinian Territories, the ESCWA region covers an area of 4.7 million square kilometres, representing approximately 35 per cent of the total area of all Arab States and 3.6 per cent of the total area of the world, of which 2.5 million square kilometres or 53 per cent of the ESCWA total belong to the Gulf States. From the economic perspective, in 1995, the average annual per capita income for ESCWA member countries was approximately US\$ 6,734 (US\$ 11,215 in the Gulf States and US\$ 1,356 in the other countries). In the same year, average per capita income in the world was US\$ 4,920 while in the Arab countries it was some US\$ 4,971, making average income in ESCWA member countries approximately 135 per cent of the average for Arab countries. In 1997, the average number of vehicles per 1,000 population in ESCWA member countries was approximately 160: 231 in the Gulf States and 88.7 in the other countries of the region, while the comparable figures in the Arab countries and the world were 113 and 121 respectively.

In 1997 total exports in ESCWA member countries were both some US\$ 124 billion, representing approximately 2.4 per cent of total world exports, of which US\$ 108 billion or 87 per cent of total regional exports were from the six Gulf States. In the same year, the value of imports to the region was approximately US\$ 109.5 billion, some 2 per cent of total world imports, of which US\$ 76 billion-worth were to the Gulf States, an amount equivalent to 69.4 per cent of all regional imports. In 1997, each ESCWA member had a share of regional exports no greater than 8.6 per cent, in contrast to the 1990 average of 10.9 per cent, while the corresponding share of regional imports was 10.4, compared with 9.1 per cent in 1990. The situation was broadly similar in all the other Arab countries. The Arab Monetary Fund, *inter alia*, sought to increase that proportion and established a fund of US\$ 500 million in order to finance intraregional trade between the Arab States, but there was little demand for funding, given the complexity of border and customs procedures between the countries of the region (see references 1, 2 and 4).

The Commission is therefore aware of the vital role that basic transportation structures play in promoting and supporting sustainable development and of the importance of integrating transport networks and simplifying border and customs procedures and commercial exchanges, in order to facilitate the movement of freight and passengers between countries, within and beyond the region. It believes that the facilitation of international and regional transport in the region will have a considerable impact, strengthening and enhancing the competitiveness of the countries of the region in international trade, industry and services, and allow them to assume their rightful place among the countries and regions of the world. This is of particular importance in view of the growing trend towards globalization.

Guided by the privately-related achievements of ESCWA and the other United Nations regional commissions realized by establishing specialized Government committees to coordinate work at the regional level, at its nineteenth session, held in Beirut from 5 to 8 May 1997, ESCWA adopted resolution 213 (XIX), concerning the establishment of a committee on transport, to be made up of Government representatives from member countries who are specialized in the field of transport, and which would hold meetings every two years, starting in 1999. The Committee on Transport held its first session on 9 and 10 February 1999, and the Executive Secretary of ESCWA presented the report and recommendations of that first session to the twentieth ESCWA session, held in Beirut on 27 and 28 May 1999.

Resolution 213 (XIX) identified the main tasks of the Committee, namely, participation in the establishment and formulation of priorities for programmes of work and medium-term plans in the field of transport; monitoring of developments in the field of transport in ESCWA member States; monitoring of the progress achieved in the activities of the ESCWA secretariat in the field of transport; follow-up of

international and regional conferences, participation of member States in them and coordination of member States' efforts relating to the implementation of resolutions and recommendations.

The principal role of the ESCWA Transport Section, therefore, is to coordinate between member countries with the aim of adopting and developing an integrated transport system in the ESCWA region, with a view to ensuring that the system assures an appropriate standard of efficiency, effectiveness and safety for freight and passenger transportation between ESCWA member countries and between those and the other countries and regions of the world. The specific objectives of the Transport Section may be summarized as follows:

(a) To promote and support, in coordination with member countries, sustainable regional development in the ESCWA region by adopting and developing an integrated regional transport system, within a unified analytical framework;

(b) To facilitate international and regional transport in the region, improve safety and increase the efficiency of transport and communications;

(c) To provide technical support to ESCWA member countries in order to contribute to the implementation of transport plans in those countries and coordinate their integrated transport system policies, legislation and specifications with a view to ensuring their standardization within the global framework.

On the basis of the foregoing, and in order to promote and support sustainable development in the region and implement ESCWA objectives and resolutions in the field of transport, the first step was to adopt an integrated network for international transport in the region, and this has been done, as mentioned earlier. It was then necessary to identify issues and priorities for developing the network, and to streamline freight flows on that network with a view to facilitating regional trade and tourism. In order to achieve those objectives, it was necessary to apply a comprehensive and analytical methodological framework.

The general features of the proposed methodological framework are outlined in chapter I, while chapter II describes the main bases, hypotheses and relationships of that framework.

## I. GENERAL FEATURES OF THE METHODOLOGICAL FRAMEWORK

In order to develop an integrated transport system in the Arab Mashreq a systematic and sustained analytical, comprehensive and integrated planning operation must be applied. The component of that process will represent the methodological framework for the development of international transport in the region.

Like a planning process, such an operation has specific objectives, which can be summarized as follows:

(a) To facilitate and improve the efficiency of international transport in the region by, *inter alia*, reducing costs, transportation times, and administrative and customs procedures, and improving safety and security for freight and passenger traffic;

(b) To facilitate, improve the efficiency and reduce the cost of international trade in the region, with the aim of increasing the volume of intraregional and extraregional international trade and transit trade through the region;

(c) To contribute to an improvement in the efficiency of agricultural and industrial production and an increase in the competitiveness of the commodities and services produced and offered by the countries of the region, by reducing the relevant logistical costs;

(d) To contribute to the proposal, analysis and evaluation of investment and funding policies and priorities in the international and regional transport sector of the region.

The operation entails analysis, because it is based on the collection of data, the interpretation of the situation on the ground, the definition of objectives and indicators of success and methods of measuring such success. It also involves proposing alternatives, projects and plans, analysing those alternatives and predicting their positive and negative impacts. Those alternatives and plans and their impacts must then be quantitatively and qualitatively evaluated and the best of them must be put forward for adoption. Practical programmes for the financing and implementation of a set of proposed plans and projects, follow-up on implementation and performance evaluation must then be formulated.

The operation is systematic in that the above-mentioned analytical steps and phases must be conducted in a systematic manner: it is not possible to propose solutions before data have been collected and the situation on the ground has been interpreted. Similarly, it is not possible to carry out analysis or make evaluations without defining the objectives and variables required in order to assess the extent to which they have been achieved. The operation must be sustained, because it is inevitable that the findings of the follow-up will reveal both positive and negative aspects of the projects implemented, and make it necessary, in the light of fresh developments, to recommence the process of collecting data, interpreting the situation on the ground, and proposing alternatives and additional projects or amendments to phases that have not yet been implemented. It is not possible to stop at a given point in time, because operation must be sustained in a dynamic manner.

The distinguishing feature of this methodological framework is that it is comprehensive and integrated. It is comprehensive in that it covers the following:

(a) All means of international and regional transport, namely, land (by road, rail and pipeline), sea (through seaports and by ship and container via sea and river routes) and air (through airports, by passenger and cargo aeroplanes, air routes), and multi-modal methods of transport, including containers transported by land, sea and air; and the routes linking together the various countries of the region and linking the region with the networks of surrounding countries in Asia, Europe and Africa;

(b) All types of freight, including agricultural and industrial products of all types and specifications, with their various requirements; such raw materials as, *inter alia*, petroleum, natural gas, coal and iron; chemical substances; machinery and equipment; vehicles; and hazardous materials; and passengers, including businessmen, officials and tourists;



(c) Aspects of supply and demand, in equal measure. Supply includes the description and analysis of all the above-mentioned means of transport in the international and regional transport sector, including sectoral organization, planning, design, construction, management, maintenance and evaluation. It also covers the analysis, evaluation and development of the performance of such sectoral institutions as ministries, public institutions, bodies and companies; installations, including roads, railways, seaports and airports; vehicles, including cars, lorries, trains, ships and aeroplanes; containers; freight and transportation companies and their agents; and the procedures involved in commercial exchanges, including electronic data exchange and e-commerce; border-crossing procedures; customs; technical and engineering specifications; design and operating standards and the extent to which these are compatible within the countries of the region, including maximum authorized mass per axle on roads, traffic regulations, traffic and road signs and numbering on international roads, container and quay specifications at the various seaports in the region; and all construction-related programmes, services, maintenance, training, study, research and development. Demand includes, *inter alia*, the description and analysis of the volume and distribution of demand for freight and passenger transportation; the carrying capacity of vehicles of all types; the characteristics of carriers, whether merchants, countries, industrialists or agriculturalists; passenger needs and requirements; origin and destination of journeys;

(d) All positive and negative impacts associated with or arising from transport, including such economic effects as increased economic growth, increase of volumes of intraregional trade and increased competitiveness for the products and services offered by the countries of the region, and reduced transportation times and costs; environmental effects including increases or reductions in air, water and noise pollution; and such local effects as regional development within and between countries, the expansion of areas suitable for development and the local redistribution of wealth and opportunities for employment.

The methodological framework is integrated in that it investigates the various means of transport in an integrated manner compatible with the objective of deriving the greatest possible benefit from the qualitative advantage of each, according to the type of freight and passenger carried and transportation distances, times and costs. It also considers the various means of transport and their geographical distribution in the region and identifies their roles, with a view to fostering their integration and preventing conflict and competition, of which there are many instances, and which lead to a decline in investment, undermine efforts and plans, thereby having a negative impact on the region.

## II. GENERAL DESCRIPTION OF THE METHODOLOGICAL FRAMEWORK

### A. MAIN HYPOTHESES

On the basis of the foregoing, it is clear that any integrated transport system in the region will be composed of fixed and movable material components that are planned, designed, established, operated, maintained and followed up by a group of ministries, institutions, bodies, companies, organizations and associations that all interact with one another in order to implement the freight and passenger transport operations that are required in order to conduct various economic and social activities at destination points. Moreover, the transport system in turn represents one of the numerous systems of economic and social activity in the region that include the agricultural and industrial production systems, services, banking, insurance and financing and other systems which should all interact with one another in order to bring about the economic and social development that is sought in this region of the world.

The methodological framework for the analysis of international transportation systems in ESCWA should therefore be based on the two following fundamental hypotheses:

- (a) The assorted international and regional transport systems mentioned above should be viewed as a single, comprehensive, integrated international transport system that includes various means of transport;
- (b) The interaction between this comprehensive system of international transport in the region, or 'transport system', and the other systems of economic and social activity related to development in the region, or 'activity system', should be taken into consideration in the proposed analytical framework.

### B. MAIN VARIABLES AND RELATIONSHIPS

The interaction between the transport system and the activity system produced a traffic flow that is distributed over all components of the comprehensive transport system in the region.

Three main variables can therefore be identified in the context of the proposed methodological framework, as follows:

- (a) The Integrated Transport System in the Arab Mashreq, or the 'transport system';
- (b) The international activity system in the Arab Mashreq, or the 'activity system';
- (c) The traffic flows distributed over all components of the transport system, or the 'traffic flows'.

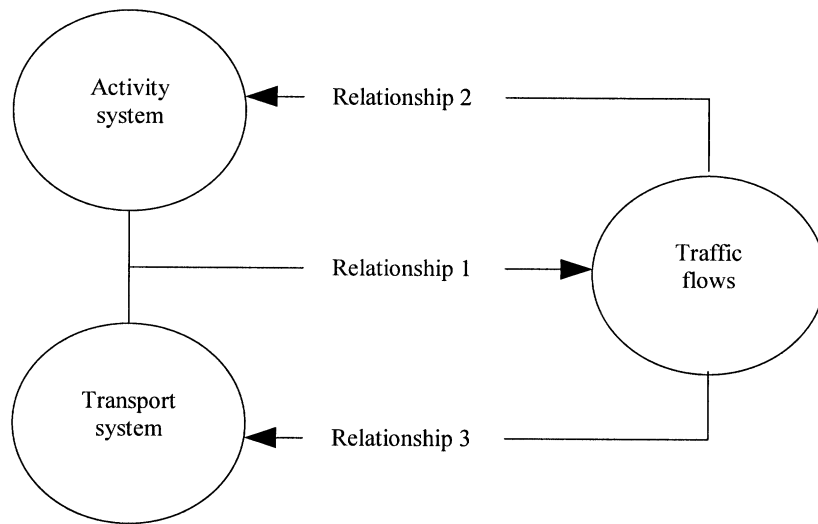
It is possible to describe three basic relationships between the three main variables, which are also illustrated in figure I, as follows:

*Relationship 1.* The interaction between the transport system and the activity system leads to differing types of traffic flow, of various volumes that are distributed between the components of the transport network.

*Relationship 2.* Over time, traffic flows lead to changes in the activity system. A sustained, regular flow traffic between the ports of Alexandria and Beirut over a period of time, for example will lead to a reduction in transport costs and a consequent increase in commercial activities between the two countries.

*Relationship 3.* Traffic flows eventually lead to changes in the transport system. A sustained, regular flow of traffic between the ports of Alexandria and Beirut over a period of time, for example, will lead to an increase in direct, regular shipping routes between the two countries.

**Figure I. Main variables and relationships in the methodological framework**



### C. MAIN GROUPS

Before concluding the description of the proposed methodological framework, the main groups and bodies, the decision taken by which will have a fundamental impact on the main variables of the analytical framework must be identified. Those include transport, activity and traffic. Eight basic groups can be identified, namely:

(a) Users: those who utilize the transport system and represent the demand for transport. They include passengers and freight carriers and their representatives and support services, which include commerce, industry and agriculture and tourism companies;

(b) Operators: those responsible for all or some aspects of the purchase, operation, administration and maintenance of the moving components of the transport system, and include, *inter alia*, overland freight companies and international overland passenger transport companies, ship owners, shipping companies, airlines, container handling companies, customs administrations, shipping chambers and freight agents;

(c) Owners: those responsible for all or some aspects of the establishment, operation, management and maintenance of the fixed components of the transport system including, *inter alia*, roads, railways, airports and seaports. Owners include ministries of transport, communications, public works and municipal and village affairs; public institutions and bodies responsible for roads, bridges, railways, seaports and civil aviation; and such private sector bodies as build, own, operate and transfer (BOOT) companies;

(d) Regulators: those responsible for establishing policies, laws and systems including traffic and safety regulations, traffic control laws, maximum loads, standard specifications, customs and border procedures and the procedures and laws governing commercial exchanges. Regulators include, *inter alia*, ministries of transport, communications, the interior, finance and commerce, and the bodies responsible for standard specifications;

(e) Enforcement entities: those who enforce laws, legislation and procedures on the ground. They include ministries of the interior, finance, transport and communications, commerce, health, agriculture and industry and their representatives at border points, customs departments, seaports and airports and on roads and railways;

(f) Regional and intraregional coordinators: the regional and global bodies whose duties include coordinating between countries in order to achieve regional development within a harmonized international

framework. This group can be divided into subgroups according to the level and limits of their concern and the extent of their impact on the development of the ESCWA region and of the international transport system there. At the forefront are three regional organizations which should, in theory, have considerable direct influence, namely, ESCWA, the general secretariat of the Gulf Cooperation Council (GCC) and the Arab League Council for Arab Economic Unity. Next in importance is a group of Arab organizations and associations that specialize in the transport sector, including the Arab Union of Railways, the Arab Sea Ports Federation, the Arab Air Carriers Organization, the Arab Union of Land Transport, the Arab Union for Maritime Forwarders, the Arab Civil Aviation Commission and the Arab Academy for Science and Technology and Maritime Transport. Lastly, there is another group of international or regional organizations that are not directly concerned with the region or that deal with issues similar to those affecting the region and which could be of benefit. Those include the United Nations Development Programme, the International Civil Aviation Organization, the United Nations Conference on Trade and Development, the World Trade Organization (WTO), the United Nations Centre for the Facilitation of Procedures and Practices for Administration, Commerce and Transport, the World Customs Organization, the International Roads Federation, the International Union of Railways, the International Telecommunication Union, the European Union and the Mediterranean countries;

(g) Financiers: those who finance development projects in the transport sector in the region, including funding for freight carriers, operators, owners and coordinators. This group includes the ministries concerned in the countries of the region and assorted financing funds, including the Arab Fund for Economic and Social Development, the Islamic Development Bank (IDB), the Saudi Fund for Development, the Abu Dhabi Fund for Development, the Kuwait Fund for Arab Economic Development, the World Bank, the Asian Development Bank, the European Bank and the African Development Bank;

(h) Society at large. This includes assorted groups that are concerned with transport in the region which do not however, play a direct role of major importance in transport operation. They include the press and the media, associations for environmental conservation, trade promotion and sustainable regional development.

#### D. OPTIONS

Having identified the basic analytical framework and the major groups concerned with transport, we may focus on identifying the options or choices available to the above-mentioned eight groups in order to bring about changes in the transport activity system, and methods of predicting the expected impacts on those eight groups of the selection that they make among the available options. The analytical framework may therefore first be described by identifying the options, and secondly by identifying expected impacts, and clarifying the prediction process used in order to calculate the impact of the selection of a particular set of options.

The options are a set of decisions that any of the eight above-mentioned groups can make in order to bring about changes in the transport and activity systems.

Decisions relating to the transport system have an impact on its performance by changing its infrastructure, technology, operating policies, organizational structure or aspects of its coordination. With respect to infrastructure, the technical and construction design specifications may be altered for any of its part, including road, railway, airport or port connections, as may the form and length of networks and connections, road signs, and the type and level of services offered on roads and at seaports and airports. With regard to technology, vehicles powered by electricity, and solar energy may be used, increased use may be made of containers and high-speed trains may be introduced for international transportation in the region. As for operating policies, the laws governing traffic, maximum axle loads and maximum speeds on roads may be amended; loading and unloading processes for ships and containers in seaports may be updated; border, customs and trade administration procedures may be simplified and electronic data interchange (EDI) may be utilized, in line with the protocols adopted by the United Nations Rules for Electronic Data Interchange for Administration, Commerce and Transport (EDIFACT). The use of e-commerce may also be expanded and changes may be made to transport and communications costs and tariffs in order to make them more competitive and thus attract investment, trade and tourism to the region. With regard to organizational structure, the ministries and public bodies concerned with transport may be reformed or their spheres of

competence and responsibilities, and the channels of communication between them, may be adjusted; national bodies may also be established in order to facilitate trade and transport. Concerning coordination-related aspects at regional level, the roles of the three main regional organizations may be defined and both their mutual coordination and that with the other Arab Unions may be strengthened. Their spheres of competence and the allocation of their roles may also be clearly defined in order to reduce duplication, remedy deficiencies and rationalize development, investment and funding policies in the region.

The options available for bringing about change in the activity system include those with an impact on demand for international and regional transport in the region. Such options, the establishment of an Arab free trade zone or an amalgamated customs union, are usually beyond the influence of decision makers in the transport system. Therefore, this set of decisions is of particular significance to the proposed methodological framework. That is because hauliers of various kinds of freight have at their disposal a range of options with regard to import sources, export destinations, haulage methods and routes and their decisions depend upon many variables, the most important of which are the ease and efficiency of international transport in the region. It has already been noted that Arab traders have refrained from using the financing available to them from the Arab Monetary Fund for the promotion of trade between Arab countries because of the difficulties involved in customs and border procedures in the region. Other factors relating to the quality and cost of products are involved, and those also depend on the ease and efficiency of international transport in the region. The analytical methodological framework must therefore take into consideration the inter-relationships between both the variables of demand for transport and the supply of methods of transport.

#### E. EXPECTED IMPACTS

The expected impacts are those aspects of the transport and activity systems likely to be affected by changes to the above-mentioned options. Those impacts will be reflected in the same eight groups that selected those options. The impacts should therefore be reviewed in the light of the groups concerned.

Transport system users, namely, hauliers and passengers, are interested in the level of service provided, which includes travel costs and times, safe arrival at destination and the ease of administrative, commercial, border and customs procedures. Operators are concerned either with increasing their share of the demand for transport or the net income that they derive from operations. Therefore, the variable of greatest interest to them is the cost of the resources they use in order to provide the services, in addition to capital and maintenance costs. However, they are also interested in the level of services, because that has an impact on the volume of demand for their services. Owners are interested in the amount of investment required in order to set up the infrastructure; the condition of infrastructural installations; the way in which they are used; the quantity of heavy traffic on them and the consequent cost of their maintenance and upgrading. Legislators are primarily concerned with aspects of safety and security. It is appropriate here to note that this group should also attach equal importance to the facilitation and simplification of procedures in order to serve hauliers and passengers. Society at large has numerous concerns, including social, environmental, health and tenure concerns and sustainable development issues. Coordinators are concerned with aspects of coordination between countries with regard to the unification of standards and specification, the simplification of procedures and the facilitation of transport. They are also interested in increasing trade exchange between the countries of the region and achieving sustainable development at regional level. It is therefore clear that the effect of the above-mentioned impacts on the various groups will vary according to their respective concerns and will also vary from one body to another, within each group, because some stand to gain and some to lose.

#### F. PREDICTION PROCESS

As noted above, the core of the analytical framework is the process used in order to predict the impact of the selection of a particular set of options. The major issue here is the prediction of even traffic flows in the transport system, resulting from the selection of a particular set of options. If such flows can be forecast, it would be possible to predict the anticipated impact on the eight groups by utilizing a number of impact models. This aspect of the methodological framework is of considerable importance and will therefore be described in chapter V, along with other major aspects of the methodological framework. Volume II of this study contains a detailed description of the impact model used in order to predict even international freight traffic flows in the region.

### III. MAIN ASPECTS OF THE METHODOLOGICAL FRAMEWORK

The main aspects of the methodological framework, which are clarified below, are described in figure II.

#### A. DESCRIPTION OF THE ECONOMIC, SOCIAL AND POLITICAL FRAMEWORK IN THE ARAB MASHREQ

This aspect of the methodological framework involves identification and analysis of the particular features of the Arab Mashreq, including economic, social and political factors that must be considered in order to carry out an analysis and develop an integrated transport system in the region. Those factors include population distribution over the region, average per capita income and its distribution between member countries and gross national product and its distribution between production and services sectors in the countries of the region. The laws and institutions that shape the general economic, social and political climate in member countries and neighbouring countries also play a part. Those include the pertinent bilateral, regional and international agreements. Such of those agreements that relate directly to the transport, trade, tourism and customs sectors are discussed below. The category of laws and institutions covers, for example, the broad orientation of a country towards privatization, economic restructuring, European partnerships, the Arab common market and the impact of WTO.

#### B. DESCRIPTION OF ITSAM

This is the basic component requiring development through the methodological framework in order to increase the international trade and tourism traffic connected to the region. Such development requires the collaboration and integrated efforts of the parties concerned at national and regional levels. The main factors comprised within this component are set forth below.

##### 1. *Infrastructure*

This part includes road and rail networks, seaports, major international airports in the region (see maps 1, 2, 3 and 4 in annex), and the regular maritime and air routes in the region. Description of the infrastructure covers the technical and engineering specifications and classification of such network components as junctions and exits; signs; traffic lights; current and planned development projects; maintenance and upgrading programmes; support services; construction, maintenance, development and administration costs; and funding volumes, sources and schemes.

##### 2. *Fleets, containers, hardware and software*

This includes cars, lorries, ships, aeroplanes, containers, trains, locomotives and derricks (small cranes), as well as computer and communications equipment and computer and EDI software. The description of those elements also includes the size and ownership of fleets, the age and technical specifications of vessels and equipment and the percentage of them available for use; programmes for and the cost of purchase, maintenance and upgrading vessels, equipment, hardware, software and administration, and funding volumes, sources and schemes.

##### 3. *Laws, regulations, by-laws and procedures*

This includes a sizeable and diverse set of laws, regulations, by-laws and procedures, including traffic and maximum load regulations; the issuance and renewal of permits; technical inspections; rules and regulations governing general and international transport and freight; maritime agencies; port regulations and by-laws; rules, regulations and procedures governing consumption and temporary entry and export, re-export and transit traffic.

**Figure II. The ITSAM-FRAMEWORK**

#### 4. *Institutions and human resources*

This includes ministries, national public bodies and institutions and the national, regional and international private bodies and companies involved in the international transport network in all countries of the region. The description included a definition of the part concerned; its institutional regulations, competencies and responsibilities; its organizational structure and the distribution of the labour force therein; training programmes; production averages; budgets and plans; and funding volumes, sources and schemes.

#### 5. *Bilateral, regional and international agreements*

This includes a large number of bilateral, regional and international agreements, treaties and protocols related to international freight and passenger transportation in each country in the region. The description covers the subject of the agreement, the main clauses and conditions, the countries that are signatories thereto, the extent of application and the positive and negative impact of the agreement on increasing the volume of trade, tourism and improving international transport in the country concerned. One such agreement is the Convention of the Regulation of Transit Traffic among the Arab League States, the standardized Arab Carnet, and the TIR Convention.

### C. MAKING ITSAM OPERATIONAL

The above-mentioned components of the integrated transport system interact in order to make operative the system, which can be described from two perspectives. The first concerns the resources consumed in operationalization processes while the second relates to performance levels from the viewpoint of users of the transport system, namely, merchants, tourists, hauliers and their agents, freight agencies, tourist agencies and society at large. The resources consumed in making the transport system operational include fixed and movable capital bases, namely, infrastructure, fleets, equipment, containers, hardware and software; and the human resources deployed in management, operation, maintenance, follow-up and financial resources. From the viewpoint of users, performance levels are evident in the type of procedure followed in international freight and passenger transport operations, the documents and forms used and the time and costs of transport and transactions.

### D. CUSTOMS, SECURITY AND CONTROL SYSTEM

This system includes infrastructure; hardware and software; and the customs, security and control laws, by-laws, systems and procedures that are generally applied at border points, in central customs departments and the laboratories used for analysis and quality control with the aim of ensuring that customs duties are collected; goods are fit for use; and prevent smuggling. It also includes the institutions and labour force working in the relevant customs, security and control departments. This aspect of the methodological framework is of considerable importance in the analysis of performance levels and, consequently, of all the other components of the framework.

### E. DESCRIPTION OF THE INTERNATIONAL ACTIVITY SYSTEM AND DEMAND FOR TRANSPORT IN THE ARAB MASHREQ

This includes a description of the economic and social base and the related rules, systems, institutions and agreements on trade, tourism and passenger travel activities, between ESCWA member countries, and between those and the other Arab countries and the rest of the world. Trade activities include import, export, transit and re-export operations. Tourism-related activities include passenger journeys to, from and through the countries of the region and involving temporary entry to those countries.

The options and policies related to the development of these international activities have an impact on the volume and distribution of the demand for international freight and passenger transport in the region. That includes the origins and destinations of journeys within and beyond the countries of the region and the distribution of traffic between those origins and destinations, from the countries of the region to non-regional countries and vice-versa, as well as transit through them and the means of transport used.



#### F. MODELS FOR PREDICTING EVEN TRAFFIC FLOW VOLUMES, PERFORMANCE LEVEL AND RESOURCE COSTS

This included a group of predictive mathematical models used in order to estimate future volumes demand for international freight and passenger transport, including journey origins and destinations, the volume of traffic between origins and destinations and the methods of transport used; performance levels, including procedures, documents, time and cost; and the consequent volume of even traffic flows expected over all components of the integrated transport system, times and cost of transportation and logistics. The mathematical models are also used in order to estimate the cost of the resources likely to be consumed in the course of delivering performance levels in the future. Those models are important because, in addition to being predictive, they contribute to the analysis of policies and options for development of the integrated transport system, the customs, security and control system and the international activity system in a harmonious, logical and integrated manner. As mentioned above, Volume II of this study will review the proposed prediction model for the even international freight flows in the region.

#### G. EXPECTED IMPACT PREDICTION MODELS

This is a set of mathematical prediction models used in order to estimate the expected economic, social, environmental, health and spatial impact on the eight main groups involved in the development of an integrated transport system in the region. Those groups were defined in chapter II, part C and the related impacts on each group are described in part E of the same chapter.

#### H. ANALYSIS AND EVALUATION OF EXPECTED IMPACTS AND SELECTION OF OPTIMUM OPTION

This important aspect of the methodological framework included analysis and evaluation of the expected impacts of development policies for the integrated transport system, the customs, security and control system and the international activity system. In earlier stages, those were considered with the objective of selecting the optimum set of such policies and related projects and programmes for implementation on the ground.

#### I. ACTION PLANS, IMPLEMENTATION PROGRAMMES AND FINANCING

This is the executive aspect of the methodological framework. It embraces a number of plans of action and practical programmes, including the budgets necessary for their implementation by the main groups entrusted with the development of the integrated transport system, the customs, security and control system and the international activity system, namely, owners, operators, regulators, coordinators and financiers. The contribution of each group is dictated by its interests. Such plans and programmes include sets of studies, expert group meetings, technical committees, conferences, ministerial sessions, research implementation projects, which should be conducted in a coordinated and integrated manner in order to achieve the stated objectives at the lowest possible cost.

Those plans and programmes can be divided into the following main types:

- (a) Development of the infrastructure;
- (b) Development of performance levels;
- (c) Development of fleets, equipment and container handling;
- (d) Development of laws, by-laws and procedures;
- (e) Development of institutions, human resources, hardware and software;
- (f) Development of original and international agreements;
- (g) Development of the methodological framework, information systems and scientific research;
- (h) Development of financing schemes.

The main objective of all those plans and programmes may be summarized as being to facilitate international transport and raise performance levels. Chapter IV of this paper reviews some components of plans of action and implementation programmes, based on divisions set forth above.

#### J. FOLLOW-UP OF IMPLEMENTATION AND EVALUATION OF PRACTICAL PERFORMANCE

This is the final and decisive aspect of the proposed methodological framework. No plan or programme can make positive progress without close follow-up of implementation of those plans and programmes or effective evaluation of the extent of improvement or decline in the performance levels of the different components of the integrated transport system, the customs and security system and the international activity system.

At this point it should be re-emphasized that this process is sustained and systematic rather than arbitrary and disjointed.

#### IV. DEVELOPMENT ISSUES AND PRIORITIES

As mentioned above, the main objectives of applying the proposed methodological framework are to facilitate international transport and raise the performance levels of the transport, customs, security, trade and tourism systems in order to increase trade exchange and tourism between both the countries of the ESCWA region and between those countries, the other Arab countries and the rest of the world.

Some of the development issues and priorities are identified below, with the focus on ITSAM.

##### A. DEVELOPMENT OF THE INFRASTRUCTURE

###### 1. *The regional road and railway network*

- (a) Agreement on classification of regional road junctions;
- (b) Identification of technical, engineering and construction specifications, axle loads, signals and network support service levels;
- (c) Standardization and unification of specifications, axle roads, signs, signals and network support service levels;
- (d) Identification of costs, plans and programmes for actual and future network construction, maintenance, upgrading and management projects;
- (e) Development, standardization and, if possible, unification of network construction, maintenance, upgrading and management methods and techniques;
- (f) Identification of methods for systematic or random monitoring of fixed and moving axle loads, as currently applied on roads;
- (g) Development, standardization and, if possible, unification of methods and techniques for monitoring axle loads;
- (h) Proposal of future projects required in order to complete development of the regional network; and establishment priorities.

###### 2. *Ports*

- (a) Identification of technical and engineering specifications, length and depth of quays, support services and storage and handling capabilities at international seaports in the region;
- (b) Agreement on classification of the seaports included in the regional network according to the specifications, capacities, specialization and advantages of the site;
- (c) Identification of costs and of plans and programmes for the construction, maintenance, upgrading and management of regional network seaports;
- (d) Development of standardization of construction, maintenance, upgrading and management methods and techniques for regional network seaports;
- (e) Identification of current, planned and approved future projects for the development of seaports;
- (f) Proposal of projects for the future and establishment of priorities required for the completion of seaport development.

### 3. Airports

- (a) Identification of technical and engineering specifications and the conditions and number of runways and design capacities for regional network airports;
- (b) Agreement on classification of regional network airports on the basis of the specifications and advantages of the site;
- (c) Identification of costs, plans and programmes for the construction maintenance, upgrading and management of regional network airports;
- (d) Development and standardization of construction, maintenance, upgrading and management methods and techniques for regional network airports;
- (e) Identification of current, planned and approved future projects for the development of airports;
- (f) Proposal of future projects required in order to complete the development of airports and establishment-related priorities.

#### B. DEVELOPMENT OF PERFORMANCE LEVELS

- (a) Identification of the procedures and documents required for and the time and cost of international freight and passenger transport operations, within and between each of the countries of the region;
- (b) Development, standardization and simplification of procedures, reductions in the number of documents and checks required and in time and cost;
- (c) Identification of the extent to which EDI is utilized in international transport and customs procedures;
- (d) Application of state-of-the-art information technologies (ITs) and EDI programmes in order to simplify procedures and raise performance levels;
- (e) Encouragement of the use of multiple-model transport;
- (f) Simplification and unification of tariff structures in the seaports of the region;
- (g) Following-up of trade procedures and the privatization of operations;
- (h) Identification of current, planned and approved future projects aimed at developing performance levels;
- (i) Proposal of future projects required in order to complete development of performance levels and establishment levels.

#### C. DEVELOPMENT OF FLEETS, EQUIPMENT AND CONTAINER HANDLING

- (a) Identification of size and characteristics of land, sea and air fleets owned or managed by member countries;
- (b) Development, maintenance and upgrading of land, sea and air fleets;
- (c) Creation of alliances and mergers between Arab land transport, shipping and airline companies;
- (d) Establishment of national and regional councils to protect hauliers' interests and support national fleets;

(e) Identification of current and approved future projects for the development of fleets, equipment and container handling;

(f) Proposal of future projects aimed at completing the development of fleets, equipment and containers and establishment of priorities.

#### D. DEVELOPMENT OF LAWS, BY-LAWS AND PROCEDURES

(a) Identification of the laws, by-laws and procedures related to international transport, customs, security and external trade that are in force in the countries of the region and the parties entrusted with implementation thereof;

(b) The conducting of analytical studies of those laws and procedures in the countries of the region and drawing of comparisons with selected models from countries that are more advanced in the field;

(c) The passing of laws on e-commerce and EDI;

(d) Development, standardization and, if possible, unification at regional level of the laws, systems and procedures of countries of the region.

#### E. DEVELOPMENT OF INSTITUTIONS, HUMAN RESOURCES, HARDWARE AND SOFTWARE

(a) Establishment of a national body for the facilitation of transport and trade which includes representatives from all the relevant parties in the country, from both the private and public sectors;

(b) Identification of the current situation in all countries of the region with regard to their respective relevant organizational structures, responsibilities and competencies and the available human resources, hardware and software;

(c) Development and restructuring of the relevant institutions and the human resources, hardware and software deployed therein, in order to increase the efficiency of international transport operations, make optimum use of available resources at country level and ensure coordination and integration between the parties concerned;

(d) Establishment of a regional body for the facilitation of transport and trade that includes representatives from all the relevant parties in the countries of the region, namely, transport, customs, security and trade, from the private and public sectors and their national representatives, with a view not only to facilitating transport and trade but also to standardizing and unifying laws, systems and procedures in those countries;

(e) Development of the hardware and software used in the relevant institutions and providing appropriate training in modern technology for personnel and, in particular, in computing and IT.

#### F. DEVELOPMENT OF REGIONAL AND INTERNATIONAL AGREEMENTS

(a) Identification of all bilateral, regional and international agreements on international transport, customs, security, external trade and tourism for each of the countries of the region;

(b) The analytical study of those agreements, the extent to which they are implemented and the benefit hoped from each in the various countries of the region;

(c) Development and harmonization of agreements at the regional level on the basis of the findings of the analytical studies on existing agreements;

(d) The updating of regional agreements on the development of ITSAM, in respect of infrastructure, operation and policies. Relevant agreements relating to each of those aspects are, respectively, the Agreement on International Roads in the Arab Mashreq, which was adopted and opened for signature on 10 May 2001, the draft agreement on the simplification of border procedures and the draft memorandum of understanding on coordination of maritime transport policies;

(e) The analytical study of the provisions of the General Agreement on Trade in Services with respect to all aspects of land, sea and air transport, customs, the facilitation of trade, the description of dimensions of trade, and the feasibility of and modalities for liberalizing some aspects of trade;

(f) Provision of technical assistance to countries in their negotiations with WTO, based on the above-mentioned analytical studies.

#### G. DEVELOPMENT OF THE METHODOLOGICAL FRAMEWORK, INFORMATION SYSTEMS AND SCIENTIFIC RESEARCH

In order to treat the development issues and priorities mentioned in this chapter, a well-considered scientific methodological approach is required as set out in this paper. The main features and components of this approach, known as the methodological framework for development, have been described. The approach necessarily includes an advanced database in line with state-of-the-art geographical information systems (GIS) technologies.

#### H. DEVELOPMENT OF FINANCING SCHEMES

While the above-mentioned development issues are of considerable importance, they will remain purely academic issues until granted the appropriate funding, time and space. The situation requires continuous close contact and interaction between all the parties involved in the development of ITSAM and the various financing parties concerned, in order to ensure the coordination of both the timing and geographical distribution of funding and the above-mentioned priority development issues. This necessitates the development of such appropriate financing schemes as are provided by IDB/Infrastructure Fund.

## V. CONCLUSION

While the proportion of trade between European countries represents more than 60 per cent of their total international trade, trade between ESCWA member countries accounts for less than 10 per cent of total international trade in the region. There are a number of reasons for that situation, of which the most important relate to the difficulty and complexity of traffic movements and procedures, trade exchanges between those countries, border crossings and at customs. The facilitation of transport and the reduction of logistical costs, by reducing the time and cost of transportation and communication and improving the ease, speed and simplicity of administrative, trade, customs and cross-border procedures for products for export outside or within the region, or transit through the region, are therefore some of the most important factors in increasing the volume of trade between those countries, enhance the international competitiveness of their products and services and, consequently, promote and lend support to the economic and social development process in the region.

The adoption and development of an integrated international and regional transport system in the ESCWA region will therefore considerably strengthen the countries of the region, develop their competitiveness in international trade, industry and services and allow them to assume the place that they deserve at the international level. This is of particular importance in the context of the growing trend towards globalization. The first step towards this objective was taken at the conclusion of the first session of the ESCWA Committee on Transport, held in Beirut on 9 and 10 February 1999, with the adoption of an integrated transport system for the region. This was followed by the identification of relevant development issues and priorities and means of streamlining traffic flow over the network. In order to develop an integrated transport system in the region, it was necessary to formulate a comprehensive analytical methodological framework.

This volume has provided a brief but comprehensive description of the proposed analytical framework. It has outlined the general features of the methodological framework, which is described as a systematic, continuous, comprehensive and integrated analytical planning process. It has identified major planning objectives and the continuous, systematic analytical steps involved in the process, and the main aspects of comprehensiveness and integration that the proposed methodological framework should include. It has clarified the main hypotheses, variables and relationships of the proposed framework and described the main groups that could have an impact on the international transport system in the region. It has identified the options and impacts and the impact prediction process for a specific set of options. This volume has reviewed the main aspects of the proposed methodological framework and demonstrated the principal relationships between those aspects in figure II. It also identified some of the most important development issues for which the methodological framework could provide a remedy. Such issues were divided into eight groups, namely, infrastructure; performance levels; fleets, equipment and container handling; laws, by-laws and procedures; institutions, human resources, hardware and software; regional and international agreements; the methodological framework, GIS and scientific research; and financing schemes.

Having provided this brief overview of the methodological framework, we should note that various packages and software programmes are available for the application of some aspects of the proposed methodological framework. Those that are most appropriate will be used, together with the necessary procedures for data collection, calibration of models, forecasts and evaluation. Furthermore, detailed programmes appropriate to the region will be prepared, with a view to ensuring that all measures are implemented within a unified framework, using GIS in order to store and analyse data held on the various databases required for implementation of the proposed framework. Such databases will be linked in a comprehensive and integrated manner with the various analytical models that the framework will contain.

Experience has shown that a comprehensive overview is necessary in order to secure much investment that is usually allocated on the basis of economic feasibility studies. The perspectives of such studies are usually constrained by the circumstances in which they are prepared including, *inter alia*, insufficient time allowed to consultants, lack of data, insufficient funding for the study and the preconceptions of the funding source. When an overview is taken, answers will have to be found to such questions as how large sums of money can justifiably be allocated to two neighbouring seaports with a view to developing their ability to perform the same task? Would it not be better to view themes complementary to, rather than in competition

with, each other? What is lost if a huge sum of money is spent on resurfacing an international road leading to a border, if border procedures are not facilitated?

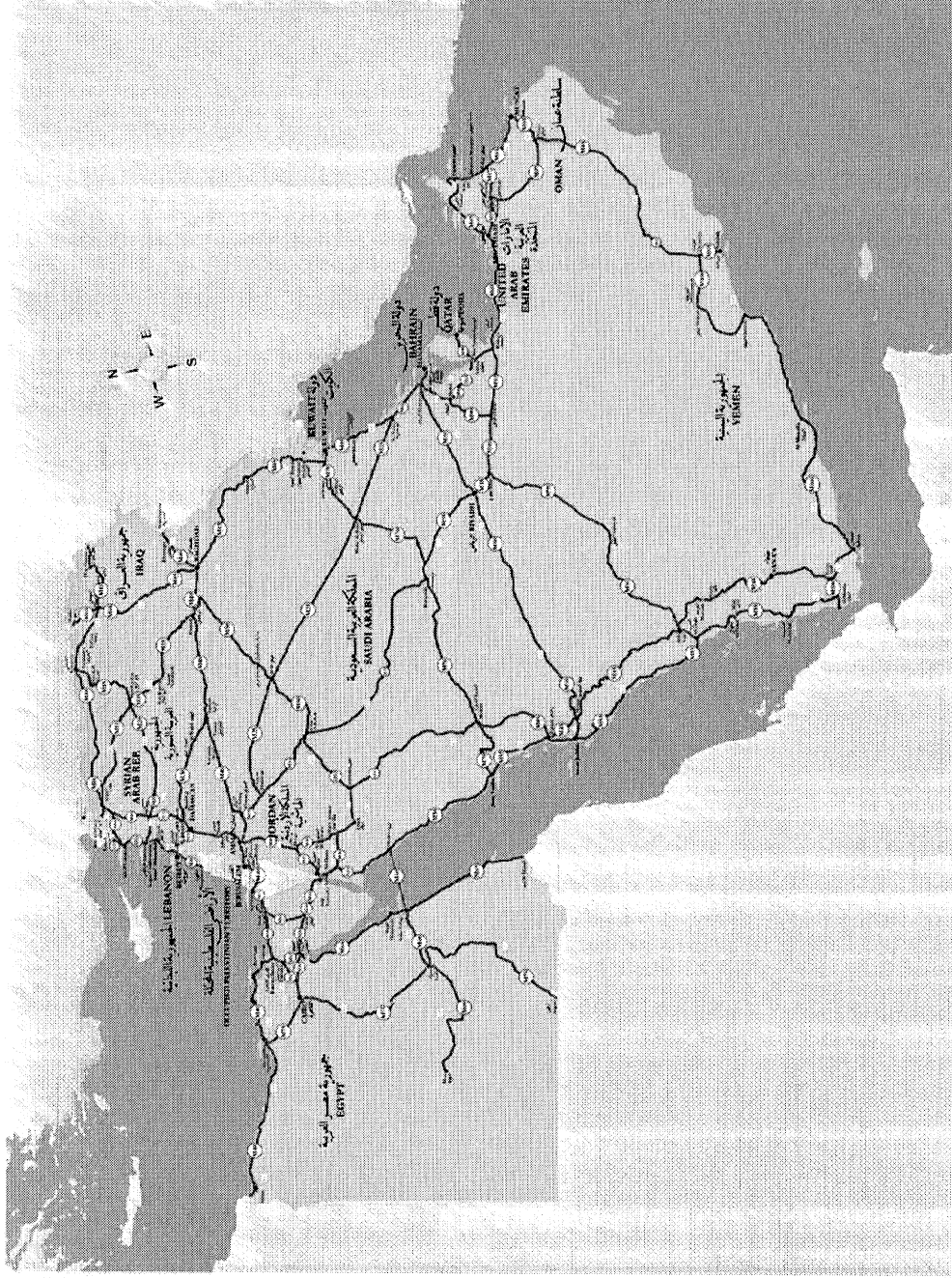
In order to find answers to those and other such questions, a comprehensive methodological framework must be formulated. That will require more time, effort and money than is required for a handful of economic feasibility studies for any of the specific projects referred to above. However, if the matter is given careful thought, the considerable direct and indirect financial benefit that can be derived from many of the projects to be implemented, if there is comprehensive and deliberate regional coordination, becomes apparent. While this volume represents only a first step towards achieving that aim, it is a step that will bring the future closer, faster.



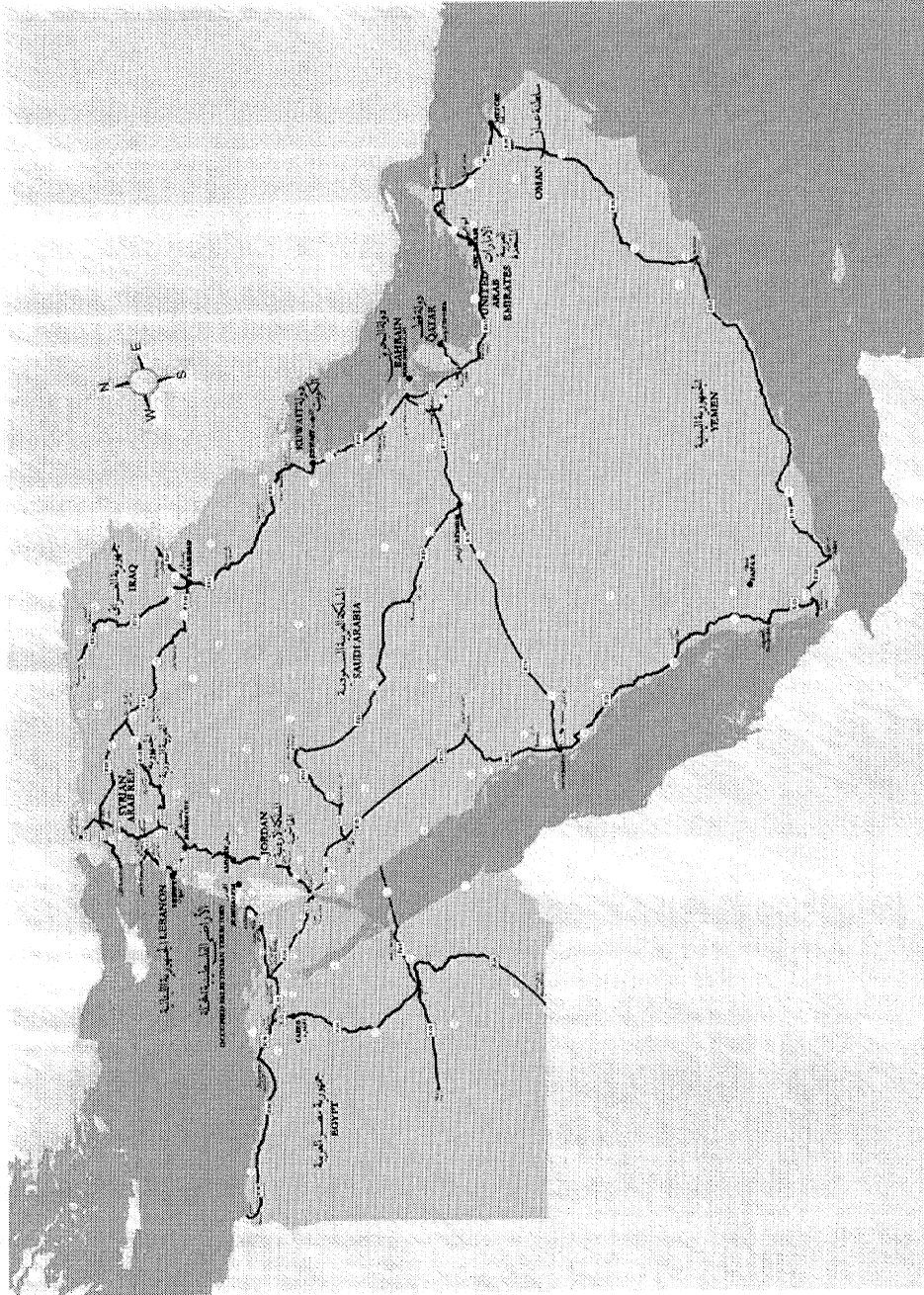
## **ANNEXES**



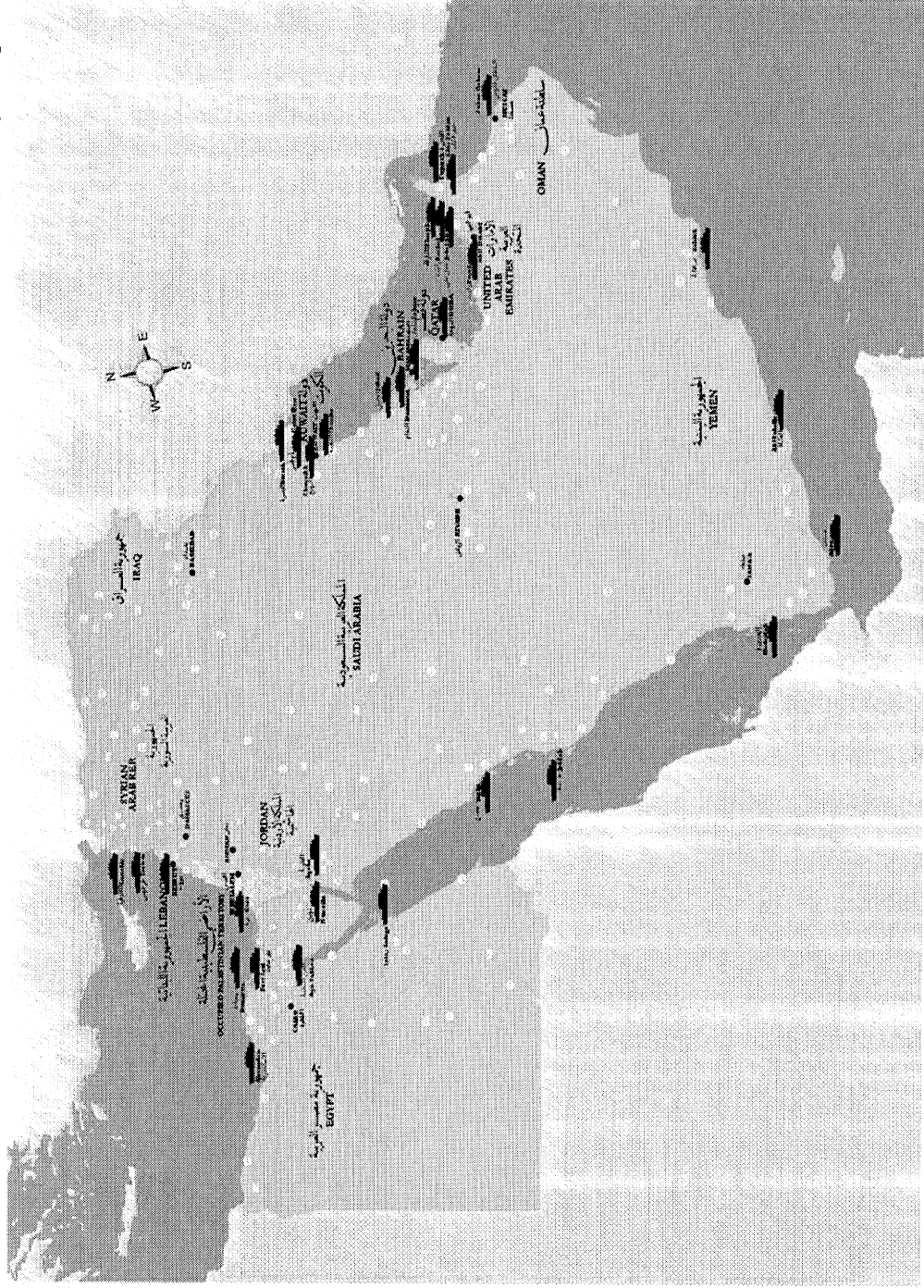
Map 1. International road network in the Arab Mashreq



Map 2. International rail network in the Arab Mashreq

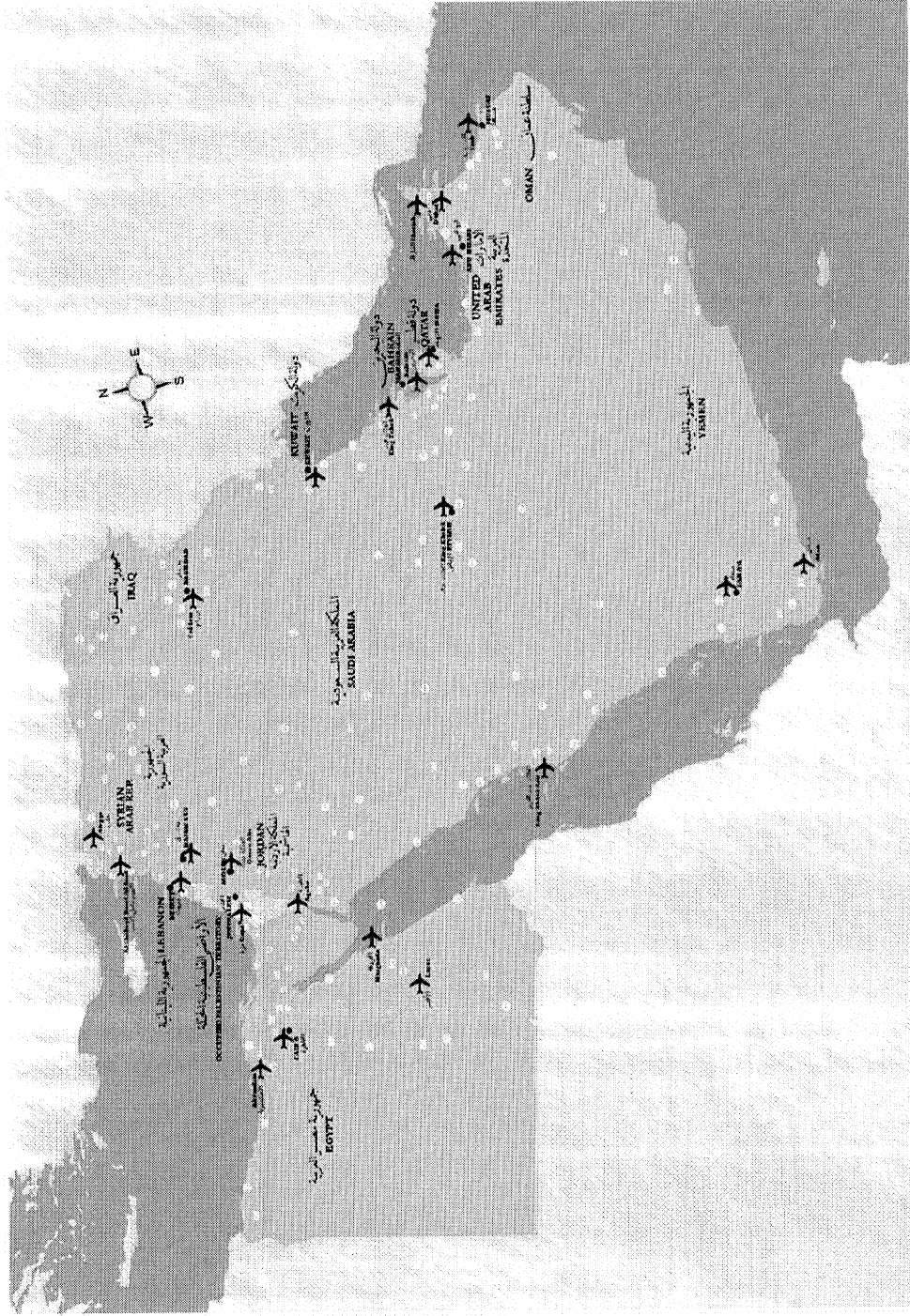


Map 3. Major seaports in the Arab Mashreq

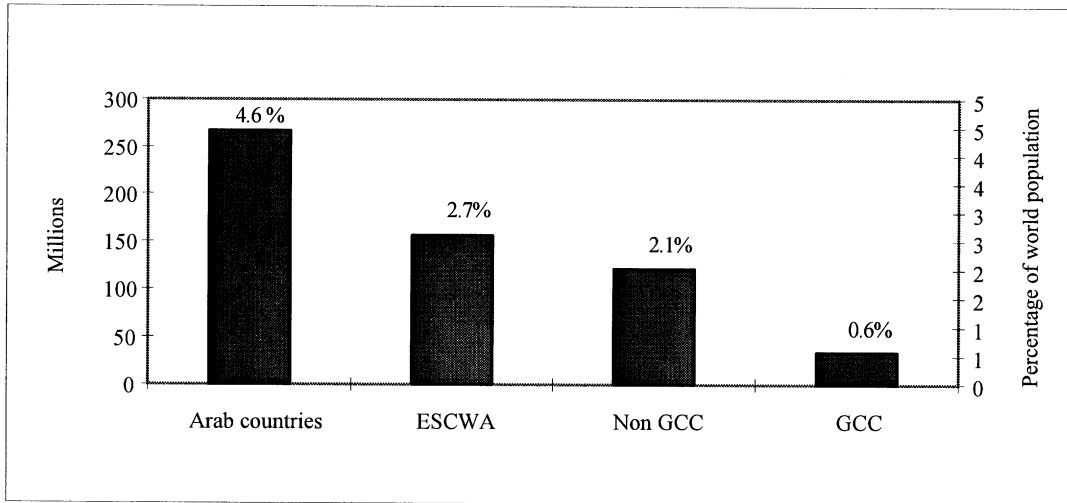




Map 4. Major airports in the Arab Mashreq

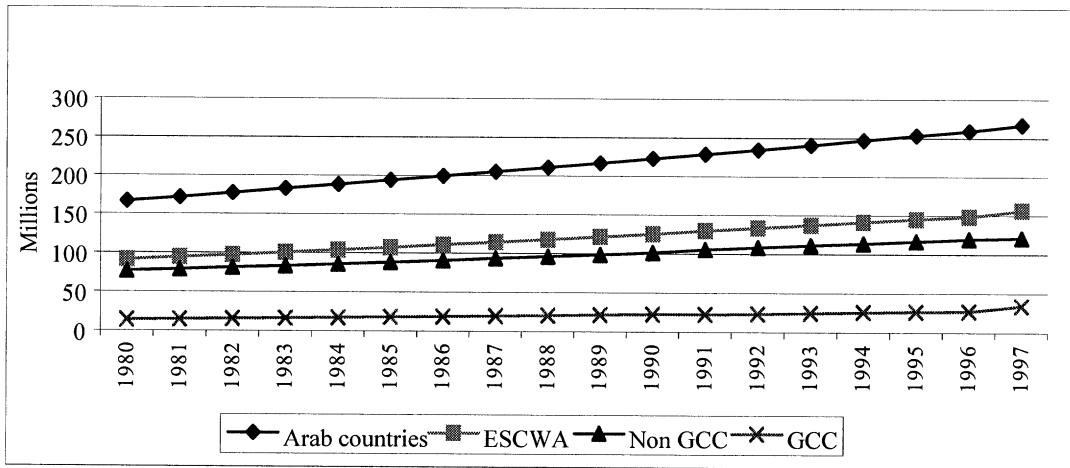


**Annex figure I. Population**



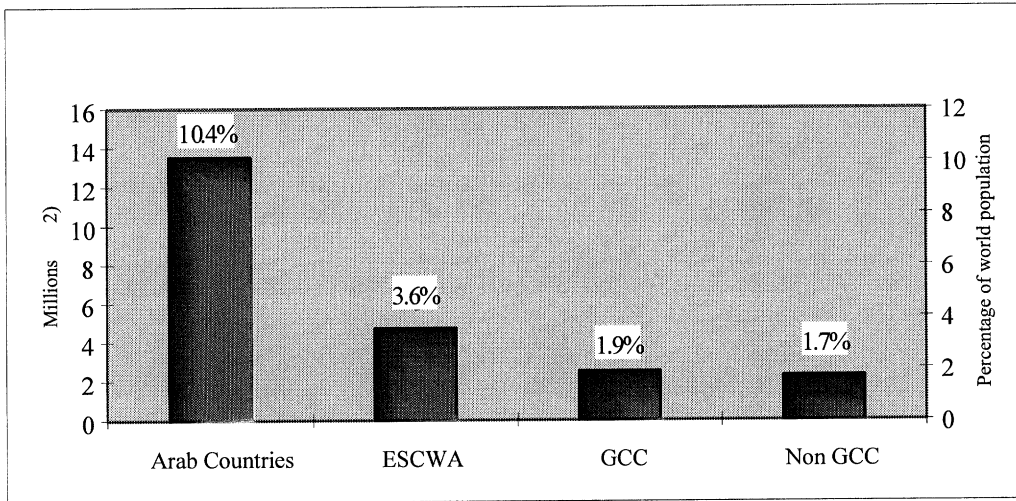
Source: World Bank, *World Development Indicators 1998* and *World Development Indicators 1999*.

**Annex figure II. Total population**



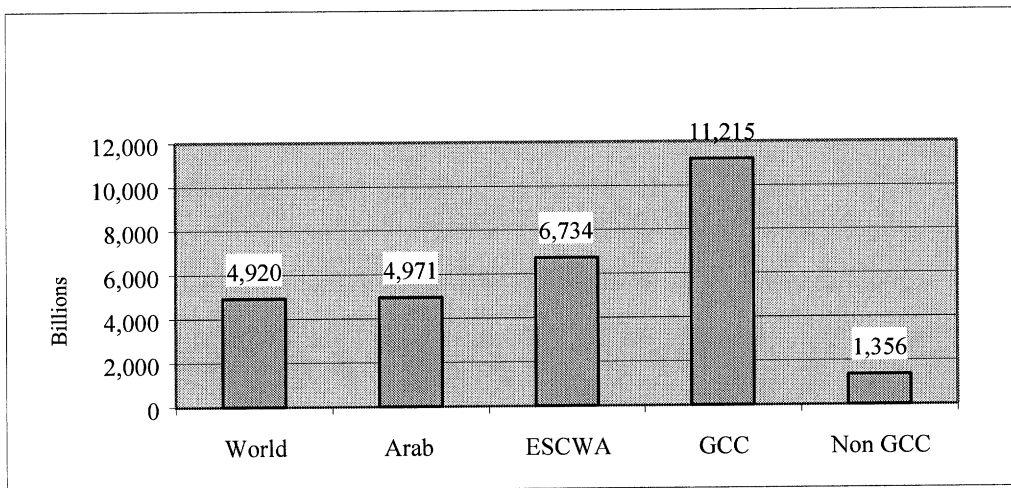
Source: World Bank, *World Development Indicators 1998* and *World Development Indicators 1999*.

**Annex figure III. Geographical area**



Source: World Bank, *World Development Indicators 1998* and *World Development Indicators 1999*.

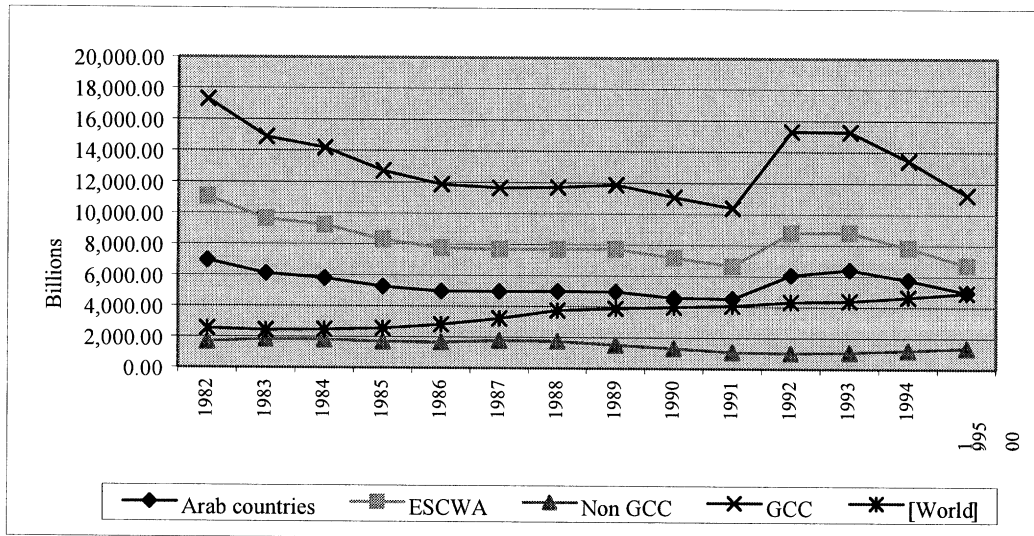
**Annex figure IV. GNP per capita (Atlas method), 1995**



Source: World Bank, *World Development Indicators 1998* and *World Development Indicators 1999*.

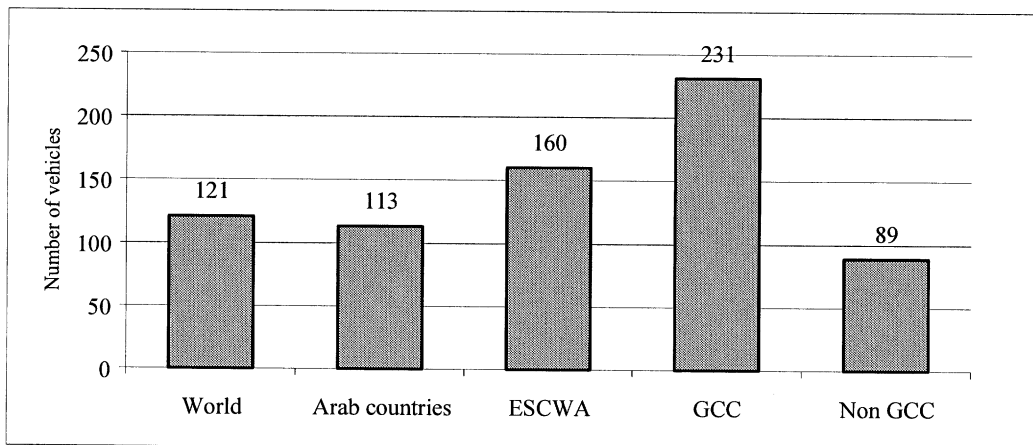


**Annex figure V. Per capita share of GNP, 1982-1995**



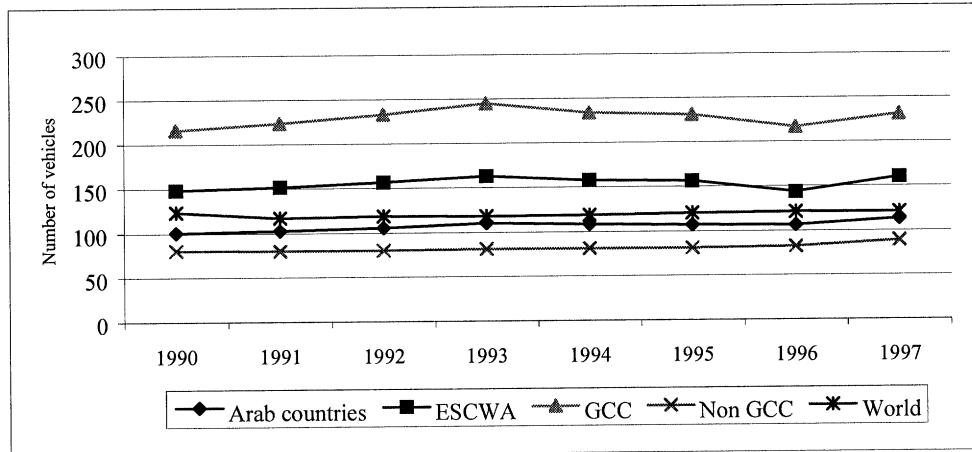
Source: World Bank, *World Development Indicators 1998* and *World Development Indicators 1999*.

**Annex figure VI. Vehicles per 1,000 inhabitants, 1997**



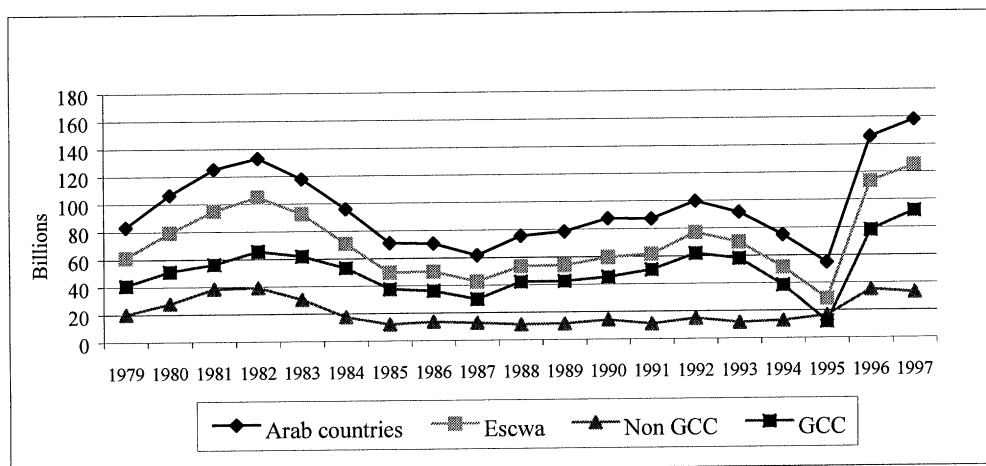
Source: World Bank, *World Development Indicators 1998* and *World Development Indicators 1999*.

**Annex figure VII. Number of vehicles per 1,000 inhabitants, 1990-1997**



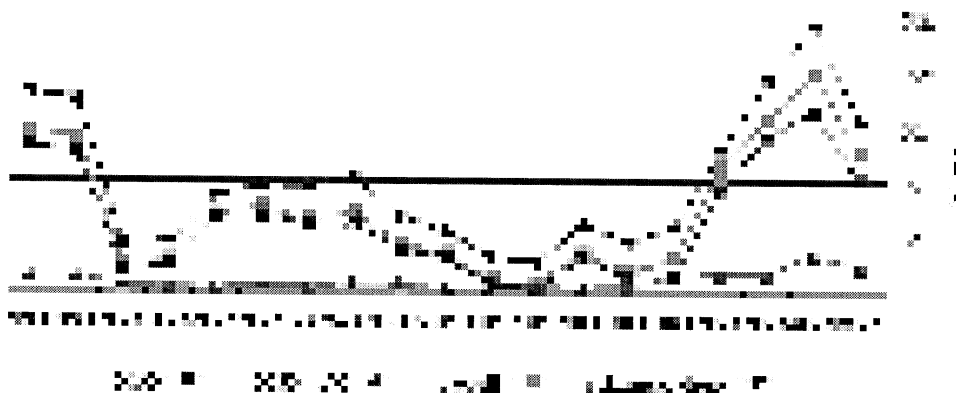
Source: World Bank, *World Development Indicators 1998* and *World Development Indicators 1999*.

**Annex figure VIII. Merchandise imports**



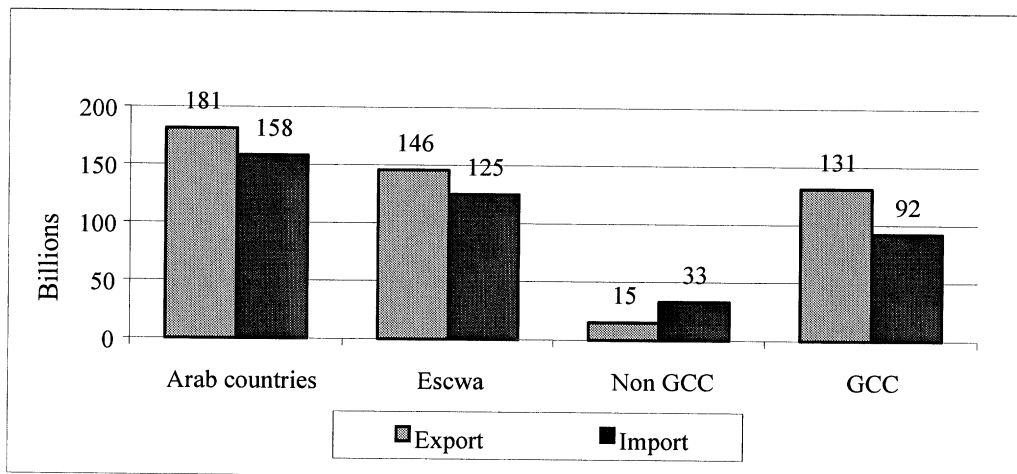
Source: World Bank, *World Development Indicators 1998* and *World Development Indicators 1999*.

**Annex figure IX. Merchandise exports**



Source: World Bank, *World Development Indicators 1998* and *World Development Indicators 1999*.

**Annex figure X. Merchandise imports and exports**



Source: World Bank, *World Development Indicators 1998* and *World Development Indicators 1999*.

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3. Nabil K. and A. Safwat, *Introduction to transportation planning and systems analysis. Arab Roads*, No. 1 (1990), pp. 8-20.
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