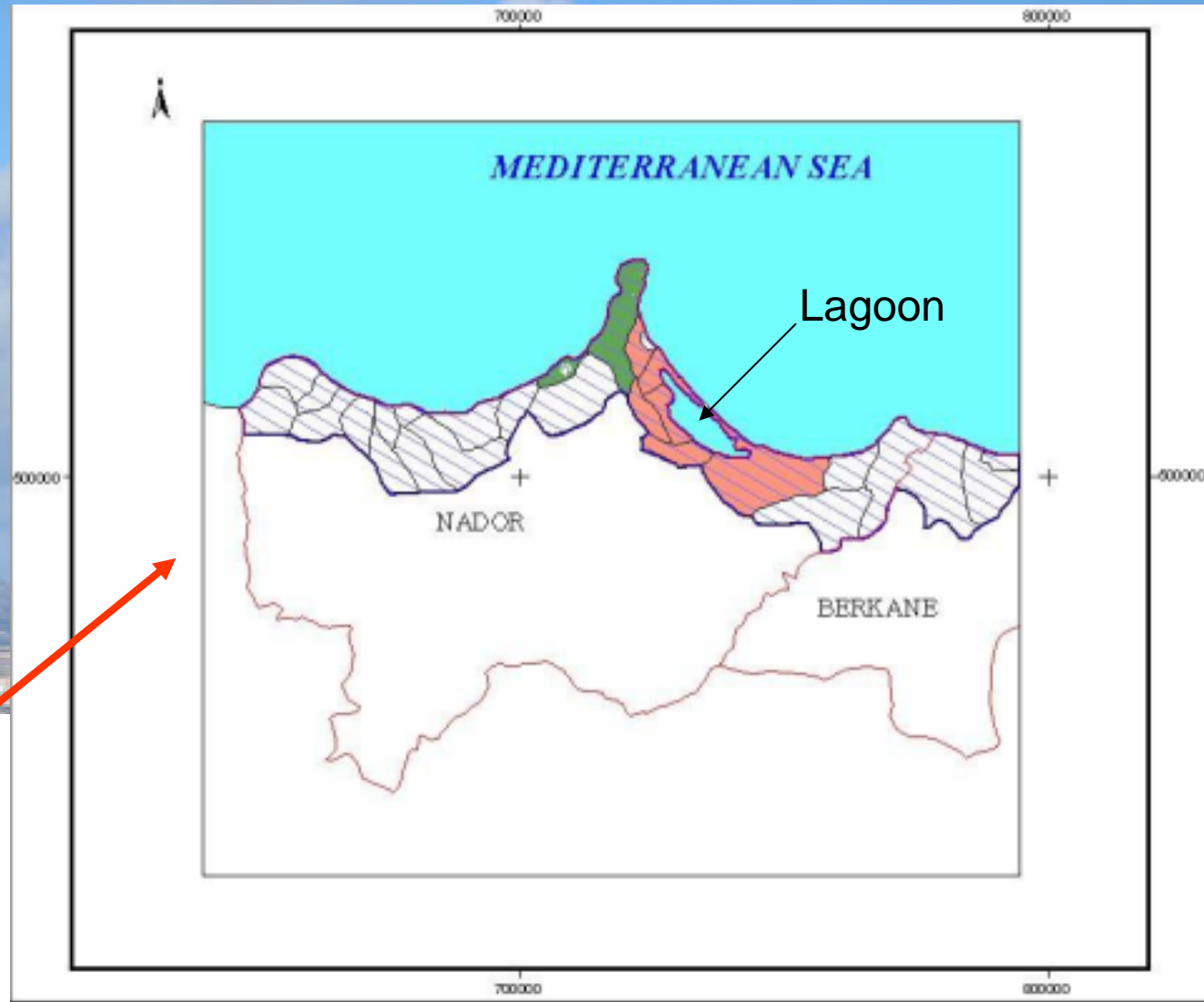




Fishing and aquaculture in the socioeconomic context of a coastal Mediterranean lagoon

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Atlantic Ocean



Localization of the lagoon on the Eastern Mediterranean Coastal Zone of Morocco

An aerial photograph of a coastal lagoon system. A white line is drawn across the lagoon, indicating its length. The lagoon is surrounded by green vegetation and some buildings. The Mediterranean Sea is visible in the background.

Mediterranean Sea

24 km

760 ha

Lagoon (Mar chica):

- **Area: 115 km²**
- **Max. depth: 8m**

Zone of biological and ecological importance



Urban development around the lagoon



Mediterranean Sea

Melillia

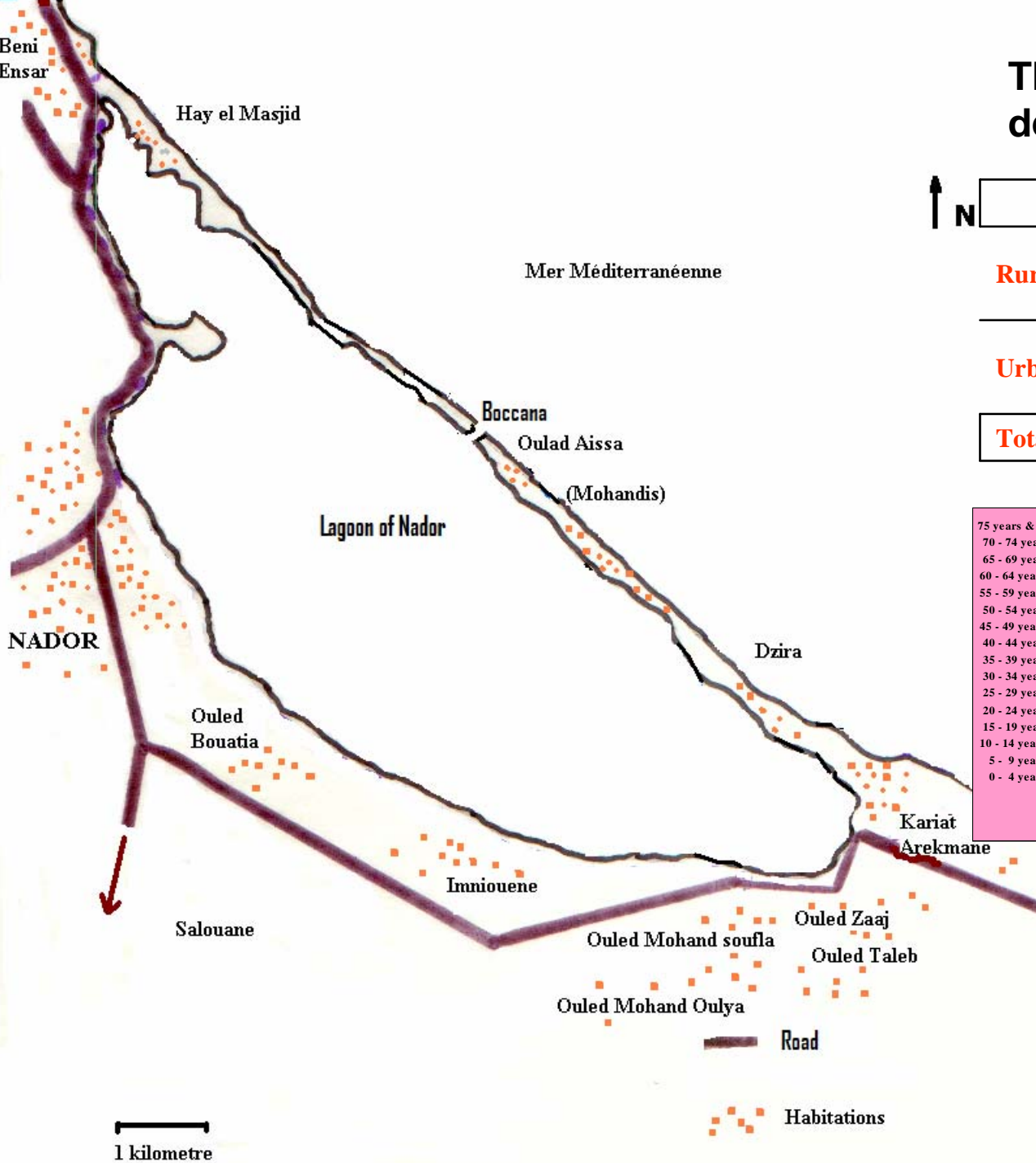
Harbor

Beni Ansar

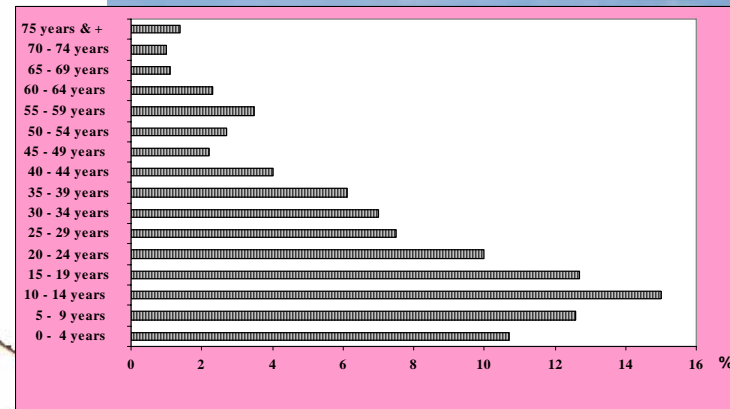
Nador City

Arekmane

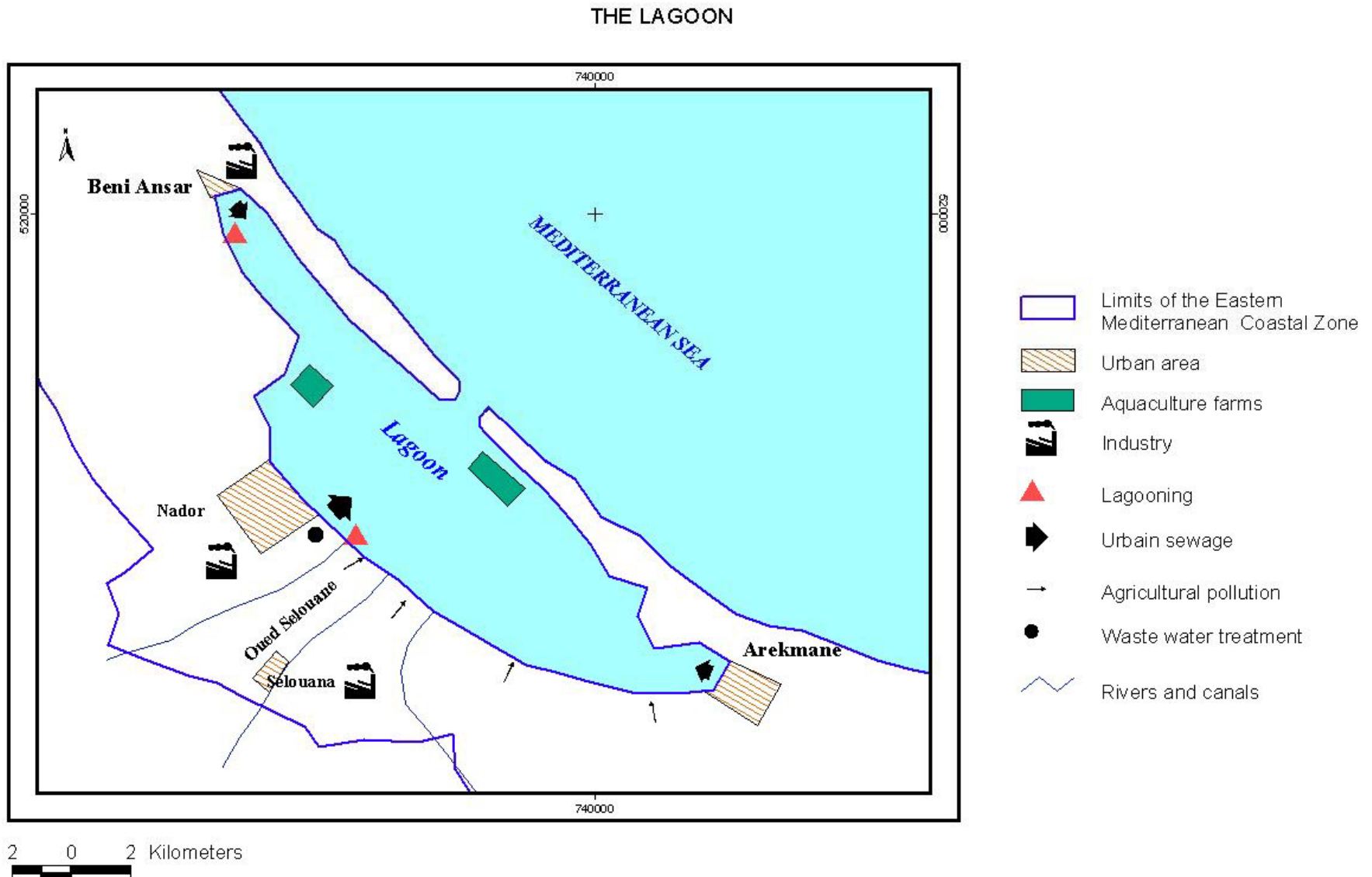
The socioeconomic context: demographic situation



	Communes	Population	Total
Rural	Arekmane	18520	36563
	Bouareg	18043	
Urban	Nador	112450	136347
	Beni Nsar	23897	
Total		172910	172910



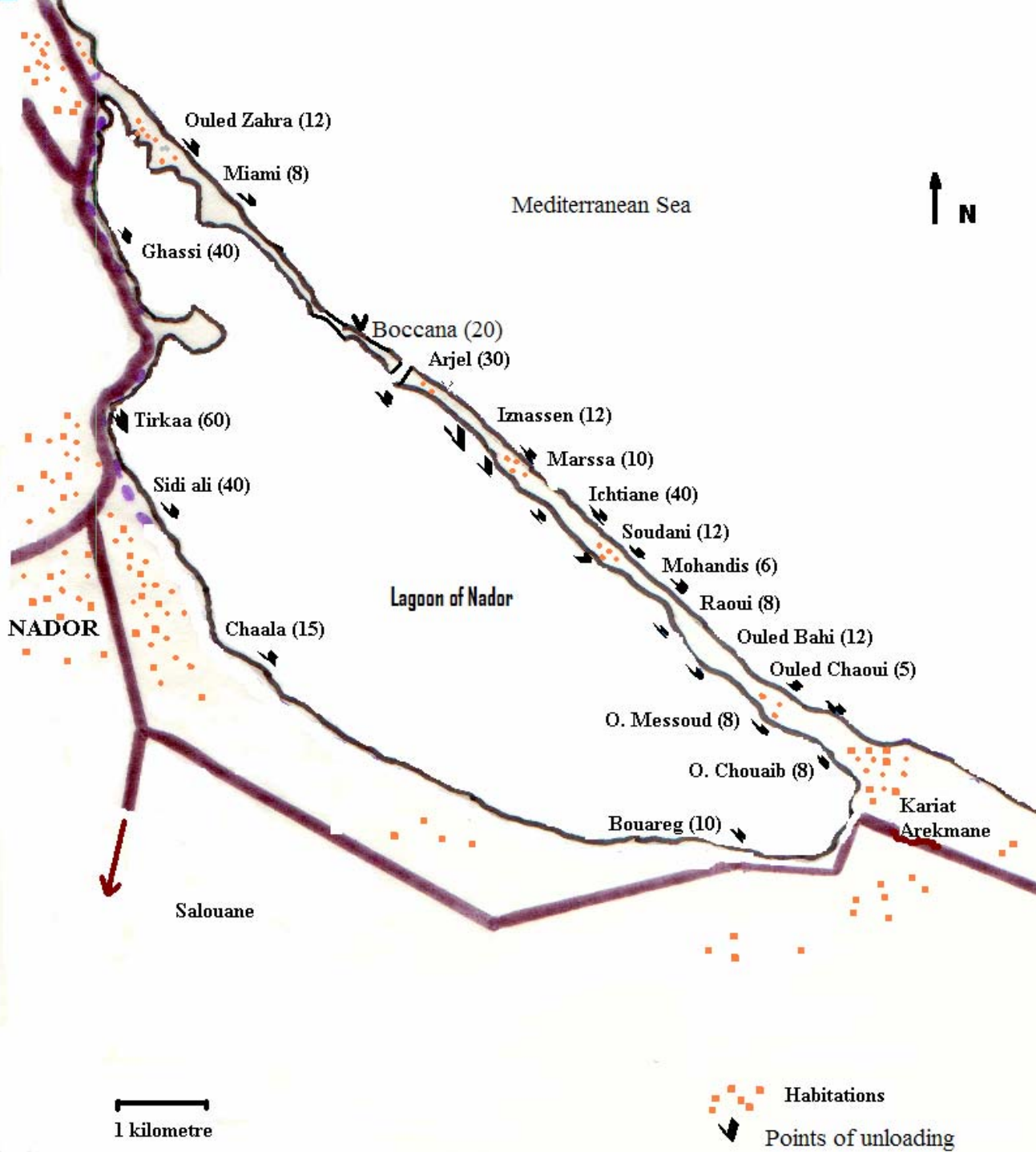
The socioeconomic context: human activities



Fishing activity

- Collect and analysis of secondary data and identification of main stakeholders
- Census of fishing boats and their distribution around the lagoon
- Survey (questionnaire) among 60 fishermen in three unloading points
- Discussions with groups and semi structured interviews with key informants
 - **Socio-demographic characteristics of fishermen**
 - **Production and commercialization of fish**
 - **Income estimation**
 - **Problems and constraints**

Fishing activity



Fishing activity

Part of the lagoon	Fishing days/year (%)	% in the lagoon
East strip	46	60
West strip	31	20
South part	30	100

Length of fishing boats: varies from 4 to 6 m

Powering engines: 4 to 8 HP

Fishing techniques: 40% 'tremail' and 60% 'palanza'

Number of fishermen per boat in average: 2

Fishing activity

- **Quantity of fish: 1378 Tons/year (all species confound)**
- **Monetary value: 28 Million DH/year (2.8 million US dollars)**
- **Part coming from the lagoon: 58% of the total quantity (1.6 Million US dollars)**
- **Boats productivity varies from 2580 to 8875 kg/year**
- **Yearly income per boat varies from 6500 to 8600 US dollars**
- **Yearly net income per fisherman: varies from 2500 to 3500 US dollars**

Aquaculture activity

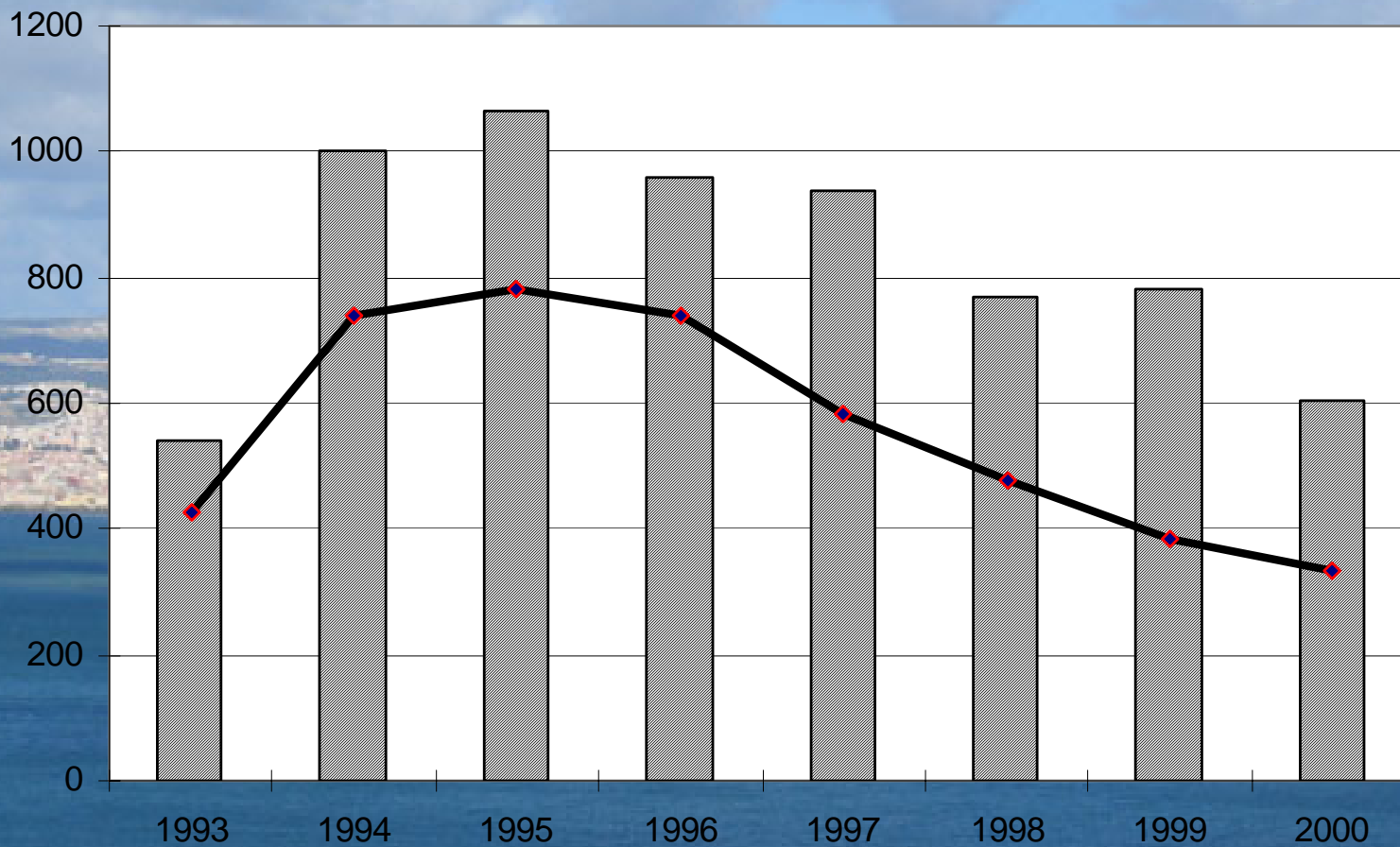
One production unit in the lagoon

Species produced: *Sparus auratus*, *Dicentrarchus labrax*, *Anguilla anguilla*, *Ostrea edulis*, ...

Produces more than 75 % of the whole national production



Aquaculture production in the lagoon



Quantity (tons) Value (10E5 DH)

Problems and constraints of the fisheries activities

- **Decline of the fishing revenue by 70% during the last decade**
- **Decline of the productivity of aquaculture by 40%**
- **Impossibility of producing shellfish**

Problems related to the water quality of the lagoon

Problems related to the stock of fish (over harvesting)

Problems related to natural phenomena (wind erosion)

.....

Solid waste disposal



Hot Spot

Urban and industrial effluents







Environmental and socioeconomic costs

- ❖ *Costs of the lost fishing productivity (loss of income)*
- ❖ *Costs of change in the social life (unemployment, emigration, ...)*
- ❖ *Costs of the lost potential of shellfish production*
- ❖ *Costs of the decrease on the aquaculture productivity*
- ❖ *Extra costs induced in the aquaculture production (expansion of the cycle of production, etc.)*
- ❖ *Health costs induced by the low quality of fish*
- ❖ *Health costs induced by the low swimming quality of the lagoon*
- ❖ *Costs induced on the tourism activity due to the degradation of the scenery and of the water*
- ❖ *Costs induced on the ecosystem functioning, its goods and services*
- ❖ *LOSS of biodiversity; etc.*

Need for an integrated management

Urbanization

Industry

Agriculture

Fisheries

Tourism

Harbor activities

Nature protection