

PADRÕES GEOGRÁFICOS, AREAIS, LODOS, CORAIS, RECIFES, PRAIAS, MANGAIS, MATAGAIS MARITIMOS

AREAIS E LODOS

Formações quaternárias muito recentes, bordejam o interior das baías mais pronunciadas, como, Tungué, Maiapa, Mionge, Pemba Metuge. Muito provavelmente resultado da deposição dos esqueletos coralinos após a morte de coral por interação das marés e dos agentes de dinâmica externa bem como depósitos resultado da erosão da faixa continental junto da orla marítima. Considera-se, também, que a interação ao que junta uma suave regressão oceânica durante os últimos séculos.

Unidade geográfica bem característica na região, tem uma largura média de 2500 metros, situam-se a uma cota de nível variando entre +0.2 m e -1.4 m (Zero Hidrográfico), consequentemente grande parte cobertos nas praia-mar.

O estudo desta formação é da maior importância quer no que respeita a utilização como elemento em movimentos de terra na construção portuária quer como meio natural de fornecimento de alimento (bivalves) ou como meio na captura de peixe à população.

OS CORAIS RECIFES E PRAIAS

Formações coralinas muito recentes, ou extensas faixas de colónias de invertebrados marinhos da classe anthozoa ou de colónias de invertebrados marinhos onde várias espécies tem como uma das propriedades absorver e segregar os carbonato de cálcio, formar seus esqueletos e deste modo em colónia edificar ou construir estruturas, formar zonas recifais em águas muito pouco profundas ou bancos de coral extensos em profundidade.

De igual modo no ambiente descrito os detritos e esqueletos do coral morto origina por acção eólica durante a baixa-mar a acumulação de areias de calcário muito branco na linha de costa.

Genericamente designados coral situam-se ao longo da linha de costa ou rodeando ilhas, situam-se ainda, a cotas negativas (MNM) e/ou entre as cotas batimétricas -1.0m e -60.0m.

Nas imagens de satélite ao lado pode observar-se uma ilha com um cobertura vegetal de matagal marinho rodeada por várias faixas, primeiros a faixa das praias de areias brancas calcárias, a faixa

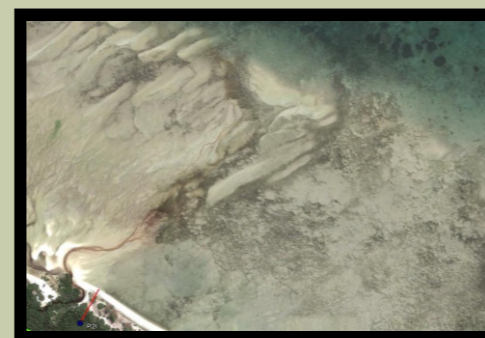
MANGAIS

Cobertura vegetal arbórea de zonas tropicais e subtropicais de pântanos marinhos ou de litorais marinhos. Árvores tolerantes a salinidades, variando do salobro ao salino chegando a tolerar concentrações duas vezes a água do mar nos trópicos. Árvores que tem grande acção na conservação do litorais e importância ainda maior como zonas de viveiro de espécies marinhas.

MATAGAIS MARITIMOS

Cobertura vegetal arbórea de zonas tropicais e subtropicais e endêmica a várias zonas de Baía do Rovuma intolerantes a solos salinos mas tolerantes às aragens marinhas. seu habitat normal situa-se entre as cotas de nível variando entre os 6m e 15m (NMM).

IMAGEM GOOGLE (Cabo Afungi)



AREAIS
LODOS
VAZAS

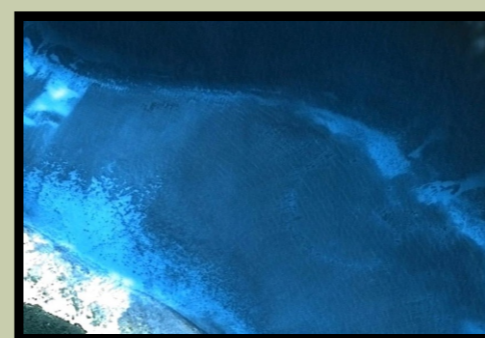
FOTO LB 2005 (Palma)



FOTO LB 2005 (Palma)



IMAGEM GOOGLE



CORAIS
RECIFES
PRAIAS

IMAGEM GOOGLE (NEGOMACI)

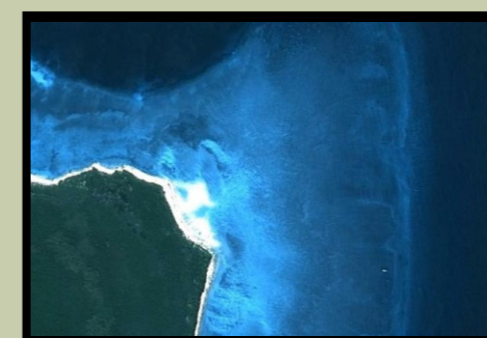
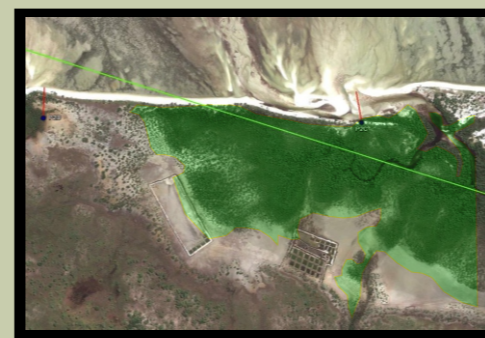


IMAGEM GOOGLE (Rongui)



IMAGEM GOOGLE (AFUNGI)



MANGAIS

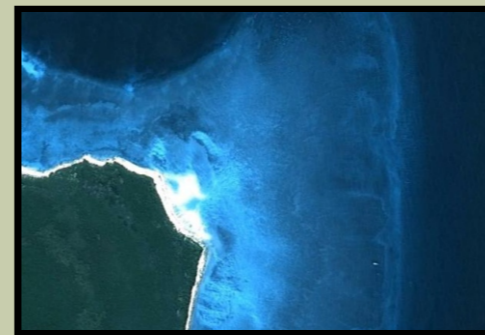
FOTO LB 2005 (Ibo)



FOTO LB 2005 (Ibo)



IMAGEM GOOGLE (NEGOMACI)



MATAGAIS
MARINHOS

IMAGEM GOOGLE (Vamizi)

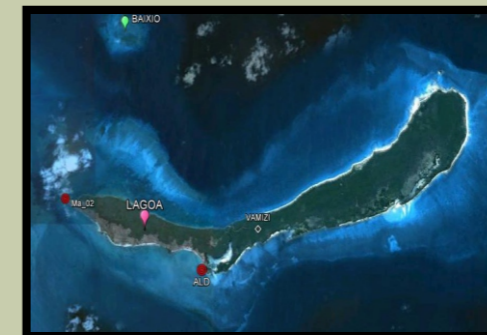


FOTO MB 1998 (Relanzapo)



QUIRIMBAS ARCHIPELAGO

page 18

The Council of Ministers of the Government of Mozambique, on June 6, 2002, declared the Quirimbas Archipelago to be a National Park, after several studies and many stages dating back to 1971. The park and its respective biodiversity includes an onshore (mainland) area and a maritime area, covering the entire coastal strip between Latitudes 10 ° 15 ' and 13 ° 00' South.

The park covers an area of 750,639 hectares of which 80% are terrestrial habitats and 20% marine habitats.

The park contains the following separate ecological regions:

- * Mosaic Coastal Forest;
- * East African Mangroves;
- * East African Marine
- * Miombo forest.

In the maritime area, the Quirimbas archipelago stands out. This consists of 28 islands and islets regarded as of global importance, and which could quite possibly be classified as a UNESCO world heritage site. The figure to the left of this page presents a summary map of the main islands, their respective areas and perimeters and geographical coordinates.

Of particular significance is an ocean shoal, the Sao Lazaro bank, 40 kms from the coast. This is a coral reef with extraordinary, indeed unique marine fauna and flora. Also of significance, in historical and cultural terms, is the island of Ibo, as a key pole in the mixing of African, Asian and European cultures. Finally, mention should be made of Great Quirimba as the island in the archipelago large enough to have a commercial coconut palm plantation.

GEOGRAFIC FEATURES

SAND BANKS

These very recent quaternary formations fringe the interior of the larger bays, such as Tungue, Maiapa, Mionge, and Pemba Metuge. They most likely result from the deposition of coral skeletons after the death of coral by interaction with the tides and dynamic external agents, as well as deposits resulting from the erosion of the continental strip along the seafront. It is also thought that to these interactions should be added a gradual regression of the ocean in recent centuries.

Sand banks are a characteristic geographical feature of the region. They have an average width of 2500 meters, and are located at an elevation ranging between +0.2 m above sea level and 1.4 m below sea level (HZ Datum). Thus they are largely covered at spring high tides.

The study of these formations is of utmost importance both as regards their use in harbour construction, and for a natural supply of food (bivalve molluscs) or as a means for the local people to catch fish.

CORAL REEFS & BEACHES

There are very recent coral formations, or extensive strips of colonies of marine invertebrates of the class Anthozoa or of marine invertebrates of various species who have the property of absorbing and secreting calcium carbonate to form their skeletons and thereby as a colony to structure and form reefs in very shallow waters or coral reefs that reach very deep into the sea.

Similarly in the environment described above, the debris and dead coral skeletons lead, through the action of the wind at low tide, to the accumulation of sands of very white limestone along the shore line, forming wonderful beaches.

Generically named corals are found along the coast line and surrounding islands. They are also found underwater at depths of between 1 and 60 metres.

In the satellite images one can note an island covered with maritime scrub vegetation surrounded by several bands, first the sandy beaches made of white limestone, followed by the range of reefs and coral banks.

MANGROVES

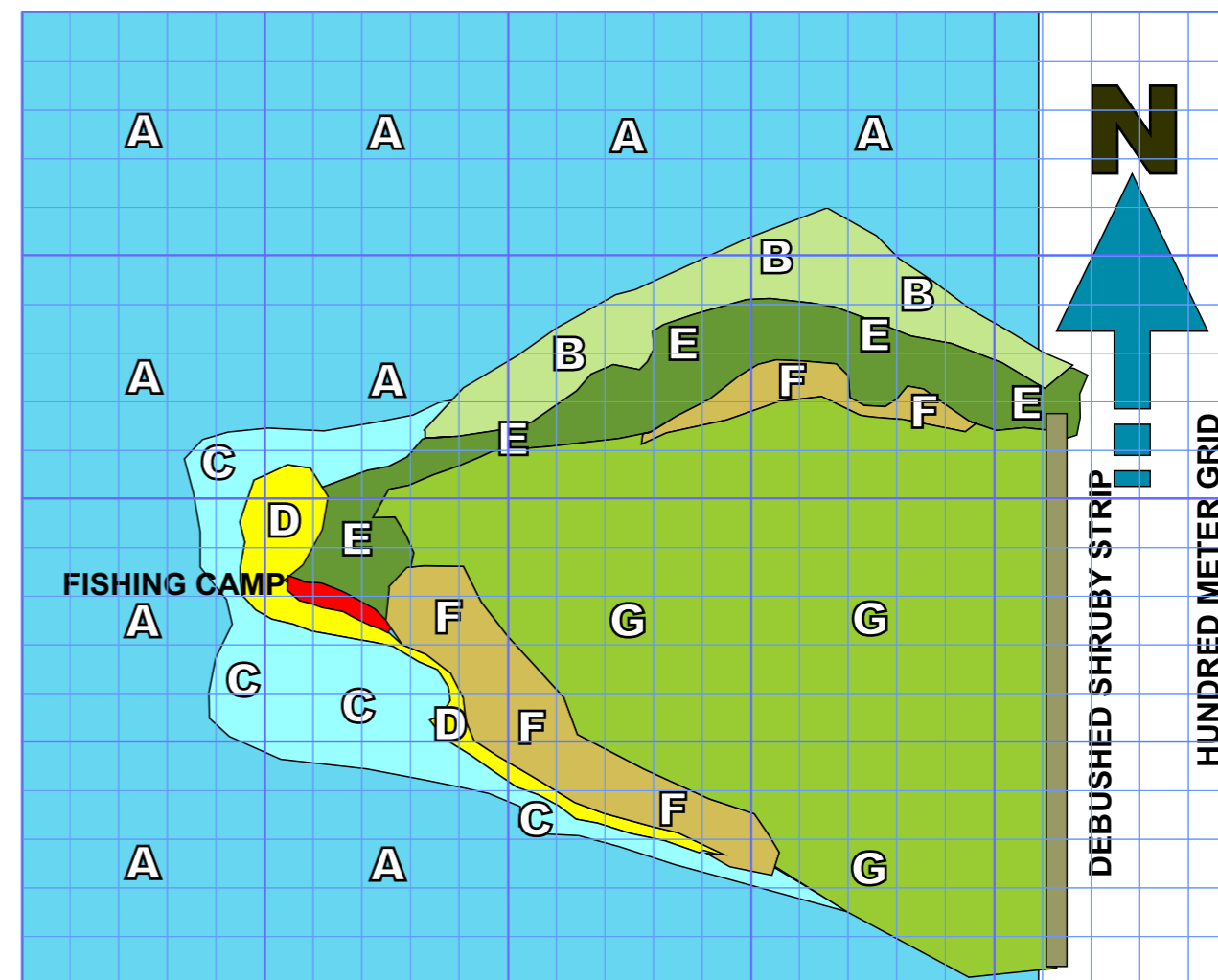
Covered by natural vegetation of tropical and subtropical tidal marshes or coastlines. Trees tolerant to salinity, ranging from brackish to saline, and in the tropics sometimes reaching concentrations of salt twice that of sea water. These trees are extremely important in preserving the coastline, and are even more important as nursery habitats for marine species.

MARITIME SHRUB

Vegetation cover in tropical and subtropical areas and endemic to various areas of the Rovuma Basin. Intolerant of saline soils, their normal habitat lies in elevations ranging between 6m and 20m above sea level.



TUNGUE BAY - NEGOMACI ISLAND GEOGRAFIC PATTERNS

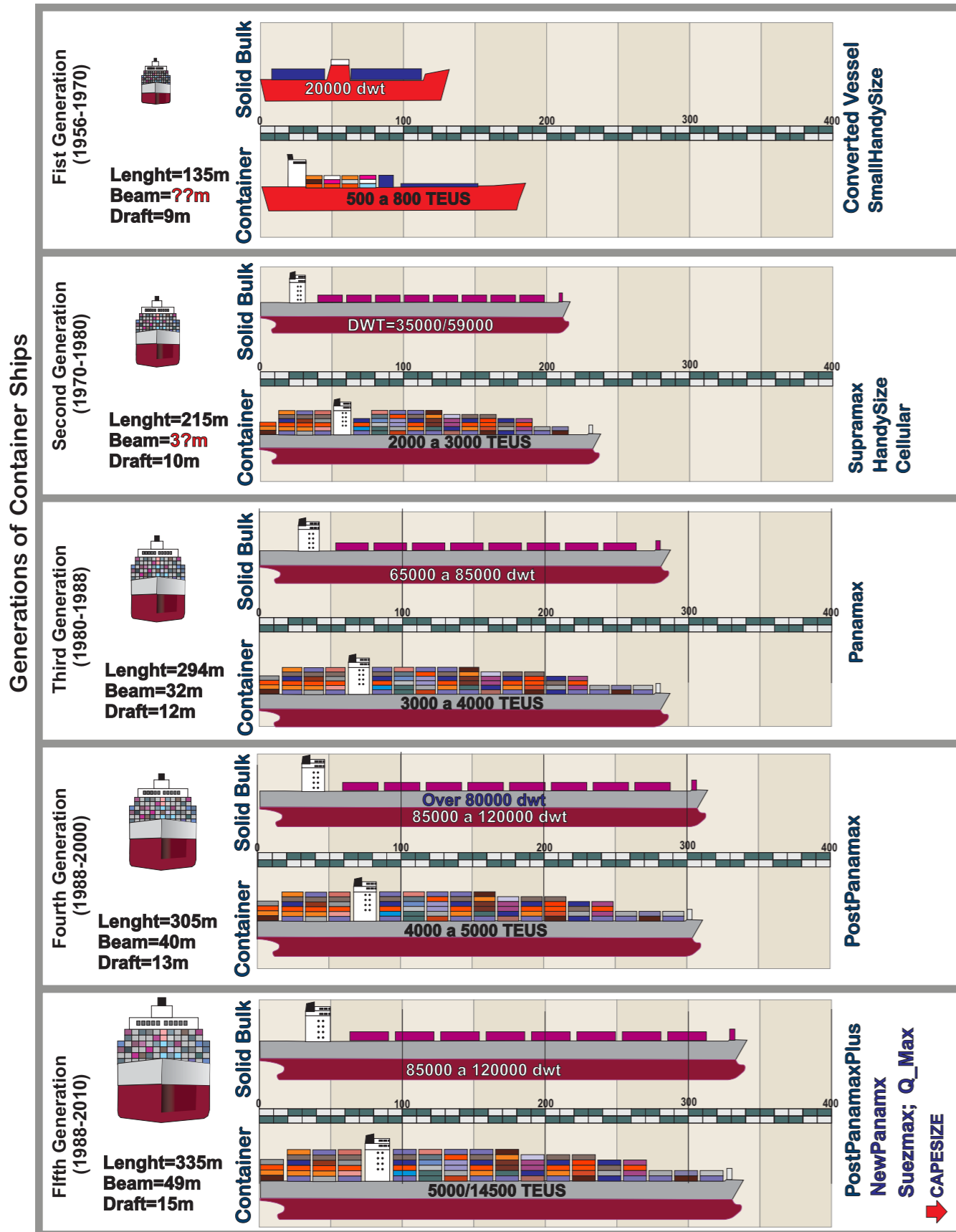


LEGENDA

		ALTITUDES
A - Banco de Coral	A - Coral Banks	A = -5m a -60m
B - Recifes Densos	B - Dense Reef Zone	B = 0m a -10m
C - Recifes pouco Densos	C - Light Reef Zone	C = 0m a -10m
D - Pralas Corallinas	D - Coral Beaches	D = +7 a - 1m
E - Mangais Muito Densos	E - Dense Mangroove Area	E = +4 a 0m
F - Mangais "Carecas"	F - Light Mangroove Area	F = +2 a +8m
G - Matagal Marítimo	G - Shrubs (marine)	G = +10 a +20m

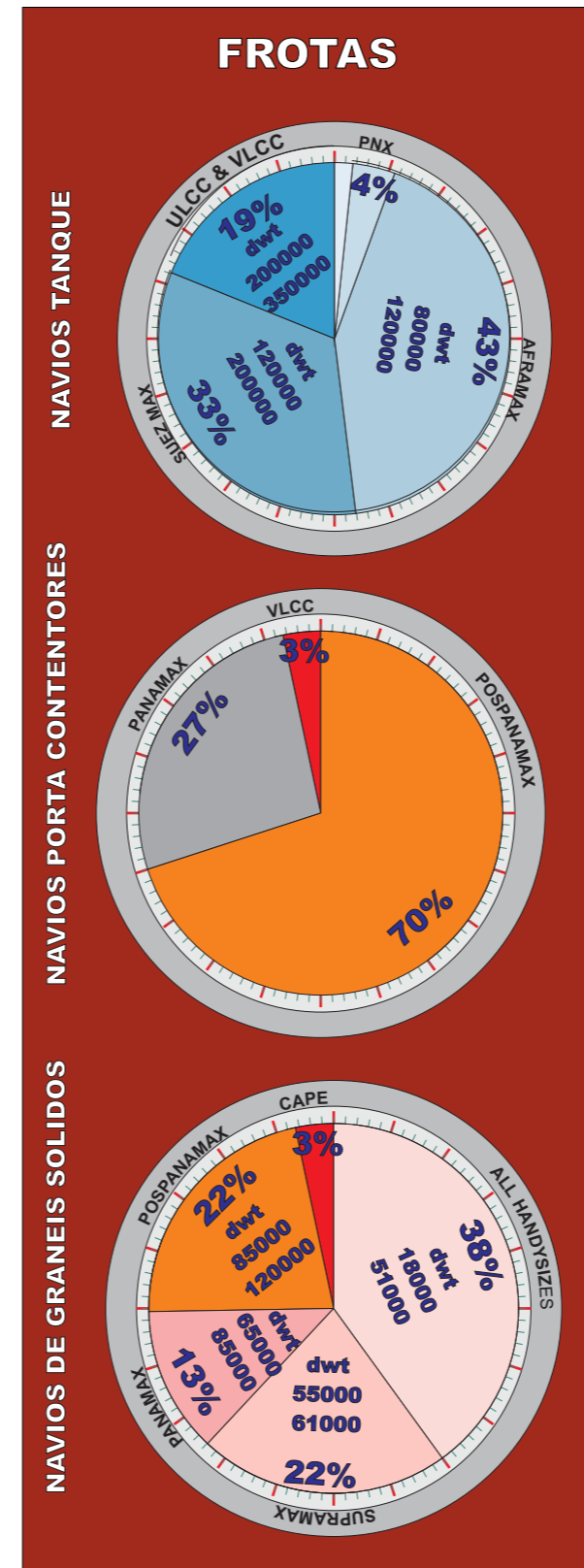
FROTAS, NAVIOS, CLASSES, CALADOS, COMPRIMENTOS

CLASSES

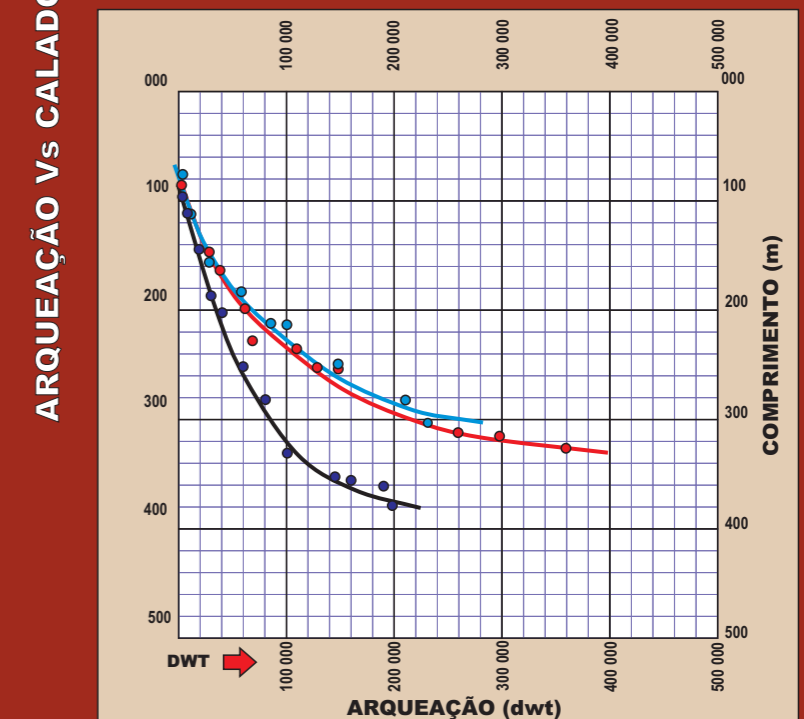
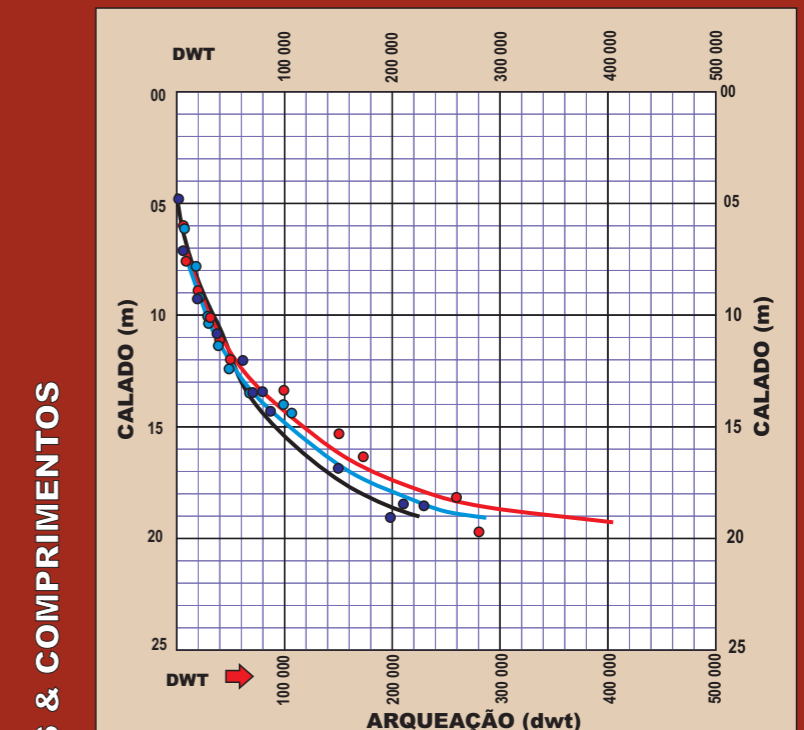


Atualização de Trabalho de 2006 e baseado num Relatório da "University of Hofstra Dep. Of Geography"

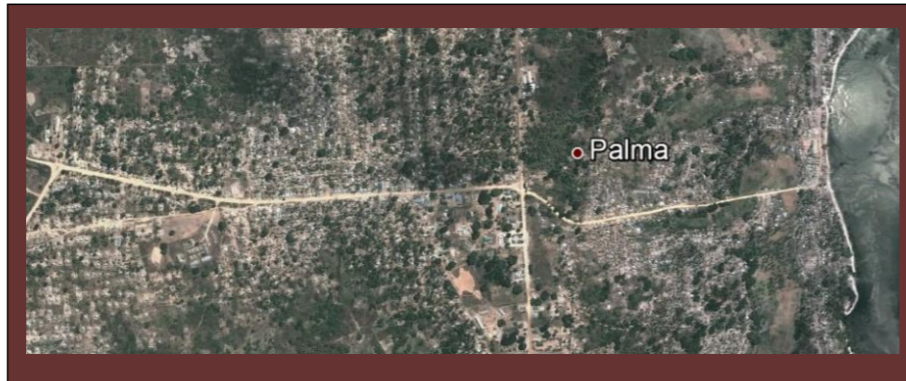
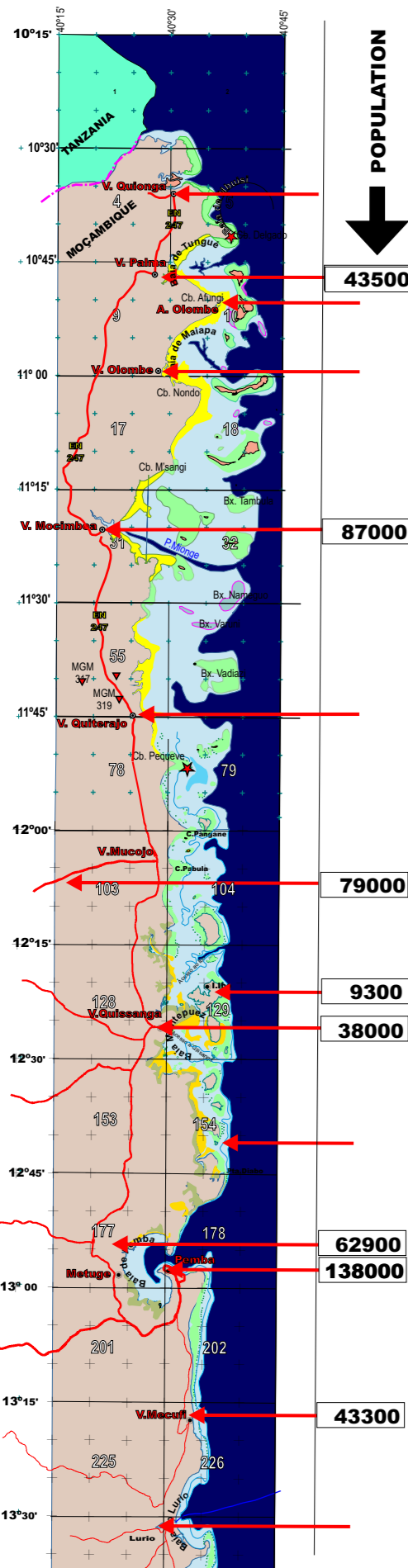
Dimensionamento normal de navios em função do tipo, da classe e respectivas capacidades:



CARACTERÍSTICAS DE NAVIOS



THE PEOPLE



POPULATION - PALMA VILLAGE & THE PORT



POPULATION - MOCIMBOA CITY THE PORT



POPULATION - IBO VILLAGE



POPULATION - MAGANJA VILLAGE FISHING CENTRE

CABO DELGADO DEMOGRAPHIC DATA

First we must have an idea of how many people are living in the region. Thus, according to the data from the 1997 and 2007 population censuses held by the National Statistics Institute (INE) and the data from the Cabo Delgado White Book (CEE1999), the information may be briefly summarised as follows :

Estimated Population = 1.83 million in 2013, projection for 2017 (1.97 million);
 Active population (above the age of 15) = 896,000;
 Number of Rural Households = 332,000;
 Number of Urban Households = 73,000;
 Growth from 394,000 in 1930 to 1.83 million in 2013;
 Population living on the coast = 30%;
 Illiteracy rate (2000) = 89%;
 Leading figures, trained staff and employers = 13,070
 Predominant ethnic and linguistic group = Emakhwa (67%);
 Other groups = Shimakonde (22%), Kimwani (7%);
 Ethno-linguistic groups living on the coast = Emakhwa, Kimwani;

Three levels of land tenure:
 1. Level Poor = 0.5 to 1.5 ha;
 2. Level Average = 1.5 to 3.0 ha;
 3. Level Rich = more than 3.0 ha

According to the basic housing conditions listed in the Cabo Delgado White Book (1999), 98% of households live in huts, traditional constructions made

of mud, wood, bamboo, makubar, and other plant material. Only 1.7% have electricity, and 3.5% have access to piped water (0.6% in their homes). The water sources used by the rest of the population are: wells (5%); rivers (76%), and lakes (15%). Only 1.4% of households live in houses with a toilet, 36.2% have latrines outside the dwelling, and 62.3% have neither a toilet nor a latrine

SECTORS QUANTITIES

Í G F I I I	QTY	PERCENT
AGRICULTURE	584,853	87.3%
MINING	1,096	0.2%
INDUSTRY	14,020	2.1%
ENERGY	494	0.1%
CONSTRUCTION	6,879	1.0%
TRANSPORTS	2,616	0.4%
COMMERCE	36,739	5.5%
CLERKS	7,463	1.1%
OTHER OCCUPATION	14,331	2.1%
UNKNOWN	1,759	0.3%
TOTAL	670,250	100%

OCCUPATIONS / POPULATION (FAMILIES)

Í F I I E I H I	QTY	TOT/OC	PERCENT
LEADERS	439	1527	0.07%
ENTREPRENEURS (BOSSES)	1,309	512	0.20%
UNIVERSITY DEGREES	1,422	471	0.21%
TECHNICAL DEGREES	11,325	59	1.69%
CLERKS	2,351	285	0.35%
NON AGRO WORKERS	21,833	31	3.26%
INDEPENDENT ARTESAN	30,280	22	4.52%
SMALL TRADERS	434	1544	0.06%
ON DUTY EMPLOYEES	5,577	120	0.83%
EMPLOYEES	1,010	664	0.15%
SMALL HOLDERS	560,129	1	83.57%
AGRO WORKERS	5,423	124	0.81%
OTHER OCCUPATION	22,750	29	3.39%
UNKNOWN	5,968	112	0.89%
TOTAL	670,250		100.00%

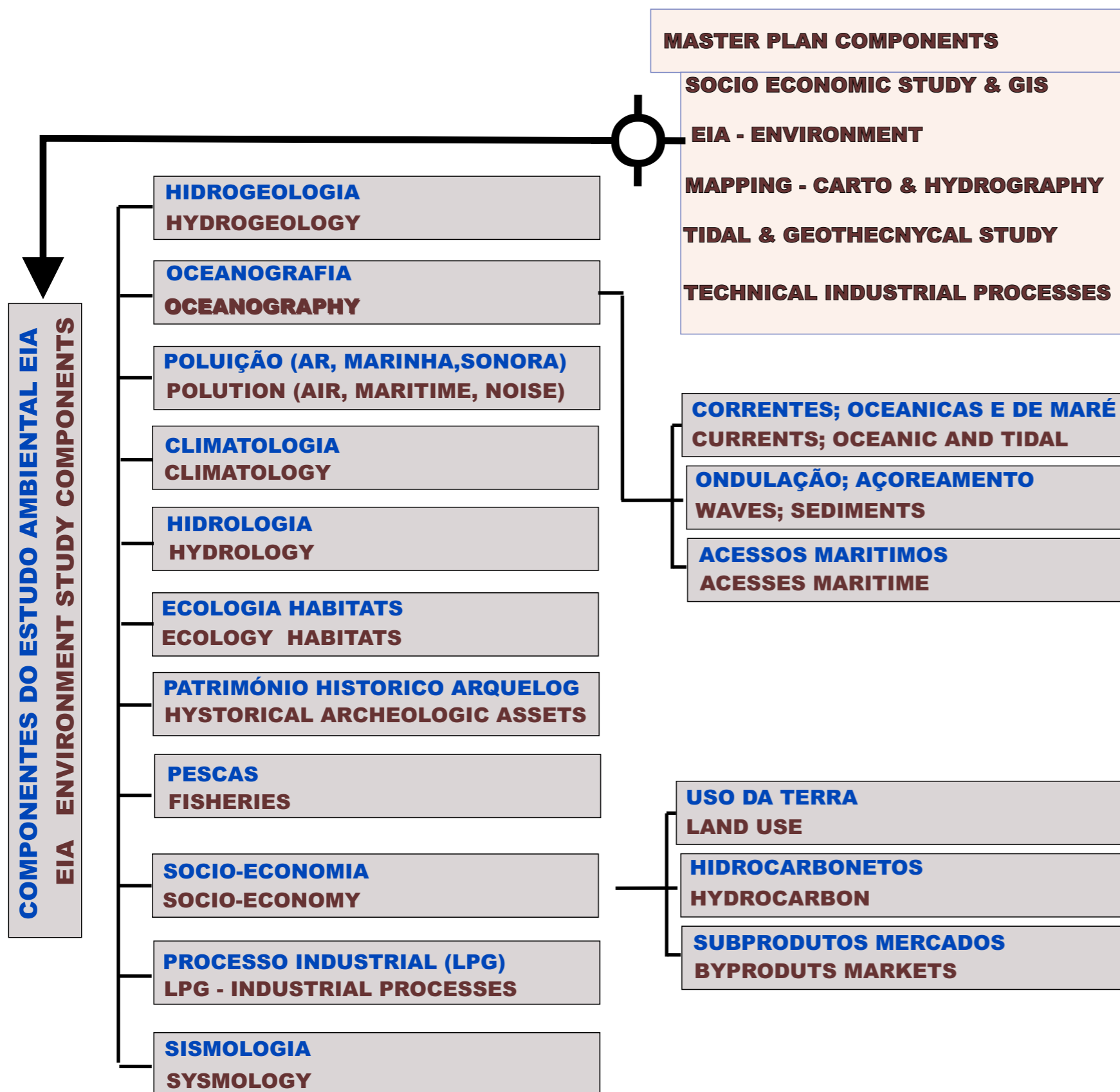
SOURCE
 INE CENSUS 2007 TABLE 30

OCCUPATIONS / SECTORS

	TOTAL	AGRICULTURE	MINING	INDUSTRY	ENERGY	CONSTRUCTIO	TRANSPORTS	COMMERCE	ADMINISTRAT	OTHER	UNKNOWN
ENTREPRENEURS (BOSSES)	1,309	165	8	47	4	23	44	987	7	23	1
UNIVERSITY DEGREES	1,422	24	6	34	6	36	9	39	285	979	4
TECHNICAL DEGREES	11,325	127	5	67	38	116	134	259	3,476	7,093	10
CLERKS	2,351	35	8	60	35	38	265	782	517	607	4
NON AGRO WORKERS	21,833	628	666	11,807	324	6,048	58	2,065	104	112	21
AGRO WORKERS	5,423	4,997	78	87	0	5	54	44	53	103	2

PORTO PLANO DIRETOR - PORT MASTER PLAN

INTERVENÇÃO



QUESTÕES AMBIENTAIS

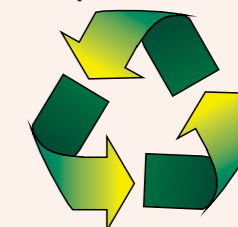
REFERÊNCIAS À LEGISLAÇÃO AMBIENTAL

Em Moçambique os assuntos ligados ao ambiente são regulados por Legislação própria, e empresas com grandes projectos ou obras são obrigadas a requerer licenças ambientais. O Ministério do Ambiente (MICOA) autoriza o licenciamento mediante uma proposta de estudo de impacto Ambiental no qual objectivos e metodologias a levar a cabo são peças fundamentais bem como seleção de operadores especialistas. Para a materialização desses objetivos e metodologias é necessário em primeiro lugar definir o domínio e âmbito exatos, do projeto ou obra ou mesmo de um programa de acções.

A exploração de gas natural na Bacia do Rovuma é assunto muito complexo envolvendo desde as obras no local de captação, transporte em pipeline para o continente, transformação em LPG, obras e instalações portuárias, transformação de subprodutos, instalação das redes de transporte agua e energia, instalação de estruturas sociais, aeroporto e outras infraestruturas,

É legislação aplicável:

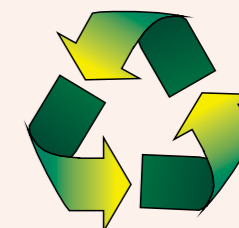
Decreto 45/2004, Diploma Ministerial nº129/2006 de 19 de Julho, Diploma Ministerial nº130/2006 de 19 de Julho,



ESTUDOS ANTERIORES

O estudo Livro Branco de Cabo Delgado, UE (exCEE) efetuado nos fins da ultima década do seculo passado refere dados colhidos que revelam genericamente uma zona extremamente pobre:

- Agricultura Tradicional com um nível de exploração da terra e rendimentos agrícolas extremamente baixos onde os camponeses mais pobres exploram 0.5 ha por agregado familiar, os remediados 1.5 ha, e os considerados ricos aproximadamente 3.0 ha;
- Pesca Artesanal com niveis de captura muito baixos e a zona com indícios de sobre-captura;
- Índice de analfabetismo extremamente alto e de escolaridade muito baixo;
- Degradação da zona de mangais;
- Desaparecimento do apoio à pesca artesanal;
- Irregularidade das monções e pluviometria;
- Perigo das viroses nos pequenos palmares de coqueiro;
- Exploração florestal sem reposição de espécies;



PRÓXIMOS PASSOS

Se as estes fatores já de si, degradantes do ambiente juntarmos os fatores inerentes a uma industria do gás natural e respetiva transformação em seus subprodutos, estamos perante uma má perspectiva ambiental, se juntarmos uma força de trabalho estimada em 40000 novos fogos, externa poderemos estar ao nível do desastre ecológico.

Assim, a recomendação de um estudo ambiental profundo e suficientemente detalhado que leve a:

- ações governamentais elevando a robustez socio-económica da região;
- ações dos concessionários conducentes a manter níveis salariais e sociais de trabalho de padrão internacional;
- medidas ambientais legislativas efetivas;
- procedimentos rigorosos nas fases preliminares de construção;



ENVIRONMENT ISSUES

ENVIRONMENT LEGAL FRAMEWORK

In Mozambique the issues related to the environment are regulated by legislation itself, and companies with large projects or works are required to seek environmental permits. The Ministry of Environment (MICOA) authorizes the licensing proposing an environmental impact study in which objectives and methodologies to carry out are key as well as selection of specialist operators.

For the realization of these objectives and methodologies is first necessary to define the exact scope and domain, or project work or even a program of action. The exploitation of natural gas in the Rovuma Basin is very complex subject involving from the works at the site of capture, pipeline transport to the mainland, transformation into LPG, works and port facilities, rendering, installation of water transport networks and energy installation of social structures, airport and other infrastructure,

Is applicable law:

Decree 45/2004, Ministerial Decree No 129/2006 of July 19, Ministerial Decree No 130/2006 of 19 July,

NINETY's OLD STUDIES

The EU (ex EEC) study, the Cabo Delgado White Book, made at the end of the 1990s, contains collected data which, in general, show an area that is extremely poor:

- * Traditional agriculture with an extremely low level of land use and agricultural yields where the poorest farmers use 0.5 ha per household, and the middle group 1.5 ha. Those using about 3.0 ha are considered rich;
- * Artisanal fisheries with very low catch levels, while the area shows signs of over-fishing;
- * Very high levels of illiteracy and very low levels of school attendance;
- * Degradation of the mangrove area;
- * Disappearance of support for artisanal fisheries;
- * Irregular monsoons and rainfall;
- * Danger of viral disease in small coconut plantations
- * Forestry activity without replanting trees.

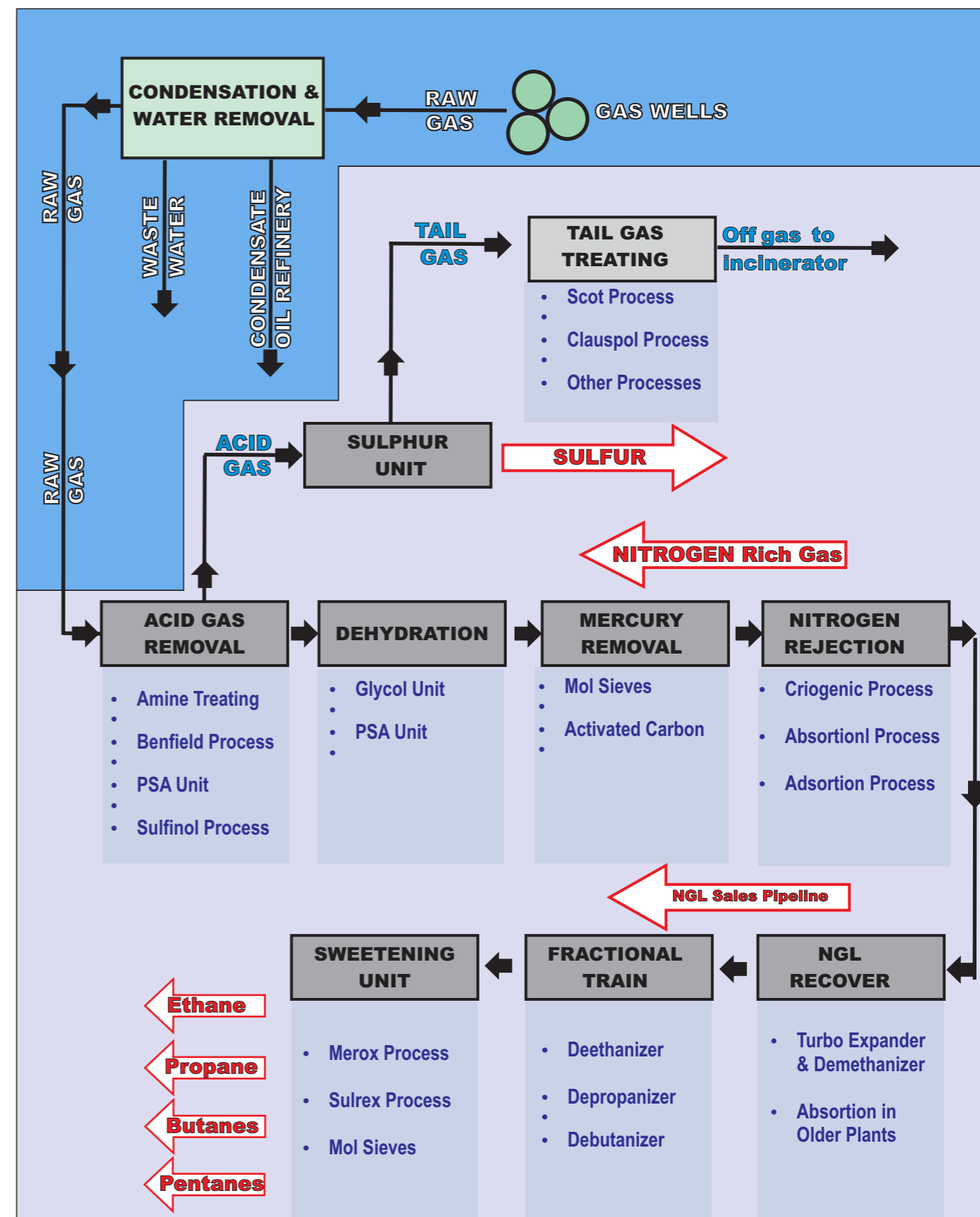
NEXT STEPS

In themselves, the above factors are already degrading the environment. If we add the factors inherent to a natural gas industry and the transformation of its by-products, we are facing poor prospects for the environment. If to all of that we add a labour force with their families who will require an estimated 40,000 new dwellings, plus all the small services suppliers, then, if there are no strong environmental measures, there will be a possibility and risk of ecological disaster;

Thus, the recommendations of a far-reaching and sufficiently detailed environmental study would lead to:

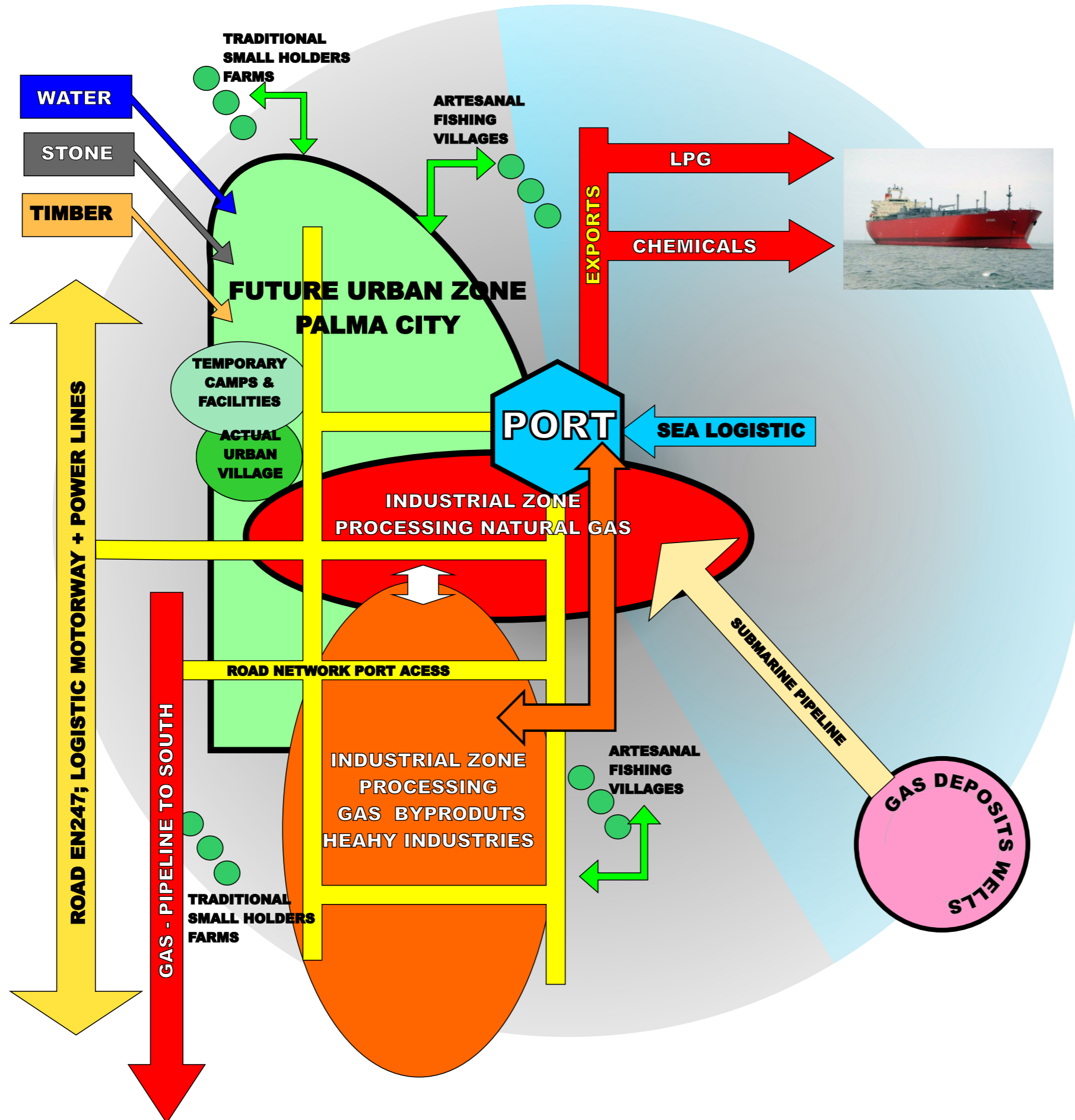
- * governmental actions to increase the social and economic robustness of the region;
- * actions of the leading companies to maintain wage levels and working conditions to international standards;
- * effective legislative environmental measures;
- * strict procedures in the preliminary stages of construction.

NATURAL GAS PROCESSING CHART



Esquema retirado "Wikipedia" Natural gas Processing

ESQUEMA DO RELACIONAMENTO E INTERVENÇÃO PORTO "GASOLEIRO"



RELAÇÃO ENTRE AS ZONAS PORTUÁRIAS E AS ZONAS ECONOMICAS DE INFLUÊNCIA

Uma zona portuária pressupõe um mercado ou zona de influencia e uma interdependência entre as duas partes. Um porto crescerá em função do mercado da zona de influencia. De igual modo se pode afirmar que o espaço físico dum porto está normalmente rodeado dum espaço urbano duma cidade ou vila, e que apenas uma parte desse espaço urbano está na zona de influencia portuária. Conflitos de espaço urbano e portuário são do domínio normal, requerendo sempre um plano diretor e um constante ajustamento desse plano. Contudo, um porto tem que ter uma reserva de espaço físico destinada a variações de crescimento da sua zona de influencia. São exemplos conhecidos as docas de Londres terem cedido espaço à municipalidade; o porto de Roterdão ter feito o mesmo; O crescimento anárquico do urbano informal não estruturado das cidades de Nacala e Pemba colocarem em risco a expansão portuária planeada; Os portos petrolíferos de Sohio em Angola e Benghazi na Libia estarem numa profunda confusão urbanística;

MODELO DE PORTO EXPORTADOR DE GÁS

Do estudo das principais baías de Cabo Delgado, pode concluir-se que existem condições excepcionais para colocação de um porto de águas profundas em Pemba, em Palma-Tungué e em Palma-Maiapa, e condições razoáveis em Mocimboa. O estudo da geologia de Cabo Delgado indica não haver jazigos de minerais de baixo valor ou de baixo preço que no espaço de uma década necessitem de porto de águas profundas. Consequentemente será o gás natural ou o petróleo a utilizar as condições excepcionais.

DIMENSIONAMENTO DO PORTO EXPORTADOR DE GÁS

No caso dos hidrocarbonetos, gás natural e do petróleo serão as reservas auditadas e outputs anuais em projeto que em principio determinarão o dimensionamento das estruturas portuárias. Um porto, mesmo os que se apresentam mais simples com bons acessos é sempre um investimento pesado, para não dizer pesadíssimo, daí procurarem soluções de aproveitamento de espaço, de equipamento bem estruturadas. Parece que no caso em estudo tem que se evitar multifuncionalidade fora do ramo do principal objetivo a exportação de LPG. Assim, serão funções, setores ou terminais:

- EXPORTAÇÃO DE LPG OU GNL;
- EXPORTAÇÃO DE SUBPRODUTOS INDUSTRIAIS RELACIONADOS;
- IMPORTAÇÃO DA LOGÍSTICA AO SETOR E COMBUSTÍVEIS;

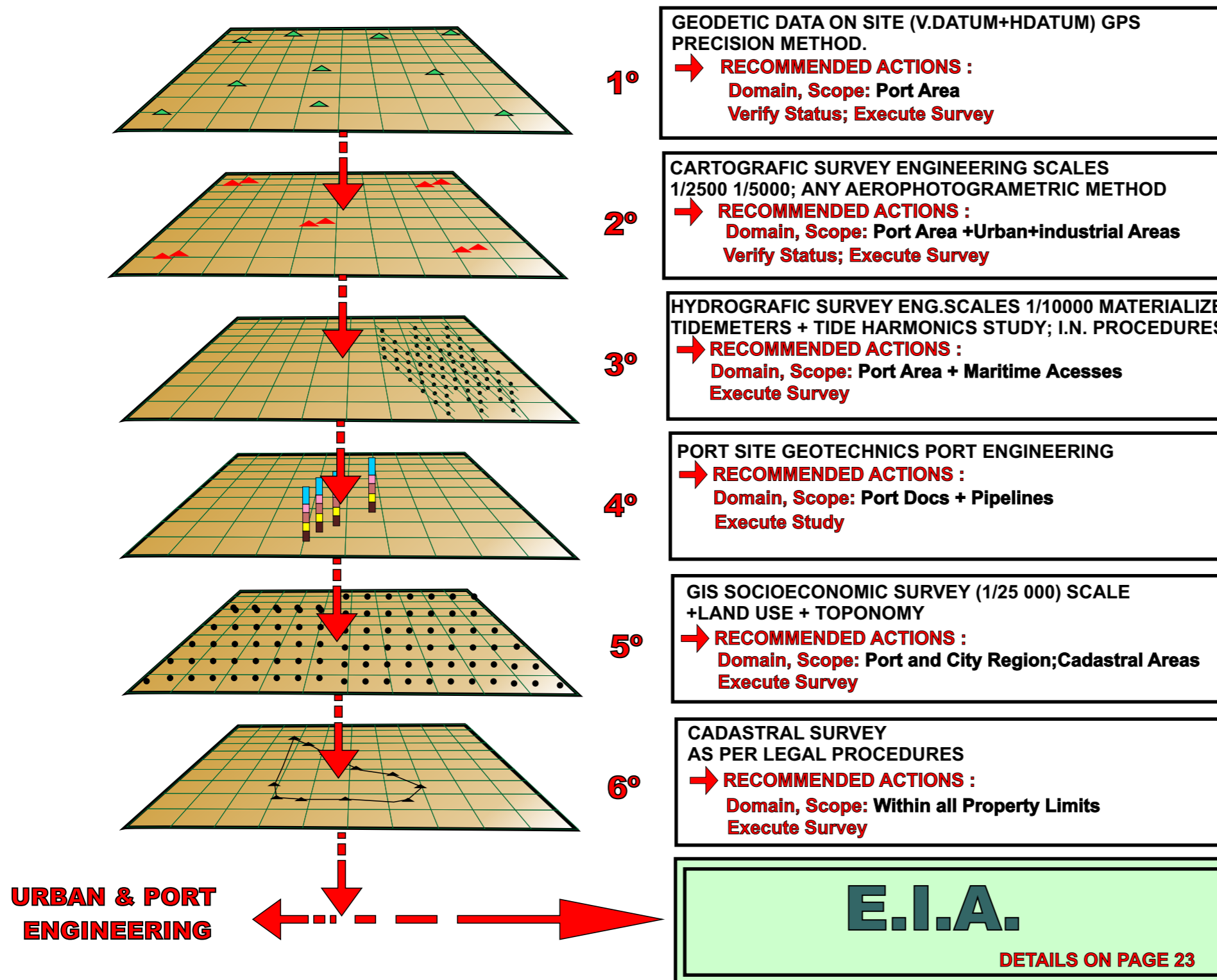
No esquema topológico ao lado apresenta-se as principais componentes adequadas a um porto "gasoleiro".

ESTUDOS DE BASE DA ZONA PORTUÁRIA

- PLANO DIRECTOR;
- VERIFICAÇÃO, COLOCAÇÃO DOS DATUM GEODÉSICOS;
- ESTUDO MARÉGRÁFICO, HIDROGRAFIA, CARTOGRAFIA;
- ESTUDO SOCIO-ECONÓMICO (GIS) DA REGIÃO;
- ESTUDO GEOTÉCNICO;
- ESTUDO AMBIENTAL (EIA);

INFRASTRUCTURE INTER RELATIONSHIP SURVEYS AND STUDIES

MASTER PLAN BASIC COMPONENTS



RELATIONSHIP BETWEEN PORTS AND THEIR ECONOMIC ZONES OF INFLUENCE.

A harbour assumes the existence of a market or an area of influence, and interdependence between the two sides. A port will grow based on the market of its zone of influence. Similarly we can say that the physical space of a port is usually surrounded with the urban space of a city or town, and only part of that urban space is within the port's zone of influence. Conflicts between urban and port space are the norm. They always require a master plan and constant adjustments to that plan. However, a port must have a reserve of physical space allocated to variations in the growth of its zone of influence. Well known examples are the London docks which have given way to the municipality; the Port of Rotterdam has done the same. Anarchic growth of the informal and unstructured urban areas in the cities of Nacala and Pemba jeopardize the planned port expansion, The oil ports of Sohio in Angola and Benghazi in Libya are in the midst of a deep urban chaos.

GAS EXPORT PORT MODEL

From the study of the main bays of Cabo Delgado, it can be concluded that there are exceptional conditions for constructing a deep water port in Pemba, in Palma-Tungue and in Palma-Maiapa and reasonable conditions in Mocimboa. The study of the geology of Cabo Delgado (LBCD2000) indicates no mineral deposits of low value or low price that will require a deepwater port within a decade. Therefore the exceptional port conditions will be used by natural gas or petroleum.

GAS EXPORT PORT DIMENSIONS

In the case of natural gas and oil, the reserves and the projected exports will be audited which will, in principle, determine the size of the port structures. Ports, even those which seem most simple and have good access, always involve heavy, indeed very heavy, investment. Hence solutions are sought for the best use of space and the best equipment. It seems that, for the case under study, a multitude of functions outside the main objective, which is the export of LPG, must be avoided. Mixing general cargo containers and the export of LPG is a nonsense. So, the functions, sectors or terminals should be as follows:

- EXPORTS OF LPG OR GNL;
- EXPORTS OF RELATED INDUSTRIAL BY-PRODUCTS
- IMPORT OF LOGISTICAL MATERIALS FOR THE SECTOR PLUS FUEL

Page 25 shows a schematic diagram for the main components appropriate for a gas port.

BASELINE STUDIES AND TASKS

- MASTER PLAN ;
- GEODETIC DATA;
- TIDAL STUDY, HYDROGRAFIE, CARTOGRAFIE;
- GIS REGIONAL SOCIO-ECONOMIC;
- GEOTECHNICS OF PORT ARES;
- ENVIRONMENT STUDY (EIA);

ANÁLISE GERAL E CONCLUSÕES

HISTORIAL SETOR AGRO

A amigo meu, e pessoa que me foi muito chegada, afirmava em meados da década de sessenta. “a economia do setor primário de Moçambique é uma economia de sobremesa”, exemplificava ... , a laranja, o açúcar, o chá, o café, o caju, o coqueiro e porque não o tabaco.

Meio século depois, pode-se acrescentar, todas aquelas atividades, menos o caju, têm por base ou fundo a economia de plantação. Nesse tipo de economia são principais características, serem produtos de exportação, tecnologia agro baseada na força de trabalho barata, salários muito baixos, preços de mercado controlados por associações, por vezes cartéis importadores, em regiões económicas com grandes subvenções à agricultura e agroindústria.

SETOR MINEIRO

Carvão - Moatize era a vila do carvão, começou com um investimento, antes da Segunda Guerra, da “Société Minière”, empresa belga, tecnologia de galerias, escoamento da Benga para Chinde e Beira utilizando o Zambeze, com todo o tipo de problemas que tal via de escoamento sempre colocou, bancos de areia moveis, utilizável apenas na época das chuvas, problemas de assoreamento no porto do Chinde. Situação melhora com mudança de acionistas, Grupo Entrepasto e (escoamento com utilização de caminho de ferro para Porto da Beira).

Uranio – Mavuzi era a vila sede da atividade, exploravam-se minerais radioativos, tecnologia de galerias, desde nascimento lutavam com problemas financeiros e logísticos.

Pegmatites – Centro da atividade Zambezia, centro aproximado, vilas de Mocuba e Molocue, exploração dos minérios de Berilo, Columbites, Tantalites, Lapidolites, pequeno investimento privado, grandes problemas financeiros, no fim da década de sessenta eram sobreviventes Morrua, Marropino em Alto Ligonha.

AGRO SECTOR HISTORY

A friend of mine from the mid-sixties, whom I was very close to, used to claim “the primary sector of the Mozambican economy is a dessert economy”, ... and the examples he gave were oranges, sugar, tea, coffee, cashew, coconuts and - why not - tobacco.

Half a century later one might add that all those activities, except cashew, work on the basis of a plantation economy. The key features of this type of economy, are that the goods are produced for export, the agricultural technology is based on cheap labour, wages are very low, the market prices are controlled by associations (sometimes cartels) of importers, in economic regions where there are huge subsidies to agriculture and to agro-industry.

MINING SECTOR

Coal - Moatize was the coal town. It began with investment, before World War II, by the Belgian Company, Société Minière, with underground shaft technology. The coal was moved from Benga to Chinde using the Zambezi River, with all the well known obstacles that the river poses. There were shifting sandbanks, the river was only navigable during the rainy season and there were problems of silting at Chinde port. The situation improved with a change of shareholders to the Entrepasto Group and the use of the railway to the port of Beira to move the coal.

Uranium - Mavuzi was the headquarters for this activity, where radioactive minerals were mined, with underground shaft technology. Right from its birth this mine struggled with financial and logistical problems.

Pegmatites - this activity was centred on Zambezia, near the towns of Mocuba and Alto Molocue. With small scale private investment beryl, columbite, tantalite and lepidolite were mined. There were major financial problems, and by the late 1960s only the mines at Morrua and Marropino in Alto Ligonha survived.

Hidrocarbonetos - Foi precursora nos anos cinquenta a Golf Oil Co., sociedade americana, descobriram o gás natural em Pande e posteriormente Temane. O gás Pande, por problemas de sondagem imprevistos ardeu durante cinco anos. Fogo extinguindo-se por colapso das paredes do jazigo.

Energia - No fim da década de sessenta, ainda colónia, e consequência da guerra de libertação faz-se como objetivo militar estratégico, o primeiro investimento sério no setor energético, a barragem de Cahora Bassa. O segundo investimento sério é feito no início do século XXI, o gás natural de Temane-Pande.

OUTROS SETORES

Os outros sectores que infelizmente ainda não emergiram:

Pescas, não houve investimento de nota. Na pesca Industrial, alugam-se áreas pesqueiras, licenças, a exportadores de camarão. O petisco para balancear a sobremesa. Empresa francesa faz nos anos noventa o primeiro investimento em Aquacultura, problema sanitário conduz a fracasso no investimento. O setor fundamental de apoio à pesca artesanal foi desaparecendo;

Cereais e Leguminosas Sêcas , a chamada segurança alimentar continuam no setor da agricultura tradicional, quase abandonado, sem perspectivas, sem estruturas de apoio, no limiar do “Slash and Burn Agriculture”;

Fibras - Algodão eliminou-se o sector têxtil industrial que poderia criar mais valias para dinamizar a produção primária de algodão. Sisal mercado substituído por fibras sintéticas;

Emergiram positivamente e com muita dinâmica :

Tabaco, de produção familiar tradicional apoiado por empresa comercial, como caso de sucesso;

Açúcar Industrial, caso de sucesso no setor comercial e agroindustrial:

Hydrocarbons - the American company Gulf Oil was the forerunner in the 1950s. It discovered natural gas first in Pande, and later Temane. A fire broke out at Pande due to unforeseen probing problems and the gas burned for five years. The fire was only extinguished when the deposit walls collapsed.

Energy – The largest investment in the energy sector was made when Mozambique was still a colony. This was the Cahora Bassa dam on the Zambezi, built with a strategic military purpose in the face of the liberation war. The second major investment was made at the beginning of the 21st century, with the exploitation of the Pande and Temane natural gas.

OTHER SECTORS

The other sectors have unfortunately not yet emerged:

Fisheries. There has been no noteworthy investment. In industrial fishing, licences have been granted and fishing areas leased to prawn exporters. The snack to balance the dessert. In the 1990s, a French company made the first investment in aquaculture, but health problem led to the failure of this investment. Support for the key sector of artisanal fishing has been disappearing;

Dried grains and pulses. Food security continues to rely on the traditional agriculture sector, which has been almost abandoned, without prospects, without support structures, on the threshold of “Slash and Burn Agriculture”;

Fibres – Cotton. The textile industry was eliminated, although it could have created added value to boost primary production of cotton. As for sisal, it has been replaced on the market by synthetic fibres;

Following have emerged positively and very dynamically:

Tobacco, a success story, based on traditional household production, backed by an industrial company;

Sugar Industry, a success story in the commercial sector and agro-industrial sector in the commercial sector and agribusiness;

ANÁLISE GERAL E CONCLUSÕES

GENERAL ANALYSIS AND CONCLUSIONS

Carvão, depois de décadas de investimento tímido emerge finalmente na primeira década do Século XXI, com vigor o Carvão com grande investimento na tecnologia céu aberto. Mineral de valor baixo, ou de preço baixo. Esta setor vai necessitar de dois vetores de Investimento, primeiro no setor ferroportuário. e em segundo no tempo para o realizar o investimento. São pesados investimentos em vias férreas, em portos, em equipamento portuário e em material rolante. Só desse modo se poderá competir num mercado exterior ávido de matérias-primas;

Titânio, surge igualmente e quase em simultâneo ao carvão. Como conceito de exploração este setor é altamente positivo com a exportação de produto refinado e não como matéria-prima bruta. Os concessionários construíram seu porto de exportação em Tupuito -Moma;

Hidrocarbonetos, finalmente a descoberta depois décadas de estudos e de tentativas. Começa com um primeiro passo no gás natural com reservas que elevam o país para os primeiros doze lugares mundiais. Como segundo passo o petróleo, e onde um concessionário acaba de anunciar a primeira descoberta de valor comercial. Tais descobertas vão modificar a vida pacata de regiões, cidades, vilas e aldeias. Espera-se que a mudança se faça com o mínimo de perdas ambientais e com o máximo de benefícios para as populações mais pobres.

Grafite, recentemente trabalhos efetuados na universidade de Manchester no domínio da transformação de grafite em grafeno levaram o comité Nobel a atribuir, em 2010, o prémio a dois cientistas daquela Universidade. O emprego generalizado do grafeno poderá levar a uma segunda revolução industrial mundial. Existem em Cabo Delgado uma serie de jazigos de grafite. Impõe-se estudos profundos:

- sobre aplicações do grafeno e respetiva tecnologia;
-
- sobre os jazigos de grafite de Cabo Delgado;
-
- vias de escoamento da grafite;
-
- fiscalidade e respetivos incentivos adequados a eventual futuro promissor.

Coal, after decades of timid investment, finally emerged strongly in the first decade of the 21st Century, with major investment in open cast mining technology. This mineral is of low value or low price. This sector will require two investment vectors. First in the rail and port sector, and second in time to make a return on the investment. This involves major investment in railways, harbours, port equipment and rolling stock. This is the only way to compete in a foreign market eager for raw materials;

Titanium also arose almost simultaneously with the coal. The exploitation of this sector is highly positive with exports of the refined product and not just as a raw material. The company which was granted the mining concession built its own export port.

Hydrocarbons were finally discovered after decades of research and trials. As a first step, the reserves of natural gas so far discovered could put Mozambique among the twelve largest gas producers in the world. The second step would be oil where one concession holder has just announced the first discovery of commercial value. These discoveries will change the quiet life of regions, cities, towns and villages. It is hoped that the change will be achieved with minimum environmental damage and maximum benefits for the poorest populations.

Graphite: recently, work done at the University of Manchester in processing graphite into graphene, led the Nobel Committee to award the Physics Prize in 2010 to two scientists from this University. The widespread use of graphene could lead to a second world industrial revolution. In Cabo Delgado there are several graphite deposits. Deep studies are needed:

- * On graphene applications and the respective technology;
- * On the graphite deposits of Cabo Delgado;
- * On the routes for moving the graphite;
- * On the taxation and possible incentives for a promising future.

Os últimos desenvolvimentos dos setores mineiros nacionais elegeram a Baía de Nacala como a zona portuária por excelência para exportação do carvão. A localização do campo de jazigos de gás natural e as condições extraordinárias da Baía de Tungué transformará certamente Palma no porto "gaseiro" moçambicano. O anuncio recente da descoberta do primeiro jazigo de petróleo na área de prospecção (2/5), área Pemba-lbo, tem duas opções válidas ou Palma terminal Maiapa ou Pemba terminal de aguas profundas de Londo. É prematuro. Para passar de descoberta a reserva auditada serão necessários vários meses de trabalhos de avaliação de reservas e testes ás qualidade encontradas.

Assim, a eleição dos lugares dos portos ou terminais sejam mineraleiras, petroleiras ou gaseiras terá que aguardar pelos trabalhos de avaliação, onde uma das grandes questões se situa na área económica. Que dimensões e qualidades justificam transformação industrial, justificam refinarias ou outros processos.

INVESTIMENTO NO SETOR HUMANO

S seja qual o tempo de espera e a escolha do lugar das infraestruturas, é logico que são prementes investimentos naquilo que é a maior riqueza dum país o sector humano.

Extrapolando doutros centros produtores de hidrocarbonetos, mineiros, lugares portuários e de transporte, iremos necessitar de perto de sessenta mil profissionais cobrindo as gamas superior, média e de operários especializados. Quando se observa o quadro retirado do censo de 2007, na pagina 18 (as gentes) linhas referentes a (quadros, ocupação, setores) fica-se com uma sensação de vazio. Dá vontade de uma afirmação quase radical. "Se houver que hipotecar financeiramente o país para infraestruturas com as chamadas parcerias publico privadas que se faça de igual modo e prioritariamente o investimento no setor principal de formação". Seja formação clássica, seja formação tecnica, seja "on the job training".

The latest developments in the Mozambican mining industry have chosen Nacala Bay as the port area par excellence for coal exports. The location of the natural gas deposits and the extraordinary conditions of the Bay of Palma-Tungue will certainly transform Palma into the Mozambican gas port. The recent announcement of the discovery of the first oilfield in exploration area 2/5, in the Pemba-lbo area poses two valid options - either a terminal at Palma-Maiapa or a Pemba deep water terminal at Londo. But this is premature. To pass from discovery to audited reserves will take several months of work of evaluating reserves and making quality tests

Therefore, the choice of places for ports and terminals - whether for minerals, oil or gas - will have to wait for the evaluation work, where one of the big questions lies in the economic area. What scale and quality of the raw materials will justify industrial processing, or refineries?

INVESTMENT IN HUMAN RESOURCES

Whatever the waiting time, and the choice of location for the ports, logically, urgent investments must be made in what is the greatest wealth of a country, its people.

Extrapolating from other hydrocarbon and mining centres, with their ports and transport, we will need close to sixty thousand professionals, including skilled workers, and technical staff with mid-level qualifications or with university degrees.

A look at the statistics taken from the 2007 census, on page 22, on the percentage of the population in particular occupations and sectors, leaves one with a feeling of emptiness. It is tempting to make an almost radical statement. "If you have to mortgage the country financially for infrastructures through so-called public-private partnerships, then make it a priority to do the same for investment in the core training sector" - whether this is through classical training, technical training or "on the job training".

ANÁLISE GERAL E CONCLUSÕES

GENERAL ANALYSIS AND CONCLUSIONS

UM TRAVÃO NA GLOBALIZAÇÃO DESENFREADA

O investimento na formação não pode ser só no setor de formação em tecnologias de hidrocarbonetos. Tem que ser muito mais abrangente tem que cobrir pelo menos a formação nos setores de Ensino Classico e de combate ao analfabetismo. Se assim não for corre-se o risco, de termos uma força de trabalho altamente especializada alimentando-se nos supermercados estrangeiros importadores de tudo, por vezes, até de tomate produzido em Israel e de camisas feitas no Paquistão.

Durante os primeiros anos da Independência quadros nossos em serviço, em Abidjan, ficaram escandalizados pelo consumo generalizado de água engarrafada de (Evian). Hoje, é considerado normal consumir-se, em Maputo, água da serra do Caramulo (Portugal). Isto não é só a onda avassaladora da globalização. É o deslubrimento consumístico ao estilo de Dubai como sumo exemplo errado de desenvolvimento.

POBREZA

No Norte dos E.U.A. e Sul do Canada na planície de "Manitoba - Ontario, no chamado corn belt", um operário agrícola (toma conta) de 250 ha num rendimento expresso em milho por área da ordem de 10 toneladas por hectare ou seja um rendimento total de 2500 toneladas/ano por trabalhador agrícola.

O operário é normalmente um "latino ilegal" que tem o conhecimento agro adequado à zona e ao processo, tem à disposição energia, químicos e maquinaria, produtos financeiros adequados, e pode ainda recorrer a seguro agrícola. Esse rendimento em Cabo Delgado no setor Agrícola Tradicional equivale ou representa o trabalho de 8000 agregados familiares, e quando dispersos representa, talvez por 80000 hectares. Embora a comparação esteja fora dum contexto lógico de desenvolvimento, serve apenas para demonstrar que sair da pobreza significa um esforço nacional gigantesco em múltiplas frentes. Tal esforço, tem que ser feito e tem carácter de urgente. Doutra modo é o perpetuar da situação atual de pobreza.

A BREAK ON THE ANARCHIC GLOBALIZATION

Investment in training cannot only be in hydrocarbon technology. It has to be much more comprehensive It must cover at least training in education, in the classical sense, and the fight against illiteracy. Otherwise we run the risk of having a highly specialized workforce, feeding itself from foreign supermarkets, which import everything, even tomatoes grown in Israel and shirts made in Pakistan.

During the early years of the Independence of Ivory Coast, our staff working in Abidjan, were scandalized by the widespread consumption of French bottled water (Evian). Today, it is considered normal in Maputo to drink water from the Caramulo mountains in Portugal. This is not only the overwhelming wave of globalization, driving all before it. It is the dazzling consumerism, Dubai-style, as the highest example of development gone wrong.

POVERTY

In the northern United States and southern Canada, on the Manitoba-Ontario plain, known as the corn belt, an agricultural labourer works 250 ha of maize and obtains a yield of around 10 tonnes per hectare. That is a total yield of 2,500 tonnes per year per agricultural worker.

The worker is usually an "illegal latino" who has the appropriate expertise and has at his disposal energy, chemicals and machinery. To obtain this yield in Cabo Delgado from the traditional agricultural sector would require the work of 8,000 households, scattered over perhaps 80,000 hectares. Although the comparison is outside the context of logical development, it does serve just to show that escaping from poverty requires a gigantic national effort on many fronts. This effort has to be made urgently. Otherwise we just perpetuate the current situation of poverty

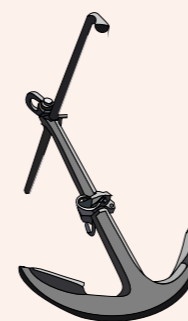
UM SONHO

Sonhar moçambicano é um direito que adquirimos em 1975, depois de séculos de pesadelos. Assim, vamos sonhar sonhar bem alto, talvez o sonho passe a comandar a vida.....

Sessenta e cinco por cento da nossa população tem menos de 25 anos. São 13 de 21 milhões. É o futuro moçambicano. Que se promova, eleja ou faça de Pemba a cidade do futuro, a cidade do estudante, a cidade do profissional, a cidade da ciência, a cidade onde se situará o "MIT" Moçambicano.

Onde não se pode esquecer que o mais celebre instituto tecnológico mundial é mais famoso pela cultura de trabalho de qualidade do que pela quantidade dos títulos académicos dos por la passaram.

Pemba não pode ser a cidade do virtual, cidade de espectadores onde um pouco a Norte num cenário dum profundo azul-marinho sobre o Indico empresas vão bombeando gás natural la para o Orienteeeeeeeee.



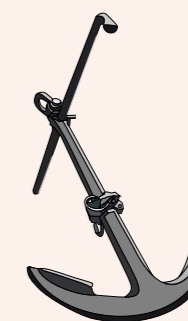
A DREAM

Dreaming Mozambican is a right we won in 1975 after centuries of nightmares. So let's dream... dream out loud, perhaps the dream will come to life...

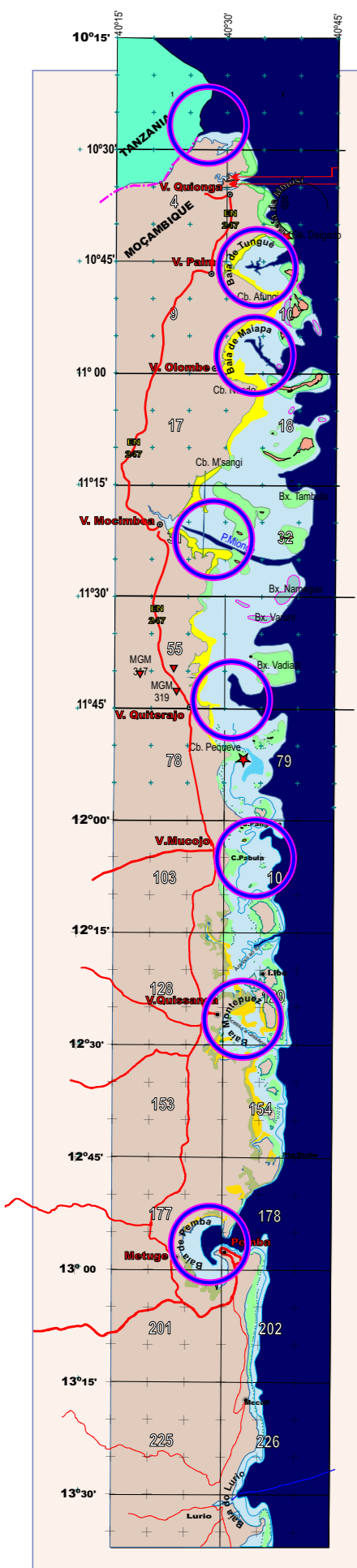
Sixty-five per cent of our population is under 25 years old. They are 13 million out of 21 million. They are the future of Mozambique. Let us promote, choose or make Pemba the city of the future, the student city, the city of professionals, the city of science, the city of opportunities, the city where the Mozambican "MIT" will be situated.

Where we cannot forget that the most renowned technological world institute is more famous for its culture of high quality work than for the number of academic titles held by those who have passed through it.

Pemba cannot just be the virtual city, the city of spectators while a little further to the North, in the deep blue of the Indian Ocean scenario...companies are pumping natural gas from the seabed to the Far East



BAYS



BAYS

page 11

Between Latitudes $10^{\circ} 15'$ and $14^{\circ} 00'$ south, and over the 350 kilometres of coastline, there are ten important bays which provide shelter for shipping. From north to south they are: the Rovuma, Quionga, Mbuisi, Tungue, Maiapa, Mocimboa, Quiterajo, Montepuez, Pemba and finally the Lurio Bay;

The diagrams or schematic drawings on page 11, show the approximate shape and size of each bay drawn over a kilometric grid so as to highlight the most important, most sensitive or most evident geographical features to be taken into consideration in port projects;

- Likewise other non-geographical concepts and factors were taken into account as criteria, such as:
- *The shape, as providing shelter for shipping;
- *The free physical space that can be made use of for port purposes;
- *Environmental strength and weaknesses;
- *Accessibility from the sea (the access channels and their respective depths);
- *Overland access (existing roads and infrastructures);
- *Capacity of the water network to provide eventual water supply;
- *The geographical features that will best allow the construction of supporting infrastructures (industrial, urban and social facilities, roads);

Considering the geographical features and the other characteristics of the ten bays, Pemba is effectively the bay that offers the best conditions for the installation of port structures followed, in order, by Tungue, Maiapa and finally Mocimboa Bays. Pemba and Mocimboa have tides meters and several years of data collection make it possible to show analyses of tide harmonics.

TUNGUE BAY

page 13

The cape Afungi, Latitude $10^{\circ} 50'$, divides the coast of Cabo Delgado Province, and Palma District in two large bays, the Tungue Bay in North and the Maiapa Bay in South. Both bays are geographic accidents protected from winds by islands, capes and other accidents, natural shelters are suitable for port infrastructure. The Tungue Bay with an almost shape of a lozenge, have a west-east diagonal of nearly 19 km, and North and South diagonal of about 14 Km. The Village of Palm occupies the West vertex and the East vertex is occupied by Negomaci Island. Tungue Bay lies still on top West of deep sea valley (Tungue Canyon).

The maritime access from the Mozambique Channel (Route Durban Zanzibar), to continent is a natural channel with a draft enough deep to any type of vessel. The Tungue bay lies still on top West Valley deep sea Tungue Canyon.

Considering the location of the discovery of natural gas Tungue Bay is the nearest potential place, and better able to develop a deep water port project.

It is expected that subsequent studies Cartographic, Hydrographic, Geotechnical and Environmental lead to the same conclusion. The figure page 13 (down bellow) shows the waterfront potential for a port infrastructure project.

MAIAPA BAY

page 14

Maiapa Bay lies between Cape Afungi to the North and Cape Nondo to the South. The Bay has the shape almost of a curved triangle, with a west-east width of nearly 18 km, and a height from north to south of almost 20 Km. The small town of Olombe is near the southwest vertex. It lies in an opening in the coral reefs between the islands of Rongui and Queramimbi to the north and Vamizi to the south. The Bay opens to the ocean along the deep Vamizi sea valley (Vamizi Canyon). The access from the Mozambique Channel to the coast is through a natural channel with depths of less than 20 metres.

Considering the location of the hydrocarbon discoveries, Maiapa Bay is the second closest site, and with alternative conditions for developing a deep water port project

It is expected that subsequent Cartographic, Hydrographic and Geotechnical studies will lead to the same conclusion, or that conditions can be compared with those of Tungue Bay. The figure on page 14 shows a water plan appropriate for the projected port area.

MOCIMBOA BAY

page 15

Mocimboa Bay is shaped approximately as a triangle, with a west-east baseline that is 16 km long. The town of Mocimboa da Praia is at the southwest vertex of this triangle. The Bay lies between Cape Msanji to the north and Cape Pequeve to the south, and is at the western end of the Tambuzi-Mionge deep sea valley (Tambuzi Canyon). Mocimboa Bay is far away from the location of the first hydrocarbon discoveries. The access channel does not present the exceptional conditions of Tungue and Maiapa bays. The average depth of the Mionge passage is less than 15 metres. There is only one place where a deepwater port (20 metres deep) would be possible, some 16 Km east of the town.

Mocimboa Bay should be considered as an alternative, if hydrocarbons are discovered south of the initial discoveries. It could perhaps be a port with logistical support terminals, and a port with the potential to serve the minerals market that needs a deep water terminal. It has potential for the current and future development of the region outside of the hydrocarbon sector.

Although Mocimboa is currently an outsider, and thus relegated to a secondary position, this does not mean that the project should be abandoned. It is expected that Cartographic, Hydrographic, and Geotechnical studies will be undertaken to obtain a more precise picture of the hydrocarbons and of the export of minerals at low price.

The figure on page 15 shows the water plan for the Mocimboa port project.

PEMBA BAY

page 16

In the current situation (2013), Pemba Port must, in a very short period, be transformed from a secondary coastal shipping port into a port providing logistical support to the natural gas industry. At the same time, prospects are opening for it to become a port for mineral exports.

On the other hand, continued hydrocarbon exploration (in Areas 2/5 and 3/6) can raise the status of the port of Pemba to that of a second natural gas exporter. It is very likely that it could become the crude oil port, with refineries and related petrochemical infrastructure. Under these circumstances the Pemba port area would consist of the northern Londo deep water terminal, handling minerals, natural gas and crude oil terminal and the southern commercial terminal.

The inner bay of Pemba is one of the most beautiful bays on the Mozambican coast. The inner Pemba Bay is sandwiched between Pemba peninsula, to the Southeast, and the Londo Peninsula to the Northeast. The inner Bay opens a bar in the East to the Indian Ocean, connecting the bay to the Pemba abyssal canyon in the Mozambique Channel.

The bar (Romero - Said Ali) is 3 km wide, and in the middle it reaches depths of 50 metres;

The shape, size, depth of the waters, type of waves, characteristics of the currents, the quality of the beaches and the waters, and the exposure to the winds all have worked together to make this Bay a natural place to site cities and ports and/or various port terminals.

In details, the size of the bay is as follows:

- * It is shaped approximately like a bean;
- * it is 15 km long from north to south;
- * it is 8 km wide from east to west;
- * It has a total water perimeter of 50 km;
- * It has a total surface area of inner bay waters of 12,000 ha;
- * It has a total surface area of deep water (20 metres deep) of 4,500 ha;
- * It has a total surface area of navigable waters (at least 12 metres deep) of 6,000 ha;
- * the length of the potential berths where ships could moor in the northeast, on the London Peninsula is 4,000 metres;
- * the length of mooring berths in the southeast, on the Pemba peninsula (the current port) is 3,500 metres
- * the shoreline in the western part of the bay, in the Metuge area, is sandy and sometimes muddy with sandbanks and mangroves. Although more difficult and costly it is also possible to put port terminals here.

In Pemba, the tides are recorded on the tide gauge and the hydrography has recently been updated.



ÍNDICE DOS "SLIDES"

01

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA QUERIMBAS

NOTA INTRODUÇÃO



01

06

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA ÁREAS DE PROTEÇÃO CONSERVAÇÃO E ZONA

Áreas de Proteção - Concessionários

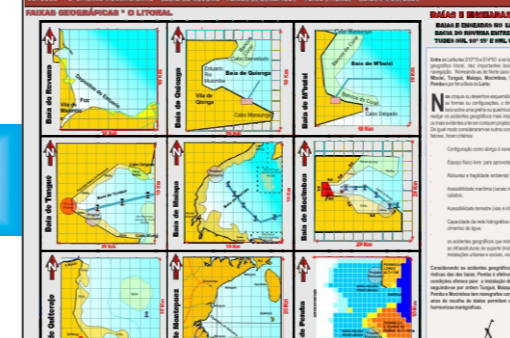
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5 off shore	CONCESSIONÁRIOS

06

11

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXAS GEOLÓGICAS FAIXAS LITORAL BAIAS E BAIXADAS

FAIXAS GEOLÓGICAS - O LITORAL

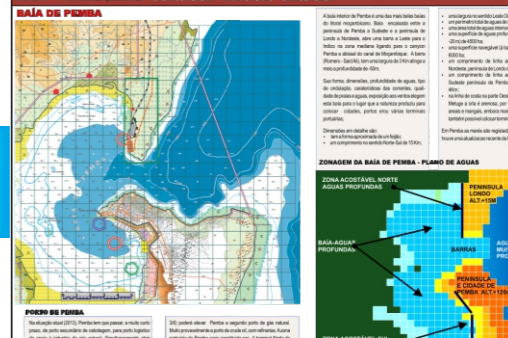


11

16

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXA LITORAL BAIA DE PENHA

BAIA DE PENHA



16

02

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA QUERIMBAS ARQUIPÉLAGO

INTRODUCTION



02

07

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA ZONA DE PROTEÇÃO EXCLUSIVA ZONA ECONÓMICA EXCLUSIVA ZONAS GEOLÓGICAS PRINCIPAIS

THE GAS DISCOVERY, EXCLUSIVE ECONOMIC ZONE, THE REGION, GEOGRAPHIC ZONES




07

12

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXAS GEOLÓGICAS FAIXAS LITORAL BAIAS E BAIXADAS

THE BAYS

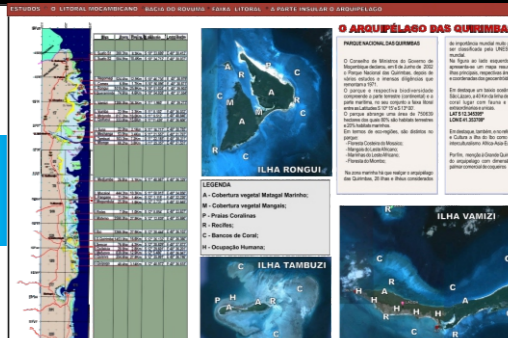


12

17

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXA LITORAL BAIA DE PENHA

O ARQUIPÉLAGO DAS QUERIMBAS

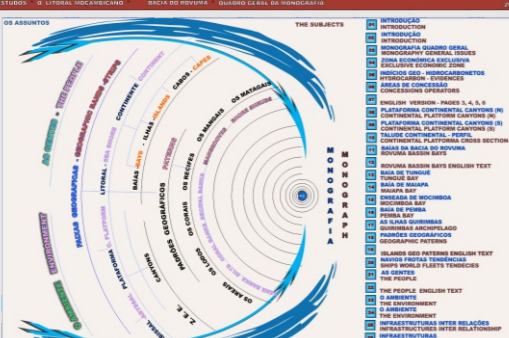


17

03

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA QUERIMBAS FAIXAS GEOLÓGICAS

THE SUBJECTS

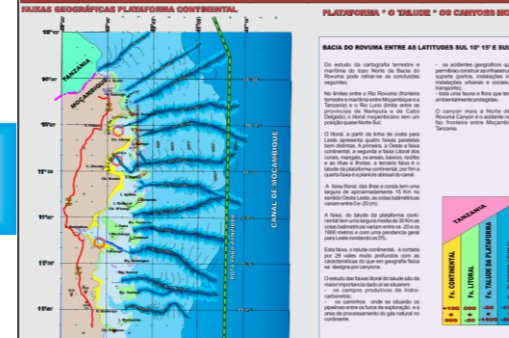


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08

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXAS GEOLÓGICAS PLATAFORMA CONTINENTAL DO CANAL DE MOÇAMBIQUE

FAIXAS GEOLÓGICAS PLATAFORMA CONTINENTAL

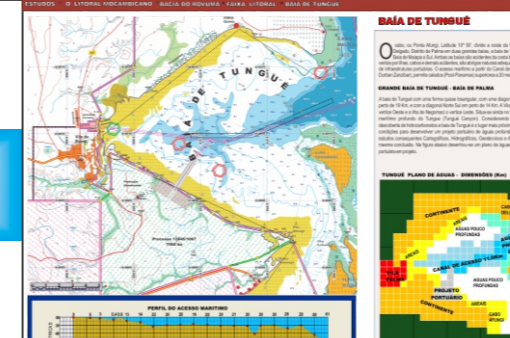


08

13

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXAS GEOLÓGICAS FAIXAS LITORAL BAIAS E BAIXADAS

BAIA DE TUNGUE




13

18

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXAS GEOLÓGICAS PRINCIPAIS

PADRÕES GEOGRÁFICOS

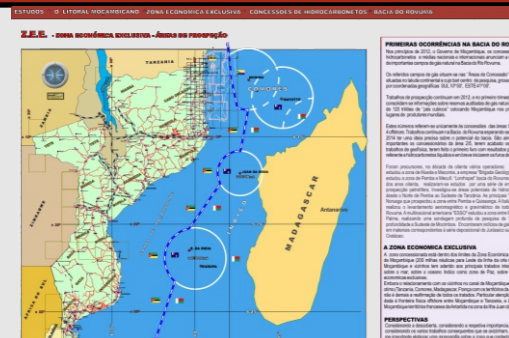


18

04

ESTUDOS DE LITORAL MOÇAMBICANO ZONA ECONÓMICA EXCLUSIVA CONCESSÃO DE HIBRIDOS COM ZONA DE PROTEÇÃO CONSERVAÇÃO E ZONA

Z.E.E. - zona económica exclusiva - áreas no levantamento

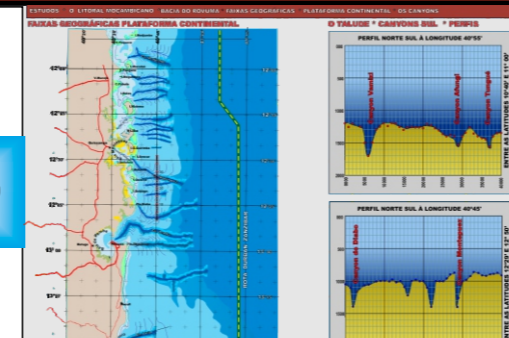


04

09

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXAS GEOLÓGICAS PLATAFORMA CONTINENTAL DO CANAL DE MOÇAMBIQUE

FAIXAS GEOLÓGICAS PLATAFORMA CONTINENTAL

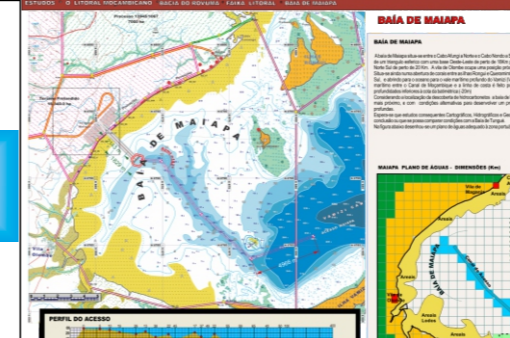


09

14

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXAS GEOLÓGICAS FAIXAS LITORAL BAIAS E BAIXADAS

BAIA DE MALAPA



14

19

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXAS GEOLÓGICAS PRINCIPAIS

QUERIMBAS ARQUIPÉLAGO

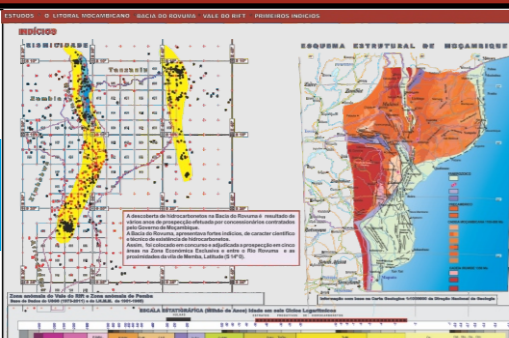


19

05

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA BAIA DE PENHA PRINCIPAIS INDICADORES

INDICADORES

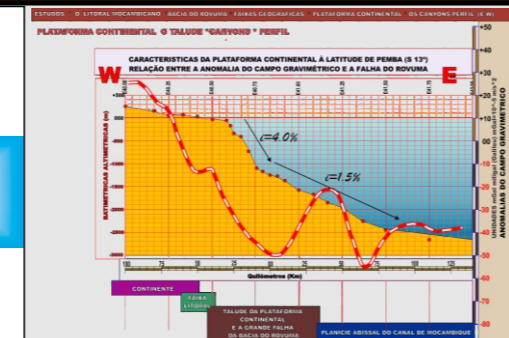


05

10

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXAS GEOLÓGICAS PLATAFORMA CONTINENTAL DO CANAL DE MOÇAMBIQUE

PLATAFORMA CONTINENTAL O TALUDE "CARVÃO" PENHA

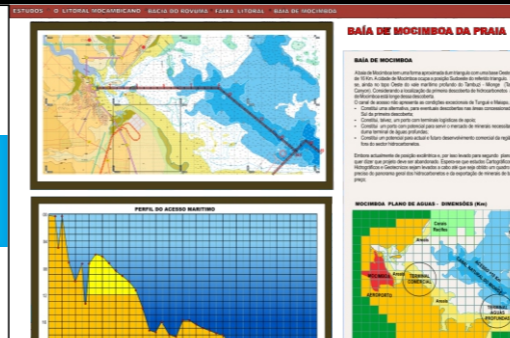


10

15

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXAS GEOLÓGICAS FAIXAS LITORAL BAIAS E BAIXADAS

BAIA DE MOCIMBOA DA PRAIA

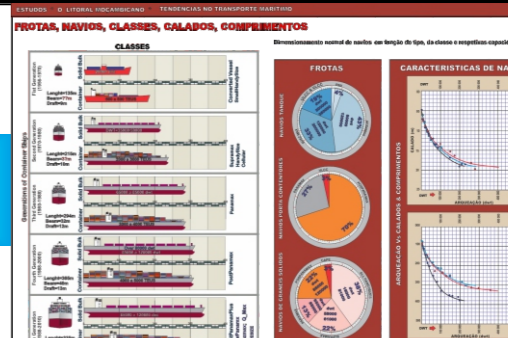


15

20

ESTUDOS DE LITORAL MOÇAMBICANO BACIA DO ROUVINA FAIXAS GEOLÓGICAS PRINCIPAIS

FROTAS, NAVIOS, CLASSES, CALABOS, COMPLEMENTOS



20

ÍNDICE DOS "SLIDES"

PATROCINADORES

21

26

22

27

23

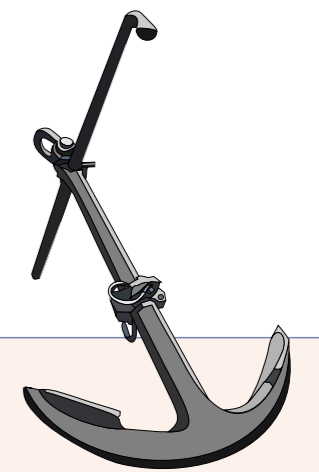
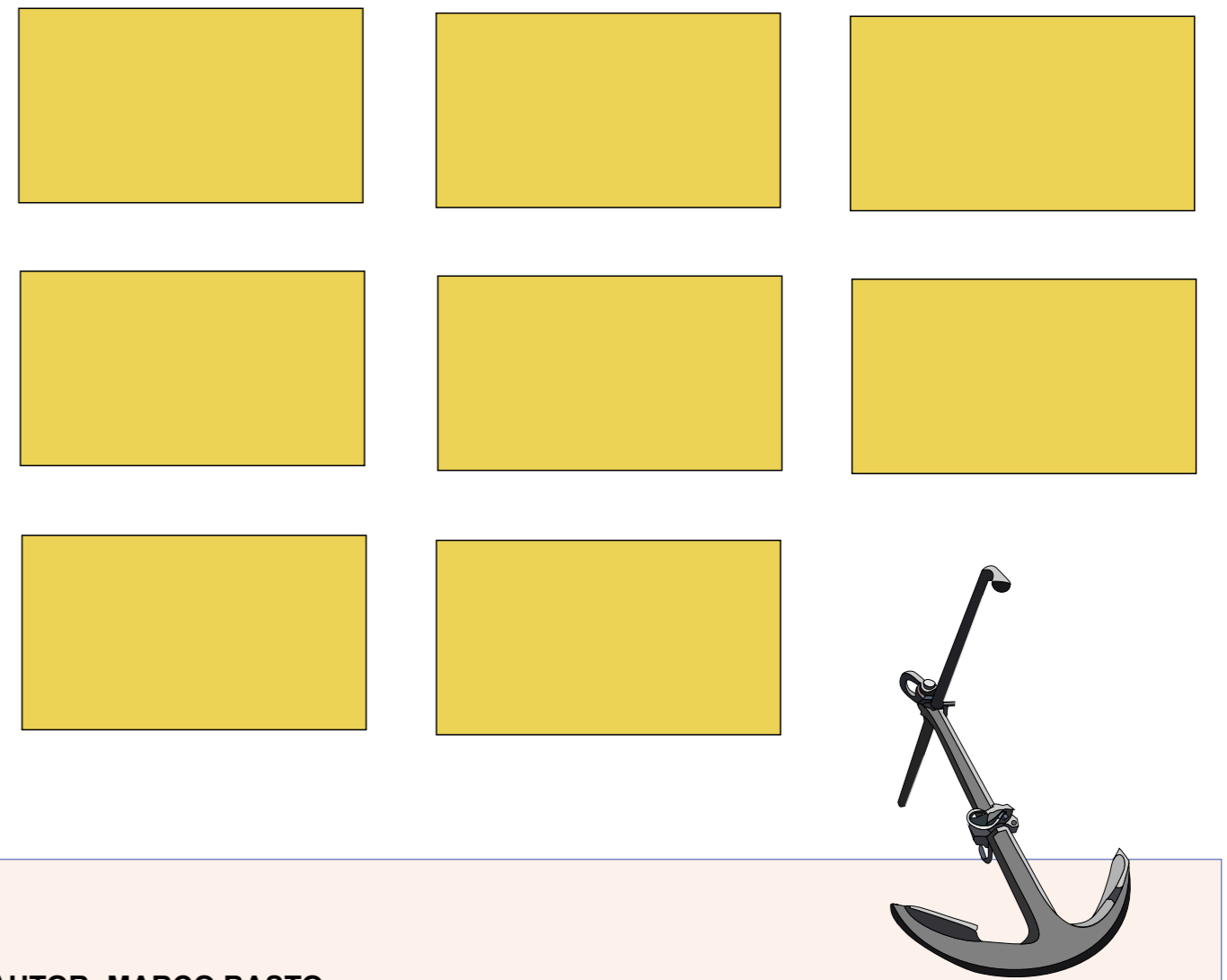
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24

29

25

30



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REFERÊNCIAS E BIBLIOGRAFIA
LIVRO BRANCO DE CABO DELGADO - CEE UE 1999
ANICETO DOS MUCHANGOS - MOÇAMBIQUE PAISAGENS E REGIÕES NATURAIS 1999
PORTS AND REFERENCE SOUTHERN AFRICA GUIDE 1999
INE INSTITUTO NACIONAL DE ESTATÍSTICA CENSO 1997
INE CENSO DE 2007
MONUMENTA 1971
MONUMENTA 1972

CARTOGRAFIA
JOHN P. SNEIDER - US GEOLOGICAL SURVEY - MAP PROJECTIONS - PAPER 1395 - 1998
CARTA 50000 DE MOÇAMBIQUE - FOLHAS DE CABO DELGADO E NAMPULA;
CARTAS HIDROGRÁFICAS, INAHINA, PALMA, MOCIMBOA, IBO, PEMBA;
CARTA GEOLÓGICA DE MOÇAMBIQUE ESCALA 1/1000000 E FOLHAS 250000;
GOOGLE EARTH, IMAGENS DE SATELITE;
CFM - CARTAS DE ZONAS PORTUÁRIAS DE PALMA, MOCIMBOA, PEMBA - EGA 2012

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