1. Vegetation will be lost at and around the life area of the migrant fishermen, following construction of their camps.
2. Vegetation will be largely lost by SONABA's project.
3. Feeding area for Bold ibis will be also lost because of the loss of the above vegetation
4. Ecosystem will change because of the increase of other species such as sea gulls following the growth of garbage.
5. Street lights construction may influence Bold ibis at nighttime.
6. Impacts of traffic and vibration by large vehicles during construction. (It is recommended to proceed the work between February and May, because during this period the birds form colony for breeding in the south of the park)

In this study, details about the habits of Bold ibis was not surveyed. The Souss-Massa National Park office has been making long-term survey on the habits of Bold ibis. Birdlife International, an International NGO, also dispatched specialists regarding this issue. For the protection of Bold ibis, it is extremely important to cooperate with them and SONABA which is in charge of the development of tourism in this district. It is necessary to keep contact with the park office, and a survey to see the significance of the area from ecological aspect should be given the first priority. Also, the present feeding area should be preserved until the range of impacts of the project will be estimated accurately.
Intertidal ecosystem existing on reefs along the beach is significant in terms of biological productivity in this area. On planning land facilities and the location of slip way, it should be taken into account that local fishermen catch fishes living on the reefs along the beach.
It is most desirable that sewage disposal be included in the project by SONABA. But if that is impossible, (chikasintoshiki) is most realistic. However, the filtering effects of soil might be low, because the soil is composed of sand in the whole area. In addition, it is assumed that an impermeable layer exists below the sand near the beach, because sea bottom is basically rock with sand layer on it, and there is a well near the beach. In this case, sewage penetrating into the ground may contaminate the source of the well while it passes on the impermeable layer. In any case, an investigation should be conducted in this respect. There is another factor which is making the sewage disposal more complicated. It is their excretory habit. Currently, there is no lavatory on the beach. Even with the cooperation with SONABA, possibility is low that all fishermen will own their residences on the site. It is then necessary to build a public lavatory. An assessment to identify appropriate number of toilets both for the resident fishermen and seasonal fishermen, and separation of toilets for seasonal fishermen and those for resident fishermen should be properly done. In addition, promotion of toilet use both for the resident fishermen and seasonal fishermen may be necessary. Especially for the promotional activities for the seasonal fishermen, involvement of resident fishermen would be very important for the effectiveness of the activities.
On the other hand, it is important to pay attention to the condition of sand which is moving inland. Multi-purpose spaces such as parking and camps for migrant fishermen will create some space without any plants. Although their effects might not be so great, it is necessary to assess convinced impacts done by this plan and SONABA plan. In order to minimize the impacts of fishery development, it is desirable to plant trees on the border of such open space to control desertification as well as to preserve soil.

(2) Social Environment

① Friction Between the Fishermen's Community and the Summer House Development District
Even if plans for the construction of a seasonal fishermen's camp or fishermen's housing are included in the project, it might not be possible to secure sufficient land unless the consent of SONABA is obtained. According to interviews conducted so far, SONABA has no intention of securing a special residential area

for fishermen, but sell them houses if they wish to live in general residential section. Moreover, it is likely that SONABA has given no consideration to a seasonal fishermen.

There is a committee composed of representatives from related agencies which is intended to examine the development plans of SONABA, and it is necessary for ample examination to be conducted by this committee.

In the event where the development plans of SONABA go ahead and summer houses and tourist facilities are developed, it is possible that friction may arise with the fishermen and migratory fishermen who are based in Tifnit. One potential trouble is on the use of the beach and another relates to sewage, solid waste treatment and odor. The utmost care is required with respect to sewage treatment, however, odor is also an evocative issue and it is necessary to not just reduce smell but take steps to remove visible signs like smoke and rubbish bins, etc. Since friction can also be averted by making both sides share the benefit, methods for making use of marine products in the tourism sector can be considered. Having said that, as was mentioned earlier, sanitary problems caused by migratory fishermen are difficult to tackle, so the efforts of local inhabitants will need to be backed up by some kind of administrative support.

② Impact on Relationship Between Fishermen and the Middlemen

This issue is inpntoit in Tifnit, because a small number of middlemen have created an monopolistic situation that is holding down the price of squid. Fishermen want to see the entry of more middlemen from Agadir, etc. to generate competition, and so push up prices. They are hoping that the public market will induce this.

Fishermen in Tifnit rely most on the middlemen. If the symbiotic relationship that exists between fishermen and the middlemen is lost and fishermen can no longer rely on agents financially as a result of the establishment of a public market, it is likely that a lot of fishermen will have trouble in acquiring that and bait. She the influmeoob the middlemen is sopowrtul, it is necessary to give ample consideration to make sure that the fishermen do not suffer as a result of the development.

9/22-23 Problem Tree
Workshop in Tifnit

※1.

	Tifnit	Agadir
Hook (100 hooks)	25	15
Line (500 m)	70	70
Net (kg)	80	80
Sinker (kg)	9?	20
Rope (kg)	27	27 / 2

Quality of life is not satisfactory
- Not enough money to take care of sick family
- The amount of money spent for food is not enough

There is no hospital or health fac. in Tifnit
There is no social assisstance or insurance for fishermen
There is no electricity at the site
Fresh water is not available
There is no school (school for children is necessary, when fishermen get to live near the beach)

Fishermen have to have credit buy something needed

- Food is not most expensive
- School fee and other equipment are the second expensive (There are more than 5children when school starts, about 500 DH should be paid for one child once a year)
- Electricity is the 2nd most expensive

Net income of fishermen is not enough — CORE PROBLEM

{Example}

(fish)	(price at Tifnit)	(price at Agadir)
Congre	6 DH	14 DH
Squid	46 DH	70 DH

Production cost is high

Government stopped giving money when fishermen buy engine (10 years ago, 3000 DH was given for buying engine)

Finding gear is expensive (※1) (compared to their own income? accoding to ※1)
- (In case of purchase not through fishermen) Transport cost to / from Agadir is high
  - Fishermen must go to Agadir to buy fishing equipment (e.g., three times a month in June, July and August)
- Some fishermen have to buy fishing gear from middlemen, when they have debt from middlemen

Gas is not bought at the discounted price (9 DH as compared to 2.5 in some regions)

Administrative procedure takes a long time (spending money as well)

This affects fishing days / hours as well

Fish sales volume is not enough

※2 (mth) (days)
Jan / Feb : 4 ~ 12
Mar ~ Oct : 20 ~ 25
Nov / Dec : 4 ~ 12

Low catch quantity

[every year, 3 ~ 5 people killed, 15 boats broken and 40 engine lost]

There is no security in the sea (Boats are capsized mostly near the access point
- There is not a sufficient rescue system (Zodiac = small rubber rescue boat)
- There is no breakwater
- There is no navigation light or light house

Hours / day of fishing are not enough (e.g., max 12 hours usually 6 ~ 8 hs)

② Fishermen cannot work for 4 months / year (now fishing days are 120 ~ 140 days) ※2
- It is difficult to carry a boat from the sea to the shore
  - There is no slipway in Tifnit
- Modern navigation and fishing technology are not available
- Fishermen's housing is far from the site (5 km ~ 20 km) → majority

① There is over exploitation by the coastal fishing fleet
- The use of prohibited fishing gear by the coastal fleet [Using lamps and purce seine to catch sardine and squid]
- Access to the ocean is difficult
  - ** There is no breakwater
    - There is no harbour in Tifnit
  - There is not enough law enforcement by the government ?

The effect of pollution from cleaning coastal offshore vessels [Oil is seen spreading near the coast line]

[Details]
① It takes 2 days off (on market day) from finding when fishermen visit their family
② Take taxi from the village to the beach. It is difficult to catch taxi during off tourist season

Price of fish are very low

There is no ice and storehouse to keep fish fresh
- Commune did not build necessary facilities
- There is no construction permit for private (people ?)

** Middlemen's bargainning power is too strong
- Only 4 middlemen monopolize the sales of fish
  - Middlemen protect themselves by negotiating directly with new middlemen
    - The beakwater is available
  - If there is a new middlemen in the village, middlemen raise the price
- Relationship between the fishermen and the middlemen is based on the credit
  - Some fishermen do not have enough money to buy equipment and material

* There is no auction
- There is no auction facility
- The commune doesn't make any effort

Info on beneficiary:

500 (boats)
× 3 (fishermen)
1,500 (total fishermen)
× 7 (family size)
10,500 (total population)

5-202

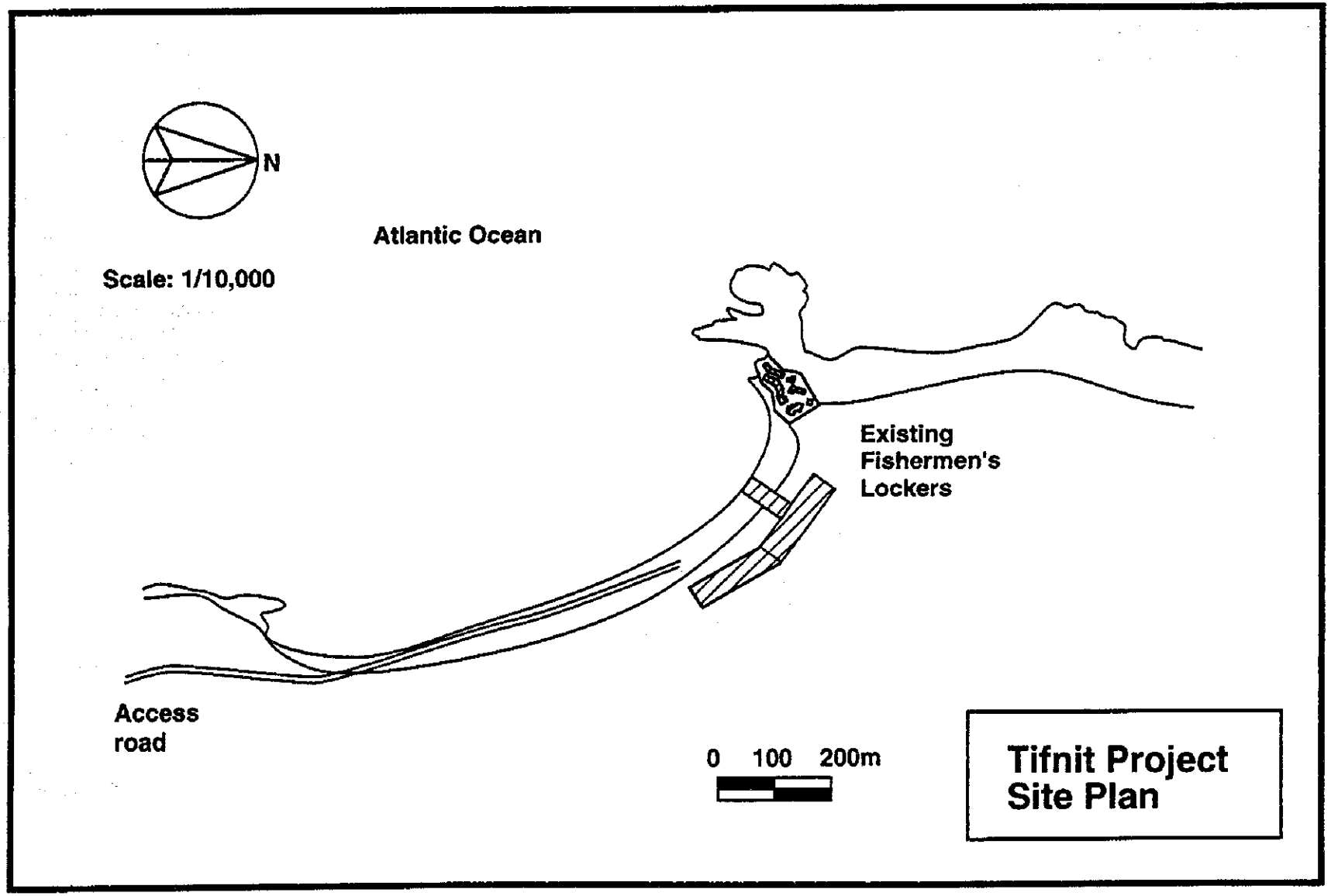
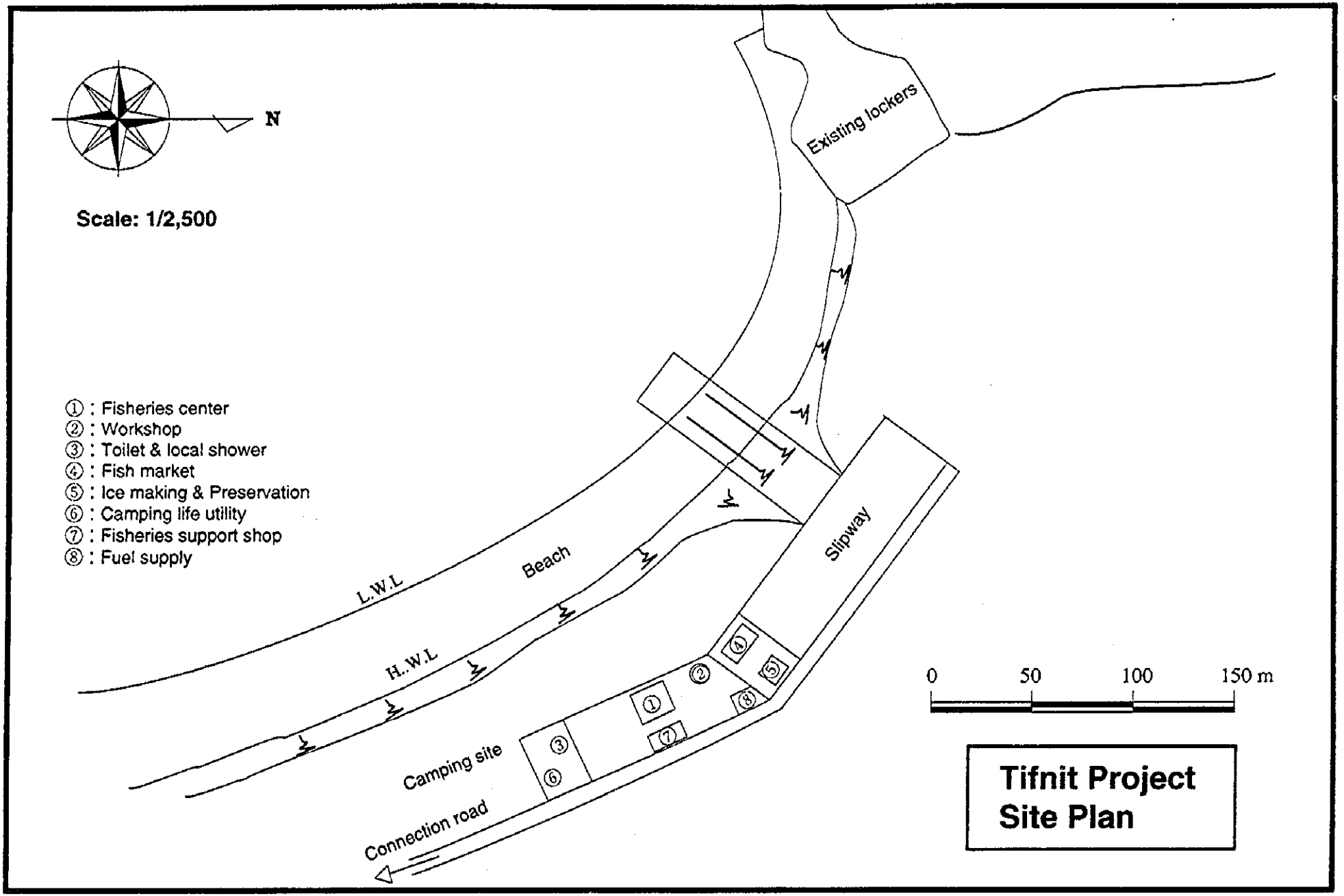
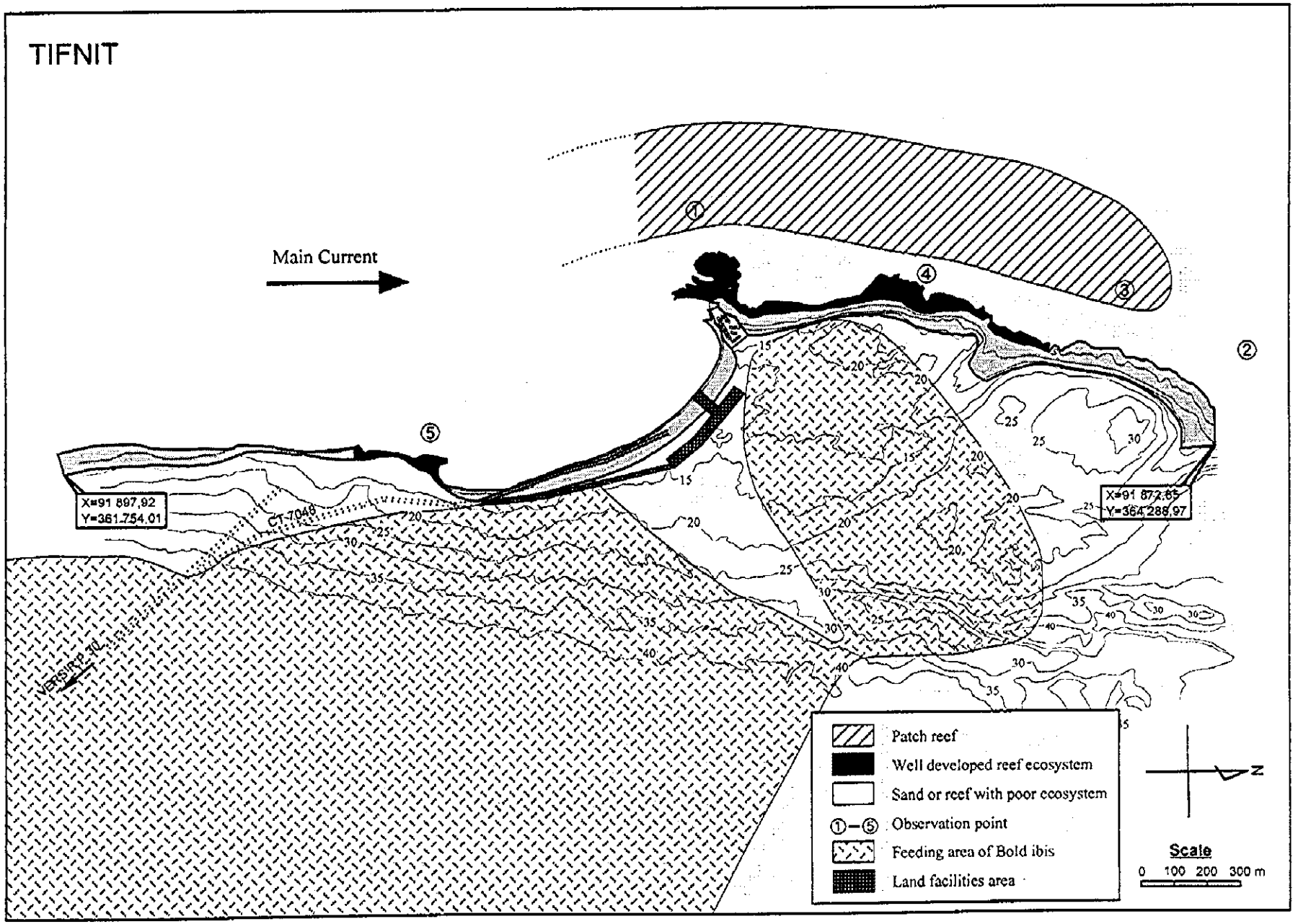


Fig. 5-3-D-3 Site plan


N
Scale: 1/2,500
① : Fisheries center
② : Workshop
③ : Toilet & local shower
④ : Fish market
⑤ : Ice making & Preservation
⑥ : Camping life utility
⑦ : Fisheries support shop
⑧ : Fuel supply
Existing lockers
Slipway
Beach
L.W.L
H.W.L
Camping site
Connection road
0
50
100
150 m
Tifnit Project
Site Plan


TIFNIT
Main Current
①
②
③
④
⑤
X=91 897.92
Y=361 754.01
X=91 872.65
Y=364 288.97
CT-7048
VERSTRP 30
Patch reef
Well developed reef ecosystem
Sand or reef with poor ecosystem
①–⑤ Observation point
Feeding area of Bold ibis
Land facilities area
N
Scale
0 100 200 300 m

Tifnit

Scope of facilities		Name of facilities	Scale of facilities	Note
Port facilities	Outer facilities			
	Mooring facilities	Slipway	W=30m	
	Water facilities	Navigation aids	navigation light : 1 set	
Port facilities	Fish preservation facilities	Auction hall	Building area 160m2	Operated by ONP
		Ice making & preservation	Building area 60m2	
		Ice making plant	1ton/day, Ice storage 3ton	Flake
		Chilled room	1ton、10m2	Fish
	Boat & gear maintenance facilities	Warehouse	Building area 20m2	Agar-agar
		Workshop	Building area 50m2	Engine & hull
	Supply facilities			
	Fishermen's welfare facilities	Fuel supply	28kl Fuel tank	Gasoline, Operated by private
		Fisheries support shop	Building area 50m2	6 booth
		Toilet & shower	Building area 30m2	Use of incinerator heat
	Management facilities	Camping life utility	Building area 40m2	Cooking table
	Treatment facilities	Fisheries center	Building area 430m2	
		Drainage treatment	Project site	Septic & subsurface infiltration
	Mulch purpose area	Incinerator		
		Dray area, parking,	Simple pavement	
Fishemens village social infra-structure	Road	Access road	Partial improvement	SONABA property
		Fishermen's locker area	Partial improvement	
	Water supply	Water distribution	Improvement of existing well	Service from SONABA
	Electricity supply	Main & branch	Self reliance	Service from SONABA
	Drainage & garbage treatment	Drain gutter, sewer	Self reliance	
		Community center	No need	
	Public facilities	Elementary school	No need	
Equipment	Fish handling equipment	Fish box, balance, cart, etc.		
	Workshop tools			
	Mulch purpose car	Boat pull up, mobilization		

Table 5-3-D-13 Financial Analysis - Cost (i)

Financial Analysis
Capital Expenditure (CAPEX)

Area	Facility	Scale	Unit	Unit price (DH)	Price (DH)	Remarks
Port facilities					8,125,000	
	Slipway	30	m	250,000	7,500,000	
	Excavation	5,000	set	125	625,000	
Port service					15,161,667	
facilities	Fish market	160	m2	5,833	933,333	
	Ice & preservation	70	m2	5,833	408,333	
	Fisheries center	432	m2	5,833	2,520,000	
	Workshop	50	m2	4,167	208,333	
	Warehouse	20	m2	4,167	83,333	
	Camping life utility	40	m2	70000	2,800,000	
	Fisheries support shop	50	set	5,833	291,667	
	Drainage treatment	1	set	833,333	833,333	
	Ice making plant	1	set	1,666,667	1,666,667	
	Chilled room	1	set	833,333	833,333	
	Connect'n&Insite road	1,000	m	3,333	3,333,333	
	External work	1	set	1,250,000	1,250,000	
Equipment					666,667	
	Fish handling	1	set	416,667	416,667	
	Workshop	1	set	250,000	250,000	
Consulting fee		1	set	1,692,267	1,692,267	
Total					25,645,600	

Table 5-3-D-13 Financial Analysis - Cost (ii)

Operation expenditure (OPEX) 418,634 DH/Year

Personnel Cost

Area	Title	Unit Price(DH)	No. of person	Cost (Month)
Administration	Manager	2,500	1	2,500
	Accountant	2,500	1	2,500
	Secretary	1,300	1	1,300
Ice machine	Engineer	2,700	1	2,700
	General worker	1,200	1	1,200
Workshop	Engineer	2,000	1	2,000
	Carpenter	1,400	1	1,400
Hamam	Worker	1,200	1	1,200
Fuel Station	Worker	1,200	1	1,200
Others	Security men	1,200	2	2,400
Fish market	Manager	2,500	1	2,500
	General worker	1,200	1	1,200
Total (month)				22,100
Total (year)				265,200

Cost of utility

Item	Use	Consumption	Unit price	Price (DH)	Remarks
Electricity	Ice machine	9	291	2,546	base charge (year)
		5,040	0.99	5,013	monthly use
	Refrigerator	216	1.27	274	monthly price
	Lights and others	768	1.30	998	monthly price
Total (year)				77,971	
Item	Use	Consumption	Unit price	Price (DH)	Remarks
Water	Fish market	100	5.83	583	monthly price
	Ice machine	45	5.83	262	monthly price
	Others	40	5.83	233	monthly price
Total (year)				12,943	

Maintenance and Operation Cost

facility	Cost (month)	Remarks			
Workshop	500				
Hamam	1,710	fuel cost	break down	daily consumpt'n	15
Ice machine	500			unit price	3.8
Building	500			no. of days	30
Other expenses	2,000	vehicles etc.			
Total	5,210				
Cost (year)	62,520				

Table 5-3-D-14 Financial Analysis - Benefit

Income (Benefit)

1,103,480 DH/Year		
in the First year	375,000	DH added

Fish landing commission

	Landing value(year)	Rate	Commission	Remarks
Fishery Coop.	14,594,580	1%	145,946	DH/year
ONP	14,594,580	5%	729,729	DH/year
Total			875,675	

Commission for fuel sales (L: litre)

No. of boats	Unit fuel use (L)	Unit charge/L	Commission	Remarks
33,225	9	0.2	59,805	DH/year

Ice sales

Daily production	Unit price (DH/ton)	No. of days	monthly sale	No. of month	Remarks
1	300	30	9,000	8	high season : March to October
		20	6,000	4	low season : November to February
Ice sales (year)				96,000	DH

Rental

Facility	Unit price (DH/pc.)	Amount	Total
Workshop	3,000	1	3,000
G-total			3,000
Rental (year)			36,000

Other income

Facility	Income (month)	Amount	Total
Hamam	3,000	1	3,000
G-total			3,000
Income (year)			36,000

Membership fee

Unit price (DH)	No. of member	Fee	Remarks
500	750	375,000	First year only

Table 5-3-D-15 Calculation sheet of FIRR

Financial Internal Rate of Return (FIRR)

Year	Cost	Benefit	Net Cash Flow	Discount Rate 1%	Net Present Value	Discount Rate 2%	Net Present Value
1	25,645,600	0	-25,645,600	0.990	-25,391,683	0.980	-25,142,745
2	418,634	1,478,480	1,059,846	0.980	1,038,963	0.961	1,018,691
3	418,634	1,103,480	684,846	0.971	664,705	0.942	645,346
4	418,634	1,103,480	684,846	0.961	658,124	0.924	632,692
5	418,634	1,103,480	684,846	0.951	651,608	0.906	620,286
6	418,634	1,103,480	684,846	0.942	645,156	0.888	608,124
7	418,634	1,103,480	684,846	0.933	638,768	0.871	596,200
8	418,634	1,103,480	684,846	0.923	632,444	0.853	584,510
9	418,634	1,103,480	684,846	0.914	626,182	0.837	573,049
10	418,634	1,103,480	684,846	0.905	619,982	0.820	561,812
11	418,634	1,103,480	684,846	0.896	613,844	0.804	550,796
12	418,634	1,103,480	684,846	0.887	607,766	0.788	539,997
13	418,634	1,103,480	684,846	0.879	601,749	0.773	529,408
14	418,634	1,103,480	684,846	0.870	595,791	0.758	519,028
15	418,634	1,103,480	684,846	0.861	589,892	0.743	508,851
16	418,634	1,103,480	684,846	0.853	584,051	0.728	498,873
17	418,634	1,103,480	684,846	0.844	578,269	0.714	489,091
18	418,634	1,103,480	684,846	0.836	572,543	0.700	479,501
19	418,634	1,103,480	684,846	0.828	566,875	0.686	470,099
20	418,634	1,103,480	684,846	0.820	561,262	0.673	460,882
21	418,634	1,103,480	684,846	0.811	555,705	0.660	451,845
22	418,634	1,103,480	684,846	0.803	550,203	0.647	442,985
23	418,634	1,103,480	684,846	0.795	544,755	0.634	434,299
24	418,634	1,103,480	684,846	0.788	539,362	0.622	425,784
25	418,634	1,103,480	684,846	0.780	534,021	0.610	417,435
26	418,634	1,103,480	684,846	0.772	528,734	0.598	409,250
27	418,634	1,103,480	684,846	0.764	523,499	0.586	401,225
28	418,634	1,103,480	684,846	0.757	518,316	0.574	393,358
29	418,634	1,103,480	684,846	0.749	513,184	0.563	385,645
30	418,634	1,103,480	684,846	0.742	508,103	0.552	378,084
					-8,027,628		-10,115,598

FIRR	-2.85 %

Impossible to calculate

Table 5-3-D-16 Economic Analysis - Cost (i)

Economic Analysis
Capital Expenditure (CAPEX)

Area	Facility	Scale	Unit	Unit price (DH)	Market price	Convers'n factor	Shadow price
Port facilities					8,125,000		7,462,500
	Slipway	30	m	250,000	7,500,000	0.9	6,750,000
	Excavation	5,000	set	125	625,000	1.14	712,500
Port service					15,161,667		14,327,217
facilities	Fish market	160	m2	5,833	933,333	0.89	830,667
	Ice & preservation	70	m2	5,833	408,333	0.89	363,417
	Fisheries center	432	m2	5,833	2,520,000	0.89	2,242,800
	Workshop	50	m2	4,167	208,333	0.89	185,417
	Warehouse	20	m2	4,167	83,333	0.89	74,167
	Camping life utility	40	m2	70000	2,800,000	0.89	2,492,000
	Fisheries support shop	50	m2	5,833	291,667	0.89	259,583
	Drainage treatment	1	set	833,333	833,333	1.14	950,000
	Ice making plant	1	set	1,666,667	1,666,667	1.14	1,900,000
	Chilled room	1	set	833,333	833,333	1.14	950,000
	Connect'n&Insite road	1,000	m	3,333	3,333,333	0.89	2,966,667
	External work	1	set	1,250,000	1,250,000	0.89	1,112,500
Equipment					666,667		760,000
	Fish handling	1	set	416,667	416,667	1.14	475,000
	Workshop	1	set	250,000	250,000	1.14	285,000
Consulting fee		1	set	1,692,267	1,692,267	1.00	1,692,267
Total					25,645,600		24,241,983

Table 5-3-D-16 Economic Analysis - Cost (ii)

Operation Expenditure (OPEX) 366,433 DH/Year

Personnel Cost

Area	Title	Unit Price(DH)	No. of person	Cost (Month)	Convers'n factor	Shadow wage
Administration	Manager	2,500	1	2,500	1.0	2,500
	Accountant	2,500	1	2,500	1.0	2,500
	Secretary	1,300	1	1,300	1.0	1,300
Ice machine	Engineer	2,700	1	2,700	1.0	2,700
	General worker	1,200	1	1,200	0.5	600
Workshop	Engineer	2,000	1	2,000	1.0	2,000
	Carpenter	1,400	1	1,400	1.0	1,400
Hamam	Worker	1,200	1	1,200	1.0	1,200
Fuel Station	Worker	1,200	1	1,200	0.5	600
Others	Security men	1,200	2	2,400	0.5	1,200
Fish market	Manager	2,500	1	2,500	1.0	2,500
	General worker	1,200	1	1,200	0.5	600
Total (month)				22,100		19,100
Total (year)				265,200		229,200

Cost of utility

Item	Use	Consumption	Unit price	Price (DH)	Transfer item	Shadow price	Remarks
Electricity	Ice machine	9	291	2,546	178	2,368	base charge (year)
		5,040	0.99	5,013	351	4,662	monthly use
	Refrigerator	216	1.27	274	19	255	monthly price
	Lights and others	768	1.30	998	70	929	monthly price
Total (year)				77,971		72,513	
Item	Use	Consumption	Unit price	Price (DH)	Transfer item	Shadow price	Remarks
Water	Fish market	100	5.83	583	41	542	monthly price
	Ice machine	45	5.83	262	18	244	monthly price
	Others	40	5.83	233	16	217	monthly price
Total (year)				12,943		12,037	

Maintenance and Operation Cost

facility	Cost (month)	Remarks	Transfer item	Shadow price
Workshop	500		100	400
Hamam	1,710	fuel cost	120	1,590
Ice machine	500		100	400
Building	500		100	400
Other expenses	2,000	vehicles etc.	400	1,600
Total	5,210			4,390
Cost (year)	62,520			52,684

break down		
	daily consumpt'n	15
	unit price	3.8
	no. of days	30

Transfer item means the VAT (Value Added Tax). Their tax rate are

fuel, light	7 %
other commodities	20 %

Table 5-3-D-17 Economic Analysis - Benefit

Benefit 2,181,052 DH

	without Project		with Project		Surplus production	Surplus value	Consumer's surplus Shadow price
	Landed quantity	Landing value	Landed quantity	Landing value			
Total Landing	333,120	12,991,680	356,400	14,594,580	23,280	1,602,900	
To export						961,740	1,315,660
To domestic						641,160	769,392

Increase of landing	Increase of export	Increase of domestic supply
2,085,052	1,315,660	769,392

Rate of increase of landed quantity	7.0	%
Rate of increase of fish price	5	%
Percentage of export oriented	60	%
Percentage of domestic oriented	40	%
Domestic marketing factor	1.20	
Shadow exchange rate	1.14	

Note 1:
With the construction of fish market, more competitive price will be realized through the auction among meddle men.
With the construction of refrigerator, quality down caused by the absence of refrigerator, will be controlled.
As a result, fish price is expected to increase as left
(based on the interview survey at site)

Note 2:
Product is exported from Port of Agadir
Product is consumed at the market of Agadir

Ice sales

Daily production	Unit price (DH/ton)	No. of days	monthly sale	No. of month	Remarks
1	300	30	9,000	8	high season : March to October
		20	6,000	4	low season : November to February
Ice sales (year)				96,000	DH

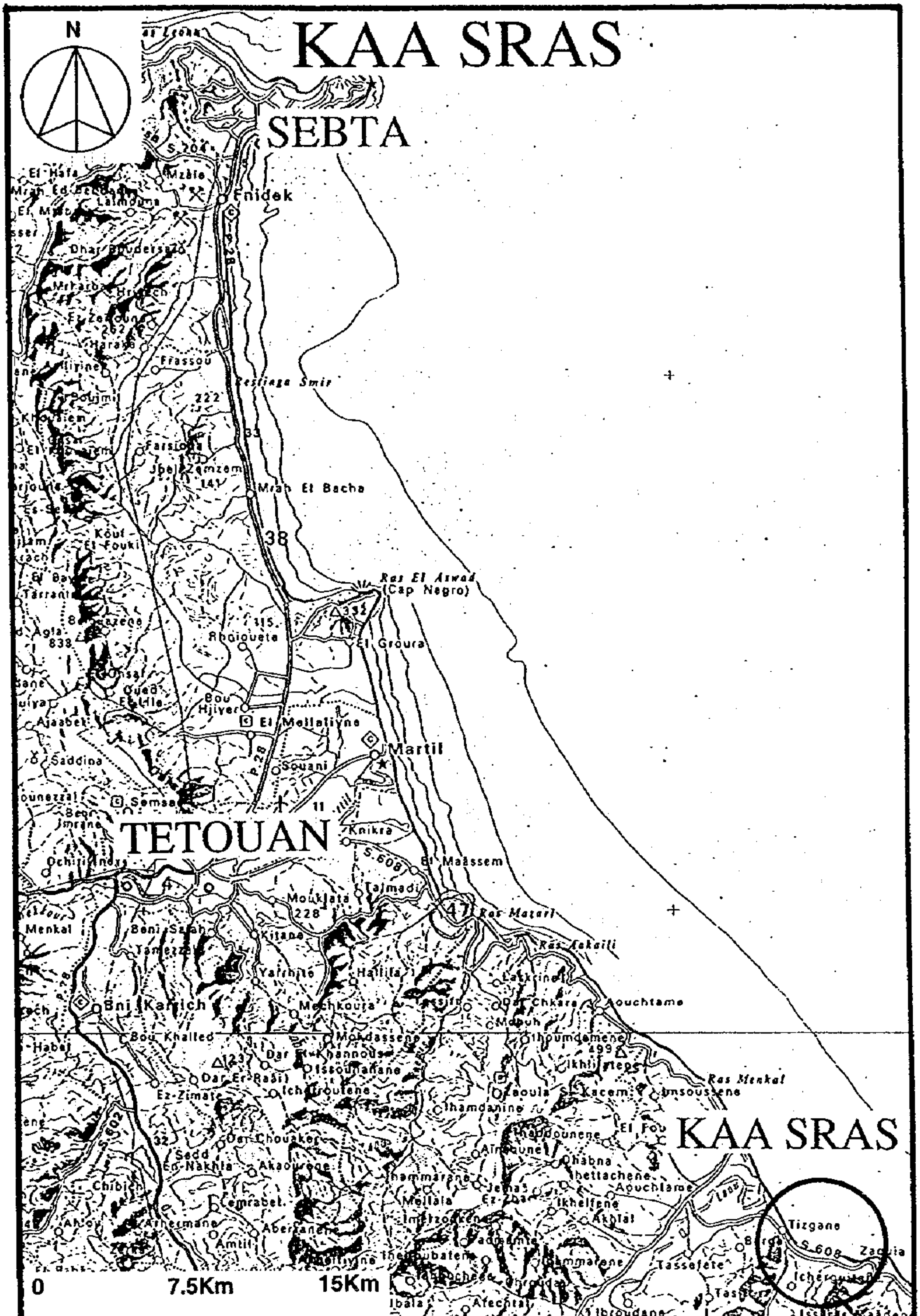
Table 5-3-D-18 Calculation sheet of EIRR

Economic Internal Rate of Return

Year	Cost	Benefit	Net Cash Flow	Discount Rate 6%	Net Present Value	Discount Rate 7%	Net Present Value
1	24,241,983	0	-24,241,983	0.943	-22,869,796	0.935	-22,656,059
2	366,433	2,181,052	1,814,619	0.890	1,615,004	0.873	1,584,959
3	366,433	2,181,052	1,814,619	0.840	1,523,589	0.816	1,481,270
4	366,433	2,181,052	1,814,619	0.792	1,437,348	0.763	1,384,364
5	366,433	2,181,052	1,814,619	0.747	1,355,989	0.713	1,293,798
6	366,433	2,181,052	1,814,619	0.705	1,279,235	0.666	1,209,157
7	366,433	2,181,052	1,814,619	0.665	1,206,825	0.623	1,130,054
8	366,433	2,181,052	1,814,619	0.627	1,138,514	0.582	1,056,125
9	366,433	2,181,052	1,814,619	0.592	1,074,070	0.544	987,033
10	366,433	2,181,052	1,814,619	0.558	1,013,274	0.508	922,460
11	366,433	2,181,052	1,814,619	0.527	955,919	0.475	862,112
12	366,433	2,181,052	1,814,619	0.497	901,810	0.444	805,713
13	366,433	2,181,052	1,814,619	0.469	850,764	0.415	753,002
14	366,433	2,181,052	1,814,619	0.442	802,608	0.388	703,741
15	366,433	2,181,052	1,814,619	0.417	757,177	0.362	657,701
16	366,433	2,181,052	1,814,619	0.394	714,318	0.339	614,674
17	366,433	2,181,052	1,814,619	0.371	673,885	0.317	574,462
18	366,433	2,181,052	1,814,619	0.350	635,741	0.296	536,880
19	366,433	2,181,052	1,814,619	0.331	599,755	0.277	501,757
20	366,433	2,181,052	1,814,619	0.312	565,807	0.258	468,932
21	366,433	2,181,052	1,814,619	0.294	533,780	0.242	438,254
22	366,433	2,181,052	1,814,619	0.278	503,566	0.226	409,583
23	366,433	2,181,052	1,814,619	0.262	475,062	0.211	382,788
24	366,433	2,181,052	1,814,619	0.247	448,172	0.197	357,746
25	366,433	2,181,052	1,814,619	0.233	422,804	0.184	334,342
26	366,433	2,181,052	1,814,619	0.220	398,871	0.172	312,469
27	366,433	2,181,052	1,814,619	0.207	376,294	0.161	292,027
28	366,433	2,181,052	1,814,619	0.196	354,994	0.150	272,923
29	366,433	2,181,052	1,814,619	0.185	334,900	0.141	255,068
30	366,433	2,181,052	1,814,619	0.174	315,944	0.131	238,381
					396,224		-1,834,282

EIRR	6.18 %

Kaa Srass


KAA SRAS
N
SEBTA
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Mrah El Bacha
38
Ras El Aswad
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El Groura
Rhoiouete
El Mellaliyne
Martil
Souani
Semsa
TETOUAN
Knikra
S.608
El Maâssem
Moukiata
Ras Mazari
Beni Salah
Kitane
Yatrhite
Hallila
Bni Karrich
Mechkoura
Bou Khalled
Dar Er-Rasi
Ez-Zimate
Dar Chouaker
Aouchtame
Ras Menkal
Imsoussene
KAA SRAS
Tizgane
Tassefete
0
7.5Km
15Km

E Kaa Srass

1. General conditions of the site

The site is a sandy beach on the Mediterranean sea, composed of the sediments of sand and soil which have been carried by rivers. The presumed population of artisanal fishermen basing in Kaa Sras is over 500, and that of their families is over 3,000[1]. Many of these small-scale fishermen live in the commune rurale including Kaa Sras, but there are some fishermen living in other adjacent commune rurales. The population of the residents in the whole commune rurale is about 10,000[2]. Agriculture is also practiced in the commune rurale, but most income of this village depends on fishing. They catch sardine, anchovy by small purse seiner; catch octopus by either jigging or octopus pot in a small boat, and catch grouper, sea bream, flatfish with trammel net, bottom longline and trolling also in a small boat all the year the round. The level of their fishing technique is higher than that in the villages on the Atlantic Ocean, but income per fisherman seems to be lower than that in Suira Kedima.

1) Fisheries

(1) Overview

Kaa Srass is a fishing village situated between the Mediterranean Sea to the north and the approaching Rif Mountain Range to the south. It is located 60 km south-east of Tetouan, 70 km from M'diq fishing port and 10 km from Oued Laou along the coast. El Jebha is located approximately 90 km south-east further along the coastline .

The coast, sandwiched between two rivers, is gently sloping and sandy, and the sea, receiving an abundant supply of nutrient salts from these rivers, contains large reserves of seaweed and shellfish. A refrigeration processing company has been established on the landing beach to utilize the abundant marine products that are available. However, in recent years fish catches in Kaa Srass have been declining and the occurrence of shell poisoning has further exasperated the situation by diminishing production overall.

(2) Number of Fishing Boats

Fishing boats in Kaa Srass mingle regularly with fishing boats from Targha and Zaoua situated around the peninsula, as well as fishing boats which migrate according to fishing conditions from surrounding villages such as Oued Laou. At peak times, approximately 220 fishing boats use the beach at Kaa Srass including 15 small purse seine fishing boats and their accompanying lightships and skiffs.

The small purse seine fishing boats are like ordinary wooden boats but with an extended length of 6-10 m, a canoe-like shape and no deck. The boat owners want to use larger boats, but anything bigger than at present would make it impossible to manually haul the boats onto the beach. Lightships are 4-5 m in length and use propane or butane gas to illuminate fish attraction lamps. The skiffs are around 4 m in length. All these boats are powered by small outboard engines with output ranging between 4-10 HP. Other commonly used artisanal fishing boats are called 'platera' and measure about 5 m in length.

Operating Pattern in Kaa Srass

The number of operating days and pattern of operation differ according to the use of small purse seine, bottom long line or gillnet, etc.

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[1] These figures are calculated based on the site researches.

[2] From " Population Legale du Maroc, 1994, Direction de la Statistique, Maroc ".

Small Purse Seine Fishing

January-April	5 days /month x 4 months = 20 days
May-June	20-27 days/month (23 days) x 2 months = 46 days
July-September	2-5 days/month (3 days) x 3 months = 9 days *(+ 60 days)
October-December	10-20 days/month (15 days) x 3 months = 45 days
	Total: 120 days + 60 days

* The reason for the unusually small number of operating days between July and September is thought to be because drift net and other fishing methods are adopted instead of purse seine fishing during this period. 20 days per month are assumed for drift net fishing, etc.

Artisanal Fishing Boats

January-March	6 days/month x 3 months = 18 days
April 10-13 days/month (12 days) x 1 month = 12 days	
May-August	25-28 days/month (26 days) x 4 months = 104 days
September-December	10-20 days/month (15 days) x 4 months = 60 days
Total: 194 days	

The number of operating boats is as follows.

May-October	15 small purse seine fishing boat units x 80% = 12 units
	175 artisanal fishing boats x 80% = 140 boats
November-April	15 small purse seine fishing boat units x 50% = 7 units
	175 artisanal fishing boats x 50% = 87 boats

Fig. 5-3-E-1 Small Purse Seine Fishing Boats in Kaa Srass: Annual Operating Schedule, Possible Operating Days per Month and Number of Operating Boats

Fishing Method/Month	1	2	3	4	5	6	7	8	9	10	11	12
Small Purse Seine	■	■	■	■	■	■	■	■	■	■	■	■
Drift Net, etc.							■	■	■			
Monthly Operating Days	5	5	5	5	23	23	3+20	3+21	3+22	15	15	15
Monthly Operating Boats	7	7	7	7	12	12	12	12	12	12	7	7

The combined annual number of operating small purse seine fishing boats (total catch effort) is (1,190+720) boat-days.

Fig. 5-3-E-2 Artisanal Fishing Boats in Kaa Srass: Annual Operating Schedule, Possible Operating Days per Month and Number of Operating Boats

Fishing Method/Month	1	2	3	4	5	6	7	8	9	10	11	12
Hand Line (Including Octopus Angling)	■	■	■	■	■	■	■	■	■	■	■	■
Trammel Net		■	■	■	■	■	■	■	■			
Bottom Long Line, etc.					■	■	■	■				
Gillnet									■	■	■	■
Monthly Operating Days	18	18	18	12	26	26	26	26	15	15	15	15
Monthly Operating Boats	87	87	87	87	140	140	140	140	140	140	87	87

The combined annual number of operating artisanal fishing boats (total catch effort) is 27,112 boat-days.

(3) Forms of Operation by Fishing Ground and Fishing Method

Fishermen based in Kaa Srass employ a wide variety of fishing methods, namely purse seine fishing, drift net fishing, bottom gillnet fishing, trammel net fishing, bottom long line fishing, hand line fishing (including octopus angling) and shell gathering. The fishing grounds cover a wide area from Amsa Sidi Kace in the north-west to El Jebha in the south-east and many grounds are located at depths of 90-100 m or less. A reef belt (undersea mountain range), which begins at a depth of around 70 m from the shore, runs along the coast and the waters here are good fishing grounds. The shallowest waters and deepest waters here are said to be 15 m and 135 m respectively. Depending on the tide and wind, it takes approximately two hours to reach Amsa Sidi Kace and three hours to reach El Jebha. The catch size per operation is said to be larger in winter than in summer.

Along the Mediterranean coast east of Tangiers, controls on boats leaving port are strictly enforced to prevent smuggling and a feature of this fishing village is that fishing boats must deposit their crew books with MPM or local officers before leaving for fishing trips. Having said that, this does not appear to be a hindrance to fisheries activities.

Fishermen responded that a small purse seine fishing boat unit catches 200-900 kg per operation (at time of the February survey), however, the interview survey conducted in September found that some fishing boats only land five tons of fish per year (100 kg per fishing trip, assuming 50 trips per year). In view of this, it is estimated that the average catch per fishing trip is around 300 kg.

Fish that are caught include sardine, anchova, saurel, bogue and skip jack, etc. The lightship first goes out ahead of the fishing boat to attract the fish and then inform to the seiner. Then, the fishing boat spreads its nets around the lightship and catches the fish. Fishing boats are equipped with fish finders, but not so the lightships. Instead, the experienced crew members recognize fish shoals by looking at the state of fish and air bubbles that come to the surface. Fishing boats usually leave for sea after dark, but if it is thought that the fishing will be poor they leave at around 3.00 a.m. and return home by morning.

The fishing methods of artisanal fishing boats also vary greatly and catches range from 10 kg to 40 kg per fishing trip. Below are described the fishing seasons and types of fish caught according to each fishing method.

The gillnet fishing season is from September to December, during which time skip jack species and swordfish are caught.

Hand line fishing is done all year round and sparidae species such as dentex and sea bream (*Pagellus spp.*), etc. and groupers are caught in rocky sea bed areas.

The bottom long line fishing season is from June to September, during which time groupers, sparidae species such as dentex and sea bream (*Pagellus spp.*), etc., raie and sole, etc. are caught.

Hooking for octopus is done in coastal fishing grounds of 20-30 m in depth by slowly dragging the dummy bait (sardine tied to a weight) through the water. The octopus hooking season is from October to June.

Fishing for common edible cockle by dredge net is also practiced, however, this is currently suspended because export to Europe has been stopped due to the outbreak of shell poisoning.

(4) Quantity and Value of Landed Fish

In this study, it is estimated that one purse seine fishing boat unit catches 300 kg of fish worth 1,200 DH

on average and 60 kg worth 1,500 DH when using a drift net, and that one artisanal fishing boat catches 25 kg worth 750 DH on average.

Annual landed quantity =300 kg x 1,190 + 60 kg x 720 + 25 kg x 27,112 =1,078,000 kg =approx. 1,078 tons
Annual landed value = 12,000 DH x 1,190 + 1,500 DH x 720 + 750 DH x 27,112 = 22,842,000 DH

(5) Fisheries Balance

It seems that small purse seine fishing boats and other artisanal fishing boats operate in fishing grounds that are two or three hours away (octopus fishing grounds are right next to shore). Assuming that a 25 HP outboard engine consumes 12 liters of gasoline per hour, it works out that a purse seine fishing boat unit of three boats uses a total of between 72-150 liters of fuel per fishing trip. Assuming that an artisanal fishing boat uses a 15 HP outboard engine, the fuel consumption per fishing trip works out to be around 60 liters. In view of this, the extremely high price of gasoline in Kaa Srass of 10 DH per liter places a great burden on the balance of fishermen's households.

2) Infrastructure

The project site, situated some 30 km south-east of Tetouan, is located on a sand beach on the edge of an alluvial fan to the east of Oued Laou River, and faces on to the main road. To the east of the landing beach runs a small river that flows down from the north slopes of Rif Mountain Range, and further east is a peninsula.

Fishermen live in a relatively concentrated community built up along the main road behind the beach, and since this community contains canteens, grocery stores and general stores, etc., the inhabitants have no trouble obtaining daily necessities. Roads in the community are lined on both sides with pavements and trees, indicating a local desire to maybe attract tourists. In the summer, when domestic tourists visit the area and stay in nearby camp sites or accommodation facilities in the community, the population almost trebles. According to the hearing survey, the province has plans to develop the coastline on the west side of the project site as a tourist resort comprising mainly a yacht harbor and summer house district.

On the landing beach are an outboard engine repair workshop and marine products processing center, and these facilities closely support local artisanal fisheries by supplying ice, purchasing marine products, and so on.

Electricity is supplied through the national grid by ONE, and water is provided through a well-based public water supply system run by ONEP and the commune.

As for public facilities, there is a primary school in the community, but inhabitants must travel to Oued Laou in order to receive other services.

3) Fishing Village Society

(1) Fishermen's Households and Housing

Fishermen commute to the beach from approximately 11 surrounding villages known as 'douar', one of which is Kaa Srass. Most of the villages are within one hour's walking distance of the beach and three, which face onto the coastal main road, are only a 30 minute bicycle ride away.

Fishermen who live in Kaa Srass village are the most common and it is thought that a relatively high proportion of fishermen live close to the beach, as compared to the case in other target fishing villages. Kaa Srass contains the local office of commune rurale and is also served by electricity and water supply. Houses, shops and restaurants, etc. can be found along the coastal main road and, of all the fishing villages surveyed, the degree of community concentration in this highway town is the highest. Having said that, there is no electricity or water supply to outlying communities, where inhabitants mainly use butane gas for fuel and batteries (recharged at the gasoline stand in Kaa Srass) for power. Water in these

communities comes from wells or rivers.

(2) Role of Agriculture for Fishermen's Households

Fishermen's households in Kaa Srass own fields in land lying alongside the river and they mainly grow wheat and barley and also bean varieties. All such crops are cultivated for private consumption and rarely for sale. This situation differs from that found in Oued Laou on the opposite bank, where the broad alluvial fan is used to cultivate fields.

(3) Fishermen's Livelihoods

Fisheries provides the main source of income for fishermen's households. Taking the case of a net fishing boat, there is one chief fisherman and three crew members. In cases where the boat owner does not also act as chief fisherman, profits after boat expenses have been deducted are halved between the boat owner and the crew members, who equally divide their share among themselves. There is no disparity in the share of profits received by the boat owner and the crew, like that frequently seen in other fishing villages. A source of cash income that is characteristic to Kaa Srass is that obtained from employment in the local refrigeration processing company, however, only a very limited number of workers are employed here. At busy times this company recruits a large number of temporary female staff but usually only employs between 10-20 regular female workers.

(4) Migration and Settlement of Fishermen

Many fishermen in Kaa Srass, after embarking on a career in fisheries on the local beach in their teens, migrate as crew members on artisanal or coastal fishing boats based mainly in ports stretching from the Mediterranean coast to as far as Larache on the Atlantic coast, and eventually return home to Kaa Srass after around 10 years to buy their own artisanal fishing boats.

4) Environment

(1) Natural environment

Kaa Sras is a sand beach located between Laou River and Ahrousse River. The coastline stretches from north-northeast to south-southeast. The main current near the beach flows from south-southeast to north-northwest along the coastline. However, the water occasionally flows in the opposite direction in winter. Sand grain is relatively large.

2. Problems in this site

Followings are the problems which emerged in the PCM workshops attended by 8 fishermen. (See Problem Tree)

The Core Problem for the fishermen was that "their income is just enough to cover their life". Lack of social security system was also their problem, though it was not directly connected to the Core Problem. Also in this site, problems about safe operation and navigation were crucial.

The direct causes of the core problem are the following 3 items;

1) Sales volume of fish catch is not sufficient.
2) Selling prices of fish catch are low (in the case of sardine, the selling price is 80% lower than that in Tetouan, the village which is close to the site).
3) The cost for production and operation is high.

These direct causes can be analyzed in light of the cause and effect relationship. The results are classified into the following problem groups. * means the most important problems for the fishermen.

[Social Security]

- There is no social services such as pension and insurance for fishermen.

[Fishing gears, fishing methods, navigation]

- There is no storeroom for fishing gears.
- Access to fishing places is dangerous. (This is because of the problem in fishing production infrastructure, as it will be described later.)
- Fishing gears have been frequently damaged by coastal fishing.

[Services related to fishing]

- Prices of fishing gears and fuel are high.
  The reasons for the above problem are;
- Transportation costs high.
- There is no special treatment by the Government to this harbor, though the other harbors enjoy such benefits. (Fuel costs 4.5DH in neighboring harbors, whereas it costs 10DH in this site.)

[Fishery resources]

- The stock size of sardine has been declining. (The average annual fish catch per vessel was 40t ten years ago. Currently, the catch declined to the 10%. The catch of other stocks has been also declining, except for octopus.)
- Demersal fishes have been overfished near the coast.

[Fishing (production) infrastructure]

- There is no breakwater.
- There is no landing pier.

[Distribution, economy]

-* There is no competition among brokers (There are only about 10 brokers).
  (Because)- There is no public market.
- * There is no cold storage for catch.

3. The direction of the development

PDM was not made for this site. Judging from the results of the problem analyses, social and public infrastructure has been relatively well established in this site. Consequently, the focus of the development seems to be the promotion of fishing industry by improving materialistic facilities such as harbor, also by improving operational aspects such as fishing methods, services related to resource management and distribution. Fishery resource management is especially significant, because this has been seriously declining in this site.

To sum up, the goals in the development are as follows;

1) Selling prices of catch should be raised.
2) Sales volume of catch should be maintained.
3) Fishery resources should be appropriately controlled.
4) Safety in fishing operation and navigation should be ensured.

The ultimately goal of the development project would be to improve standard of living of the local residents in the commune. In order to realize the above goals, the following actions should be taken in each field;

1) Establishment of infrastructure for fishing production and fishery distribution
2) Improvement of fishery resource management
3) Improvement of fishing methods and realization of safe fishing operation
4) Establishment of the base for fisheries cooperative organization

4. Action Plans by subject

1) Fisheries Infrastructure Development Plan

(1) Development Contents

Although the coast consists of sand beach, because bottom sediment is coarse and the limit depth of surface drift is shallower than in the other project sites, a plan of fishing port facilities construction on an offshore artificial island will be adopted. In terms of layout, the artificial island will be constructed by extending a connecting bridge from the existing landing beach where the access road from the main road is located. Since the base of the connecting bridge on the beach will take up available space for facilities, almost all the land facilities will be constructed on the artificial island.

Facilities will consist of a fish market, ice making machine and ice storage and fisheries store room, and will be located close to the landing facilities. In setting the scale of facilities, consideration will be given to the fact that the share of pelagic fish (sardine, etc.) handled is high, most fish are intended for the domestic market, and the adjacent marine product processing plant is also able to supply ice.
Other facilities will consist of a fisheries center, workshop, fishermen's lockers and fisheries welfare building, also to be located on the artificial island. A multi-purpose space will be planned on the beach at the base of the connecting bridge.

(2) Project Cost

The cost required for the above-mentioned fisheries infrastructure development project is estimated at 111,249,000 DH.

(3) Operation and Management Plan

Of the fisheries-related infrastructure, the fish market will be operated by the Fisheries Public Corporation (ONP: Office National des Peches). As a rule, the ONP will assign two market operating staff (one manager and one employee) to mediate the sale of fish by auction between fishermen and agents, although more staff may be assigned depending on the size of catches. The staff will collect 5% of the auction price as commission for their services, and this will be the sole source of income for the ONP at the market. From the said income, the ONP will pay personnel expenses, heating and lighting expenses and market facilities maintenance costs. Moreover, 2% of the said 5% commission charge will be returned to the fishermen in the form of a social security contribution (for pensions, life insurance and hospital cost subsidization, etc.).
The other land facilities (fishermen's lockers, workshop, ice making and ice storage facilities, toilets and hamam, refueling facilities, etc.) will be operated and managed by a new body to be newly organized around the local fishermen's cooperative association. The main work areas of the new body are as follows.

① Landing and handling (landing of fish from boats and carrying to the fish market)

② Ice retailing (sale of ice for marketing purposes)
③ Ice storage rental (leasing of ice storage space for temporary storage of long line bait and unsold fish)
④ Fuel retailing (procurement and sale of tax-free gasoline)
⑤ Facilities rental (leasing of fishermen's lockers and the workshop, etc.)
⑥ Fisherman services (operation of hamam or local style showers)

The operating organization will be divided into a steering committee, to act as the decision making organ, and an executive organ. The steering committee will be composed of the manager of the DRAM in M'diq and fisherman and commune representatives, whereas the executive organ will be made up of full-time staff employed by the steering committee. As a rule, staff will be recruited from the local area, however, if no suitable human resources exist, especially to fill the specialist roles of management, accounting and ice making and ice storage engineering, recruiting will be carried out in the nearest city. It is intended for the operating body to function on a self accounting system based on income derived from the above-mentioned services.

2) Fisheries Resource Management Plan

The fishermen of Kaa Srass are experienced and extremely positive in their actions, for example, they will travel to consumer areas to directly sell their fish if they cannot agree on a price with agents. Against the current background of diminishing resources, it is urgently necessary to strengthen controls on illegal trawling in coastal waters, protect existing fishing grounds and create new fishing grounds. In future, placement of artificial reefs that not only create new fishing grounds but also create physical barriers to the entry of trawlers should be considered.

(1) Monitoring of Resources

Concerning the types of fish put up for auction, records of weight and sale price will be kept for each boat and trends monitored. Upon determination of the facility construction schedule,

As for the important fish species of sardine and anchovy, records will be kept on changes in fish types and sizes, caught quantities, water temperature and fishing grounds. Moreover, cooperation will be obtained from agencies in Spain and other European countries for collecting survey data on roe and building data banks for forecasting fishing conditions. The current state of resources can be monitored through carrying out year-round sampling.

Concerning demersal fish, surveys will be implemented on species, sex, body length and egg bearing conditions, etc. of groupers and sparidae.

Moreover, trips will be made to fishing grounds to survey sea and fishing conditions and select candidate sites for nurseries and protected zones. It is also necessary to implement tests at fixed points in order to study resource volumes. These survey activities will be implemented by the INRH, and would commence simultaneous to facility construction.

(2) Resource Management Setup

The level of fishermen in Kaa Srass is very high in both technical and economic terms when compared to fishermen based on the Atlantic Ocean side and, since fishermen's homes are situated close to the beach, a strong bond appears to exist between fishermen here. In view of this, Kaa Srass is now at the stage where education and guidance should be provided to encourage fishermen to actively make a joint effort in regulating the mesh size of nets, working to establish protected zones and refraining from catching fish during the spawning season. In unison with the improvement of fishing methods, it is considered that the thinking and awareness of fishermen in Kaa Srass can also be reformed. Activity in this regard by

dispatched extension personnel would begin prior to facility construction.

3) Fisheries Technical Improvement Plan

The safety of fishing operations will be greatly enhanced through construction of the lighthouse and placement of navigational aids, etc. Concerning the rescue setup, it is desirable to install fishing boats with SOS transmitters for use in the event of shipwreck caused by sudden changes of weather.

The small purse seine fishing boats are already fairly advanced, however, if a jetty and so on is constructed, it is desirable to give the boats inboard motors and decks, like the fishing boats in Sidi Hsaine. Regarding fishing methods, it is possible to place reefs to attract shoals swimming at deeper levels and thus develop new fishing grounds.

Concerning demersal fish, too, as was mentioned in the section on resource management, the placement of artificial fish aggregating devices can be considered. Since doing this will create fishing grounds that are nearer to the coast and thus lead to reduced operating costs and greater resources in the medium term, an implementation survey should be carried out as soon as possible. It is important that these activities be advanced by the INRH as one aspect of the plan to promote organization of fishermen.

4) Plan for Developing a Base of Fishermen's Cooperative Association Activities

As with the fishermen of Sidi Hsaine, fishermen in Kaa Srass have a stronger sense of unity than their counterparts on the Atlantic coast and it is thought that they possess ample capacity to independently manage facilities, providing that they are not too big. These fishermen, guided by young leaders, have formed their own mutual aid groups and it is considered that, through steadily developing such spontaneous organizations and utilizing the strong local sense of fellowship, the fishermen's cooperative association can be bolstered. Concerning agricultural cooperative associations in Morocco, technical guidance and support with respect to production are provided by the Ministry of Agriculture, while the ODECO is responsible for the provision of management technology and legislation. For this reason, taking the opportunity of facilities construction, MPM should take the initiative in forming fishermen into groups and after that maintain close links with the commune rurale, ODECO and CNCA, etc. in carrying out basic social training relating to literacy education, fishing log campaigns, savings campaigns, environmental clearing campaigns and leader training, etc. and so raise the organizational capacity of the fishermen.

5) Plan for Development of the Fishing Village Environment

Since the fishermen live in communities located within walking distance of the beach and land mobility is high, there is no need to carry out housing development at the present time. The same can be said of school facilities because there already is a primary school within walking distance and no sudden increase in population is occurring. Moreover, there is a clinic in Oued Laou a few miles away and no problem exists regarding medical care services. One problem that does exist, however, is the question of how to find ways to deal with the increased volumes of domestic waste water and solid waste that are generated in the summer season when the population becomes temporarily much larger.

5. Project Evaluation

1) Financial Analysis

(1) Project Cost

Concerning the capital expenditure that will be put into project implementation, the facilities construction cost is calculated based on general construction rates (tax-separate) in Morocco, and the equipment supply cost is based on local prices with respect to locally procured items and prices in Japan with respect to imported items. In addition, a consultant supervision cost equivalent to 8% of the total equipment supply cost is also taken into account. Land acquisition cost is not counted because the project site is located on state-owned land. Operating costs following the completion of facilities are calculated based on prices in Morocco. The breakdown of these costs is indicated in Table 3.

(2) Project Benefit

The effects that can be anticipated as a result of project implementation are as follows.

① Increased fishing trip days
Effect gained through fishing port facilities development

② Increased operating time
Effect gained through ice storage installation. In other words, fishermen can decide when to return to port without being limited by the activities of agents.

③ Increased fish prices
Effect gained through realization of total competition between agents via the fish market

④ Improved quality of handled fish
Effect gained through use of ice

⑤ Reduction of fisheries-related expenses
Construction of the slipway will make fishing boat maintenance easier and extend the service lives of boats. Moreover, through provision of the workshop, fishing gear store and long line bait store, time that was previously spent on procuring outboard engine parts, fishing gear and bait will be saved.

Specific effects in the event of project implementation are as follows.

A. It is forecast that the annual landed quantity of fish will increase by approximately 6% from the present 1,078,000 kg to 1,141,450 kg.

B. It is forecast that average fish prices will increase by approximately 5% from the present:

① 4.0 DH/kg to 4.2 DH/kg (sardines caught by purse seine),
② 25 DH/kg to 26.3 DH/kg (tuna caught by drift net),
③ 30 DH/kg to 31.5 DH/kg (demersal fish caught by artisinal fishing).

The profits which these project effects will bestow on the operating body are as follows. The breakdown of these benefits is indicated in Table 4.

① Landing commission
6% of successful bid prices at the market will be levied, 1% of which will go to the fishermen's cooperative association and 5% to the ONP.

② Ice sales

③ Fuel sale commission

For every liter of fuel sold, 0.2 DH will be levied as a commission charge.

④ Facilities leasing charge
Charges from the lease of fishermen's lockers, the workshop and stores, etc.

⑤ Other income
Canteen sales and hamam charges

⑥ Fishermen's cooperative association contribution
In the first year only when the fishermen's cooperative association is established, a contribution will be levied from fishermen who join the association.

Incidentally, concerning the residual value of the capital expenditure, this is not taken into account because the target facilities are largely intended to serve the public benefit.

(3) Project Profitability

It is not possible to calculate the FIRR, as is indicated in the calculation table shown in Table 5. Because the sum total of the net present value is already negative when the discount rate is set at 1%, any further calculation is impossible. In other words, before even making a comparison with the long-term rate of interest, it is clear that the project cannot make a profit on investment.

Sensitivity analysis was carried out to find the FIRR by varying expected increase in the quantity and average price of landed fish. Three scenarios each were assumed: the landed fish quantity was assumed to increase by 3%, 6% and 9% and the average fish price by 3%, 5% and 7%. However, it was not possible to calculate a value in any of the assumed cases.

2) Economic Analysis

(1) Project Cost

Using the same cost items as those adopted in the financial analysis, only the prices are corrected, from market prices to shadow prices. In other words, concerning the capital expenditure, the facilities construction cost is multiplied by the shadow construction coefficient, and the equipment supply cost is multiplied by the shadow exchange rate with respect to imported items and by 1.0 with respect to locally procured items. Concerning operating costs, personnel expenses are multiplied by the shadow labor coefficient with respect to unskilled labor, and transfer items such as TVA, etc. are deducted from other expenses such as lighting and heating costs, etc. Concerning the value of land that is lost as a result of facilities construction, this will not be taken into account because it is currently sandy beach not used for any particular production activities. The breakdown of these costs is indicated in Table 6.

(2) Project Benefit

The following three benefits can be anticipated as a result of project implementation.

① Increased quantity of landed fish (the extra amount will contribute to increasing the amount of fish exported and the amount supplied to the domestic market)

② Increased fish prices

③ Ice production volume

The value of the increased amount of fish for export is first converted to the FOB price in force at the main trade port of Tangiers (domestic marketing coefficient: 1.15) and then multiplied by the shadow exchange rate (1.14). In the economic analysis, since the consumer surplus resulting from project implementation is also treated as a benefit, the value of the increased amount of fish for supply to the domestic market is calculated by converting the price in the production area to the price in the main consumer area of Tangiers

market. Concerning increase in the volume and price of landed fish, the same anticipated values as used in the financial analysis are adopted. The breakdown of these benefits is indicated in Table 7.

The construction of refueling facilities, a fishing gear store and outboard engine workshop under the project will result in a cost saving benefit in that time previously spent traveling to the nearest such facilities can be saved on, however, by assuming that this benefit will translate into greater operating time and thus increased catches, it is not treated as a separate item.
Income from commission and lease charges, which is taken into account in the financial analysis, is not considered in the economic analysis since it is viewed as domestic transfer of services.

(3) Level of Priority of the Project
The EIRR cannot be calculated, as is indicated in the calculation table shown in Table 8.
Because the sum total of the net present value is already negative when the discount rate is set at 1%, any further calculation is impossible.
Sensitivity analysis was carried out to find the FIRR by varying expected increase in the quantity and average price of landed fish. Three scenarios each were assumed: the landed fish quantity was assumed to increase by 3%, 6% and 9% and the average fish price by 3%, 5% and 7%. However, it was not possible to calculate a value in any of the assumed cases.
In view of the fact that the project site is on a sandy beach coast prone to drift sand and there is little room to the rear of the site, it is necessary to plan full-scale fishing port facilities that are resistant to waves and will not become blocked by drift sand, even if this means disregarding profitability. Because construction of an offshore artificial island, which will incur massive costs, is planned, it is impossible to calculate the value of the EIRR. However, there are a number of indirect benefits that cannot be measured in money terms, for example, the ripple effect on tourism and other local industries and employment creation. Moreover, as a result of being able to enter the social security system through selling catches via the ONP, fishermen will have a greater sense of security in their daily lives.

3) Environmental Impact Assessment
(1) Natural environment
In this project, a wharf is planed to be constructed at the end of the pier projecting into the sea. It is less likely that building of the wharf will cause sand accumulation in the port. The coastline might also not be changed, since the diameter of a sand grain is relatively large. However, it is desirable to conduct a detailed survey at the detailed designing stage.
There is an area which has been proposed for a protected area in the neighboring watershed area to the east. However, this project includes no actions which may affect beyond the watershed, thus, this project is supposed to have no impact on the proposed protected area.

(2) Social Environment
① Friction Between Artisanal Fishing Boats and Coastal Fishing Boats
Same the trawlers operate relatively close to the coastline in this area, friction will become more pronounced if fishing trips made by artisinal fishing boats increase. By setting fish aggregating devices in place (an item for future research in the project), demersal fish resources can be nurtured and this problem can be avoided by clarifying boundaries between the fishing grounds of trawlers and artisinal fishing boats.
② Impact on Relationship Between Fishermen and Middlemen
Since fishermen in this area place very little reliance on the middlemen and there is almost no kind of symbiotic relationship between the two parties, the possibility of friction arising as a result of

project implementation is very low.

③ Population Movement to Areas around the Project Site

In view of the well developed transportation infrastructure in this area, fishing port development will not lead to increased concentration of the population.

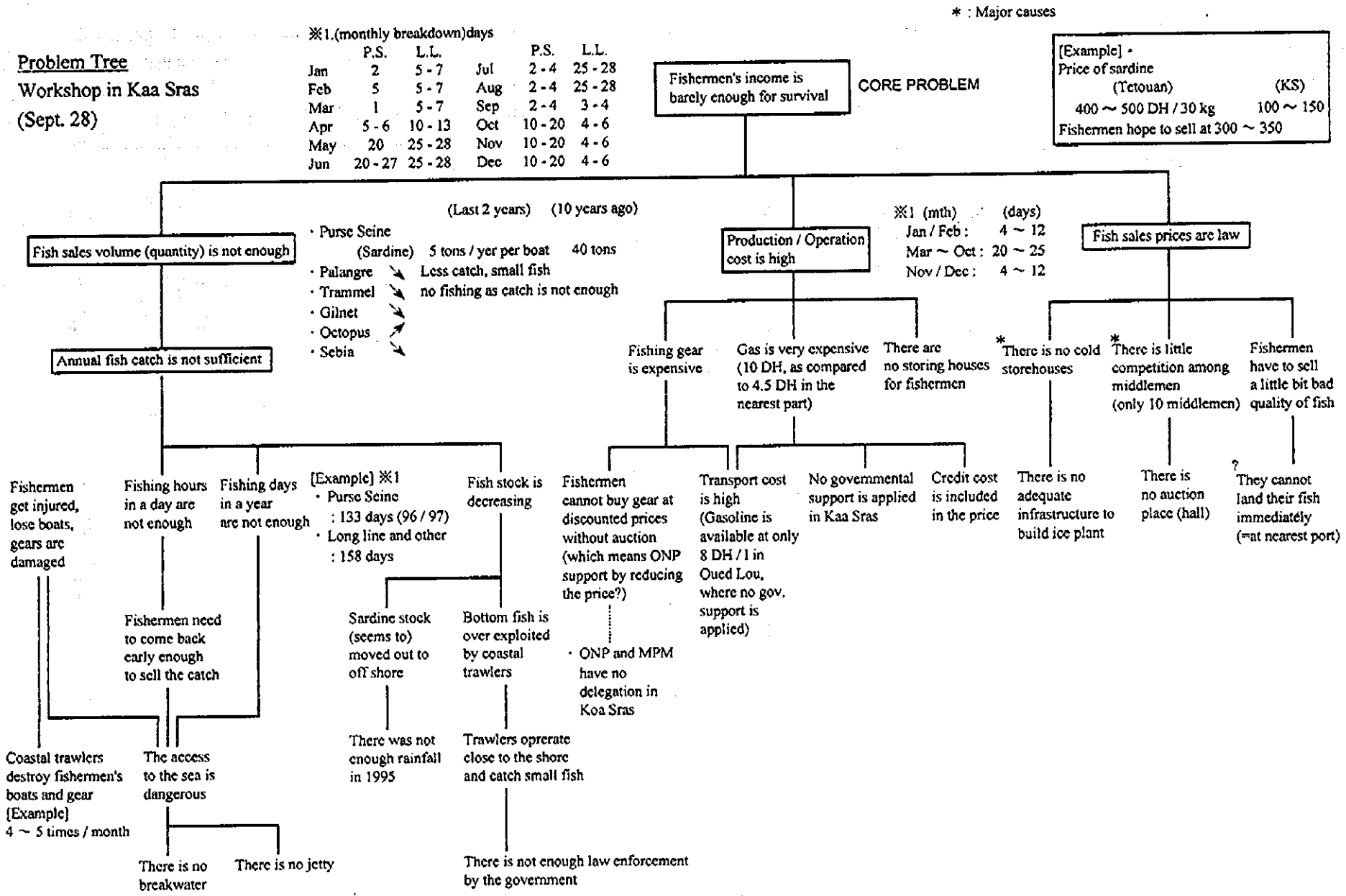

Fig. 5-3-E-3 Problem tree

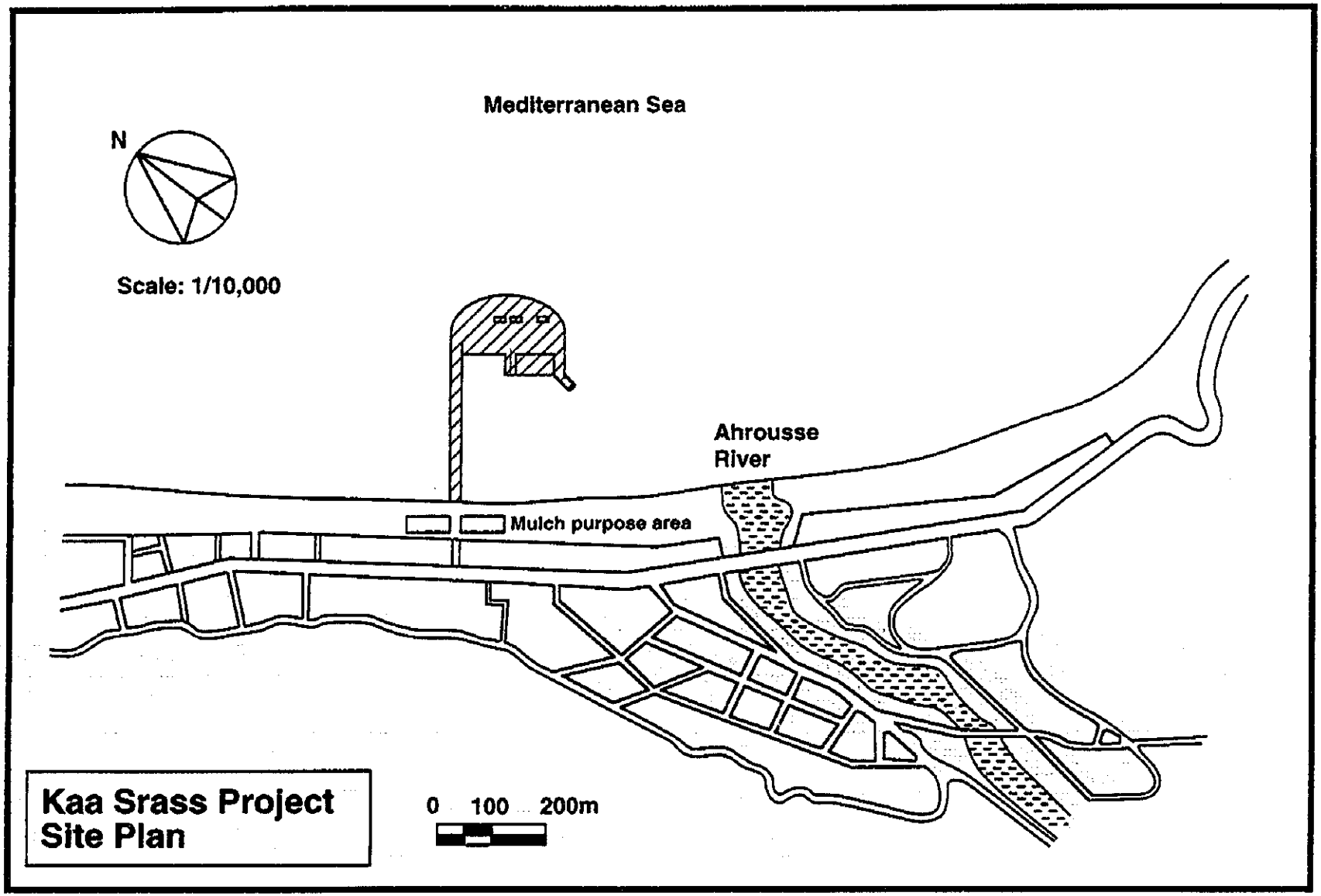

Fig. 5-3-E-4 Site plan

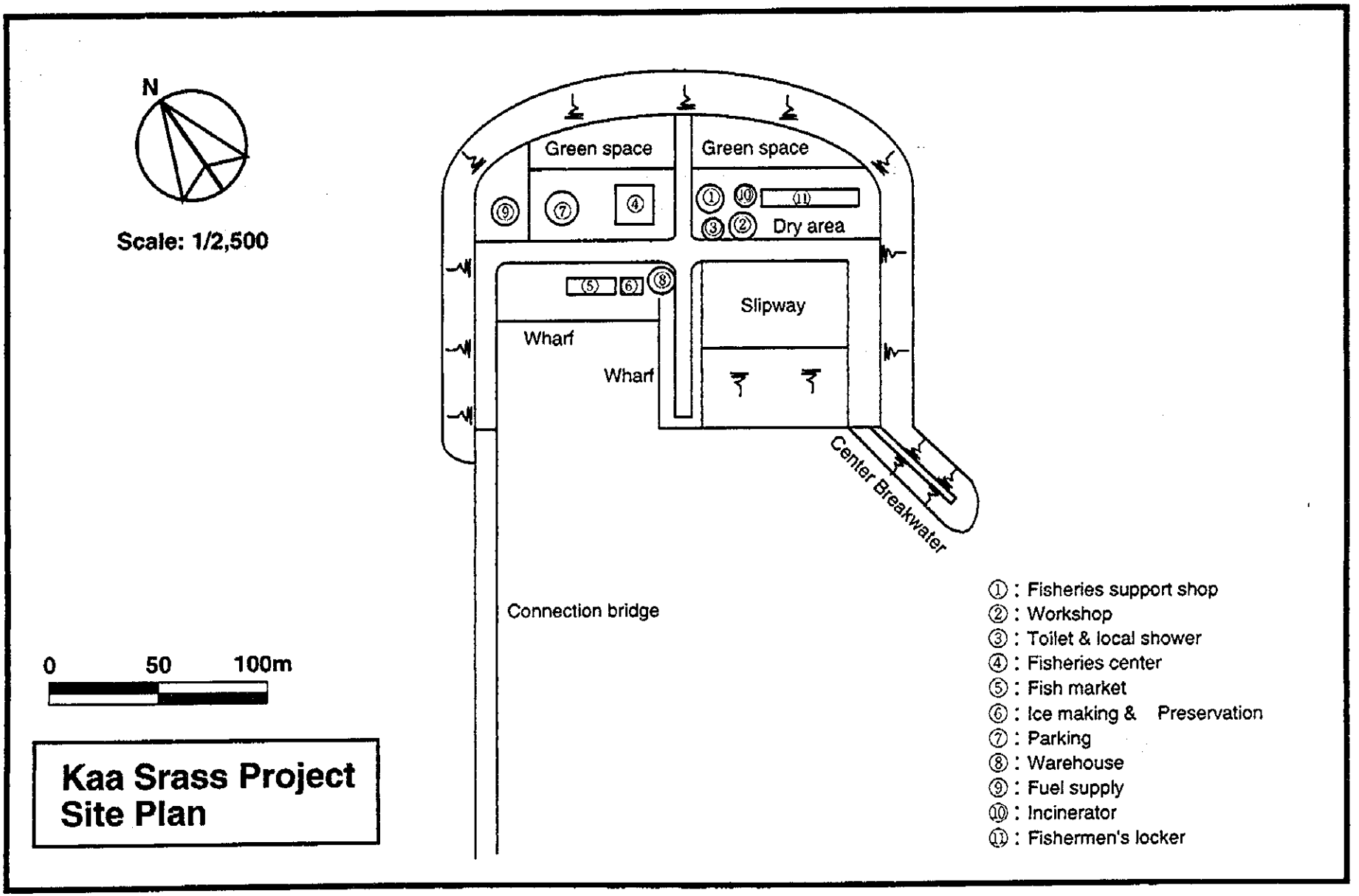

Fig. 5-3-E-4 Site plan (detail)

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Scope of facilities		Name of facilities	Scale of facilities	Note
Port facilities	Outer facilities	Breakwater	L= 50m	
		Revetment	L= 400m	
	Mooring facilities	Wharf (-1.5m)	L= 98m	
		Slipway (-1.5m)	W= 50m	
	Water facilities	Navigation aids	Navigation light : 1 set	
	Transport facilities	Access bridge	L=250m	
Port service facilities	Fish preservation facilities	Auction hall	Building area 170m2	Operated by ONP
		Ice making & preservation	Building area 30m2	
		Chilled room	2ton、20m2	
	Boat, gear maintenance facilities	Ware house	Building area 30m2	
		Workshop	Building area 100m2	Engine & hull
	Supply facilities	Fishermen's locker	Building area 660m2	110 sets
	Fishermen's welfare facilities	Fuel supply	39kl fuel tank	Gasoline, Operated by private
		Fisheries support shop	Building area 40m2	3 booth
	Management facilities	Toilet and local shower	Building area 30m2	Use of incinerator heat
	Treatment facilities	Fisheries center	Building area 430m2	
		Drainage treatment	Harbor area	Septic tank & subsurface infiltration
	Mulch purpose area	Dry area, parking,, souk	Gravel pavement	
Fishermens village social infra-structure	Road	Fishermen's village	Serviced	
	Water supply	Water distribution	Serviced	Operated by ONEP
	Electricity supply	Main & branch line	Serviced	Operated by ONE
	Drainage & garbage	Drain gutter, sewer	Serviced、Treatment facility will be needed in the future.	
	Treatment facilities	Fishermen's housing site	No need	
	Public facilities	Community center		
		Elementary school	within walking distance	
Equipment	Fish handling equipment	Fish box, balance, cart etc.		
	Workshop tools			

Table 5-3-E-2 Financial Analysis - Cost (i)

Financial Analysis
Capital Expenditure (CAPEX)

Area	Facility	Scale	Unit	Unit price (DH)	Price (DH)	Remarks
Port facilities					89,625,000	
	Access bridge	250	m	166,667	41,666,667	
	Revetment	400	m	66,667	26,666,667	
	Breakwater	50	m	125,000	6,250,000	
	Slipway	50	m	66,667	3,333,333	
	Wharf (-1.5m)	50	m	58,333	2,916,667	
	Navigation aids	1	set	125,000	125,000	
	Land	80,000	m3	108	8,666,667	
Port service					12,716,667	
facilities	Fish market	170	m2	5,833	991,667	
	Ice & preservation	30	m2	5,833	175,000	
	Fisheries center	430	m2	5,833	2,508,333	
	Workshop	100	m2	4,167	416,667	
	Fishermen's locker	660	m2	4,167	2,750,000	
	Warehouse	30	m2	4,167	125,000	
	Drainage treatment	1	set	833,333	833,333	
	Ice making plant	1	set	2,083,333	2,083,333	
	Chilled room	1	set	1,250,000	1,250,000	
	Insite road	100	m	3,333	333,333	
	External work	1	set	1,250,000	1,250,000	
Equipment					666,667	
	Fish handling	1	set	416,667	416,667	
	Workshop	1	set	250,000	250,000	
Consulting fee		1	set	8,240,667	8,240,667	
Total					111,249,000	

Table 5-3-E-2 Financial Analysis - Cost (ii)

Operation Expenditure (OPEX) 610,173 DH/Year

Personnel Cost

Area	Title	Unit Price(DH)	No. of person	Cost (Month)
Administration	Manager	2,500	1	2,500
	Accountant	2,500	1	2,500
	Secretary	1,300	1	1,300
Ice machine	Engineer	2,700	1	2,700
	General worker	1,200	1	1,200
Workshop	Engineer	2,000	1	2,000
	Carpenter	1,400	1	1,400
Hamam	Worker	1,200	1	1,200
Fuel Station	Worker	1,200	1	1,200
Others	Security men	1,200	2	2,400
Fish market	Manager	2,500	1	2,500
	General worker	1,200	1	1,200
Total (month)				22,100
Total (year)				265,200

Cost of utility

Item	Use	Consumption	Unit price	Price (DH)	Remarks
Electricity	Ice machine	35	291	10,185	base charge (year)
		20,160	0.99	20,051	monthly use
	Refrigerator	216	1.27	274	monthly price
	Lights and others	768	1.30	998	monthly price
Total (year)				266,066	
Item	Use	Consumption	Unit price	Price (DH)	Remarks
Water	Fish market	100	5.83	583	monthly price
	Ice machine	180	5.83	1,049	monthly price
	Others	40	5.83	233	monthly price
Total (year)				22,387	

Maintenance and Operation Cost

facility	Cost (month)	Remarks			
Workshop	500				
Hamam	1,710	fuel cost	break down	daily consumpt'n	15
Ice machine	500			unit price	3.8
Building	500			no. of days	30
Other expenses	1,500	vehicles etc.			
Total	4,710				
Cost (year)	56,520				

Table 5-3-E-4 Calculation sheet of FIRR

Financial Internal Rate of Return (FIRR)

Year	Cost	Benefit	Net Cash Flow	Discount Rate 1%	Net Present Value	Discount Rate 2%	Net Present Value
1	111,249,000	0	-111,249,000	0.990	-110,147,525	0.971	-108,008,738
2	610,173	2,729,391	2,119,218	0.980	2,077,461	0.943	1,997,566
3	610,173	2,361,891	1,751,718	0.971	1,700,200	0.915	1,603,070
4	610,173	2,361,891	1,751,718	0.961	1,683,366	0.888	1,556,379
5	610,173	2,361,891	1,751,718	0.951	1,666,699	0.863	1,511,047
6	610,173	2,361,891	1,751,718	0.942	1,650,197	0.837	1,467,036
7	610,173	2,361,891	1,751,718	0.933	1,633,859	0.813	1,424,307
8	610,173	2,361,891	1,751,718	0.923	1,617,682	0.789	1,382,822
9	610,173	2,361,891	1,751,718	0.914	1,601,665	0.766	1,342,546
10	610,173	2,361,891	1,751,718	0.905	1,585,807	0.744	1,303,443
11	610,173	2,361,891	1,751,718	0.896	1,570,106	0.722	1,265,478
12	610,173	2,361,891	1,751,718	0.887	1,554,561	0.701	1,228,620
13	610,173	2,361,891	1,751,718	0.879	1,539,169	0.681	1,192,835
14	610,173	2,361,891	1,751,718	0.870	1,523,930	0.661	1,158,092
15	610,173	2,361,891	1,751,718	0.861	1,508,841	0.642	1,124,361
16	610,173	2,361,891	1,751,718	0.853	1,493,902	0.623	1,091,613
17	610,173	2,361,891	1,751,718	0.844	1,479,111	0.605	1,059,818
18	610,173	2,361,891	1,751,718	0.836	1,464,466	0.587	1,028,950
19	610,173	2,361,891	1,751,718	0.828	1,449,967	0.570	998,980
20	610,173	2,361,891	1,751,718	0.820	1,435,611	0.554	969,884
21	610,173	2,361,891	1,751,718	0.811	1,421,397	0.538	941,635
22	610,173	2,361,891	1,751,718	0.803	1,407,323	0.522	914,208
23	610,173	2,361,891	1,751,718	0.795	1,393,390	0.507	887,581
24	610,173	2,361,891	1,751,718	0.788	1,379,594	0.492	861,729
25	610,173	2,361,891	1,751,718	0.780	1,365,934	0.478	836,630
26	610,173	2,361,891	1,751,718	0.772	1,352,410	0.464	812,262
27	610,173	2,361,891	1,751,718	0.764	1,339,020	0.450	788,604
28	610,173	2,361,891	1,751,718	0.757	1,325,762	0.437	765,635
29	610,173	2,361,891	1,751,718	0.749	1,312,636	0.424	743,335
30	610,173	2,361,891	1,751,718	0.742	1,299,640	0.412	721,685
					-66,313,816		-75,028,587

FIRR	-5.61 %

Impossible to calculate

Table 5-3-E-5 Economic Analysis - Cost (i)

Economic Analysis
Capital Expenditure (CAPEX)

Area	Facility	Scale	Unit	Unit price (DH)	Market price	Convers'n factor	Shadow price
Port facilities					89,625,000		80,692,500
	Access bridge	250	m	166,667	41,666,667	0.9	37,500,000
	Revetment	400	m	66,667	26,666,667	0.9	24,000,000
	Breakwater	50	m	125,000	6,250,000	0.9	5,625,000
	Slipway	50	m	66,667	3,333,333	0.9	3,000,000
	Wharf (-1.5m)	50	m	58,333	2,916,667	0.9	2,625,000
	Navigation aids	1	set	125,000	125,000	1.14	142,500
	Land	80,000	m3	108	8,666,667	0.9	7,800,000
Port service					12,716,667		12,359,500
facilities	Fish market	170	m2	5,833	991,667	0.89	882,583
	Ice & preservation	30	m2	5,833	175,000	0.89	155,750
	Fisheries center	430	m2	5,833	2,508,333	0.89	2,232,417
	Workshop	100	m2	4,167	416,667	0.89	370,833
	Fishermen's locker	660	m2	4,167	2,750,000	0.89	2,447,500
	Warehouse	30	m2	4,167	125,000	0.89	111,250
	Drainage treatment	1	set	833,333	833,333	1.14	950,000
	Ice making plant	1	set	2,083,333	2,083,333	1.14	2,375,000
	Chilled room	1	set	1,250,000	1,250,000	1.14	1,425,000
	Insite road	100	m	3,333	333,333	0.89	296,667
	External work	1	set	1,250,000	1,250,000	0.89	1,112,500
Equipment					666,667		760,000
	Fish handling	1	set	416,667	416,667	1.14	475,000
	Workshop	1	set	250,000	250,000	1.14	285,000
Consulting		1	set	8,240,667	8,240,667	1.00	8,240,667
合計					111,249,000		102,052,667

Table 5-3-E-5 Economic Analysis - Cost (ii)

Operation Expenditure (OPEX) 545,345 DH/Year

Personnel Cost

Area	Title	Unit Price(DH)	No. of person	Cost (Month)	Convers'n factor	Shadow wage
Administration	Manager	2,500	1	2,500	1.0	2,500
	Accountant	2,500	1	2,500	1.0	2,500
	Secretary	1,300	1	1,300	1.0	1,300
Ice machine	Engineer	2,700	1	2,700	1.0	2,700
	General worker	1,200	1	1,200	0.5	600
Workshop	Engineer	2,000	1	2,000	1.0	2,000
	Carpenter	1,400	1	1,400	1.0	1,400
Hamam	Worker	1,200	1	1,200	1.0	1,200
Fuel Station	Worker	1,200	1	1,200	0.5	600
Others	Security men	1,200	2	2,400	0.5	1,200
Fish market	Manager	2,500	1	2,500	1.0	2,500
	General worker	1,200	1	1,200	0.5	600
Total (month)				22,100		19,100
Total (year)				265,200		229,200

Cost of utility

Item	Use	Consumption	Unit price	Price (DH)	Transfer item	Shadow price	Remarks
Electricity	Ice machine	35	291	10,185	713	9,472	base charge (year)
		20,160	0.99	20,051	1,404	18,647	monthly use
	Refrigerator	216	1.27	274	19	255	monthly price
	Lights and others	768	1.30	998	70	929	monthly price
Total (year)				266,066		247,442	
Item	Use	Consumption	Unit price	Price (DH)	Transfer item	Shadow price	Remarks
Water	Fish market	100	5.83	583	41	542	monthly price
	Ice machine	180	5.83	1,049	73	976	monthly price
	Others	40	5.83	233	16	217	monthly price
Total (year)				22,387		20,820	

Maintenance and Operation Cost

facility	Cost (month)	Remarks	Transfer item	Shadow price
Workshop	500		100	400
Hamam	1,710	fuel cost	120	1,590
Ice machine	500		100	400
Building	500		100	400
Other expenses	1,500	vehicles etc.	300	1,200
Total	4,710			3,990
Cost (year)	56,520			47,884

break down		
	daily consumpt'n	15
	unit price	3.8
	no. of days	30

Transfer item means the VAT (Value Added Tax). Their tax rate are

fuel, light	7 %
other commodities	20 %

Table 5-3-E-6 Economic Analysis - Benefit

Benefit: 2,566,775 DH

	without Project		with Project		Surplus production	Surplus value	Consumer's surplus Shadow price
	Landed quantity	Landing value	Landed quantity	Landing value			
Total Landing	1,078,000	22,842,000	1,141,450	24,606,855	63,450	1,764,855	
To export						529,457	724,296
To domestic						1,235,399	1,482,478

Increase of landing	Increase of export	Increase of domestic supply
2,206,775	724,296	1,482,478

Rate of increase of landed quantity	12.6	% (seiner)
Rate of increase of landed quantity	1.9	% (small boat)
Rate of increase of fish price	5	%
Percentage of export oriented	30	%
Percentage of domestic oriented	70	%
Domestic marketing factor	1.20	
Shadow exchange rate	1.14	

Note 1:
With the construction of fish market, more competitive price will be realized through the auction among meddle men.
With the construction of refrigerator, quality down caused by the absence of refrigerator, will be controlled.
As a result, fish price is expected to increase as left
(based on the interview survey at site)

Note 2:
Product is exported from Port of Tanger
Product is consumed at the market of Tanger

Ice sales

Daily production	Unit price (DH/ton)	No. of days	monthly sale	No. of month	Remarks
4	300	30	36,000	6	high season : May to October
		20	24,000	6	low season : November to April
Ice sales (year)				360,000	DH

Table 5-3-E-7 Calculation sheet of EIRR

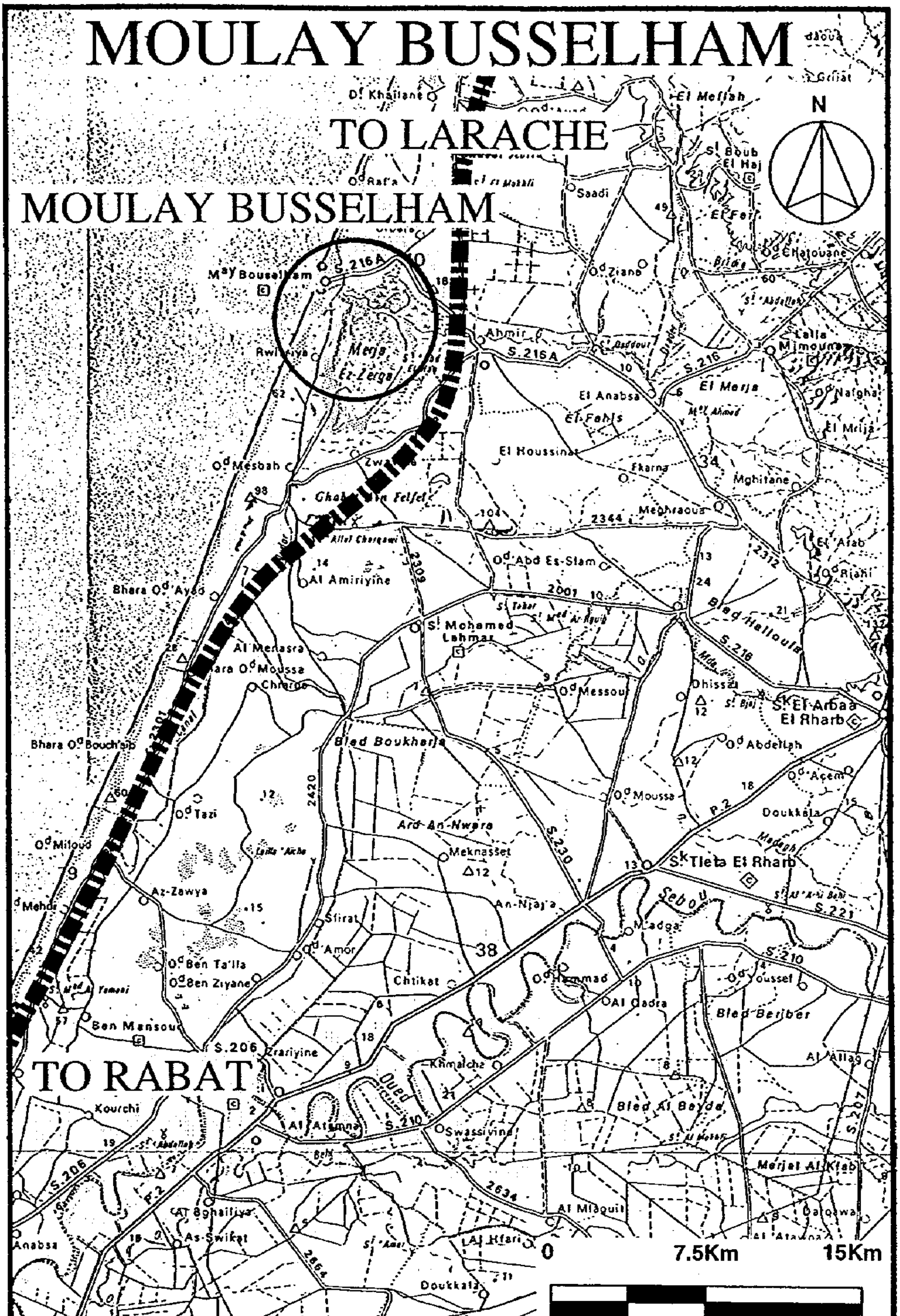
Economic Internal Rate of Return

Year	Cost	Benefit	Net Cash Flow	Discount Rate 1%	Net Present Value	Discount Rate 2%	Net Present Value
1	102,052,667	0	-102,052,667	0.990	-101,042,244	0.980	-100,051,634
2	545,345	2,566,775	2,021,429	0.980	1,981,599	0.961	1,942,935
3	545,345	2,566,775	2,021,429	0.971	1,961,979	0.942	1,904,838
4	545,345	2,566,775	2,021,429	0.961	1,942,554	0.924	1,867,488
5	545,345	2,566,775	2,021,429	0.951	1,923,321	0.906	1,830,871
6	545,345	2,566,775	2,021,429	0.942	1,904,278	0.888	1,794,971
7	545,345	2,566,775	2,021,429	0.933	1,885,424	0.871	1,759,776
8	545,345	2,566,775	2,021,429	0.923	1,866,756	0.853	1,725,271
9	545,345	2,566,775	2,021,429	0.914	1,848,273	0.837	1,691,442
10	545,345	2,566,775	2,021,429	0.905	1,829,974	0.820	1,658,276
11	545,345	2,566,775	2,021,429	0.896	1,811,855	0.804	1,625,761
12	545,345	2,566,775	2,021,429	0.887	1,793,916	0.788	1,593,883
13	545,345	2,566,775	2,021,429	0.879	1,776,154	0.773	1,562,631
14	545,345	2,566,775	2,021,429	0.870	1,758,569	0.758	1,531,991
15	545,345	2,566,775	2,021,429	0.861	1,741,157	0.743	1,501,952
16	545,345	2,566,775	2,021,429	0.853	1,723,918	0.728	1,472,502
17	545,345	2,566,775	2,021,429	0.844	1,706,849	0.714	1,443,629
18	545,345	2,566,775	2,021,429	0.836	1,689,950	0.700	1,415,323
19	545,345	2,566,775	2,021,429	0.828	1,673,218	0.686	1,387,571
20	545,345	2,566,775	2,021,429	0.820	1,656,651	0.673	1,360,364
21	545,345	2,566,775	2,021,429	0.811	1,640,249	0.660	1,333,690
22	545,345	2,566,775	2,021,429	0.803	1,624,009	0.647	1,307,539
23	545,345	2,566,775	2,021,429	0.795	1,607,929	0.634	1,281,901
24	545,345	2,566,775	2,021,429	0.788	1,592,009	0.622	1,256,766
25	545,345	2,566,775	2,021,429	0.780	1,576,247	0.610	1,232,124
26	545,345	2,566,775	2,021,429	0.772	1,560,640	0.598	1,207,964
27	545,345	2,566,775	2,021,429	0.764	1,545,189	0.586	1,184,279
28	545,345	2,566,775	2,021,429	0.757	1,529,890	0.574	1,161,053
29	545,345	2,566,775	2,021,429	0.749	1,514,742	0.563	1,138,292
30	545,345	2,566,775	2,021,429	0.742	1,499,745	0.552	1,115,972
					-50,875,199		-56,760,574

EIRR	-7.64 %

Impossible to calculate

Moulay Bousselham



MOULAY BUSSELHAM
TO LARACHE
MOULAY BUSSELHAM
N
TO RABAT
0
7.5Km
15Km
Merja Ez-Zerga
Ahmir
S.216A
El Anabsa
El Houssine
Sebou
S.210
Oued
Bled Boukharja
Ard An-Nwara
Sk Tleta El Rharb
S. El Arbaa El Rharb
Bled Beriber
Bled Al Beyda
Merjet Al Ktab

F. Moulay Bousselham

1. General conditions of the site

This site is located at the mouth of Merja-zerga lagoon on the Atlantic Ocean. The site is under the influence of inland water and sea water. The estimated population of artisanal fishermen basing in Moulay Bousselham is over 400, and that of their families is over 2,000[1]. Many of these artisanal fishermen live in the commune rurale including Moulay Bousselham, but some of them come from other adjacent commune rurales. The population of the residents in the whole commune rurale is over 15,000[2]. Agriculture is also practiced in the commune rurale, but most of their income depends on fishing. They catch decussate venus in the lagoon. They also catch European hake, sea bream, sole, and hairtail, mainly by using bottom gillnets and handlines. Their fishing technique is at the same level as that in the other sites on the Atlantic. But as compared with villages on the Mediterranean Sea, their fishing technique has not been well developed. The standard of the income of fishermen seems to be lower than that in Suira Kedima.

1) Fisheries

(1) Overview

Moulay Bousselham, on the Atlantic coast approximately 80 km north of Rabat, is like a river port located at the point where Merja Zerga lagoon opens out to the Atlantic Ocean. Extensive sand beaches on the coast attract a great many tourists during the summer. Fisheries is divided into both inland water fishing in the lagoon and ocean fishing, and participation by women and sport fishing aspects can also be found.

(2) Number of Fishing Boats

The number of fishing boats registered with the DRAM in Kenitra Province is 164 in Central, Ryad and Luchare, with another 54 boats scheduled to be registered in the near future. According to surveys made by CID and Maruyama of JOCV, approximately 100-120 boats are operating. Of these, around 60 operate in ocean waters and the remainder work in the lagoon. Ocean fishing boats need to be 7 m or more in length and be installed with an outboard engine possessing at least 20 HP output. This regulation is unique to Moulay Bousselham and has been adopted to ensure operating safety.
In summer, with the influx of tourists comes a rise in the number of pleasure boats.

Operating Pattern in Moulay Bousselham

The possible number of ocean operating days are as follows:

April-September	20-25 days /month (22 days) x 6 months = 132 days
October-November	15 days/month x 2 months = 30 days
December-March	5-10 days/month (8 days) x 4 months = 32 days
	Total: 194 days

The number of operating boats is as follows.

April-September	Maximum 60 boats x 80% = 48 boats
October-March	Maximum 60 boats x 50% = 30 boats
	The high season is from June to August.

Fig. 5-3-F-1 Annual Operating Schedule, Possible Operating Days per Month and

[1] These figures are calculated based on the site researches.
[2] From " Population Legale du Maroc, 1994, Direction de la Statistique, Maroc ".

Number of Operating Boats

Fishing Method/Month	1	2	3	4	5	6	7	8	9	10	11	12
Bottom Long Line, Gillnet, Hand Line	■	■	■	■	■	■	■	■	■	■	■	■
Trammel Nets		■	■	■	■	■	■	■	■			
Monthly Operating Days	8	8	8	22	22	22	22	22	22	15	15	8
Monthly Operating Boats	30	30	30	48	48	48	48	48	48	30	30	30

The combined annual number of operating fishing boats (total catch effort) is 8,196 boat-days.

(3) Forms of Operation by Fishing Ground and Fishing Method

Ocean fishing methods are bottom gillnet and hand line fishing, and fishing methods in the lagoon are gillnet, beach seine, dredge net and shell collecting.

The catch size per fishing boat is 50-100 kg during the high season and landed fish types are European hake, sea bream (*Pagellus spp.*), sole, Large head hair tale, cuttlefish and spiny lobsters. The catch size drops to 20-50 kg in winter, when landed types are European sea bass, sparidae and sole. In the lagoon, decussate venus is caught from July to November and the daily catch per fisherman is 1-3 kg.

The fishermen of Moulay Bousselham operate in fishing grounds that are located around two hours' away in summer, but in winter concentrate on coastal fishing grounds no more than one hour away because of the rough conditions.

(4) Quantity and Value of Landed Fish

Assuming that the average catch per fishing boat is 70 kg worth 2,100 DH during the high season and 30 kg worth 900 DH in winter, the annual quantity and value of catches are estimated as follows.

Annual landed quantity = 70 kg x 6,336 + 30 kg x 1,860 = 499,320 kg = approx. 499 tons
Annual landed value = 21,000 DH x 6,336 + 900 DH x 1,860 = 14,979,600 DH

Fishing in the lagoon is performed all year round, but there are no data available on the quantity and value of catches. Assuming that 50 small fishing boats catch 20 kg worth 300 DH per day and operate 250 days per year, the annual landed quantity and value amount to 250 tons and 3,750,000 DH respectively. According to the survey made by Maruyama in 1996 on decussate venus fishing in the lagoon, it is estimated that hand gathering and dredge net fishing produce approximately 13 tons worth 245,000 DH in the period between July and November.

Therefore, it is estimated that the totally quantity and value of fish landed from both the ocean and lagoon are roughly 760 tons and 19,000,000 DH respectively.

2) Infrastructure

The project site is located facing Merja Zerga lagoon approximately 100 km north of Rabat. Construction of a high speed expressway interchange just a few kilometers away from the site has dramatically improved the level of transportation services to the Rabat (the provincial capital) and Tangiers in the north (the gateway to Spain).

A sand beach facing the channel that connects the lagoon to the Atlantic Ocean is used as the landing beach. Because ocean waves are weak by the time they reach the lagoon, fishing boats are simply laid up on the beach. In this area there are numerous camping sites and restaurants, etc. intended to attract tourists, and the channel is also used by tourist pleasure boats in the summer.

In the hearing with the province, it was reported that the influx of tourists in the summer causes the local population to multiply by 10 times and the construction of summer houses remains a busy activity. The lagoon is sometimes affected by tides from the Atlantic Ocean and the beach is almost completely covered

in water when high tide is reached around the channel. Fishermen's communities are basically located in three places on the shores of the lagoon. Small boats used by women to gather decussate venus are placed on the frontal beaches of these communities.
There are currently no facilities in the landing beach area, however, there is a wide urbanized district on high ground to the rear and services here are relied upon. A large proportion of catches are consumed in the local area, however, in summer when local catches are insufficient to satisfy the extra demand from tourists, fish is shipped in from outside areas. Fuel for outboard engines can be purchased (tax included) from local privately operated gasoline stands, however, because these close down during the winter, fishermen must travel long distances to buy what they need.
Electricity is supplied by the ONE to the urbanized district but not as far as the fishing communities. Water from wells is supplied by the Kenitra Water Supply Corporation (Régie Autonome de Kenitra) to the urbanized district, but again the fishing communities have to rely on their own local wells. In construction terms, it is possible to extend the electricity and water supply networks to the communities.

3) Fishing Village Society

(1) Fishermen's Households and Housing

The fishermen live in communities located in and around the urbanized district, which is served by a paved access road that links to the main road, and in communities located on the opposite bank of the lagoon. The urbanized district contains town office of the caidat and other administrative offices and is also home to numerous tourist facilities such as hotels, camping sites, restaurants, and so on. As was mentioned above, the urbanized district is served by electricity and water supply. In contrast, since the surrounding communities have no such public services, inhabitants mainly use butane gas for fuel and batteries (recharged at gasoline stands) for power. Water in these communities is provided by wells.

(2) Role of Agriculture for Fisherman Households

The importance of agriculture in the urbanized district is low, with only a few households in outlying parts possessing a little land to cultivate crops for personal consumption. In the surrounding communities, on the other hand, commercial cultivation of strawberries, etc. is conducted on a relatively large scale and this provides employment for women in particular. Other agricultural activities, however, are mainly done for self supply.

(3) Fishermen's Livelihoods

Fisheries provides the main source of income for fishermen's households. In addition to ocean artisanal fisheries carried out by men, in the lagoon boat fishing by men and decussate venus gathering by women are also practiced. In cases where the male family members are engaged in tourism and lose their source of income in the winter, or cases where the huabard has passed away, decussate venus gathering by women is an extremely important source of household income.

(4) Migration and Settlement of Fishermen

The male fishermen in Moulay Bousselham, after embarking on a career in fisheries on the local beach in their teens, migrate widely working as crew members on artisinal or coastal fishing boats based mainly in ports on the north Atlantic coast. Many fishermen have also experienced working at the major fishing port of Larache. Upon returning to Moulay Bousselham after around 10 years of working away from home in this way, many of these fishermen buy their own artisanal fishing boats.

4) Environment

(1) Natural environment

Moulay Bousselham fronts on the Lake Merja-Zerga, a lagoon formed at the mouth of Drader River. Canal Nador functioning as a flood control also flows into it. The surface level of the lagoon fluctuates about 2m. At low tide, the river line appears, and the rest of the lagoon becomes mud flat. The south side of Drader River mouth is composed of coastal dunes, on which afforestation has been under way for the purpose of stabilization. The dunes have been developing to the north because of the sand supplied by the river. There are hilly solid rocks on the north side of the mouth, and it is more resistant to morphological change. The coastline is straight, not shaped into bay. A belt of table rocks exist along the coastline. Growth of mussels were observed in the north of the rock belt. Productivity of the rock ecosystem seems not very high, judging from the following factors. The coastline is open and is exposed to the sand impacts. Also, there is no topographical base for ecological development near the coast.

On the other hand, Lake Merja Zerga is a designated wetland by Lamsaar Convention, and is also a habitat of slender-billed curlew, a specie listed in Appendix 1 of CITES, and IUCN's Red List.

2. Problems in this site

In all the other villages, there are only male participants in the workshops. PCM workshops in this site were intended for women to adopt their opinion. Followings are the problems which emerged at the workshop.

Discussions in the workshop were focused on the issues related to their economic activities as well as their daily life. Because these two subjects are not directly related, they were classified into the two different Problem Trees (See Problem Trees on page XX). The Core Problem was expressed as "their income is too small", and the results of the discussion could be analyzed into the following direct causes.

1) There is no income from their spouses.
2) Selling prices of marine products are low.
3) Work opportunities are not sufficient.
4) Living cost is expensive.

The item (4) refers to the outcome and not the income, so that it is not directly related to the Core Problem. It should be rather defined as a cause of their low living standard, which is at the level higher than the Core Problem, or the Core Problem itself should be changed to "Life is difficult to maintain".

Looking more closely at the above direct causes, item (1) is caused because 5 to 10 fishermen are killed every year due to the difficulty in access to their fishing places. Consequently, more than half of the participants were widows. The problem about selling prices of marine products in the item (2) seems to be caused by bargaining by brokers, as in the other villages. (3) has been caused because other industries such as agriculture and industry have not been well developed in this site. The problem in the item (4) is because of large-size family (average number of children of the participants were 7.3).

Followings are the problems related to their daily life. In combination with the above "small income", these also seem to have caused problems about their life and their families.

1) Shortage of fuels for cooking
2) Hygienic problem (public bath is located too far)
3) Insufficiency in treatment of pregnant women

4) Insufficiency in education for their children
5) Risk of fire (They use candles because there is no electricity)
6) Difficulty in obtaining water (water source is far and it takes long time to get there).

These outcomes of the workshop are not representing the majority of the residents, because the participants were only women and most of them were widows. The results may have been biased. Consequently, it is not appropriate to treat these results in the same way as in the other sites.
However, it was meaningful that the researchers could take female opinions. Investigation could be conducted for women in the other sites as well.

On the other hand, a small workshop was also conducted for fishermen, as a supplement of the one for women. In the male workshop, problems were presented regarding brokers and high production cost, which were similar to the problems in the other artisanal fishing villages on the Atlantic.
Ocean The conditions in the whole area can be defined to be considerably close to that in Tifnit. But problem of safe operation was more crucial in this site, so as the problems of widows.

3. The direction of the development

PDM was not made for this site. But the conditions seem similar to the other artisanal fishing villages on the Atlantic Ocean. Consequently, the approaches to the development may also become similar. But problems of safe operation and widows should be taken into more consideration. Thus, the goals of the development are:

1) Improvement of basic social infrastructure (electricity, water supply, roads)
2) Increase in selling prices of fish catch
3) Increase in sales volume of fish catch
4) Increase in safety of fishing operation and navigation
5) Conservation of resources in the lagoon
6) Improvement of women's status

The ultimate goal in the development seems to be the improvement of living standard of the residents in the commune. The followings are (provisional) action items in order to realize the above goals.

1) Establishment of basic social infrastructure (electricity, water supply)
2) Establishment of infrastructure related to fishery production and fishery distribution
3) Improvement of fisheries resource management (as for conservation of resources in the lagoon, "extensive aquaculture of clams", "setting of the conservation area")
4) Improvement of fishing methods and realization of safe operation
5) Establishment of the base for fisheries cooperative organization
6) Improvement of the conditions of fishing village (housing, school, medical service).

4. Action Plans by Subject

1) Basic Social Infrastructure Development Plan

The communities that are home to fishermen are located on the lagoon in an environment blessed with water and natural greenery. Families appear to lead efficient lifestyles in that houses are relatively large, farming is practiced and livestock and poultry are reared. Potable water is obtained from private or communal wells and since the relatively shallow water level ensures that these never go dry, the burden in terms of water is small compared to that seen in the other target fishing villages. Because a public water supply network exists nearby, this could be extended to the fishing communities at a low cost. There is currently no electricity supply, however, a power main is located nearby and it would be possible to extend branch lines into each household.

In view of these conditions, households do not experience too much inconvenience in obtaining water from wells and, regarding electricity, since it is possible to extend the nearby power main, it is realistic for this to be carried out through the independent efforts of the communities.

Domestic waste water does not as yet have a large impact on the public water body because the quantity of water use is small, however, since waste water levels will increase in future, it is necessary to construct small-scale treatment facilities that are easy to maintain. In cooperation with NGO and other agencies, it is possible to design and construct such facilities by using local materials and labor.

Public facilities such as schools are located within walking distance and basically do not require development. Medical care facilities (clinics, etc.), too, are situated within walking distance and also in Rabat around one hour away by car, therefore, since wide area support is possible, there is no need for development at the present time.

2) Fisheries Infrastructure Development Plan

(1) Development Contents

In view of the fact that the lagoon is susceptible to outside impact and provides good fishing grounds for decussate venus, marine facilities will not be constructed. Also, concerning the channel that connects the lagoon to the Atlantic Ocean, since it is difficult to make a quantitative assessment of environment impact, this will be left unchanged. Therefore, the development will mainly comprise the construction of land facilities on the existing landing beach. The facilities to be considered are a fisheries center and fishermen's lockers. These facilities will contain a fish market and ice making machine and ice storage and be located in front of the existing landing beach. Fish that are caught in both the ocean and the lagoon will be handled here.

(2) Project Cost

The cost required for the above-mentioned fisheries infrastructure development project is estimated at 22,632,333 DH.

(3) Operation and Management Plan

Of the fisheries-related infrastructure, the fish market will be operated by the Fisheries Public Corporation (ONP: Office National des Peches). As a rule, the ONP will assign two market operating staff (one manager and one employee) to mediate the sale of fish by auction between fishermen and agents, although more staff may be assigned depending on the size of catches. The staff will collect 5% of the auction price as commission for their services, and this will be the sole source of income for the ONP at the market. From the said income, the ONP will pay personnel expenses, heating and lighting expenses and market facilities maintenance costs. Moreover, 2% of the said 5% commission charge will be returned to the fishermen in the form of a social security contribution (for pensions, life insurance and hospital cost

subsidization, etc.).
The other land facilities (fishermen's lockers, workshop, ice making and ice storage facilities, toilets and hamam, refueling facilities, etc.) will be operated and managed by a new body to be newly organized around the local fishermen's cooperative association. The main work areas of the new body are as follows.

① Landing and handling (landing of fish from boats and carrying to the fish market)
② Ice retailing (sale of ice for marketing purposes)
③ Ice storage rental (leasing of ice storage space for temporary storage of long line bait and unsold fish)
④ Fuel retailing (procurement and sale of tax-free gasoline)
⑤ Facilities rental (leasing of fishermen's lockers and the workshop, etc.)
⑥ Fisherman services (operation of hamam or local style showers)

The operating organization will be divided into a steering committee, to act as the decision making organ, and an executive organ. The steering committee will be composed of the manager of the DRAM in Kenitra and fisherman and commune representatives, whereas the executive organ will be made up of full-time staff employed by the steering committee. As a rule, staff will be recruited from the local area, however, if no suitable human resources exist, especially to fill the specialist roles of management, accounting and ice making and ice storage engineering, recruiting will be carried out in the nearest city. It is intended for the operating body to function on a self accounting system based on income derived from the above-mentioned services.

3) Improvement of Fisheries Resource Management
Being located close to the major cities of Rabat and Tangiers, Moulay Bousselham is in a favorable location in terms of fish demand and marketing. In the summer vacances season especially, supply is unable to keep up with the demand for fish and shellfish from tourists. However, because resources are already fully exploited, there is a danger that over-fishing of demersal fish is occurring. Against this background, it is urgently necessary to strengthen controls on illegal trawling in coastal waters, protect existing fishing grounds and create new fishing grounds. In future, placement of artificial reefs that not only create new fishing grounds but also create physical barriers to the entry of trawlers should be considered.
Concerning fisheries resources in the lagoon, the setting of decussate venus fishing prohibition zones would be an effective step. Moreover, if size restrictions are strictly enforced, the effective utilization of shellfish will be sustained into the future.

(1) Monitoring of Resources
In order to strictly control the sizes of caught shellfish and also spiny lobsters, monitoring will be performed in the market.

(2) Resource Management Setup
It is important to educate and enlighten the fishermen in order to encourage autonomous management that also covers protection of the lagoon environment.

4) Fisheries Technical Improvement Plan
Existing fish gear and fishing methods are not perfect, however, improvement efforts are not especially necessary. Since varying fishing methods is one way to stabilize artisanal fisheries, it is worth giving a try to the trolling of thon which seasonally migrate to the local waters. There may be competition with coastal fishing boats, however, fishing grounds can be established through placing fish aggregating devices (FAD) in outer sea waters (of depth 500 m or more).

The safety of fishing operations will be greatly enhanced through construction of a lighthouse and placement of navigational aids, etc. Concerning a rescue setup to deal with shipwrecks and accidents, it is desirable to provide a rescue boat to aid boats that capsize in the wave breaking zone near the beach, and to install fishing boats with SOS transmitters for use in the event of accidents caused by sudden weather changes.

5) Plan for Developing a Base of Fishermen's (Women's) Cooperative Association Activities

Fisheries in Moulay Bousselham is largely carried out by three types of fisherman, that is to say fishermen (male) who go out to sea, fishermen (male) who fish from boats in the lagoon, and women who gather decussate venus in the lagoon. The male fishermen appear to have a reasonable sense of unity, but cannot be considered as sufficiently trained. As for women, there appears to be a strong sentiment towards lagoon protection born out of the knowledge that catches from the lagoon support their livelihoods. Thus, it can be said that there is ample potential for the development of joint cooperative activities among both the male and female fishing folk.

One extremely effective means of encouraging cooperation is to provide guidance in attracting popular support for the goal of advancing fisheries on a sustained basis via protection of the lagoon environment. Doing this may in turn provide an incentive for ocean fishermen to also adopt joint cooperative activities. Unfortunately, however, although there is a strong level of awareness towards lagoon environmental protection, this is not being nurtured into a collective group consciousness. Having said that, agricultural and industrial cooperative associations have been established in the Moulay Bousselham area and fishermen are aware of their existence. Consequently, if fishermen are made to understand that the spirit of cooperation can be applied to the long-term protection of resources and not just the immediate expansion of operations, it should not be too difficult to organize them into groups.

Even if group cooperation activities can be instigated, however, the lack of basic skills among fishermen will severely hinder operational progress. Moreover, the formation of groups does not necessarily ensure that grass roots leaders will develop. Concerning agricultural cooperative associations in Morocco, technical guidance and support with respect to production are provided by the Ministry of Agriculture, while the ODECO is responsible for the provision of management skills and legislation. For this reason, MPM should take the initiative in forming fishermen into groups and after that maintain close links with the commune rurale, ODECO and CNCA, etc. in carrying out basic social training relating to literacy education, fishing log campaigns, savings campaigns, environmental beautification campaigns and leader training, etc. and so impress the meaning of cooperative activities on fishermen and encourage the appearance of grass roots leaders.

6) Plan for Development of the Fishing Village Environment

Since the fishing communities are relatively well concentrated around the lagoon, there is no need at present to develop residential land for fishermen. However, because there are a number of areas which need to be improved from the viewpoint of enhancing the living environment, it would be effective to carry out steady ongoing support through NGO activities, and so on.

Since there is already a primary school within walking distance of the fishing communities, there is no need for new construction. Regarding medical care facilities, too, it is only necessary to promote preventive medicine without constructing new facilities.

5. Project Evaluation

1) Financial Analysis

(1) Project Cost

Concerning the capital expenditure that will be put into project implementation, the facilities construction cost is calculated based on general construction rates (tax-separate) in Morocco, and the equipment supply cost is based on local prices with respect to locally procured items and prices in Japan with respect to imported items. In addition, a consultant supervision cost equivalent to 8% of the total equipment supply cost is also taken into account. Land acquisition cost is not counted because the project site is located on state-owned land. Operating costs following the completion of facilities are calculated based on prices in Morocco. The breakdown of these costs is indicated in Table 2.

(2) Project Benefit

The effects that can be anticipated as a result of project implementation are as follows.

① Increased operating time
Effect gained through ice storage installation. In other words, fishermen can decide when to return to port without being limited by the activities of agents.

② Increased fish prices
Effect gained through realization of total competition between agents via the fish market

③ Improved quality of handled fish
Effect gained through use of ice

④ Reduction of fisheries-related expenses
Construction of the slipway will make fishing boat maintenance easier and extend the service lives of boats. Moreover, through provision of the workshop, fishing gear store and long line bait store, time that was previously spent on procuring outboard engine parts, fishing gear and bait will be saved.

Specific effects in the event of project implementation are as follows.

A. It is forecast that the annual landed quantity of fish will increase by approximately 5% from the present 490,020 kg to 514,020 kg.

B. It is forecast that average fish prices will increase by approximately 5% from the present 30 DH/kg to 31.5 DH/kg.

The profits which these project effects will bestow on the operating body are as follows. The breakdown of these benefits is indicated in Table 3.

① Landing commission
6% of successful bid prices at the market will be levied, 1% of which will go to the fishermen's cooperative association and 5% to the ONP.

② Ice sales

③ Fuel sale commission
For every liter of fuel sold, 0.2 DH will be levied as a commission charge.

④ Facilities leasing charge
Charges from the lease of fishermen's lockers, the workshop and stores, etc.

⑤ Other income
Canteen sales and hamam charges

⑥ Fishermen's cooperative association contribution

In the first year only when the fishermen's cooperative association is established, a contribution will be levied from fishermen who join the association.

Incidentally, concerning the residual value of the initial capital investment, this is not taken into account because the target facilities are largely intended to serve the public benefit.

(3) Project Profitability

It is not possible to calculate the FIRR, as is indicated in the calculation table shown in Table 4. Sensitivity analysis was carried out upon revising the quantity and average price of landed fish following project implementation in the following way.

Table 5-3-F-5 FIRR Sensitivity Analysis

Increases in Landed Quantity	Increases in Average Fish Price	FIRR
2%	3%	Incalculable
	5%	Incalculable
	7%	Incalculable
5%	3%	Incalculable
	5%	Incalculable
	7%	Incalculable
8%	3%	Incalculable
	5%	Incalculable
	7%	1.10

As a result, even by varying the expected levels of increase in the quantity and average price of landed fish, the likelihood of achieving a profitable project is still low.

2) Economic Analysis

(1) Project Cost

Using the same cost items as those adopted in the financial analysis, only the prices are corrected, from market prices to shadow prices. In other words, concerning the capital expenditure, the facilities construction cost is multiplied by the shadow construction coefficient, and the equipment supply cost is multiplied by the shadow exchange rate with respect to imported items and by 1.0 with respect to locally procured items. Concerning operating costs, personnel expenses are multiplied by the shadow labor coefficient with respect to unskilled labor, and transfer items such as TVA, etc. are deducted from other expenses such as lighting and heating costs, etc. Concerning the value of land that is lost as a result of facilities construction, this will not be taken into account because it is currently sandy beach not used for any particular production activities. The breakdown of these costs is indicated in Table 5.

(2) Project Benefit

The following three benefits can be anticipated as a result of project implementation.

① Increased quantity of landed fish (the extra amount will contribute to increasing the amount of fish exported and the amount supplied to the domestic market)
② Increased fish prices
③ Ice production volume

The value of the increased amount of fish for export is first converted to the FOB price in force at the main trade port of Tangiers (domestic marketing coefficient: 1.15) and then multiplied by the shadow exchange rate (1.14). In the economic analysis, since the consumer surplus resulting from project implementation is also treated as a benefit, the value of the increased amount of fish for supply to the domestic market is calculated by converting the price in the production area to the price in the main consumer area of Tangiers market. Concerning increase in the volume and price of landed fish, the same anticipated values as used in the financial analysis are adopted. The breakdown of these benefits is indicated in Table 6.

The construction of refueling facilities, a fishing gear store and outboard engine workshop under the Project will result in a cost saving benefit in that time previously spent traveling to the nearest such facilities can be saved on, however, by assuming that this benefit will translate into greater operating time and thus increased catches, it is not treated as a separate item.
Income from commission and lease charges, which is taken into account in the financial analysis, is not considered in the economic analysis since it is viewed as domestic transfer of services.

(3) Level of Priority of the Project
The EIRR is 6.52%, as indicated in the calculation table shown in Table 7.
Sensitivity analysis was carried out upon correcting the quantity and average price of landed fish following project implementation in the following way.

Table 5-3-F-9 EIRR Sensitivity Analysis

Increases in Landed Quantity	Increases in Average Fish Price	FIRR
2%	3%	Incalculable
	5%	2.82
	7%	4.37
5%	3%	4.05
	5%	6.52
	7%	8.75
8%	3%	7.73
	5%	9.94
	7%	12.06

In view of the fact that the project site faces the always calm internal waters of an estuary and there is a danger that construction of marine facilities may affect the sand supply balance, only facilities on land will be constructed. Although massive capital expenditure is thus not required and the EIRR is relatively high, the facilities still cannot be profitable in financial terms, because they are not intended for the pursuit of profits but are public facilities aimed at supporting fisheries production. The EIRR value of around 6% does not make the project a top priority concern, however, it is still worthy of implementation in the future. Because the project site is conveniently located close to a high speed expressway interchange, indirect benefits that cannot be measured in money terms can be anticipated, for example, the ripple effect on tourism and other local industries and employment creation. Moreover, as a result of being able to enter the social security system through selling catches via the ONP, fishermen will have a greater sense of security in their daily lives.

3) Environmental Impact Assessment

(1) Natural environment

Excavation at the mouth of the river should be avoided, otherwise seawater will flow into the lagoon and ecosystem peculiar to the lagoon will be affected. For this reason, this project is limited to the repair of existing landing place.

Because this landing place is situated near the mouth of the Drader River, it is less likely that the sewage from the landing place will affect the ecosystem in the lagoon. However, if it is not scheduled in this plan, the increase of sewage following the construction of waterworks will probably affect a limited part of the ecosystem in the lagoon.

At present, it is mostly in west part of the lagoon where local people, mainly women, collect clum and others. The habit of waterfowls such as Slender-Billed Curlew is centered in the east and south of the lagoon. It is feasible to preserve their habitat by keeping off this area. As for this issue, it is important to take coordinated actions with AEFCS.

Problem Tree (Social issues)
Workshop at Moulay Bausselham
(only women)
Sept. 25

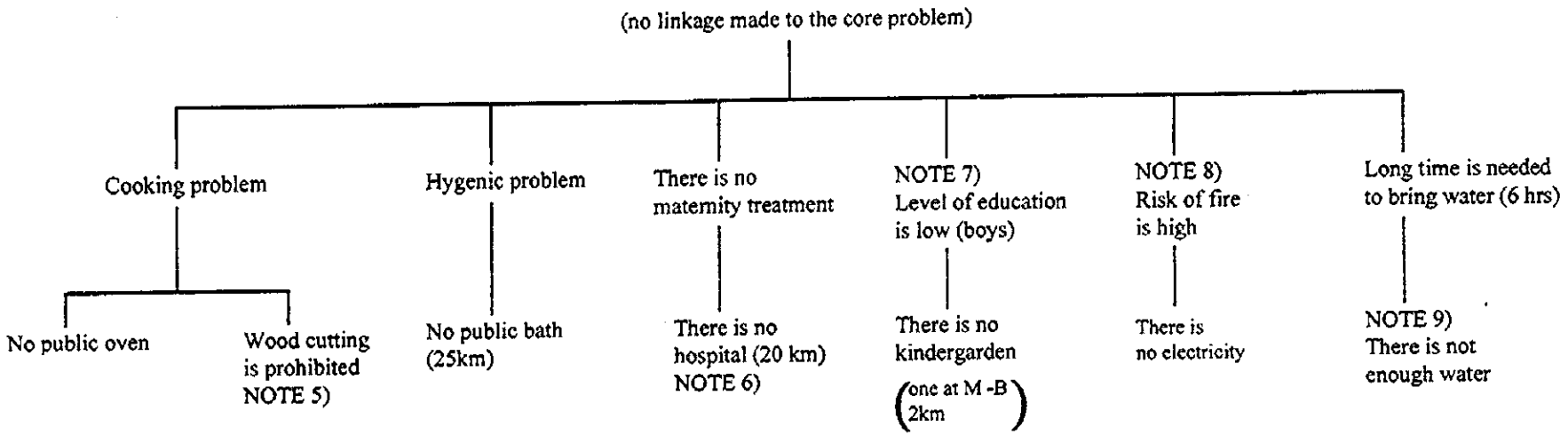


Fig. 5-3-F-2 Problem tree (social issue)

Problem Tree (Economic issues)
Workshop at Moulay Bausselham
(Women and partly supplemented by fishermen)
Sept. 25

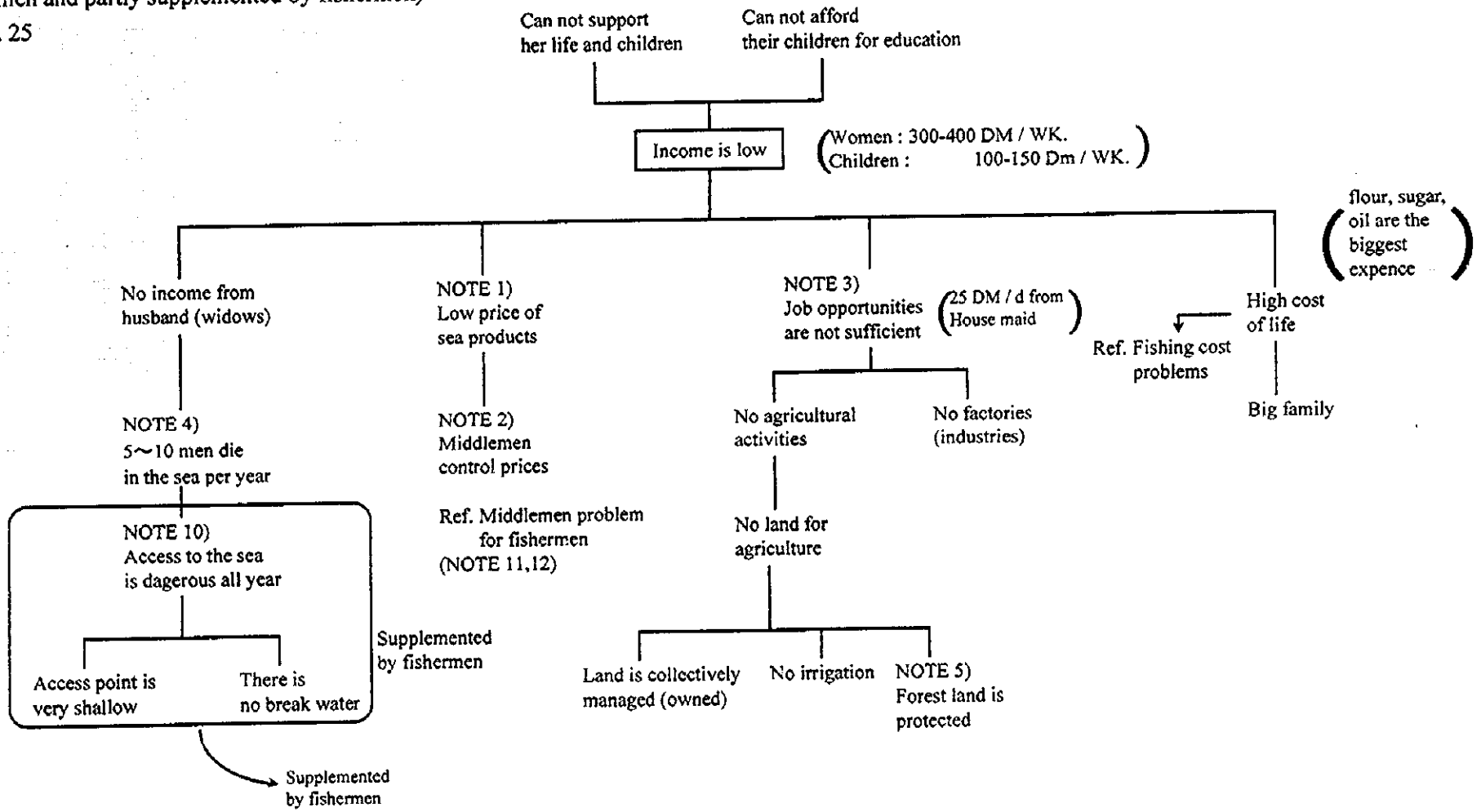


Fig. 5-3-F-2 Problem tree (economic issue)

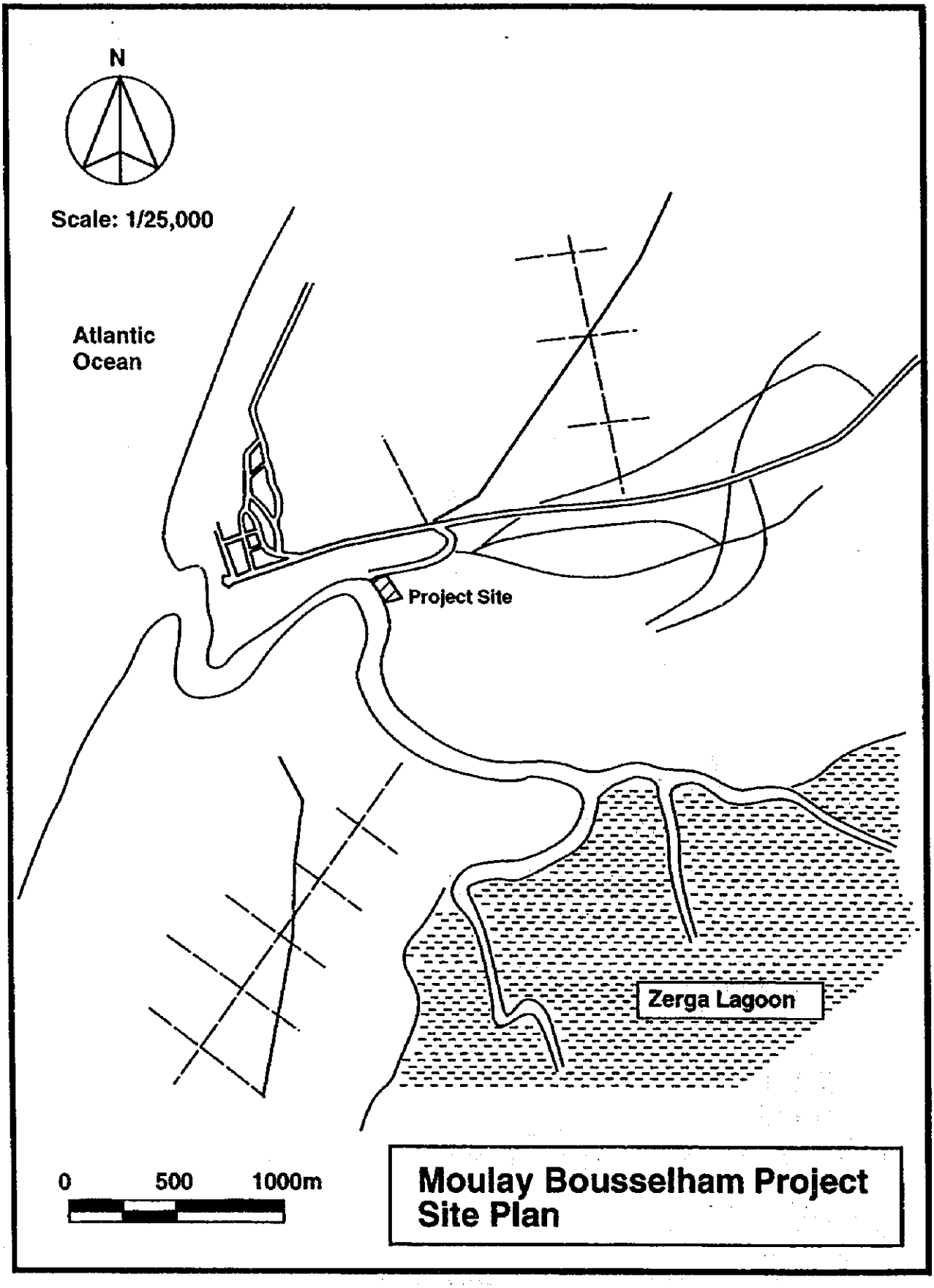
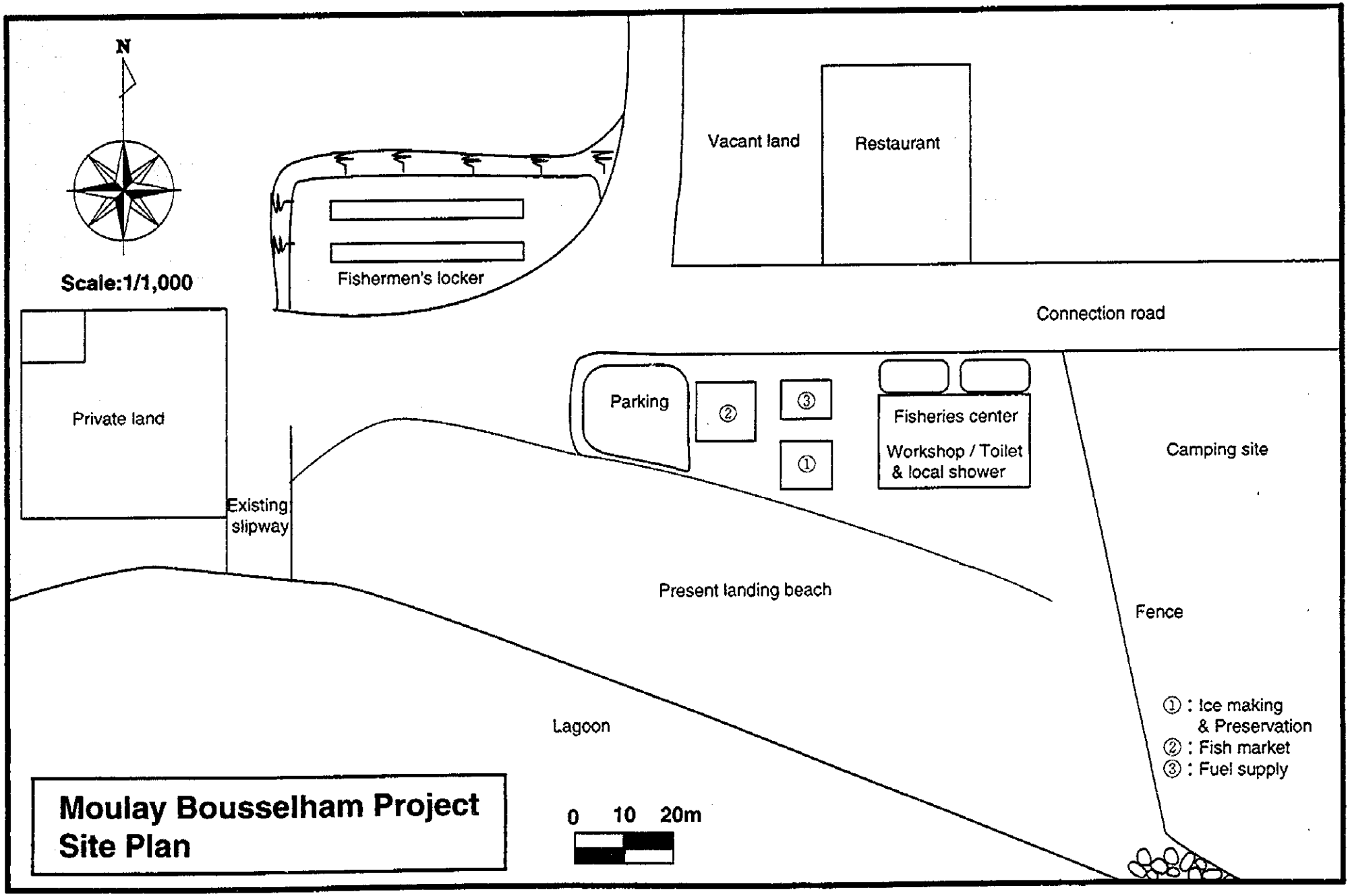


Fig. 5-3-F-3 Site plan


N
Scale:1/1,000
Fishermen's locker
Vacant land
Restaurant
Connection road
Private land
Parking
②
③
①
Fisheries center
Workshop / Toilet
& local shower
Camping site
Existing
slipway
Present landing beach
Fence
Lagoon
① : Ice making
& Preservation
② : Fish market
③ : Fuel supply
Moulay Bousselham Project
Site Plan
0 10 20m

Moulay Busselham

Scope of facilities		Name of facilities	Scale of facilities	Note
Port facilities	Outer facilities			
	Mooring facilities			
	Water facilities	Navigation aids	Navigation light : 1set	
Port service facilities	Fish preservation facilities	Auction hall	Building area 130m2	Operated by ONP
		Ice making & preservation	Building area 50m2	
		Ice making machine	1ton/day、Ice storage 3ton	Flake ice
	Boat & gear maintenance	Chilled room	1ton、10m2	Fish
	facilities	Workshop	Building area 30m2	Engine
	Supply facilities	Fishermen's locker	Building area 175m2	35 sets
	Fishermen's welfare	Fuel supply	12kl Fuel tank	Gasoline, Operated by private
	facilities	Toilet & local shower	Building area 30m2	Use of incinerator heat
	Management facilities			
	Treatment facilities	Fisheries center	Building area 500m2	
		Drainage treatment	Harbor area	Septic tank & subsurface
		Incinerator		infiltration
Fishemens village social infra-structure	Road	Fishermen's village	Self reliance	
	Water supply	Branch water distribution	Self reliance	Possible from RAK line
	Electricity supply	Main & branch line	Self reliance	Possible from ONE line
	Drainage & garbage	Drain gutter, sewer	Self reliance	Support with NGO
	treatment			
	Fishermen's house	Fishermen's housing site	No need	
	Public facilities	Community center	No need	
		Elementary school	Within walking distance	
Equipment	Fish handling equipment	Fish box, balance, cart, etc.		
	Workshop tools			

Table 5-3-F-2 Financial Analysis - Cost (i)

Financial Analysis
Capital Expenditure (CAPEX)

Area	Facility	Scale	Unit	Unit price (DH)	Price (DH)	Remarks
Port service					20,883,333	
facilities	Fish market	130	m2	5,833	758,333	
	Ice & preservation	50	m2	5,833	291,667	
	Fisheries center	500	m2	5,833	2,916,667	
	Workshop	30	m2	4,167	125,000	
	Warehouse	30	m2	4,167	125,000	
	Fishermen's locker	175	m2	50000	8,750,000	
	Drainage treatment	1	set	833,333	833,333	
	Ice making plant	1	set	1,666,667	1,666,667	
	Chilled room	1	set	833,333	833,333	
	Connecti'n&insite road	1,000	m	3,333	3,333,333	
	External work	1	set	1,250,000	1,250,000	
Equipment					666,667	
	Fish handling	1	set	416,667	416,667	
	Workshop	1	set	250,000	250,000	
Consulting fee		1	set	1,082,333	1,082,333	
Total					22,632,333	

Table 5-3-F-2 Financial Analysis - Cost (ii)

Operation Expenditure (OPEX) 478,480 DH/Year

Personnel Cost

Area	Title	Unit Price(DH)	No. of person	Cost (Month)
Administration	Manager	2,500	1	2,500
	Accountant	2,500	1	2,500
	Secretary	1,300	1	1,300
Ice machine	Engineer	2,700	1	2,700
	General worker	1,200	1	1,200
Workshop	Engineer	2,000	1	2,000
	Carpenter	1,400	1	1,400
Hamam	Worker	1,200	1	1,200
Fuel Station	Worker	1,200	1	1,200
Others	Security men	1,200	2	2,400
Fish market	Manager	2,500	1	2,500
	General worker	1,200	1	1,200
Total (month)				22,100
Total (year)				265,200

Cost of utility

Item	Use	Consumption	Unit price	Price (DH)	Remarks
Electricity	Ice machine	18	291	5,093	base charge (year)
		10,080	0.99	10,025	monthly use
	Refrigerator	216	1.27	274	monthly price
	Lights and others	768	1.30	998	monthly price
Total (year)				140,669	
Item	Use	Consumption	Unit price	Price (DH)	Remarks
Water	Fish market	100	5.83	583	monthly price
	Ice machine	90	5.83	525	monthly price
	Others	40	5.83	233	monthly price
Total (year)				16,091	

Maintenance and Operation Cost

facility	Cost (month)	Remarks
Workshop	500	
Hamam	1,710	fuel cost
Ice machine	500	
Building	500	
Other expenses	1,500	vehicles etc.
Total	4,710	
Cost (year)	56,520	

break down		
	daily consumpt'n	15
	unit price	3.8
	no. of days	30

Table 5-3-F-3 Financial Analysis - Benefit

Income (Benefit)

1,328,986 DH/Year	
in the First year	120,000 DH added

Fish landing commission

	Landing value(year)	Rate	Commission	Remarks
Fishery Coop.	16,191,630	1%	161,916	DH/year
ONP	16,191,630	5%	809,582	DH/year
Total			971,498	

Commission for fuel sales (L: litre)

No. of boats	Unit fuel use (L)	Unit charge/L	Commission	Remarks
8,686	40	0.2	69,488	DH/year

Ice sales

Daily production	Unit price (DH/ton)	No. of days	monthly sale	No. of month	Remarks
2	300	30	18,000	6	high season : April to September
		20	12,000	6	low season : October to March
Ice sales (year)				180,000	DH

Rental

Facility	Unit price (DH/pc.)	Amount	Total
Workshop	3,000	1	3,000
Fishermen locker	50	60	3,000
G-total			6,000
Rental (year)			72,000

Other income

Facility	Income (month)	Amount	Total
Hamam	3,000	1	3,000
G-total			3,000
Income (year)			36,000

Membership fee

Unit price (DH)	No. of member	Fee	Remarks
500	240	120,000	First year only

Table 5-3-F-4 Calculation sheet of FIRR

Financial Internal Rate of Return (FIRR)

Year	Cost	Benefit	Net Cash Flow	Discount Rate 1%	Net Present Value	Discount Rate 2%	Net Present Value
1	22,632,333	0	-22,632,333	0.990	-22,408,251	0.980	-22,188,562
2	478,480	1,448,986	970,506	0.980	951,383	0.961	932,820
3	478,480	1,328,986	850,506	0.971	825,492	0.942	801,450
4	478,480	1,328,986	850,506	0.961	817,319	0.924	785,736
5	478,480	1,328,986	850,506	0.951	809,227	0.906	770,329
6	478,480	1,328,986	850,506	0.942	801,215	0.888	755,225
7	478,480	1,328,986	850,506	0.933	793,282	0.871	740,416
8	478,480	1,328,986	850,506	0.923	785,428	0.853	725,898
9	478,480	1,328,986	850,506	0.914	777,651	0.837	711,665
10	478,480	1,328,986	850,506	0.905	769,952	0.820	697,711
11	478,480	1,328,986	850,506	0.896	762,328	0.804	684,030
12	478,480	1,328,986	850,506	0.887	754,781	0.788	670,618
13	478,480	1,328,986	850,506	0.879	747,307	0.773	657,468
14	478,480	1,328,986	850,506	0.870	739,908	0.758	644,577
15	478,480	1,328,986	850,506	0.861	732,583	0.743	631,938
16	478,480	1,328,986	850,506	0.853	725,329	0.728	619,547
17	478,480	1,328,986	850,506	0.844	718,148	0.714	607,399
18	478,480	1,328,986	850,506	0.836	711,037	0.700	595,489
19	478,480	1,328,986	850,506	0.828	703,997	0.686	583,813
20	478,480	1,328,986	850,506	0.820	697,027	0.673	572,366
21	478,480	1,328,986	850,506	0.811	690,126	0.660	561,143
22	478,480	1,328,986	850,506	0.803	683,293	0.647	550,140
23	478,480	1,328,986	850,506	0.795	676,528	0.634	539,353
24	478,480	1,328,986	850,506	0.788	669,829	0.622	528,778
25	478,480	1,328,986	850,506	0.780	663,197	0.610	518,409
26	478,480	1,328,986	850,506	0.772	656,631	0.598	508,245
27	478,480	1,328,986	850,506	0.764	650,130	0.586	498,279
28	478,480	1,328,986	850,506	0.757	643,693	0.574	488,509
29	478,480	1,328,986	850,506	0.749	637,320	0.563	478,930
30	478,480	1,328,986	850,506	0.742	631,010	0.552	469,539
					-1,183,101		-3,858,741

FIRR	0.56 %

Impossible to calculate

Table 5-3-F-6 Economic Analysis - Cost (i)

Economic Analysis
Capital Expenditure (CAPEX)

Area	Facility	Scale	Unit	Unit price (DH)	Market price	Convers'n factor	Shadow price
Port service					20,883,333		19,419,500
facilities	Fish market	130	m2	5,833	758,333	0.89	674,917
	Ice & preservation	50	m2	5,833	291,667	0.89	259,583
	Fisheries center	500	m2	5,833	2,916,667	0.89	2,595,833
	Workshop	30	m2	4,167	125,000	0.89	111,250
	Warehouse	30	m2	4,167	125,000	0.89	111,250
	Fishermen's locker	175	m2	50000	8,750,000	0.89	7,787,500
	Drainage treatment	1	set	833,333	833,333	1.14	950,000
	Ice making plant	1	set	1,666,667	1,666,667	1.14	1,900,000
	Chilled room	1	set	833,333	833,333	1.14	950,000
	Connecti'n&insite road	1,000	m	3,333	3,333,333	0.89	2,966,667
	External work	1	set	1,250,000	1,250,000	0.89	1,112,500
Equipment					666,667		760,000
	Fish handling	1	set	416,667	416,667	1.14	475,000
	Workshop	1	set	250,000	250,000	1.14	285,000
Consulting fee		1	set	1,082,333	1,082,333	1.00	1,082,333
Total					22,632,333		21,261,833

Table 5-3-F-6 Economic Analysis - Cost (ii)

Operation Expenditure (OPEX) 422,871 DH/Year

Personnel Cost

Area	Title	Unit Price(DH)	No. of person	Cost (Month)	Convers'n factor	Shadow wage
Administration	Manager	2,500	1	2,500	1.0	2,500
	Accountant	2,500	1	2,500	1.0	2,500
	Secretary	1,300	1	1,300	1.0	1,300
Ice machine	Engineer	2,700	1	2,700	1.0	2,700
	General worker	1,200	1	1,200	0.5	600
Workshop	Engineer	2,000	1	2,000	1.0	2,000
	Carpenter	1,400	1	1,400	1.0	1,400
Hamam	Worker	1,200	1	1,200	1.0	1,200
Fuel Station	Worker	1,200	1	1,200	0.5	600
Others	Security men	1,200	2	2,400	0.5	1,200
Fish market	Manager	2,500	1	2,500	1.0	2,500
	General worker	1,200	1	1,200	0.5	600
Total (month)				22,100		19,100
Total (year)				265,200		229,200

Cost of utility

Item	Use	Consumption	Unit price	Price (DH)	Transfer item	Shadow price	Remarks
Electricity	Ice machine	18	291	5,093	356	4,736	base charge (year)
		10,080	0.99	10,025	702	9,324	monthly use
	Refrigerator	216	1.27	274	19	255	monthly price
	Lights and others	768	1.30	998	70	929	monthly price
Total (year)				140,669		130,823	
Item	Use	Consumption	Unit price	Price (DH)	Transfer item	Shadow price	Remarks
Water	Fish market	100	5.83	583	41	542	monthly price
	Ice machine	90	5.83	525	37	488	monthly price
	Others	40	5.83	233	16	217	monthly price
Total (year)				16,091		14,964	

Maintenance and Operation Cost

facility	Cost (month)	Remarks	Transfer item	Shadow price
Workshop	500		100	400
Hamam	1,710	fuel cost	120	1,590
Ice machine	500		100	400
Building	500		100	400
Other expenses	1,500	vehicles etc.	300	1,200
Total	4,710			3,990
Cost (year)	56,520			47,884

break down

daily consumpt'n	15
unit price	3.8
no. of days	30

Transfer item means the VAT (Value Added Tax). Their tax rate are

fuel, light	7 %
other commodities	20 %

Table 5-3-F-7 Economic Analysis - Benefit

Benefit: 2,069,433 DH

	without Project		with Project		Surplus production	Surplus value	Consumer's surplus Shadow price
	Landed quantity	Landing value	Landed quantity	Landing value			
Total Landing	490,020	14,700,600	514,020	16,191,630	24,000	1,491,030	
To export						596,412	815,892
To domestic						894,618	1,073,542

Increase of landing	Increase of export	Increase of domestic supply
1,889,433	815,892	1,073,542

Rate of increase of landed quantity	4.9	%
Rate of increase of fish price	5	%
Percentage of export oriented	40	%
Percentage of domestic oriented	60	%
Domestic marketing factor	1.20	
Shadow exchange rate	1.14	

Note 1:
With the construction of fish market, more competitive price will be realized through the auction among meddle men.
With the construction of refrigerator, quality down caused by the absence of refrigerator, will be controlled.
As a result, fish price is expected to increase as left
(based on the interview survey at site)

Note 2:
Product is exported from Port of Tanger
Product is consumed at the market of Tanger

Ice sales

Daily production	Unit price (DH/ton)	No. of days	monthly sale	No. of month	Remarks
2	300	30	18,000	6	high season : April to September
		20	12,000	6	low season : October to March
Ice sales (year)				180,000	DH

Table 5-3-F-8 Calculation sheet of EIRR .

Economic Internal Rate of Return

Year	Cost	Benefit	Net Cash Flow	Discount Rate 6%	Net Present Value	Discount Rate 7%	Net Present Value
1	21,261,833	0	-21,261,833	0.943	-20,058,333	0.935	-19,870,872
2	422,871	2,069,433	1,646,563	0.890	1,465,435	0.873	1,438,172
3	422,871	2,069,433	1,646,563	0.840	1,382,486	0.816	1,344,086
4	422,871	2,069,433	1,646,563	0.792	1,304,232	0.763	1,256,155
5	422,871	2,069,433	1,646,563	0.747	1,230,407	0.713	1,173,976
6	422,871	2,069,433	1,646,563	0.705	1,160,762	0.666	1,097,174
7	422,871	2,069,433	1,646,563	0.665	1,095,058	0.623	1,025,396
8	422,871	2,069,433	1,646,563	0.627	1,033,074	0.582	958,314
9	422,871	2,069,433	1,646,563	0.592	974,598	0.544	895,621
10	422,871	2,069,433	1,646,563	0.558	919,432	0.508	837,029
11	422,871	2,069,433	1,646,563	0.527	867,389	0.475	782,270
12	422,871	2,069,433	1,646,563	0.497	818,291	0.444	731,093
13	422,871	2,069,433	1,646,563	0.469	771,973	0.415	683,265
14	422,871	2,069,433	1,646,563	0.442	728,276	0.388	638,565
15	422,871	2,069,433	1,646,563	0.417	687,053	0.362	596,790
16	422,871	2,069,433	1,646,563	0.394	648,163	0.339	557,748
17	422,871	2,069,433	1,646,563	0.371	611,475	0.317	521,260
18	422,871	2,069,433	1,646,563	0.350	576,863	0.296	487,158
19	422,871	2,069,433	1,646,563	0.331	544,210	0.277	455,288
20	422,871	2,069,433	1,646,563	0.312	513,406	0.258	425,503
21	422,871	2,069,433	1,646,563	0.294	484,345	0.242	397,666
22	422,871	2,069,433	1,646,563	0.278	456,930	0.226	371,651
23	422,871	2,069,433	1,646,563	0.262	431,066	0.211	347,337
24	422,871	2,069,433	1,646,563	0.247	406,666	0.197	324,614
25	422,871	2,069,433	1,646,563	0.233	383,647	0.184	303,378
26	422,871	2,069,433	1,646,563	0.220	361,931	0.172	283,531
27	422,871	2,069,433	1,646,563	0.207	341,444	0.161	264,982
28	422,871	2,069,433	1,646,563	0.196	322,117	0.150	247,647
29	422,871	2,069,433	1,646,563	0.185	303,884	0.141	231,445
30	422,871	2,069,433	1,646,563	0.174	286,683	0.131	216,304
					1,052,962		-977,453

EIRR	6.52 %

APPENDIX

Consideration about the use of PCM method (Participatory Planning[1]) in this study

1. The use of PCM method in this study

In this study, PCM was applied as a main research method for the formulation of effective project reflecting needs of residents. The method was applied for its first time in Development Studies in the field of fisheries industry. First, we applied the method in the first Project Site Research experimentally. More concretely speaking, We conducted workshops for 2 days in each sample village on Mediterranean Sea and the Atlantic Ocean (Suira Kedima, Oued Rmel), also did participation analysis and problems analysis. Through this process, we confirmed the effectiveness of the method in this study as well. At the same time, we extracted important subjects in the development of small-scale fishing villages preliminary to the future formulation of the master plan. Secondly, we applied PCM method in the 3rd Project Site Research for the purpose of conducting Feasibility Study (= formulating rather concrete development plans). As stated in 5-1 in the main report, we conducted workshops for one or two days in each of the six model villages, and did analysis useful for the formulation of development plan in each village (up to "Problems analysis" or "Objectives analysis"). Also in the three villages (Suira Kedima, Sidi Hsaine, Tafedna), PDM was formulated mostly by Japanese experts and Moroccan C/P.

2. Effectiveness of PCM method

The use of PCM method was effective from the following three aspects.

1) Effective collecting of information about present situations of small-scale fishery industry

The subject of small-scale fishery had been excluded from development projects in Morocco until recent years. Accordingly, information regarding fishing activities had not also been collected systematically. Thus, the information obtained directly from the fishermen through this study was useful. It is true that such information could be obtained by ordinary interviewing, but information obtained through workshop was better in accuracy because wrong information by a part of participants could be examined right away at the workshop. Workshop was useful not only in terms of quality, but also of quantity of the information. (From this respect, it was unfortunate that the number of female participants were very small in the whole workshops).

2) Raising awareness among beneficiaries as participants in the project

For unionization of fishermen as well as maintenance and management of fishing infrastructure, it is significant that the fishermen, the beneficiaries, consider themselves as important actors in the development project so that the effectiveness of the project will be maintained for long time. Normally, development studies are focused on hearings from fishermen. As a result, the hearings can be just one-way process in search of their requests. In PCM workshops, however, the attitude of fishermen in the development was strongly discussed in such phases as Participation Analysis and Objectives Analysis. Such discussion seems to have had a good effect to raise their awareness as major actors in the project.

[1] Participatory Planning is a component of PCM.

3) Logical formulation of project and enhancing C/P and local administrators' ability in such respect.

In PCM, the formulation of project could be undertaken logically because actual problems were analyzed in light of "cause and effect" relationship. Means for the solution to the problems could be examined based on such analyses. The method was also effective to induce practical conclusion based on active discussions between fishermen and experts in workshops and at the stage of site visit. The series of workshops also provided the participants, especially C/P from the Ministry of Fishery and ONP, with OJT to conduct workshops and consequently, they reached to the level to be able to formulate PDM by themselves in the future.

3. Recommendations about the use of PCM method in JICA's Development Studies

PCM method was applied for its first time in Development Studies in the field of fishery industry. Recommendations about the use of the method are stated based on our experience in this study.

1) More systematic use of PCM method through the entire process of Development Studies

In this study, PCM method was applied in the 3rd Project Site Research for the purpose of conducting Feasibility Study (= formulating rather concrete development plans) after we used the method in the first Project Site Research experimentally and confirmed its effectiveness. From the point of view that research should be conducted from general aspect to specific aspect or from framework to details, however, the use of the PCM method seems to be rather inclined to the latter half of the entire schedule. The PCM method will be useful not only in concrete project planning for each project site but also in the discussion of big picture such as the entire sector of artisanal fishery in Morocco.

This kind of discussion of the big picture was also undertaken in this study, but the timing was rather late and the quality also has some room for improvement. In the coming Development Studies the opportunity of such discussion should be set up relatively early, a half year after the beginning of the study for example, because it is about this time when the related parties feel their knowledge about the subject is enough. Analysis of the problems and the consequent formulation of the master plan should be conducted by using one week at least. Senior government officials should also participate in such discussion in addition to the relatively young project C/P.

2) Local administration's more positive participation in to the discussion of FS

The way to conduct PCM workshop at the time of FS can be similar to what was undertaken this time basically (see the records of PCM workshop). It is observed, however, that local administrators, regional office of the MPM for example, participate rather as observers of the intensive discussion while fishermen participated actively in the discussion. Consequently local administration's opinion was not too strongly reflected in this study. Of course, it is important to respect the fishermen's opinion but it is local administration that takes the initiative of the advancement of the plan in the future. Accordingly local administration's more direct and positive participation is highly recommended.

3) Building closer liaison between managerial studies and material studies

This study covered both managerial research such as fishing operation and local society and material research such as building fishing facilities. In this study, the PCM method, especially PCM workshop, was more utilized in the managerial research rather than in the material research. (However, that was principally because the team member who was in charge of material research could hardly participate in the workshops due to his/her tight schedule as well as heaviness of responsibility in his/her work).

It is true that PCM workshop does not necessarily suit to highly technical research. Nevertheless, it is highly recommended that members in charge of material research will be more involved in the workshops. Concretely speaking, the whole research schedule should be arranged in such a way that enables them to participate in the analytical workshops at least one day in each site, in addition to their full-day participation in PDM workshop.

4) More participation of women in workshop

For the purpose of making development project truly effective to the whole beneficiaries, it is significant to include more opinions from women at the formulation of the project. Normally, it is difficult for the women to speak their opinions in front of men. Therefore, it is important to make a special arrangement to conduct workshop for women.

Followings are the major fruits of our attempt to improve PCM method through this study.

1) Combination of PCM method with RRA (Rapid Rural Appraisal): The use of RRA at the stage of mapping analysis was useful for Japanese experts to understand whole situations in rather short time. Accordingly, the main discussions were proceeded smoothly.

2) Weighting of problems in the process of analysis ("Problem Analysis" and "Objectives Analysis"): In the past studies applying PCM method, weighting of problems was undertaken not at the stage of analysis but at the final stage, i.e., Alternative Analysis. As a result, some discussions could be undertaken for vein. However in this study, we did weighting of problems at the stage of formulating Problem Tree. Consequently, important issues were well emphasized from early stages of the analysis.

3) Application of quantitative information in the process of analyses: Conventional PCM workshop had an inclination to qualitative analysis so that the results could be sometimes not accurate. In this study, we considered quantitative data as much as possible at the phase of framing the Problem Tree. As a result, the effect of the analysis became more profound and objective

4) Defining responsible persons for future activities at the stage of Objectives Analysis: In the past, it was at the phase of PO (Plan of Operations) when the discussion was undertaken regarding the definition of persons in charge of future activities. In this study, however, such discussion was included at the stage of Objectives Analysis. As a result, participants in the workshops, i.e., the fishermen, could more understand that they are not just beneficiaries from the project but also play important roles in the project, though their part might be partial. The approaches of the project became clear from the early stage so that we think the formulation of PO in the future will be smoothly undertaken.

5) Use of visual materials in discussions: In this study, the participants in the workshops, i.e., the fishermen, were mostly illiterate. We used illustrations as much as possible at the formulation of Problem Tree and Objectives Tree. The use of visual works enabled the participants to follow discussions relatively easily.

PCM Workshop Records

1. Workshop held at MPM

(1)	Schedule	September 2, 3 and 5 (the first session) October 8 (the second session: review of the output of the first session based on site researches)	
(2)	Place	A conference room in MPM	
(3)	Participants*		
	(Japanese side)	Study Team members	6 persons (including a moderator[2])
		Expert	1 person
		Interpreter	1 person(only for the first session)
	(Moroccan side)	Staff of MPM	9 persons
		Staff of ONP	1 person
		Staff of INRH	1 person

* Figures are those of the first day and not the same for other days.

(4) Discussion style: The first session was held with interpretation between Japanese and French. The second session was held without interpretation and only in English. Cards were always written only in English.

(5) Procedure

September 2	(1) Lecture on PCM and workshop procedure (9:30-11:50) (2) Problem analysis (11:50-17:30, including 1 and half hour lunch break)
September 3	(1) Problem analysis(discussion of Core Problem) and Lecture on objective analysis (9:30-10:30) (2) Objective analysis (10:40-12:40) (3) Lecture on PDM (12:40-13:15)
September 5	Discussion of PDM by the use of draft prepared by the Study Team (15:30-16:30)
October 8	Discussion of PDM by the use of draft revised by the Study team (10:30-12:00)

(6) Remarks: At the time of the first site research (December, 1996) trial workshop was undertaken and this time the then output was utilized. More concretely speaking, in participation analysis, it was confirmed that artisanal fishermen were beneficiary by the use of chart made in last discussion and problem analysis was also undertaken by the use of problem tree made last time.

Because Moroccan participants were not very familiar with the situation of artisanal fishing villages at the time of the first session (September 2,3 and 5), second session was held on October 8th after the series of site researches.

[2] Mr. Sasao, a specialist of participatory planning worked as moderator in all the workshop sessions except for that in Moulay Busselham.

2. Workshop in Souira Kedima

(1)	Schedule	September 8, 9 and 10 (analytical stage) September 11 (planning stage)	
(2)	Place	Analytical stage : a conference room of the office of rural commune Planning stage : a conference room in a hotel	
(3)	Participants*		
	(Japanese side)	Study Team members	4 persons (including a moderator)
	(Moroccan side)	Fishermen	7 persons (most of them are boat owners)
		Staff of MPM (HQ)	1 person
		Staff of ONP	2 persons
		Staff of MPM (local office)	2 persons
		Staff of MTP (local office)	1 person

* Figures are those of the first day and not the same for other days. Workshop of September 11 was held by the Study Team and Moroccan C/P.

(4)	Discussion style	The discussion was held with interpretation between English and Arabic by the staff of MPM (HQ) and the staff of ONP. Cards were also written in both English and Arabic.
(5)	Procedure	
	September 8	(1) Mapping exercise (10:40-12:30) (2) Participation analysis (15:10-15:45) (3) Problem analysis (15:45-17-50)
	September 9	Problem analysis (15:30-18:45)
	September 10	(1) Objective analysis (15:15-18:30) (2) Questionnaire filling (18:30-19:00)
	September 11	Discussion and formulation of PDM (draft of local development plan) (18:00-19:30)
(6)	Remarks	Study Team members paid a visit of Safi local office (MPM) representative and reported on the mission of the Team, PCM method and workshop results and also requested him to fully utilize PDM in the future.

3. Workshop in Tafedna

(1)	Schedule	September 15 and 16 (analytical stage) September 19 (planning stage)	
(2)	Place	Analytical stage : a conference room of the cottage owned by a villager Planning stage : a conference room in a hotel	
(3)	Participants*		
	(Japanese side)	Study Team members	4 persons (including a moderator)
		Advisory Committee members	2 persons (as observers, only on September 15 and 16)
	(Moroccan side)	Residents (male)	9 persons (two of them are middle men, the representative of commune and Caidat are also included.)
		Staff of MPM (HQ)	2 persons
		Staff of ONP	1 person
		Staff of MPM (local office)	1 person
		Staff of INRH	1 person

* Figures are those of the first day and not the same for other days. Workshop of September 19 was held within the Study Team.

(4)	Discussion style	The discussion was held with interpretation between English and Arabic by the staff of MPM (HQ) and the staff of INRH. Cards were also written in both English and Arabic.
(5)	Procedure	
	September 15	Problem analysis (14:00-16:30, mapping exercise, participation analysis and lecture on PCM were conducted concurrently and completed in the morning)
	September 16	(1) Problem analysis (9:45-11:30) (2) Objective analysis (11:30-12:40, 14:10-17:00)
	September 18	Discussion and formulation of PDM (draft of local development plan) based on a draft prepared by the moderator (18:00-19:00)
(6)	Remarks	Study Team members paid a visit of Essaouira local office (MPM) representative and reported on the mission of the Team, PCM method and workshop results and also requested him to fully utilize PDM in the future.

4. Workshop in Tifnit

(1)	Schedule	September 22 and 23 (only analytical stage)	
(2)	Place	September 22 : an ad hoc meeting place set up near the beach September 23 : a conference room of Agadir local office of MPM (The place was changed because the first place was not suitable for the discussion.)	
(3)	Participants*		
	(Japanese side)	Study Team members	3 persons (including a moderator)
	(Moroccan side)	Fishermen (male)	13 persons (L'amine is included and most of fishermen are boat owners. There were 20 observer fishermen as well.)
		Staff of MPM (HQ)	2 persons
		Staff of ONP (HQ)	1 person
		Staff of MPM (Agadir office)	1 person (Vice representative)
		Staff of ONP (local office)	1 person
		Staff of INRH	1 person

* Figures are those of the first day and not the same for other days.

(4)	Discussion style	The discussion was held with interpretation between English and Arabic by the staff of MPM (HQ) and the staff of ONP. Cards were also written in both English and Arabic.
(5)	Procedure	
	September 22	(1) Lecture on PCM (11:00-12:00) (2) Problem analysis (14:15-17:00)
	September 23	(1) Problem analysis (9:45-11:30) (2) Objective analysis (11:00-12:15)

5. Workshop in Moulay Busselham

(1)	Schedule	September 25 (only analytical stage)	
(2)	Place	Cafe Kabab in Moulay Busselham	
(3)	Participants		
	(Japanese side)	Study Team member	1 person (a moderator)
	(Moroccan side)	Fishermen	22 persons (There were 12 female and 10 male villagers. Seven female participants were widows.)
		Staff of MPM (HQ)	3 persons
		Staff of ONP	1 person

(4)	Discussion style	The discussion was held with interpretation between English and Arabic by the staff of MPM (HQ) and the staff of ONP. Cards were also written in both English and Arabic.
(5)	Procedure	
	September 25	(1) Greetings and lecture on PCM (11:45-12:00) (2) Problem analysis (session for women, 12:00-13:00, 14:30-16:00) (3) Problem analysis (session for men, 16:00-17:00)

6. Workshop in Kaa Sras

(1)	Schedule	September 28 (only analytical stage)	
(2)	Place	A conference room in the office of rural commune	
(3)	Participants		
	(Japanese side)	Study Team member	5 persons (including a moderator)
	(Moroccan side)	Fishermen (male)	8 persons (including Llamine., most of them are boat owners.)
		Staff of MPM (HQ)	3 persons
		Staff of ONP (HQ)	1 person
		Caidat	1 person
		Vice Caidat	1 person
		Representative of commune	1 person
		Vice Representative	2 persons
		Others	3 persons (from the office of rural commune)
(4)	Discussion style	The discussion was held with interpretation between English and Arabic by the staff of MPM (HQ) and the staff of ONP. Cards were also written in both English and Arabic.	
(5)	Procedure		
	September 28	(1) Lecture on PCM (11:00-11:50, mapping exercise was concurrently undertaken.) (2) Problem analysis (11:50-14:00, 15:15-17:00)	

7. Workshop in Sidi Hsaine

(1)	Schedule	October 1 and 2 (analytical stage) October 3 (planning stage)	
(2)	Place	Analytical stage : a conference room of Nador office of MPM Planning stage : a restaurant in a hotel	
(3)	Participants*		
	(Japanese side)	Study Team members	5 persons (including a moderator)
	(Moroccan side)	Fishermen (male)	8 persons (all of them are boat owners.)
			Staff of MPM (HQ) 3 persons
			Staff of ONP 1 person
			Staff of MPM (local office) 1 person

* Figures are those of the first day and not the same for other days. Workshop of October 3 was held within the Study Team.

(4) Discussion style

The discussion was held with interpretation between English and Berber (through Arabic) by the staff of MPM (HQ and local office). Cards were written in both English and Arabic.

(5) Procedure

October 1

(1) greetings and lecture on PCM (11:30-12:30, mapping exercise and participation analysis were concurrently conducted and completed in the morning.)

October 2

(1) Review of the discussion of the first day (9:25-9:40)
(2) Objective analysis (9:40-12:40)

October 3

Discussion and formulation of PDM (draft of local development plan) based on the draft prepared by the moderator (19:00-20:00)

(6) Remarks

Study Team members paid a visit of Nador local office (MPM) vice representative and reported on the mission of the Team, PCM method and workshop results and also requested him to fully utilize PDM in the future.

Structure of PDM

Narrative Summary	Indicator	Means of Verification	Assumption (See Note 1. and 2 below)
Overall Goal : To state a longer term objective (for the point of time of 3~5 years after the end of a project) which the realized Project Purpose contributes to	To describe the content of the Overall Goal quantitatively and concretely in terms of time, object and area	To state the reliable source of information of the content of the left hand side indicator	To state external conditions in which the realized Overall Goal is maintained or with which the realized Overall Goal leads to an even higher goal entitled Super Goal
Project Purpose : To state a goal which should be realized at the end of project period	To describe the content of the Overall Goal quantitatively and concretely in terms of time, object and area	To state the reliable source of information of the content of the left hand side indicator	To state external conditions with which the realized Project Purpose leads to Overall Goal
Outputs : To state important specific objectives* necessary for the realization of the Project Purpose These objectives can be realized before the end of project period.	To describe the content of the Overall Goal quantitatively and concretely in terms of time, object and area	To state the reliable source of information of the content of the left hand side indicator	To state external conditions with which the realized Outputs lead to Project Purpose
Activities : To state daily activities which the Project team conducts and which correspond to the above Outputs	Inputs : To state necessary input for the project with the following items for both Japanese side and the beneficiary country side Japanese side : Dispatch of experts C/P training in Japan Provision of equipment Beneficiary country side : Assignment of C/P Allocation of budget		To state external conditions with which the undertaken activities lead to Outputs Pre-Condition : To state conditions necessary for the Project to start

Note 1. Assumptions shown at a level of PDM are assumed to be applied at a higher level and therefore are not necessary to be repeated.

Note 2. Assumptions are conditions those which cannot be controlled by the project, are important and highly probable.