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**THE DECOMMISSIONING SCHEME FOR THE ITALIAN CLAM FISHERY: A
CASE OF SUCCESS**

Preliminary draft

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The management of clams in Italy has undergone three different phases. A centralised fishery was first started, then a co-management strategy followed, and, finally a self-management approach was introduced.

To allow for the different strategies, and a sustainable ratio between fishing effort and stock, two buy back programs were introduced within two different “Clam Programs”. Result shows the stock has fully recovered after years of decline, the resource rent and profits have greatly increased. The whole clam fishery is now living on its own and fishermen are in a much better position concerning the control of the clam market.

Weaknesses exist and depend on the uncertainties linked with periodical environmental damages. In order to reduce the risk of losing their production, fishermen can only heavily exploit clam beds, thus breaking the responsible and sustainable strategies so far introduced.

Key words: clam, management, buy back

Description of the area and the fleet which are the focus of the case study

In Italy, the fishing of bivalve molluscs performed by means of hydraulic dredges is a relatively recent activity. Introduced in the first years of the 70s, this type of fishing activity

Map. 1 – Geographical distribution of hydraulic dredges, 2002



is mainly concentrated along the Adriatic coast of the country. Its target resource is the autochthonous *Chamelea gallina* (i.e., the clam).

The study area covers 764 km of the coastline along the Adriatic Sea; it has been divided into 11 ports of registration (maritime districts) for administrative purposes.

A significant number of elements characterise the environment of the Central and North Adriatic. In particular,

besides identifying its uniqueness, these elements interact to determine the biological richness and the availability of fishery resources. The shallowness of water, the considerable quantity of nutrients which these areas receive mainly from the run-off of freshwater from the rivers, together with the distinctive processes of sedimentation, accumulation and decomposition of the organic silt on the seabed are essential factors for the development of its extremely rich and diverse trophic chain.

The Adriatic is characterised by a moderate slope and soft sea bottom that covers a large area which slopes away from the coast and is mostly sandy, muddy and alluvial. Therefore, this sea has been particularly suitable for trawl fishery, both bottom and beam trawling for

demersal species, mid-water pair trawl for small pelagic fish and dredgers for clams. Hence, from the coastal fishing valleys to the open sea, the fishing activities that require such environment flourish.

Rigorous restrictions regulate this type of fishing activity, which is aimed at harvesting a resource (the clam) that, when fully grown, becomes quite motionless. In order to harvest clams, hydraulic dredges drag up clams from the seabed and remove the sand by means of high-pressure water jets. Thus, since these types of passive gears make use of blades, these erode a few centimetres of sediment. Afterwards, both the sediment and the clams are dredged up in a parallelepiped metallic cage in which the sediment and the clams are separated by means of metal grids. High-pressure water jets remove the sediment from the cage. Hence, being bigger than the meshes of the metallic grid, the clams remain inside the cage and can be collected when the dredge is hauled aboard.

From a technical and dimensional perspective, hydraulic dredges are homogeneous vessels (average tonnage: 10 tons; average engine power: 107 kW). In 2002, the number of operators taken aboard was estimated at 1500 units, which, on average, corresponds to a crew of two units per vessel. In economic terms, the segment of hydraulic dredges accounts for 4,7% of the saleable gross production of the Italian sector as a whole. The overall production represents 5% of the entire production of the fishery fleet.

Description of the buy-back program

The clam management experience in Italy can be broken down into three phases.

The first period, which went from the early '70s to the beginning of the '90s, was characterised by a massive increase in the fishing effort owing to the growth of the number of vessels. Landings, profits and stock exploitation also increased. Consequently, in a few years, the resource became overexploited. New measures were immediately established at the

central level once the management authority identified the problem. Input and output measures were introduced and a specific licensing scheme was started.

These measures imposed restriction on:

- fishing time (hours), vessel size, daily landings, minimum size, fishing areas, landing sites; and
- licence transferability was formally forbidden.

In 1992, a committee for the management of clams was established. The committee's task was to submit proposals directed to improve fishery management.

Fishermen's income increased steadily, both during the period in which landings were high and also when landings decreased as a result of the reduced stock. Income increased in the latter case as a consequence of increasing demand pressure which pushed the prices up when landings started to decrease. Obviously, prices fell when landings were high. However, quantities compensated for this imbalance until the end of the period. It is of some interest to underline that, though quite stringent, all the restrictions imposed proved to be rather useless. Undoubtedly, this was due to the dimension of profits, which were so high that it was worth the risking a fine.

Over the period in consideration, both the licence rent and the pressure to issue new licences were high. A debate related to the need for reducing the licence rent by issuing new licences was solved in 93/94 by granting fewer new licences and by introducing new restrictions on the activity. Undoubtedly, this resulted in a higher pressure on the stock, without any real benefit for the fishery itself, given that the demand for both fresh and processed products was particularly strong.

In those years, fishing capacity increased dramatically and dredges went from 384 of 1974 to over 800 in 1994. Owing to the high pressure exerted on the stock, landings reached 38.000 tons in 1993, while in 1984 they exceeded 100.000 tons.

At the end of this period, prices started to be less profitable, as quality suffered and clam size failed to meet the required dimension (25mm). Compared with the usual price, which previously ranged between 0,5/0,8 €/Kg, the average price then reached was 0,25 €/Kg. Towards the end of the '90s, the failure of the strategy which had been adopted by the central management was evident. The management authority was considered responsible for the failure and fishermen asked for financial support and new rules. Since then a new approach was initiated.

As matter of fact, it clearly appeared that the central management approach had not worked and fishing capacity was still too high. It was deemed necessary to immediately reduce fishing mortality to enable the stock to recover and, subsequently, to establish a sustainable balance between the resource and the fishing effort. One of the most noticeable achievements which came from the central authority, was the progressive shift of the management of resources to the industry.

Over the period under discussion, a co-management approach was started and, in 1996, the central authority launched the first “Clam Program” whose elements were:

- introduction of a voluntarily buy back scheme, with a minimum number of vessels to be withdrawn in each fishing area;
- institution of “Clam Fishery Consortia” in each area, where at least 80% of all vessel owners operating within the fishing area had to register. The powers and activities of the Consortia were defined by law. In particular, they were entitled to decide, among themselves, about control and surveillance procedures, rotation of fishing areas, restocking areas, temporary closures and any other restrictions on the limitations which were still decided by the central authority; and
- introduction of subsidies for clam restocking and other related activities.

The shift of power from the Ministry to the Consortia was rather substantial, even if the basic management measures were still centrally determined, with the exception of those cases in which the Consortia had established more restrictive limits.

As for the buy back measure, the program required a scientific assessment of the clam stock in each fishing area. Furthermore, it emerged from the results of the study, that it would be necessary to reduce the number of vessels to boost the sustainability of the resource.

In its first round, the program required the permanent withdrawal of 36 dredges which were chosen by granting priority to those areas where the pressure on the resource was higher. Each withdrawn vessel was granted € 130.000 as a lump sum payment, while each crewmember quitting the dredge activity, received € 6.500. The withdrawal amount was calculated on the basis of the market value of the licence. Where the vessel owner wished to continue fishing using a different passive gear, he was granted the permission to maintain the vessel with a 40% reduction on the premium.

It could be of some interest to indicate that, in the first period, the financial resources were mostly spent on launching the Consortia as well as on the implementation of restocking and related activities. Out of 27 million euro, only 5 million were used for the permanent withdrawal of dredges (Tab.1).

For the first time, the results showed that vessel owners were willing to take an active part in the implementation of the program. Furthermore, the consortia were established and the related activities took place as planned. In some circumstances, the consortia resolved to use their power to introduce even tougher restrictions on their fishing activities. These concerned, for example, the reduction of time spent at sea, restrictions on the catch quantities allowed and the like.

The vessel owners' response provided the possibility to design a second program, with a twofold aim:

- to increase the number of vessels to be withdrawn, according to the state of stocks within different areas; and
- to increase the level of responsibility granted to the Consortia.

The second “Clam Program” was introduced only two years later, in 1998, and, given the good results previously recorded, it was accepted by the members of the Consortia.

Within the second program, 109 dredges were withdrawn, but not all areas were affected by the measure. They were still implemented on the basis of the stock assessment results. In some areas (Marche and Emilia Romagna), where the management had already produced good results, there was no need for any further reduction of the fleet. In others, where the Consortia had not succeeded in recovering the stock, the withdrawal was more significant. It is important to underline that, with the second plan, the funds allocation showed a reversal in the trend. In fact, only 5 million euro was granted to restocking and related activities, while 21 million euro was allocated to the withdrawing of dredges. The second plan, which provided for a temporary withdrawal measure, was also introduced. The financial resources that were used amounted to 10 million euro.

Other important management measures were adopted with the second plan. The most important step concerning the rules to be imposed on the activity involved the complete transfer of responsibility from the Ministry to the Consortia. The National Management Committee was dismissed and Local Management Co-ordination Committees were established. The powers granted to these committees were provided for by a central Regulation, which entitled them to determine maximum landings, area rotation, allowed gears, periods, landing sites, restocking areas, and the like.

Basically, they were granted all the powers previously held by the Ministry, which were added to those already in their control.

Furthermore, an “inter-consortia” Committee was established at national level. Its aim was to improve the co-ordination of the catch and of the commercial flows among its members. As shown below, this permitted an increase in prices, while reducing the level of exploitation.

No other clam licences shall be issued prior to January 1st 2009, a date on which reconsideration on the whole experience is foreseen.

In fact, with the second plan, the co-management experience was finally replaced by a complete self-management approach. It is still too early to draw final conclusions on this experience, however, except in case of an extraordinary environmental catastrophe, the sector is now having excellent results. In fact, as demonstrated below, the activity proves to be still highly profitable for those who have held the licence from the very beginning, while newcomers’ income remains at a “standard” level.

In addition to the existing allowances provided for by the Regulations governing the fishing activities as a whole, both the 1st and the 2nd Clam Plans have introduced the following set of subsidies for the segment of dredges (tab. 1):

- subsidies in support of income: allowances for permanent and temporary withdrawals, compensations for environmental and ecological damages; and
- subsidies for general services: start up allowances to be granted to new Management Consortia and an additional allowance to cover the expenses borne by scientific and economic research Institutes for providing technical assistance and formulating Consortia plans.

Table 1 –Financial resources for the implementation of Clam Programs

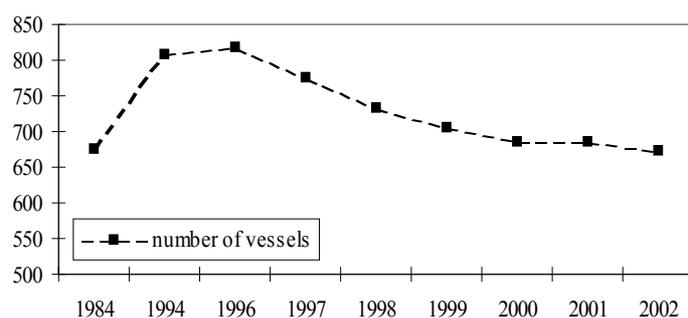
	I Clam Program	II Clam Program	Total
	Million euro		
Permanent withdrawal	5	21	26
Restocking and other related activities	22	5	27
Temporary withdrawal (Years '97 e '98)	-	10	10
Total	27	36	63

Source: MiPAF, Direzione Generale Pesca e Acquacoltura

Potential or actual impact of buy-back schemes on fishing capacity and rents

In 1996, the number of hydraulic dredges operating in the Adriatic Sea peaked reaching a total of 818 units. However, with the introduction of the two Clams Plans, the fleet underwent a slow but constant reshaping. The number of units decreased until they fell to 673 units in 2002. In percentage terms, the impact of the withdrawal program, which accounted for 22% of the segment capacity as a whole, is to be considered significant.

Fig.1 – Trend in the fishing capacity of hydraulic dredges within the Adriatic Sea (1984-2002)



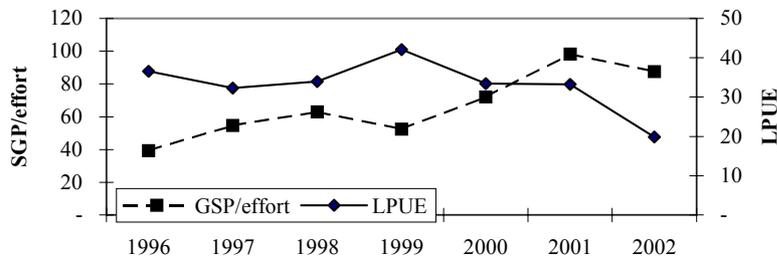
Source: Italian Vessel Register

The first Clam plan did not fully succeed in stabilising incomes and supply. The buy back program only allowed a small reduction of the fleet and fishermen were not yet fully aware of the new approach.

Landings first slowed down, while prices and gross salable production followed accordingly (Fig.3). In this period, consortia were further reducing effort by introducing more stringent restriction on their activity and prices showed a constant increase, so did GSP and profits. At the same time,

other positive changes were registered, such as the improvement of the quality and sanitation of landings which had a positive impact on the value of landings.

Fig. 2 – Trend of LPUE and saleable gross production for hydraulic dredges (1994-2002)

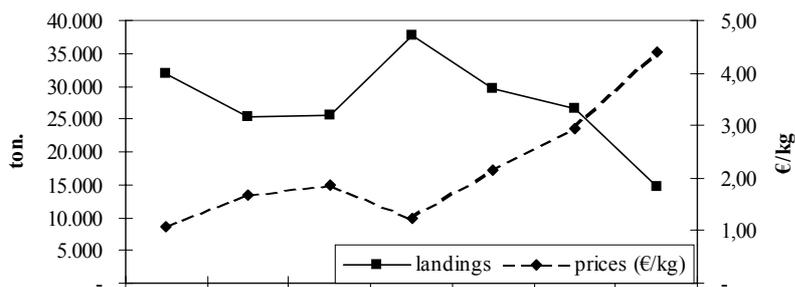


Source: Irepa

Between 1996 and 1998, the production decreased from 27 thousands to 24 thousands tons. In the last months of 1997 and in the first months of 1998, the seaweed and mucilage phenomenon

caused a widespread death of clams. This phenomenon, which was associated with the reduction of the fleet, caused a significant productive decline particularly in some areas (Friuli, Veneto, Abruzzo). In addition, the decrease in landings produced a rise in the average clam price positively affecting the saleable gross production which started to increase. (fig.3).

Fig. 3 – Landings and prices for hydraulic dredges (1996-2002)



Source: Irepa

But it was in 1999, when positive environmental conditions, together with the new, more stringent, management regime, determined a rapid increase in biomass that the whole

industry underwent major changes. Once again, the growth in supply adversely affected the prices, whose steep fall determined a stagnation of the saleable gross production in the whole segment. It was clear that the resource management issue had to be integrated with a strategy directed to control market flows and prices. It was essential therefore to develop a market

policy based on the definition of the productive levels which would meet a demand that varies in time and space. The coordination committee of all the management consortia, which was set by a national law, started playing this role and a market strategy at national level was introduced to ensure that decisions on quantity and prices were taken for the industry as a whole. In particular, the committee played a key role in the mechanism through which they succeeded in adjusting the producers' offer to the trends of the demand. This new policy, which allowed the Consortia to control selling prices, brought the profitability of producers to record level, while reducing the level of exploitation of clam beds.

It is evident that it was the implementation of the II Clam Plan which, by strengthening the role of CoGeVo (the Clam Management Consortium) that allowed fishermen to make full use of the new regime.

From the year 2000 till the end of 2001, the new policy determined a considerable recovery of profits. The measures adopted by the Consortia were directed at restricting the daily catch as far as possible, allowing the stock to increase, while inducing prices to grow. The real importance of the new regime can be fully appreciated when considering the effects of an environmental crisis in 2002. In this year, a strong depletion of the resource was recorded and a dramatic decline in the production brought total production to 15 thousands tons. The marked reduction of the offer led to a considerable price growth. In 2002, the unit value almost doubled (4.42 euro/Kg in 2002 as compared to 2.97 euro/kg in 2001) and the final impact on GSP was very small.

To sum up, over the period 1996-2002 the following events were recorded:

- considerable growth of saleable gross production;
- constant decrease in productive levels; and
- reduction of exploitation costs due to a more rational management of resources.

Tab. 2 – Main indicators for clam fishery with hydraulic dredges (1996 - 2002)

	1996	2002	Δ %
Incomes/vessel (000 euro)	42	96	129
Gross profit/vessel (000 euro)	14	39	179
Added value/vessel (000 euro)	30	77	157
Incomes (mill. euro)	34	64	88
Gross profit (mill. euro)	12	26	117
Added value (mill. euro)	25	52	108
Licence value (000 euro)	130	500	285

Source: Irepa

The higher profits attained by the hydraulic dredges sector increased the value of the licences. The ship owners who did not quit the activity benefited from the suspension imposed on the issuing of new licences as well as from their reduction. In this respect, it is true that only those having the licence from the very start of the clam regime received a benefit from the ownership of their exclusive fishing rights.

Who remained and who left

As provided for by the two Clam Plans, the withdrawal of licences was performed in two phases, that is, an optional phase and a compulsory one. During the first stage, fishermen spontaneously adhered to the plan, and complied with its requirements. In the second phase, apart from a few cases¹, the applications submitted by fishermen fulfilled the expectations of the plan for the complete abandonment of the activity. Given that almost all the hydraulic

dredges voluntarily complied with the plan for the withdrawal of licenses, this was implemented without any social conflicts. Indeed, the considerable allowance provided for by the plan represented an effective incentive which induced fishermen to quit the segment.

As in most cases of buy back schemes, those who preferred to leave the fishery considered the premium as a retirement provisions due to their old age and not willing to bear any environmental risk which is always possible.

As a matter of fact, a considerable degree of environmental hazard represents the distinctive feature of the activity performed by hydraulic dredges. The sector is exposed to the risks of large productive falls caused by the recurring problems of anoxia, the damages produced by predators and parasites and, especially, by the cyclical bloom of toxic micro alga.

The units which did not adhere to the withdrawal plan still benefit from high revenues, partially justified by the above-mentioned cyclical crises. The last was recorded in 2002 and caused the complete cessation of the activities in some areas as well as the reduction of productive levels in others. The success of the new regime, as it has already said above, allowed for a substantial reduction of potential damages, but when the plans started it was quite normal to loose all the production of the year.

Winners and losers

The bonus granted to ship owners for their permanent withdrawal, which represented a positive return for them, amounted to approximately 130 thousand euro, which was the value of the licence in 1996. Indeed, the only reason for the permanence in the sector of their obsolete fishing units would be the need for a monetization and valorisation of their fishing licences.

¹ As for the II Clam Plan, in Venice, Chioggia and Manfredonia a mandatory withdrawal of 12 vessels (2 in Venice, 4 in Chioggia and 6 in Manfredonia) was required.

The units still performing their activities benefited from the above-mentioned measures. They attained the valorisation of their licence as well as profits and a highly positive gross cash flow (tab.2).

On the other hand, the stop imposed on the issue of new licenses represents a barrier for newcomers. Indeed, notwithstanding the high investment costs, newcomers gain a normal income. Furthermore, the self-management system adopted prevents newcomers from increasing the fishing pressure, which would be expected otherwise.

Retrospective discussion: strengths and weaknesses

In the context of the Italian clam fishery, the buy back measure has to be considered as part of a wider management program aiming at:

- shifting of responsibility from the central administration to ship owners,
- replenishment of clam stock and establishment of a sustainable ratio between effort and resource.

In this case, the issues which deserve major attention concern the fine tuning with which the programs have been implemented and the balance among:

- the number and quality of measures applied;
- the progressiveness of the action;
- the weight that each single measure holds within the plan; and
- the degree of responsiveness of vessel owners, who were requested to play an active role in the whole process.

The combination of the measures adopted, their timely introduction, together with the amount of money invested by the community at large proved to have an important role in allowing a segment of the fleet to leave the central administration support and to accept its own

responsibility. It is well known that, in many industrialised countries fishermen do not intend to forgo government support since, in doing so, their benefits would be higher.

Among the weaknesses of the entire management system, environment plays a crucial role. Fishermen accepted the responsibility of formulating their own management and harvesting plans. In the expected event that recurring environmental crises destroy the clam beds or the stock die for any environmental reason, fishermen would tend to accelerate the rate of exploitation in order to avoid the resulting losses. A likely increase of such cases would possibly bring the system to the initial conditions of overexploitation and fishermen would not be blamed for doing so.

What was learned and what will be done differently

The successful management of the segment is based on a progressive decentralisation of the decision level, ending up with a self management regime where Territorial Use Rights (TURF: Territorial Use Rights for Fisheries) were introduced.

A number of interesting issues can be derived from this experience.

They can be summarized as follows:

- the sedentary character of the target resource, which is distributed in specific areas easily identified in every harbour, make things much easier;
- homogeneity of the fishery segment is another important aspect, allowing the introduction of rules largely accepted by all fishermen,
- when territorial exclusive rights are assigned fishermen are ready to take advantage of them,
- fine tuning introducing different measures and their combination is a vital issue. The difference between the first and second plan shows the importance of a strategy where

preliminary, perhaps less efficient, measures could be important for the final achievement of the targets,

- the existence of a co management approach plays an important role; a command and control approach would have never been appropriate.

Synthetic tables

Main indicators of the fishing effort with hydraulic dredges (1996-2002)

REGIONS	1996	1997	1998	1999	2000	2001	2002
	N. of vessels						
Abruzzo and Molise	161	150	141	106	118	115	115
Emilia Romagna	55	54	52	60	56	56	55
Marche	245	221	213	215	221	222	221
Puglia	81	79	72	72	67	75	74
Veneto and Friuli V.G.	276	271	254	253	223	217	208
Total	818	775	732	706	685	685	673
	tsl						
Abruzzo and Molise	1.778	1.619	1.565	1.090	1.290	1.271	1.280
Emilia Romagna	552	541	519	592	550	554	544
Marche	2.735	2.413	2.324	2.331	2.463	2.466	2.462
Puglia	788	723	659	654	662	686	678
Veneto and Friuli V.G.	2.828	2.789	2.612	2.545	2.210	2.144	2.081
Total	8.680	8.085	7.679	7.211	7.175	7.122	7.046
	Fishing days						
Abruzzo and Molise	11.270	5.253	8.249	12.508	12.508	8.812	9.976
Emilia Romagna	6.171	6.764	7.111	6.020	4.928	4.844	5.377
Marche	22.540	22.708	22.972	24.761	27.662	25.097	15.842
Puglia	11.178	10.744	8.208	6.912	7.806	5.906	11.081
Veneto and Friuli V.G.	28.152	30.036	18.754	32.890	28.795	30.462	27.102
Total	79.311	75.504	65.293	83.091	81.698	75.121	69.378
	Employment						
Abruzzo and Molise	322	350	282	212	248	259	261
Emilia Romagna	132	119	104	120	112	126	124
Marche	501	442	426	430	442	463	463
Puglia	162	158	144	144	134	150	150
Veneto and Friuli V.G.	621	542	550	578	496	416	436
Total	1.738	1.611	1.506	1.484	1.431	1.413	1.433

Source: Irepa

Catches, incomes and production prices for Adriatic hydraulic dredges dealing with clams (1996-2002)

REGIONS	1996	1997	1998	1999	2000	2001	2002
	tons						
Abruzzo and Molise	4213	1586	2657	6360	4878	1941	1533
Emilia Romagna	3230	3001	4081	3703	2092	1894	1307
Marche	10117	9867	8394	12753	14394	14485	4788
Puglia	2801	2878	4141	2796	1293	2158	1034
Veneto and Friuli	11511	7988	6237	11986	6959	6014	5934
Total	31873	25320	25511	37598	29615	26492	14595
	Million euro						
Abruzzo and Molise	3,7	1,2	5,2	4,4	8,9	4,5	7,7
Emilia Romagna	4,1	5,5	9,9	7,9	4,7	4,8	4,5
Marche	8,7	19,0	15,4	14,2	31,5	41,9	18,9
Puglia	3,5	4,1	7,3	4,9	2,9	8,0	9,3
Veneto and Friuli	14,3	13,1	9,4	15,4	15,8	19,2	24,0
Total	34,2	42,8	47,2	46,8	63,8	78,3	64,4
	€/kg						
Abruzzo and Molise	0,87	0,78	1,97	0,70	1,83	2,31	5,05
Emilia Romagna	1,28	1,82	2,43	2,15	2,23	2,51	3,44
Marche	0,86	1,93	1,83	1,11	2,19	2,90	3,94
Puglia	1,24	1,41	1,76	1,76	2,27	3,69	8,98
Veneto and Friuli	1,24	1,64	1,51	1,28	2,27	3,19	4,05
Total	1,07	1,69	1,85	1,25	2,16	2,96	4,41

Source: Irepa

Economic account and cost headings for hydraulic dredges (1996-2002), mill. euro

	1996	1997	1998	1999	2000	2001	2002
Fuel	3,03	3,39	2,95	3,77	5,69	5,21	5,05
Selling costs	0,70	0,46	0,48	1,01	1,37	1,25	0,86
Other variable	1,26	1,35	1,14	1,85	2,09	2,29	1,94
Maintenance	2,02	2,54	1,87	2,00	3,07	2,76	2,18
Other fixed	2,42	2,23	1,99	2,53	2,09	1,97	2,27
Total	4,99	5,20	4,57	6,63	9,15	8,74	7,84
Total fixed	4,44	4,77	3,86	4,53	5,16	4,73	4,45
Intermediary	9,43	9,97	8,43	11,16	14,31	13,47	12,29
Labour costs	13,16	14,35	17,42	19,68	21,54	28,04	25,86
Gross profit	11,62	18,51	21,39	15,99	27,99	36,79	26,24
Added value	24,78	32,86	38,81	35,67	49,53	64,83	52,10

Source: Irepa

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