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**REPORT SUMMARY:
STUDY OF POST-HARVEST LOSSES
AT MBOUR**

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SUMMARY

I INTRODUCTION

- The problem of losses
- Features of Mbour

II ORGANISATION OF THE SECTOR

- Wet fish
- Intermediary upstream of the processing and manufacture
- Processing
- Mongering
- Trading

III METHOD

- Objective
- Sample
- Presentation of the team
- Theories approached during the work of ground

IV METHOD TOOLS

- Developed Strategy
- Accelerated Method of participative research or participative diagnosis (DP)
- Exploitation of the secondary data
- Semi structured interviews
- Seasonal calendars
- Statistical surveys
- Questionnaires
- Follow-up of the cargo (Load Tracking)

V RESULTS DISCUSSION

- Analysis of random sample during the follow-up of cargo
- Losses noted for fresh fishing
- Losses noted for the tradesmen (Bana - banas)
- Losses noted for the wholesale fish merchant
- Analysis of the questionnaires
- Investigations into the processing
- Advantage of the team

VI ESTIMATION OF LOSSES

- Processing
- Trading
- Fishing
- Results
- Comparison of results

VII PROPOSED IMPROVEMENTS

- Recommendation

VIII CONCLUSION

ANNEXES: Annex 1. Load tracking

Annex 2. Questionnaires A and B

Annex 3. Quotation

Bibliography

INTRODUCTION

Senegal produces a large quantity of fish annually (more than 300,000 tonnes of fish).

Production from artisanal fisheries represents between 60 and 70 % of this production. Nearly a third of this is processed artisanally. The place occupied by small pelagic fish is large(75 %) coming mainly from the Petit Cote region with herrings being dominant.

Confronted with insufficient means of preservation fish products in order to present them in an intact form, a good part is processed (~ 30 %). Processing in this manner guarantees a profitable outlet for captures whose quality at the time of landing does not permit them to be marketed as fresh. More than 80% of processed fish comes from the region of Mbour. A large proportion of the landings of the artisanal fisheries comprises of pelagic fish (75%) with herrings constituting 50%.

The main means of utilisation of herrings is marketing as fresh and processing into Ketiakh. The latter processed product in spite of its processing often suffers from breakage during marketing and its shelf life is relatively short. Ketiakh is destined to markets in the interior of the country and losses during trading are not negligible.

The general objective, for WARF (West Africa Regional Programme Improvement of the Post-Harvest Utilisation of Artisanal Fish Catches) is to reduce the level of post harvest fish losses in the region by 25%.

These losses essentially apply to pelagic fish in particular, herrings. They are due to two main causes, on the one hand excess production which surpasses demand and on the other, inferior quality of products (in general, due to the conditions of production and landing.

Features of Mbour

Mbour has a total surface area of 10 km² with a population of 109,000 inhabitants. Fishing is the main source of employment.

The first Lebous fishermen, came from Nianing 9 kilometres away, settled in Mbour in the first years of the first world war and Mbour FAYE who came from Sine, was named after the town.

In Mbour, there are 63 GIE(Economic Interest Groupings), 39 in fish processing and 77 in fish mongering. Each GIE is composed of an average of 10 persons. We census counted 55 purse seines

in Mbour (Badou's source, 59) for the 1,900 fishermen , 1,500 of which are natives. 80 % of the 58,606,335 kilos of fish produced in 1997 is herrings. The site is 1,900 m in length and its width varies from 5 to 25 m. This stretch of land is used :

- for landing
- for processing and the construction of boats
- for different commercial activities

The main processing method grill- dries herring to produce a product known locally as 'Ketiakh'. 363 processors were counted, three quarters of whom produce 'ketiakh' and 95 % of whom are women.

'Ketiakh' or grill-dried

The procedures use only fresh fish comprising mainly of herrings. Traditional grilling is done on the ground. The fish are carefully arranged side by side . The layer of fish is sprinkled with sand or ash to prevent individual fish from sticking to each other. It is all covered with straw which is lit and left burning for one hour.

When the fish has cooled down and is ready, it is peeled, beheaded, hulled and salted in bowls then dried on racks for 1 to 2 days.

ORGANISATION OF THE SECTOR

This comprises essentially of fishermen, mongers, women processors and traders known here as 'bana-bana'. All these persons are united by complex bond based on trust.

-The fishermen irrespective of whether they are migrants or not are all Senegalese with illiteracy rate at 98 %.

-The mongers are all Senegalese with illiteracy rate at 60 %.

-The women processors are all Senegalese illiteracy rate at 99.5 %.

-80 % of the traders 'bana-bana' are Senegalese (20 % being Malians, Guineans, Burkinabes and Togolese) with illiteracy rate at 80 %.

The fishing calendar is based on the Wollof calendar i.e.

Loly October-December

Noor January- March

Thoron April-June

Nawet July-September

At Petit Cote, (Mbour - Joal) the most favourable period for all the species of fish encountered is during Noor when catches are large, decreasing during Thoron before registering a slight decrease in Nawet(Summer).

During Loly, landings rise sharply. Herrings, the subject of this study attain average length FL (fork length) of 25 cm. But this can go up to 35 cm with a weight of 300 g. For this period, we had an average of 400 g (we counted 133 individual fish in a basket of 60 kg and 150 others in a basket 63 kg. The first haul of a fishermen's net is sold to the wet fish mongers on the basis of its quality. The second and third hauls are distributed between the fresh fish mongers and the processors on account of their lower quality level.

There was excess production in March during which the day captures were put side by side the night captures on the market. Consequently, the price of a basket dropped drastically and fishermen were compelled to sell at 800 F in order not to end up without buyers. Faced with such market forces, they are compelled to dispose of them, either for cash or on credit to meet their family needs.

Wet fish products

Night fishing is done from the month of January to mid-March

Catches are not abundant however, they are of good quality (ambient temperature little high) and the herrings are large (450 g at 33 cm).

A review of secondary data and a verification show that as an average out of months fishing, there are 12 good fishing days, 8 days during which the fishing trips serve solely to pay for miscellaneous expenses (fuel 75 %, food 20 % - the rest for requirements such as cigarettes and tea) and 10 days when fishing is not good (3 years' results from 1995 to 1997).

Income is divided into 3 after deducting expenses, 1 part allocated to the net, the other two parts shared as follows ;

Boat	1 part
Engine	2 parts
Seller	1 part
Cook	1 part
Crew	1 part for each fisherman.

If crew is composed of 15 members (minimum for purse seine) all the parts add up to 20. These 20 parts are divided into 2/3 of the income. Good fishing works out at 3,000 FCFA per day on average for each fisherman.

The baskets used are of different sizes:

Basket known as lag -lagal	80 kg
Basket known as pick-up	60 kg
Basket known as mini-car	70 kg.

A full fishing canoe carries 280 baskets but most often when there is a good catch the average is 200 baskets. During the period of night fishing the baskets are smaller (average 50 kg) compared to day fishing (60 kg). Each canoe depends on a team of more than 4 persons who fill the baskets, a tally man for counting the number of baskets and one or two persons who off-load the baggage of the fishermen.

INTERMEDIARIES PRECEDING PROCESSING ACTIVITIES

They play a significant role in the supply of raw materials to the processors. The "keud-cat" purchase the contents of the canoes and resell to a monger or to a "lag-lagal". The latter is an intermediary between the "keud-cat" and the monger. Often the "keud-cat" and the 'lag-lagal' constitute one and the same person.

It was evident from the questionnaires and semi-structured interviews that they were more affected by market forces than the cost of material.

PROCESSING

The cost price of processing is high due to the cost of the fish and secondary inputs (straw, salt). Because of this, the women processors are obliged to sell on the spot. The demand for wet herrings on the international market has caused the price of the raw material to rise. We have gone from 800 F per basket to 1500 F as an average price, that is close to being doubled. The absence of storage infrastructure compels them to store for short periods and often sell at a loss in order to meet their daily needs.

The traders (bana-bana)

They buy processed fish from the sites and take them to the country's regions for marketing. For this, they hire trucks, Peugeot 404 pick-ups and hire intermediaries "julas" at a fee.

The costs are thus for:

product health certificate
packaging
transport

These traders make the expenses to be 10 F/kg. When there is a lot of fish, there is excess supply on the market and there are often several price proposals which eventually end up pegged at a level below which the traders would not want to go.

They store when the fish is cheap and re-sell when the price is greater with such the kind of problem that each time they stock the product takes up moisture which results in losses.

MONGERS

It is the most important branch in the sector. They buy directly from the fishermen, sell to processors and convey fish throughout Senegal especially to Dakar. They may buy fish from one or several fishermen in order to have a full load.

80 % of the fish is conveyed to Dakar but there is a lot of competition since the fishermen settle/camp around Hann and Rufisque (region of Dakar) whilst the canoes pursue the fish schools (shoals). There are a lot of fishing equipment and an excessive number of mongers. Dakar's central market does not become fully stocked until catch from day fishing gets there. That is to say from April onwards.

There are about 50 mongers who work on herrings out of which only 4 own their vehicles. The others hire vehicles. Mongers use flake ice.

In the past they stowed in block ice which melted very fast because it was inadequately frozen. Nowadays, they do not buy ice except when there is fish and competition between ice plants (4) has resulted in the reduction of the price of flake ice from 1200 F to 900 F.

If the buying negotiations (sale to highest bidder) are done under the sun i.e the fish is exposed for a long time, stowage in ice become difficult.

The mongers either have transporting baskets locally made from palm fronds of 30 kg capacity or plastic fish handling trays of 40 kg capacity. The local baskets last for 2 trips, during the 2nd trip having absorbed water, their volume increase (+ 10-15 kg). The plastic trays as they become old also distend and increase their volume. Thus, for the mongers the calculation is done on 3 baskets = 2 trays.

If buying negotiations are done at night the fish is not iced especially when the distance from the market is short (e.g. Dakar at 80 km or Kaolack at 100 km before dawn).

If the fish is purchased from 9.00 am onwards, they are iced twice in order to sell them the following day at farther destinations (Ziguinchor 380 km and Tamba 400 km). The duration of selling will be 4 - 5 days. On site, if the price of fish drops, they lock up their vehicles and wait till the price becomes more rewarding.

On site, there is a retailer to whom a percentage (2 - 4 %) per basket sold (close to 250 - 500 F) is paid. Often in the market they are faced with competition of vehicles of other mongers from other sites who often sell the fish at low price.

Own consumption comprises the gifts to relatives and friends as well as the fish consumed by the household.

THE METHOD

Objective

We were to test a methodology with a zone of study limited to the transformers, fishermen and wholesale fish merchants. Tiny and not very significant losses being on the level of the tradesmen (bana - bana).

The Sample

Our objectives being of qualitative nature, we worked on limited samples. We confined ourselves with maintenance (by

half-open questionnaires) with the transformer ones to confirm or add information on the operation of the sector.

We have worked on a limited number of samples. We are restricted by what processors will tell us.

In this study emphasis will be put on focussed quantitative and qualitative data using appropriate methods which can easily be used in the sub region. For the artisanal sector, the species studied is the herring.

We undertook a workshop to go over information and to provide rapid training to refresh the team members since there has been an extended lull between the theoretical training sessions in June 1997 and the beginning of field work activities. Work involving data collection and cross-checking of the results of the statistical enquiry did not really take off until 13 February, 1998.

Presentation of the team

The team composed of :

- Badou NDOYE Fisherman / CNPS
- Arona DIAGNE Head fisherman / CNPS
- Mareme KANE Supervisor of household economy
- Boubacar DIAKITE Co-ordinator

Badou NDOYE and Arona DIAGNE conducted the study on wet fish and Mareme KANE that of processing.

Theories approached during the work of ground

We were interested in the conditions under unclaimed losses. Accordingly the work of ground developed around the following topics:

Analyze operation of the die of artisanal fish transformation based on a library search then supplemented by talks, discussions and some observations of ground, our approach of the operation of the die makes it possible to have a fast outline of

the technical systems of transformations of the principal products

- Forms of organization and relations in the activity - Types of organization and relationships - major Problems in the sector - problems in the sector - Relationships to the tradesmen and the destination of the products - Relation between the traders and the product destination.

Our attention went on indicators such as: processed line of goods, outputs, the number of productions per week, the organization of the activities and time necessary to run out the products, the production costs of the kéthiakh.

THE TOOLS USED

Three methods were tested in the field :

-PRA (Participatory Rural Appraisal)

-Questionnaire method

-Load tracking

Strategy Developed

To use the three methods to put the finger on the losses and to be able to quantify them That implies three dimensions: - To test - To quantify (see if there are losses) - To sensitize

PRA, (Participatory Rural Appraisal)

PRA is a process of learning based on visualisation and the utilisation of a variety of tools, methods and local know-how in the evaluation of the opportunities and constraints of a surrounding.

PRA uses tools and skills amongst which are :

Making use of secondary data :

An important stage since it enables one to have information on the study area and permits the acquisition of a more comfortable position to discuss with respondents.

Semi-Structured Interview (SSI) :

The main tool in PRA since it supports other tools of the method. In place of formal and pre-established questions, SSI utilises a guide which itemises the essential points on which the interview is to be conducted.

Seasonal Calendars :

Permit one to have a retrospective and prospective vision in the analysing phenomena. The calendar used in this study is based on local (Wollof) months with their corresponding Gregorian calendar months. Visualisation was accomplished using local materials (pebbles obtained from the beach).

The MARP was the method best included/understood because a longer time was devoted to him for the formation. Moreover, this method has the adhesion of the community. It made it possible to break the ice, to admit the other, to discuss all the results, to exchange ideas and to correct.

The MARP especially made it possible to gum the differences between people, the illiterate ones easily could be found and be expressed there. The trained team could find itself at ease

Questionnaire method :

This enables one to have masses of information - with the disadvantage of always having to verify information which may differ considerably from one person to the other.

During questionnaires, it happens that other people intervene to rectify certain statements or to point out the number of bought baskets.

To avoid the too formal aspect of the questionnaires one was able without the questionnaire and one memorized the answers. De this fact, unconsciously or not we use one of the tools of the MARP in fact the semi interviews - structured.

However it is difficult to make a reliable questionnaire without being allowed (integrated) in the community i.e. to

have a degree of confidence without which one could not have reliable answers. So it the women time did not have is to finish some quickly with you, answered anything, which brought an additional work of control of the answers.

There were thus too many questionnaires which did not take an action pursuant with almost the same answers.

Load tracking

This permits a better understanding of all the operations of the sector and have a more precise idea of losses.

It is the most reliable method because it makes it possible to check with each stage. However it was also the method the least included/understood by the team because less time ago for the formation on this subject. The method requires as intellectual abilities as all the team did not have. It was necessary to make an additional formation of follow-up of cargo so that the method is included/understood better.

DISCUSSION OF THE RESULTS

- 40 women processors were interviewed
- 25 fishermen
- 2 traders (bana-bana)
- 8 mongers
- 5 SSI were carried out with groups of women processors (of 3 17 persons
- 4 SSI were carried out with groups of fishermen of 5 persons
- 4 SSI were carried out with two groups of mongers of 5 - 7 persons.
- 5 follow-ups of cargo plus 2 in supplement for a better comprehension

For the wet fish, 2 seasonal calendars were carried out with a group of 17 and 12 fishermen.

For processing, 3 seasonal calendars with 12, 6, 7 persons of whom one was a man.

For the mongers, a seasonal calendar with 7 persons

With the arrival of Ndene (February) an additional work was to be carried out at Mbour with 3 questionnaires and 2 load alignment during March 1999 and February. The death of aunt de Badou NDOYE did not enable us to work during the stay of Ndenè except the last day for a questionnaire.

- For the load alignment the places selected targeted are Kaolack, Dakar, Thiès - For the questionnaires: 15 fishermen and 20 transformer will again be questioned

In this period the majority of the fishermen (purse seine) were in Joal. Therefore one allowed fishermen of different dugouts to take part in the talks.

The investigation depends on the climate of confidence and the objective to be reached. In their answer transformer the and fishing ones say the truth by thinking that one can solve their problem.

However during April and March, we could not make the follow-up of the cargo because the little of sardinelle unloaded in Mbour was expensive. It was not possible for the wholesale fish merchants to go to sell in Dakar by knowing that they will not be able to compete with fish coming from the Northern Coast (St Louis and Kayar)

Analyze random sample during the follow-up of the cargo

3 elements are taken into account. Eyes, gills and skin.

They are the elements tested by everyone with the purchase thus best included/understood. We used an increasing scale of quotation going from 0 to 3 (see appendix) For the majority of the followed samples, the quality of fish varied between 2 and 3 During the second test of March 1999 the sardinelles ones were rare but of good quality

Losses established for the wet fish

In the case of full load (200 baskets) we may lose up to 10 baskets divided thus :

- 1 basket for the captain
- 1 basket for the mother of the proprietor (owner)
- 1 basket for the Management Committee
- 1 basket for the retired folk
- 1 basket for cooking.

Furthermore, with these baskets each person that fills them takes some fish in his bag which exceeds the contracts of the basket (80 kg). He who off-loads the baggage also has his bag.

The tally man is also paid 1 basket.

In addition, to these established losses are the following:

- Crushed fish (those who fill the baskets trample on the fish)
- Fish of low quality (the first haul of the net when there are two or three hauls)
- Pilfering during off-loading the baskets.

These are all due to several factors:

- The non-respect of the work on the part of those who fill the baskets
- Haste on the part of the carriers of the baskets to obtain the maximum number of baskets registered/tallied.
- The height of the canoe in relation to those who hold the baskets while standing in the sea. A good number of fish falls in the water (7 - 10 per basket).

During the month of March, it is quite windy, fishing is difficult and fish is scarce.

The baskets of fish on sale are not full (50 kg) and the prices are high (5000 - 6000 F). Similarly during religious feasts like Tabaski and Tamxarit, it is difficult to find fish since there is practically no fishing. Tabaski is the moment used for repairs of nets and canoe.

Unfavourable period also for the studies because there were a lot of funerals and in many occasions the deceased were women which involved all the women of the community. When there is a shortage of fish, the price of a basket rises.

If today it is 5,000 FCFA, tomorrow the starting price is 5,000 FCFA for the first canoe that lands. If there are a lot of canoes and sales do not proceed fast, the fishermen begin to reduce the price up to the point which permits them to recover the expenses.

LOSSES INCURRED DURING PROCESSING

At purchase, the women send an intermediary who goes to find out for them the price of the basket. If the price is affordable, they may purchase. But these intermediaries cheat them on the price and weight of the basket. After having themselves proven this, they participate in person in purchases (using a simple calculation that 3 baskets of raw fish should give 100 kg of processed fish).

We observe losses at other points :

- ✓ At the moment the product is being off loaded
- ✓ The rejects (fish other than herrings)
- ✓ Soft and crushed fish
- ✓ The uncooked fish
- ✓ At storage when 2 products of different sources having different dryness level are put together due to shortage of space on the racks this may cause loss of 25 % of the product.

The offals of fish sold to farmers (2,000 F a cart load) as manure, the heads sold to poultry farmers at the same price and ketiakh powder sold at 25 F/kg hardly offset the losses.

LOSSES INCURRED BY THE TRADERS (banabana)

- ✓ Over production on the market
- ✓ Long storage
- ✓ Inferior quality of product
- ✓ Infestation which is rejected.

LOSSES INCURRED BY THE WET FISH MONGERS

- ✓ During transport of fish from canoe to truck
- ✓ During icing (sort and reject)
- ✓ On arrival with insufficient icing.

The financial losses during an operation are divided prorata on the contributions if one or several join to carry out the operation.

Analysis of Questionnaires

To collect our information we prepared two half-open questionnaires: one for transformer the other for the fishermen.

Investigations into the transformation

The questionnaire contained groups of supposed questions to inform us about the treated products, the number of treated baskets, the price with the purchase and the sale and the losses noted throughout the die.

The questionnaire aimed at collecting on behalf of transformer the their feeling on the problems which they encounter and their reaction vis-a-vis to the prevention of the losses.

The questionnaire proved to be long (2h 00) and tiresome because of the difficulty encountered by the women to answer certain questions. This led us to choose discussions without questionnaire more slackened and very abstract with the women, who led them to express themselves much more freely.

The problems encountered in the investigations were delivered to their monotony due partly to the weak attention of the women because of their obligations of work.

In the two types of investigations, the individual talks often finish groups some, because other women joined the discussions.

The discussions with the wholesale fish merchants proceeded during fast interviews and without questionnaire. It should be said that in this medium, the questionnaire filled out in front of them would be suspect. The tackled questions turned around the products and quantities marketed, of the relations with the transformer ones, of the selection criteria, the destination of the products and the costs of marketing

While analyzing the three methods, one arrives at the result that they are imbricated. One can slip easily from one method to another without paying attention. The results of a method are reflected in the others.

But especially the participative diagnosis and the follow-up of the cargo are imbricated perfectly because the weather is necessary to be all the time semi-structurés interviews, discussions etc.

Example: Arrangement to have a vehicle description with sticks broken along the way

Favour of the team

The team had a thorough knowledge of the die three of them were economic operators. It is to say that foreign investigators with the die would have had many difficulties. Moreover the fact of having economic operators in the team a faster integration in the community thus a participation of that Ci in work allows.

Another advantage of having within the team of the economic operators is to form them easily and more quickly. Work is some reinforced into serious and adhesion more especially as before this work, the actors of the die did not have any idea of the ideas as for their economic incidence.

ESTIMATION OF LOSSES**Processing**

Based on 1 basket of 60 kg

<u>Physical losses</u>		<u>Qualitative losses</u>
Reject	0.5 kg	
Soft, crushed	1	
Uncooked	2	
Pilfering and others	0.5	
	—————	
	4 kg - 6.66%	

From these results we see that the uncooked fish constitutes the large percentage. That is due to the fact that often the straws used flare up too fast.

Mongering

With 100 baskets, the monger could give 1 basket

Basis : 1 basket of 60 kg

Physical losses

2.25 kg - transport beach - vehicle	
1 kg - crushed rejected fish	
3 kg -	
—————	
6.25 kg	- 10.41 %

If the quantity of ice is insufficient losses can be 10 baskets being 10 % of the load.

Fisherman

<u>Physical losses</u>		<u>Qualitative losses</u>
Crushed	2kg	2.5 kg
Poor quality(reject)	1kg	being 4.16 %
Pilfering	2kg	
	—————	
	5 kg	- 8.33 %

Trader (bana-bana)Physical losses

Crumbled 1 kg

In powder 0.5 kg

1.5 Kg - 2.5 %

Qualitative losses

humid 0.75 kg

being 1.25 %

Using the questionnaire and making cross-checks, we were able monitor the sector. We discovered that only the fisherman experiences fairly high qualitative losses.

In effect, having made several hauls, the fish first caught are a little tired and are not generally bought by the mongers to convey to Dakar or other urban centres. The mongers buy fish to sell to the women processors the latter who can also buy directly from the fisherman.

Hence, the monger and processor do not incur qualitative losses. They rather incur physical and economic losses due to market forces.

The trader (banabana) is the most well off. He incurs practically no losses controlling as he does ketiakh trading. He controls the quality of the product and fixes its price.

RESULTS

Research method	Type of loss	Supply %	Processing %	Mongering
PRA	Physical	20	22	26.66
	Qualitative	22.5	-	10
	Economic	30	40	45
Load tracking	Physical	-	-	2.15
	Qualitative	-	-	-
	Economic	-	-	28.94
Questionnaire	Physical	1.5	0.8	1.75
	Qualitative	25	7.48	-
	Economic	46.66	43.33	34.47
Summary	Physical	10.75	11.4	14.2
	Qualitative	23.75	7.48	10
	Economic	38.33	41.66	36.47

Like we stated, we observe that all the economic operators of the sector in this study incur important economic losses with the woman processor at a level a little higher.

She is the only one who has no influence on the turn of events. She waits for low prices in order to buy and thus depends on the fisherman and monger and cannot fix the price to the trader (banabana), the latter who imposes his/her law on her.

Physical losses are important for the monger. (It is much for those who make a long trip to transport fish from the canoe to the vehicle).

If we summarise the physical losses :

- ◆ For the fisherman. For a daily production of 200 baskets the fisherman can lose 21.5 baskets x 1650 F = 35,475 (1650 F being the average price of the basket).
- ◆ The woman processor with an average production of 20 baskets can lose 2.28 baskets being 107.5 FCFA x 114 kg = 12,255 FCFA (107.5 being the average selling price of ketiakh).
- ◆ The monger with a daily production of 230 baskets can lose 32.6 baskets, being 163,360 FCFA with an average price of 5000 FCFA especially if he/she travels out into the other regions. This is why many mongers have come into groups and losses are divided on prorata basis on the basis of individual contributions.

All the economic operators of the sector studied incur high economic losses between 30 - 40 % except the traders - (banabana) who make a good job of it incurring low economic losses at 5 %.

Distrib- ution satge	Good price F CFA	Reduced price F CFA	% sold at reduced price	% physical losses
Fishing	2,500	800	40	8.33
Fish mongering	7,500	2,500	20	10.41
Processing	150	65	60	6.6
Market (bana-bana)	175	100	5	2.5

Proposals

- Landing area adequate with infrastructure for cooling managed by a committee of economic operators to rationalise the distribution of fish.
- Processing area paved

- Grilling oven since ketiakh produced in oven has a better market and better price, sometimes doubling that produced on the ground.
- Adequate icing during transporting the fish in the region at least in a ratio of 1% 1.

Recommendations

To make a sensitizing on the level of the ranges to avoid to the maximum the losses

To put in the team which works on the losses of the people informed (knowledge of the die) in fact of the operators economic

CONCLUSION:

We continued our study by constantly adapting us to the conditions of ground. The flexibility of our methodology and our calendar enabled us to make outward journey and return on the ground.

The subject of the study, the losses could not be approached à.fond (raw material shortage obliges). The results which we present are incomplete and will require of other more precise studies. However we hope to have been able to advance some elements useful for the comprehension of the factors contributing to the losses after capture

It remains to be said that the losses incurred during the period are more due to market forces than physical losses. But at Mbour, these losses are still difficult to encompass within the short period.

Economic losses were more notable during the study. They are especially due to large volumes of production (night fishing co-inciding with day fishing). The woman processor buys the basket of fish at a high cost and cannot sell at a certain price.

The methodology best adapted for the quantification of the losses to Mbour, remains for us, the MARP or DP coupled with the follow-up of the cargo

In Senegal currently the losses became a significant problem considering the rarefaction of the resources. There is thus a project of development of a national strategy of prevention of the losses being studied with the implication of various institutions.

A focussed study should be undertaken for at least six months due to the large volume of production and the high numbers of stakeholders in the sector.

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DIRECTION DES PÊCHES DU SENEGAL

Annexes

Trader - bana-bana Maodo DIAGNE 21/04/1998

Expenses

500 kg Ketiakh bought at three prices	70F	80F	85F	
				230 kg X 85F = 19,550 F CFA
				125 kg X 80F = 10,000 F
				145 kg X 70F = <u>10,150 F</u>
				39,700 F CFA
Other estimated costs 10F / kg				<u>5,000 F</u>
				44,700 F

Income

	487 kg X 175F = 85,225 F
	10 kg X 100F = <u>1,000 F</u>

Physical losses 3 kg being0.6 %

Profit 86,225 - 44,700 = 41,525 F CFA

Load Tracking Dame DAIKITE 16/05/1998 Mbour - Ziguinchorr)

Refrigerated vehicle

207 baskets

Expenses

Fish	1,750F X 207	= 362,250 F
Carrier / transport	150F X 207	= 31,050
Local basket	200F X 200	= 40,000
Tally (canoe)		= 3,000
Tally (vehicle)		= 1,500
Labour (ice)		= 11,000
Rent (vehicle)		= 100,000
Road charges	30,000 X 2	= 100,000
Gas oil		= 85,000
Retailing cost	Ziguinchorr 30,000 Bignona 10,000	= 40,000
Ice		= 99,800
Driver		= 10,000
Driver assistant (Apprentice)		= 3,000
Council tax	1,000	
Health certificate	500	= <u>1,500</u>

Selling price

4,000 X 177 baskets	= 708,000
2,500 X 23 baskets	= <u>57,500</u>

Physical losses

7 baskets 3.38 %

Financial losses 887,300 - 765,500 = 121,800

Load Tracking NDiaga NDIAYE 18/05/1998 Mbour - Touba) 28 ° C

Truck

101 baskets

Expenses

Fish	1,500F X 101	= 151,500 F
Carrier / transport	150F X 101	= 15,150
Tally (canoe)		= 1,500
Tally (vehicle)		= 1,000
Labour (ice)		= 6,000
Rent (vehicle)		= 39,000
Gas oil		= 21,000
Retailing cost		= 9,000
Ice 15 trays X 900 F		= 13,500
Driver		= 1,500
Driver assistants (Apprentice)		= 4,000

Selling price

3,000 X 62 baskets	186,000	= 273,500
2,500 X 35 baskets		= <u>87,500</u>

Physical losses

4 baskets 3.96 %

Profit 273,500 -263,150 =10,350

Abundant fish on the market caused a drop in price
No tax (health certificate)

Fish was landed at 2.00 A.M departure time 3.00 A.M

Arrived at Tamba 8.00 P.M

Load Tracking Ablie GUEYE 28 °C

22/05/1998

Fish bought from 4 canoes (253 baskets)

Expenses

Fish	2,500F X 251	= 627,500 F
transport	150F X 251	= 37,650
Labour		= 11,000
Ice		= 100,000
Rent (refrigerated vehicle)		= 100,000
Gas oil		= 85,000

Income

Fish sold		=184,000
(The fish was sold at 4 prices 7,500F -7,000F -6,500F -5,500F)		
Profit	184,000-976,150	=207,850

Physical losses

2 baskets 0.8 % for others reasons
(pilfering, gift, rejects)

Handling cost for the large tray	50F	11,000 F
Small tray	40F	5,000 F

Load Tracking Modou MBAYE trader 20 °C

23/05/1998 Transporter bour - Tamba

Truck SG4

Expenses

Fish	3,500F X 110	= 385,000 F
Ice non		
Labour		= 6,000
Rent (vehicle)		= 30,000
Gas oil		= 20,000
Transport fish(carriers) 110 baskets X150F		= <u>16,500</u>
		457,500

Income

Fish sold	=376,500
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(The fish was sold at 2 prices-(First price 6,000F per basket, then 4,500 due to market forces. He met with 4 other traders who came from Joal who had been sold herrings of lower quality (flat herrings) at at a lower price

Losses

1/2 baskets 30 kg on departure from Mbour being	0.45 %
financial 457,500 - 376,500	= 81,000

These losses are incurred by 3 associates prorata on their contributions (Modou MBAYE, Pape DIENG, Youssou SAMBA)

Fish purchased at 7 h. Loading lasted for 2 h.

Arrival at Tamba at mid-night (transport time 15 h)

Load Tracking Modou MBAYE trader 25 °C

17/05/1998

Expenses

Fish	3,500F X 110	= 385,000 F
Ice		= 90,000
Labour		
Rent (vehicle)		= 100,000
Gas oil		= 100,000
Tally	150 F X110 baskets	= 16,000
Retailing cost		<u>705,000</u>

Income

Fish sold		= <u>500,000</u>
		250,000 F

Loss : Problem of competition of 5 other traders from Joal with the flat herrings of lower quality of lower price.

PRICES

Straw	200 F / bundle
Salt	150 F (10 kg bucket)
Transport	400 F
Negotiations	200 F / person
Offal	100 F / pan
Selling price	60-75 F / kg
Cart of straw	1,500 F
Price of straw	1,000 F
Cart load of 5 baskets (150 F per basket)	750 F
Canoe transport to cart	200 F
Negotiation for fish 1,000 / 5 persons. (9 persons for period of large volumes)	
Pan of offals (30 kg)	100 F
Drying	25 or 35 F / pan or self employment
Visitor expenses	1,500 6 2,000(with breakfast)
Salt 1,000 F 50 kg bag (bucket for a basket)	

Herring production in Mbour

Feb.98	11,500 tonnes
Mar.98	13,000
Apr.98	6,500
May 98	7,000

QUESTIONNAIRE A : PERTES AUPRES DES PECHEURS

Enquêteur : Assurez-vous que toutes les réponses se font par rapport à une seule pirogue dans laquelle la personne concernée a pêché elle-même.

1. Quel est le nom de la pirogue dans laquelle vous avez pêché ou quel est votre nom?

[a] numéro

2. Quand avez vous pêché des sardinelles pour la dernière fois avant la date d'aujourd'hui?

[a] date (estimée)

Enquêteur : Si la date remonte à plus de sept jours, arrêtez de répondre au questionnaire

DITES : Toutes les questions qui suivent sont posées par rapport à la semaine passée où vous avez pêché. Tous les poissons capturés sont déjà été vendus.

3. Quels engins de pêche avez-vous utilisés? (préciser)

[a] les engins

4. Combien d'heures le poisson a-t-il passé dans le cale avant le débarquement?

[a] heures

5. A quelle heure avez-vous débarqué votre poisson?

[a] heures (par exemple : 09 h 00)

6. Avez-vous rejeté du poisson en mer avant le débarquement? Si oui pourquoi?

[a] unités de mesure

[b] nombre d'unités

[c] raisons pour lesquelles le poisson a été rejeté

7. Quelle quantité de poisson est autoconsommation?

[a] unités de mesure

[b] nombre d'unités

8. Quel volume de poisson avez-vous débarqué sur la plage?

[a] espèces de poisson ou unité de mesure

[b] nombre d'unités

Enquêteur : Q8 devrait inclure le poisson auto-consommé (Q7)

9. Avez-vous rejeté du poisson immédiatement après le débarquement pour cause d'altération?

[a] unités

[b] nombre d'unités

[c] raisons pour lesquelles du poisson a été rejeté

10. Du poisson a t-il été jeté plus tard du fait de sa dégradation?

[a] unités

[b] nombre d'unités

[c] raisons pour lesquelles le poisson a été rejeté

11. A quel prix avez-vous vendu du poisson bon qualité?

[a] unités de mesure

[b] nombre d'unités

[c] prix moyen à l'unité

[d] à qui?

12. Avez-vous vendu du poisson à un prix plus bas aux transformatrices et autres?

- [a] unités de mesure
- [b] nombre d'unités
- [c] prix moyen de poisson de faible qualité
- [d] prix moyen de poisson de basse qualité)
- [e] qui achète ces poissons et pour quelle utilisation?
- [F] raisons pour lesquelles le prix est bas

13. Est-ce qu'une partie du poisson n'a pas été vendu (à l'exception du poisson auto-consommé ou bien rejeté à cause d'altération)?

- [a] unités de mesure
- [b] nombre d'unités
- [c] raisons de la non vente

Enquêteur : Fin des questions posées au pêcheur

14. **Enquêteur** : remplissez le tableau ci-dessous. Vos réponses doivent être basées sur les poids, les prix d'aujourd'hui et seulement pour les unités mentionnées dans cet entretien

- [a] unités de mesure
- [b] nombre d'unités
- [c] poids moyen de l'unité
- [d] prix moyen pour le poisson de bonne qualité

QUESTIONNAIRE B : PERTES AUPRES DES TRANSFORMATEURS

1. Quel est votre nom?

[a] Nom

2. Quand avez-vous vendu pour la dernière fois un lot de poisson que vous avez transformé?

[a] Date (estimation)

Enquêteur : Si cela remonte à plus de 14 jours, arrêter l'entretien

Dites : Les questions suivantes sont posées par rapport à la dernière fois où vous avez transformé du poisson.

3. Quelle est la qualité de poisson que vous avez acheté pour être transformé?

4. Quelle est la qualité de poisson perdue avant transformation?

- [a] unités de mesure
- [b] nombre d'unités
- [c] raisons des pertes

Enquêteur : Veuillez ne pas changer les unités pendant cet entretien

5. Quelle est la quantité de matière première de bonne qualité transformée?

- [a] unités de mesure
- [b] nombre d'unités
- [c] prix d'achat de l'unité

6. Quelle est la quantité de matière première de faible qualité transformée?

- [a] unités de mesure
- [b] nombre d'unités
- [c] prix de l'unité

7. Avez-vous rejeté du poisson pendant ou après la transformation?

- [a] unités de mesure
- [b] nombre d'unités
- [c] raisons
- [d] utilisation finale du produit

8. Avez-vous perdu du poisson pour d'autres raisons?

- [a] unités de mesure
- [b] nombre d'unités
- [c] raisons

9. Quel est le prix de vente moyen du poisson transformé de bonne qualité?

- [a] unités de mesure
- [b] nombre d'unités
- [c] prix de vente moyen du produit transformé de bonne qualité

10. Avez-vous vendu du poisson transformé à prix réduit du fait de son altération?

- [a] espèces de poisson ou unité de mesure
- [b] nombre d'unités
- [c] prix de vente moyen (du poisson de qualité réduite)
- [d] raisons
- [e] utilisation finale (nutrition animale par exemple)

Enquêteur : Veuillez répondre à la question suivante seulement par rapport aux unités de mesure utilisées au cours de cet entretien

11.

- [a] espèce de poisson
- [b] unités
- [c] poids moyen (kg)

1. DEBARQUEMENT

Données/Protocole	Comment collecter les données	Commentaires	Travail nécessaire
Site			
Date			
Temps	Equipe		
Choisir un lot de poisson	Equipe	échantillon aléatoire	définir l'échantillonnage technique
Temps de capture	iss avec les pêcheurs qui ont opéré dans la pirogue d'où est débarqué le poisson	doit identifier les pirogues d'où le lot provient	
Temps où le poisson est débarqué	Idem	idem	à partir de l'étude préliminaire
Type d'engins pour la capture	Idem	idem	
Type de pirogue	Idem	idem	
(avec ou sans moteur)			
Temps écoulé entre le débarquement et le déplacement du poisson du site	iss avec vendre/propriétaire		
Evaluation de la qualité du lot	équipe utilisant la cotation	échantillonnage de lot aléatoire	développer pour le poisson frais
Prix en fonction de la qualité	iss avec pêcheurs vérifier avec le commerçant	standardisation kg	

. TRANSPORT

Données/Protocole	Comment collecter les données	commentaires	Travail nécessaire
Date	Equipe		
d'où à où	iss avec le commerçant		
Temps	Equipe		
Mode de transport	iss/observation		
Durée du transport	iss/observation		
Qui transporte?	iss avec le commerçant		
Qui reçoit/vendeur		peut être n'est pas un vendeur sauf s'il est transformateur de poisson	
Manutention/préservation/emballage	iss/observation		
Evaluation de la qualité	l'équipe à la destination	échantillon aléatoire même échantillon qu'au débarquement	développer un barème de cotation
Pertes physiques durant le transport	iss avec le commerçant		

3. TRANSFORMATION

Données/Protocole	Comment collecter les données	Commentaires	Travail nécessaire
Date			
Site			
Temps			
Temps à l'arrivée			
Etapes de la transformation durée	iss avec le transformateur		identifier les étapes de la transformation
Evaluation de la qualité du produit	Equipe		développer un diagramme sur le produit traité
Prix	iss avec transformateur/acheteur	une information fiable pourrait être difficile à obtenir	
Pertes physiques durant le traitement	iss avec le transformateur (cotation)		

Temps écoulé avant la vente après le transport	iss avec le transformateur		
Qui achète et où?	Iss		
Emballage (qui? matériau utilisé)	iss/observation		

4. VENTE EN GROS

Données/Protocole	Comment collecter des données	Commentaires	Travail nécessaire
Date			
Site			
Temps			
Temps où les lots sont réceptionnés			
Temps où les lots sont vendus			
Transformés au marché (pesée, classification, emballage, stockage)		information venant de l'étude exploratoire	
Pertes physiques	iss avec les commerçants (cotation)		
Evaluation de la qualité	barème de cotation		développer un diagramme de cotation
Prix en fonction de la qualité	Iss		
Destination	iss avec commerçant (cotation)	les lots pouvant être divisés	

5. VENTE AU DETAIL

Données/Protocole	Comment collecter les données	Commentaires	Travail nécessaire
Date	Equipe		
Site	Equipe		
Temps	Equipe		
Temps à l'arrivée	iss/observation		
Durée de la vente	Iss		
Méthode de manutention/préservation	iss/observation		
Pertes physiques	Iss	poisson non vendu	

Evaluation de la qualité		échantillonner le lot	développer un barème de cotation
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Evaluation de la fraîcheur : Règlement du Conseil de la CEE n° 103/76 J.O n° L20

Critères				
Parties du poisson Inspectées				
Note				
2		3 1		0
				Apparence
Peau Pigmentation en voie de décoloration et terne mucus laiteux	Pigmentation brillante iridescente : pas de mucus décoloration : mucus opaque transparent : aqueux	Pigmentation terne pas de mucus opaque	Pigmentation brillante mais non luisante mucus légèrement trouble	
Oeil Plat, cornée opalescente, pupille opaque opalescente, pupille laiteuse, terne grise	Convexe (gonflé) cornée transparente pupille noire et brillante cornée	Concave au centre, noire et brillante cornée	Convexe et légèrement enfoncé, cornée légèrement	noire et pupille
Branchies En voie de décoloration, clair	Couleur brillante, Jaunâtre, pas de mucus mucus opaque	Jaunâtre, mucus	Moins colorées, quelques traces de mucus laiteux	
Chair (de l'abdomen) Légèrement opaque	Bleuâtre, translucide, lisse et brillante, pas de changement de la couleur initiale	Opaque	Veloutée, cireuse, terne, couleur légèrement altérée	
Couleur le long de la colonne vertébrale	Incolore	Rouge	Légèrement rosée	

Critères

Parties du poisson inspectées				
Notes				
2		1	3	0
Organes Les reins, résidus et sang devront être rouge sang en voie décoloration	être roses	Les reins et résidus Les reins, d'autres organes résidus et devront être de même que le sang dans l'aorte	Les reins et résidus devront être rouges, sang devront être brunâtre	Les reins et résidus d'autres devront être terne, de
Etat physique				
Chair Légèrement molle (flasque), moins élastique, cireuse (veloutée) et surface terne		Ferme et élastique Molle surface lisse (flasque), facilement détachables, surface ridée		Moins élastique
Colonne vertébrale Adhère légèrement pas		Se casse au lieu N'adhère de se détacher		Adhère
Odeur				
Branchies, peau, cavité abdominale Légèrement aigre	Odeur d'algues Aigre		Pas de mauvaise odeur ni d'odeur	

