An evaluation of Field trials Conducted by the RNRKS Monsoon Fish Losses Research Project.

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EXECUTIVE SUMMARY

The monsoon season presents a high-risk situation for fish processors in India, as losses are high. This phenomena was researched under the RNRRS Post Harvest Fisheries Research Programme, funded by the Department for International Development (DFID), UK and managed jointly by the Natural Resources Institute, UK, and the College of Fisheries Mangalore, India.

After an initial phase of exploratory research, a series of micro level studies focused on loss assessment were carried out in the states of Orissa and Andhra Pradesh (AP). In addition, a participatory planning exercise was carried out on the field to examine possible options to help processors cope with their monsoon losses. Based on the results of the planning excercise, an intervention package was formulated and field-tested in three villages of AP and Orissa. Three processors in each village were selected as participants. The intervention package developed consisted of the following:

1. To ensure cleanliness of processing vats through the use of bleaching powder for cleaning.
2. To treat seawater using bleaching powder and give adequate contact time for chlorination.
3. To wash fish in treated water.
4. To gut fish on plastic sheets.
5. To wash gutted fish using treated water.
6. To monitor brine strength and quality during and between brining cycles.
7. To keep trays over the fish with clean weights over them for complete immersion of fish.
8. To cover the vats with a strong lid, which would not allow insects or rain water, and would not be carried away by heavy wind.
9. To facilitate covering of fish on the racks using plastic sheets in case of sudden showers or carrying the racks into a shelter.

The present report seeks to document the perceptions of the processors to the above interventions, their willingness to adopt them and the benefits coming out of their adoption.

Key findings and some important issues:

One of the major findings that emerged during the study was as is usually seen, the close relationship between cost of the intervention and willingness to adopt. Other influencing factors to the uptake of interventions were:

a. the desire to use economically and efficiently all existing processing infrastructure (all vats used for processing fish)
b. possibility of increase in work load
c. Time taken for processing

This has therefore led to the adoption (with some innovation) of the following interventions:

- the use of bleaching powder for washing vats
- use of lids to cover the vats,
- use of weights and frames to hold the fish down.

However there have been minor variations in the perceptions to the above interventions.

Bleaching powder has had a visible impact in reducing fly infestation in the processing site. Therefore it is well taken by most processors. But there has been innovation in its use, starting from using water to which bleaching powder has been added, immediately without allowing for treatment time to direct use on fish during processing. While the former has been done due to lack of adequate time, as monsoon rains often hamper processing, and the insufficient number of vats for processing fish especially under glut conditions, the latter raises cause for concern. As the fish is seldom washed after bleaching powder is applied.

The use of lids have helped the processors to reduce spoilage of brine due to seepage of rainwater and frames and weights have helped in promoting uniform salting as well as holding fish down thereby reducing exposure to infestation. However some processors did complain about the weight of the lids and the inability to use frames when vats were not filled to capacity.

Plastic sheets in many cases were already in use during gutting operations, as were the racks for drying of fish (in certain cases). It must therefore be noted that when the processors speak about the racks being insufficient to take in the quantity processed they refer to the racks and mats given as part of the intervention package rather than to the concept as a whole. A table giving details at a glance of the perception to the various interventions site wise and processor wise has been included under Appendix 1 of this report.

However, it must be borne in mind that climatic and other conditions during the field trials were not uniform across all sites. The rains during the monsoons in AP at the time of the field trials were not heavy, infrequent fishing did not keep up regular supply of fish during the period as result of which some of the processors abstained from fishing. The losses experienced by processors in AP (during the monsoon when field trials were conducted) were limited. They themselves were not sure whether it was because of the interventions or because of other reasons.

In the case of Orissa, processors in the village New Bakshipalli said that they did not usually process during monsoons while in the case of Balipantal processing was seen more as a method to deal with gluts of low value species rather than as an economic enterprise. The problems in Balipantal seemed more to do with transport considering the fact that it is a rather isolated village. But that does not mean that the intervention package does not address the needs of the processors in the two villages mentioned above. It does and seems to have been well taken from what the processors had to say. However, considering the fact that the villages in Orissa were just recovering from a severe natural calamity, losses in fish processing seemed minor in comparison. The author is therefore not sure whether their perceptions to the interventions discussed just three months after the cyclone really reflects exactly what they feel. Another constraint was that it was not possible to observe processors at work in Orissa to get direct information through observation. This, however, does not suggest that these perceptions are "unreliable". The perceptions are in line with what is reflected in the monitoring data and what was felt in general in AP. What is being stressed here is the regret experienced by the author for her inability to have the same richness in the discussions held (with processors at home and at work) as in the case of Andhra Pradesh.

CHAPTER 1

BACKGROUND

The monsoon season presents a high-risk situation for fish processors in India, as losses are high. This phenomena was researched under the RNRRS Post Harvest Fisheries Research Program, funded by the Department for International Development (DFID), UK and managed jointly by the Natural Resources Institute, UK, and the College of Fisheries Mangalore, India.

The initial phases of the research consisted of an exploratory phase during the monsoon of 1997 in the states of Andhra Pradesh (AP), Kerala, Orissa and Tamilnadu and a microlevel focused loss assessment study in Orissa and AP during the monsoon of 1998. A two-day workshop held in Chennai in March 1999 discussed the findings of the micro level study in great detail with various agencies and individuals working in the post harvest fisheries sector. One of the recommendations that came out of the workshop was to examine the possibility of transferring existing coping strategies followed by processors during monsoons into sets of interventions.

These interventions which consisted various technical, socio-economic, skill development and other options (relating to transportation, infrastructure development etc) were then discussed with processors and major stakeholders as part of a participatory intervention planning exercise (PIP) to decide on their applicability to a specific site[1]. One issue that emerged was that there was limited scope for production of new –non traditional products as an alternative to traditional processing and limited potential for taking up alternate income generating programmes. This exercise was carried out between 21st April and 15th May 1999 in identified sites in the states of AP and Orissa.

The findings of the PIP exercise was then discussed in detail in June 1999 at a planning workshop where the intervention package was refined to suit the conditions at the field sites. In all, six sites were identified for field testing – three in AP (in the villages of Suradapeta-Mayapatnam, Chodipalipeta and Konapapa peta) and three in Orissa (in the villages of Chandrabaga,Balipantal and New Bakshipalli). The field-testing was undertaken in July 1999 when the south-west monsoons would be over the two states so that the processors would be able to test the package during the monsoon period.

The Intervention package:

The intervention package that was field-tested emerged from an understanding of the existing practices followed in the area for processing. Most of the processors use sea water for processing operations which being from near shore waters near crowded villages and industrial areas were causes of contamination in themselves. Besides, frugal usage of sea water to compensate of time taken in collection and transportation resulted in improper cleaning of fish and vats resulting in cross contamination. The insufficient spread of weight over fish during processing does not allow for complete immersion in brine, which exposes the fish for maggot infestation. The practice of closing vats after salting using dried palm leaves and plastic sheets is ineffective in preventing the entry of flies, other insects and

[1] Mohan Joseph M, *Report on Participatory Intervention Planning carried out in Orissa and AP during April – May 1999 for field testing of interventions as phase III of the monsoon season losses in post harvest fisheries project*

rainwater. Further, high winds carry away the leaves making them unreliable covers during monsoons. Finally the method of drying fish at ground level using nets, leaves and sheets was not found to be effective in increasing the drying speed and to remove fish in a hurry in case of a sudden rain.

Based on the understanding of the above situation, the 'critical control points' where the team-felt interventions were important and could be undertaken were:

1. Improving quality of water used in processing.
2. Washing of fresh and gutted fish
3. Minimisation of sand contamination at each step
4. Complete immersion of fish in salt brine during salting/brining
5. Protection of fish during salting from seepage of rainwater and infestation
6. Increasing drying speed.

Based on the above mentioned critical control points a set of interventions was developed and field-tested.

1. To clean vats using bleaching powder before starting a new processing operation.
2. To treat seawater using bleaching powder and give adequate contact time for chlorination
3. To wash fish in treated water
4. To gut fish on plastic sheets
5. To wash gutted fish using treated water
6. To monitor brine strength and quality during and between brining cycles.
7. To keep trays over the fish with clean weights over them for complete immersion of fish.
8. To cover the vats with a strong lid, which would not allow insects or rain water, and would not be carried away by heavy wind.
9. To facilitate covering of fish on the racks using plastic sheets in case of sudden showers or carrying the racks into a shelter.

Observations made by the field testing team indicated that losses were the cumulative results of many short comings in the processing chain which suggested the need to test the intervention package as a whole rather than in a piecemeal fashion.[2]

Three participants were identified in each village based on the following criteria:

1. Processing activities taken up during monsoons: It was essential that the processor participating in the field testing operations process during monsoon.
2. The processor in question should own at least some processing infrastructure like a vat.
3. The processing site should be easily accessible so that other processors can come and observe the improved practices.
4. Willingness of the processor to participate in the field-testing.

The following were the list of processors who participated in the field-testing:

[2] Venkatesh Salagrama et al *Research project on Monsoon losses in Post harvest fisheries (R6817) Phase III: Field testing of simple loss reduction methods* . Vol I : Main report Draft1

ANDHRA PRADESH	ORISSA
Village : ***Suradapeta Mayapatnam***	Village : ***New Bakshi Palli***
Kambala Yellayyamma Kare Nookalamma Kambala Yellayyamma	Souripalli Rajamma Kalaga Hemalatha Dase Enjamma
Village : ***Konapapa Peta***	Village : ***Chandrabhaga***
Benugu Bangaramma Kare Muthyalamma Konela Bangaramma	ChawakulaGangamma Mallipalli Bendamma Chepala Thotamma
Village : ***Chodipallipeta***	Village : ***Balipantal***
Koda Danayyamma Marupalli Lakshmi Chokka Kasiyya	Parboti Behera Charulatha Behera Menaka Behera

The field-testing, which took place in the month of July was followed by regular monitoring data collection during which period, members of the field testing team gathered data on the use pattern. The summarised monitoring data is appended to this report.

The present report set in the post field testing phase looks into the perception of the processors to the various loss reducing strategies introduced.

The Specific **terms of reference** of this study are as follows:

To describe and discuss

- The perceptions of the processors to each intervention introduced to them for trial.
- The willingness of processors to adopt the interventions tested.
- The perceived benefits of those interventions adopted in terms of loss reduction, improved income, reducing risk and any other benefits during monsoons.
- Any constraints associated with each intervention and whether these constraints could be overcome by a feasible level of adaptation or further development to improve acceptability.
- The appropriateness of interventions for use during non monsoon periods.

CHAPTER 2

METHODOLOGY

The report is based on a participative methodology of data collection. Discussions were held with the processors in the villages where field-testing was carried out. Each individual processor who participated in the field-testing shared her perceptions with the consultant. The individual discussion was then followed by a group discussion involving all the three participants and in cases where a women's group or *Mahila Mandal* existed at the village level, a village level meeting was conducted to obtain the perceptions of non participant observers to the introduced methodology. The above method was also used to validate information .It must be noted that in each case the processor in question would follow up the discussion with a visit to the processing site (in cases where it was located away from her house) so that she could demonstrate her response practically wherever possible.

Discussions were also held with the field testing team based on the information collected from the processors. In most cases, representatives of the team were present at the village during discussion with the processors so that responses could be put in perspective and misunderstandings (when and where they occurred) could be cleared.

Besides the above, secondary data was used in the form of the information collected during monitoring activities. The data collected from each processor over a period of three months was tabulated by the consultant and was used as points for discussion during primary data collection in the villages.

The report presents findings of the field study at two levels - processor- wise followed by a general summing up for the village.

CHAPTER 3

ANDHRA PRADESH

Based on the discussions held with the processors the report attempts to classify processors into three categories:

Small: These processors did not usually process during monsoons. They usually dealt in fresh fish and processed fish more as a means of preservation rather than as an economic activity. They used vats made of palmyrah trunks, which were hollowed out for the purpose.

Medium: These processors did take up processing as an economic activity. They owned 1-4 cement vats and invested a weekly sum of Rs2000-5000 in processing.

Large: These processors owned more than five cement vats and invested a weekly sum of Rs. 5000 or more in processing related activities.

Based on the above definition, four of the processors were in the medium category and the three were in the large category. One processor in Konapapapeta was unavailable for comments while another abstained from processing during the field trials.

Village: Suradapeta – Mayapatnam

Surada Sathiyyamma :

Surada Sathiyyamma is an elderly woman who has considerable experience in processing. Her processing activities are usually conducted jointly with her sister's family. Though she was not very forthcoming about sharing information about the investment made by each of the two families, she stated that labour for the activities was provided by the women from both families. In cases where there were glut landings resulting in large quantities to be processed, she employed hired labour paying them Rs30 per day. Clearly a large processor, Sathiyyamma, owns seven cement vats. Her investment in processing activities are about Rs. 5000 –10,000 per week of which 50% comes is in the form of non institutional credit sources like money lenders.

Her usual method followed for processing includes washing small varieties once ungutted in sea water and larger ones once after gutting before putting into brine. Plastic sheets are used for gutting and vats covered with plastic sheets and palmyrah leaves. Vats were seldom cleaned and if done it was only when brine was changed. Brine was rarely changed after each cycle. Infact, she still maintains that if rainwater does not get into the brine it could be used for as long as four weeks. Fish was dried on the ground after sweeping it and spreading it on nets or palmyrah leaves.

Perception to interventions:

1. **Cleaning of vats**: Sathiyyamma recognises that cleaning of vats is essential to reduce contamination and therefore losses. However, following it practically after each cycle she says is not easy. One reason for this is that she changes the brine after about two cycles during monsoons. As mentioned earlier, she maintains that it is not necessary to change the brine at all if rain water does not get into the vat during processing. Some of

Sathiyamma's vats are old and others are buried in the ground. She is therefore nervous about shifting them about frequently during cleaning. But what she is happy about is the use of bleaching powder, which she says has definitely reduced infestation of flies in the processing site.

2. **Washing fish twice using water treated with bleaching powder**: This intervention, according to Sathiyyamma, is practical only when there is a manageable quantity of fish. When there are glut landings, it is very difficult because, each time water is treated, she has to spare one vat for it and allow for treatment time not to mention collecting huge quantities of water. She sometimes deals with the situation by immediately using water to which bleaching powder has been added. However, she tries to use this intervention whenever possible because the cost inputs being so low and the effects so dramatic in arresting flies.

3. **Gutting fish on plastic sheets:** This is a simple method for reducing contamination and it was being followed by her even before introduction during field testing.

4. **Monitoring brine strength and quality during and between brining cycles**: Uses her professional experience to monitor brine strength. She says that the smell is her indicator of spoilage. In cases where the strength is not adequate, extra salt is added to bring the concentration to the desired level rather than changing brine and preparing it afresh.

5. **Using frames and weights for keeping fish submerged**: This intervention has been very well received by Sathiyamma as she says that it keeps the fish down, improves brining as well as prevents maggot infestation. Their low cost is an added advantage for subsequent adoption.

6. **Covering vats with a strong lid**: This intervention again, is well taken. She says that it has prevented the seepage of rain water and kept her brine 'clean' and therefore reduced the need to change it frequently-definitely something that she would think about adopting.

7. **Using racks and frames for drying fish:** She recognises the fact that it promotes quick drying and easy removal in case of rains. But she says that the present capacity of the intervention does not allow for large quantities to be dried. What she therefore does is to dry the better quality fish on this while the others are dried as before.

Sathiyyamma accesses the markets at Nakkapalli and Kakinada for selling her products. She also buys dried fish from Vizag and resell at Nakkapalli. This is a coping strategy she sometimes follows during monsoons to save herself the trouble of losing products and therefore money. She also follows this in the post monsoon season starting from September, which is a lean season.

However, she said that though the product produced this time using these interventions, had reduced her losses by about 10 –20 % the price paid has remained unchanged. She is willing to adopt interventions in the form of

a. use of bleaching powder
b. use of frames and weights to keep fish submerged
c. using lids to cover the vats.

The above were low cost interventions which she was willing to try and did not involve too much increase in her cost of production and therefore not reducing her profit margins. However, their appropriateness during non monsoon periods were not uniform. For instance, she felt that cement lids would increase heat during non monsoon periods and therefore increase spoilage.

Kare Nookalamma:

Nookalamma is another large-scale processor. She operates alone. Her three sons go fishing. She has a processing shed located within the village and has 10 vats. She invests between Rs.10000 to Rs.15000 in her processing business. Her personal investment is usually a third of the total with the remaining two thirds being credit obtained from money lenders. She also practices dry salting which involved packing alternate layers of fish and salt and putting a weight on top for the water to drain out. She uses sea water for processing activities since she feels that the salt in the water gives a better product. When told about use of bore well water by other processors in the same village, she says that she is not being allowed to use that water. It appears that there have been some dynamics at the village level because of which she is not using the bore well at all. However, she cleans fish twice in case of varieties that can be gutted and once in case of small varieties, which are not gutted. Brine is changed once in two weeks and sometimes when care is taken to prevent entry of rain water, it is changed once in four weeks! She sells her products at Nakkapalli and Kakinada. Her main problem during monsoons she says are flies and maggot infestation.

Perceptions to interventions:

1. **Cleaning of vats with treated water**: Vats are cleaned only when the brine is changed. Rather than using treated, water, the vats are scoured with bleaching water and then cleaned with ordinary sea water. This is done as cleaning a vat requires about four pots of water and overnight treatment brings up the need to have one vat free, which is not possible always.

2. **Cleaning fish twice using treated water**: Nookalamma says that using treated water has helped in reducing fly infestation. However, when she handles a large quantity of fish it becomes difficult to wash them twice because the water consumption is high. This also calls for a large space to store the water for treatment overnight. She therefore improvises by adding bleaching powder to water and using immediately. The effect of such use is questionable.

3. **Using plastic sheet for gutting purposes**: This was something that she was following before. However as in the case of the earlier intervention, it becomes difficult for her to follow this when there are huge quantities of fish.

4. **Monitoring brine concentration during processing:** This is done using her own experience as a processor. As and when she feels that the strength is low, more salt is added to bring up the concentration. She uses the smell as an indicator of brine spoilage and therefore the need for change. The egg test method introduced during field testing is not followed by her.

5. **Using frames and weights to hold fish down**: This is an useful intervention she says. It helps in keeping the fish down and reduces their exposure to maggot infestation.

6. **Use of cement lids**: Though the lids are useful for preventing rain water seepage, they are not very practical for use on vats whose surface is not uniform. It results in incomplete closure and thus resulting in rainwater seeping in. Besides, Nookalamma is also not sure of the ability of her old vats to handle the weight of the lids. The problem of weight also causes problems while lifting them. Besides this Nookalamma also feels that the cement lids may increase heat inside the vats to a very high level resulting in spoilage.
7. **Using mats and racks for drying:** Though these interventions promote easy drying and transport during rains, they are unable to handle large quantities, which is the present drawback.

Nookalamma is not sure about how much of her product was saved by the use of these interventions though she admits that product loss was not as high as in earlier monsoons. However, she also reasons that the rains this year were not very heavy and the reduced spoilage could be attributed to that. On the market side, there is no change in the product prices though she does admit that quality was better. She is not very enthusiastic about adoption of all the interventions though she admits that the frames and weights used to hold fish down are very good in reducing maggot infestation.

She is therefore willing to adopt only the use of frames and weights. The lids would be useful if they were made lighter.

Kambala Yellayyamma

Yellayyamma operates at a lower scale when compared to the two processors mentioned above. Her investment is in the range of Rs 2000 –5000 per week all of, which is credit based. She not only takes loans from private money lenders like the other processors but has on one occasion taken a bank loan for Rs 3000 which she says has been repaid on time. She owns four vats and undertakes processing activities in partnership with her sister. Yellayyamma contributes her expertise in processing while her sister is the one who is responsible for marketing of the product. A careful processor, Yellayyamma takes great care of her fish during the monsoons. She uses borewell water for processing activities. Her perception to the interventions introduced are positive on the whole though she has reservations about following them under certain conditions.

Perceptions to the interventions:

1. **Cleaning of vats with treated water:** As in the case of the other processors mentioned above, Yellayyamma also cleans her vats when she changes her brine. Change in brine again is not done after every cycle. It is usually done after two cycles or more depending on her judgement of the brine quality.

2. **Washing fish before and after gutting using treated water:** This again is seen by her as a good intervention to avoid contamination. However, she follows this practice only when there is a manageable quantity of fish being processed. In case of large quantities of fish, only the larger and better quality of fish is given this treatment. She says that following this method for all varieties is not practical as it would involve fetching large quantities of water and allowing for sufficient treatment time. Her understanding is that using the treated water helps in arresting flies at the processing site. She therefore tries to

innovate by sprinkling treated water in the processing site to control the flies. In case of smaller varieties of fish the processing method does not involve gutting. So she just dips them in the treated water prior to brining.

3. **Use of plastic sheets for gutting operations:** This is an elementary precaution that most processors seem to have been following even before its inclusion and introduction through field trials. However, there are competing needs for the use of plastic sheets, which are prioritised depending on that particular point in time. For e.g. Yellayyamma says that if it is raining heavily and the varieties being processed are not high quality species, she prefers to safe guard her salt bags from the rain using the plastic sheet rather than use it for the fish. This is however the case only when she has bought a new bag of salt and is unable to store it indoors.

4. **Monitoring brine concentration:** As in the case of the other processors, Yellayyamma also uses her judgement gained through years of experience to decide whether the brine concentration is adequate or not. In case she feels that it is inadequate, she adds more salt to bring up the concentration.

5. **Using frames and weights for complete immersion of fish:** This is an intervention, which has convinced Yellayyamma about its benefits completely. She says that it keeps the fish submerged and therefore reduces maggot infestation. She has also taken the initiative of preparing more frames at her own expense.

6. **Using cement lid for covering the vats:** Though she is aware of the benefits of using the lid (i.e. preventing rainwater seepage and contamination) she says that they are very heavy and therefore difficult for her to handle. She has injured herself a couple of times before trying to lift the lid she said.

7. **Using racks and trays for drying:** Though the racks and trays are useful in promoting quick drying and easy removal during rains, she feels that they are not suited for handling large quantities.

Yellayyamma who accesses the markets at Nakkapalli, Kakinada and Peddapuram feels that the use of the above mentioned interventions have helped in reducing flies and maggot infestation. These are two visible benefits of the use of the interventions. However, there has been no increase in price at the market for the improved product. But she is happy that she has been able to save between 20 –30% of her product. Her advantage in the market lies in the fact that the better product moves faster (though at the prevailing price).

About the suitability of the interventions during non monsoon periods, she says that use of water treated with bleaching powder, frames and weights are all prevailing and irrespective of the season. These are therefore two interventions that she is willing to adopt. As far as the lid is concerned she is not very sure. If it were not so heavy, it would be more useful she says.

General perception of processors Suradupeta Mayapatnam

The processors on the whole felt that these interventions were well suited to their needs. However, they did feel that it was only large-scale processors who could benefit from these. One reason being that smaller processors rarely processed during monsoons – the risks being high. Even if they did, the smaller processors used hollowed out palmyrah trunks, which had an uneven surface on which a cement lid would not sit easily. Besides, the sizes being non

uniform, standards size frames for immersion of fish could not be used. The processors therefore found it curious that when the interventions were targeted for larger processors who handled larger quantities of fish the racks and mats did not allow for drying of large quantities of fish and could at present serve the needs of smaller processors who did not process during monsoons.

But generally, the feeling that was shared by all the processors at the group meeting of the *Mahila Mandal* was that certain interventions like use of treated water to clean fish was applicable to all processors in all seasons as it involved very little inputs financially. There was also some discussion about cleaning of vats. Some of the processors felt that if the design of the vats could be altered with a drain hole at the bottom it would help them in the cleaning operation.

To conclude it can be said that the processors at Surdapeta – Mayapatnam did perceive a certain amount of loss reduction by use of the improved processing practices. Though the intervention menu was not used in totality and did not evoke a uniform response from all the processors it can be said that the following practices were found to be very useful in this village:

1. Using water treated with bleaching powder (though sprinkling it on the processing site to control flies was what made it attractive to the processors.)
2. Use of frames and weights to keep the fish submerged
3. Use of cement lids if they could be made lighter.

Village: Konapapapeta

The field trials at Konapapapeta did not go as planned. One of the reasons was that there were a number of days when there was not enough fish landings for processing. Therefore one of the processors, Kondela Bangaramma abstained from processing. Besides, one of the processors, Benugu Bangaramma was ill and could therefore not take up processing activities continuously during the trial period. However, the inputs provided to both these processors were used by Palleti Nallamma, who is a large processor. She has been using these inputs and interventions thereby becoming a respondent for this study. Kare Muthyalamma was not available for discussion as she had left for her sister's house in another village 25km away to take care of her sister who had suddenly suffered a paralytic stroke. There was no one else from Muthyalamma's family available for comments.

Benugu Bangaramma and Palleti Nallamma : Benugu Bangaramma did not process all through the monsoon field trials as the availability of fish landings was low. Being a medium scale processor who processes fish worth Rs 3000 –5000 per week she felt that the price of fish was too high for her to take up processing. She therefore transferred her inputs to her daughter who is a large scale processor investing about Rs 10,000 – Rs 40,000 per week in processing. The daughter and mother however do not do business together. Nallamma has a big processing shed located on a sand dune close to the village.

Perception to interventions

1. **Cleaning of vats with treated water**: The vats are cleaned only in cases where the brine is changed which is usually done only after two weeks. The processors are aware that cleaning vats reduces contamination and therefore spoilage. But they still have

reservations about regular cleaning with treated water. The source of water for processing is sea water and cleaning with treated water involves large quantities of water and a long time to allow for treatment. Besides, it also necessitates that one vat be kept free for storing water for treatment. The processors therefore scour the vats with bleaching powder and clean it with untreated water.

2. **Washing fish with treated water before and after gutting**: This was not followed most of the time because, in most cases, varieties like ribbon fish and mackerels were landed, which were not gutted. They were therefore just dipped in treated water before brining. However when very large quantities were being processed, Nallamma the large scale processor sprinkled bleaching powder directly on to the fish to prevent flies. She was emphatic that this did not in any way affect the quality of the product and in the long run was easier to follow and more effective than using it to treat water for processing. The direct use of bleaching powder in processing products used for human consumption is something that needs to be looked into by technologists. This report however refrains from commenting on it as it is beyond its scope.

3. **Using plastic sheet for gutting operations:** Plastic sheets are used for gutting operations only when the quantity processed is not very large. The processors recognise the advantages of using plastic sheets to reduce contamination, but follow its use only for larger varieties like seer and pomfrets. The smaller varieties, which are not gutted while processing do not require the use of plastic sheets.

4. **Use of frames and weight for complete immersion** This is very well taken and the processors are very happy with the visible reduction in maggot infestation.

5. **Using cement lids for covering the vats:** This is also recognised by the processors as being useful for preventing seepage of rainwater thereby reducing the risk of spoilage of brine and therefore the need for changing it. However, it was felt that the weight of the lids was a constraint in its usage.

6. **Monitoring brine concentration** The processors monitor the brine concentration by experience. In cases where they feel that the concentration is not high enough for effective brining, salt is added to bring up the concentration.

7. **Use of mats and racks for drying** The mats and racks provided were found to be insufficient to handle large quantities though individually the processors were convinced that they increased air circulation and were easy to move about in case of sudden rains. Nallamma used the mats for preparing dry salted product.

The products were sold at the Nakkapalli market. Though better in quality the products prepared using these sets of interventions did not fetch an improved price in the market. However the processors who participated in the field trials were sure that quantity lost in spoilage was lower this year. Again, they were not sure whether it was because of the interventions or a season of low rainfall. Regarding the appropriateness of these interventions during non monsoon periods, they were of the opinion that use of bleaching powder and frames with weights could help in preparing better products even during non monsoon periods as it did not involve much investment. However, use of cement lids during summer was something that both Bangaramma and Nallamma were skeptical about. They felt that it

would increase the heat and spoil the product. Nallamma however felt that if the vats were housed in a shed such deleterious effect of the lids could be reduced.

The other processors in the village could not comment about these interventions because, this year on the whole, processing activities had been very less at the village level. Besides some of the other processors had a feeling that some external agency was helping two large processors in the village and were therefore very upset and unwilling to talk about the interventions.

Village: Chodipallipeta

Koda Danayyamma : Danayyamma processes in partnership with her sister. Together they invest about Rs3000 –5000 per week in processing activities. The expertise in processing comes from Danayyamma while her sister handles the marketing side of the enterprise. Their capital investment is about 30% from their own sources while the remaining 70% is through external sources like private money lenders. Given below are her perceptions to the introduced interventions :

Perception to interventions :

1. **Cleaning of vats with treated water**: Danayyamma owns five cement vats. She recognises that cleaning of vats is essential to prevent contamination. However, this is only done whenever she is changing the brine, which may be once in two weeks. Rather than cleaning with treated water she prefers to scour it with bleaching powder and clean with untreated sea water. She also feels nervous about shifting her old vats for cleaning as she feels that it may break during the process. Buried vats again cause problems during cleaning.

2. **Washing fish twice using treated water**: She says that use of treated water has helped in reducing flies. However, washing fish twice is done with treated water only in cases where the varieties are large ones requiring gutting. In case of the smaller varieties, they are just dipped in treated water before brining. But even this she says would not be practical to follow when there is a glut landing and large quantities for processing.

3. **Use of plastic sheets for gutting operations**: This was a practice, which she says she was following before. But when there are large quantities for processing the sheet cannot accommodate all the fish and in such cases, gunny bags/ palmyrah leaves are also used.

4. **Use of frames and weights to keep fish submerged:** This is an intervention whose benefits seem very clear and convincing to her. She says that visibly the maggot infestation has reduced after its use.

5. **Use of cement lids for covering vats:** This intervention again is well taken. It has helped in reducing seepage of rain water, thereby keeping her from changing her brine frequently. However, the weight of the lids make it difficult for her to manipulate easily without help.

6. **Monitoring brine concentration:** The brine concentration is monitored using years of professional experience. Whenever the brine is found to be dilute, more salt is added to bring up the concentration.

7. **Using mats and racks for quick drying:** This is not very well taken. Danayyamma claims that they are insufficient to dry the quantity that she processes. When asked whether a large or more number of such racks would be useful, she was skeptical. She prefers to dry it on old nets.

Danayyamma sells her product at the Nakkapalli market. She claims that there has been no visible improvement in quality with the use of these interventions. One reason for this could be that there has been irregular fishing during the field trial period as a result of which there have been no regular processing activities. Besides the monsoons this year have not resulted in very heavy rains as a result of which the processor has not really been exposed to the benefits of the interventions and seen the effect of reduced losses. However, she is willing to concede that the fly and maggot infestation has been much lower this year due to the use of bleaching powder and frames and weights.

Marupalli Lakshmi : Lakshmi is a large scale processor whose investment varies between Rs5000 – Rs16000. About 50% of her investment is credit based with the source of credit being private money lenders. She usually deals in smaller varieties like mackerels and anchovies. Given below are her perceptions to the introduced interventions :

Perceptions to the interventions:

1. **Cleaning of vats with water treated with bleaching powder:** She owns six cement vats and cleans them once a week or whenever she changes the brine. Rather than using treated water for cleaning purposes, she scours the vat with the bleaching powder before using ordinary sea water to rinse it out. The reason for not using treated water for cleaning is because, she cannot spare a vat for treating water.

2. **Washing fish twice using treated water** Since she processes only smaller varieties, she finds it unnecessary to wash it twice since gutting is not done. However she does recognise the fact that use of treated water has reduced fly infestation.

3. **Use of plastic sheets:** The sheets are used only when gutting is done. In case of smaller varieties no gutting is done and the fish is directly put into the brine. This does not require the use of the plastic sheet.

4. **Use of frames and weights to keep fish down:** Though Lakshmi is aware that it helps in keeping the fish submerged and thereby reducing maggot infestation, she is unsure about using it when the vats are full because on one occasion, when the vat was full of sardines, the fish adhered to the frames resulting in a foul odour.

5. **Use of cement lids as cover for the vats:** The use of lids is seen as a definite way to prevent seepage of rainwater and is therefore well accepted by her. However, she says that the lids are rather heavy and she is unable to lift them up by herself.

6. **Monitoring brine concentration:** Lakshmi monitors brine concentration using her experience. Whenever the concentration is low she adds more salt. Brine is discarded only when rainwater seeps into it.

7. **Use of racks and mats:** She has not used these at all though she recognises the fact that they help in easy drying and quick removal. The reason for not using them is because on

the few days that she has undertaken processing it has only been small varieties that have been processed and the quantities being large she has been unable to dry them all in the racks and mats. She has therefore used the traditional method of drying on old nets.

Lakshmi like the others before her is not sure if the market has been sensitive to the product produced using these interventions. She was constantly complaining about the fact that prices this year at Nakkapalli have not been very favourable on the whole as fish has come in from Nellore and other areas in Southern AP resulting in a fall in prices. Other the use of bleaching powder she is not sure about taking up any of the other interventions. As far as their use in non monsoon periods is concerned, she is sure that she does not want to invest in any of the interventions, because, they would involve expenditure and she is not convinced that it would pay off economically in the long run.

Chokka Kasiyya : Chokka Kasiyya is a person belonging to a minority group – a male processor in a largely female dominated profession. He belongs to the fishing community and has been processing for the last eight years. He prefers this to going to sea because it is safer. He is assisted in processing related activities by his wife. His investment is in the range of Rs5000 –Rs10,000 per week with about 50% of it being supplied by external sources in the form of private money lenders from inland villages.

Perception to interventions:

1. **Cleaning of vats using treated water**: Chokka Kasiyya who owns seven cement vats was of the opinion that cleaning vats was essential. However, he did not feel it was necessary to use treated water for that purpose. He felt that scouring the vats with bleaching powder and subsequent rinsing with sea water would be sufficient. He cleans his vats only when the brine is being changed.

2. **Washing fish twice with treated water** : The processor was of the opinion that this was something that needed to be done only in case of larger varieties which were gutted before brining. In case of smaller varieties, he just dipped them in the treated water before brining. However, he did notice that the use of treated water had reduced fly infestation.

3. **Use of plastic sheets** : Plastic sheets were only used if gutting operations were involved. In case of smaller varieties, which were not gutted there was no need to use plastic sheets felt the processor. He did not feel that the resulting contamination would be too high. Besides, it was too much effort involved (spreading the sheet, cleaning it afterwards etc) when the varieties were small ones and not likely to fetch very high prices.

4. **Use of frames and weights for keeping fish submerged:** This intervention again is very well taken. The processor is visibly convinced about the reduction in maggot infestation.

5. **Use of cement lids:** Again, this is another intervention that has been well received. It has helped to reduce water seepage during the rains. However, he is not sure whether he would invest his own money in more lids because, he feels that it would be too expensive.

6. **Monitoring brine concentration:** This again is done using experience.

7. **Use of racks and mats for drying:** These were not used by him. He felt that the quantities he had processed were too large to dry on the racks.

Kasiyya sells his products at Kakinada and Nakkapalli. His sales are very often on credit. He has to sometimes make several trips to recover his price. But he prefers that to keeping the product with himself . He also commented that this year, the processing activities were not very vigour as fishing was not very regular. Besides, the products flooding the markets from other places in AP had resulted in a fall in prices. On the whole, he seemed to think that other than the bleaching powder use and the frames and weights, the others involved too much investment financially and were not suited to his needs.

General perception of processors Chodipallipeta

It was interesting to note that in Chodipallipeta, the general tone of the discussions seemed to indicate that the processors felt that they were owed something by the facilitating agencies involved in the field trials. They felt that were “doing a favour” by trying out the interventions. This was illustrated in constant reference to the cost of interventions (“We will pay only 50% of the cost of the cement lids. You arrange finances for the rest” was and example of an oft repeated comment) The consultant is of the opinion that due to irregular processing activities and rather mild monsoon the processors have not been in a situation where they really used the interventions to the maximum. Another reason could be the constant coming and going of outside agencies during field testing, monitoring and subsequently for the perception study. This has in some way led the processors to the opinion that their cooperation was essential to ensure the success of some experiment and they were well within their right in demanding financial assistance for that.

CHAPTER 3

ORISSA

Unlike the case of Andhra Pradesh the classification of processors here cannot be attempted in general. A village wise classification again is not possible (most processors in the villages of New Bakshipalli and Balipantal are homogenous) except in the case of Chandrabhaga.

The following three villages were chosen for field testing of interventions in Orissa :

New Bakshipalli:

New Bakshipalli is a fishing village near Gopalpur. The community is largely Telugu speaking. The crafts used are traditional as a result of which there is not much fishing during monsoons. The fish is marketed by the fisher women and cycle traders in the fresh form in the nearby villages and villages a little inland respectively. Most of the women are involved in processing rather than in fresh fish trade. Only two processors could be contacted for responses as one of them, Hemlatha was away from the village.

Rajamma:

Rajamma is an enterprising middle-aged processor. She has considerable leadership qualities representing women in the village Panchayat or local self-governing body. Rajamma undertakes processing activities along with four of her family members (three sisters and an aunt). Together they own six vats. Her weekly investment ranges from Rs2000-Rs10000. Most of this is in the form of credit from non institutional sources which carry an interest rate of Rs.3 for credit worth Rs100 per month. Though the interest is repaid promptly the principal amount revolves. The credit burden is shared by all the five processors. The processed fish is marketed at the Humma market, which is usually held on a Sunday between 5-10 AM. She along with other processors hire private transport to go to the market. The charges include Rs 2 per person and Rs3 per basket.

Perceptions to the introduced interventions are as follows:

1. **Cleaning of vats using bleaching powder**: The vats used in this village are of cement and locally made and have a capacity of about 100 –150kg. The cleaning of the vat is done only when the brine is changed. The brine as in the case of the AP villages is discarded only when rainwater seeps in. The vats are scoured with bleaching powder and washed subsequently. The processor can visibly see the reduction in fly infestation after washing with bleaching water. This is an intervention that she feels she can adopt easily.

2. **Using treated water to clean fish**: Fish is usually cleaned here using seawater. However, using water treated with bleaching powder was something that was found to reduce fly infestation. However, there does not seem to be much treatment time allowed. The water to which bleaching powder is added was said to be used immediately. This says Rajamma is mainly because, she has to spare a vat overnight for treatment purposes and this may not always be possible when there is a lot of fish. Under such circumstances, she has to prioritise and innovate.

3. **Use of plastic sheets for gutting operations**: They normally used palmyrah leaves for gutting. The fish that were processed during the monsoons this year were sardines, ribbon fish and croakers which did not require gutting operations. She was therefore not able to comment very clearly about the use of plastic sheets in reducing monsoon losses in fish processing.

4. **Use of lids**: The lids were found to be very useful as they successfully prevented seepage of rain water and also fly infestation. The vats in the area being smaller and different in size when compared to those in AP, the women made lids to suit their own purposes.

5. **Use of wooden frames to hold fish down**: This was found to be very useful to keep the fish fully immersed and thereby promoting uniform salting and protecting from exposure to insect attack. However, Rajamma pointed out that they served their purpose only when the vats were fully which was not always the case during monsoons.

6. **Monitoring brine concentration**: This was done using their experience. They did not use the egg test. Rajamma felt that having been a processor for the last fifteen years of her life gave her ample experience to know when the brine concentration was adequate. She did not need to use an egg for it she said ! Whenever the concentration fell below her expectation she added some more salt to bring up it up to the required level.

7. **Use of racks and mats for drying**: The racks and mats given out during the field study were used by Rajamma. However, she felt that the mats could not dry large quantities of fish. The present capacity for them was about 5kg when on an average she processed at least 50kgs during the monsoons. But she recognised that it was a concept that was sound and would find wider acceptance if they could contain larger quantities of fish.

Rajamma, speaks of the interventions in a positive tone. However, she says that the monsoon is usually a season when there is less fish and less processing. They cope with the high risk situation by not processing. But as a concept the interventions seem well accepted by her. She says that she plans to try out some of them like use of bleaching powder and use of lids to cover vats during non monsoon periods too as they have helped in controlling insect infestation. She has lost a lot of her processing infrastructure during the cyclone. However, when she builds new vats, she said that she is going to insist that lids that fit them are also made. When asked whether the market is willing to pay a better price for an improved product, she was not very sure. It is because of this doubt that she plans to invest on those interventions that would cost least and last long.

Enjamma:

Enjamma processes along with two of her daughters. She is considerably old and has been processing for many years. Between the three of them, they own seven vats and invest about Rs.3000 – Rs.10000 weekly in processing.

Perceptions to the intervention:

1. **Cleaning of vats using bleaching powder**: As in the case of Rajamma, the use of bleaching powder for cleaning operations seems well taken. She realises that it is important to clean her vat to obtain a good product as it reduces fly infestation. However, the cleaning is done only when the vat is emptied of brine, which is done after 2-3 cycles.

2. **Use of treated water for cleaning fish**: Water from the sea is treated with bleaching powder and used immediately. This is done to save time and allow for infrastructure like vats to be available for fish. Enjamma insists that treatment time for twelve hours is not necessary. Half an hour is enough to treat the water.

3. **Use of plastic sheets for gutting**: The fish processed during monsoons are usually the smaller variety and no gutting operations are necessary. Therefore, the use of plastic sheets here was seen by her as not essential.

4. **Monitoring brine concentration**: Monitoring of brine concentration is done using individual experience. The brine is discarded only when rain water seeps in. On other occasions, the concentration is monitored and brought up to the normal by adding extra salt.

5. **Use of lids to cover the vats**: While Enjamma recognises that the lids prevent rain water seepage, she felt that they were too heavy for her to handle on her own. The processing area being at a distance from the village and the fact that there were only three of them working together she did not always get help to move the lids.

6. **Use of weights and frames**: Enjamma did not have an occasion to use the frames because, she processed only about 10-50kgs of fish on a weekly basis this time during the monsoon. Therefore the vats were not fully and it was not possible to use the frames with so little fish. But she does concede that they would have helped if the vats were full by enabling complete submergence.

7. **Use of mats and racks for drying**: She was using these inputs since she processed only small quantities of fish. They were helpful for easy removal during rains and could be stacked easily inside the house. However, she felt that their capacity was not sufficient to handle larger quantities.

Enjamma like the other processors sells her produce in the Humma market. She was not sure whether the market would be willing to pay higher prices for her improved and less damaged product. However, she was sure that of all the interventions, the use of bleaching powder was something which she would definitely adopt. The others had to be modified or used only under specific conditions.

Village : Chandrabhaga

Chandrabhaga is a fishing village located very close to the town of Konark and is populated largely by fisherfolk from Andhra Pradesh. Though they have been living in the same area for a long time, they have and still face the threat of eviction from their village as the government considers it to be an illegal settlement. The fisherfolk in this region are enterprising. Being easily accessible, fish is usually sent out fresh in trucks by big traders who buy a large chunk of the catch. The remaining fish is usually bought by the women who sell it either fresh in the town of Konark or process and sell it in the markets of Humma and Nakkapalli. This village being close to the beach has been damaged considerably by the cyclone in Oct-Nov 1999. However, they are now busy rebuilding their lives and their houses on one hand and on the other, battling with the government to grant them ownership rights over the land they reside in. It must be mentioned here, that though the thoughts of the cyclone and its trauma were

fresh in their minds, they were still very clear about the objective of the present study and went so far as to elaborate the process of selection of participants for the field trial. The selection done in partnership with a local NGO and the field testing team took into account the women's groups in the village with each group leader suggesting a participant. One explanation to this extremely methodical way of sharing information by the participants and the others from the village could be previous exposure to the Post Harvest Fisheries Project and the efforts of the local NGO.

Mallipalli Bendamma :

A young woman in her thirties, Bendamma mostly deals in dried and processed fish. She processes along with four of her family members (sister-in-law, mother and two cousins). The families of all these women are headed by them and they all depend on fish trade for their livelihood. Between the five them there are four vats (each of 100 –120kg capacity) and the total investment ranges from Rs.2000 –4000 per week. This taken in the form of non institutional credit with an interest rate of Rs100 per Rs1000 borrowed per month. The interest is paid on a monthly basis and the principal cleared at the end of the year.

Perceptions to interventions

1. **Cleaning of vats using bleaching powder** : This _is followed by her whenever she discards brine. The vats are scoured with bleaching powder and rinsed before they are used again. However, brine is changed after two cycles or when she feels that rain water has entered it or some insect infestation has set in. On the whole, she says that use of bleaching powder has reduced flies and maggots infestation thereby reducing spoilage and improving quality of the product.
2. **Using treated water for cleaning fish** : The fish is dipped in sea water to which bleaching powder is added and then processed. Most of the variety processed this monsoon were ribbon fish and catfish and required no gutting. Bendamma understands the need to allow for treatment time. However, she says that it depends on whether she can spare a vat for that purpose overnight which again depends on the availability of fish. A good intervention, she says that she will definitely adopt the use of bleaching powder more regularly irrespective of the season.

3. **Monitoring brine concentration**: Bendamma relies on her experience to monitor the brine concentration. She makes up for reduced concentration by adding extra salt.

4. **Use of plastic sheets for gutting operations**: This has already been in use in the village due to exposure to previous fisheries programmes.

5. **Use of lids:** The cement lids used to cover vats have been replaced by use of lids covered by plastic sheets. This has reduced fly and maggot infestation and is easy to handle.

6. **Use of frames and weights to hold fish down** This has helped Bendamma by completely immersing the fish and reducing the exposure to insect and maggots. However, she says that vat needs to be filled to capacity for the frame to be useful.

7. **Use of mats and racks:** This is not a new concept here as the villagers have been using drying racks for quite sometime. Bendamma understands the concept of the mats and

racks that have been given to her as part of the intervention package but feels that their capacity is not adequate.

Bendamma sells her product at Humma which she accesses using a shared transport (usually a lorry). She also goes to Nakkapalli market by taking the lorry up to Puri from where she takes a train. Transportation costs to the markets are shared amongst all the processors who use that form of transport based on the profits made by them.

Chepala Thotamma :

Thotamma undertakes processing along with her daughter and sister –in-law. Her son is an alchoholic and so are the men from the families of her partners. They therefore depend on fish processing as major source of income. Thotamma deals only in processed fish. She invests Rs2000-7000 per week. She also takes credit from the same sources as Bendamma at the same rate with the same conditions for repayment.

Perception to introduced interventions

1. **Cleaning of vats using bleaching water** Thotamma cleans her vats whenever she changes the brine. She recognises the importance of cleaning the vat using bleaching powder as it cleans her vat thoroughly and prevents fly infestation. This is something that she feels that she can adopt easily as it requires very little investment.

2. **Washing fish in treated water** Fish is washed in water treated with bleaching powder by Thotamma as she feels it will improve the quality of the product. She does not allow for much treatment time because she has only 3 vats and keeping one overnight with treated water is something that she feels would be a waste since, it could easily be used to keep fish. She feels that treatment time is not the factor but the use of the powder is what is important.
3. **Use of plastic sheets for gutting** She has already been in the practice of using plastic sheets for gutting since it keeps the mud out. However certain varieties like eels cannot be gutted or cut on plastic sheets as they are slippery, she says. She says that she deliberately uses sand to reduce the friction and subsequently washes it off in the treated water.

4. **Use of lids** This seen by her as positive. The wooden lids are light and easy to handle and the plastic cover helps protect them. The use of lids has reduced entry of rain water and exposure to fly infestation. This is something that she definitely plans to use even in the non monsoon months.

5. **Use of frames and weights to hold fish down** This is also seen as useful as it promotes uniform brining and reduces exposure to maggots. However she finds their use limited when the vats are not full to capacity.

6. **Monitoring brine concentration** : Thotamma uses her experience to check the brine concentration. In case the concentration falls short of expectation, she adds more salt to make up for it.

7. **Use of mats and racks** Thotamma was not given mats and racks as she like the others have been using drying racks for quite sometime. Thotamma sells her product at Humma and Nakkapalli. She says that the market appreciated her quality and at one time she got

an extra Rs2 per kg of product . She feels that the use of bleaching powder and the wooden lid require very little by way of inputs but help in producing good quality product. She is going to adopt them on a regular basis.

Chawakula Gangamma :

A single woman who has been recently widowed, she relies entirely on fish processing for a livelihood. She sometimes employs hired labour by paying Rs 30 per day. She invests about Rs 1000-5000 in the processing activity. The finance is through non institutional sources like the other processors at the same rates of interest and repayment conditions. She owns six vats.

Perception to interventions

1. **Cleaning of vats using bleaching powder** She cleans her vats twice a week with bleaching powder. It helps in giving good quality product, and reduces spoilage due to fly infestation. Since it requires very little investment, it is an intervention that she wants to adopt.

2. **Washing fish in treated water** This again, is something that Ganagamma feels has improved the quality of product. She has allowed for treatment time whenever possible. Again, she feels that this is worth adopting with appropriate innovation (i.e. whether or not to allow for treatment time when there are glut landings).

3. **Use of plastic sheets to gut fish** She has already been following this and recognises that it keeps contamination out and therefore spoilage.
4. **Use of lids :** The lids used to cover the vats are important as they reduce fly infestation and rainwater seepage. However, the plastic coating on the wooden lid has to be preserved says Gangamma for the lid to be effective. Again, she feels that it is worth adopting.

5. **Use of frames to hold fish down** This is definitely useful and again requires very little inputs and can be locally made. It helps in uniform brining and keeps out maggots by immersing the fish completely. But she feels that when fish quantity is low they will be of no use.
6. **Monitoring brine concentration:** Though she usually relies on her experience to monitor the brine strength she says that she also used the egg test as it helped her to save on salt. She was not sure whether she would continue doing that in future.

7. **Use of drying racks :** She is used to drying her fish on racks and is fully convinced of its advantage.

Gangamma feels that all the interventions are worth putting into practice as they are easily available and require minimum inputs.

Village: Balipantal

This village is different from the other villages in the sense that it has a strong agricultural orientation. Most of the fisherfolk here own some land and dairy animals like cows. The village is difficult to access as the transport system linking it is poor. Fishing is done by the

menfolk in the sea, which is accessed by a creek. Crafts used are traditional. Most of the fish caught are sold to traders at the jetty near the entrance to the creek. It is only the left over fish i.e. low value species that are brought home for processing. It was interesting to note that in this village the women seldom bought fish for processing. Processing is done only with fish caught by fish brought in by their own menfolk. The processed fish is sold at the Astarang market, which is accessed by the women by foot. They walk a very long distance for about two hours on market days to sell their processed fish and buy provisions for the household. The monsoons present problems of inaccessibility to markets, which results in the processors storing their fish at home for weeks, which in turn led to losses. The processing here is done in earthen vats buried in the ground or in pits lined with plastic. During glut landings the catch is usually sundried on the beach away from the village. The usual species that are processed during monsoons are silver bellies, croakers and ribbon fish.

Parboti Behera

Parboti's family owns its own boat and process the catch that is their share of what is remaining after the main sales. Processing is done at the household level using four earthen vats (average capacity of one vat is 30-40kgs) and family labour consisting of Parboti, her two daughters and daughters –in- law. Since two of her sons also go along with her husband to fish there is enough catch for them to bring home for processing.

Perceptions to interventions

1. **Use of bleaching powder to clean vats** The processor cleans her vats using bleaching powder. She said that it was beneficial as it helped to reduce contamination by way of flies and insects and helped in giving a product that was of better quality. She is willing to adopt its use on a more regular basis.

2. **Use of treated water to clean fish** Fish is usually cleaned using pond water. Parboti allows for treatment time of 2-3 hours before using the fish. This again like the earlier interventions seems to have won her approval as Parboti says that she will continue to do so. She was however not able to explain why she did not allow for treatment time overnight. It could be mainly to save on time.

3. **Use of plastic sheets for gutting operations** This is something that was already being followed by Parboti and the other processors. They all recognise that it will reduce contamination and subsequent damage to the product.

4. **Monitoring brine concentration** Parboti was the only processor who said that she was using the egg test on a regular basis as it helped her save on salt.

5. **Use of lids to cover the vats** The processors were earlier using plastic sheets to cover their vats which did not help to keep out the water. The cement lids introduced in the field trials were heavy and the processors felt that they may break the earthen vats. They were therefore planning to get earthen lids made locally during the winter which is the time the potter visits their village. However with the coming of the cyclone it has not materialised. However, the fact that Parboti was considering making her own lid to suit her vat goes to prove that she is convinced of its use.

6. **Use of frames and weights to hold fish down** This intervention has helped to keep the fish down thereby reducing infestation by flies and maggots. It has also promoted even salting. This again is something that Parboti is willing to adopt even during non monsoon periods. However she is not sure of their use when the vat is not completely full.

7. **Use of mats and racks for drying** The processor was convinced that the mats and racks given were useful for drying and easy removal during rains. However, she felt that the capacity was not adequate.

Parboti was of the opinion that the interventions did help in improving the quality of her product and reducing losses. She sometimes got an increase in price of Rs2-3 per kg of the product during the monsoon. However she added that it depended on the market situation – when the quantity was less she could get higher prices and when the market was flooded with fish her product moved faster but at the same prices which again is a positive phenomenon.

Menaka Behera :

Menaka comes from an extended/joint family consisting of 23 members. Fishing is done by her husband and three of his brothers in their own craft. As in the case of the other processors, fish is not purchased but the fish brought home by the men is processed. The family owns four earthern vats.

Perceptions to interventions

1. **Use of bleaching powder to clean vats** : This intervention is being followed by Menaka who is convinced that the use of bleaching powder has reduced fly infestation and kept her vat clean all of which has resulted in good quality product.

2. **Use of treated water to clean fish : T**he fish is cleaned by dipping in water to which bleaching powder is added. Menaka too did not feel that treatment time overnight is essential. The monsoons being rainy they liked "to save on time and get the processing over as soon as possible".

3. **Use of plastic sheets for gutting:** This again is not a new intervention. She was already following it as it helped reduce contamination.

4. **Use of lids :** The concept of using waterproof lids was indeed helpful says Menaka who until then had been using plastic sheets to cover her vats. However the cement lids introduced were too heavy. She, like Parboti had also been hoping to get earthen lids made for her vats during the winter. But now after the cyclone she is not sure when it can be done.

5. **Use of frames and weights to hold fish down** An easy intervention to follow, says Menaka. The frames and weights had helped to keep the fish down so that they were not exposed to flies. She plans to make similar ones and use them. But she feels it cannot be used if the vat is not full to capacity.

6. **Monitoring brine concentration**: Though she does not use the egg test to check on the brine strength, Menaka relies largely on her experience to know the concentration of the brine.

7. **Use of mats and racks for drying** : Menaka feels that they would have been more useful had their capacity been higher.

Like Parboti, Menaka also reported higher prices for the product produced using the above interventions. She feels that all the interventions field tested by her required minimum inputs and were worth adopting during all seasons.

Charulatha Behera :

Charulatha's family owns a FP boat and a traditional craft. Processing of the catch is done by the women of the family using six earthen vats.

Perceptions to interventions:

1. **Use of bleaching powder to clean vats** : This is well taken by her as it has helped in keeping the vats clean and ensuring good quality product.

2. **Use of treated water to clean fish** : This again is seen positively. However, treatment time is not given.

3. **Use of plastic sheets :** She was already using them for processing activities as they helped to produce cleaner product.

4. **Use of lids** The lids were found very useful in reducing seepage of rainwater. Charulatha was also considering making lids more suited to her needs.

5. **Use of frames and weights to hold fish down** Charulatha feels that this intervention has helped in keeping her fish down and fully submerged thereby reducing exposure to infestation.

6. **Monitoring brine concentration** She does this using the egg test as well as her own experience.

7. **Use of mats and racks.** They were found to be useful but they were unable to dry all the fish processed.

The village of Balipantal has been affected badly by the cyclone. It was therefore difficult to get the processors to talk about anything else. The opinion of the author is that the positive responses not withstanding, the people here did not give much thought to the losses encountered during monsoons in processing. It appears that their single most important problem is the lack of adequate transport system into their village which result in their inability to go the markets regularly during the monsoon and the resulting spoilage that comes up due to long term storage of the product. Discussions with them revealed that many of them did not process during monsoons as the fishing was uncertain. The fact that they did not invest cash in their venture could be a reason for their taking a casual approach to the question of monsoon losses.

CHAPTER 4

CONCLUSION

To conclude, it can be said that on the whole there has been a positive response to three of the introduced interventions. However the perceived use and benefits of the interventions by the processors have been a little different from that of the facilitating agencies. Some of the issues that influence the uptake of a particular intervention are:

a. **Visual impact**: One issue that emerged was that the processors were impressed only with interventions which had a visible impact like the use of bleaching powder and frames and weights to hold fish down. They helped to control flies and maggots respectively and this was visible to the processors and were hence well received. These are also interventions that require minimum financial investment and therefore did not present the processor with a high risk situation.

b. **Increase in workload**: Increase in workload again is an important factor. Washing fish twice in treated water involved carrying large quantities of water and allowing for treatment time. In some cases it also required that one vat be spared for the purpose of treating water. This was something that the processors felt that they could ill afford when there were large quantities to be processed. They improvised by using the suggested methodology for better quality fish while the others were processed as before. This has led to an innovation in using certain practices like use of bleaching powder, which is sometimes sprinkled mixed with water around the processing site or used directly on the fish. The later is a phenomenon that needs looking into.

c. **Quantity processed**: Linked to the points mentioned above, this influences the use of certain practices like drying the fish in racks and mats, washing the fish twice.

d. **Traditional practices**: The traditional practices followed for monitoring brine concentration and subsequent changing of brine also influence the uptake of the interventions. Besides, frequent changing of brine involves greater effort and is therefore not done.

e. **Condition of processing infrastructure:** The condition of vats being old in many cases and in some cases where they are buried in the ground, cleaning regularly is not done regularly for fear of damaging them. This is also true in the case of using cement lids as cover because, the processor is worried that it may damage her vat.

f. **Perception to losses:** A general perception of the processor is that losses due to contamination occur during processing. But this is not given as much importance as for e.g. losses due to maggot infestation. This influences use of hygienic practices in processing. However, this does not mean that none of these practices are followed. They are followed but only where the processor feels that taking extra care would result in better prices. So low value species doe not receive the care that high value fish would.

g. **The weather conditions and irregular supply of fish for processing:** Discussions with the field testing team and processors reveal that this year the monsoon has not resulted in heavy rains as a result of which the need for a particular intervention has not been clearly

demonstrated to the user. Besides, in certain villages, there has been irregular fishing as a result of, which processing activities were not taken up regularly. This again has been a deterrent. Certain villages like New Bakshipalli in Orissa did not usually take up processing during monsoons since there was very little fishing during the period. They were therefore not able to state clearly the extent of their losses during the monsoons.

h. **Price of product:** While the objective of the exercise has been to reduce losses during monsoons and consequently help the processor to earn extra income at the prevailing prices for the increased quantity, this has not been achieved completely. The reasons of course have been largely due to the fact that in most of the villages, there have been days when there has been very little processing as fish was not available. Besides, it was unfortunate that on certain days, when the processors went to the market, the supply from other areas in AP flooding the market, stocks have remained unsold or been sold at lower prices.

Andhra Pradesh :

The above interventions are also useful during non monsoon periods say the processors. They also suggested that some design related changes in the form of introducing drain holes for vats would help in regular cleaning.

The intervention menu is limited by the fact that it is targeted essentially at a medium and large scale processor . This is not intentional simply because smaller processors do not process during monsoon. However, the smaller processors who do process occasionally (when they are unable to sell fish as fresh) can also derive the benefits of the use of certain interventions like using bleaching powder and racks and trays. A methodology for introducing it to them needs to be explored.

In conclusion it can be said that the intervention package does and has addressed felt needs of the processors. It has introduced new concepts which have caught on. The losses that the processor felt earlier to be inevitable has now been demonstrated as controllable. This is an important fact that needs to be noted. The success of the concept is further indicated by the fact that smaller processors have begun exhibiting an interest in the interventions which at present only targets medium to large processors. A few of them spoke to the consultant stating that they do process sometime during monsoons and if the interventions could be tailored to suit their needs they would take it up on a more regular basis during monsoons. While it remains to be seen whether they would actually venture out and take the risk their present interest in itself is a positive indicator of a good concept.

Orissa

One of the conclusions that is striking about the above three villages in Orissa is that the scale of monsoon processing seems to be lower than the three villages studied in Andhra Pradesh. In the case of New Bakshipalli, the fishing during monsoons is low as a result of which little fish is available for processing while in the case of Balipantal, processing is seen more as a method to reduce spoilage (in the absence of any icing facility) and income earned out of it is incidental. In fact in Balipantal, the village in itself is more agrarian in orientation with the households owning small land holdings and farm animals. It is only in the case of Chandrabhaga that processing comes out clearly as an economic enterprise taken up even during monsoon months.

The second issue that comes to the forefront here is the fact that almost all processors in each village belong to one homogenous group unlike Andhra Pradesh where there are small and medium/large processors owning different sized enterprises and processing infrastructure. The fact that processors in two of the three villages selected for field trials are not processors who process during monsoons (New Bakshipalli) or are those who do not take up processing as a major economic activity (Balipantal) pose some constraints in examining the impact of the field trials in totality in Orissa.

Regarding the uptake of interventions, discussions with the processors reveal that use of bleaching powder seems to have found general acceptance. The use of frames for keeping fish submerged again seem to be accepted depending on whether or not the vat is full. This response in itself suggests that there are occasions that the vat is not full to capacity, which raises the question of the processor's scale of operation. As regards, the use of racks, an awareness of the concept seems to be there. Previous experience of the author at Chandrabhaga confirms that they did indeed use racks. However, in the case of the other two villages, the author was not able to observe any drying racks as the study was conducted at time when life had just come back to normal in Orissa after the super cyclone. In fact this has been a limiting factor throughout the study as the people would constantly relate their experience during the cyclone whenever questions relating to processing infrastructure were asked (A question on cleaning vats would elicit an answer " Oh, I lost all my vats during the cyclone. Can you assist in buying new ones?"). Another limiting factor has been that there were not much landings during the previous monsoon season. Therefore, processors had not processed very much. Finallly, the interventions, though targeted at reducing monsoon losses were unfortunately being discussed at a time when people had a fresh memory of having lost much more than just some money in processing!

Appendix 1

A site and processor wise summary of adoption/perception to introduced intervention

Site	Processor	Interventions adopted	Reasons for adoption. (Constraints if any)	Interventions not adopted and constraints
Suradapeta Mayapatnam	Surada Sathiyamma	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of cement lids	1.Helps prevent contamination. But no treatment time allowed for water with bleaching powder due to lack of time and vats. Also afraid that vats will break during cleaning. 2. Submerges fish completely-reduces infestation 3. Prevents rainwater seepage.	-Racks for drying fish not adopted as the quantity processed was too high. - Egg test not used for testing brine strength. Traditional experience was relied on.
Suradapeta Mayapatnam	Kare Nookalamma	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of cement lids	1Helps to reduce fly infestation. No treatment time allowed 2 Fish submerged completely - reduces exposure to infestation 3. Prevents rain water seepage. Fear of breaking vats due to weight	-Racks for drying fish not adopted as the quantity processed was too high. - Egg test not used for testing brine strength. Traditional experience was relied on
Suradapeta Mayapatnam	Kambala Yellayamma	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of cement lids	1Helps to reduce fly infestation. No treatment time allowed due to large quantities processed. 2 Fish submerged completely - reduces exposure to infestation 3. Prevents rain water seepage. But found too heavy to lift.	-Racks for drying fish not adopted as the quantity processed was too high. -Egg test not used for testing brine strength. Traditional experience was relied on.
Site	**Processor**	**Interventions adopted**	**Reasons for adoption. (Constraints if any)**	**Interventions not adopted**

Site	Processor	Interventions adopted	Reasons for adoption. (Constraints if any)	Interventions not adopted and constraints
				and constraints
Konapapa Peta	Palleti Nallamma	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of cement lids	1Helps to reduce fly infestation. 2 Fish submerged completely - reduces exposure to infestation 3. Prevents rain water seepage. But found too heavy to lift.	- In sufficient rack capacity - Egg test not used for testing brine strength. Traditional experience was relied on
Chodpalipeta	Koda Danayamma	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of cement lids	1Helps to reduce fly infestation. Unsure of use when large qty handled. 2 Fish submerged completely - reduces exposure to infestation 3. Prevents rain water seepage. But found too heavy to lift	- In sufficient rack capacity - Egg test not used - experience relied on
Chodpalipeta	Marupalli Lakshmi	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of cement lids	1Helps to reduce fly infestation. No treatment time when large qty processed. 2 Fish submerged completely - reduces exposure to infestation. But when vat was full of fish like sardine it adhered to the frame 3. Prevents rain water seepage.	- Quantity processed too large for rack drying -Egg test not used - experience relied on
Chodpalipeta	Marupalli Lakshmi	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of cement lids	1Helps to reduce fly infestation. No treatment time when large qty processed. 2 Fish submerged completely - reduces exposure to infestation . But when vat was full of fish like sardine it adhered to the frame 3. Prevents rain water seepage. But found too heavy to lift	Racks for drying fish not adopted- quantity processed was too high. - Egg test not used - experience relied on

Site	Processor	Interventions adopted	Reasons for adoption. (Constraints if any)	Interventions not adopted and constraints
Site	**Processor**	**Interventions adopted**	**Reasons for adoption. (Constraints if any)**	**Interventions not adopted and constraints**
Chodpalipeta	Chokka Kasiya	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of cement lids	1Helps to reduce fly infestation. 2 Fish submerged completely - reduces exposure to infestation . 3. Prevents rain water seepage. Had a doubt that they might be expensive.	Quantity processed too large for rack drying - Egg test not used - experience relied on
New Bakshipalli	Rajamma	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of cement lids	1Helps to reduce fly infestation. No treatment time for water allowed due to lack of time/vats. 2 Fish submerged completely - reduces exposure to infestation . But cannot be used if vat is not full of fish. 3. Prevents rain water seepage and fly infestation	Quantity processed too large for rack drying - Egg test not used - experience relied on
New Bakshipalli	Enjamma	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of cement lids	1Helps to reduce fly infestation. No treatment time for water allowed due to lack of time/vats. 2 Fish submerged completely - reduces exposure to infestation . But cannot be used if vat is not full of fish. 3. Prevents rain water seepage but found too heavy to move.	Racks for drying fish not adopted- quantity processed was too high. - Egg test not used - experience relied upon
Chandrabaga	Mallipalli Bendamma	1.Use of bleaching powder. 2 Use of weights and frames	1Helps to reduce fly infestation. No treatment time for water allowed due to lack of time/vats. 2 Fish submerged	Racks for drying fish not adopted- insufficient capacity Egg test not used

Site	Processor	Interventions adopted	Reasons for adoption. (Constraints if any)	Interventions not adopted and constraints
			completely - reduces exposure to infestation . But cannot be used if vat is not full of fish.	- experience relied upon Cement lids not used due to their weight.
Site	**Processor**	**Interventions adopted**	**Reasons for adoption. (Constraints if any)**	**Interventions not adopted and constraints**
Chandrabaga	Chepala Thotamma	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of wooden lids to cover vats	1Helps to reduce fly infestation. No treatment time for water allowed due to lack of time/vats. 2 Fish submerged completely - reduces exposure to infestation . 3. Helped reduce fly infestation and rain water seepage.	She was already using drying racks Egg test not used - experience relied upon
Chandrabaga	Chawakula Gangamma	1.Use of bleaching powder. 2 Use of weights and frames 3 Use of wooden lids to cover vats	1Helps to reduce fly infestation. No treatment time for water allowed due to lack of time/vats. 2 Fish submerged completely - reduces exposure to infestation . 3. Helped reduce fly infestation and rain water seepage.	She was already using drying racks Egg test not used - experience relied upon
Balipantal	Parboti Behera	1.Use of bleaching powder. 2 Use of weights and frames 3. Use of lids to cover vats. 4. Monitoring brine concentration	1Helps to reduce fly infestation. No treatment time for water allowed due to lack of time. 2 Fish submerged completely - reduces exposure to infestation . 3. Helped reduce fly infestation and rain water seepage. Found rather heavy on their	Racks not used as capacity was inadequate.

Site	Processor	Interventions adopted	Reasons for adoption. (Constraints if any)	Interventions not adopted and constraints
		using the egg test	earthern vats. 4. Helped in saving salt.	
Balipantal	Maneka Behera	1.Use of bleaching powder. 2 Use of weights and frames 3. Use of lids to cover vats.	1Helps to reduce fly infestation. No treatment time for water allowed due to lack of time. 2 Fish submerged completely - reduces exposure to infestation . 3. Helped reduce fly infestation.	Racks not used as capacity was inadequate. Largely relies on experience to test brine concentration.
Balipantal	Charulatha Behera	1.Use of bleaching powder. 2 Use of weights and frames 3. Use of lids to cover vats.	1Helps to reduce fly infestation. No treatment time for water allowed due to lack of time. 2 Fish submerged completely - reduces exposure to infestation. 3. Helped reduce fly infestation and rain water seepage. Found rather heavy on their earthern vats.	Racks not used as capacity was inadequate. Largely relies on experience to test brine concentration.

Appendix 2

Information gathered during monitoring of field trials (between July – Sept 1999)

Place : Suradapeta – Mayapatnam

Name of the processor : Surada Sathiyyamma

Date	**Cleaning of vat with treated water**	**Washing fish before and after gutting with treated water**	**Using plastic sheets for gutting**	**Monitoring brine concentration**	**Placing frames and weights to hold fish down**	**Covering with lids to reduce infestation and seepage of water**	**Drying on stackable racks and mats**
15.7.99	Not done. Will do so only when brine is changed.	Done. Flies controlled	Done. Reduces contamination	Done by experience. Concentration usually adjusted by adding extra salt.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage	Used. Helps in easy removal of fish and quick drying.
17.7.99	Done. Brine was changed.	Done. Helps to arrest flies. Only one wash after gutting.	Done. Reduces contamination	Done by experience	Useful reasons mentioned above	Done. Reasons mentioned above.	Used. Reasons mentioned above.
18.7.99	Not done. Brine was not changed.	Done only after one wash with untreated water.	Done. Reduces contamination	Done by experience	Useful reasons mentioned above	Done. Reasons mentioned above.	Used. Helps drying and easy removal.
21.7.99	Done. Brine was changed.	Done but treated water is used immediately.	Done. Reduces contamination	Done by experience	Useful reasons mentioned above	Done.	Used. Helps drying and easy removal.

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
23.7.99	Not done. Brine was not changed	Done but only once.	Done. Quantity of sheets insufficient. most sheets are used to cover salt bags.	Done by experience.	Useful reasons mentioned above	Done. Reasons mentioned above.	Used. Reasons mentioned above.
25.7.99	Not done as brine was not changed.	Done but only once after initial wash.	Used. Plastic sheets reduce contaimnation	Monitoring of brine conc. Done by experience.	Frames useful to keep fish down.	Lids help prevent rain water seepage.	Used.Mats and racks help in quick drying and easy removal.
1.8.99	Done as and when brine is changed.	Done but only once after initial wash	Used. Plastic sheets reduce contaimnation	Monitoring of brine conc. Done by experience	Frames useful to keep fish down.	Used.Lids help prevent rain water seepage.	Used.Mats and racks help in quick drying and easy removal.
17.8.99	Done as and when brine is changed.	Done but only once after initial wash	Used. Plastic sheets reduce contaimnation	Monitoring of brine conc. Done by experience	Frames useful to keep fish down	Used.Lids help prevent rain water seepage	Used.Mats and racks help in quick drying
31.8.99	Done as and when brine is changed	Small fish washed with treated water while other fish washed with treated water after gutting.	Used. Plastic sheets reduce contaimnation	Monitoring of brine conc. Done by experience and found alright	Frames useful to keep fish down	Used.Lids help prevent rain water seepage	Used.Mats and racks help in quick drying
12.9.99	Done as and when brine is changed	Used once after wash with untreated water.	Used. Plastic sheets reduce contaimnation	Monitoring of brine conc. Done by experience and found alright	Frames useful to keep fish down	Used.Lids help prevent rain water seepage	Used.Mats and racks help in quick drying
19.9.99	Done as and when brine is changed	Used for after gutting wash in case of gutted varieties.	Used. Plastic sheets reduce contaimnation	Monitoring of brine conc. Done by experience and found alright	Frames useful to keep fish down	Used.Lids help prevent rain water seepage	Used.Mats and racks help in quick drying

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
26.9.99	Done as and when brine is changed	Used for after gutting wash in case of gutted varieties	Used. Plastic sheets reduce contaimnation	Monitoring of brine conc. Done by experience and found alright	Frames useful to keep fish down	Used.Lids help prevent rain water seepage	Used.Mats and racks help in quick drying

Name of the processor : Kambala Yellayyamma

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Moniotorng brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
15.7.99	Not done. Will do so only when brine is changed.	Done. But the water treated with bleaching powder is used immediately after treatment.	Done	Done by experience. Concentration usually adjusted by adding extra salt. Brine not changed today	Useful to prevent maggot infestation	Done. Helps prevent rainwater seepage	Used. Helps in easy removal of fish
17.7.99	Not done. Reasons mentioned above	Done. Helps to arrest flies.	Done.	Done by experience Brine not changed today	Useful reasons mentioned above	Done. Reasons mentioned above.	Used. Reasons mentioned above.
18.7.99	Not done. Reasons mentioned above.	Done. Helps to arrest flies.	Done.	Done by experience Brine not changed today	Useful reasons mentioned above	Done. Reasons mentioned above.	Used. Reasons mentioned above.
21.7.99	Done. Brine was changed.	Done. Helps to arrest flies.	Done.	Done by experience Brine was not changed today	Useful reasons mentioned above	Done. Reasons mentioned above.	Used. Reasons mentioned above.
23.7.99	Not done. Brine was not changed.	Not done. Had to finish work quickly	Not done. Plastic sheet used to protect salt. Gunny bags	Done by experience Brine was not changed today	Useful reasons mentioned above	Done. Reasons mentioned above.	Used. Reasons mentioned above.

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Moniotorng brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
			used instead.				
25.7.99	Not done. Brine was not changed.	Fish was washed only after gutting.	Done.	Done by experience Brine was not changed today	Useful reasons mentioned above	Done. Reasons mentioned above.	Used. Reasons mentioned above.
1.8.99	Done. Brine was changed.	Fish was washed only after gutting.	Done.	Done by experience. Brine was changed.	Useful reasons mentioned above	Done. Reasons mentioned above.	Used. Reasons mentioned above.
17.8.99	Done. Brine was changed.	Done.	Done.	Done by experience Brine was not changed today	Useful reasons mentioned above	Done. Found it heavy to do so by herself. Injured her finger.	Used. Reasons mentioned above
31.8.99	Not done. Brine not changed.	Done. Gutting is followed only for bigger varieties.	Done.	Done by experience. Brine was not changed though it was saturated.	Useful reasons mentioned above	Done. Prevents water seepage during rains.	She did not use the racks and mats as only low value species were processed. Used nets and elevated platform.
5.9.99	No Not done. Brine not changed	Done.	Done.	Done by experience	Useful reasons mentioned above	Done. But the lids were found to be heavy	She did not use the racks and mats as only low value species were processed. Used nets and elevated platform

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Moniotorng brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
12.9.99	Not done. Brine was not changed.	Done	Done	Done by experience	Used for reasons mentioned above.	Used. But reporting that it is heavy	Used.
19.9.99	Done as and when brine was changed.	Done	Done	Done by experience	Useful.She herself prepared two more frames for use.	Useful but heavy	Used.
26.9.99	Done as and when brine was changed	Done	Done	Done by experience	Useful.	Useful	Used.

Name of the processor : Kare Nookalamma

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
15.7.99	Not done. Will do so only when brine is changed.	Done. Flies controlled But the water treated with bleaching powder is used immediately after treatment.	Done. Reduces contamination	Done by experience. Concentration usually adjusted by adding extra salt.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage	Used. Helps in easy removal of fish
17.7.99	Not done. Reasons mentioned above	Done. Helps to arrest flies. Only one wash after gutting.	Done. Reduces contamination	Done by experience	Useful reasons mentioned above	Done. Reasons mentioned above.	Used. Reasons mentioned above.
18.7.99	Not done. She has not shown	Not done. Has not collected	Done. Reduces contaminat	Done by experience	Useful reasons mention	Done. Reasons mentioned	Not used.Reasons not

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
	interest in collecting Bleaching powder.	bleaching powder	ion		ed above	above.	mentioned .
21.7.99	Done. Brine was changed using another vat.	Done but only after gutting.	Done. Reduces contamination	Done by experience	Useful reasons mentioned above	Done. But due to uneven surface of the vat, water entered despite the lid.	Used. Easily collected.
23.7.99	Done. Brine was changed as water had got into the previous one.	Not done. Bleaching powder not obtained from animator	Done.	Done by experience.	Useful reasons mentioned above	Done. Reasons mentioned above.	Used. Reasons mentioned above.
25.7.99	Not done. Brine concentration was considered alright and hence not changed.	Done but only once.	Done	Done by experience. Brine was not changed today	Done. Keeps fish down, prevents maggot infestation.	Not done	Used .
1.8.99	Done. Brine was changed	Done but washed only once in treated water.	Done	Done by experience.	Done. Keeps fish down.	Used only one lid.	Used. Easy to collect and protect.
17.8.99	Done as when existing brine is changed.	Done only when there is a manageable quantity of fish. Not following in case of gluts.	Used	Done by experience.	Used. Keeps fish down.	Lids not used. Says they are heavy will cause breakage of old vats.	Used. Easy to collect and protect.
31.8.99	Done as when existing	Washed only once with treated	Uses plastic sheet.	Done by experience.	Used. Keeps fish	Lids not used. Says they are	Not used. Today she is drying

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
	brine is changed.	water after initial wash with untreated water.			down.	heavy will cause breakage of old vats.	on nets on elevated place. Ribbon fish and small varieties.
5.9.99	Done as when existing brine is changed	Washed only once with treated water after initial wash with untreated water.	Uses plastic sheet only when there are managable quantity of fish.	Done by experience	Used. Keeps fish down	Lids not used. Says they are heavy will cause breakage of old vats	Ribbon fish dried on nets. Clupids on racks and mackerals on mats.
12.9.99	Done as when existing brine is changed	Washed only once with treated water after initial wash with untreated water.	Done	Done by experience	Used to hold fish down.	Not used. Found heavy.	Useful only when quantities are low.
19.9.99	Done only when brine is changed.	Used after wash in case of cutting and gutting varieties.	Used.	Done by experience. Brine was not changed today.	Useful to hold fish down. But did not use today as quantity was less.	Lids not used. Found to be heavy.	Used.
26.9.99	Done only when brine is changed	Used after wash in case of cutting and gutting varieties.	Used.	Done by experience. Brine was not changed today.	Useful to hold fish down. But did not use today as quantity was less	Lids not used. Found to be heavy	Used.

Place : Chodipallipeta

Name of the processor : Chokka Kasiyya

Date	**Cleaning of vat with treated water**	**Washing fish before and after gutting with treated water**	**Using plastic sheets for gutting**	**Monitoring brine concentration**	**Placing frames and weights to hold fish down**	**Covering with lids to reduce infestation and seepage of water**	**Drying on stackable racks and mats**
15.7.99	Not done. Bleaching powder was only distributed today.	Not done. Bleaching powder was only distributed today	Not done. Sardines directly put in the vat after washing.	Monitoring done by egg test to check concentration.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Not used.Racks and mats insufficient as quantity processed is large.
21.7.99	Done. Brine was changed.	Sardines were processed. Washed only in sea.	Directly put in vat.	Done by experience	Vat filled with sardines No space for frame	Done. Avoids seepage of water..	Not used.
23.7.99	Done. Brine was changed.	Not done	Not used. No gutting done.	Done by experience	Useful . Keeps fish down	Done. Avoids seepage of water	Not used. Quantity of fish was too large.
1.8.99	Vat not cleaned as brine was not discarded.	Small croakers, ribbon fish obtained in shore seine. No gutting only dipping in sea water before processing.	Varieties obtained not gutted.	Done by experience.	Frames used as they keep fish down	Lids used to prevent rain water seepage.	Useful. Faster drying.
17.8.99	Done as and when existing brine is discarded.	Washing twice is done only for fish that is gutted.	Used for gutting operation .	Monitoring brine concentration is done by experience.	Frames used to hold fish down.	Lids used to prevent rain water seepage.	Drying on racks and mats done as it is faster.
12.9.99	Done as and when existing brine is	Washing twice is done only for fish that	Used for gutting operation No	Monitoring brine concentration is done by	Frames used to hold fish	Lids used to prevent rain water seepage.	Useful when small quantities

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
	discarded.	is gutted.	gutting variety landed.	experience	down.		are processed.
19.9.99	Done as and when existing brine is discarded.	Washing twice is done only for fish that is gutted.	Used for gutting operation No gutting variety landed.	Monitoring brine concentration is done by experience	Frames used to hold fish down.	Lids used to prevent rain water seepage.	Useful when small quantities are processed.
26.9.99	Done as and when existing brine is discarded	Washing twice is done only for fish that is gutted	Used for gutting operation No gutting variety landed	Monitoring brine concentration is done by experience	Frames used to hold fish down.	Lids used to prevent rain water seepage.	Useful when small quantities are processed.

Place : Chodipallipeta

Name of the processor : Marupalli Lakshmi

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
15.7.99	Not done. Bleaching powder was only distributed today.	Not done. Bleaching powder was only distributed today	Not done. Sardines directly put in the vat after washing.	Monitoring done by test to check concentration.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Not used.Racks and mats insufficient as quantity processed is large.
1.8.99	Not done. Earlier brine was not changed.	Cleaned in sea water only as only small varieties were processed.	No gutting done.	Reported to be checking brine concentration with egg.	Frames used to keep fish down.	Lids found useful to prevent rainwater seepage.	Used racks for faster drying.
12.9.99	Not done. Earlier brine was not changed	Cleaned in sea water only as ribbon fish was the only variety processed	Not used as no gutting operations were involved.	Monitor brine concentration by experience.	Did not use frames as when used in a full vat, it sticks to fish and gives a bad odour.less salt abosorbtion	Lids helpful to prevent water seepage.	Racks and mats are useful when small quantities are processed.
19.9.99	Not done. Earlier brine was not changed	Cleaned in sea water only as ribbon fish was the only variety processed	Not used as no gutting operations were involved	Monitor brine concentration by experience	Used frames when the vats were not full.	Lids helpful to prevent water seepage.	Mats and racks are useful only in case of smaller quantities.
26.9.99	Not done. Earlier brine was not changed	Cleaned in sea water only as ribbon fish was the only variety	Not used as no gutting operations were involved	Monitor brine concentration by experience	Used frames	Lids helpful to prevent water seepage.	Mats and racks are useful only in case of smaller quantities.

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
		processed					

Place : Chodipallipeta

Name of the processor : Koda Danayamma

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
15.7.99	Not done. Bleaching powder was only distributed today.	Not done. Bleaching powder was only distributed today	Not done. Sardines directly put in the vat after washing.	Monitoring done by test to check concentration.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Not used.Racks and mats insufficient as quantity processed is large.
1.8.99	Not done. Earlier brine was not changed.	Cleaned in sea water only as only small varieties were processed.	No gutting done.	Reported to be checking brine concentration with egg.	Frames used to keep fish down.	Lids found useful to prevent rainwater seepage.	Used racks for faster drying.
12.9.99	Not done. Earlier brine was not changed	Cleaned in sea water only as ribbon fish was the only variety processed	Not used as no gutting operations were involved.	Monitor brine concentration by experience.	Frames used to keep fish down.	Lids helpful to prevent water seepage.	Racks and mats are useful when small quantities are processed.
19.9.99	Not done. Earlier brine was not changed	Cleaned in sea water only as ribbon fish was the only variety processed	Not used as no gutting operations were involved	Monitor brine concentration by experience	Used frames.	Lids helpful to prevent water seepage.	Mats and racks are useful only in case of smaller quantities.

Place : Konapapa peta

Name of the processor : Benugu Bangaramma and daughter Palleti Nallamma (when Bangaramma fell sick after one cycle her daughter used her inputs as well as those of Kare Bangaramma who was not processing. From 5.9.99)

Date	**Cleaning of vat with treated water**	**Washing fish before and after gutting with treated water**	**Using plastic sheets for gutting**	**Monitoring brine concentration**	**Placing frames and weights to hold fish down**	**Covering with lids to reduce infestation and seepage of water**	**Drying on stackable racks and mats**
31.8.99	Done as and when brine was changed.	Only washing with sea water as no gutting varieties were processed.	Not done. Small variety directly put in the vat after washing.	Monitoring done by test to check concentration.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Used. Racks and mats insufficient as quantity processed is large.
5. 9.99	Done as and when brine was changed	Single wash with treated water. No gutting variety processed.	Not done. Small variety directly put in the vat after washing	Monitoring done by test to check concentration.	Useful to prevent maggot infestation by keeping fish down	Done. Helps prevent rainwater seepage. But found to be heavy	Used her mother's and Kare Bangaramma's racks and mats .
12.9.99	Done as and when brine was changed	Utilised for after wash in case of mackeral. The water was also sprinkled in the shed to control flies.	Used plastic sheet for gutting.	Monitoring done by experience.	Used two sets of frames to use fish down	Used two sets of lids to cover vats for preventing rain water seepage.	Racks help in faster drying.
26.9.99	Done as and when brine was changed	Done only in case of gutting varieties..	. Used plastic sheet for gutting	Monitoring done by experience	.Used two sets of frames to use	Used two sets of lids to cover vats for preventing	Racks help in faster drying.

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
					fish down	rain water seepage.	

Place : Konapapa peta

Name of the processor : Muthylamma

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
31.8.99	Done as and when brine was changed	No cutting/gutting varieties available. Washing done only in untreated water.	Plastic sheets unused as gutting was not done.	Monitoring done by test to check concentration.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Used. Racks and mats insufficient as quantity processed is large.
12.9.99	Done as and when brine was changed.	Only washing with sea water as no gutting varieties were processed.	Not done. Ribbon fish directly put in the vat after washing.	Monitoring done by test to check concentration.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Used. Racks and mats insufficient as quantity processed is large.
26.9.99	Done as and when brine was changed	Done only in case of gutting varieties..	.Used plastic sheet for gutting	Monitoring done by experience	.Used frames to use fish down	Used lids to cover vats for preventing rain water seepage.	Racks help in faster drying.

Appendix 3

Information gathered during field trials in Orissa (between July 1999-September 1999)

Village New Bakshipalli

Name of the processor : Rajamma

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
29.7.99	Done as it keeps the stains away from the vats.	Yes if gutting varieties available. Washing done only in treated water.	Plastic sheets unused as gutting was not done.	Monitoring done by experience.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Used mats earlier. Racks insufficient as quantity processed is large.
31.7.99	Done as it keeps the stains away from the vats.	Yes if gutting varieties available. Washing done only in treated water.	Plastic sheets unused as gutting was not done.	Monitoring done by experience.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Used mats earlier. Racks insufficient as quantity processed is large.
2.8.99	Done as it keeps the stains away from the vats.	Yes if gutting varieties available. Washing done only in treated water.	Plastic sheets unused as gutting was not done.	Monitoring done by experience.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Used mats earlier. Racks insufficient as quantity processed is large.

Village : New Bakshipalli

Name of the processor : Hemalatha

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
29.7.99	Done as it keeps the stains away	Washing done only in treated	Plastic sheets unused	Monitoring done by experience.	Useful to prevent maggot	Done. Helps prevent rainwater	Used mats and racks

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
	from the vats.	water. No treatment time allowed	as gutting was not done.		infestation by keeping fish down.	seepage. But found to be heavy.	
31.7.99	Done as it keeps the stains away from the vats.	Washing done only in treated water. No treatment time allowed	Plastic sheets unused as gutting was not done.	Monitoring done by experience.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Used mats and racks
2.8.99	Done as it keeps the stains away from the vats.	Washing done only in treated water. No treatment time allowed	Plastic sheets unused as gutting was not done.	Monitoring done by experience.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Used mats earlier and also racks

Village : New Bakshipalli

Name of the processor : Enjamma

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
29.7.99	Done as it keeps the stains away from the vats.	No. Gutting was not done. Just dipped in treated water.	Plastic sheets unused as gutting was not done.	Monitoring done by experience.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Used mats and racks
31.7.99	Done as it keeps the stains away from the vats.	Washing done only in treated water. No treatment time allowed	Plastic sheets unused as gutting was not done.	Monitoring done by experience.	Useful to prevent maggot infestation by keeping fish down.	Done. Helps prevent rainwater seepage. But found to be heavy.	Used mats and racks
2.8.99	Done as it keeps the stains away	Washing done only in treated	Plastic sheets unused	Monitoring done by experience.	Useful to prevent maggot	Done. Helps prevent rainwater	Used mats and racks

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
	from the vats.	water. No treatment time allowed	as gutting was not done.		infestation by keeping fish down.	seepage. But found to be heavy.	

Village : Chandrabhaga

Name of the processor : Maripalli Bendamma

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
23.7.99	Done as it keeps the stains away from the vats.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish.	Yes.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
24.7.99	Not done. Vat looks clean	Yes. No flies.	Yes. Plastic sheets prevent sand on fish	Yes.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
25.7.99	Not done. Vat looks clean	Low value species processed.	No. Eels are slippery. Need to have sand.	Yes.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
6.8.99	Yes. No foul smell.	Yes. Prevents flies.	Yes. Plastic sheets prevent sand on fish.	Yes.	No. Vats were not full to capacity	Done. Helps prevent rainwater seepage.	Used mats and racks
23.8.99	Yes. No foul smell.	Yes. Prevents flies.	Yes. Plastic sheets prevent sand on fish.	Yes.	Yes. Keeps fish down and prevents exposure to spoilage.	Done. Helps prevent rainwater seepage.	Used mats and racks
28.8.99	Yes. No	Yes.	Yes.	Yes.	Yes.	Done. Helps	Used mats

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
	foul smell.	Prevents flies.	Plastic sheets prevent sand on fish.		Keeps fish down and prevents exposure to spoilage.	prevent rainwater seepage.	and racks

Village : Chandrabhaga

Name of processor : Totamma

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
23.7.99	Done as it keeps the stains away from the vats.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish.	Yes.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
24.7.99	Done. Vat looks clean	Yes. No flies.	Yes. Plastic sheets prevent sand on fish	Yes.	Yes. Keeps fish down and prevents exposure to spoilage .	Done. Helps prevent rainwater seepage.	No. Only low value fish processed today.
25.7.99	Not done. Vat looks clean	Low value species processed.	No. Eels are slippery. Need to have sand.	Yes.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
6.8.99	Not done. Vat looks clean	Yes. Prevents flies.	Yes. Plastic sheets prevent sand on fish.	Yes.	No. Vats were not full to capacity	Done. Helps prevent rainwater seepage.	Used mats and racks
13.8.99	Yes. No foul smell.	Yes. Prevents flies.	Yes. Plastic sheets prevent	Yes.	Yes. Keeps fish down and prevents	Done. Helps prevent rainwater seepage.	Used mats and racks

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
			sand on fish.		exposure to spoilage.		
28.8.99	Yes. No foul smell.	Yes. Prevents flies.	Yes. Plastic sheets prevent sand on fish.	Yes.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks

Village : Balipantal

Name of Processor : Parboti Behera

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets	Monitoring brine concentration	Use of frames and weights	Use of lids	Drying on stackable racks and mats
28.7.99	Done as it keeps the stains away from the vats.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish.	Yes. Helps us to know the correct amount of salt.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
11.8.99	No. Vat looks clean	Yes. No flies.	Yes. Plastic sheets prevent sand on fish.	Yes. Helps us to know the correct amount of salt.	Yes. Keeps fish down and prevents spoilage	Done. Helps prevent rainwater seepage.	Used mats and racks .
13.8.99	Yes. No foul smell.	Yes. Prevents flies.	Yes. Plastic sheets prevent sand	Yes.	Yes. Keeps fish down and prevents spoilage.	Done. Helps prevent rainwater seepage.	Used mats and racks
17.8.99	Done as it keeps the stains away from the vats.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish.	Yes. Helps us to know the correct amount of salt.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
24.8.99	No. Vat looks clean	Yes. No flies.	Yes. Plastic sheets prevent sand on	Yes. Helps us to know the correct amount of salt.	Yes. Keeps fish down and prevents exposure to	Done. Helps prevent rainwater seepage.	Used mats and racks .

Date	Cleaning of vat with treated water	Washing fish with treated water	Using plastic sheets	Monitoring brine concentration	Use of frames and weights	Use of lids	Drying on stackable racks and mats
			fish.		spoilage		
28.8.99	Yes. No foul smell.	Yes. Prevents flies.	Yes. Plastic sheets prevent sand on fish.	Yes.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
29.8.99	Done	Yes. No flies.	Yes.	Yes.	Yes. Keeps fish down and spoilage .	Done. Prevents rainwater seepage.	Yes. But the capacity was not sufficient.

Village : Balipantal

Name of processor : Maneka Behera

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
28.7.99	Done as it keeps the stains away from the vats.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish.	Yes. Helps us to know the correct amount of salt.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
7.8.99	Done as it keeps the stains away from the vats.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish.	Yes. Helps us to know the correct amount of salt.	Yes. Keeps fish down and prevents exposure to spoilage	Done. Helps prevent rainwater seepage.	Used mats and racks .
11.8.99	No. Vat looks clean.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish.	Yes. Helps us to know the correct amount of salt.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
17.8.99	Done as it keeps the stains away from the vats	Yes. No flies.	Yes. Plastic sheets prevent sand on	Yes. Helps us to know the correct amount of salt.	Yes. Keeps fish down and prevents exposure	Done. Helps prevent rainwater seepage.	Used mats and racks .

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
			fish.		to spoilage		
24.8.99	No. Vat looks clean.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish	Yes.	Yes. Keeps fish down and prevents exposure to spoilage .	Done. Pevent rainwater seepage.	Yes. But the capacity was not sufficient.
29.8.99	Yes. No foul smell.	Yes. Prevents flies.	Yes.	Yes.	No. Vats not full to capacity.	Done.	Used mats and racks

Village: Balipantal
Name of processor : Charulatha Behera

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
28.7.99	Done as it keeps the stains away from the vats.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish.	Yes. Helps us to know the correct amount of salt.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
7.8.99	Done as it keeps the stains away from the vats.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish.	Yes. Helps us to know the correct amount of salt.	Yes. Keeps fish down and prevents exposure to spoilage	Done. Helps prevent rainwater seepage.	Used mats and racks .
11.8.99	No. Vat looks clean.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish.	Yes. Helps us to know the correct amount of salt.	No. Vats were not full to capacity.	Done. Helps prevent rainwater seepage.	Used mats and racks
17.8.99	Done as it keeps the stains away	Yes. No flies.	Yes. Plastic sheets	Yes. Helps us to know the correct	Yes. Keeps fish down and	Done. Helps prevent rainwater	Used mats and racks .

Date	Cleaning of vat with treated water	Washing fish before and after gutting with treated water	Using plastic sheets for gutting	Monitoring brine concentration	Placing frames and weights to hold fish down	Covering with lids to reduce infestation and seepage of water	Drying on stackable racks and mats
	from the vats		prevent sand on fish.	amount of salt.	prevents exposure to spoilage	seepage.	
24.8.99	No. Vat looks clean.	Yes. No flies.	Yes. Plastic sheets prevent sand on fish	Yes.	Yes. Keeps fish down and prevents exposure to spoilage .	Done. Pevent rainwater seepage.	Yes. But the capacity was not sufficient.