

# Understanding the blowfly life cycle helps promote hygienic fish processing

RIU

## Validated RNRRS Output.

Understanding the blowfly lifecycle is helping village fish processors raise the quality of their products. Traditional methods of smoking, drying and salting fish in the tropics are often very unhygienic and between 25% and 90% go bad. Previously, processors were slow to adopt simple hygienic measures, such as disposing of waste, making sure the fish and utensils are clean, preparing brines properly, and drying fish on frames rather than on the ground. But when they understand that maggots in their fish come from blowflies they are quickly converted. The guide to help fisheries authorities and NGOs teach processors how to keep their products safe from blowfly maggots is being widely used in Africa, South Asia and South East Asia.

Project Ref: **PHF11:**

Topic: **5. Rural Development Boosters: Improved Marketing, Processing & Storage**

Lead Organisation: **The Grimsby Institute of Higher & Further Education, UK**

Source: **Post Harvest Fisheries Programme**

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## Description

**PHF11**

## Research into Use

NR International  
Park House  
Bradbourne Lane  
Aylesford  
Kent  
ME20 6SN  
UK

## Geographical regions included:

[India](#),

## Target Audiences for this content:

[Fishers](#), [Processors](#),

**A. Description of the research output(s)****1. Working title of output or cluster of outputs.**

*In addition, you are free to suggest a shorter more imaginative working title/acronym of 20 words or less.*

Guidelines on Using a Systems Based Approach to Control Blowfly Infestation of Traditionally Processed Fish

**2. Name of relevant RNRRS Programme(s) commissioning supporting research and also indicate other funding sources, if applicable.**

Post Harvest Fisheries Research Programme

**3. Provide relevant R numbers (and/or programme development/dissemination reference numbers covering supporting research) along with the institutional partners (with individual contact persons (if appropriate)) involved in the project activities. As with the question above, this is primarily to allow for the legacy of the RNRRS to be acknowledged during the RIUP activities.**

R7971. Collaborating organisations were Food Control International Ltd., now Manufacturing Improvement International Ltd., a subsidiary company of the Grimsby Institute of Further and higher Education, Nuns Corner, Grimsby DN 34 5BQ (contact person Dr John Esser) and Integrated Coastal Management, Pratap Nagar, Kakinada 533 004, Andhra Pradesh, India (contact person Mr Venkatesh Salagrama). Partner organisations in implementation of the project were the Andhra Pradesh Department of Fisheries, the Andhra Pradesh State Institute of Fisheries Technology (SIFT), the Central Institute of Fisheries Technology (CIFT) and the NGO, Action for Food Production (AFPRO).

**4. Describe the RNRRS output or cluster of outputs being proposed and when was it produced? (max. 400 words). This requires a clear and concise description of the output(s) and the problem the output(s) aimed to address. Please incorporate and highlight (in bold) key words that would/could be used to select your output when held in a database.**

The project resulted in three outputs;

- A field tested, systems based approach to controlling **blowfly infestation** of traditionally processed fish products in tropical countries.
- Trainers guides to controlling infestation of **traditionally processed fish** published in English, Oriya, Telugu, Tamil and Bengali.
- A CD-ROM illustrating application of the systems based control strategy produced in English, Oriya, Telugu, Tamil and Bengali languages.

These outputs were designed to address the problems of blowfly infestation of fish products during processing and the inappropriate use of **harmful insecticides** by some processors.

Traditionally processed fish is an economically important commodity in tropical countries. Throughout processing

and early storage, fish are exposed to infestation by blowflies. This is a significant cause of **post-harvest losses**, exacerbated by the unhygienic conditions under which much of the fish is processed.

Whilst few quantitative studies of insect related losses of cured fish have been carried out, losses of 25% are thought to be common and maybe in excess of 90% in situations where no preventative measures are used. Some processors have responded to the problem by applying unsuitable insecticides to their fish, jeopardising both their own health and that of fish consumers.

A range of methods of infestation control have been developed and promoted over the past 30 years. However, despite extensive research and promotion, uptake of recommended control measures by fish processors has been poor and so insect infestation of traditionally processed fish remains a major cause of losses. The apparent failure to successfully promote recommended control measures is generally attributed to socio-economic factors, whereby implementation of the suggested measures may be too costly or culturally unacceptable, and poor extension of research findings to the fish processors. Whilst the first is difficult to overcome, the second can be improved with good training of extension workers.

Success of the control measures also depends upon a detailed understanding of the various modes of blowfly infestation, and the influence of external factors, such as climatic variations etc. It has been demonstrated that control of infestation can be successfully achieved by implementing a systematic control strategy that is adaptable to the many different fish processing systems and takes into account limiting socio-economic factors. The design of this **systems-based blowfly control strategy** was fully informed by the findings of a comprehensive review of insect infestation and further refined during field evaluation trials conducted at small-scale fish processing sites in India. The trainers' guides provide development workers with the information and tools necessary for them to apply the approach in the field.

5. What is the type of output(s) being described here?

Please tick one or more of the following options.

Product	Technology	Service	Process or Methodology	Policy	Other Please specify
x			x		

6. What is the main commodity (ies) upon which the output(s) focussed? Could this output be applied to other commodities, if so, please comment

Traditionally processed salted, salted – dried, dried and smoked fish. The systems – based approach has the potential to be applied to other traditionally processed animal products that are susceptible to blowfly infestation.

7. What production system(s) does/could the output(s) focus upon?

Please tick one or more of the following options. Leave blank if not applicable

Semi-Arid	High potential	Hillsides	Forest-Agriculture	Peri-urban	Land water	Tropical moist forest	Cross-cutting
					x		

8. What farming system(s) does the output(s) focus upon?

Please tick one or more of the following options (see Annex B for definitions).

Leave blank if not applicable

<b>Smallholder rainfed humid</b>	<b>Irrigated</b>	<b>Wetland rice based</b>	<b>Smallholder rainfed highland</b>	<b>Smallholder rainfed dry/cold</b>	<b>Dualistic</b>	<b>Coastal artisanal fishing</b>
						X

9. How could value be added to the output or additional constraints faced by poor people addressed by clustering this output with research outputs from other sources (RNRRS and non RNRRS)? (**max. 300 words**).

One of the problems faced by development workers attempting to promote improved processing techniques in small-scale processing communities is providing a convincing case for adoption in terms of reduced losses and economic benefits. Processors are more likely to be receptive to ideas that are backed up quantitative evidence of their efficacy. If quantitative estimates of losses can be obtained then it is relatively easy to provide an economic case for adopting a new technology. Whilst fully quantitative loss assessments can be costly and difficult to perform, there are simpler methods that allow at least a semi-quantitative loss assessment to be made. These are described in Ward, A.R. and Jeffries, D.J. (2000) *A Manual for Assessing Post Harvest Fisheries Losses*. Natural Resources Institute, Chatham, UK – an output of DFID projects R5027, R7008, R6817 Post Harvest Fisheries Research Programme. A further useful source of information for development workers working in small-scale fish processing communities is 'Post Harvest Fisheries, A Manual of Information and Guidelines for NGOs and Development Agencies Working with Artisanal Fishing Communities, an output of the DFID Post-Harvest Fisheries Project 1987 – 98.

Also, it has been observed that approaches to dealing with insect infestation are most effectively adopted when incorporated into a package of tools and methods to deal with fish losses caused by factors additional to insect infestation e.g. inclement weather, poor quality materials and methods, general sanitation etc. Outputs from the DFID research project Monsoon Losses in Post-Harvest Fisheries in India (R6817) can contribute towards more holistic and effective intervention packages.

Please specify what other outputs your output(s) could be clustered. At this point you should make reference to the circulated list of RNRRS outputs for which proformas are currently being prepared.

These outputs could be clustered with Johnson, C & Esser, J. (2000) *A Review of Insect Infestation of Traditionally Cured Fish in the Tropics*. Department for International Development, London. 92pp., an output from project R6824. Post Harvest Fisheries Research Programme. Following the logic used in the previous section, they could also be clustered with the following outputs of DFID projects R5027, R6817, R7008: Informal Fish Loss Assessment Method (IFLAM), Load Tracking (LT) Method and Questionnaire Loss Assessment Method (QLAM),

## Validation

**B. Validation of the research output(s)****10. How** were the output(s) validated and **who** validated them?

*Please provide brief description of method(s) used and consider application, replication, adaptation and/or adoption in the context of any partner organisation and user groups involved. In addressing the “who” component detail which group(s) did the validation e.g. end users, intermediary organisation, government department, aid organisation, private company etc... This section should also be used to detail, if applicable, to which social group, gender, income category the validation was applied and any increases in productivity observed during validation (max. 500 words).*

The findings of an impact assessment of the project that produced the outputs described here are presented in Clucas, I.J. and Stirrat, R.L. (2004) *Impact Assessment of two 'Seedcorn' Initiatives and one Research Project in India*. Interim Report. Post Harvest Fisheries Research Programme. The report is based on a short visit conducted by Ivor Clucas and Jock Stirrat. The consultants visited project locations and collected information through direct observations and semi-structured interviews with project stakeholders. These included government officials, NGOs and fish processors from the communities in which the project field trials had been conducted. Most of the processors were female and headed single parent households.

The team was impressed by the project's impact, which they believed would grow in future. It found that some at least of the interventions arising from the research had been welcomed and some adopted. The team was also impressed that the research had led to the processors understanding of the blowfly life cycle and the relationship between blowflies and maggots – *“In this sense the research has not just led to technical innovations but also to a change in the knowledge of the processors.”*

The dissemination materials produced by the project, both the manuals and the video CD were reported to have been widely disseminated and used. In light of the finding of the impact assessment, the training guides were reviewed and re-published in 5 languages. They have since been distributed in Africa, South Asia and South East Asia.

The assessment team commented that project impact had been greatest amongst NGOs and training institutions. The State Institute of Fisheries Technology, which trains fisheries development officers in Andhra Pradesh, was reported to have incorporated the research findings and training material into its curriculum. Various NGOs, such as the Coastal Peoples Development Association, Action for Food Production, the Society for Eradication of Rural Poverty and OXFAM Andhra Pradesh were reported to be using the materials produced by the project.

The impact evaluation concluded as follows – *“The project throws up interesting and highly significant questions about the nature of ‘knowledge’. On one level, this concerns the general ignorance of the relationship between blowflies and maggots and a lack of understanding of the life cycle of the blowfly. Given the widespread stress on the importance of ‘indigenous knowledge’ this is a clear case where indigenous knowledge was inadequate, and one of the enduring benefits of the project is improved knowledge which could be used as the basis for further and novel ways of dealing with the problem of blowflies. At another level, this project has led to at least one institution (OXFAM, Andhra Pradesh) recognising the importance of technical factors in poverty reduction rather than putting all the weight on social and economic factors.”*

**11. Where and when** have the output(s) been validated?

*Please indicate the places(s) and country(ies), any particular social group targeted and also indicate in which*

*production system and farming system, using the options provided in questions 7 and 8 respectively, above (max 300 words).*

The impact study was conducted in 2003 at coastal, small-scale, traditional fish processing sites located in Uppada and Timmapuram in Andhra Pradesh, and Shandakud / Paradeep in Orissa. The impact study team also met with several institutional representatives e.g. Department of Fisheries (DOF) in Andhra Pradesh and Orissa, NGOs such as AFPRO, Forum for Integrated Rural Management (FIRM), the South India Federation of Fisheries Societies (SIFFS) and international NGOs such as OXFAM. The social group targeted in the field consisted mostly of poor, single, female small-scale fish processors who were usually the principal family breadwinner.

In the process of gathering information for the RIUP proforma, about 200 people in various institutions – government (central, state and local levels), research and academic bodies, UN organisations, NGOs and fish-worker groups – covering five coastal states of India (West Bengal, Orissa, Andhra Pradesh, Tamil Nadu and Kerala) were contacted through email, surface mail, personal meetings either individually or in groups for their assessment of the project impact. Also met were a number of fish processors in Andhra Pradesh and Orissa to obtain their feedback on the project outputs, how effective they have been in terms of reducing infestation and increasing incomes, the overall impact of the project in terms of improving livelihoods and reducing poverty etc. Thus the feedback generated by this study also contributes to the validation process.

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## Current Situation

### C. *Current situation*

**12. *How and by whom* are the outputs currently being used? Please give a brief description (max. 250 words).**

Traditional fish processors in India are the direct users of the technical research outputs. They rank amongst the poorest stakeholders in the fisheries sector and face increasing marginalisation .

Visits to processing areas in Andhra Pradesh and Orissa and interactions with training institutes such as SIFT show that usage of project outputs by the processors is reflected in:

- Better disposal of fish processing waste;
- More frequent cleaning of fish at different stages of processing;
- Regular cleaning of the cement vats;
- More frequent change of brine and improved quality consciousness while preparing fresh brine;
- Using bamboo frames and clean stones for holding the fish beneath the brine
- Drying fish on elevated surfaces

As with any change involving large numbers of people, some of these behavioural changes are the outcome of a complex chain of factors and events which make it difficult to tease out the impact of any individual factor; but it is clear the project outputs have played a role in influencing the scope and direction of these changes.

Beyond the processors, the project outputs have directly contributed to increasing the awareness as well as the capacity of institutional stakeholders in India (such as the extension personnel in the DOF and NGOs) and led to the delivery of training courses in quality control and loss reduction methods for fish processors. The outputs have also been used in some African countries.

**13. *Where* are the outputs currently being used? As with Question 11 please indicate place(s) and countries where the outputs are being used (max. 250 words).**

Use of the guides by several training organisations in India has helped extend the research outputs across the country. A review of the activities undertaken by organisations such as SIFT, DOF (in Orissa), ICM, CIFT, Integrated Fisheries Project (IFP), the College of Fisheries (Tuticorin) and the College of Fisheries (Mangalore) reveals use of the project outputs in training fish processors, as well as field-level functionaries of government, NGOs and INGOs) from almost all coastal (and some non-coastal) districts in the states of Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka and certain islands in the Andaman & Nicobar Islands. The post-tsunami livelihood support programmes being implemented by different organisations in Tamil Nadu and Kerala have incorporated the project outputs in training programmes on improved fish processing and loss reduction methods. In Africa, copies of the outputs were circulated at regional post-harvest fisheries workshops held in Ghana, Tanzania and Uganda. Requests for feedback from workshop participants, however, have generated little response. Feedback received to-date shows the outputs are being used by the Ugandan Food Science and Technology Research Institute in providing training to traditional fish processors and undergraduate students at Makerere University. They are also being used as a training resource by INFOSA, the South African Development Community (SADC) regional office of INFOPECHE, in southern African countries and the Mbegani Fisheries Development Centre in Tanzania.

Fish processors in coastal areas of Andhra Pradesh and Orissa are currently the main users of the project's technical interventions. They have also participated in subsequent training programmes conducted by government agencies, NGOs and the private sector. Uptake of the project outputs is most visible in the Uppada and Visakhapatnam areas in Andhra Pradesh, and the Paradeep and Puri areas of Orissa.

**14. *What is the scale of current use? Indicating how quickly use was established and whether usage is still spreading (max 250 words).***

The processors using the research outputs live in villages that are spread along the length of the east coast of India (and some parts of the west coast), making it difficult to quantify extent of usage. Also, although the blowfly control strategy involves applying a range of measures at different stages of processing, each processor tends to use only some measures that are appropriate for her purpose or are affordable, indicating that the extent of uptake of different control strategies tends to be rather diffuse and varies from processor to processor. However, it is reported in many locations that the number of processors using the project outputs has increased, assisted by the growing support they have begun to receive from the government, NGOs and INGOs.

Most processors in the project locations in Andhra Pradesh and Orissa started using the control measures immediately after they were introduced. In other locations, uptake was determined by the extent of institutional support provided in terms of training and finance. Where no institutional support was forthcoming, and where fish

processing tends to be a small- to medium-size activity for the processors, the extent of uptake has remained low and is mostly confined to a few improvements that require relatively low investments or changes in practice.

During field visits in Andhra Pradesh and Orissa, it was observed that in villages where the usage of research outputs has taken root, uptake seems to be more widespread among processors who are involved full-time in processing operations and have access to (or ownership of) basic processing infrastructure. In terms of ease of uptake, it has been suggested that it is easier, in financial and spatial terms, for small-scale processors to adopt control measures such as drying racks than for the medium- to large-scale processors.

*15. In your experience what programmes, platforms, policy, institutional structures exist that have assisted with the promotion and/or adoption of the output(s) proposed here and in terms of capacity strengthening what do you see as the key facts of success? (max 350 words).*

Several initiatives of the DOF in Andhra Pradesh and Orissa have been effective in raising awareness of the research outputs amongst the processors. In Andhra Pradesh, SIFT delivered training /awareness programmes and refresher courses for DOF officers, NGOs and fish processors. In Orissa, the DOF, through the Support to Training and Employment Programme for Women (STEP), supported by the Department of Rural Development, provided training to fisherwomen in hygienic fish processing methods.

Government intervention has also helped some processors invest in control measures. These included favourable credit policies targeting members of women's groups in Andhra Pradesh and provision of investment and infrastructure support to women processors in Orissa. In addition, the Department of Rural Development, through the World Bank-supported 'Velugu' programme has enhanced access to investment for coastal women, including fish processors.

The Indian Council for Agricultural Research (ICAR)-funded National Agricultural Technology Project (NATP) on Studies on Fisherwomen used the outputs in conducting training programmes on 'hygienic handling, processing, and value addition to fish' for fisherwomen. The Kakinada centre of the Central Marine Fisheries Research Institute (CMFRI) conducted training programmes including blowfly control strategies for fisherwomen in Uppada. CIFT, Kochi, used the research outputs as training material in their winter school programme on improved post-harvest methods, attended by fisheries extension workers and college lecturers who in turn reportedly used the material in their work. In Tamil Nadu, the College of Fisheries, Tuticorin reportedly included the project outputs in its training fish processors and graduate fisheries science students. The Marine Products Export Development Authority (MPEDA) regularly uses the manuals and the video-cd produced by the project at its village level extension programmes.

In the private sector, ICM provided training to several fish processor groups (about 45) in Srikakulam, Visakhapatnam, East Godavari and Krishna Districts in Andhra Pradesh; in Kendrapara, Jagatsinghpur, Puri and Ganjam districts in Orissa and in the Andaman & Nicobar Islands at the request of government and research organisations, NGOs, INGOs and fish-worker groups.

Several civil society organisations expressed interest in promoting the research outputs amongst processors, particularly during the post-tsunami period in Tamil Nadu and southern Andhra Pradesh.



## Key success factors:

- Project outputs are felt to be simple, easily implementable, address an important problem, target vulnerable and marginalised group, fit easily into existing development/support frameworks and policies, show immediate results in terms of improved products and reduced losses.
- Project outputs easily fit into already existing policy and institutional frameworks and hence are easily operationalised.

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## Current Promotion

### D. Current promotion/uptake pathways

16. **Where** is promotion currently taking place? Please indicate for each country specified detail what promotion is taking place, by whom and indicate the scale of current promotion (**max 200 words**).

SIFT in Andhra Pradesh is promoting the research outputs by conducting regular training and awareness raising events for fish processors. It has also conducted a National Workshop on Post-Harvest Methods and Domestic Fish Marketing Opportunities. In most coastal states (Andhra Pradesh, Orissa, Tamil Nadu and Pondicherry), there are proposals to strengthen processing infrastructure and market linkages for processed fish through appropriate technological, financial and market related interventions, which have implications for the further uptake of the research results. The National Fisheries Development Board (NFDB) is strongly focused upon improving post-harvest infrastructure, quality control and market linkages and can play an important role in further promoting the research outputs.

The post-tsunami fisheries livelihood programmes being implemented by some INGOs and NGOs have a component of support earmarked for training fisherwomen in fish loss reduction and hygienic fish processing methods. Some of these programmes emphasise not only training and awareness-raising aspects, but also the need to meet institutional, market-related and financial needs to help the processors take up the programmes.

UN initiatives such as the ongoing United Nations Development Programme) UNDP projects in Orissa have included the research outputs in their information and communications technology (ICT) materials which are being developed for wider dissemination. The Food and Agriculture Organisation (FAO) fisheries livelihood support programme, as part of the joint UN post-tsunami response system in Chennai, proposes to use the project outputs in training to reduce post-harvest fish losses and support fisheries-based livelihoods in the post-tsunami context in Tamil Nadu and Kerala.

In Africa, the outputs have been distributed at UK Department for International Development (DFID) Post Harvest Fisheries Research Programme (PHFRP) funded post-harvest workshops in Ghana and Uganda, and an FAO workshop in Tanzania. They have also been used for DOF staff training in Cambodia under the DFID PHFRP.

17. **What are the current barriers preventing or slowing the adoption of the output(s)?** Cover here institutional issues, those relating to policy, marketing, infrastructure, social exclusion etc. (**max 200 words**).

§ Limited dissemination strategies adopted by the project – little opportunity for active dissemination in the post-project phase;

§ Information outputs could have been more focused upon the needs of different users in order to improve their reach and effectiveness. Coupled with lack of coherent and sustainable dissemination strategy in the post-project phase, their reach may have been less than it could have been.

§ Follow up in terms of uptake of project outputs by partner organisations and other relevant organisations has been piece-meal and largely confined to training activities, focusing upon the specific tools rather than on the systems-based approach as a whole. This standardisation of interventions, irrespective of their applicability and acceptability in different locations, affects the rate of uptake.

§ Apart from training, the processors' needs for uptake of the project outputs include investment – the existing channels of institutional support for meeting this need are inadequate and unevenly spread, whilst initiatives like women's self-help groups have yet to reach the stage where they can sustainably satisfy their own investment needs.

§ The traditional market systems are not geared to deal with, or pay, a premium for high quality products, especially when they constitute a fraction of the total available

§ Lack of opportunities into diversify to other markets further reduce scope for adoption of some of the suggested interventions.

§ Training outputs focus on traditional fish processing in India, limiting their applicability to other countries.

*18. What changes are needed to remove/reduce these barriers to adoption? This section could be used to identify perceived capacity related issues (max 200 words).*

§ More vigorous and systematic awareness/training campaigns (including pilot scale/demonstration activities) at village level, with more focus upon the systems based approach and using local government, NGO and grassroots level personnel as resource people. This could be best implemented through an existing training institution like SIFT, which, given adequate support in terms of policy and financing, can link with other government and NGO platforms at the district level for wider and more effective dissemination.

§ A similar initiative for raising awareness about the fish processing sector and its needs at the institutional and policy-making levels, including ensuring availability of funds for meeting the processors' investment needs. In the initial stages, it would be necessary for donor agencies to extend help in promoting appropriate the policy and institutional changes required for this purpose.

§ Efforts at understanding the existing fish markets and enhancing the scope for the processors to maximise returns through market/product diversification are necessary to understand consumer preferences and take the steps necessary to bring about behaviour change for better acceptance of the improved product, or to seek alternative opportunities to enhance returns to the processors.

§ Edit training outputs to achieve greater relevance to African and south east Asian countries and conduct demonstration led research in these countries.

*19. What lessons have you learnt about the best ways to get the outputs used by the largest number of poor people? (max 300 words).*

Principal requirements for the successful uptake of the outputs are raised awareness amongst the target groups, accompanied by their incorporation into the larger context of the environment within which processors operate. Awareness raising on the nutritional and economic impacts of blowfly infestation has not only led processors to adopt some of the project outputs, but also encouraged them to adapt them to individual circumstances. This has led them to articulate their needs to the support agencies in terms of specific support required to improve their livelihoods (rather than simply ask for money) and undertake some concerted efforts for lobbying. An important outcome of the project in Uppada village, where part of the research had been conducted, has been an initiative on the part of fish processors to form a cooperative society which allows them to become eligible for government support in terms of investment, infrastructure and processing equipment. This initiative is all the more remarkable because it has been taken by the women themselves, without help from any external agency.

While such initiatives in villages where the project worked directly are important, it has to be recognised that raising awareness is not a one-off exercise, especially in a sector which has a long history of failures in attempts to bring about changes in behaviour. It is essential for the project outputs to be properly incorporated into agendas at institutional level in order for them to be widely disseminated and supported. It needs long-term commitment, requiring sustained action by an agencies such as the DOF, in conjunction with other government and NGO bodies. It also means that more innovative, people-friendly approaches should be explored alongside making use of cable TV, village internet kiosks etc

The fact that the project's impact so far has been more visible at the institutional level than at the processors' level indicates that is likely to grow in coming years.

Experience also shows that there is a need for clarity in terms of designing dissemination materials, keeping in mind the needs and abilities of different stakeholders being targeted. For instance, the video-cd produced by the project has been the most important vehicle to take its message forward at the fish processors' level, while the training manual has been the most widely used at the institutional level. Thus, depending upon where a project seeks to see the most change in terms of individual or group behaviour, it needs to tailor its dissemination activities and outputs accordingly.

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## Impacts On Poverty

### *E. Impacts on poverty to date*

*20. Where have impact studies on poverty in relation to this output or cluster of outputs taken place? This should include any formal poverty impact studies (and it is appreciated that these will not be commonplace) and any less formal studies including any poverty mapping-type or monitoring work which allow for some analysis on impact on poverty to be made. Details of any cost-benefit analyses may also be detailed at this point. Please list studies here.*

No formal poverty impact studies have been undertaken in connection with this project. The only assessment that addresses the poverty implications of the research is that done by Clucas and Stirrat, who commented: "As far as poverty is concerned, in all three sites fish processors are undoubtedly amongst the poorest of the poor. Most are women and although some at least of these women are relatively wealthy processors, the ease of entry

*into fish processing means that it provides a source of livelihood for the poor. Although the project did not have a specific gender component, there is a sense in which those who stand to benefit from it are predominately single women .... These women, both married and unmarried are those who benefit most from the outputs from this project.”*

The assessment carried out in preparing this proforma has yielded additional information on the potential impacts of the research on poverty, rather than providing empirical examples. Whilst case studies of fish processors in some locations like Paradeep and Uppada indicate increased incomes, reduced vulnerability and so forth, it may be too early to expect these changes to have an impact on poverty and lead to an improved quality of life.

**21. Based on the evidence in the studies listed above, for each country detail how the poor have benefited from the application and/or adoption of the output(s) (max. 500 words):**

- *What positive impacts on livelihoods have been recorded and over what time period have these impacts been observed? These impacts should be recorded against the capital assets (human, social, natural, physical and, financial) of the livelihoods framework;*
- *For whom i.e. which type of person (gender, poverty group (see glossary for definitions) has there been a positive impact;*
- *Indicate the number of people who have realised a positive impact on their livelihood;*
- *Using whatever appropriate indicator was used detail what was the average percentage increase recorded*

Being a short-term research project aimed at addressing one particular aspect of fish processing and with a relatively small budget, it may be a little ambitious to expect it to lead to substantial changes in the levels of poverty of the fish workers. Whilst such changes do happen, they tend to be incremental and accumulate over a period of time, often in conjunction with other initiatives aimed at alleviating poverty.

As to the number of people who have realised a positive impact on their livelihood, the spread of the project outputs has been quite extensive and the problems in assessing effectiveness are compounded by lack of good databases on numbers of fish processors in the country, making it difficult to quantify the percentage of people adopting the new techniques, even within a given location.

The people most likely to benefit from the project are women, who constitute over 80% of the people involved in fish processing and trade on the east coast of India. At least 25% of these processors are single women, who are the main bread winners in their families and whose access to other livelihood opportunities is very limited. So potentially, the project outputs could help a sizeable number of extremely vulnerable and marginalised poor people. This is, however, contingent upon creating an environment and conditions conducive to uptake of the project outputs.

The project ended over three years ago, which is when adoption of inputs can be considered to have begun. As indicated, it is not possible to arrive at the number of people who have realised a positive impact on their livelihood. However, one can use some qualitative indicators to see what real/potential impacts the adoption of the project outputs has had for the poor. For the processors who have adopted the control measures in their processing systems, the positive impacts have been reported to be:

- Reduced fish losses, hence more produce to take to the market, increasing income per processing cycle by up to 20% or more
- Reduced risk in terms of both physical and economic losses of fish
- More hygienic working conditions
- More cohesion amongst processors who can lobby for a better deal in development programmes as well as share their physical tools and infrastructure to reduce costs of investment

Whilst there is no doubt about the benefits to processors from adopting control measures, these remain largely invisible in the face of some larger problems they are currently facing. Given time, it is possible there will be some sort of stability in the sector which will allow the outputs to have a more significant impact upon the livelihoods of poor people dependent upon processing.

The project has contributed to raising the profile of small scale processors, resulting in them being taken seriously by the policy makers and administrators, By focusing upon such development priorities as infrastructure, technical improvements and market linkages, the project has also contributed to 'mainstreaming' traditional fish processing, which is reflected in the number of training programmes that the outputs have given rise to. Fish processing has traditionally been regarded by development workers as being a difficult area to work in; the project may have contributed to enhancing processor access to support and influenced decisions taken at macro-economic level. Similarly, by locating the project beneficiaries amongst some of the poorest and most vulnerable groups (such as single women), the project also helped draw the attention of civil society organisations. In the post-tsunami context, when most development agencies were at a loss as to the best means to address the livelihood needs of fisherwomen, it is publications like the manuals brought out by the project which highlighted not just a means to address a problem within a livelihood activity but, more importantly, to the significance of the activity itself to the women and to coastal fishing communities in general.

An important aspect of the systems-based approach is that it is applicable to almost any situation. This has made it possible for an FAO initiative to use the approach in developing an understanding the dynamics of fishing operations in a coastal village in Tamil Nadu to identify a series of measures to reduce conflicts between different producer groups. Although rather rudimentary and still evolving, this initiative has been seen as a simple, yet effective mechanism to control conflicts in this perpetually conflict-ridden area.

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## Environmental Impact

### *H. Environmental impact*

**24. What are the direct and indirect environmental benefits related to the output(s) and their outcome(s)? (max 300 words)**

*This could include direct benefits from the application of the technology or policy action with local governments or multinational agencies to create environmentally sound policies or programmes. Any supporting and appropriate evidence can be provided in the form of an annex.*

One of the important requirements for the control of blowfly infestation is that the processing areas be free of any waste material that could act as a substrate for the blowfly to feed and breed upon. In some villages, where processors have adopted the blowfly control strategies, it is reported that the hygiene conditions of processing areas and their neighbourhoods have improved since the women started disposing of processing waste at a distance from the village. Similarly, the use of clean water and other developments are reported to have improved the general sanitation in the middle of the village where much of the processing takes place. With fish offal and other processing related wastes being disposed at a distance and regular cleaning of the processing areas taking place, a decrease in pest activity has been reported. It can be assumed that improvements in hygiene will lead to improvements in public health. It can also be assumed that a reduction in the use of insecticides as a blowfly control measure will bring about public health and environmental benefits.

25. *Are there any adverse environmental impacts related to the output(s) and their outcome(s)? (max 100 words)*

None.

26. *Do the outputs increase the capacity of poor people to cope with the effects of climate change, reduce the risks of natural disasters and increase their resilience? (max 200 words)*

**No.**

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