

POST-HARVEST FISH LOSS ASSESSMENT FOR SMALL-SCALE FISHERIES (PHFLA): AN OPEN-ACCESS CUSTOMIZABLE TOOL

Kathleen Ragsdale, Mississippi State University
 Mary Read-Wahidi, Mississippi State University
 Elin Torell, University of Rhode Island
 Netsayi Mudege, WorldFish
 Pamela Marinda, University of Zambia

Post-harvest fish loss – both in quality and physical losses – contributes to substantial waste and impacts the livelihoods, nutrition, food safety, and food security of millions. Understanding the causes of post-harvest fish loss in small-scale fisheries is a key step in reducing its impact. That is why FishFirst! Zambia researchers, with support from the Feed the Future Innovation Lab for Fish, created an open-access customizable tool called the **POST-HARVEST FISH LOSS ASSESSMENT FOR SMALL-SCALE FISHERIES (PHFLA)**. We developed the PHFLA as a brief tool that is quantitative, easy to collect and analyze, open-access, customizable, and suitable as a stand-alone assessment or for inclusion in a larger survey.

ACKNOWLEDGEMENT: Development of the Post-Harvest Fish Loss Assessment for Small-Scale Fisheries (PHFLA) is made possible by the generous support of the American people provided by the Feed the Future Innovation Lab for Fish through the United States Agency for Development (USAID). The contents are the responsibility of the authors and do not necessarily reflect the views of USAID or the United States Government. The Feed the Future Innovation Lab for Fish is managed by Mississippi State University through an award from USAID (Award No. 7200AA18CA00030; M. Lawrence, PI) and provides support to FishFirst! Zambia (Grant No. 322554 012200 027000 (K. Ragsdale, PI; N. Mudege, PI). We would like to acknowledge the important works that informed the PHFLA's development, including: Diei-Ouadi & Mgawe (2011); Kefi, Cole, Kaminski, Ward & Mkandawire (2017); Petrescu, Vermeir & Petrescu-Mag (2019); Torell et al. (2020); Ward & Jeffries (2000).

TO CITE THIS TOOL: Ragsdale, K., Read-Wahidi, M., Torell, E., Mudege, N., & Marinda, P. (2021). *Post-Harvest Fish Loss Assessment For Small-Scale Fisheries (PHFLA): An Open-Access Customizable Tool*. Mississippi State, USA: Feed the Future Innovation Lab for Fish, Mississippi State University.

<https://www.fishinnovationlab.msstate.edu/sites/www.fishinnovationlab.msstate.edu/files/inline-files/Ragsdale%20et%20al%20PHFLA%20Survey%20Tool%20FINAL%202.pdf>

Post-Harvest Fish Loss Assessment for Small-Scale Fisheries (PHFLA)

Name of Enumerator: [Autofill]

Today's Date: [Autofill: DD / MM / YY]

INTRODUCTORY SCRIPT: Thank you for the opportunity to speak with you. We are a study team from [Organization(s)]. We are conducting a study to learn about post-harvest fish loss in this area. If you are willing to be a part of our study, we will ask you questions about your background and experiences with post-harvest fish loss. The survey should take about one-half hour to complete. Your answers are confidential: This means that we will not ask you for your name and your answers are private and any information that can identify you will not be shared outside the study team. The information you provide may be used to develop programs that could help people in this area. Your participation in this study is entirely voluntary – this means you can stop taking the survey at any time or to skip any questions you do not want to answer.

Q1. Would you like to take the ELIGIBILITY SCREEN?	1 = No [Skip to Q6] 2 = Yes
Q2. Are you 18 years old or older?	1 = No [Skip to Q7] 2 = Yes
Q3. Do you reside/live in this [site]? This can be either your permanent or a seasonal residence.	1 = No [Skip to Q7] 2 = Yes
Q5. Do you engage in ANY fishing-related activities at [site]: [NOTE: Person can also be involved in other agricultural/non-farm activities]	1 = Fishing using a canoe/boat or without a boat (e.g., fishing with fishing poles, nets, and traps from shore) [Skip to Q8] 2 = Fish processing [Skip to Q8] 3 = Selling/trading fish [Skip to Q8] 4 = None of the above [Skip to Q7]
Q6. Thank you for your valuable time. Could you tell me why you declined the eligibility screen?	1 = I don't have the time 2 = The topic doesn't interest me 3 = Other: _____
Q7. Because you answered NO to this question, you aren't eligible to participate in the study. We deeply appreciate your valuable time.	[End Survey]

Q8. You answered YES to all the questions and are eligible to participate. Would you like to continue?		1 = No → We deeply appreciate your valuable time! [End Survey] 2 = Yes → Before we get started, do you have any questions about the study or what I have said?		
If in the future you have any questions, concerns, or complaints regarding the study, please feel welcomed to contact [First, Last Name(s)] at [Organization(s)] at [+XXX XXX XXX XXX] or by email at [email(s)]. If you would like, we will leave a copy of this page for you to keep.				
SECTION A: DEMOGRAPHICS				
A1. Province [or its equivalent]:	[Autofill]			
A2. District [or its equivalent]:	[Autofill]			
A3. Name of site [fishing village/fishing camp]:	Site: _____			
A4. Participant's gender:	1 = Male 2 = Female			
A5. Is [site] a permanent fishing village or temporary fishing camp?	1 = Permanent fishing village 2 = Temporary fishing camp			
A6. What is your age? OR: What year were you born?	Age: ____ (in years) OR: Year Born: 19 ____			
A7. How many years of school did you complete?	<table border="1"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>			
A8. What is the total number of people living in your household at [site]?	<table border="1"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>			
A9. What type of household do you live in? Is your household <u>HEADED</u> by:	1 = A husband/wife pair who <u>jointly</u> make most of your household's important decisions 2 = An adult female who makes most of your household's important decisions 3 = An adult male who makes most of your household's important decisions 4 = A husband and co-wives (polygynous household)			
A10. What is your marital status:	1 = Married and live with your spouse 2 = Married but have not lived with spouse in past 3 months because <u>you</u> migrate for work 3 = Married but have not lived with spouse in past 3 months because <u>spouse</u> migrates for work 4 = Widowed 5 = Separated/Divorced 6 = Single/Never married 7 = Living together (cohabiting)			
SECTION B: FISHERS				
SCRIPT: I want to ask you some questions about YOUR fishing in the PAST 7 DAYS:				
B1. In the PAST 7 DAYS, did you fish at [Site]: 1) using a canoe/boat or 2) without a boat (e.g., fishing with fishing poles, nets, and traps from shore)?	1 = No [Skip to C1] 2 = Yes			
SCRIPT: Please answer the next set of questions based on your VERY LAST CATCH:				
B2. For your LAST catch: Did you: 1) fish using a canoe/boat or 2) fish without using a canoe/boat (e.g., fishing with fishing poles, nets, and traps from shore)? [NOTE: IF PERSON REPORTS THEY FISHED BOTH 'USING A CANOE/BOAT' AND 'WITHOUT A BOAT,' ASK THEM TO ANSWER THE NEXT SET OF QUESTIONS BASED ON THEIR LARGEST CATCH, AND SELECT 1 OR 2 AS APPROPRIATE]	1 = Fished using a canoe/boat 2 = Fished without using a canoe/boat			
B3. For your LAST catch: What species of fish/other foods did you harvest? List up to 3 species of fish/other in rank order from largest catch to smallest catch:	1 = ____ 2 = ____ 3 = ____			
B4. For your LAST catch: How many [UNITS] [e.g., pieces, baskets, crates] were in this catch? [NOTE: THIS UNIT WILL BE CONVERTED TO THE APPROPRIATE STANDARD UNIT OF PIECES, KILOS, POUNDS, ETC., FOR DATA ANALYSIS. FOR EXAMPLE: 1 BASKET = 1.5 KILOS, ETC.]	Unit type: ____ TOTAL # of UNITS: ____			
B5. For your LAST catch: What did you do with the catch?				
SELECT	ACTIVITY:	IF SELECTED:		
	1 = Sold FRESH	How much of THIS CATCH was [ACTIVITY 1]? 1 = all or most 2 = about half 3 = less than half		
	2 = Eaten FRESH by household	How much of THIS CATCH was [ACTIVITY 2]? 1 = all or most 2 = about half 3 = less than half		
	3 = PROCESSED and then sold	How much of THIS CATCH was [ACTIVITY 3]? 1 = all or most 2 = about half 3 = less than half		
	4 = PROCESSED and then eaten by household	How much of THIS CATCH was [ACTIVITY 4]? 1 = all or most 2 = about half 3 = less than half		
	5 = Other: _____	How much of THIS CATCH was [ACTIVITY 5]? 1 = all or most 2 = about half 3 = less than half		

B6. How many [Currency Units] did you get for the [UNITS] that you sold FRESH?		Currency Units: ____
B7. How many [Currency Units] did you get for the [UNITS] that you PROCESSED and then sold?		Currency Units: ____
SCRIPT: Now I want to ask you about experiencing REDUCED QUALITY in your last catch. REDUCED QUALITY means that some portion of your catch deteriorated or worsened in freshness, smell, taste, appearance, color, size, shape, or nutrition.		
B8. For your LAST catch: Did you experience any REDUCED QUALITY from time of catch until the catch was processed, sold, or eaten?		1 = No [Skip to B11] 2 = Yes
B9. For your LAST catch: What were the reasons for the REDUCED QUALITY?		
SELECT	REASON:	IF SELECTED:
	1 = Contaminated: Oils, fuels, blood, or unclean water	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 1]? 1 = all or most 2 = about half 3 = less than half
	2 = Contaminated: Insects	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Contaminated: Mold or rot	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 3]? 1 = all or most 2 = about half 3 = less than half
	4 = Crushed or Broken: From handling or packing; over-crowding during storage	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 4]? 1 = all or most 2 = about half 3 = less than half
	5 = Crushed or broken: During unloading the catch	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 5]? 1 = all or most 2 = about half 3 = less than half
	6 = Theft: By birds, rodents, animals	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 6]? 1 = all or most 2 = about half 3 = less than half
	7 = Theft: By humans	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 7]? 1 = all or most 2 = about half 3 = less than half
	8 = Time: Spoiled over many hours of fishing	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 8]? 1 = all or most 2 = about half 3 = less than half
	9 = Time: Transportation delayed getting batch to buyers	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 9]? 1 = all or most 2 = about half 3 = less than half
	10 = Time: Catch was not sold in time to a buyer	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 10]? 1 = all or most 2 = about half 3 = less than half
	11 = Weather: Spoiled because the weather was hot and there was no ice	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 11]? 1 = all or most 2 = about half 3 = less than half
	12 = Other _____	How much of THIS CATCH experienced REDUCED QUALITY due to [REASON 12]? 1 = all or most 2 = about half 3 = less than half
B10. What did you do with this REDUCED QUALITY fish?		
SELECT	ACTIVITY:	IF SELECTED:
	1 = Sold for a normal market price	How much of THIS CATCH was [ACTIVITY 1]? 1 = all or most 2 = about half 3 = less than half
	2 = Sold for a reduced price	How much of THIS CATCH was [ACTIVITY 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Eaten by household	How much of THIS CATCH was [ACTIVITY 3]? 1 = all or most 2 = about half

		3 = less than half
	4 = Bartered/traded it for a service	How much of THIS CATCH was [ACTIVITY 4]? 1 = all or most 2 = about half 3 = less than half
	5 = Gave it away	How much of THIS CATCH was [ACTIVITY 5]? 1 = all or most 2 = about half 3 = less than half
	6 = Other: _____	How much of THIS CATCH was [ACTIVITY 6]? 1 = all or most 2 = about half 3 = less than half

SCRIPT: Now I'd like to ask you if you experienced any TOTAL LOSS to any portion of your last catch. TOTAL LOSS means that you were NOT able to sell or eat some portion of your catch because 1) it deteriorated or worsened in quality or 2) due to theft.

B11. For your LAST catch: Did you experience any TOTAL LOSS from time of catch until the catch was processed, sold, or eaten? 1 = No [Skip to C1]
2 = Yes

B12. What were the causes of the TOTAL LOSS?

SELECT	REASON:	IF SELECTED:
	1 = Quality: Had to be discarded because quality was so low	How much of THIS CATCH experienced TOTAL LOSS due to [REASON 1]? 1 = all or most 2 = about half 3 = less than half
	2 = Theft: By birds, rodents, animals	How much of THIS CATCH experienced TOTAL LOSS due to [REASON 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Theft: By humans	How much of THIS CATCH experienced TOTAL LOSS due [REASON 3]? 1 = all or most 2 = about half 3 = less than half
	4 = Other: _____	How much of THIS CATCH experienced TOTAL LOSS due to [REASON 4]? 1 = all or most 2 = about half 3 = less than half

SECTION C: FISH PROCESSORS

SCRIPT: Now I'd like to ask you some questions about your fish processing in the PAST 7 DAYS:

C1. In the PAST 7 DAYS, did you engage in fish processing? 1 = No [Skip to D1]
2 = Yes

SCRIPT: Please answer the next set of questions based on the VERY LAST BATCH of fish you processed:

C2. For the VERY LAST BATCH of fish you processed, what species of fish did you process? List up to 3 species of fish/other you processed in rank order of largest batch to smallest batch: 1 = ____
2 = ____
3 = ____

C3. For your LAST batch: How many [UNITS] were in your batch? Unit type: ____
TOTAL # of [UNITS]: ____

C4. For your LAST batch: How was it processed?

SELECT	METHOD:	IF SELECTED:
	1 = Sun-dried: Ground into dried fish powder	How much of THIS BATCH was [METHOD 1]? 1 = all or most 2 = about half 3 = less than half
	2 = Sun-dried: Whole fish	How much of THIS BATCH was [METHOD 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Smoked: Whole fish	How much of THIS BATCH was [METHOD 3]? 1 = all or most 2 = about half 3 = less than half
	4 = Salted: Whole fish	How much of THIS BATCH was [METHOD 4]? 1 = all or most 2 = about half 3 = less than half
	5 = Fried	How much of THIS BATCH was [METHOD 5]? 1 = all or most 2 = about half 3 = less than half

	6 = Other: _____	How much of THIS BATCH was [METHOD 6]? 1 = all or most 2 = about half 3 = less than half
C5. After your LAST batch was processed, what did you do with it?		
SELECT	ACTIVITY:	IF SELECTED:
	1 = Sold: Normal market price	How much of THIS BATCH was [ACTIVITY 1]? 1 = all or most 2 = about half 3 = less than half
	2 = Sold: Reduced price	How much of THIS BATCH was [ACTIVITY 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Eaten by household	How much of THIS BATCH was [ACTIVITY 3]? 1 = all or most 2 = about half 3 = less than half
	4 = Bartered/traded for a service or other goods	How much of THIS BATCH was [ACTIVITY 4]? 1 = all or most 2 = about half 3 = less than half
	5 = Gave it away	How much of THIS BATCH was [ACTIVITY 5]? 1 = all or most 2 = about half 3 = less than half
	6 = Other: _____	How much of THIS BATCH was [ACTIVITY 6]? 1 = all or most 2 = about half 3 = less than half
SCRIPT: Now I'd like to ask you if you experienced REDUCED QUALITY to a portion of your LAST batch. REDUCED QUALITY means that some portion of your batch deteriorated or worsened in freshness, smell, taste, appearance, color, size, shape, or nutrition.		
C6. For your LAST batch: Did you experience any REDUCED QUALITY from time you received the batch until it was processed, sold, or eaten?		1 = No [Skip to C9] 2 = Yes
C7. For your LAST batch: What were the reasons for the REDUCED QUALITY?		
SELECT	REASON:	IF SELECTED:
	1 = Contaminated: Oils, fuels, blood, or unclean water	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 1]? 1 = all or most 2 = about half 3 = less than half
	2 = Contaminated: Insects	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Contaminated: Mold or rot	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 3]? 1 = all or most 2 = about half 3 = less than half
	4 = Contaminated: Dirt or dust during processing	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 4]? 1 = all or most 2 = about half 3 = less than half
	5 = Crushed or Broken: During unloading the catch	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 5]? 1 = all or most 2 = about half 3 = less than half
	6 = Crushed or Broken: During drying or smoking	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 6]? 1 = all or most 2 = about half 3 = less than half
	7 = Crushed or Broken: From handling, packing, or over-crowding during storage	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 7]? 1 = all or most 2 = about half 3 = less than half
	8 = Crushed or Broken: During transportation	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 8]? 1 = all or most 2 = about half 3 = less than half
	9 = Processing: Burned during drying or smoking	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 9]? 1 = all or most

		2 = about half 3 = less than half
	10 = Processing: Loss of moisture from over-drying or over-smoking	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 10]? 1 = all or most 2 = about half 3 = less than half
	11 = Theft: By birds, rodents, animals	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 11]? 1 = all or most 2 = about half 3 = less than half
	12 = Theft: By humans	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 12]? 1 = all or most 2 = about half 3 = less than half
	13 = Time: Batch was not processed in time	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 13]? 1 = all or most 2 = about half 3 = less than half
	14 = Time: Batch had to be stored for too long	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 14]? 1 = all or most 2 = about half 3 = less than half
	15 = Time: Transportation delayed getting the batch to buyers	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 15]? 1 = all or most 2 = about half 3 = less than half
	16 = Weather: Rain/lack of sun made drying or smoking the batch difficult	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 16]? 1 = all or most 2 = about half 3 = less than half
	17 = Weather: Rain/lack of sun made it difficult to keep the batch dry after processing	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 17]? 1 = all or most 2 = about half 3 = less than half
	18 = Weather: Rain/weather delayed getting the batch to buyers	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 18]? 1 = all or most 2 = about half 3 = less than half
	19 = Other _____	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 19]? 1 = all or most 2 = about half 3 = less than half

C8. For your LAST batch: What did you do with the REDUCED QUALITY fish?

SELECT	ACTIVITY:	IF SELECTED:
	1 = Sold: Normal market price	How much of THIS BATCH was [ACTIVITY 1]? 1 = all or most 2 = about half 3 = less than half
	2 = Sold: Reduced price	How much of THIS BATCH was [ACTIVITY 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Eaten by household	How much of THIS BATCH was [ACTIVITY 3]? 1 = all or most 2 = about half 3 = less than half
	4 = Bartered/traded for a service or other goods	How much of THIS BATCH was [ACTIVITY 4]? 1 = all or most 2 = about half 3 = less than half
	5 = Gave it away	How much of THIS BATCH was [ACTIVITY 5]? 1 = all or most 2 = about half 3 = less than half
	6 = Other: _____	How much of THIS BATCH was [ACTIVITY 6]? 1 = all or most 2 = about half 3 = less than half

SCRIPT: Now we're going to ask you if you experienced any TOTAL LOSS to any portion of your last batch. TOTAL LOSS means that you were NOT able to sell or eat some portion of your batch because it deteriorated or worsened in quality or 2) due to theft.

C9. For your LAST batch: Did you experience any TOTAL LOSS from time you received the batch until it was processed, sold, or eaten?	1 = No [Skip to D1] 2 = Yes
---	--------------------------------

C10. For your LAST batch: What were the reasons for the TOTAL LOSS?		
SELECT	REASON:	IF SELECTED:
	1 = Quality: Had to be discarded because quality was so low	How much of THIS BATCH experienced TOTAL LOSS due to [REASON 1]? 1 = all or most 2 = about half 3 = less than half
	2 = Theft: By birds, rodents, animals	How much of THIS BATCH experienced TOTAL LOSS due to [REASON 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Theft: By humans	How much of THIS BATCH experienced TOTAL LOSS due to [REASON 3]? 1 = all or most 2 = about half 3 = less than half
	4 = Other: _____	How much of THIS BATCH experienced TOTAL LOSS due to [REASON 4]? 1 = all or most 2 = about half 3 = less than half

SECTION D: FISH SELLERS

SCRIPT: Now I have some questions about SELLING fish and fish products – whether you processed the fish yourself or not.

D1. In the PAST 7 DAYS, did you sell fish or fish products to a buyer, including at a market?	1 = No [END MODULE] 2 = Yes
---	--------------------------------

SCRIPT: Please answer the next set of questions based on the LAST BATCH of fish you SOLD:

D2. For the LAST BATCH of fish/fish products you sold: Did you processed the FISH/FISH PRODUCTS yourself?	1 = No, I purchased processed fish from someone 2 = Yes, I processed the batch myself
---	--

D3. For this LAST BATCH: What species did you sell? List up to 3 species of fish/fish products you sold in rank order of largest batch to smallest batch:	1 = _____ 2 = _____ 3 = _____
---	-------------------------------------

D4. For this LAST BATCH: How many [UNITS] were in your batch?	Unit type: _____ TOTAL # of [UNITS] in batch: ____
---	---

D5. For this LAST BATCH OF FISH/FISH PRODUCTS you sold: How was it PROCESSED?

SELECT	METHOD:	IF SELECTED:
	1 = Fresh	How much of THIS BATCH was [METHOD 1]? 1 = all or most 2 = about half 3 = less than half
	2 = Sun-dried: Ground into dried fish powder	How much of THIS BATCH was [METHOD 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Sun-dried: Whole fish	How much of THIS BATCH was [METHOD 3]? 1 = all or most 2 = about half 3 = less than half
	4 = Smoked: Whole fish	How much of THIS BATCH was [METHOD 4]? 1 = all or most 2 = about half 3 = less than half
	5 = Salted: Whole fish	How much of THIS BATCH was [METHOD 5]? 1 = all or most 2 = about half 3 = less than half
	6 = Fried	How much of THIS BATCH was [METHOD 6]? 1 = all or most 2 = about half 3 = less than half
	7 = Other _____	How much of THIS BATCH was [METHOD 7]? 1 = all or most 2 = about half 3 = less than half

SCRIPT: Did you experienced any REDUCED QUALITY to any portion of this LAST batch. REDUCED QUALITY means that a portion of your batch deteriorated or worsened in freshness, smell, taste, appearance, color, size, shape, or nutrition.

D6. For this LAST BATCH OF FISH/FISH PRODUCTS you sold: Did you experience any REDUCED QUALITY before you could sell to a buyer, including at a market?	1 = No [Skip to D9] 2 = Yes
---	--------------------------------

D7. For your LAST batch: What were the reasons for the REDUCED QUALITY?		
SELECT	REASON:	IF SELECTED:
	1 = Contaminated: Oils, fuels, blood, or unclean water	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 1]? 1 = all or most 2 = about half 3 = less than half
	2 = Contaminated: Insects	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Contaminated: Mold or rot	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 3]? 1 = all or most 2 = about half 3 = less than half
	4 = Contaminated: Dirt or dust at market; point-of-sale	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 4]? 1 = all or most 2 = about half 3 = less than half
	5 = Crushed or Broken: During unloading the catch	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 5]? 1 = all or most 2 = about half 3 = less than half
	6 = Crushed or Broken: From handling, packing, or over-crowding during storage	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 6]? 1 = all or most 2 = about half 3 = less than half
	7 = Crushed or Broken: During transportation	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 7]? 1 = all or most 2 = about half 3 = less than half
	8 = Crushed or Broken: From over-handling at market; point-of-sale	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 8]? 1 = all or most 2 = about half 3 = less than half
	9 = Theft: By birds, rodents, animals	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 9]? 1 = all or most 2 = about half 3 = less than half
	10 = Theft: By humans	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 10]? 1 = all or most 2 = about half 3 = less than half
	11 = Time: Batch had to be stored for too long	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 11]? 1 = all or most 2 = about half 3 = less than half
	12 = Time: Transportation delayed getting batch to market; point-of-sale	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 12]? 1 = all or most 2 = about half 3 = less than half
	13 = Time: Batch was not sold in time at market; point-of-sale	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 13]? 1 = all or most 2 = about half 3 = less than half
	14 = Weather: Rain/lack of sun made it difficult to keep the batch dry	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 14]? 1 = all or most 2 = about half 3 = less than half
	15 = Weather: Rain/lack of sun delayed getting the batch to market; point-of-sale	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 15]? 1 = all or most 2 = about half 3 = less than half
	16 = Other _____	How much of THIS BATCH experienced REDUCED QUALITY due to [REASON 16]? 1 = all or most 2 = about half 3 = less than half
D8. For your LAST batch: What did you do with the fish that were REDUCED QUALITY?		
SELECT	ACTIVITY:	IF SELECTED:
	1 = Sold at NORMAL market price	How much of THIS BATCH was [ACTIVITY 1]? 1 = all or most 2 = about half

		3 = less than half
	2 = Sold at REDUCED price	How much of THIS BATCH was [ACTIVITY 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Eaten by household	How much of THIS BATCH was [ACTIVITY 3]? 1 = all or most 2 = about half 3 = less than half
	4 = Bartered/traded for a service or other goods	How much of THIS BATCH was [ACTIVITY 4]? 1 = all or most 2 = about half 3 = less than half
	5 = Gave it away	How much of THIS BATCH was [ACTIVITY 5]? 1 = all or most 2 = about half 3 = less than half
	6 = Other: _____	How much of THIS BATCH was [ACTIVITY 6]? 1 = all or most 2 = about half 3 = less than half
SCRIPT: Now we're going to ask you if you experienced any TOTAL LOSS to any portion of your last catch. TOTAL LOSS means that you were NOT able to sell or eat some portion of your batch because 1) it deteriorated or worsened in quality or 2) due to theft.		
D9. For your LAST batch: Did you experience any TOTAL LOSS from time you received the batch until it was processed, sold, or eaten?		1 = No [END SURVEY] 2 = Yes
D10. For your LAST batch: What were the reasons for the TOTAL LOSS?		
SELECT	ACTIVITY:	IF SELECTED:
	1 = Quality: Had to be discarded because quality was so low	How much of THIS BATCH experienced TOTAL LOSS due to [REASON 1]? 1 = all or most 2 = about half 3 = less than half
	2 = Theft: By birds, rodents, animals	How much of THIS BATCH experienced TOTAL LOSS due to [REASON 2]? 1 = all or most 2 = about half 3 = less than half
	3 = Theft: By humans	How much of THIS BATCH experienced TOTAL LOSS due to [REASON 3]? 1 = all or most 2 = about half 3 = less than half
	4 = Other: _____	How much of THIS BATCH experienced TOTAL LOSS due to [REASON 4]? 1 = all or most 2 = about half 3 = less than half

Thank you for your valuable time today. END SURVEY

REFERENCES

- Diei-Ouadi, Y., & Mgawe, Y. I. (2011). Post-harvest fish loss assessment in small-scale fisheries: A guide for the extension officer. *FAO Fisheries and Aquaculture Technical Paper*. No. 559. Rome, FAO. 2011. 93p. <http://www.fao.org/3/i2241e/i2241e.pdf>
- Kefi, A. S., Cole, S. M., Kaminski, A. M., Ward, A., & Mkandawire, N. L. (2017). Physical losses of fish along the value chain in Zambia: A case study of Barotse Floodplain. *International Journal of Fisheries and Aquaculture*, 9(10), 98-107. <https://doi.org/10.5897/IJFA2017.0638>
- Petrescu, D. C., Vermeir, I., & Petrescu-Mag, R. M. (2019). Consumer Understanding of Food Quality, Healthiness, and Environmental Impact: A Cross-National Perspective. *International Journal of Environmental Research and Public Health*, 17(1), 169. MDPI AG. <http://dx.doi.org/10.3390/ijerph17010169>
- Torell, E. C., Jamu, D. M., Kanyerere, G.Z., Chiwaula, L., Nagoli, J., Kambewa, P., Brooks, A., & Freeman, P. (2020). Assessing the economic impacts of post-harvest fisheries losses in Malawi. *World Development Perspectives*, 19, 10024, 2452-2929. <https://doi.org/10.1016/j.wdp.2020.100224>
- Ward, A.R., & Jeffries, D. J. (2000). *A manual for assessing post harvest fisheries losses*. Chatham, UK, Natural Resources Institute. vii + 140 pp. <https://core.ac.uk/reader/42390152>