



Production Without Medicalisation: a pilot intervention in global protein production

Thank you for agreeing to participate in this survey on disease management and aquaculture conducted by the University of Exeter (UK), CEFAS (UK), Worldfish Bangladesh, and ARBAN. The purpose of this questionnaire is to assess whether and how hatchery and pond aquaculture systems can be sustainable without significant changes in inputs, and without the use of antibiotics.

The information provided by you in this questionnaire will be used for research purposes. Your participation in this study is entirely voluntary, and it will not be possible to identify you from your individual responses.

Researcher's Name

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Researcher's Contact Details

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Shrimp (Bagda) and Prawn (Golda) Hatchery Questionnaire

Hatchery Name: _____

Hatchery Type: _____

(Researcher's instructions: if possible, supply grid reference)

Hatchery Location: _____

Respondent's Role:

(Note to Researcher, eg Owner/Manager/Technician)

Respondent's Experience:

(Note to Researcher: Years Working/Qualifications)

Question Number	Researcher's Instructions & Notes
<p>1. Hatchery Characteristics</p> <p>1.1. Production Capacity <i>What is the production capacity for your hatchery?</i></p> <p>a) Total PL Production for 2016 <input type="text"/> M PL</p> <p>b) Target PL production for 2017 <input type="text"/> M PL</p> <p>c) Potential operational capacity per year <input type="text"/> M PL</p>	

Question Number	Researcher's Instructions & Notes
<p>d) Average density of:</p> <p> i Shrimp nauplii <input type="text"/> 100/Ltr</p> <p> ii Prawn larvae <input type="text"/> 100,000/Tonne</p> <p>e) Total water capacity of tanks <input type="text"/> Ltrs</p>	
<p>1.2. Management of Broodstock: <i>Which method for managing your broodstock do you use?</i></p> <p>a) Untested mixed broodstock method <input type="checkbox"/> (if yes, % of annual PL production) <input type="text"/></p> <p>b) PCR tested: mixed broodstock <input type="checkbox"/> (if yes, % of annual PL production) <input type="text"/></p> <p>c) PCR tested: one mother, one tank <input type="checkbox"/> (if yes, % of annual PL production) <input type="text"/></p> <p>d) Eye ablation of broodstock <input type="checkbox"/> i If yes, % of annual production <input type="text"/></p>	<ul style="list-style-type: none"> • Tick all that apply • Ask respondent to break down method as an approximate percentage of annual production

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<p>ii How frequently does eye ablation produce results?</p> <p><25% 25-50% 50-75% >75%</p> <p>iii How many broods does ablation stimulate? <input type="text"/></p>	<ul style="list-style-type: none"> • Circle most accurate
<p>1.3. Water Source</p> <p><i>Where do you source your water?</i></p> <p>a) Seawater <input type="checkbox"/></p> <p>b) Brine water <input type="checkbox"/></p> <p>c) Groundwater <input type="checkbox"/></p> <p>d) Canal <input type="checkbox"/></p> <p>e) River</p> <p> i Local river <input type="checkbox"/></p> <p> ii Distant river <input type="checkbox"/></p>	<ul style="list-style-type: none"> • Tick all that apply
<p>1.4. Water Treatment</p> <p><i>What treatment and filtration methods do you use?</i></p> <p>a) Settlement tanks <input type="checkbox"/></p> <p>b) Slow sand filter <input type="checkbox"/></p> <p>c) Activated carbon filter <input type="checkbox"/></p> <p>d) Cartridge filter <input type="checkbox"/></p> <p>e) UV filter <input type="checkbox"/></p> <p>f) Chlorination <input type="checkbox"/></p>	<ul style="list-style-type: none"> • Tick all that apply

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<p>g) Other</p> <div style="border: 1px solid black; height: 140px; width: 502px;"></div>	
<p>1.5. Do you follow a standard operating procedure? Yes / No</p> <div style="border: 1px solid black; height: 140px; width: 502px;"></div>	<ul style="list-style-type: none"> • If yes, ask to provide a copy • Ask for the name of SOP or manual • Ask how closely they follow the manual
<p>1.6. Water Temperature Management <i>How do you control the temperature of hatchery water?</i></p> <div style="border: 1px solid black; height: 140px; width: 502px;"></div>	<p>If necessary, prompt from answers below:</p> <ul style="list-style-type: none"> • Fan assisted temperature control • Water aeration • Chillers • Heaters (during winter or bad weather)
<p>1.7. Water Exchange: <i>What percentage of water is exchanged daily?</i></p> <p>a) On average</p> <div style="border: 1px solid black; width: 90px; height: 63px; margin-left: 380px;"></div>	

Question Number	Researcher's Instructions & Notes
b) At peak times (disease emergence, weather events etc.) <input type="checkbox"/>	
<p>2. Threats to Production <i>What are the main threats to your PL production?</i></p> <p>2.1. Disease Signs</p> <p>a) No disease problems <input type="checkbox"/></p> <p>b) Larvae/nauplii with abnormal shape and colour (blue or black); often as early as first hatching, but sometimes later in the cycle <input type="checkbox"/></p> <p>c) Abnormal, usually weak spiral swimming behaviour <input type="checkbox"/></p> <p>d) Reduced appetite <input type="checkbox"/></p> <p>e) Degeneration of tail, with prominent head/eyes <input type="checkbox"/></p> <p>f) Gradual whitening/greying of the body <input type="checkbox"/></p> <p>g) Progressive weakening <input type="checkbox"/></p> <p>h) Disappearance and mortality of the larvae/nauplii, with up to 100% mortality by the end of the cycle <input type="checkbox"/></p> <p>i) Other (please specify)</p> <div style="border: 1px solid black; height: 200px; width: 100%;"></div>	<ul style="list-style-type: none"> • Tick all that apply • Prompt respondent • Note any named diseases, pathogens etc. that are mentioned

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<p>2.3. Broodstock Condition:</p> <p>a) Poor availability <input type="checkbox"/></p> <p>b) Poor fecundity/reproductive capacity <input type="checkbox"/></p> <p>c) Frequently diseased <input type="checkbox"/></p> <p>d) Suffer high mortality rate <input type="checkbox"/></p> <p>e) Low weight/size <input type="checkbox"/></p> <p>f) Frequently stressed <input type="checkbox"/></p> <p>g) Other (please specify</p> <div style="border: 1px solid black; height: 140px; width: 501px;"></div>	<ul style="list-style-type: none"> • Tick all that apply
<p>3. Treatments and Brands</p> <p><i>What treatments do you use for optimal shrimp/prawn and water health?</i></p> <p>3.1. Probiotics (Brands)</p> <p>a) Not used <input type="checkbox"/></p> <p>b) Brands currently using</p> <div style="border: 1px solid black; height: 105px; width: 181px;"></div>	<ul style="list-style-type: none"> • Tick all that apply • Prompt respondent

Question Number	Researcher's Instructions & Notes
<p>c) Preferred brand</p> <div style="border: 1px solid black; height: 106px; width: 181px; margin: 5px 0;"></div> <p>d) Quantity per cycle (Kg)/estimated</p> <div style="border: 1px solid black; height: 58px; width: 75px; margin: 5px 0;"></div>	<ul style="list-style-type: none"> • If using, ask respondent to give approximate usage in Kg • If the respondent cannot give approximate weights, offer the option of estimating the number of units or packets used
<p>3.2. Antibiotics (brands)</p> <p>a) Not used <input type="checkbox"/></p> <p>b) Brands currently using</p> <div style="border: 1px solid black; height: 106px; width: 181px; margin: 5px 0;"></div> <p>c) Preferred brands</p> <div style="border: 1px solid black; height: 106px; width: 181px; margin: 5px 0;"></div> <p>d) Quantity per cycle (Kg)</p> <div style="border: 1px solid black; height: 58px; width: 75px; margin: 5px 0;"></div>	<ul style="list-style-type: none"> • If using, ask respondent to give approximate usage in Kg
<p>3.3. Disinfectants</p> <p>a) Egg and nauplii washing <input type="checkbox"/></p> <p>b) Tank cleaning <input type="checkbox"/></p>	

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<p>c) Other (please specify)</p> <div style="border: 1px solid black; height: 142px; width: 501px;"></div> <p>d) Quantity per cycle (Kg)</p> <div style="border: 1px solid black; width: 74px; height: 51px; display: inline-block;"></div>	<ul style="list-style-type: none"> • If using, ask respondent to give approximate usage in Kg
<p>3.4. Water Quality Treatments</p> <p>a) Aeration <input type="checkbox"/></p> <p>b) pH control <input type="checkbox"/></p> <p style="padding-left: 20px;">i Not used</p> <p style="padding-left: 20px;">ii Products/brands</p> <div style="border: 1px solid black; height: 105px; width: 181px;"></div> <p style="padding-left: 40px;">iii Quantity per cycle (Kg)</p> <div style="border: 1px solid black; width: 77px; height: 58px; display: inline-block;"></div> <p>c) Ammonia control/removal <input type="checkbox"/></p> <p style="padding-left: 20px;">i Not used</p> <p style="padding-left: 20px;">ii Products/brands</p> <div style="border: 1px solid black; height: 105px; width: 181px;"></div>	<ul style="list-style-type: none"> • Tick all that apply • If using, ask respondent to give approximate usage in Kg

Question Number	Researcher's Instructions & Notes
<p>iii Quantity per cycle (Kg) <input type="text"/></p> <p>d) Other (please specify)</p> <div style="border: 1px solid black; height: 140px; width: 100%;"></div>	<ul style="list-style-type: none"> • If using, ask respondent to give approximate usage in Kg • Ask respondent what other products they use, and ask to give approximate usage in Kg per cycle
<p>4. Feed <i>What types and brands of feed do you use?</i></p> <p>4.1. Onsite Algae (including species)</p> <div style="border: 1px solid black; height: 105px; width: 181px; margin-left: 200px;"></div>	<ul style="list-style-type: none"> • Tick all that apply • Ask respondent for approximate weight • If the respondent cannot give approximate weights, offer the option of estimating the number of units or packets used
<p>4.2. Artemia Brand and Amount (Kg)</p> <div style="border: 1px solid black; height: 105px; width: 181px; margin-left: 200px;"></div>	
<p>4.3. Names and Brands of Artificial or Frozen Feeds and amounts</p> <p>a) Liquid brand and amount (ltr)</p> <div style="border: 1px solid black; height: 105px; width: 181px; margin-left: 200px;"></div>	

Question Number	Researcher's Instructions & Notes
b) Dry brand and amount (Kg) <div style="border: 1px solid black; width: 180px; height: 100px; margin-left: 300px;"></div>	
4.4. Vitamins and other feed additive brands and amount (Kg) <div style="border: 1px solid black; width: 180px; height: 100px; margin-left: 300px;"></div>	
5. Business Performance and Expenditure 5.1. Hatchery Ownership <i>Is this hatchery....</i> a) Main business? <input type="checkbox"/> b) Subsidiary business? <input type="checkbox"/> c) Social enterprise? <input type="checkbox"/>	
5.2. Production Cycles a) How many cycles do you attempt per year? <div style="border: 1px solid black; width: 80px; height: 50px; margin-left: 300px;"></div> b) How many production cycles do you complete per year? <div style="border: 1px solid black; width: 80px; height: 50px; margin-left: 300px;"></div>	
5.3. What was your selling price for PL/1000 for the last 3 cycles at hatchery gate and PL market? a) Cycle 1 <div style="border: 1px solid black; width: 200px; height: 50px; display: inline-block; vertical-align: middle; margin-left: 100px;">BDT/USD</div> PL/1000	

Question Number	Researcher's Instructions & Notes
<p>b) Cycle 2 <input type="text" value="BDT/USD"/> PL/1000</p> <p>c) Cycle 3 <input type="text" value="BDT/USD"/> PL/1000</p>	
<p>5.4. Input as % of Running Costs</p> <p>a) Feed <input type="text"/> %</p> <p>b) Medicines/chemicals <input type="text"/> %</p> <p>c) Energy costs <input type="text"/> %</p> <p>d) Water procurement and treatment <input type="text"/> %</p> <p>e) Transportation costs <input type="text"/> %</p> <p>f) Staff <input type="text"/> %</p> <p>g) Other <input type="text"/> %</p>	<ul style="list-style-type: none"> • Ask respondent to break down their costs as approximate percentages

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<p>5.5. Labour Force <i>What number of staff do you employ....</i></p> <p>a) On a permanent basis? <input type="text"/></p> <p>b) On a temporary (casual/seasonal) basis? <input type="text"/></p> <p>c) On a temporary fulltime basis? <input type="text"/></p> <p>d) On a temporary part-time basis? <input type="text"/></p>	<ul style="list-style-type: none"> • Ask respondent to state number of staff for each category
<p>5.6. Market System <i>How do you sell your PL?</i></p> <p>a) Direct sales to farmer <input type="checkbox"/></p> <p>b) Sales to a wholesaler at PL market <input type="checkbox"/></p>	<ul style="list-style-type: none"> • Tick all that apply • If both, ask for percentage
<p>5.7. Are Sales Largely...</p> <p>a) Cash? <input type="checkbox"/></p> <p>b) Credit? <input type="checkbox"/></p> <p>c) Some other system of exchange (please specify)?</p> <div style="border: 1px solid black; height: 140px; width: 100%;"></div>	<ul style="list-style-type: none"> • Tick all that apply • If both, ask for percentage

Question Number	Researcher's Instructions & Notes
<p>5.8. Where Do You Sell Your PL?</p> <p>a) Cox's Bazar <input type="checkbox"/></p> <p>b) Satkhira Market <input type="checkbox"/></p>	<ul style="list-style-type: none"> • Tick all that apply • Prompt if necessary
<p>c) Other (please specify)</p> <div style="border: 1px solid black; height: 140px; width: 100%;"></div>	
<p>5.9. Main Method of Transportation</p> <p>a) Air freight <input type="checkbox"/></p> <p>b) Truck <input type="checkbox"/></p> <p>c) Mircobus <input type="checkbox"/></p> <p>d) Other (please specify)</p> <div style="border: 1px solid black; height: 140px; width: 100%;"></div>	
<p>5.10. Sources of Income Support</p> <p><i>What—if any—financial support do you receive for your business?</i></p> <p>a) None <input type="checkbox"/></p> <p>b) Department of Fisheries <input type="checkbox"/></p> <p>c) Cross-subsidise hatchery with other business <input type="checkbox"/></p>	<ul style="list-style-type: none"> • Tick all that apply

Question Number	Researcher's Instructions & Notes
d) Grants <input type="checkbox"/> e) Money from social enterprise <input type="checkbox"/> f) Bank loan <input type="checkbox"/>	
g) Other (please specify) <div style="border: 1px solid black; height: 100px; width: 100%;"></div>	
<p>6. Threats to Business <i>What are the main threats to your business?</i></p> 6.1. Lack of quality broodstock <input type="checkbox"/> 6.2. Variation in market price for PL <input type="checkbox"/> 6.3. Poor quality medication <input type="checkbox"/> 6.4. Poor quality feed <input type="checkbox"/> 6.5. Rising costs in: a) Energy <input type="checkbox"/> b) Water costs <input type="checkbox"/> c) Feed <input type="checkbox"/> d) Medication <input type="checkbox"/> e) Treatment and inputs <input type="checkbox"/> f) Transportation <input type="checkbox"/>	<ul style="list-style-type: none"> • Tick all that apply • Prompt if necessary

Question Number	Researcher's Instructions & Notes
<p>g) Other (please specify)</p> <div style="border: 1px solid black; height: 140px; margin-bottom: 10px;"></div> <p>6.6. Certification</p> <p>a) Costs of accreditation <input type="checkbox"/></p> <p>b) Increasing regulation <input type="checkbox"/></p> <p>6.7. Illegal border trading of PL <input type="checkbox"/></p> <p>6.8. No access to:</p> <p>a) Capital or credit <input type="checkbox"/></p> <p>b) Insurance <input type="checkbox"/></p> <p>c) Compensation <input type="checkbox"/></p> <p>6.9. Lack of experienced staff <input type="checkbox"/></p> <p>6.10. Other (please specify)</p> <div style="border: 1px solid black; height: 140px; margin-top: 10px;"></div>	

Question Number	Researcher's Instructions & Notes
<p>6.11. Out of the list above, what are your top three threats?</p> <p>a) Threat 1 <input type="text"/></p> <p>b) Threat 2 <input type="text"/></p> <p>c) Threat 3 <input type="text"/></p>	<ul style="list-style-type: none"> • Ask respondent to rank the top three threats to their business
<p>7. Business Protection <i>If your production fails, what do you receive?</i></p> <p>7.1. Nothing <input type="checkbox"/></p> <p>7.2. Compensation <input type="checkbox"/></p> <p>7.3. Insurance payments <input type="checkbox"/></p> <p>7.4. Other (Please specify)</p> <input type="text"/>	<ul style="list-style-type: none"> • Tick all that apply

Question Number	Researcher's Instructions & Notes
<p>8. Sources of Expertise and Information <i>Which of the following are your main sources of professional and operations advice?</i></p> <p>8.1. Consultancies <input type="checkbox"/></p> <p>8.2. Government training <input type="checkbox"/></p> <p>8.3. NGO/aid projects and assistance <input type="checkbox"/></p> <p>8.4. Farm supply shops <input type="checkbox"/></p> <p>8.5. Marketing <input type="checkbox"/></p> <p>8.6. International connections <input type="checkbox"/></p> <p>8.7. Internet and social media <input type="checkbox"/></p> <p>8.8. World of mouth <input type="checkbox"/></p> <p>8.9. Other (please specify)</p> <div style="border: 1px solid black; height: 140px; width: 501px;"></div>	<ul style="list-style-type: none"> • Tick all that apply

Question Number	Researcher's Instructions & Notes
<p>9. Opportunities and Improvements</p> <p><i>In your opinion, what would improve the industry?</i></p> <div style="border: 1px solid black; height: 247px; width: 481px;"></div>	<p>Prompt from examples:</p> <ul style="list-style-type: none">• Certification• Branding• PCR testing• SPF• Access to rapid diagnostics• Training programmes• Direct marketing• Insurance• Investment