



ARIAS SOCIETY

Assam Rural Infrastructure and Agricultural Services Society

(An Autonomous Body under Govt. of Assam)

Project Coordination Unit (PCU), of the proposed World Bank financed

Assam Agribusiness and Rural Transformation Project (APART)

Agriculture complex, Khanapara, G.S. Road, Guwahati-781022 (Assam, India)

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CONTRACT FOR CONSULTANT'S SERVICES Lump-Sum

Project:

**Assam Agribusiness and Rural Transformation Project
(APART)**

(Project ID: P155617, IBRD Loan No. 8780-IN)

(Procurement Plan Reference No.: IN-ARIAS-48699-CS-CQS)

CONTRACT No.: ARIAS/APART/273/2017/209

Between

**Assam Rural Infrastructure and Agricultural Services
Society (ARIAS Society)**

Project Coordination Unit, Agriculture Complex, Khanapara, G.S. Road,
Guwahati-781022 (Assam, India); email: spd@arias.in

And

ICAR- Central Inland Fisheries Research Institute (CIFRI),

Monirampur, Barrackpore, Kolkata, West Bengal- 700120;

E-mail: director.cifri@icar.gov.in, director.cifri@gmail.com,

For the Consulting Services for:

**“Rapid Risk Assessment of the Potential Invasiveness of
Genetically Improved Farmed Tilapia (GIFT) of APART”**

Country: India

Date of Signing: 30th July 2018

BK Bhattacharjee

Head, Regional Centre
ICAR-CIFRI, Guwahati -06

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[Signature]
State Project Director
ARIAS Society

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**Head, Regional Centre
ICAR-CIFRI, Guwahati -06**


**State Project Director
ARIAS Society**

I. Form of Contract

LUMP-SUM

This CONTRACT (hereinafter called the "Contract") is made the 30th day of the month of July, 2018 between, on the one hand, Assam Rural Infrastructure and Agricultural Services Society (ARIAS Society), Project Coordination Unit, Agriculture Complex, Khanapara, G.S. Road, Guwahati-781022 (Assam, India) (hereinafter called the "Client") and, on the other hand, ICAR- Central Inland Fisheries Research Institute (CIFRI), Monirampur, Barrackpore, Kolkata, West Bengal- 700120; E-mail: director.cifri@icar.gov.in, director.cifri@gmail.com (hereinafter called the "Consultant").

WHEREAS

- (a) the Client has requested the Consultant to provide certain consulting services as defined in this Contract (hereinafter called the "Services");
- (b) the Consultant, having represented to the Client that it has the required professional skills, expertise and technical resources, has agreed to provide the Services on the terms and conditions set forth in this Contract;
- (c) the Client has received a loan from the *International Bank for Reconstruction and Development (IBRD)* toward the cost of the Services and intends to apply a portion of the proceeds of this loan to eligible payments under this Contract, it being understood that (i) payments by the Bank will be made only at the request of the Client and upon approval by the Bank; (ii) such payments will be subject, in all respects, to the terms and conditions of the loan agreement, including prohibitions of withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of goods, if such payment or import, to the knowledge of the Bank, is prohibited by the decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations; and (iii) no party other than the Client shall derive any rights from the loan agreement or have any claim to the loan proceeds;

NOW THEREFORE the parties hereto hereby agree as follows:

1. The following documents attached hereto shall be deemed to form an integral part of this Contract:
 - (a) The General Conditions of Contract (including Attachment 1 "Fraud and Corruption");
 - (b) The Special Conditions of Contract;
 - (c) Appendices:
 - Appendix A: Terms of Reference
 - Appendix B: Key Experts
 - Appendix C: Breakdown of Contract Price
 - Appendix D: Form of Advance Payments Guarantee (DELETED)

In the event of any inconsistency between the documents, the following order of precedence shall prevail: the Special Conditions of Contract; the General Conditions of Contract, including Attachment 1; Appendix A; Appendix B; Appendix C; Appendix D. Any reference to this Contract shall include, where the context permits, a reference to its Appendices.

2. The mutual rights and obligations of the Client and the Consultant shall be as set forth in the Contract, in particular:
 - (a) the Consultant shall carry out the Services in accordance with the provisions of the Contract; and
 - (b) the Client shall make payments to the Consultant in accordance with the provisions of the Contract.

IN WITNESS WHEREOF, the Parties hereto have caused this Contract to be signed in their respective names as of the day and year first above written.

Authorized Representative for and on behalf of
Consultants: Signature:



(Dr. B. K. Bhattacharjya)
Principal Scientist & Head (Genng), ICAR- Central
Inland Fisheries Research Institute (CIFRI),
Guwahati Centre, Email: director.cifri@icar.gov.in,
director.cifri@gmail.com;

Authorized Representative for and on behalf of
Client: Signature:



(Vinod Seshan, IAS)
State Project Director,
Assam Rural Infrastructure and Agricultural
Services (ARIAS) Society, Agriculture Complex,
Khanapara, G.S. Road, Guwahati-781022 (Assam,
India); Tel: 0361-2332125;; email: spd@arias.in

Witness -1:


(Dr. Pranob Das)
Scientist, ICAR-CIFRI RC
Guwahati - 781006

Witness -2:

II. General Conditions of Contract

A. GENERAL PROVISIONS

<p>1. Definitions</p>	<p>1.1 Unless the context otherwise requires, the following terms whenever used in this Contract have the following meanings:</p> <p>(a) "Applicable Law" means the laws and any other instruments having the force of law in the Client's country, or in such other country as may be specified in the Special Conditions of Contract (SCC), as they may be issued and in force from time to time.</p> <p>(b) "Applicable Regulations" means Procurement Regulations for IPF Borrowers of date specified in Special Conditions of Contract (SCC).</p> <p>(c) "Bank" means the International Bank for Reconstruction and Development (IBRD) or the International Development Association (IDA).</p> <p>(d) "Borrower" means the Government, Government agency or other entity that signs the financing agreement with the Bank.</p> <p>(e) "Client" means the implementing agency that signs the Contract for the Services with the Selected Consultant.</p> <p>(f) "Consultant" means a legally-established professional consulting firm or entity selected by the Client to provide the Services under the signed Contract.</p> <p>(g) "Contract" means the legally binding written agreement signed between the Client and the Consultant and which includes all the attached documents listed in its paragraph 1 of the Form of Contract (the General Conditions (GCC), the Special Conditions (SCC), and the Appendices).</p> <p>(h) "Day" means a working day unless indicated otherwise.</p> <p>(i) "Effective Date" means the date on which this Contract comes into force and effect pursuant to Clause GCC 11.</p> <p>(j) "Experts" means, collectively, Key Experts, Non-Key Experts, or any other personnel of the Consultant, Sub-consultant or JV member(s) assigned by the Consultant to perform the Services or any part thereof under the Contract.</p> <p>(k) "Foreign Currency" means any currency other than the currency of the Client's country.</p> <p>(l) "GCC" means these General Conditions of Contract.</p> <p>(m) "Government" means the government of the Client's country.</p> <p>(n) "Joint Venture (JV)" means an association with or without a legal personality distinct from that of its members, of more than one entity where one member has the authority to conduct all businesses for and on behalf of any and all the members of the JV, and where the members of the JV are jointly and severally liable to the Client for the performance of the Contract.</p> <p>(o) "Key Expert(s)" means an individual professional whose skills, qualifications, knowledge and experience are critical to the performance of the Services under the Contract and whose Curricula Vitae (CV) was taken into account in the technical evaluation of the Consultant's proposal.</p> <p>(p) "Local Currency" means the currency of the Client's country.</p> <p>(q) "Non-Key Expert(s)" means an individual professional provided by the Consultant or its Sub-consultant to perform the Services or any part thereof under the Contract.</p> <p>(r) "Party" means the Client or the Consultant, as the case may be, and "Parties" means both of them.</p> <p>(s) "Procurement Regulations" means the World Bank's Procurement Regulations for IPF Borrowers,</p> <p>(t) "SCC" means the Special Conditions of Contract by which the GCC may be</p>
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	<p>amended or supplemented but not over-written.</p> <p>(u) "Services" means the work to be performed by the Consultant pursuant to this Contract, as described in Appendix A hereto.</p> <p>(v) "Sub-consultants" means an entity to whom/which the Consultant subcontracts any part of the Services while remaining solely liable for the execution of the Contract.</p> <p>(w) "Third Party" means any person or entity other than the Government, the Client, the Consultant or a Sub-consultant.</p>
2. Relationship between the Parties	2.1. Nothing contained herein shall be construed as establishing a relationship of master and servant or of principal and agent as between the Client and the Consultant. The Consultant, subject to this Contract, has complete charge of the Experts and Sub-consultants, if any, performing the Services and shall be fully responsible for the Services performed by them or on their behalf hereunder.
3. Law Governing Contract	3.1. This Contract, its meaning and interpretation, and the relation between the Parties shall be governed by the Applicable Law.
4. Language	4.1. This Contract has been executed in the language specified in the SCC, which shall be the binding and controlling language for all matters relating to the meaning or interpretation of this Contract.
5. Headings	5.1. The headings shall not limit, alter or affect the meaning of this Contract.
6. Communications	<p>6.1. Any communication required or permitted to be given or made pursuant to this Contract shall be in writing in the language specified in Clause GCC 4. Any such notice, request or consent shall be deemed to have been given or made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or when sent to such Party at the address specified in the SCC.</p> <p>6.2. A Party may change its address for notice hereunder by giving the other Party any communication of such change to the address specified in the SCC.</p>
7. Location	7.1. The Services shall be performed at such locations as are specified in Appendix A hereto and, where the location of a particular task is not so specified, at such locations, whether in the Government's country or elsewhere, as the Client may approve.
8. Authority of Member in Charge	8.1. In case the Consultant is a Joint Venture, the members hereby authorize the member specified in the SCC to act on their behalf in exercising all the Consultant's rights and obligations towards the Client under this Contract, including without limitation the receiving of instructions and payments from the Client.
9. Authorized Representatives	9.1. Any action required or permitted to be taken, and any document required or permitted to be executed under this Contract by the Client or the Consultant may be taken or executed by the officials specified in the SCC.
10. Fraud and Corruption	10.1 The Bank requires compliance with the Bank's Anti-Corruption Guidelines and its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework, as set forth in Attachment 1 to the GCC.
a. Commissions and Fees	10.2 The Client requires the Consultant to disclose any commissions, gratuities or fees that may have been paid or are to be paid to agents or any other party with respect to the selection process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee. Failure to disclose such commissions, gratuities or fees may result in termination of the Contract and/or sanctions by the Bank.
B. COMMENCEMENT, COMPLETION, MODIFICATION AND TERMINATION OF CONTRACT	
11. Effectiveness of Contract	11.1. This Contract shall come into force and effect on the date (the "Effective Date") of the Client's notice to the Consultant instructing the Consultant to begin carrying out the Services. This notice shall confirm that the effectiveness conditions, if any, listed in the SCC have been met.


 P. P. Bhattacharya
 Head, Regional Centre
 ICAR-CIFRI, Guwahati -06

12. Termination of Contract for Failure to Become Effective	12.1. If this Contract has not become effective within such time period after the date of Contract signature as specified in the SCC , either Party may, by not less than twenty two (22) days written notice to the other Party, declare this Contract to be null and void, and in the event of such a declaration by either Party, neither Party shall have any claim against the other Party with respect hereto.
13. Commencement of Services	13.1. The Consultant shall confirm availability of Key Experts and begin carrying out the Services not later than the number of days after the Effective Date specified in the SCC .
14. Expiration of Contract	14.1. Unless terminated earlier pursuant to Clause GCC 19 hereof, this Contract shall expire at the end of such time period after the Effective Date as specified in the SCC .
15. Entire Agreement	15.1. This Contract contains all covenants, stipulations and provisions agreed by the Parties. No agent or representative of either Party has authority to make, and the Parties shall not be bound by or be liable for, any statement, representation, promise or agreement not set forth herein.
16. Modifications or Variations	16.1. Any modification or variation of the terms and conditions of this Contract, including any modification or variation of the scope of the Services, may only be made by written agreement between the Parties. However, each Party shall give due consideration to any proposals for modification or variation made by the other Party. 16.2. In cases of substantial modifications or variations, the prior written consent of the Bank is required.
17. Force Majeure	
a. Definition	17.1. For the purposes of this Contract, "Force Majeure" means an event which is beyond the reasonable control of a Party, is not foreseeable, is unavoidable, and makes a Party's performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible under the circumstances, and subject to those requirements, includes, but is not limited to, war, riots, civil disorder, earthquake, fire, explosion, storm, flood or other adverse weather conditions, strikes, lockouts or other industrial action confiscation or any other action by Government agencies. 17.2. Force Majeure shall not include (i) any event which is caused by the negligence or intentional action of a Party or such Party's Experts, Sub-consultants or agents or employees, nor (ii) any event which a diligent Party could reasonably have been expected to both take into account at the time of the conclusion of this Contract, and avoid or overcome in the carrying out of its obligations hereunder. 17.3. Force Majeure shall not include insufficiency of funds or failure to make any payment required hereunder.
b. No Breach of Contract	17.4. The failure of a Party to fulfill any of its obligations hereunder shall not be considered to be a breach of, or default under, this Contract insofar as such inability arises from an event of Force Majeure, provided that the Party affected by such an event has taken all reasonable precautions, due care and reasonable alternative measures, all with the objective of carrying out the terms and conditions of this Contract.
c. Measures to be Taken	17.5. A Party affected by an event of Force Majeure shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall take all reasonable measures to minimize the consequences of any event of Force Majeure. 17.6. A Party affected by an event of Force Majeure shall notify the other Party of such event as soon as possible, and in any case not later than fourteen (14) calendar days following the occurrence of such event, providing evidence of the nature and cause of such event, and shall similarly give written notice of the restoration of normal conditions as soon as possible. 17.7. Any period within which a Party shall, pursuant to this Contract, complete any action or task, shall be extended for a period equal to the time during which

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ARIAS Society

	<p>such Party was unable to perform such action as a result of Force Majeure.</p> <p>17.8. During the period of their inability to perform the Services as a result of an event of Force Majeure, the Consultant, upon instructions by the Client, shall either:</p> <ul style="list-style-type: none"> (a) demobilize, in which case the Consultant shall be reimbursed for additional costs they reasonably and necessarily incurred, and, if required by the Client, in reactivating the Services; or (b) continue with the Services to the extent reasonably possible, in which case the Consultant shall continue to be paid under the terms of this Contract and be reimbursed for additional costs reasonably and necessarily incurred. <p>17.9. In the case of disagreement between the Parties as to the existence or extent of Force Majeure, the matter shall be settled according to Clauses GCC 44 & 45.</p>
18. Suspension	<p>18.1. The Client may, by written notice of suspension to the Consultant, suspend part or all payments to the Consultant hereunder if the Consultant fails to perform any of its obligations under this Contract, including the carrying out of the Services, provided that such notice of suspension (i) shall specify the nature of the failure, and (ii) shall request the Consultant to remedy such failure within a period not exceeding thirty (30) calendar days after receipt by the Consultant of such notice of suspension.</p>
19. Termination	<p>19.1. This Contract may be terminated by either Party as per provisions set up below:</p>
a. By the Client	<p>19.1.1. The Client may terminate this Contract in case of the occurrence of any of the events specified in paragraphs (a) through (f) of this Clause. In such an occurrence the Client shall give at least thirty (30) calendar days' written notice of termination to the Consultant in case of the events referred to in (a) through (d); at least sixty (60) calendar days' written notice in case of the event referred to in (e); and at least five (5) calendar days' written notice in case of the event referred to in (f):</p> <ul style="list-style-type: none"> (a) If the Consultant fails to remedy a failure in the performance of its obligations hereunder, as specified in a notice of suspension pursuant to Clause GCC 18; (b) If the Consultant becomes (or, if the Consultant consists of more than one entity, if any of its members becomes) insolvent or bankrupt or enter into any agreements with their creditors for relief of debt or take advantage of any law for the benefit of debtors or go into liquidation or receivership whether compulsory or voluntary; (c) If the Consultant fails to comply with any final decision reached as a result of arbitration proceedings pursuant to Clause GCC 45.1; (d) If, as the result of Force Majeure, the Consultant is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days; (e) If the Client, in its sole discretion and for any reason whatsoever, decides to terminate this Contract; (f) If the Consultant fails to confirm availability of Key Experts as required in Clause GCC 13. <p>19.1.2. Furthermore, if the Client determines that the Consultant has engaged in Fraud and Corruption in competing for or in executing the Contract, then the Client may, after giving fourteen (14) calendar days written notice to the Consultant, terminate the Consultant's employment under the Contract.</p>
b. By the Consultant	<p>19.1.3. The Consultant may terminate this Contract, by not less than thirty (30) calendar days' written notice to the Client, in case of the occurrence of any of the events specified in paragraphs (a) through (d) of this Clause.</p>

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Head, Regional Centre
ICAR-CIFRI, Guwahati -06

	<p>(a) If the Client fails to pay any money due to the Consultant pursuant to this Contract and not subject to dispute pursuant to Clause GCC 45.1 within forty-five (45) calendar days after receiving written notice from the Consultant that such payment is overdue.</p> <p>(b) If, as the result of Force Majeure, the Consultant is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days.</p> <p>(c) If the Client fails to comply with any final decision reached as a result of arbitration pursuant to Clause GCC 45.1.</p> <p>(d) If the Client is in material breach of its obligations pursuant to this Contract and has not remedied the same within forty-five (45) days (or such longer period as the Consultant may have subsequently approved in writing) following the receipt by the Client of the Consultant's notice specifying such breach.</p>
c. Cessation of Rights and Obligations	19.1.4. Upon termination of this Contract pursuant to Clauses GCC 12 or GCC 19 hereof, or upon expiration of this Contract pursuant to Clause GCC 14, all rights and obligations of the Parties hereunder shall cease, except (i) such rights and obligations as may have accrued on the date of termination or expiration, (ii) the obligation of confidentiality set forth in Clause GCC 22, (iii) the Consultant's obligation to permit inspection, copying and auditing of their accounts and records set forth in Clause GCC 25 and to cooperate and assist in any inspection or investigation, and (iv) any right which a Party may have under the Applicable Law.
d. Cessation of Services	19.1.5. Upon termination of this Contract by notice of either Party to the other pursuant to Clauses GCC 19a or GCC 19b, the Consultant shall, immediately upon dispatch or receipt of such notice, take all necessary steps to bring the Services to a close in a prompt and orderly manner and shall make every reasonable effort to keep expenditures for this purpose to a minimum. With respect to documents prepared by the Consultant and equipment and materials furnished by the Client, the Consultant shall proceed as provided, respectively, by Clauses GCC 27 or GCC 28.
e. Payment upon Termination	19.1.6. Upon termination of this Contract, the Client shall make the following payments to the Consultant: <p>(a) payment for Services satisfactorily performed prior to the effective date of termination; and</p> <p>(b) in the case of termination pursuant to paragraphs (d) and (e) of Clause GCC 19.1.1, reimbursement of any reasonable cost incidental to the prompt and orderly termination of this Contract, including the cost of the return travel of the Experts.</p>
C. OBLIGATIONS OF THE CONSULTANT	
20. General	
a. Standard of Performance	<p>20.1 The Consultant shall perform the Services and carry out the Services with all due diligence, efficiency and economy, in accordance with generally accepted professional standards and practices, and shall observe sound management practices, and employ appropriate technology and safe and effective equipment, machinery, materials and methods. The Consultant shall always act, in respect of any matter relating to this Contract or to the Services, as a faithful adviser to the Client, and shall at all times support and safeguard the Client's legitimate interests in any dealings with the third parties.</p> <p>20.2. The Consultant shall employ and provide such qualified and experienced Experts and Sub-consultants as are required to carry out the Services.</p> <p>20.3. The Consultant may subcontract part of the Services to an extent and with such Key Experts and Sub-consultants as may be approved in advance by the Client. Notwithstanding such approval, the Consultant shall retain full responsibility for the Services.</p>
b. Law Applicable to	20.4. The Consultant shall perform the Services in accordance with the Contract and the Applicable Law and shall take all practicable steps to ensure

Services	<p>that any of its Experts and Sub-consultants, comply with the Applicable Law.</p> <p>20.5. Throughout the execution of the Contract, the Consultant shall comply with the import of goods and services prohibitions in the Client's country when</p> <p>(a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country; or</p> <p>(b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's Country prohibits any import of goods from that country or any payments to any country, person, or entity in that country.</p> <p>20.6. The Client shall notify the Consultant in writing of relevant local customs, and the Consultant shall, after such notification, respect such customs.</p>
21. Conflict of Interest	<p>21.1. The Consultant shall hold the Client's interests paramount, without any consideration for future work, and strictly avoid conflict with other assignments or their own corporate interests.</p>
<p>a. Consultant Not to Benefit from Commissions, Discounts, etc.</p>	<p>21.1.1 The payment of the Consultant pursuant to GCC F (Clauses GCC 38 through 42) shall constitute the Consultant's only payment in connection with this Contract and, subject to Clause GCC 21.1.3, the Consultant shall not accept for its own benefit any trade commission, discount or similar payment in connection with activities pursuant to this Contract or in the discharge of its obligations hereunder, and the Consultant shall use its best efforts to ensure that any Sub-consultants, as well as the Experts and agents of either of them, similarly shall not receive any such additional payment.</p> <p>21.1.2 Furthermore, if the Consultant, as part of the Services, has the responsibility of advising the Client on the procurement of goods, works or services, the Consultant shall comply with the Bank's Applicable Regulations, and shall at all times exercise such responsibility in the best interest of the Client. Any discounts or commissions obtained by the Consultant in the exercise of such procurement responsibility shall be for the account of the Client.</p>
<p>b. Consultant and Affiliates Not to Engage in Certain Activities</p>	<p>21.1.3 The Consultant agrees that, during the term of this Contract and after its termination, the Consultant and any entity affiliated with the Consultant, as well as any Sub-consultants and any entity affiliated with such Sub-consultants, shall be disqualified from providing goods, works or non-consulting services resulting from or directly related to the Consultant's Services for the preparation or implementation of the project.</p>
<p>c. Prohibition of Conflicting Activities</p>	<p>21.1.4 The Consultant shall not engage, and shall cause its Experts as well as its Sub-consultants not to engage, either directly or indirectly, in any business or professional activities that would conflict with the activities assigned to them under this Contract.</p>
<p>d. Strict Duty to Disclose Conflicting Activities</p>	<p>21.1.5 The Consultant has an obligation and shall ensure that its Experts and Sub-consultants shall have an obligation to disclose any situation of actual or potential conflict that impacts their capacity to serve the best interest of their Client, or that may reasonably be perceived as having this effect. Failure to disclose said situations may lead to the disqualification of the Consultant or the termination of its Contract.</p>
22. Confidentiality	<p>22.1 Except with the prior written consent of the Client, the Consultant and the Experts shall not at any time communicate to any person or entity any confidential information acquired in the course of the Services, nor shall the Consultant and the Experts make public the recommendations formulated in the course of, or as a result of, the Services.</p>
23. Liability of the Consultant	<p>23.1 Subject to additional provisions, if any, set forth in the SCC, the Consultant's liability under this Contract shall be provided by the Applicable Law.</p>
24. Insurance to be taken out by the	<p>24.1 The Consultant (i) shall take out and maintain, and shall cause any Sub-consultants to take out and maintain, at its (or the Sub-consultants', as the case</p>

Asst. Project Director

Consultant	may be) own cost but on terms and conditions approved by the Client, insurance against the risks, and for the coverage specified in the SCC , and (ii) at the Client's request, shall provide evidence to the Client showing that such insurance has been taken out and maintained and that the current premiums therefore have been paid. The Consultant shall ensure that such insurance is in place prior to commencing the Services as stated in Clause GCC 13.
25. Accounting, Inspection and Auditing	<p>25.1 The Consultant shall keep, and shall make all reasonable efforts to cause its Sub-consultants to keep, accurate and systematic accounts and records in respect of the Services and in such form and detail as will clearly identify relevant time changes and costs.</p> <p>25.2 Pursuant to paragraph 2.2 e. of Appendix to the General Conditions the Consultant shall permit and shall cause its subcontractors and subconsultants to permit, the Bank and/or persons appointed by the Bank to inspect the Site and/or the accounts and records relating to the performance of the Contract and the submission of the bid, and to have such accounts and records audited by auditors appointed by the Bank if requested by the Bank. The Consultant's and its Subcontractors' and subconsultants' attention is drawn to Sub-Clause 10.1 which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility pursuant to the Bank's prevailing sanctions procedures).</p>
26. Reporting Obligations	26.1 The Consultant shall submit to the Client the reports and documents specified in Appendix A , in the form, in the numbers and within the time periods set forth in the said Appendix.
27. Proprietary Rights of the Client in Reports and Records	<p>27.1 Unless otherwise indicated in the SCC, all reports and relevant data and information such as maps, diagrams, plans, databases, other documents and software, supporting records or material compiled or prepared by the Consultant for the Client in the course of the Services shall be confidential and become and remain the absolute property of the Client. The Consultant shall, not later than upon termination or expiration of this Contract, deliver all such documents to the Client, together with a detailed inventory thereof. The Consultant may retain a copy of such documents, data and/or software but shall not use the same for purposes unrelated to this Contract without prior written approval of the Client.</p> <p>27.2 If license agreements are necessary or appropriate between the Consultant and third parties for purposes of development of the plans, drawings, specifications, designs, databases, other documents and software, the Consultant shall obtain the Client's prior written approval to such agreements, and the Client shall be entitled at its discretion to require recovering the expenses related to the development of the program(s) concerned. Other restrictions about the future use of these documents and software, if any, shall be specified in the SCC.</p>
28. Equipment, Vehicles and Materials	<p>28.1 Equipment, vehicles and materials made available to the Consultant by the Client, or purchased by the Consultant wholly or partly with funds provided by the Client, shall be the property of the Client and shall be marked accordingly. Upon termination or expiration of this Contract, the Consultant shall make available to the Client an inventory of such equipment, vehicles and materials and shall dispose of such equipment, vehicles and materials in accordance with the Client's instructions. While in possession of such equipment, vehicles and materials, the Consultant, unless otherwise instructed by the Client in writing, shall insure them at the expense of the Client in an amount equal to their full replacement value.</p> <p>28.2 Any equipment or materials brought by the Consultant or its Experts into the Client's country for the use either for the project or personal use shall remain the property of the Consultant or the Experts concerned, as applicable.</p>
D. CONSULTANT'S EXPERTS AND SUB-CONSULTANTS	
29. Description of Key Experts	29.1 The title, agreed job description, minimum qualification and estimated period of engagement to carry out the Services of each of the Consultant's Key Experts are described in Appendix B .

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<p>30. Replacement of Key Experts</p>	<p>30.1 Except as the Client may otherwise agree in writing, no changes shall be made in the Key Experts.</p> <p>30.2 Notwithstanding the above, the substitution of Key Experts during Contract execution may be considered only based on the Consultant's written request and due to circumstances outside the reasonable control of the Consultant, including but not limited to death or medical incapacity. In such case, the Consultant shall forthwith provide as a replacement, a person of equivalent or better qualifications and experience, and at the same rate of remuneration.</p>
<p>31. Removal of Experts or Sub-consultants</p>	<p>31.1 If the Client finds that any of the Experts or Sub-consultant has committed serious misconduct or has been charged with having committed a criminal action, or if the Client determines that a Consultant's Expert or Sub-consultant has engaged in Fraud and Corruption while performing the Services, the Consultant shall, at the Client's written request, provide a replacement.</p> <p>31.2 In the event that any of Key Experts, Non-Key Experts or Sub-consultants is found by the Client to be incompetent or incapable in discharging assigned duties, the Client, specifying the grounds therefore, may request the Consultant to provide a replacement.</p> <p>31.3 Any replacement of the removed Experts or Sub-consultants shall possess better qualifications and experience and shall be acceptable to the Client.</p> <p>31.4 The Consultant shall bear all costs arising out of or incidental to any removal and/or replacement of such Experts.</p>
<p>E. OBLIGATIONS OF THE CLIENT</p>	
<p>32. Assistance and Exemptions</p>	<p>32.1 Unless otherwise specified in the SCC, the Client shall use its best efforts to:</p> <ul style="list-style-type: none"> (a) Assist the Consultant with obtaining work permits and such other documents as shall be necessary to enable the Consultant to perform the Services. (b) Assist the Consultant with promptly obtaining, for the Experts and, if appropriate, their eligible dependents, all necessary entry and exit visas, residence permits, exchange permits and any other documents required for their stay in the Client's country while carrying out the Services under the Contract. (c) Facilitate prompt clearance through customs of any property required for the Services and of the personal effects of the Experts and their eligible dependents. (c) Issue to officials, agents and representatives of the Government all such instructions and information as may be necessary or appropriate for the prompt and effective implementation of the Services. (d) Assist the Consultant and the Experts and any Sub-consultants employed by the Consultant for the Services with obtaining exemption from any requirement to register or obtain any permit to practice their profession or to establish themselves either individually or as a corporate entity in the Client's country according to the applicable law in the Client's country. (e) Assist the Consultant, any Sub-consultants and the Experts of either of them with obtaining the privilege, pursuant to the applicable law in the Client's country, of bringing into the Client's country reasonable amounts of foreign currency for the purposes of the Services or for the personal use of the Experts and of withdrawing any such amounts as may be earned therein by the Experts in the execution of the Services. (f) Provide to the Consultant any such other assistance as may be specified in the SCC.
<p>33. Access to Project Site</p>	<p>33.1 The Client warrants that the Consultant shall have, free of charge, unimpeded access to the project site in respect of which access is required for the performance of the Services. The Client will be responsible for any damage to the project site or any property thereon resulting from such access and will indemnify the Consultant and each of the experts in respect of liability for any</p>

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	such damage, unless such damage is caused by the willful default or negligence of the Consultant or any Sub-consultants or the Experts of either of them.
34. Change in the Applicable Law Related to Taxes and Duties	34.1 If, after the date of this Contract, there is any change in the applicable law in the Client's country with respect to taxes and duties which increases or decreases the cost incurred by the Consultant in performing the Services, then the remuneration and reimbursable expenses otherwise payable to the Consultant under this Contract shall be increased or decreased accordingly by agreement between the Parties hereto, and corresponding adjustments shall be made to the Contract price amount specified in Clause GCC 38.1
35. Services, Facilities and Property of the Client	35.1 The Client shall make available to the Consultant and the Experts, for the purposes of the Services and free of any charge, the services, facilities and property described in the Terms of Reference (Appendix A) at the times and in the manner specified in said Appendix A .
36. Counterpart Personnel	36.1 The Client shall make available to the Consultant free of charge such professional and support counterpart personnel, to be nominated by the Client with the Consultant's advice, if specified in Appendix A . 36.2 Professional and support counterpart personnel, excluding Client's liaison personnel, shall work under the exclusive direction of the Consultant. If any member of the counterpart personnel fails to perform adequately any work assigned to such member by the Consultant that is consistent with the position occupied by such member, the Consultant may request the replacement of such member, and the Client shall not unreasonably refuse to act upon such request.
37. Payment Obligation	37.1 In consideration of the Services performed by the Consultant under this Contract, the Client shall make such payments to the Consultant for the deliverables specified in Appendix A and in such manner as is provided by GCC F below.
F. PAYMENTS TO THE CONSULTANT	
38. Contract Price	38.1 The Contract price is fixed and is set forth in the SCC . The Contract price breakdown is provided in Appendix C . 38.2 Any change to the Contract price specified in Clause GCC 38.1 can be made only if the Parties have agreed to the revised scope of Services pursuant to Clause GCC 16 and have amended in writing the Terms of Reference in Appendix A .
39. Taxes and Duties	39.1 The Consultant, Sub-consultants and Experts are responsible for meeting any and all tax liabilities arising out of the Contract unless it is stated otherwise in the SCC . 39.2 As an exception to the above and as stated in the SCC , all local identifiable indirect taxes (itemized and finalized at Contract negotiations) are reimbursed to the Consultant or are paid by the Client on behalf of the Consultant.
40. Currency of Payment	40.1 Any payment under this Contract shall be made in the currency (ies) of the Contract.
41. Mode of Billing and Payment	41.1 The total payments under this Contract shall not exceed the Contract price set forth in Clause GCC 38.1. 41.2 The payments under this Contract shall be made in lump-sum installments against deliverables specified in Appendix A . The payments will be made according to the payment schedule stated in the SCC . 41.2.1 <u>Advance payment:</u> Unless otherwise indicated in the SCC , an advance payment shall be made against an advance payment bank guarantee acceptable to the Client in an amount (or amounts) and in a currency (or currencies) specified in the SCC . Such guarantee (i) is to remain effective until the advance payment has been fully set off, and (ii) is to be in the form set forth in Appendix D , or in such other form as the Client shall have approved in writing. The advance payments will be set off by the Client in equal portions against the lump-sum installments specified in the SCC until said advance payments have been fully set off. 41.2.2 <u>The Lump-Sum Installment Payments.</u> The Client shall pay the Consultant within sixty (60) days after the receipt by the Client of the deliverable(s) and the cover invoice for the related lump-sum installment payment. The payment can be withheld if the Client does not approve the

	<p>submitted deliverable(s) as satisfactory in which case the Client shall provide comments to the Consultant within the same sixty (60) days period. The Consultant shall thereupon promptly make any necessary corrections, and thereafter the foregoing process shall be repeated.</p> <p>41.2.3 <u>The Final Payment</u>. The final payment under this Clause shall be made only after the final report have been submitted by the Consultant and approved as satisfactory by the Client. The Services shall then be deemed completed and finally accepted by the Client. The last lump-sum installment shall be deemed approved for payment by the Client within ninety (90) calendar days after receipt of the final report by the Client unless the Client, within such ninety (90) calendar day period, gives written notice to the Consultant specifying in detail deficiencies in the Services, the final report. The Consultant shall thereupon promptly make any necessary corrections, and thereafter the foregoing process shall be repeated. 41.2.4 All payments under this Contract shall be made to the accounts of the Consultant specified in the SCC.</p> <p>41.2.4 With the exception of the final payment under 41.2.3 above, payments do not constitute acceptance of the whole Services nor relieve the Consultant of any obligations hereunder.</p>
42. Interest on Delayed Payments	42.1 If the Client had delayed payments beyond fifteen (15) days after the due date stated in Clause GCC 41.2.2 , interest shall be paid to the Consultant on any amount due by, not paid on, such due date for each day of delay at the annual rate stated in the SCC.
G. FAIRNESS AND GOOD FAITH	
43. Good Faith	43.1 The Parties undertake to act in good faith with respect to each other's rights under this Contract and to adopt all reasonable measures to ensure the realization of the objectives of this Contract.
H. SETTLEMENT OF DISPUTES	
44. Amicable Settlement	<p>44.1 The Parties shall seek to resolve any dispute amicably by mutual consultation.</p> <p>44.2 If either Party objects to any action or inaction of the other Party, the objecting Party may file a written Notice of Dispute to the other Party providing in detail the basis of the dispute. The Party receiving the Notice of Dispute will consider it and respond in writing within fourteen (14) days after receipt. If that Party fails to respond within fourteen (14) days, or the dispute cannot be amicably settled within fourteen (14) days following the response of that Party, Clause GCC 45.1 shall apply.</p>
45. Dispute Resolution	45.1 Any dispute between the Parties arising under or related to this Contract that cannot be settled amicably may be referred to by either Party to the adjudication/arbitration in accordance with the provisions specified in the SCC.



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II. General Conditions
Attachment 1
Fraud and Corruption

(Text in this Appendix shall not be modified)

1. Purpose

1.1 The Bank's Anti-Corruption Guidelines and this annex apply with respect to procurement under Bank Investment Project Financing operations.

2. Requirements

2.1 The Bank requires that Borrowers (including beneficiaries of Bank financing); bidders (applicants/proposers), consultants, contractors and suppliers; any sub-contractors, sub-consultants, service providers or suppliers; any agents (whether declared or not); and any of their personnel, observe the highest standard of ethics during the procurement process, selection and contract execution of Bank-financed contracts, and refrain from Fraud and Corruption.

2.2 To this end, the Bank:

- a. Defines, for the purposes of this provision, the terms set forth below as follows:
 - i. "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
 - ii. "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;
 - iii. "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
 - iv. "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
 - v. "obstructive practice" is:
 - (a) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/or threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or
 - (b) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 2.2 e. below.
- b. Rejects a proposal for award if the Bank determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;
- c. In addition to the legal remedies set out in the relevant Legal Agreement, may take other appropriate actions, including declaring misprocurement, if the Bank determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement process, selection and/or execution of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;
- d. Pursuant to the Bank's Anti- Corruption Guidelines and in accordance with the Bank's prevailing sanctions policies and procedures, may sanction a firm or individual, either indefinitely or for a stated period of time, including by publicly declaring such firm or individual ineligible (i) to be awarded or otherwise benefit from a Bank-financed contract, financially or in any other manner;¹ (ii) to be a

¹ For the avoidance of doubt, a sanctioned party's ineligibility to be awarded a contract shall include, without limitation, (i) applying for pre-qualification, expressing interest in a consultancy, and bidding, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated

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nominated² sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract; and (iii) to receive the proceeds of any loan made by the Bank or otherwise to participate further in the preparation or implementation of any Bank-financed project;

- e. Requires that a clause be included in bidding/request for proposals documents and in contracts financed by a Bank loan, requiring (i) bidders (applicants/proposers), consultants, contractors, and suppliers, and their sub-contractors, sub-consultants, service providers, suppliers, agents personnel, permit the Bank to inspect³ all accounts, records and other documents relating to the procurement process, selection and/or contract execution,, and to have them audited by auditors appointed by the Bank.

service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.

- ² A nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider (different names are used depending on the particular bidding document) is one which has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.
- ³ Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Bank or persons appointed by the Bank to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraud and Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm's or individual's financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of information.

On Chhetra Chatterjee

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III. Special Conditions of Contract

Number of GC Clause	Amendments of, and Supplements to, Clauses in the General Conditions of Contract
1.1 (a)	The Contract shall be construed in accordance with the laws of the Republic of India
1.1(b)	The date of the "Applicable Regulations" is: 1 st July 2016
4.1	The language is: English.
6.1 and 6.2	<p>The addresses are:</p> <p>Client: Assam Rural Infrastructure and Agriculture Services (ARIAS) Society Attention: State Project Director, ARIAS Society Address: ARIAS Society, Project Coordination Unit, Agriculture Complex, Khanapara, G.S. Road, Guwahati-781022 (Assam, India); Tel: 0361-2332125; Tele-Fax: 0361-2332564; Email: spd@arias.in</p> <p>Consultant : ICAR- Central Inland Fisheries Research Institute (CIFRI), Monirampur, Barrackpore, Kolkata, West Bengal- 700120; Attention : Dr. Basanta Kumar Das, Director/ Team Leader, ICAR-CIFRI Tele-Fax : +033-25920177 E-mail : director.cifri@icar.gov.in, director.cifri@gmail.com</p>
8.1	"N/A";
9.1	<p>The Authorized Representatives are:</p> <p>For the Client: The State Project Director, ARIAS Society For the Consultant: Dr. Basanta Kumar Das, Director/ Team Leader, ICAR-CIFRI</p>
11.1	The effectiveness conditions are the following: Confirmation of the Key Experts' availability to start the Assignment.
12.1	Termination of Contract for Failure to Become Effective: The time period shall be 30 (thirty) days from the the date of signing of the Contract.
13.1	<p>Commencement of Services:</p> <p>The number of days shall be 15 (fifteen) calendar days.</p> <p>Confirmation of Key Experts' availability to start the Assignment shall be submitted to the Client in writing as a written statement signed by each Key Expert.</p>
14.1	Expiration of Contract: The time period shall be for period of 75 (seventy five) days from the date of effectiveness. The duration may be extended by the client with mutual agreement of the parties (Please refer to the TOR).
21 b.	The Client reserves the right to determine on a case-by-case basis whether the Consultant should be disqualified from providing goods, works or non-consulting services due to a conflict of a nature described in Clause GCC 21.1.3: Yes
23.1	<p>The following limitation of the Consultant's Liability towards the Client can be subject to the Contract's negotiations:</p> <p>(a) Except in the case of gross negligence or wilful misconduct on the part of the Consultant or on the part of any person or a firm acting on behalf of the Consultant in carrying out the Services, the Consultant, with respect to damage caused by the Consultant to the Client's property, shall not be liable to the Client:</p> <p>(i) for any indirect or consequential loss or damage; and</p>

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Number of GC Clause	Amendments of, and Supplements to, Clauses in the General Conditions of Contract
	<p>(ii) for any direct loss or damage that exceeds [insert a multiplier, e.g.: one, two, three] times the total value of the Contract;</p> <p>(b) This limitation of liability shall not</p> <p>(i) affect the Consultant's liability, if any, for damage to Third Parties caused by the Consultant or any person or firm acting on behalf of the Consultant in carrying out the Services;</p> <p>(ii) be construed as providing the Consultant with any limitation or exclusion from liability which is prohibited by the applicable law in the Client's country.</p> <p><i>[Notes to the Client and the Consultant: Any suggestions made by the Consultant in the Proposal to introduce exclusions/limitations of the Consultant's liability under the Contract should be carefully scrutinized by the Client and discussed with the Bank prior to accepting any changes to what was included in the issued RFP. In this regard, the Parties should be aware of the Bank's policy on this matter which is as follows:</i></p> <p><i>To be acceptable to the Bank, any limitation of the Consultant's liability should at the very least be reasonably related to (a) the damage the Consultant might potentially cause to the Client, and (b) the Consultant's ability to pay compensation using its own assets and reasonably obtainable insurance coverage. The Consultant's liability shall not be limited to less than a multiplier of the total payments to the Consultant under the Contract for remuneration and reimbursable expenses. A statement to the effect that the Consultant is liable only for the re-performance of faulty Services is not acceptable to the Bank. Also, the Consultant's liability should never be limited for loss or damage caused by the Consultant's gross negligence or wilful misconduct.</i></p> <p><i>The Bank does not accept a provision to the effect that the Client shall indemnify and hold harmless the Consultant against Third Party claims, except, of course, if a claim is based on loss or damage caused by a default or wrongful act of the Client to the extent permissible by the law applicable in the Client's country.]</i></p>
24.1	<p>The insurance coverage against the risks shall be as follows:</p> <p>(a) Professional liability insurance, with a minimum coverage of Rs.47,06,000/-</p> <p>(b) Third Party motor vehicle liability insurance in respect of motor vehicles operated in the Client's country by the Consultant or its Experts or Sub-consultants, with a minimum coverage in accordance with the applicable law in the Client's country);</p> <p>(c) Third Party liability insurance, with a minimum coverage <i>in accordance with the applicable law in the Client's country</i>;</p>
27.2	<p>The Consultant shall not use any documents, software or project related information for purposes unrelated to this Contract without the prior written approval of the Client.</p>
32.1 (f)	<p><i>As stated in the TOR</i></p>
38.1	<p>The Contract price is: Rs.19,37,800/- (Indian Rupees nineteen lakh and thirty seven thousand and eight hundred only) [exclusive of local indirect taxes (i.e. GST).</p> <p>Any indirect local taxes (i.e. GST) chargeable in respect of this Contract for the Services provided by the Consultant shall be dealt with as per applicable laws of the Government.</p> <p>The amount of such taxes (GST @ 18%) is Rs.3,09,330/- (Rupees three lakh nine thousand three hundred & thirty only)</p> <p>At source deductions, however, shall be made as applicable as per Statutory laws of India.</p>
39.1 and 39.2	<p>The Client warrants that client will dealt with the taxes as applicable, as per related laws of the Government.</p> <p>The Consultant and its Sub-consultants and Experts shall be responsible for meeting all tax liabilities arising out of the Contract as per the Indian laws.</p> <p>The amounts payable by the Client to the Consultant under the contract shall be subject to local taxation (e.g. Goods & Services Tax or GST) and deductions at source, however, shall be made as applicable</p>

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Number of GC Clause	Amendments of, and Supplements to, Clauses in the General Conditions of Contract																								
41.2	<p>The payment schedule: {Payment of installments shall be linked to the deliverables specified in the Terms of Reference in Appendix A}</p> <table border="1"> <thead> <tr> <th>#</th> <th>Report Type</th> <th>Number of Copies</th> <th>Schedule from the date of agreement</th> <th>Payment</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Inception report</td> <td>5 copies</td> <td>Within 10 days</td> <td>20%</td> <td>Payment on acceptance of the report</td> </tr> <tr> <td>2</td> <td>Draft Final report</td> <td>5 copies</td> <td>Within 65 days</td> <td>60%</td> <td>Make a power-point-presentation</td> </tr> <tr> <td>3</td> <td>Final report</td> <td>5 copies</td> <td>Within 75 days</td> <td>20%</td> <td>Payment on acceptance of the report</td> </tr> </tbody> </table> <p>[Total sum of all installments shall not exceed the Contract price set up in SCC38.1.]</p>	#	Report Type	Number of Copies	Schedule from the date of agreement	Payment	Remarks	1	Inception report	5 copies	Within 10 days	20%	Payment on acceptance of the report	2	Draft Final report	5 copies	Within 65 days	60%	Make a power-point-presentation	3	Final report	5 copies	Within 75 days	20%	Payment on acceptance of the report
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41.2.1	There shall be no advance payment under the contract.																								
41.2.4	<p>The accounts are: (To be filled by CIFRI)</p> <table border="1"> <tbody> <tr> <td>Name</td> <td>ICAR unit CIFRI, Barrackpore</td> </tr> <tr> <td>Account No.</td> <td>11278713220</td> </tr> <tr> <td>Name of Bank</td> <td>STATE BANK OF INDIA</td> </tr> <tr> <td>Address of Bank Branch, with contact Tel. No. and email</td> <td>State Bank of India, Barrackpore Branch, SN Banerjee Road, Monirampore, Barrackpore, Kolkata – 700120; Tel. No. 25922043; E-mail: sbi.00029@sbi.co.in</td> </tr> <tr> <td>IFS Code</td> <td>SBIN003852</td> </tr> <tr> <td>GST Regn. No</td> <td>19AAAGC0090D 1ZX (Name: Director, ICARCIFRI)</td> </tr> </tbody> </table>	Name	ICAR unit CIFRI, Barrackpore	Account No.	11278713220	Name of Bank	STATE BANK OF INDIA	Address of Bank Branch, with contact Tel. No. and email	State Bank of India, Barrackpore Branch, SN Banerjee Road, Monirampore, Barrackpore, Kolkata – 700120; Tel. No. 25922043; E-mail: sbi.00029@sbi.co.in	IFS Code	SBIN003852	GST Regn. No	19AAAGC0090D 1ZX (Name: Director, ICARCIFRI)												
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GST Regn. No	19AAAGC0090D 1ZX (Name: Director, ICARCIFRI)																								
42.1	The interest rate is: 7 % per annum																								
45.1	<p>Disputes shall be settled by arbitration in accordance with the following provisions:</p> <ol style="list-style-type: none"> 1. <u>Selection of Arbitrators.</u> Each dispute submitted by a Party to arbitration shall be heard by a sole arbitrator or an arbitration panel composed of three (3) arbitrators, in accordance with the following provisions: <ol style="list-style-type: none"> (a) Where the Parties agree that the dispute concerns a technical matter, they may agree to appoint a sole arbitrator or, failing agreement on the identity of such sole arbitrator within thirty (30) days after receipt by the other Party of the proposal of a name for such an appointment by the Party who initiated the proceedings, either Party may apply to The Indian Council of Arbitration for a list of not fewer than five (5) nominees and, on receipt of such list, the Parties shall alternately strike names there from, and the last remaining nominee on the list shall be the sole arbitrator for the matter in dispute. If the last remaining nominee has not been determined in this manner within sixty (60) days of the date of the list, The Indian Council of Arbitration shall appoint, upon the request of either Party and from such list or otherwise, a sole arbitrator for the matter in dispute. (b) Where the Parties do not agree that the dispute concerns a technical matter, the Client and the Consultant shall each appoint one (1) arbitrator, and these two arbitrators shall jointly appoint a third arbitrator, who shall chair the arbitration panel. If the arbitrators named by the Parties do not succeed in appointing a third arbitrator within thirty (30) days after the latter of the two (2) arbitrators named by the Parties has been appointed, the third arbitrator shall, at the request of either Party, be appointed by The Secretary, The Indian Council of Arbitration. (c) If, in a dispute subject to paragraph (b) above, one Party fails to appoint its arbitrator within thirty (30) days after the other Party has appointed its 																								

Number of GC Clause	Amendments of, and Supplements to, Clauses in the General Conditions of Contract
	<p>arbitrator, the Party which has named an arbitrator may apply to The <i>Indian Council of Arbitration, New Delhi</i> to appoint a sole arbitrator for the matter in dispute, and the arbitrator appointed pursuant to such application shall be the sole arbitrator for that dispute.</p>
	<p>2. <u>Rules of Procedure.</u> Except as otherwise stated herein, arbitration proceedings shall be conducted in accordance with the rules of procedure for arbitration of the United Nations Commission on International Trade Law (UNCITRAL) as in force on the date of this Contract, for contracts with Foreign Consultant . For contract with an Indian firm, the arbitration shall be in accordance with Arbitration and Conciliation Act, 1996 of the Government of India, as in force on the date of this Contract.</p> <p>3. <u>Substitute Arbitrators.</u> If for any reason an arbitrator is unable to perform his/her function, a substitute shall be appointed in the same manner as the original arbitrator.</p> <p>4. <u>Nationality and Qualifications of Arbitrators.</u> The sole arbitrator or the third arbitrator appointed pursuant to paragraphs 1(a) through 1(c) above shall be an internationally recognized legal or technical expert with extensive experience in relation to the matter in dispute and shall not be a national of the Consultant's home country or of the Government's country. For the purposes of this Clause, "home country" means any of:</p> <p>(a) the country of incorporation of the Consultant ; or (b) the country in which the Consultant's principal place of business is located; or (c) the country of nationality of a majority of the Consultant's shareholders; or (d) the country of nationality of the Sub-consultants concerned, where the dispute involves a subcontract</p>
	<p>5. <u>Miscellaneous.</u> In any arbitration proceeding hereunder:</p> <p>(a) Proceedings shall, unless otherwise agreed by the Parties, be held in Guwahati, Assam, India.</p> <p>(b) English language shall be the official language for all purposes; and</p> <p>(c) The decision of the sole arbitrator or of a majority of the arbitrators (or of the third arbitrator if there is no such majority) shall be final and binding and shall be enforceable in any court of competent jurisdiction, and the Parties hereby waive any objections to or claims of immunity in respect of such enforcement.</p>



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IV. Appendices

APPENDIX A – TERMS OF REFERENCE

For hiring a consultancy firm for RAPID RISK ASSESSMENT OF THE POTENTIAL INVASIVENESS OF GENETICALLY IMPROVED FARMED TILAPIA (GIFT)

(A) BACKGROUND:

1. Government of Assam (GoA), through the Government of India has received a loan of US\$200 million from the World Bank (W.B.) for implementation of the **Assam Agribusiness and Rural Transformation Project (APART)**. The Project Development Objective (PDO) of APART is to *“add value and improve resilience of selected agriculture value chains, focusing on smallholder farmers and agro-entrepreneurs in targeted districts of Assam”*. The targeted districts (undivided as of 1st April, 2016) are Nagaon, Sonitpur, Barpeta, Karbi Anglong, Kamrup, Dhubri, Golaghat, Kokrajhar, Lakhimpur, Darrang, Cachar, Sivasagar, Jorhat, Goalpara, Morigaon and Nalbari. The project will adopt a value chain and clusters approach to achieve the targeted objectives. The targeted value chains are those of (i) cereals (rice, maize), (ii) pulses (lentil, pea and blackgram), (iii) spices and condiments (ginger, turmeric, mustard), (iv) fruits (banana) & vegetables, (v) livestock & fisheries (pork, milk, fish), (vi) specialty commodities (eri and muga silk). Expected duration of the project is seven years.
2. There are four components of APART. **The first component is Enabling Agri Enterprise Development**, with sub components being (i) enhancing state capacity to attract private investments, (ii) setting up an Agribusiness Enterprise Development and Promotion Facility (EDPF) (iii) Agribusiness Investment Fund (AIF) support (iv) establishing sector stewardship councils. **The second component is Facilitating Agro Cluster Development** with subcomponents being- (i) support establishment of cluster level Industry Associations (IAs), (ii) supply chain support (roads, warehouses, markets). **The third component is Fostering Market Led Production and Resilience Enhancement** with sub components being (i) promoting climate resilient technologies and their adoption (ii) facilitating market linkages through market intelligence and product aggregation (iii) facilitating access to and responsible use of financial services. **The fourth component is project Management, Monitoring and Learning.**
3. APART would support value addition in the production and post-harvest segments of selected agriculture value-chains; facilitate agribusiness investments through inclusive business models that provide opportunities to smallholder farmers as well as stimulate the establishment of new small and medium agribusiness enterprises; and support resilience of agricultural production systems in order to better manage increasing production and commercial risks associated with climate change and marketing of agro produce, in the targeted districts. The project would adopt a cluster strategy within the targeted districts to generate economies of scale; promote vertical and horizontal links between local agricultural enterprises; enable diffusion of innovations; leverage network externalities; and channel public support for services and infrastructure. By adopting a cluster approach, the project would enable all the value chain participants to develop competitive and innovative products that meet market demands rapidly and successfully.
4. ‘Fish’ has been identified as one of the important commodities under the project. To achieve the objective of APART under Fishery Sub-Component, 44 fish production clusters have been identified in 15 districts (except Karbi Anglong district) out of 16 identified project districts.
5. Fisheries Value Chain interventions will be implemented by the Directorate of Fisheries at State level and District Fishery Development Offices & Agricultural Technology Management Agencies (ATMAs) at District level, with technical support from WorldFish, a reputed CGIAR organization having its Head Quarter in Penang, Malaysia. This fisheries value chain interventions will focus on: (i) improving the quality of the inputs such as fish seed and feed for aquaculture, (ii) increasing the fish productivity and production from the pond/tank aquaculture systems, (iii) increasing fish production through culture-cum-capture fisheries activities in the beels, (iv) promoting diversification of fish species – particularly genetically improved strains - in combination with Indian major carps in the culture systems, (v)



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improved post-harvest management, value addition and marketing of produce by setting up fish farmer common service centres (CSCs.).

6. Increasing fish productivity is highly dependent on quality fish seed of high yielding fish strain. The project therefore will explore approaches and business models (e.g. establishment of Multiplication Centres (MC) for genetically improved fish strains such as Jayanti Rohu, **Genetically Improved Farmed Tilapia (GIFT)**, etc., establishment of commercial hatcheries and nurseries) appropriate for production clusters through a systematic study. The study findings will be used to attract public/private investments. Mechanisms to ensure seed quality through **seed certification programmes** by Government will be initiated so that private investors could differentiate their product in the market. Under **Sustainable Production Enhancement Program**, four (4) seed multiplication centers will be established.
7. All Tilapia species are considered to be invasive in nature and recognized as a major threat to biodiversity. Having considered the potential invasive nature of and the possibility of its escape to natural water bodies, it is therefore required to undertake a rapid risk assessment study of the potential invasiveness of GIFT under Assam conditions and its possibility of escaping into natural water bodies before taking up establishment of any multiplication centre for GIFT. Ecological Risk Assessment (ERA) is the process of predicting or estimating the likelihood and magnitude of adverse ecological effects occurring as a result of one or more threats (stressors) caused by an invasive species to another species, natural communities or ecosystem processes.
8. Monoculture of GIFT under APART may be considered based on the findings after carrying out an ERA for the species and a framework must be formulated consisting of three major phases: problem formulation, analysis, and risk characterization.
9. Development of an effective assessment process for non-native fishes is of increasing urgency in the State. The assessment must comprise information and risk-ranking algorithms to give an estimate of risk posed by GIFT in the State, if any.
10. With this in view, the ARIAS Society intends to hire a reputed Consulting Agency to take up a Rapid Risk Assessment of the Potential Invasiveness of GIFT under APART.

(B) OBJECTIVES:

11. The key objectives of the assignment are :-
 - a) Identification of potential adverse ecological impacts of GIFT on aquatic environment, if any;
 - b) To predict areas at risk, including natural water bodies river/stream/lake/beel etc. and to suggest measures to contain species spread beyond initial introduction;
 - c) Study all existing guidelines and formulation of robust risk assessment and mitigation protocol to address GIFT introduction and its management into the project area;
 - d) Conduct Rapid Risk Assessment study following two basic elements: (i) risk identification and (ii) risk assessment. A qualitative risk assessment method and its application as a screening tool will be helpful for determining the risk of establishment and spread of the invasiveness of GIFT, if any, within the project area;
 - e) Chance of spreading disease to other native fish species from a viral/fungal/bacterial attack, its likelihood of transmission in the population (probability) and the severity of disease (impact). The probability of an incident developing, and the impact if it does, are based on both the nature of the infectious agent and details of the incident;
 - f) Key recommendations for safe farming practices of GIFT under the project; further scope on risk assessment of non-native fishes within the State.

(C) SCOPE OF THE ASSIGNMENT & TASKS TO BE CARRIED OUT BY THE CONSULTANT:

12. The study should include the following but not limited to:
 - a) **Problem Formulation:** Initial task of the consultant is to describe the organism of interest, or stressor, as GIFT and outline its known or potential adverse ecological impacts on receiving environments of Assam.

- i) Identification of potential indigenous species of concern (SOC), and aquatic habitats (rivers/streams/beels/any other natural water body) that would be at risk of an GIFT invasion, once the species is introduced in project areas within the State.
 - ii) Generate a risk characterization for GIFT establishment and potential impact to indigenous species of concern. Assessment of probability of spreading disease to other native fish species and its likelihood of transmission in the population.
- b) **Stressor description:** Its (GIFT) wide range of trophic and ecological adaptations, and its adaptive life history characteristics enabling it to occupy many different tropical and sub-tropical freshwater niches has to be established.
- c) **Assessment of impacts:** Invasion risk of GIFT to its indigenous co-generics is to be defined as the product of the likelihood of this species becoming successfully established in a given water body or an ecosystem and the associated adverse ecological consequences. The highest risk scenarios are to be assessed when there is both a high probability of the occurrence of GIFT in recipient water body and associated adverse ecological impacts. Presence of Tilapia within the water body often causes rapid displacement of indigenous congenics through competitive exclusion, to the extent that some populations have become locally extinct, probability of occurrence of such incidence has to be assessed.
- d) **Assessment End Points:** The advent of GIFT in the natural water bodies may be a cause for concern, if at all, for the conservation of indigenous species.
- e) **Risk Assessment:** A Rapid Risk Assessment is to be performed by the Consultant following two basic elements:
- i) **Risk Identification:** qualitative or quantitative analysis of ecological and biological characteristics of existing non-native species in a specific region to identify those attributes that will reliably predict future invasive species from the same donor region and can be used as an import screening mechanism to detect and prevent entry of high risk species into an area or region.
 - ii) **Risk Assessment:** consideration of the environmental, social and economic values of a specific area/region in relation to potential threats posed by one target species. Using semi-quantitative or qualitative decision support systems, nature and magnitude of the threat is to be ascertained. Target species may be present, in areas adjacent to the specified region, or recently detected within it. This phase enables decision maker prioritize actions including allocation of resources to implement control measures for rapid and effective threat abatement.

It is also expected that consultant would calculate the invasion vulnerability score (IVS) considering all physical variables for all types of natural water bodies. The IVS values may be divided into various risk categories.

The consultant is to carry out the assignment in accordance with the highest standard of professional and ethical competence and integrity, having due regards to the nature and purpose of the assignment, and to ensure that the staff assigned to perform the services under this Contract, will conduct themselves in a manner consistent herewith.

13. **FIELD VISITS/ STUDY AREA:** Water resources in the form of ponds, tanks, beels, and rivers are the potential areas for the study. Landings of the fish in the neighbouring markets of the farming areas and volume of landings are other indications of the extent of farming of the fish in the catchment areas of the markets. The field work is to be conducted in the 4 (four) districts viz. Morigaon, Sonitpur, Dhubri and Cachar considering the extent of farming of the fish species by private farmers.

(D) CONSULTANCY PERIOD:

14. The assignment shall be completed within **75 (seventy five) days** of contract signing. Since time is an essence of this assignment, there shall be no delay in conducting the study and submission of reports as per prescribed time schedule.



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(E) TEAM COMPOSITION: KEY PROFESSIONALS WHOSE CVS WILL BE EVALUATED:

15. The CVs of following professionals will be evaluated for the purpose of deciding merit

Sl	Designation	Qualifications and Experiences
1	Team Leader	A PG in Fisheries/Environment/Economics/MBA with minimum of 15 years experience in conducting risk assessment studies, research studies etc..
2	Ecologist/ Environment Specialist (With specialization in aquatic ecology)	PG in Ecology/Environment/Biology with minimum of 10 years experience in ecological studies including aquatic ecological studies and risk assessment.
3	Fisheries Expert*	PG in fisheries with minimum 10 years of Experience in fisheries.

* Retired person from any organization with the years of experience mentioned above in the relevant fields may also be considered.

(F) SERVICES AND FACILITIES TO BE PROVIDED BY THE CLIENT:

16. The services and facilities to be provided by the client are:-

- a) The Client will provide relevant documents as per availability to enable the consultant perform his job smoothly during the period of consultancy. A list of fish farmers presently practicing GIFT culture in few project districts will also be made available to the consultant.
- b) Necessary cooperation of the line Departments involved shall be ensured by ARIAS Society.

(G) EXPECTED OUTPUT FROM THE CONSULTANT:

17. A comprehensive and analytical detailed report on RAPID RISK ASSESSMENT OF THE POTENTIAL INVASIVENESS OF GIFT in the state of Assam with special reference to the selected four project districts for this study, including all relevant issues as per objective and scope of the assignment. The report should clearly spell out implementable risk mitigating strategies for culturing GIFT in the state more efficient and effective, under sustainable production enhancement programme. Consultant will be required to make a power-point-presentation, indicating summary of activities, findings, recommendations, constraints, etc after submission of draft report at mutually agreed time & date(s). The views of the Review Committee emerging during the presentation shall be addressed in the final report.

(H) SCHEDULE FOR SUBMISSION OF REPORTS & PAYMENTS:

18. The consultant shall furnish to the client, the following reports in soft and hard copy. All documents shall be in English.

- a) **Inception Report:** The consultant is required to submit an inception report within **10 (ten)** working days from the date of contract agreement. It is expected that the consultant will mobilize the resources within **7 (seven)** days from the date of contract agreement. The report shall cover the following:
 - i) Project preparation
 - ii) Detailed methodology to meet the requirement of the ToR including number of teams to be mobilized for deployment, scheduling of various activities to be carried out for completion of different stages of the assignment within the stipulated time schedule.
 - iii) Task assignment and work schedule.
 - iv) Work programme
 - v) Proforma for data collection
 - vi) Key personnel to be employed
 - vii) Time frame for submission of various reports
 - viii) The consultant shall carryout the modification if required in the inception report based on the client's observations and comments. The approval to the inception report will be given by the client within **7 (seven)** working days of its submission with desired changes incorporated.

- b) The consultant will give a presentation on the interim progress of the study (no report is required) within 40 days after submission of the inception report.
- c) The consultant is required to submit a draft report within 65 (fifty five) days from the date of contract agreement. This report should contain all study finding covering all aspects of the proposed assignment as mentioned in the scope of work.
- d) **Final Report:** The consultant shall submit a final report within 75 (seventy five) days from the date of contract agreement as per schedule shown below. Comments of the ARIAS Society and Fisheries Directorate, on the draft report based on discussions with the consultants would be given within 7(seven) working days of its receipt. The consultant shall incorporate modifications as required in the draft report and submit the final report for approval within 10(ten) working days.

#	Report Type	Number of Copies	Schedule from the date of agreement	Payment	Remarks
1	Inception report	5 copies	Within 10 days	20%	Payment on acceptance of the report
2	Draft Final report	5 copies	Within 65 days	60%	Make a power-point-presentation
3	Final report	5 copies	Within 75 days	20%	Payment on acceptance of the report

Note:

- i) Reports are to be furnished in hard copies along with soft copies in PDF as well as in MS Office applications.
- ii) Review Committee: All reports will be examined and approved by a committee comprising of members as deemed suitable by the ARIAS Society & Directorate of Fisheries. SPD may be the Chairman while Director-Fisheries may be Co-chairman/member.

(I) REPORTING AND REVIEW:

19. The consultant will report to the Sate Project Director (SPD) of ARIAS Society, Govt. of Assam. The reports will be reviewed by a committee comprising the SPD; Director of Fisheries, Assam; Fishery Coordinator (PCU); Fishery Advisor (PCU) and Environment Specialist (PCU)


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APPENDIX B - KEY EXPERTS

Team Composition/Key Expert's Inputs					
No.	Name	Position	Time Input in Person/ day	Remuneration Per-day	Indian Rupees
Key Experts					
K-1	Dr. B. K. Das	Team Leader	12	6,000	72,000
K-2	Dr. B.K. Bhattacharjya	Ecologist	25	6,000	1,50,000
K-3	Dr. P. Das	Fishery Expert	21	2,500	52,500
None Key Experts					
NK-1	K. K. Sarma	R. S. Staff	21	3,000	63,000
NK-2	A. Kakati	R. S. Staff	28	1,000	28,000
				Total Costs:	3,65,500

[Based on the Consultant's Technical Proposal and finalized at the Contract's negotiations]

APPENDIX C - BREAKDOWN OF CONTRACT PRICE

Summary of costs (Rs.)			
No.	Item	Quoted Amount as per Financial Proposal	Agreed Negotiated Contract Amount
1	Remuneration	3,65,500	3,65,500
2	Reimbursables	13,77,600	13,53,000
Sub-Total (A)		17,43,100	17,18,500
(i)	Intellectual fee (60% of man-days staff deployed)	2,19,300	2,19,300
Total (Excluding Taxes)		19,62,400	19,37,800
(ii)	GST (18% on 'A')	3,13,758	3,09,330
Total Cost		22,76,158	22,47,130

Breakdown of Remunerations					
No.	Name	Position	Remuneration Per-day	Time Input in Person/ day	Indian Rupee
Key Experts					
K-1	Dr. B. K. Das	Team Leader	6,000	12	72,000
K-2	Dr. B.K. Bhattacharjya	Ecologist	6,000	25	1,50,000
K-3	Dr. P. Das	Fishery Expert	2,500	21	52,500
None Key Experts					
NK-1	K. K. Sarma	R. S. Staff	3,000	21	63,000
NK-2	A. Kakati	R. S. Staff	1,000	28	28,000
				Total Costs	3,65,500

Breakdown of Reimbursables									
No.	Reimbursables Expenses	Quoted as per Fin. Proposal submitted (Rs.)				Agreed Negotiated Contract Amount (Rs.)			
		Unit	Unit Cost	Quantity	Quoted Amt.	Unit	Unit Cost	Quantity	Amount
1	TA/ DA	70 days	3000	2 person	420000	70 days	3000	2 person	420000
2	Vehicle Hiring	80 days	4000		320000	75 days	4000		300000
3	Communication Costs	Lump sum			40000	Lump sum			40000
4	Cost of Hiring of Project Assistant	4 persons X 2 months	14000	8 man-month	112000	4 persons X 2 months	14000	8 man-month	112000
5	Data Entry Operator	1 person X 2 month	14000	2 man-month	28000	1 person X 2 month	14000	2 man-month	28000
6	Production of Reports	Lump-sum			120000	Lump-sum			120000
7	Office Expenses	Lump-sum			80,000	Lump-sum			80,000
Sub- total					11,20,000				11,00,000
8	Contingencies				33600				33000
9	Overhead Charges				224000				220000
Total					13,77,600				13,53,000

[Based on the Consultant's Proposal and finalized during negotiation.]

M. Bhattacharjya

Head, Regional Centre
ICAR-CIFRI, Guwahati -06

[Signature]
State Project Director
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APPENDIX D - FORM OF ADVANCE PAYMENTS GUARANTEE
[See Clause GCC 41.2.1 and SCC 41.2.1]

Format of Bank Guarantee for Advance Payment

(Deleted)

M. Bhattacharjya

Head, Regional Centre
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[Signature]

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APPENDIX E – TECHNICAL & FINANCIAL PROPOSAL OF THE CONSULTANT

(Attached Separately)


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डा. बसंत कुमार दास, निदेशक
Dr. Basanta Kumar Das, Director

भाकृअनुप-केन्द्रीय अंतर्स्थलीय मात्स्यकी अनुसंधान संस्थान
आई एस ओ 9000 : 2008 प्रमाणित संगठन
(भारतीय कृषि अनुसंधान परिषद्)
बैरकपुर, कोलकाता - 700 120, पश्चिम बंगाल
ICAR-Central Inland Fisheries Research Institute
AN ISO 9000 : 2008 Certified Organisation
(Indian Council of Agricultural Research)
Barrackpore, Kolkata - 700120 West Bengal



No. Consultancy/ APART-2018

Date. 05.05.2018

To: **The State Project Director**
ARIAS Society, Project Coordination Unit,
Agriculture Complex, Khanapara, G.S. Road,
Guwahati-781022 (Assam, India);

Dear Sirs:

We, the undersigned, offer to provide the consulting services for **"Rapid Risk Assessment of the Potential Invasiveness of Genetically Improved Farmed Tilapia (GIFT)"** in accordance with your **Request for Proposals document for Technical & Financial proposal** dated 7th April 2018 and our Proposal.

We are hereby submitting our Proposal, which includes this Technical Proposal and a Financial Proposal sealed in a separate envelop.

We hereby declare that:

- All the information and statements made in this Proposal are true and we accept that any misinterpretation or misrepresentation contained in this Proposal may lead to our disqualification by the Client and/or may be sanctioned by the Bank.
- Our Proposal shall be valid and remain binding upon us for the period of **120 days** from the date fixed for opening of Technical & Financial proposal.
- We confirm our understanding of our obligation to abide by the Bank's policy in regard to Fraud and Corruption.
- We, along with any of our sub-consultants, subcontractors, suppliers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the World Bank Group or a debarment imposed by the World Bank Group in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the World Bank and other development banks. Further, we are not ineligible under the Client's country laws or official regulations or pursuant to a decision of the United Nations Security Council;
- In competing for (and, if the award is made to us, in executing) the Contract, we undertake to observe the laws against fraud and corruption, including bribery, in force in the country of the Client.

Phone : (033) 2592 0177 (Director), 2593 5288 (AO), 2593 3081 (SF&AO), Fax : : (033)2592 0388, EPBX 2592 1190/91 Ext.
Email : director.cifri@icar.gov.in; director.cifri@gmail.com; Website : www.cifri.res.in
AN ISO 9000 : 2008 Organisation

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- (g) We undertake to negotiate a Contract on the basis of the proposed Key Experts. We accept that the substitution of Key Experts (except in *force majeure* conditions) may lead to the termination of Contract negotiations.
- (h) Our Proposal is binding upon us and subject to any modifications resulting from the Contract negotiations.

We undertake, if our Proposal is accepted and the Contract is signed, to initiate the Services related to the assignment no later than 2018.

We understand that the Client is not bound to accept any Proposal that the Client receives.

We remain,
Yours sincerely,

Signature: 

Full name: Basanta Kumar Das

Title: Dr.

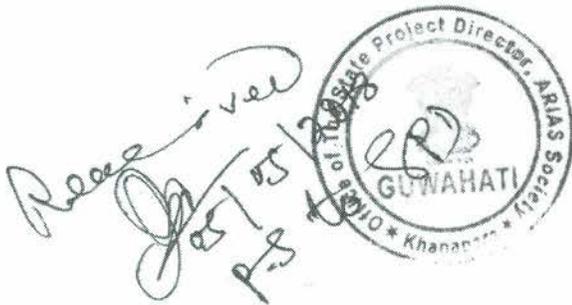
Name of Consultant: Basanta Kumar Das

Capacity: Director/ Team Leader

Address: ICAR-CIFRI, Barrackpore, Kolkata-700120, West Bengal

Phone/fax: 033-25920177 / 033-25920388

Email: director.cifri@gmail.com, director.cifri@icar.gov.in



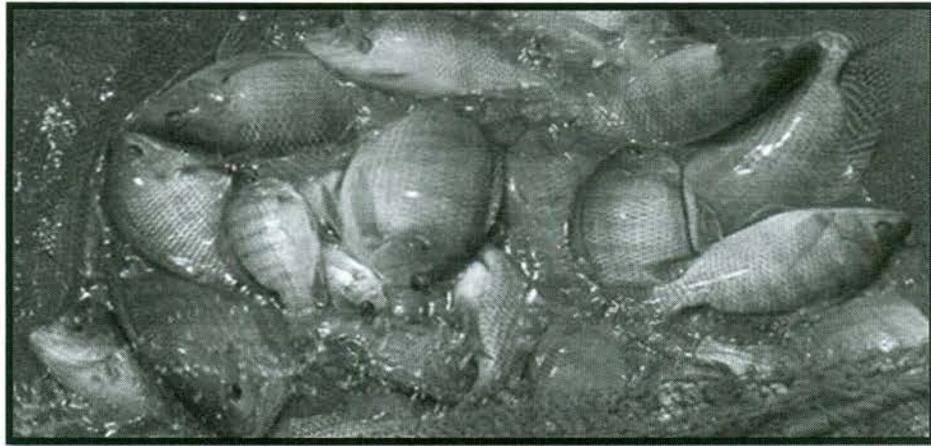
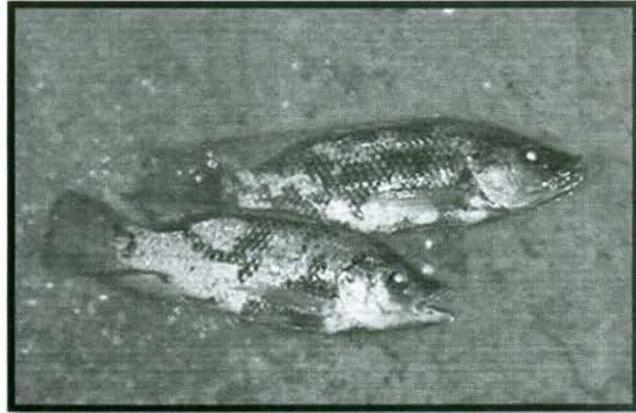


Head, Regional Centre

ICAR-CIFRI, Guwahati -06


State Project Director
ARIAS Society

Project proposal for Consultancy assignment on
**Rapid risk assessment of the potential invasiveness of
genetically improved farmed Tilapia (GIFT)**



Submitted to
Assam Rural Infrastructure and Agricultural Services (ARIAS) Society
5th May, 2018

Submitted by



ICAR-Central Inland Fisheries Research Institute
Barrackpore, Kolkata - 700120

M. B. Chatterjee

Head, Regional Centre
ICAR-CIFRI, Guwahati -06

[Signature]
State Project Director
ARIAS Society

Section 3 – Technical Proposal

Background

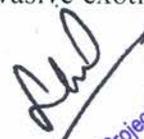
Three exotic carps *viz.* common, silver and grass carp were legally introduced into India in the sixties and after extensive aquaculture experimentation, these were recommended for composite fish culture in ponds for efficient utilization of natural foods present in all the ecological niches and spaces available in these cultivable water bodies. These exotic carps have shown good growth and survival in ponds, community tanks and (*beels*) of Assam where these are cultured. These species can provide significant economic benefits to farmers because of their fast growth rate and high production potential. Due to their lower unit price compared to Indian major carps (IMC), exotic carps provide a cheap source of animal protein to economically weaker sections. Thus, these exotic fish species contributes significantly to the socio-economic well being of poor fish farmers and fish consumers of the state. Browsing of common carp facilitates maintenance of good water quality (by way of releasing anoxic gases) as well as increasing productivity of the water body. In paddy-cum-fish culture, common carp (including Amur carp) is a preferred species because of its wide temperature tolerance, good growth and seed availability in many places/hatcheries. Similarly, grass carp is the most suitable species for efficient utilization of aquatic macrophytes. On the other hand, silver carp is considered as one of the ecologically efficient carps to produce, as it mainly feeds on the primary trophic level (phytoplankton) and therefore its production cost is much less than that of the other cultured carps barring grass carp. Besides, it is the only carp used in composite carp culture that efficiently uses phytoplankton.

Occasional catch of exotic fishes from natural water bodies like floodplain wetlands and rivers of the state have been reported in recent years raising concerns about their possible establishment in these water bodies having implications on indigenous fish germplasm. Bhattacharjya *et al.* (2003) reported the occurrence of six exotic species *viz.*, common carp (*Cyprinus carpio* var. *communis*), grass carp (*Ctenopharyngodon idella*) and silver carp (*Hypophthalmichthys molitrix*), bighead carp (*Hypophthalmichthys nobilis*), tawes/ silver barb (*Barbonymus gonionotus*), Mozambique tilapia (*Oreochromis mossambicus*) and African catfish (*Clarias gariepinus*) in Assam. There are reports of occurrence of six exotic species *viz.*, common carp (*C. carpio* var. *communis*), grass carp (*C. idella*) and silver carp (*H. molitrix*), bighead carp (*H. nobilis*), tawes/ silver barb (*B. gonionotus*), Mozambique tilapia (*O. mossambicus*) and African catfish (*C. gariepinus*) in open water bodies of Assam (Bhattacharjya *et al.*, 2003 & 2017).

ICAR-CIFRI recorded the occurrence of exotic common, grass and silver carp from R. Brahmaputra and in selected floodplain wetlands in Assam state during 2007 as part of a consultancy assignment sponsored by the ARIAS Society. They also observed that bighead carp and tawes were regularly stocked in many of the floodplain wetlands of Assam. Fortunately, none of the exotic carps established their natural populations in the main river and the surveyed wetlands at that time (Vass and Bhattacharjya, 2008). Never-the-less, concerns are raised by different quarters over the escapement of these exotic carps from aquaculture systems into natural water bodies like rivers, reservoirs and floodplain wetlands and the possible establishment of their natural populations in such waters. More so, because new invasive exotic



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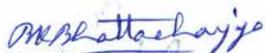
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fish species are being brought in to the state illegally from neighbouring states/ countries. For example, exotic pacu (*Piaractus brachypomus*), pangas (*Pangasianodon hypophthalmus*), Vietnam koi (*Anabas cobojicus*), Thai climbing perch (*Anabas testudineus*, Thai variety) and Nile tilapia (*O. mossambicus*) are reportedly being cultured by some fish farmers in certain pockets of Assam and sold in the local markets although no published reports are available. We personally observed freshly caught Nile tilapia being sold by a retail fish seller in Guwahati (Beltola Survey) a few days back.

The introduction and spread of alien (i.e., non-native) species is a major threat to global biodiversity and hence to ecological sustainability (Vitousek *et al.*, 1997; Kolar & Lodge, 2001; Sakai *et al.*, 2001; Lee, 2002; Dudgeon *et al.*, 2006). In particular, studies of fish introductions to freshwater ecosystems in the Northern hemisphere have shown that some fish species can reduce native fish populations, degrade aquatic habitats, compromise gene pools and increase the risk and spread of exotic diseases/ parasites. The introduction of alien fishes is a major cause of biodiversity decline in freshwater ecosystems (Courtenay & Stauffer, 1990; Courtenay & Moyle, 1992; Fuller *et al.*, 1999; Canonico *et al.*, 2005) and on a global basis, fish introductions are the prime cause of the extinction of many indigenous fish populations (Sala *et al.*, 2000). This is more important in the north-east Indian state of Assam, which has rich ichthyofaunistic resources. Bhattacharjya *et al.* (2003) reported 217 fish species belonging to 36 families occurring in Assam. The eastern Himalayan region encompassing the Northeast is considered as one of the hot spots of freshwater fish biodiversity in the world (Kottelat and Whitten, 1996). However, there has been drastic reduction in the abundance and distribution range of fishes in this region due to habitat modification, overexploitation and other anthropogenic causes (Bhattacharjya *et al.*, 1998; Ponniah and Sarkar, 2000). Bhattacharjya *et al.* (2000) identified 25 fish species occurring in the state as threatened. As per CAMP report (1998), 76 threatened fish species occurring in the state (3 critically endangered, 26 endangered and 47 vulnerable) have been assessed. Thus, it is important that Assam takes a precautionary approach in introducing GIFT in to the state for pond aquaculture. More so because few attempts have been made to control alien fish species that breeds prolifically in ponds (e.g., *O. Mossambicus*) and their removal is expected to be difficult or impossible once such alien species become established, especially in the riverine ecosystems of the state. A case in point is that of River Ganga, where invasion of *C. Carpio*, *O. Niloticus*, *H. Nobilis*, *C. Idella*, *H. Molitrix* and *C. Gariepinus* has been reported in the middle stretch (Vass *et al.*, 2011; Singh *et al.*, 2013). Against this background we are submitting the following project proposal for carrying out a consultancy assignment for APART entitled, "Rapid risk assessment of the potential invasiveness of genetically improved farmed Tilapia (Gift)."

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FORM TECH-4: Description of Approach, Methodology, and Work Plan for Performing the Assignment

Technical Approach, Methodology and Organization of the Consultant's team.

Technical Approach

Environmental risk analysis will be carried out for rapid risk assessment of the potential invasiveness of GIFT. Risk analysis approaches are currently being used to address many environmental issues including assessing the risks of pathogen spread or potential ecological and genetic impacts caused by non-native species introductions. As the field of risk analysis has progressed and evolved, several generalized risk analysis frameworks have emerged that are widely promoted by various governments, organizations and institutions. Although there may be slight variations among the different frameworks and guidelines for risk analysis, in most instances, analogous elements and stages common to all are clearly discernible. The major stages of risk analysis are: (i) scoping or problem formulation, (ii) hazard identification, (iii) risk assessment or characterization, (iv) risk management and (v) risk communication. The worked example outlined in this document follows this general approach, and is based on the risk analysis principles and methodologies described in detail in the following publications:

- Arthur JR, Bondad-Reantaso MG, Campbell ML, Hewitt CL, Phillips MJ and Subasinghe RP. 2010. *Understanding and applying risk analysis in aquaculture: A manual for decision-makers*. FAO Fisheries and Aquaculture Technical Paper 519/1. 113pp.
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Scope of the risk assessment

The present risk assessment will be limited to rapid risk assessment of GIFT in four of the APART project districts (Morigaon, Sonitpur, Dhuburi and Cachar) of Assam as specified in the TOR. However, we may visit selected fish farms, fish markets, riverine landing centres and floodplain wetlands located in other APART project districts (16 in total) in the interest of carrying out an effective assessment in consultation with APART and the Department of Fisheries, Government of Assam. For the same purpose, we may visit fish farms located outside the state where monoculture and/or seed production of GIFT is being practiced following BMP for possibly evolving a risk management protocol for culture of GIFT in the state.

Stakeholder identification

The incorporation of stakeholders' (e.g. fish farmer, fishers, fishery official, researchers, conservationist, planner etc.) views, *inter alia* will be elicited on the following aspects-

1. Who will buy cultured GIFT fish?
2. Who are the people or groups that may be profited by the introduction of GIFT in culture fishery or natural waters?


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3. What is the safety measures to be taken to prevent escape of GIFT to natural waters ?

4. Is the area flood prone?

Table 1: Potential stakeholders with respect to introduction of GIFT to Assam for aquaculture

• Department of Fisheries, Govt. of Assam	
• ARIAS Society, Govt. of Assam	
• Dept. of Forest, Govt. of Assam	
• Fish consumers of the state	
• Fish famers	- hatcheries, breeders - producers, multipliers - retailers, wholesalers
• Fish traders	
• Fisher communities	
• Neighbouring state/ countries	-Meghalaya (Foot hill region) - Arunachal Pradesh (Foot hill region) - Nagaland - Manipur - Mizoram - Tripura - Bangladesh
• Local politicians	
• NGOs dealing with development	- Centre for Rural development - Appropriate Technology Mission of Assam, Guwahati
• Conservation groups	- World Wide Fund for Nature (WWF), India - Aaranyak (NGO) - Arayana Surakshya Samittee, Assam - Nature's Foster, Bongaigaon - Nature's Benyapran, Biswanath - Nature's Bacon, Dhubri
• Research Institutes/ Universities	- ICAR-CIFRI RC, Guwahati - College of Fisheries (AAU), Raha, Nagaon - Gauhati University, Dibrugarh University & Assam University, Assam
• Fishers' groups or organizations	- Scheduled Caste Mahasangha, Assam - Assam Jia-Bharali Anglers' Association



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- Corporate aquaculture sectors
 - Amalgamated Plantations Pvt. Ltd.
 - Maihang Prakriti Gosthi, Nagaon

Conceptual modelling

The rapid risk assessment will be conducted based on some conceptual understanding of the aquatic eco-systems (floodplain wetlands, rivers etc.) being investigated upon.

A conceptual model of the potential receiving aquatic system for introduction of GIFT tilapia will be developed which considers the components of the receiving environment and their relationships. Elements that commonly appear in conceptual models include: other native fish species; introduced species; crustaceans; aquatic macrophytes, plankton, benthos and abiotic components such water quality and water quantity (wherever available). Values for abiotic components are not required, but could be included in the model as interacting with biotic factors.

Collection of secondary information

(a) Potential reference materials: Available published information about biotic and abiotic components of potential receiving water bodies and their fish diversity, threatened status will be consulted. These will include the following sources (among others).

- Biodiversity surveys or databases (e.g. Fish Base, IUCN vulnerable species lists, California Academy of Science database (e.g, ICAR-CIFRI Bulletin No.104)
- Studies on ecology and fisheries of potential receiving environments (e.g. water bodies)
- Stakeholder interviews.

(b) We will also use the generic material available on conceptual modelling and resource materials such as:

- Species profiles from various sources (FAO factsheets, Fish Base, IUCN vulnerability lists, other databases) which includes the following information:
 - Literature on indigenous and exotic fish species of Assam (e.g, Bhattacharjya *et al.*, 2000, 2003)
 - Closely related species present in the receiving environment (same family)
 - Geographical distribution (native and introduced, within Assam only)
 - Biological tolerance (water parameters: salinity, temperature etc.)
 - Natural diet
 - Aquaculture practices (hatcheries, farms, ponds, cages; extensive, intensive etc.)


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- Published reports on the ecology and fisheries of floodplain wetlands (e.g., Sugunan and Bhattacharjya, 2000) and rivers (Yadava and Sugunan, 1992; Anon., 2000; Bhattacharjya *et al.*, 2017) of Assam and so on.

Hazard Identification

In the context of environmental risk analysis, a hazard is “an act or phenomenon that has the potential to produce harm or other undesirable consequences to what human’s value” (Kapusinski *et al.* 2007). The hazard identification stage should enable us to identify, characterize and prioritize hazards. There are many different techniques and approaches to identify hazards in risk analysis (e.g. Hayes 2002, 2003; Carey *et al.* 2007) which can range from unstructured brainstorming to sophisticated exercises. Whereas some approaches are more ‘formalized’ and time-consuming, they are less likely to result in potentially important hazards being overlooked than less rigorous, quicker approaches. The purpose of this step is to identify the hazards associated with the introduction of GIFT with special reference to the potential genetic impacts of the introduction. In this case one may consider:

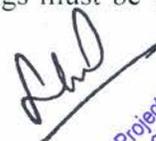
- The escape of fish into the wild (“a hazard”) which may lead to hybridization or genetic introgression, or other adverse genetic effects a harm”) on native wild or cultured stocks.
- An escaped fish encountering a wild fish, which may lead to interbreeding.
- The native tilapia in the region and their conservation status. During this step, potentially useful information could include:
 - Life-cycle information of GIFT and other native tilapia from Fish Base (Froese and Pauly 2011).
 - Studies on aquatic ecology of Assam.
 - Examples of fault tree diagrams
 - IUCN Red List of Threatened Species (www.iucnredlist.org);
 - Studies demonstrating crossbreeding ability amongst tilapia species or hybridization in the wild.

Risk assessment

There are multiple methodologies described in the literature for evaluating risk within an environmental risk analysis context (Burgman 2005; Kapuscinski *et al.* 2007; Vose 2008). These methodologies can range from highly statistical quantitative approaches, to more subjective, opinion-based judgments to inform qualitative and semi-quantitative approaches to risk analysis.

To evaluate the risk of each hazard identified in the previous step, we will use a qualitative approach based on “expert” opinion. The qualitative approach to risk assessment is amongst the most simple and flexible approaches for estimating risk, but it is highly prone to several types of bias and suffers several flaws (Burgman 2001). These shortcomings must be well


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understood and addressed as thoroughly as possible when taking this approach. Hayes et al. (2007) outline several ways to help maintain the scientific credibility of qualitative and semi-quantitative risk assessment. It is beyond the scope of this document to discuss in detail the various additional approaches to risk assessment.

Constructing Risk Assessment Model

Risk Assessment at organism level will be done following tri-national (Canada, Mexico & USA risk assessment) guidelines for aquatic alien invasive species (Orr and Fisher, 2008). It is divided into two major components: “Probability of Establishment” and the “Consequence of Establishment.” Such a will help us to evaluate the exotic fish species (e.g. more restrictive measures may be used to lower the probability of the particular exotic species establishing itself when the consequences of that establishment appear to be considerable).

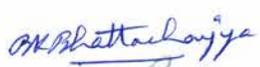
The Risk Assessment Model is a working model that represents a simplified version of the real world. In reality, the specific elements of the Risk Model are not static or constant, but are dynamic showing distinct temporal and spatial relationships. Additionally, the elements are not equal in weighing the risk, nor are they necessarily independent. The weight of the various elements will never be static because they are strongly dependent upon the non-indigenous organism and its environment at the time of introduction.

The two major components of the Risk Assessment Model are divided into seven basic elements that serve to focus scientific, technical, and other relevant information into the assessment. Each of these seven basic elements is represented on the Organism Risk Assessment Form (Appendix A) as probability or impact estimates. The individual elements may be determined using quantitative or subjective methods.

The information gathered by the assessors (consultants) can be organized under the seven elements. The cumulative information under each element provides the data to assess the risk for that element. Whether the method used in determining the risk for that element is quantitative, qualitative or a combination of both, the information associated with the element (along with its references) will function as the information source. Placing the information in order of descending risk under each element will further communicate to reviewers the thought process of the assessors.

Adequate documentation of the information sources makes the Guidelines transparent to reviewers and helps to identify information gaps. This transparency facilitates discussion if scientific or technical disagreement on an element-rating occurs. For example, if a reviewer disagrees with the rating that the assessor assigns an element, the reviewer can point to the information used in determining that specific element-rating and show what information is missing, misleading, or in need of further explanation. Focusing on information to resolve disagreements will often reduce the danger of emotion or a preconceived outcome from diluting the quality of the element rating by either the assessors or the reviewers.

The specific questions and rationale for each of the Risk Assessment Model elements addressed are listed below. When evaluating an organism that is recently introduced, the answer to the first two Group 1 questions below would automatically be rated as “high” because entry into the new environment is either assumed or has already occurred.


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Exposure and effects

This step attempts to evaluate the exposure to the selected hazards and the effects of this exposure on the various end points identified in earlier stages of the risk analysis. Qualitative and semi-quantitative risk assessments attempt to estimate risk of a particular hazard by multiplying qualitative rankings of the Likelihood and consequence scores are based on clearly defined categories that increase on nominal scales (e.g. from least to most likely, ranging from 1 to 5). The combination of the likelihood and consequence scores is the risk (risk = likelihood x consequence). There are many examples of likelihood and consequence categories in the literature, for example, those outlined by Hewitt et al., 2006. The risk scores for each hazard can be evaluated using a risk matrix, which helps in the categorization of differing levels of risk. Risk matrices also have various shortcomings that should be well understood (Cox *et al.*, 2005; Cox, 2008). A risk evaluation matrix may look like the following: Questions may be asked for any hazard identified, but we need to ensure that the consequences “to what” are clearly defined (e.g. consequences in terms of numbers of non-native fish in the system, consequences to genetic integrity of native fish and introduced fish, consequences to water quality, etc.)

Risk management

Here we consider what can be done to reduce risk, either by reducing the likelihood of the hazard happening or mitigating the consequences of the hazard once they are realized. Management objectives will depend on the stage of entry, spread, and/or establishment of the organism in the receiving environment (e.g. one may be addressing whether a certain activity will increase the spread of an already established organism). It is generally true that risk management initiatives for aquatic organisms will be more effective in minimizing the likelihood component of risk than attempting to minimize consequence. Minimizing the consequences of an escaped fish may be possible, but actions such as pest control to reduce feral fish populations can be laborious and costly (and in many cases ineffective). Therefore, reducing the likelihood of the fish escaping in the first place would be a more cost effective approach to risk management, and addresses the risk at its source.

Stakeholder consultations can also significantly benefit the development of risk management options, by providing feedback as to whether or not a suggested approach is likely to be feasible in a given region. For example, complex pest management approaches implemented in developed countries (such as electric fish barriers or strict licensing restrictions) may be prohibitively expensive or may be too demanding in some regions.

In addition to identifying and implementing risk management measures for a given activity, a suitable monitoring program should be put in place. The output of a risk analysis is only a prediction, irrespective of how much data is available for the risk assessment. Validating this prediction through an adequate monitoring program is a critical step towards sound environmental management and ensuring a risk analysis is effective at minimizing potential diverse impacts. For example, an analyst may recommend that installing mesh screens on all pond outlets would be an effective risk management approach to minimize escapes but if there is no monitoring strategy to confirm this as an effective strategy (e.g. by checking compliance of farmers or reliability of screens), the effort to minimize risk is essentially futile.


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Risk management measures for addressing genetic risk related to the introduction of GIFT might consider:

- Documentation and controls on movement of GIFT for farming purposes.
- A reporting system for escapes creating zones for aquaculture activities, away from important wild populations improved technology to reduce escape risks.
- Development of targeted GIFT fisheries.
- Development of sterile fish production systems.

A key tool for the management of alien fish is a method of predicting which introduced species can be expected to cause unacceptable environmental impacts. A comprehensive environmental impact assessment that includes tank, pond and field trials can provide this but is not always possible, feasible or desirable. A modelling approach is therefore required as a preliminary screening tool to identify the species posing little risk as against those requiring a more stringent EIA.

Boundaries and limitations

It is not always possible to evaluate every single risk associated with the proposed introduction of GIFT in to the state based on one rapid risk assessment study. Detailed studies on food and feeding habits, reproductive biology of the species are required to assess possible niche overlaps as well as competition for food and space with native fishes of the state.

The present rapid risk assessment has been proposed mainly because of limitations in time and financial resources needed to conduct an all-encompassing assessment. In view of the above we will focus in the present assessment mainly to the potential ecological risks posed by planned introduction of GIFT tilapia to the selected APART project districts of Assam (4 No.). However, our past experiences on studies on natural fisheries/ open water bodies of Assam showed that the species in question might have already gained an entry into natural water bodies of Assam since the fish is reportedly being cultured in certain pockets of the state and is being sold in markets including Guwahati.

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(b) Work Plan and Staffing:

COMPOSITION OF THE TEAM PERSONNEL AND THE TASK WHICH WOULD BE ASSIGNED TO EACH TEAM MEMBER

1. Technical/ Managerial Staff:

Sl. No.	Name	Position	Task assignment
1	Dr. B. K. Das	Team Leader	Planning and monitoring
2	Dr. B.K. Bhattacharjya	Ecologist	Preparation of inception report, Field collection of data (ecological aspects), Laboratory analysis, Collection of secondary information, Compilation of results, Report writing
3	Dr. P. Das	Fishery Expert	Field collection of data (fisheries aspects), Laboratory analysis, Compilation of results, Report writing

2. Research Support Staff:

Sl. No.	Name	Position	Task assignment
1	K.K. Sarma	Chief Technical Officer	Assistance in field collection of data and compilation of results
2	Mr. A. Kakati	Sr. Technician	Assistance in field collection of data and compilation of results

FORM- TECH-5: Work Schedule and planning for deliverables

N°	Deliverables ₁ (D-..)	Duration-Week											
		1	2	3	4	5	6	7	8	9	10	11	TOTAL
D-1	Inception Report												
	1) Literature search	■	■	■	■	■							5
	2) drafting	■	■	■									3
	3) submission of draft inception report			■									1
	4) incorporating comments of client			■									1
	5) delivery of final report to Client				■								1
D-2	Collection of data & analysis												
	1) Field data collection		■	■	■	■	■	■					5
	2) Collection of secondary information	■	■	■	■	■							5


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FORM- TECH-6: Team Composition, Assignment, and Key Experts' inputs

No.	Name	Position	Expert's input-week											Total
			1	2	3	4	5	6	7	8	9	10	11	
	KEY EXPERTS													
K-1	Dr. B. K. Das	Team Leader		-				-	-	-			-	2
K-2	Dr. B. K. Bhattacharjya	Ecologist	-	-	-	-	-	-	-	-	-	-	-	4
K-3	Dr. P. Das	Fishery Expert			-	-	-	-	-					3
	Non-KEY EXPERTS													18
NK-1	K. K. Sarma	R.S. Staff					-	-	-					3
NK-2	A. Kakati	R.S. Staff								-	-	-		4
	Total													8

- Note:**
- Indicates Part-time involvement (33% time) during the week.
 - Indicates Full-time involvement during the week (field visits).
 - Indicates no involvement of the concerned personnel during the week.

(c) Comments (on the TOR and on counterpart staff and facilities)

- (i) There is a need for continuous open communication between the risk managers (DoF & ARIAS) and the risk assessors (consultant) throughout the rapid risk assessment. This is necessary to ensure that the assessment will implementable when completed. Thus, the society should organize informal brainstorming session in the four project districts (Morigaon, Sonitpur, Dhuburi and Cachar) during the consultancy period to elicit the pertinent responses/ apprehensions from the fishery officials on mutually convenient duties. A few progressive fish farmers may also be invited in the second half of the informal discussion to understand their views on the prospects and constraints of tilapia culture in the district, its market, diseases encountered (if any), economics of tilapia culture, risk, etc.
- (ii) In addition to the list of fish framers presently practicing GIFT culture in the selected project districts (Item No.16 a, p. 20 of TOR), the client should also provide the list of fish framers practicing culture of Nile tilapia (*Oreochromis niloticus*) and Mozambique tilapia (*O. mossambicus*) in the concerned districts. Field visits to a few such fish farm will help us to understand in possibility of hybridization of GIFT with others such tilapia species in natural water bodies This, in turn, will help in Ecological Risk Assessment of GIFT in the state in a more meaningful way.



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- (iii) The client should provide information and map of chronic flood prone areas of Assam, if possible. This information will be useful to predict areas of the state which will have high risk of being adversely affected by GIFT on open water ecosystems of the state.
- (iv) Consultant (ICAR-CIFRI) has a well furnished regional centre located at Guwahati. Therefore, it doesn't require any administrative support, office space, local transportation & equipments.

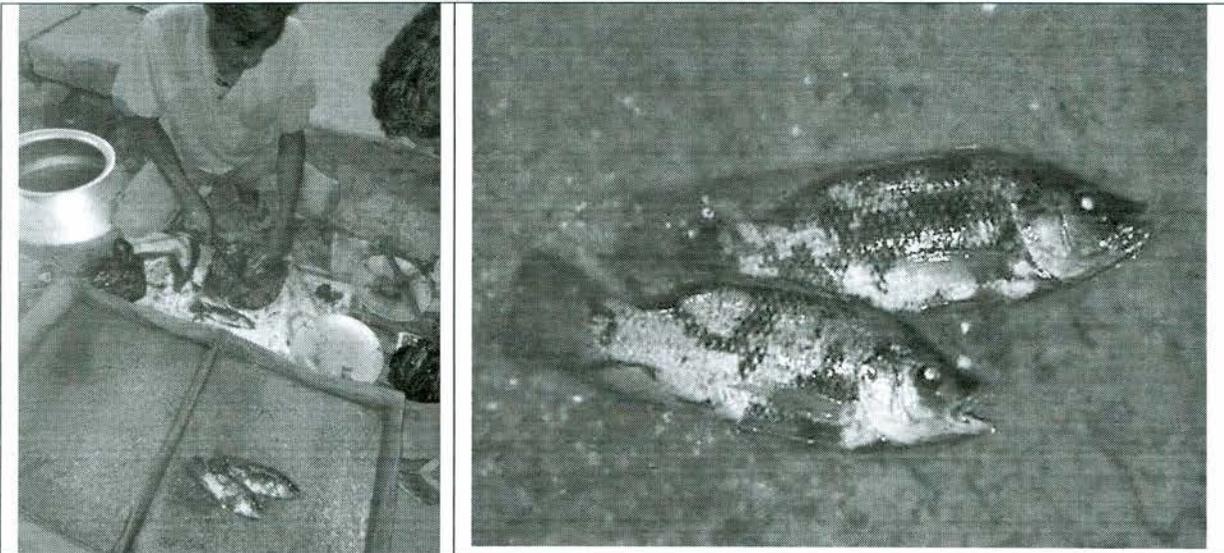


Fig. 1: Fresh tilapia being sold in a Guwahati market.

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Form TECH-6: Curriculum Vitae (CV)

Position Title and No.	K-1 , TEAM LEADER
Name of Expert	DR. BASANTA KUMAR DAS
Date of Birth	20/03/1966
Country of Citizenship/Residence	INDIA

Education:

Exam/ Degree/ Diploma	Institute/Board/U niversity	Year	Subject(s) with major field	Class/Division/ Grade/%marks	Rank/Medal/Award, if any
Graduation (B.F.Sc.)	O.U.A.T., Bhubaneswar	1988	Fisheries, Aquaculture	1 st , 80%	Honours (ICAR- HRD Fellowship)
Masters (M.F.Sc)	- Do -	1991	Aquaculture	1 st , 84%	First class first /Gold Medallist (JRF- ICAR)
Ph. D (Aquacul ture)	- Do -	1998	Aquaculture	8.18	SRF(ICAR)
Post-Doc	FRS Marine Lab, Aberden, Scotland, UK	2006	Molecular Immunolog y	Nov-2005-Nov- 2006	One Year (DBT Associateship)

Trainings:

Period	Host Institute	Country	Area of Specialization
1995	ICAR-NAARM, Hyderabad	India	PRA in ICAR-CIFA, Bhubaneswar (Field Experience Training)
2005 - 2006	FRS, Marine Fisheries Laboratory	Scotland	Molecular Immunology(Post-doc)
15/6/2010 to 13/09/2010	Bourn's College of Engineering, Riverside at UCR	USA	Three months training on Nanotechnology (Fishery Science)(Experience of working/ training in an International Organization/ Laboratory other than Post- Doctoral Fellow)

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Employment record relevant to the assignment:

Period	Employing organization and your Title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
30.07.16- Till date	ICAR-CIFRI, Barrackpore as Director	India	Research, Research guidance
01.07.09 - 30.07.16	ICAR- CIFA, Bhubaneswar as Principal Scientist	India	Research
July, 2003- July, 2009	ICAR- CIFA, Bhubaneswar as Senior Scientist	India	Research
July 1998- July, 2003	ICAR- CIFA, Bhubaneswar as Scientist (Senior Scale)	India	Research
July 1994- July 1998	ICAR- CIFA, Bhubaneswar as Scientist	India	Research
July 1994- Jan. 1995	ICAR- NAARM Hyderabad as Scientist	India	FC on Agril. Res. Mgt.

Membership in Professional Associations and Publications:

Memberships in Professional Associations

President	Inland Fisheries Society of India	From 2016	Professional Society	Individual
President	PFGF (Professional Fisheries Graduate Forum)	From 2017	Professional Society	Individual
President	Orissa Fisheries College Alumni Association (OFCAAR)	2001-2003	Professional Society	Individual
Assistant Editor	Association of Aquaculturists	1998-99	Professional Society	Individual
Bulletin Editor	Rotary Club, Royal	2013	Rotary International	Individual
Chair (Animal Science)	Rotary International Dist 3262	2013	Rotary International	Individual
Member	Association of Aquaculturists	1998	Professional Society	Individual
Member	Indian Science congress	2014	Professional Society	Individual

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a) Number of publications

Scientific Papers		Policy paper	Books (Edited/written)	Technical Bulletins	Handbook / Training manuals	Seminars/ Symposia papers	Technical / Popular articles
International	National						
6	34	1	3	6	2	13	26

b) Papers published in research journals (national/international):

45. **Das B.K.**, Pradhan J., Sahu S., Marhual N.P., Mishra B.K. & Eknath A.E. 2012. *Microcystis aeruginosa* (Kütz) incorporated diets increase immunity and survival of Indian major carp *Labeo rohita* (Ham.) against *Aeromonas hydrophila* infection. *Aquaculture Research*. 1-10. **Doi.10.1111/j.1365-2109.201203098**
44. Marhual N.P., **Das B.K.**, Pradhan J., Swain P., Mishra B. K. and Eknath A. E. 2011 RAPD-PCR and Outer membrane Protein Characterization of *Vibrio alginolyticus* and *Vibrio parahaemolyticus* isolated from diseased shrimp *Penaeus monodon* to *The Israeli Journal of Aquaculture- Bamidgeh*. (64), 683-128.
43. Pradhan J., **Das B.K.**, Sahu S, Marhual N.P., Swain A. K., Mishra B.K. and Eknath A.E. 2012. Traditional antibacterials of freshwater microalga *Spirulina platensis* to aquatic pathogens. *Aquaculture Research*. 43 (9):1287-1295.
42. **Das B.K.**, Tlili C., Badhulika S., Cella L. N., Chen W., Mulchandani A. 2011 **Single-walled carbon nanotubes chemiresistor aptasensor for small molecules: Picomolar level detection of adenosine triphosphate.** *Chem. Commun.*, DOI: **10.1039/C0CC04733C**
41. Rajesh., **Das B.K.**, Srinives S.,1 and Mulchandani A. 2011 ZnS nanocrystals decorated single-walled carbon nanotube (SWNT) based chemiresistive label-free DNA Sensor. *Applied Physics Letters*
40. Behera T., Nanda P.K., Mohanty C., Mohapatra D., Swain P., **Das B.K.**, Routray P., Mishra B.K., and Sahoo S.K. 2010 Parental immunization of fish, *Labeo rohita* with Poly D, L-lactide-co-glycolic acid (PLGA) microparticle encapsulated antigen stimulates both acquired and innate immune parameters through parenteral immunization in fish. *Fish and shellfish immunology*, 28:320-325.
39. Swain P., Behera T., Mohapatra D., Nanda P. K., Nayak S. K., Meher P. K., and **Das B. K.** 2010 Derivation of rough attenuated variants from smooth virulent *Aeromonas hydrophila* and their immunogenicity in fish. *Vaccine*, 28:4626-4631.
38. Marhual N.P., **Das B.K.**, Sadique M, Swain A. K., Mishra B. K., Maiti N. K. and Eknath A. E. 2010 Molecular identification and typing of *Vibrio alginolyticus* and *Vibrio parahaemolyticus* strains isolated from black tiger shrimp *Penaeus monodon*. *Journal of Aquaculture in Tropics*. 25, 25-33.
37. **Das, B.K.**, Pradhan, J. and Sahu, S. 2009 The effect of *Euglena viridis* on immune response of rohu, *Labeo rohita* (Ham.). *Fish and Shellfish Immunology*. 26: 871-6.


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36. Marhual N.P. and **Das B.K.** 2009 Use of Random Amplified Polymorphic DNA (RAPD) and Restriction fragment length polymorphism (RFLP) for typing of *Vibrio alginolyticus* isolated from Black tiger shrimp *Penaeus monodon*. *Journal of Pure and applied Microbiology* 3:75-82.
35. **Das B.K.**, Debnath C., Patnaik P., Swain D.K., Kumar K., Mishra B.K. 2009 Effect of β -glucan on immunity and survival of early stage of *Anabas testudineus* (Bloch). *Fish and Shellfish Immunology*, 27:678-683.
34. **Das, B. K.**, Collet, **B.**, and Ellis, A.E. 2009 Induction and persistence of Mx protein in tissues, blood and plasma of Atlantic salmon parr, *Salmo salar*, injected with poly I:C. *Fish & Shellfish Immunology*, 26:40-48.
33. Misra, C. **K.**, **Das, B. K.**, Mukherjee, S. C. 2009 Immune response, growth and survival of *Labeo rohita* fingerlings fed with levamisole supplemented diets for longer duration. *Aquaculture Nutrition*, 15:356-365.
32. Dash, S. S., **Das, B. K.**, Pattnaik, P., Samal, S. K., Sahu, S. and Ghosh, S., 2009. Biochemical and serological characterization of *Flavobacterium columnare* from freshwater fishes of Eastern India. *Journal of World Aquaculture Society*, 40(2):236-247.
31. Sahu, S., **Das, B. K.**, Mishra, B. K., Pradhan, J. and Sarangi. N. 2008. Effect of dietary *Curcuma longa* on enzymatic and immunological profiles of rohu, *Labeo rohita* (Ham.), infected with *Aeromonas hydrophila*. *Aquaculture Research*. 39: 1720-1730.
30. **Khuntia, C.P., Das, B.K.**, Samantaray, B.R., Samal, S.K., Mishra, B.K. 2008. Characterization and pathogenicity studies of *Vibrio parahaemolyticus* isolated from diseased freshwater prawn, *Macrobrachium rosenbergii* (de man). *Aquaculture Research*, 39:301-310.
29. Samal S.K., Samantaray B.R. and **Das B.K.** 2008 Genetic analysis of *Aeromonas hydrophila* MTCC 646 by random amplified polymorphic DNA. *Journal of Pure and Applied Microbiology*, 2: 239-244.
28. **Das, B.K.**, Nayak, K.K. Fourier, M., Collet, **B.**, Snow, M. and Ellis, A.E., 2007 Expression of Mx protein in tissues of Atlantic salmon post-smolts- An immunohistochemical study. *Fish & Shellfish Immunology*, 23:1209-1217.
27. **Das, B.K.**, Collet, **B.**, Snow, M. and Ellis, A.E., 2007. **Expression of kinetics of ISG15 and viral major capsid protein (VP2) in atlantic cod (*Gadus morhua* L.) fry following infection with infectious pancreatic necrosis virus (IPNV).** *Fish & Shellfish Immunology*, 23:825-830.
26. **Das, B. K.**, Collet, **B.**, Snow, M. and Ellis, A.E., 2007. **Expression of Interferon type I and II, Mx and γ IP genes in the kidney of Atlantic salmon, *Salmo salar*, is induced during smolting.** *Fish & Shellfish Immunology*, 23:514-520.
25. Sahu, S., **Das, B. K.**, Mishra, B. K., Pradhan, J. and Sarangi. N. 2007. Effect of *Allium sativum* on the immunity and survival of *Labeo rohita* infected with *Aeromonas hydrophila*. *Journal of Applied Ichthyology*, 23(1): 80-86.



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24. Sahu, S., **Das, B. K.**, Pradhan, J., Mohapatra, B. C., Mishra B. K. and Sarangi N. 2007 **Effect of *Magnifera indica* kernel as a feed additive on immunity and resistance to *Aeromonas hydrophila* in *Labeo rohita* fingerlings.** *Fish & Shellfish Immunology*, 23:109-118.
23. Misra, C.K., **Das, B. K.**, Mukherjee, S.C. and Pradhan, J. 2007. Effects of dietary vitamin C on immunity, growth and survival of Indian major carp *Labeo rohita*, fingerlings. *Aquaculture Nutrition*, 13 (1): 35-44.
22. **Das, B. K.**, Samal, S. K., Samantaray, B. R., Sethi, S., Pattnaik P., and Mishra, B. K. 2006. **Antagonistic activity of cellular components of *Pseudomonas* species against *Aeromonas hydrophila*.** *Aquaculture*, 253(1-4): 17-24.
21. Misra, C. K., **Das, B. K.**, Mukherjee, S. C. and Pattnaik, P. 2006 **Effect of multiple injections of β -glucan on non-specific immune response and disease resistance in *Labeo rohita* fingerlings.** *Fish & Shellfish Immunology*, 20(3): 305-319.
20. Misra, C. K., **Das, B. K.**, Mukherjee, S. C. and Pattnaik, P. 2006. **Effect of long term administration of dietary β -glucan on immunity, growth and survival of *Labeo rohita* fingerlings.** *Aquaculture*, 255(1-4): 82-94.
19. Rao, Y. V., **Das, B.K.**, Pradhan J. and Chakrabarti, R. 2006. **Effect of *Achyranthes aspera* on the immunity and survival of *Labeo rohita* infected with *Aeromonas hydrophila*.** *Fish & Shellfish Immunology*, 20 (3): 263-273.
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17. Sethi, S., Mukherjee, S. C., **Das, B. K.**, Samal, S.K. and Soni, S. 2006. Physiological Changes in Indian River Prawn *Macrobrachium malcolmsonii* Experimentally Infected with *Vibrio alginolyticus* and *Vibrio anguillarum*. *Asian Fishery Science*. 19(2): 131-139.
16. **Das, B. K.**, Pradhan, J., Pattnaik, P., Samantaray, B. R. and Samal, S. K., 2005. Production of antibacterials from the freshwater alga *Euglena viridins* (Ehren). *World Journal of Microbiology and Biotechnology*, 21:45-50.
15. **Das, B. K.**, Samal, S. K., Samantaray, B. R., Meher, P. K., 2005. Protein fingerprinting profiles in different strains of *Aeromonas hydrophila* isolated from diseased freshwater fish. *World Journal of Microbiology and Biotechnology*. 21:587-591.
14. **Das, B. K.**, Pattnaik, P. and Mishra, B. K. 2005. Observation on Haematological and Enzymatic Changes on Spontaneous Papillomatous Condition of *Anabas testudineus* (Bloch). *Asian Fishery Science*. 18(1): 33-38.
13. Sahoo, B., Sethi, S., Mishra, B. K. and **Das, B. K.** 2005. Effects Elicitors on Prophenoloxidase and Superoxide Anion Activities of Freshwater Prawn, *Macrobrachium malcolmsonii*. *Asian Fishery Science*. 18(4): 345-353.
12. Misra, C. K., **Das, B. K.**, Pradhan, J., Pattnaik, P., Sethi, S. and Mukherjee, S. C., 2004. Changes in lysosomal enzyme activity and protection against *Vibrio* infection in *Macrobrachium rosenbergii* (De Man) post larvae after bath immunostimulation with β -glucan. *Fish & Shellfish Immunology*. 17:389-395.

11. Nayak, A. K., **Das, B. K.**, Mukherjee, S. C. and Kohli, M. P. S. 2004. The immunosuppressive effect of α -permethrin on Indian Major carp, rohu, *Labeo rohita*. *Fish and Shellfish Immunology*. 16:41-50.
10. **Das, P. C.**, Ayyappan, S., **Das, B. K.** and Jena J. K. 2004. **Nitrite toxicity in Indian major carps: sublethal effect on selected enzymes in fingerlings of *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala*.** *Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology*. 138(1): 3-10.
9. **Das, P. C.**, Ayyappan, S., Jena J. K. and **Das, B. K.** 2004. **Nitrite toxicity in *Cirrhinus mrigala* (Ham.): acute toxicity and sub-lethal effect on selected haematological parameters.** *Aquaculture*, 235(1-4): 633-644.
8. Das P. C., Ayyappan S., Jena J. K. and **Das B. K.** 2004. Effect of sub-lethal nitrite on selected haematological parameters in fingerling *Catla catla* (Hamilton). *Aquaculture Research*, 35 (9): 874-880.
7. Das, P. C., Ayyappan, S., Jena, J. K. and **Das, B. K.** 2004. Acute toxicity of ammonia and its sub-lethal effects on selected haematological and enzymatic parameters of mrigal, *Cirrhinus mrigala* (Hamilton) *Aquaculture Research*, 35 (2): 134-143.
6. **Das B. K.** and Mukherjee, S. C. 2003. **Toxicity of cypermethrin in *Labeo rohita* fingerlings: biochemical, enzymatic and haematological consequences.** *Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology* 134(1): 109-121.
5. Swain, P., Mukherjee, S. C., Sahoo, P. K., **Das, B. K.**, Pattnaik, P., Murjani, G., Nayak, S. K., 2001. Dot-Enzyme-Linked Immunosorbent Assay (Dot-ELISA) for the Diagnosis of *Edwardsiella tarda* Infection in Fish. *Asi. Fish. Sci.* 14:89-93.
4. **Das, B.K.** and Mukherjee, S.C. and Murjani, G. 2000. A histopathological study of carp (*Labeo rohita*) exposed to hexachlorocyclohexane. *Veterinarski Arhiv* 70(4):169-180.
3. **Das, B.K.** and Mukherjee, S.C. 2000. Sub lethal effect of quinalphos on selected blood parameters of *Labeo rohita* (Ham.) fingerlings. *Asian Fisheries Science*, 13: 225-233.
2. **Das, B.K.** and Mukherjee, S.C. 2000. Chronic toxic effects of quinalphos on some biochemical parameters in *Labeo rohita* (Ham.). *Toxicology Letters*, 114:11-18.
1. **Das, B. K.** and Mukherjee, S.C. and Murjani, G. 2002. Acute toxicity of Neem *Azadirachta indica* in Indian Major carps. *Journal of Aquaculture in the Tropics*, 17(1): 23-33.

b) National publications

32. Sahu I., **Das B.K.**, Marhual N.P, Samanta M., Mishra B.K. 2011 Toxicity of crude extracellular product of *Aeromonas hydrophila* on rohu, *Labeo rohita* (Ham). *Indian Journal of Microbiology*. 51(4):515-520
31. Behera T., Swain P., Sahoo S.K., Mohapatra D. & **Das B.K.** 2011. Immunostimulatory effects of curcumin in fish, *Labeo rohita* (H.). *Indian Journal of Natural Products and Resources*. 2: 184-188.
30. Pradhan J., Sahu S., Marhual N.P., Mishra B.K. and **Das B.K.** 2011 Antibacterial properties of freshwater *Microcystis aeruginosa* (Kütz) to bacterial pathogen – a comparative study of bacterial bioassays. *Indian Journal of Animal Sciences*. 81(12): 79-00 (accepted).



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29. Mohanty, K., **Das, B.K.**, Marhual, N.P. and Roy, P. 2011 Random amplified polymorphic DNA-PCR typing of *Pseudomonas aeruginosa* isolated from diseased freshwater fish. *Indian J. Soc. Nat. Sci.* 1(1):1-10.
28. **Das B. K.** and Pradhan, J. 2010 Antibacterial properties of selected freshwater microalgae against pathogenic bacteria. *Indian Journal of Fisheries.* 57: 61-66.
27. Samal, S.K., **Das, B. K.**, Ghosh, S and Sahu, S., 2009 *In vitro* susceptibility of *Pseudomonas sp.* isolated from freshwater fish to antimicrobial agents. *Indian Journal of Fishery*,56(3): 227-230.
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25. **Das, B. K.**, Samal, S.K., Samantaray, B.R., and Mishra, B.K. 2009. Genetic diversity of *Pseudomonas putida* field population revealed by RAPD fingerprinting from freshwater fishes. *e-planet.* 7(2):1-7.
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22. Sahu, S., Mishra, B.K., Pradhan, J., and **Das, B.K.** 2005. Antibacterial activity of *Curcuma longa* on fish microbial pathogens. *Journal of Aquaculture* 13.9-16.
21. Sahoo, P.K., Tripathy, S., Mishra, B. K., Adhikari, S., **Das, B. K.**, Nandi, S., Hari Babu, P., Sarangi, N. and Ayyappan, S., 2005. Is appendage deformity syndrome caused by *Macrobrachium rosenbergii* nodavirus? *Current science*, 88(9):1374-1375.
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19. Das, P. C., Ayyappan, S., Jena, J. K. and **Das, B. K.**, 2004. Effect of sub-lethal nitrite toxicity on the haematological parameters of fingerlings of rohu, *Labeo rohita* (Ham.). *Indian J. Fish.*, 51(3):287-294.
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17. **Das, B. K.**, Pattnaik, P., Murjani, G., & Mukherjee, S.C. 2001. *Edwardsiella tarda* endotoxin as an immunopotentiator in singhi, *Heteropneustes fossilis* fingerlings. *Ind. J. Exp. Biol.*, 9: 1311-1313.
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14. **Das, B. K.**, Mukherjee, S. C., Sahu, B. B. and Murjani, G. (1999). Neem (*Azadirachta indica*) extract as an antibacterial agent against fish pathogenic bacteria. *Ind. J. Expt. Biology.* 36: 1097-1100.

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13. **Das, B. K.**, Sahu, B. B. and Mukherjee, S. C. 1999. The acute toxicity of Neem *Azadirachta indica* to fresh water prawn, *Macrobrachium lamarrei* (H. Milne Edwards). *J. Appl. Zool. Res.* 10(2): 163-164.
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c) Popular articles

1. **Das, B. K.** 1993. Epizootic Ulcerative Disease in India, Fishing Chimes, pp.43-45.
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7. Swain, S.K., Singh, H. and **Das, B.K.** 1994. Aflatoxins in feed ingredients and their effects on fish. *Fishing Chimes* 18(10): 67-69.
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10. Mukhi, S.K., **Das, B.K.**, Madhavi, B., Mishra, C.K and Paniprasad, K. 2001. Shrimp farm waste and its management. *Info fish international*. 1:50-55.
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d) Books/Journals edited:

1. Mishra, B.K., Swain, P., Sahoo, P.K., **Das, B.K.**, and Sarangi, N. (2007). Disease management in freshwater pisciculture. Agrotech Publishing Academy, Udaipur, 288pp.
2. Aquaculture Technology for farmers (ICAR) Jena, J.K., Das, P.C., **Das, B.K.**, and others 2005
3. Souvenirs on Responsible Fisheries and Aquaculture Jena, J.K., **Das, B.K.** and others 2004
4. Abstracts and proceedings 40th Annual conferece of Association of Microbiologists of India, Bhubaneswar Ayyappan, S., Adhikari, S.P., **Das, B.K.** and others 22-24 January –2004
5. CIFA Technologies Sarangi, N., Jena, J.K., **Das, B.K.**, and others 2004
6. Vision 2020; Sarangi, N., Jena, J.K., Sahoo P.K., **Das, B.K** 2007

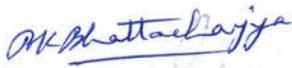
e) Policy paper

Das, B. K., Bhattacharjya, B. K., Borah, S., Das, P., Debnath, D., Yengkokpam, S., Yadav, A. K., Sharma, N., Singh, N. S., Panit, A., Ekka, A., Mishal, P., Karnatak, G., Kakati, A., Saud, B. J., Das, S. S., 2017. Roadmap for Development of Openwater Fisheries in Northeastern States. ICAR-CIFRI, Policy paper No. 6. pp.101 (ISSN 0970-616X).

f) Book chapters:

1. **Das, B.K.** Ecotoxicants and Fish Immne system: **Fish and Shellfish Immunology: an introduction** pp. 245-258 ed. P. Swain, P.K. Sahoo, S. Ayyappan.
2. **Das, B.K.** Bacterial diseases of fish and their control in *Disease Management: Freshwater Pisciculture* ed. B.K. Mishra, P. Swain, P.K. Sahoo, B.K. Das & N. Sarangi
3. Das, B.K. Disease diagnosis and control in freshwater prawn hatchery and grow out culture system pp. 151-162 ed. B.K. Mishra, P. Swain, P.K. Sahoo, B.K. Das & N. Sarangi.
4. RAPD- principles and its application in microbial genome studies pp. 183-188 ed. B.K. Mishra, P. Swain, P.K. Sahoo, **B.K. Das** & N. Sarangi.
5. **B.K. Das.** Ecotoxicants and fish Immune System pp. 246-261 ed. B.K. Mishra, P. Swain, P.K. Sahoo, B.K. Das & N. Sarangi

g) Review Articles:


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Swain, S.K. and **Das, B.K.** 2004. Ornamental fish breeding and Culture : a successful economic enterprise. In Technologies on livestock and fisheries for poverty alleviation in SAARC countries, SAIC, Dhaka, Bangladesh, 135-144pp.

h) Leaflets: 8 No.

Language Skills (indicate only languages in which you can work): English, Hindi, Oriya

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks
Planning and monitoring	I have been working as Director, ICAR-CIFRI, Barrackpore, Kolkata since 30.07.16, the which involves research planning and monitoring.
Fish disease surveillance of GIFT	I worked as as Scientist/ Senior Scientist/ Principal Scientist at ICAR- CIFA, Bhubaneswar with specialization in fish disease research (as reflected in my publications).

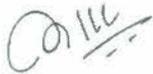
Expert's contact information:

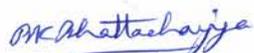
E-mail: director.cifri@gmail.com, director.cifri@icar.gov.in, cifridirectorcell@gmail.com
 Phone: 033-25920177, 259201191(O), 25921190, 25920388(Fax), 25920029(R), 08420229567(M).

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client, and/or sanctions by the Bank.

{05/05/2018}

Name of Expert	Signature	Date
DR. BASANTA KUMAR DAS		05/05/2018}



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Form TECH-6: Curriculum Vitae (CV)

Position Title and No.	K-2 , ECOLOGIST
Name of Expert	DR. BIRENDRA KUMAR BHATTACHARJYA
Date of Birth	29/05/1967
Country of Citizenship/Residence	INDIA

Education:

Exam./ Degree	Institute (Board/ University)	Year	Subject(s)/ Major field(s)	Class/ Division (% Marks/CGPA, Rank)
B.F.Sc.	College of Fisheries, Mangalore (Univ. Agril. Sciences, Bangalore)	1988	Fisheries Sciences and Fisheries Technology	1st class with Distinction (3.91/4.00, 2nd rank)
M.F.Sc. (Fish Production & Management)	-Do-	1991	Fishery Hydrography	1st class, Distinction (3.95/4.00, 1st rank)
Ph.D. in Fish & Fisheries Science	ICAR-CIFE, Mumbai	2002	Fisheries Resources Management (Ecology and fisheries of floodplain wetlands)	1st class, Distinction (9.02/10.00, 1st rank)

Trainings in the relevant field:

Organisation	Period		Details of trainings
	From	To	
ICAR-NAARM, Hyderabad	25.11.2013	07.12.2013	Management Development Programme on Leadership Development
ICAR-CIFRI, Barrackpore	2.07. 2006	21.07.2006	Summer Institute on 'Management issues in fisheries and biodiversity of estuarine and associated eco-systems'
NIE, New Delhi & IWMI, Colombo	23.03.2005	24.03.2005	HRD focused international workshop on 'Environmental flow'
ICAR-CIFRI, Barrackpore	1.12.2003	12.12.2003	Workshop-cum-training on 'Participatory approach to R & D of inland fisheries

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			resources of North-eastern India'
ICAR-CIFE, Mumbai	17.08.1999	23.08.1999	Short training on 'Computer applications in fisheries'
ICAR-NAARM, Hyderabad	15.02.1995	13.07.1995	Fiftieth Foundation Course of Agricultural Research Service
ICAR-CIFA, Bhubaneswar	20.5.1993	8.6.1993	Summer Institute on 'Recent advances in fresh water aquaculture'

Employment record relevant to the assignment:

Period	Employing organization and your Title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
08.07.16 - Till date	ICAR-CIFRI Regional Centre, Guwahati as Principal Scientist & Head (Acting)	India	Research, Research guidance
08.07.11 - 07.07.16	ICAR-CIFRI Regional Centre, Guwahati as Pr. Scientist & Head of Regional Centre	India	do
01.01.09 - 07.07.11	Principal Scientist	India	do
17.06.02 - 07.07.11	Senior Scientist	India	do
27.07.99- 16.06.02	Scientist (Senior Scale)	India	do
21.08.95- 26.07.99	ICAR-CIFRI, Barrackpore & Guwahati as Scientist	India	do
15.02.95- 12.08.95-	ICAR- NAARM Hyderabad as Scientist	India	FC on Agril. Res. Mgt
16.09.91- 11.02.95	College of Fisheries (AAU), Raha, Assam as Assistant Professor	India	Teaching, Research, Extension
		Total =	26 years 6 months

Membership in Professional Associations and Publications:

Members of Learned Societies (International/ National)

Life member of -

- Inland Fisheries Society of India, Kolkata.
- Indian Society of Fisheries Technology, Kochi.
- Agricultural Research Service Scientists' Forum, New Delhi.
- Indian Society of Fisheries Professionals, Mumbai.
- Northeast Society for Fisheries and Aquaculture, (CoF), Lembucherra.
- Life member, College of Fisheries alumni Association (COFAA), Mangalore, Karnataka.

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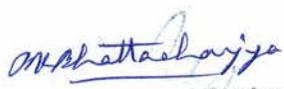
Publications

a) Number of publications

Scientific Papers		Policy paper	Books (Edited/written)	Technical Bulletins	Handbook / Training manuals	Seminars/ Symposia papers	Technical / Popular articles
International	National						
6	34	1	3	6	2	13	26

b) Papers published in research journals (national/international):

1. Bhattacharjya, B. K., Bhaumik, U. and Sharma, A. P., 2017. Fish habitat and fisheries of Brahmaputra River in Assam, India. *Aquatic Ecosystem Health & Management* (Taylor & Francis), Vol. 20, No. 1&2:102-115. (Impact factor: 0.79, NAAS rating: 6.46, ISSN: 1463-4988).
2. Borah, S., Bhattacharjya, B. K., Saud, B. J., Yadav, A. K., Debnath, D., S. Yengkokpam, Das, P., Sharma, N., Singh, N. S. and Sarma K. K., 2017. Length-weight relationship of six indigenous fish species from Deepor beel, a Ramsar site in Assam, India. *Journal of Applied Ichthyology* (Wiley). **33** (3): 655-657. <https://doi.org/10.1111/jai.13348>. (NAAS rating: 6.78, ISSN: 0175-8659). Cited by: 3
3. Das, Alakesh, Bhattacharjya, B. K., Goswami, S. N., Sawant, P. B., Debnath, D., Yengkokpam, S., Das, A., Kakati, A., Sarma, K. K., Chadha, N. K., Verma, A. K. and Sharma, A. P., 2017. Assessment of economic feasibility of pen aquaculture technology in floodplain wetlands (beels) of Assam, India. *Indian J. Fish.*, **64** (Special Issue): 1-7. (Impact factor: 0.24, NAAS rating: 6.16, ISSN:0970-6011).
4. Alam, A., Joshi, K. D., Das, S. C. S., Jha, D. N., Srivastava, K., Kumar, V. and Bhattacharjya, B. K., 2017. Enhancing fish productivity through pen culture: a case study in Sareni wetland of Uttar Pradesh. *Indian J. Fish.*, **64** (Special Issue): 8-13. (Impact factor: 0.24, NAAS rating: 6.16, ISSN:0970-6011).
5. Bhattacharjya, B. K., Barman, K., Yengkokpam, S., Debnath, D., Das, P., Sharma, N., Pegu, S. R., Yadav, A. K., Borah, S., Sarma, K. K., Gogoi, P., Kakati, A., Sarma, D. K., Mohanty, B. P. and Das, B. K. Recycling of commercial piggery wastes in semi-intensive carp polyculture under rainfed pond environment in Assam: an economic analysis. *J. Inland. Fish. Soc. India*, **49** (1): 35-45 (NAAS Rating: 4.54, ISSN:0379-3435).
6. Bhattacharjya, B. K., Saud, B. J., Verma, V. K., Debnath, D., Kumar, D., Yadav, A. K., Yengkokpam, S. and Sarkar, U. K., 2017. Occurrence of functional single-lobed ovary in *Cirrhinus mrigala* (Hamilton) from Assam, India. *Journal of Applied and Natural Science*, **9** (4): 2477- 2480. (NAAS rating: 4.84, ISSN:0974-9411).
7. Das, S.C.S., Alam, A., Jha, D. N., Kumar, V., Srivastava, K. and Bhattacharjya, B. K., 2017. Raising of stocking materials in pen enclosure in a floodplain wetland of Uttar Pradesh. *J. Inland. Fish. Soc. India*, **49** (1): 15-21 (NAAS Rating: 4.54, ISSN:0379-3435).


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8. Kumar, J., Yadav, A. K. and Bhattacharjya, B. K., 2017. A comparative analysis of phytoplankton diversity and abundance during monsoon season in selected beels (wetlands) of Assam, India. *Journal of Applied and Natural Science*, **9** (4): 2285-2290. (NAAS rating: 4.84, ISSN:0974-9411).
9. Nath, K. D., Borah, S., Yadav, A. K., Bhattacharjya, B. K., Das, P., Deka, P. M., Darngawn, O. and Deb Nath, D. J., 2017. Length-weight and length-length relationship of four native fish species from Barak River, Assam, India. *J. Exp. Zool. India*, **20** (2): 977-979. (NAAS rating: 5.51, ISSN: 0972-0030).
10. Debnath, D., Yengkokpam, S., Bhattacharjya, B.K., Biswas, P., Prakash, C., Kohli, M.P.S. and Sharma, A.P., 2016. Effect of dietary incorporation of dry-powdered water hyacinth (*Eichhornia crassipes*) meal on growth and digestibility of *Labeo rohita* fingerlings. *Proceedings of the Zoological Society*. DOI: 10.1007/s12595-016-0187-6 (NAAS rating: 4.42, ISSN:0972-6683).
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12. Barman, J., Jaiswar, A.K., Chakraborty, S.K., Bhattacharjya, B.K. and Gopalkrishna, 2016. Morphological variation in an anophthalmic specimen of *Sperata seenghala* (Sykes, 1839) from Brahmaputra River, Assam, India. *Journal of Applied and Natural Science*, **8**(2): 905-909. (NAAS rating: 4.84, ISSN:0974-9411).
13. Pandit A., Ekka, A., Sharma, A. P., Bhattacharjya, B. K., Katiha, P. K. and Biswas, D. K., 2015. Economic valuation of natural ecosystems-an empirical study in a stretch of Brahmaputra River in Assam, North-East India. *Indian J. Fish.*, **62**(3): 107-112 (Impact factor: 0.24, NAAS rating: 6.16, ISSN:0970-6011).
14. Bhattacharjya, B. K., Yengkokpam, S., Gogoi, P., Sarma, K. K. and Debnath, D., 2015. Rearing of carried over carp seed in pen enclosure in a closed floodplain wetland of Assam. *J. Inland Fish. Soc. India*, **47**: 43-48 (NAAS Rating: 4.54, ISSN:0379-3435).
15. Das, U. K., Rout, S. K., Kumar, N., Misra, R. P., Bhattacharjya, B. K., and Gogoi, P., 2015. Limno-chemistry of River Pagladia (a major tributary of R. Brahmaputra), Assam. *Environment & Ecology*, **33**(2A):863-866. (NAAS ID: E065 & Rating: 4.18, ISSN:0970-0420).
16. Borah, S., Landge, A T., Bhattacharjya, B. K., Chakraborty, S. K., Ramteke, K. K., Barman, J., Bhagawati K., and Saud, B. J., 2014. Variation in morphometric and meristic traits of *Aspidoparia morar* from Brahmaputra and Barak Rivers of Assam, India. *Journal of Applied and Natural Science*, **6** (1): 262-266. (NAAS rating: 4.84, ISSN:0974-9411).
17. Biswas, P., Kohli, M. P. S., Chadha, N. K., Bhattacharjya, B. K., Debnath, D., Yengkokpam, S., Sarma, K. K., Gogoi, P., Kakati, A. and Sharma, A. P., 2014. Optimizing stocking density of *Labeo rohita* fry in cage aquaculture system as a tool for floodplain wetland fisheries management. *Proc. Natl. Acad. Sci., India, Sect. B Biol. Sc.* (Jan-Mar 2015), **85**(1): 181-190. DOI: 10.1007/s 40011-014-0343-6 (Impact factor: 0.345, NAAS rating: 5.0, ISSN:0369-8211).


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18. Muzaddadi, A. U., Taye, R. K. and Bhattacharya, B. K., 2013. Traditional knowledge associated with *numsing*, an ethnic fish product prepared by *Mising* tribes of Upper Assam, India. *Indian Journal of Traditional Knowledge*, **12** (1): 91-96 (NAAS ID: I085 & Rating: 6.37, ISSN:0972-5938). Cited by: 2
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20. Kashyap, D. and Bhattacharjya, B. K., 2012. Costs, margins and price spread across the marketing channels of dry fish in Jagiroad dry fish market of Morigaon district, Assam. *J. Inland. Fish. Soc. India*, **44** (2): 49-55 (NAAS Rating: 4.54, ISSN:0379-3435).
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24. Saud, B. J., Bhattacharya, B. K., Verma, V. K., Kumar, D., Debnath, D., Das, M. K. and Sharma, A. P., 2012. Effect of climate change on aquatic life with special reference to north-east region of India. *Environment & Ecology*, **30**(4a): 1534-1537. (NAAS ID: E065 & Rating: 4.18, ISSN:0970-0420).
25. Vass, K. K., Das, M. K., Tyagi, R. K., Katiha, P. K., Samanta, S., Shrivastava, N. P., Bhattacharjya, B. K., Suresh, V. R., Pathak, V., Chandra, G., Debnath, D. and Gopal, B., 2011. Strategies for sustainable fisheries in the Indian part of the Ganga-Brahmaputra river basins. *International Journal of Ecology and Environmental Sciences*, **37** (4): 157-218.(NAAS ID: I179 & Rating: 5.18, ISSN:0377-015X). Cited by: 12
26. Das, U. K., Rout, S. K., Bhattacharjya, B. K. and Trivedi, R. K., 2011. Mollusc and fish diversity of Pagladia River: A tributary of River Brahmaputra, Assam. *J. Exp. Zool. India*, **14** (Suppl. 1): 65-67 (NAAS rating: 5.51, ISSN: 0972-0030).
27. Bhattacharjya, B. K. and K. K. Sarma, 2010. Stock enhancement practices followed in floodplain wetlands (beels) of Barak Valley, Assam. *Environment and Ecology*, **28**(2B): 1396-1399. (NAAS ID: E065 & Rating: 4.18, ISSN:0970-0420). Cited by: 2
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30. Bhattacharjya, B. K., Manna, R. K., Sarma, K. K. and Biswas, A., 2008. Growth performance of Indian major and minor carps in cage aquaculture for raising stocking materials in Puthimari beel, Assam. *J. Inland. Fish. Soc. India*, **40** (1): 93-98 (NAAS Rating: 4.54, ISSN:0379-3435).
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ii) Books authored/edited:

1. Das, S. K., B. K. Bhattacharjya, D. Sarma and O. K. Dutta, 1996. 'Meen Vignan Parichay' (A text-book of vocational fisheries course - in Assamese). Assam Higher Secondary Education Council, Guwahati, 199 p. Price Rs. 39.00.



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2. Bhattacharjya, B. K. and Choudhury, M. (Eds.), 2004. Ornamental fish culture and trade in north eastern India (Workshop Proceedings). CIFRI, Barrackpore. 105 p.
3. Das P., Bhattacharjya, B. K., Parida, P., Behera, B. K. and Das, B.K., 2016. Aquatic Animal Diseases in Assam. Published by Director, ICAR-CIFRI, Barrackpore, p. 100 (ISSN: 0970-616X).

iii) Policy paper

1. Das, B. K., **Bhattacharjya, B. K.**, Borah, S., Das, P., Debnath, D., Yengkokpam, S., Yadav, A. K., Sharma, N., Singh, N. S., Panit, A., Ekka, A., Mishal, P., Karnatak, G., Kakati, A., Saud, B. J., Das, S. S., 2017. Roadmap for Development of Openwater Fisheries in Northeastern States. ICAR-CIFRI, Policy paper No. 6. pp.101 (ISSN 0970-616X).

iv) Technical bulletins:

1. Sugunan, V. V. and B. K. Bhattacharjya, 2000. Ecology and Fisheries of Beels in Assam. *Bull. No. 104*, ICAR-CIFRI, Barrackpore, W. B., 65 p. Cited by: 40.
2. Sugunan, V. V., G. K. Vinci, B. K. Bhattacharjya and M. A. Hassan, 2000. Ecology and Fisheries of *Beels* in West Bengal. *Bull. No. 103*, ICAR-CIFRI, Barrackpore, W. B., 53 p. Cited by: 30
3. B. K. Bhattacharjya, 2003. '*Bilor Abestoneet Meen Palon*' (Pen culture in beels - in Assamese). *Bull. No. 116*, ICAR-CIFRI, Barrackpore, W. B., 33 p.
4. Bhattacharjya, B. K., R. K. Manna and M. Choudhury, 2004. Fishing Crafts and Gear of Northeastern India. *Bull. No. 142*, ICAR-CIFRI, Barrackpore, 67. Cited by: 14
5. Sharma, A. P., M. Naskar, K. D. Joshi, B. K. Bhattacharjya, S. K. Sahu, S. Das, D. Sudheesan, P. K. Srivastava, A. Rej, 2014. Impact of Climate Variation on Breeding of Major Fish Species in Inland Water. *Bull. No. 185*, ICAR-CIFRI, Barrackpore, W. B.
6. Katiha, P. K., A. P. Sharma, A. Ekka, A. Pandit, B. K. Bhattacharjya and D. K. Biswas, 2014. Economic Valuation of Inland Open Water Fisheries Resources. *Bull. No. 187*, ICAR-CIFRI, Barrackpore, W. B., 55 p.

v) Selected papers published in Seminars/Symposia proceedings:

1. Bhattacharjya, B. K. and T. R. C. Gupta, 1997. Impact of organic wastes on physico-chemical quality of Gurupur estuary, Mangalore. *In: K. K. Vass and M. Sinha (ed.), Changing Perspectives of Inland Fisheries, Proc. Nat. Sem., Inland Fisheries Society of India, Barrackpore, W. B., pp. 46-49.*
2. Bhattacharjya, B. K., V. V. Sugunan and M. Choudhury, 2000. Threatened fishes of Assam. *In: A. G. Ponniah and U. K. Sarkar (ed.), Fish Biodiversity of North-east India. Proc. Nat. Workshop. NATP Publ. 2, NBFGR, Lucknow, pp. 75-79. Cited by: 4*
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4. Bhattacharjya, B. K., Sarma, S. and Sarma, P., 2004. Collection, conditioning and transport of indigenous ornamental fishes with special reference to those of the Northeast. pp. 56-63. *In: Bhattacharjya, B. K. and Choudhury, M. (eds.), Ornamental Fish Culture and Trade in Northeastern India, Workshop Proceedings, NERC, CIFRI, Guwahati.*
5. Bhattacharjya, B. K., M. Choudhury and V. V. Sugunan, 2003. Ichthyofaunistic resources of Assam with a note on their sustainable utilization, pp. 87-105. *In: (Mahanta, P. C. and Tyagi, L. K., eds) Participatory approach for fish biodiversity conservation in North East India. Workshop Proceedings, NBFGR, Lucknow. Cited by: 13*
6. Choudhury, M. and Bhattacharjya, B. K., 2005. Ecology and fisheries of hill streams of North East India, pp. 57-66. *In: Vass, K. K., Abidi, S. A. H. and Agrawal, V. P. (ed.), Proceedings of National Seminar on Aquatic Resource Management in Hills. NRC on Coldwater Fisheries, Bhimtal, Uttaranchal.*
7. Bhattacharjya, B. K., 2011. Ichthyofaunistic diversity of floodplain wetlands (beels) of Assam with a note on their sustainable utilization. *In: Kumar, D., Rajendran, K. and Jahageerda, S. (eds.), Bioresource Management and Climate Change. Proceedings of 96th Indian Science Congress (Part II: Section of Animal, Veterinary and Fishery Science), Shillong, January 3-7, 2009. Studim Press Pvt. Ltd., new Delhi , 263 p. ISSN:978-93-80012-45-2.*
8. Bhattacharjya, B. K., 2012. Conservation and sustainable fisheries development in floodplain wetlands, pp. 28-45. *In: S. K. Nath and R. Nath (eds.), Proceedings of the National Seminar on 'Current issues of conservation and wise use of wetlands in North-eastern region of India', February 3-4, 2012 organized by Dhing College, Nagaon, Assam.*
9. Kashyap, D., Hazarika, D., B. K. Bhattacharjya, S. Bhuyan, B. Phukan, S. Baishya and R. Bordoloi, 2012. Ichthyofaunistic diversity of selected floodplain wetlands of Central Brahmaputra valley (Cbv) zone of Assam with a note on their conservation, pp. 128-140. *In: S. K. Nath and R. Nath (eds.), Proceedings of the National Seminar on 'Current issues of conservation and wise use of wetlands in North-eastern region of India', February 3-4, 2012 organized by Dhing College, Nagaon, Assam.*

vi) Selected Technical/ popular articles:

1. Manna, R. K., Hassan, M. A., B. K. Bhattacharjya and Sharma, A. P., 2013. Hazards associated with cage farming in wetlands of Assam. *Fishing Chimes*, **33**(3): 39-43.
2. Das, P., Bhattacharjya, B. K., Debnath, D., Yadav, A. K., Yengkokpam, S. and Sarma, K. K., 2013. Ecology and fisheries of selected floodplain wetlands of Dhubri district, Assam. *CIFRI News*, 18 (2): 4-5.
3. B. K. Bhattacharjya, U. Bhaumik and A. P. Sharma, 2011. Fish bio-resources of Brahmaputra River in north-eastern India and factors affecting natural fisheries, pp. 26-31. *In: M. Goswami and A. K. Hazarika (eds.), Souvenir, International Seminar on "Bioresources and Human Sustenance" during October 20-22, 2011. Cotton College, Guwahati.*
4. Bhattacharjya, B. K., 2009. Conservation and sustainable use of wetland fisheries of Assam, pp. 60-65. *In: Souvenir, First BTC Area Matsya Utsav 2009, January 28-30, 2009. Dept. of Fisheries, BTC, Kokrajhar.*

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5. Sharma, R. and Bhattacharjya, B. K., 2001. Aquatic biodiversity- concept, significance and conservation. *INFOFISH international 1/2001*: 27-32. Cited by: 1
6. Goswami, M. and Bhattacharjya, B. K., 1999. Quarantine and fish health certification. *INFOFISH International 2/99*: 48-52.

Language Skills (indicate only languages in which you can work):

Language	Level of proficiency			Remarks
	Can speak	Can read	Can write	
Assamese	√	√	√	Mother tongue; Medium of instruction up to Class XII
English	√	√	√	Compulsory subject from Class V to XII; Medium of instruction thereafter
Hindi	√	√	√	Compulsory subject from Class V to VII
Bengali	√	√	x	Worked in ICAR-CIFRI, Barrackpore from 1995-96
Kannada	√	x	x	Studied in Mangalore, Karnataka from 1984 to 1990

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks
Preparation of inception report	I prepared the inception reports for consultancy projects on (i) "Rapid sustainability assessment of farmers' pond schemes under the Assam Rural Infrastructure and Agricultural Services Project Society, Guwahati" (Sponsored by ARIAS Society in July, 2004) and (ii) Establishment of population of exotic carps with special reference to common, grass and silver carp in the natural water bodies of Assam (Sponsored by ARIAS Society during November 2006 to October 2007).
Field collection of data & laboratory analysis (pertaining to ecological aspects of GIFT introductions)	I have been carrying out research on ecology and fisheries of floodplain wetlands and rivers of Assam and its neighbouring states since October 1996 (as reflected in my publications).
Collection of secondary information, Compilation of results, Report writing	I led a team of the Institute/ Centre in carrying out works on similar nature pertaining to the above two consultancy assignments sponsored by ARIAS Society, eight more consultancy assignments sponsored by other organizations as well as over 30 research projects (Institutional/ externally funded) during my service at ICAR-CIFRI Regional Centre for the past 22 years.

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Expert's contact information:

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Telefax: 0361-2228486, Phone: 0361-2224893 (O), M:09435553274

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client, and/or sanctions by the Bank.

{05/05/2018}

Name of Expert	Signature	Date
B. K. BHATTACHARJYA		05/05/2018}


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Form TECH-6: Curriculum Vitae (CV)

Position Title and No.	K-3 , Expert
Name of Expert	DR. PRONOB DAS
Date of Birth	01/02/1980
Country of Citizenship/Residence	INDIA

Education:

Sl. No.	Exam. passed/ Degree awarded	University/ Institution/ Board	Year of passing	Subjects taken & Specialization	Result with Division/ Class
1.	B.F.Sc.	College of Fisheries, AAU, Raha, Assam	2001	All the subjects of Fisheries Sciences	1 st Class
2.	M.F.Sc.	College of Fisheries, KAU, Panagad, Kerala	2005	Major: Fishery Hydrography Minor: Aquaculture, Fish biology, Statistics, etc.	1 st Class with Distinction
3.	Ph.D.	ICAR-Central Institute of Fisheries Education, Mumbai	2014	Major: Aquaculture, Minor: Fisheries Resources Management, Fish Physiology, Biochemistry & Nutrition and Animal health management	1 st Class with Distinction

Trainings in the relevant field:

Title	Duration	Institution	Year
“DBT sponsored 3 months National training programme on Molecular biology and biotechnology for fisheries professionals”	3 months	ICAR-Central Institute of Freshwater Aquaculture, Bhubaneswar	2015 & 2016 (2 nd Nov, 2015 to 31 st Jan, 2016)
Attachment training programme for ARS probationers	3 months	Centre for Environmental Studies, School of Earth, Biological and Environmental Sciences, Central University of Bihar, Patna	2012 (1 st February to 29 th April)
Orientation training programme for ARS probationers	1 month	ICAR-Central Inland Fisheries Research Institute (CIFRI), Barrackpore	2011-12 (23 rd Dec, 2011 to 22 nd Jan, 2012)
Foundation course for	3 months	ICAR-National Academy for	2011



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ARS probationers (FOCARS)		Agricultural Research Management (NAARM), Hyderabad	(15 th September to 13 th December)
Alternative aquaculture technologies in the context of present aquaculture scenario	21 days	Central Institute of Fisheries education, Mumbai	2009 (17 th March to 6 th April)
Quality seed production	10 days	ICAR Research Complex for NEH Region, Manipur Centre, Imphal	2008 (4 th to 10 th Sep)
E-linkage	10 days	ERNET, Bangalore and KVK, of BCKV, Nadia, West Bengal	2008 (21 st July to 1 st August)
Recent advances and technologies for fisheries development in the Northeastern region	3 days	Zonal Coordinator Unit, Zone-III, Umiam	2007 (4-6 July)

Employment record relevant to the assignment:

Period	Employing organization and your Title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
13/06/2012 to till date	ICAR-CIFRI, Regional Centre, Guwahati as Scientist	India	Research, Research guidance
23/12/2011 to 12/06/2012	ICAR-CIFRI, Barrackpore as Scientist	India	Research, Research guidance
15/09/11 to 22/12/2011	ICAR-NAARM, Hyderabad as Scientist	India	-do-
12/07/2011 to 14/09/2011	ICAR RC for NEH Region, Manipur Centre, Imphal-795004 as Subject Matter Specialist (Fisheries)	India	-do-
13/07/2006 to 14/09/2011	ICAR RC for NEH Region, Manipur Centre, Imphal-795004 as Subject Matter Specialist (Fisheries)	India	FC on Agril. Res. Mgt
10/02/2005 to 12/07/2006	CP Aquaculture (India) Pvt. Ltd., Chennai as Hatchery Technician	India	Management of hatchery
26.10.2001 to 22.10.2002	Fisheries Research Centre, AAU, Jorhat as Junior Research Fellow	India	


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Membership of Professional societies:

Member	Society	Institute	Year
Life member	Society of Fisheries and Life Sciences	CoF, Manglore	2017
Life member	Indian Fisheries Association	ICAR-CIFE, Mumbai	2015
Life member	Inland Fisheries Society of India	ICAR-CIFRI, Barrackpore	2013
Life member	Association of Aquaculturist	CIFA, Bhubaneswar	2008
Life/ Founder member	Aquatic Biodiversity Conservation Society (ABCS)	NBFGR, Lucknow	2007

Publications

a) Number of publications

Scientific Papers		Policy papers	Books edited	Manuals edited	Articles		Abstracts
International	National				International	National	
20	12	1	1	7	10	15	60

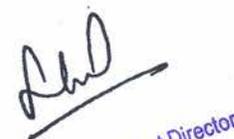
b) List of important publications

Research papers (International)

1. Behera, B. K., Baisvar, V. S., Kunal, S. P., Meena, D. K., Panda, D., Pakrashi, S., Paria, P., **Das, P.**, Bhakta, D., Debnath, D., Roy, S., Suresh, V. R. and Jena, J. K. (2018). Population structure and genetic diversity of Indian Major Carp, *Labeo rohita* (Hamilton, 1822) from three phylo-geographically isolated riverine ecosystems of India as revealed by mtDNA cytochrome b region sequences. *Mitochondrial DNA Part A*, 29 (2): 199-205.
2. Behera, B. K., Baisvar, V. S., Rout, A. K., Pakrashi, S., Kumari, K., Panda, D., Das, P., Parida, P. K., Meena, D. K., Bhakta, D., Das, B. K. and Jena, J. K. (2017). The population structure and genetic divergence of *Labeo gonius* (Hamilton, 1822) analyzed through mitochondrial DNA cytochrome b gene for conservation in Indian waters, *Mitochondrial DNA Part A*, DOI: 10.1080/24701394.2017.1320992.
3. Borah S., Bhattacharjya B. K., Saud B.J., Yadav A.K., Debnath D., Yengkokpam S., **Das P.**, Sharma N., Singh N. S. and Sarma K. K. (2017). Length-weight relationship of six indigenous fish species from Deepor beel, a Ramsar site in Assam, India. *Journal of Applied Ichthyology*, 33: 655-657 [(DOI: 10.1111/jai.13348), (ISSN No. 01756-8659)].
4. Behera, B.K., Baiswar, V.S., Kunal, S.P., Meena, D.K., Panda, D., Pakrashi, S., Paria, P., **Das, P.**, Bhakta, D., Debnath, D., Roy, S., Suresh, V.R. and Jena, J.K. (2016). Population structure and genetic diversity of Indian major carp, *Labeorohita* (Hamilton, 1822) from

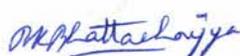


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three phylo-geographically isolated riverine ecosystems of India as revealed by mtDNA cytochrome b region sequences. *Mitochondrial DNA Part A*, DOI:10.1080/24701394.2016.1267156 1320992 [(ISSN: 1940-1736 or Present ISSN: 2470-1394)].

5. **Das, P.**, Behera, B. K., Meena, D. K., Singh, S. K., Mandal, S.C., Das, S. S., Yadav, A.K. and Bhattacharjya, B.K. (2016). Comparative efficacy of different inducing agents on breeding performance of a near threatened cyprinid *Osteobramabelangeri* in captivity. *Aquaculture Reports*, 4: 178-182 [(ISSN: 2352-5134) & (<http://dx.doi.org/10.1016/j.aqrep.2016.11.001>)].
6. Debnath, C., Dube, K., Saharan, N., Tiwari, V. K., Datta, M., Sahoo, L., Yadav, G. S. and **Das, P.** (2016). Growth and production of endangered Indian butter catfish, *Ompokbimaculatus* (Bloch) at different stocking densities in earthen ponds. *Aquaculture Research*, 47 (10): 3265-3275 [(doi:10.1111/are.12780), (Print ISSN: 1355-557X or Online ISSN: 1365-2109)].
7. Behera, B. K., Singh, N. S., Paria, P., Sahoo, A. K., Panda, D., Meena, D.K., **Das, P.**, Pakrashi, S., Biswas, D.K. and Sharma, A.P. (2015). Population genetic structure of Indian shad, inferred from variation in mitochondrial DNA sequences. *Journal of Environment Biology*, 36: 1193-1197.
8. Prusty, A. K., Meena, D. K., Mohapatra, S., Panikkar, P., **Das, P.**, Gupta, S. K., Behera, B. K. (2015). Synthetic pyrethroids (Type II) and freshwater fish culture: Perils and mitigations. *Int. Aquat. Res.*, 7:163-191 (ISSN: 2008-4935 (print version)ISSN: 2008-6970 (electronic version)).
9. Singh, S.K., Tiwari, V.K., Chadha, N.K., Prakash, C., Sukham, M., **Das, P.**, Mandal, S.C. and Chanu, T. I. (2015). Effect of *Bacillus circulans* and fructooligosaccharide supplementation on growth and haemato-immunological function of *Labeorohita* (Hamilton, 1822) fingerlings exposed to sub-lethal nitrite stress. *The Israeli Journal of Aquaculture - Bamidgeh, IJA* 67.2015.894 10 pages.
10. De, B. C., Meena, D.K., Behera, B.K., **Das, P.**, Mohapatra, D. P. K. and Sharma, A. P., (2014). Probiotics in fish and shellfish culture: immunomodulatory and ecophysiological responses. *Fish Physiology and Biochemistry*, 40: 921-971.
11. Ciji, A., Sahu, N. P., Pal, A. K., Akhtar, M. S., Tincy, V., Mishal, P. and **Das, P.** (2014). Effect of dietary vitamin E and nitrite exposure on growth and metabolic variables of *Labeo rohita* juveniles. *Natl. Acad. Sci. Lett.*, 37 (2): 123-129.
12. Meena, D. K., **Das, P.**, Kumar, S., Mandal, S.C., Prusty, A.K., Singh, S. K., Akhtar, M.S., Behera, B. K., Kumar, K., Pal, A. K. and Mukherjee, S. C. (2013) (1st, 2nd and 3rd authors have contributed equally). Beta- Glucan: An ideal Immunostimulant in Aquaculture (a review). *Fish Physiology and Biochemistry*, 39: 431-457.



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13. Gupta, S. K., Pal, A. K., Sahu, N. P., Jha, A. K., Akhtar, M. S., Mandal, S. C., Das, P. and Prusty, A. K., **2013**. Supplementation of microbial levan in the diet of *Cyprinus carpio* fry (Linnaeus, 1758) exposed to sublethal toxicity of fipronil: effect on growth and metabolic responses. *Fish Physiology and Biochemistry*, 39: 1513-1524.
14. Akhtar, M. S., Pal, A. K., Sahu, N. P., Ciji, A., Meena, D. K. and Das, P., **2013**. Physiological responses of dietary tryptophan fed *Labeo rohita* to temperature and salinity stress. *Journal of Animal Physiology and Animal Nutrition*, 97 (6): 1075-1083.
15. Mandal, S.C., Singh, S. K., Das, P., Rather, M.A. and Barman, D., **2013**. Effect of dietary vitamin E and eicosapentaenoic acid and docosahexaenoic acids and on reproduction and gonadal fatty acid composition in *Bettasplendens*. *The Israeli Journal of Aquaculture - Bamidgah, IJA* 65.2013.868, 8 pages.
16. Mohapatra, S., Chakraborty, T., Prusty, A. K., Das, P., Paniprasad, K. and Mohanta, K. N., **2012**. Use of different microbial probiotics in the diet of rohu, *Labeo rohita* fingerlings: effects on growth, nutrient digestibility and retention, digestive enzyme activities and intestinal micro-flora. *Aquaculture Nutrition*, 18 (1): 1-11.
17. Mandal, S.C., Kohli, M.P.S., Das, P., Singh, S. K., Sahu, N.P., Sarma, K. and Baruah, K., **2012**. Effect of Substituting Live Feed with Formulated Feed on Larval Production and Survival of Siamese Fighting Fish, *Bettasplendens* (Regan, 1910). *Fish Physiology and Biochemistry*, 38:573-584.
18. Singh, S. K., Rather, M.A., Mandal, S.C., Das, P., Pawar, N., Singh, Y. J. and Dar, S.A., **2012**. Effects of dietary fish oil substitution with palm oil on growth, survival and muscle proximate composition of *Cirrhinus mrigala* (Hamilton, 1822). *The Israeli Journal of Aquaculture - Bamidgah, IJA*:64.2012.809, 8 pages.
19. Singh, Y. B., Singh, S. K., Saha, H., Tiwari, V.K., Das, P. and Waikhom, G. (2011). *Euraleferoxsalis* integration into fish ponds in Manipur, India: A sustainable Approach. *African Journal of Basic and Applied Sciences*, 3(5): 198-200. (ISSN:2079-2034).
20. Mandal, S.C., Sahu, N.P., Kohli, M. P., Das, P., Gupta, S. K. and Munilkumar, S., **2010**. Replacement of live feed by formulated feed: Effect on the growth and reproductive performance of Siamese fighting fish (*Bettasplendens*, Regan). *Aquaculture Research*, 41(11): 1707-1716.

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21. Nath, K. B., Borah, S., Yadav, A. K., Bhattacharjya, B. K., Das, P., Deka, P. M., Darnagawn, O. and Nath, D. V. D., **2017**. Length-weight and length-length relationship of four native fish species from Barak River, Assam, India. *J. Exp. Zool. India*, 20 (2): 977-979.
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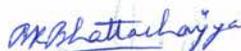

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Books (Edited)

1. **Das P.**, Bhattacharjya, B. K., Parida, P., Behera, B. K. and Das, B.K., **2016**. Aquatic Animal Diseases in Assam. Published by Director, ICAR-CIFRI, Barrackpore, p. 100 (ISSN: 0970-616X).



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Policy paper

1. Das, B. K., Bhattacharjya, B. K., Borah, S., **Das, P.**, Debnath, D., Yengkokpam, S., Yadav, A. K., Sharma, N., Singh, N. S., Panit, A., Ekka, A., Mishal, P., Karnatak, G., Kakati, A., Saud, B. J., Das, S. S., 2017. Roadmap for Development of Openwater Fisheries in Northeastern States. ICAR-CIFRI, Policy paper No. 6. pp.101 (ISSN 0970-616X).

Book chapters (selected)

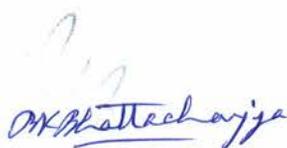
1. **Das, P.**, Bhattacharjya, B. K., Sahoo Das, S. and Behera, B. K., 2015. Prophylactic measures for fish disease management. *In: Kalita, B. and Ali, A. (eds.), Advances in fish disease diagnosis and fish health management (ISBN: 978-93-84679-19-4)*. College of Fisheries, AAU, Raha, Nagaon, Assam, pp. 174-208.
2. Behera, B. K., **Das, P.** and Bhattacharjya, B. K., 2015. Diseases of freshwater prawn, *Macrobrachium rosenbergii* and its control. *In: Kalita, B. and Ali, A. (eds.), Advances in fish disease diagnosis and fish health management (ISBN: 978-93-84679-19-4)*. College of Fisheries, AAU, Raha, Nagaon, Assam, pp. 128-132.
3. **Das, P.** and Sahoo Das, S., 2015. Fish health management in aquaculture. *In: Hand book on Pig and Fish Husbandry Practices (eds. Barman, K., Bhattacharjya, B. K., Sarma, D. K. and Pegu, S. R. Total pages 209)*, National Research Centre on Pig, Rani, Guwahati, pp. 99-113 (ISBN: 978-93-5212-970-6).
4. Behera, B.K., **Das, P.** and Ngachan, S.V., 2009. Strategies for improving fish production in Loktak Lake. *In: Ecology, Aquatic Bio-resources and conservation of wetlands of North east India (ed. Kosygin, L.)*, Akansha Publishing House, New Delhi, pp. 29-40 (ISBN 978-81-8370-187-7).

Language Skills (indicate only languages in which you can work):

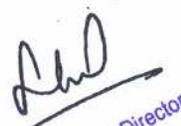
English, Hindi, Bengali, Assamese

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts:	Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks
Field collection of data and laboratory analyses (fisheries aspects)	I have been carrying out research on various aspects of freshwater aquaculture and inland fisheries of NE India since July 2006. I also worked as a Hatchery Technician CP Aquaculture (India) Pvt. Ltd., Chennai
Fish disease surveillance of GIFT	I worked as a Co-Principal Investigator in the National Surveillance Programme for Aquatic Animal Diseases (sponsored by NFDB, Hyderabad) during 2013-17.



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Expert's contact information:

E-mail: pronobjaan80@gmail.com, pronob.das@icar.gov.in
Telefax: 0361-2228486 (O), M: 08473001970

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client, and/or sanctions by the Bank.

{05/05/2018}

Name of Expert	Signature	Date
DR. PRNOB DAS		05/05/2018}

Name of authorized Representative of the Consultant (the same who signs the Proposal)	Signature	Date
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भाकृअनुप-केन्द्रीय अंतर्स्थलीय मात्स्यकी अनुसंधान संस्थान

आई एस ओ 9000 : 2008 प्रमाणित संगठन

(भारतीय कृषि अनुसंधान परिषद्)

बैरकपुर, कोलकाता - 700 120, पश्चिम बंगाल

ICAR-Central Inland Fisheries Research Institute

AN ISO 9000 : 2008 Certified Organisation

(Indian Council of Agricultural Research)

Barrackpore, Kolkata - 700120 West Bengal



डा. बसंत कुमार दास, निदेशक
Dr. Basanta Kumar Das, Director

No. CIFRI/PS/Consultancy/APART-2018

Date. 05.05.2018

To: **The State Project Director,
ARIAS Society, Project Coordination Unit,
Agriculture Complex, Khanapara, G.S. Road,
Guwahati-781022 (Assam, India);**

Dear Sir,

We, the undersigned, offer to provide the consulting services for **Rapid Risk Assessment of the Potential Invasiveness of Genetically Improved Farmed Tilapia (GIFT)** in accordance with your Request for Proposal dated 7th April, 2018 and our Technical Proposal.

Our attached Financial Proposal is for the amount of **INR 17,43,100/-** (Seventeen lakhs forty three thousand one hundred only), *excluding of all indirect local taxes (e.g. GST)*. The estimated amount of local indirect taxes (e.g. GST) is **INR 5,33,058/-** (Five lakhs thirty three thousand fifty eight only) which shall be confirmed or adjusted, if needed, during negotiations.

Our Financial Proposal shall be valid and remain binding upon us, subject to the modifications resulting from Contract negotiations, for the period of **120 days** after the proposal submission deadline.

No commissions or gratuities have been or are to be paid by us to agents or any third party relating to this Proposal and Contract execution.

We understand you are not bound to accept any Proposal you receive.

We remain,
Yours sincerely,

Signature: 
Full name: Basanta Kumar Das
Title: Dr.
Name of Consultant: Basanta Kumar Das
Capacity: Director/ Team Leader
Address: ICAR-CIFRI, Barrackpore, Kolkata-700120, West Bengal
Phone/fax: 033-25920177 / 033-25920388
Email: director.cifri@gmail.com, director.cifri@icar.gov.in

Phone : (033) 2592 0177 (Director), 2593 5288 (AO), 2593 3081 (SF&AO), Fax : (033) 2592 0388, EPBX 2592 1190/91 Ext.

Email : director.cifri@icar.gov.in; director.cifri@gmail.com; Website : www.cifri.res.in

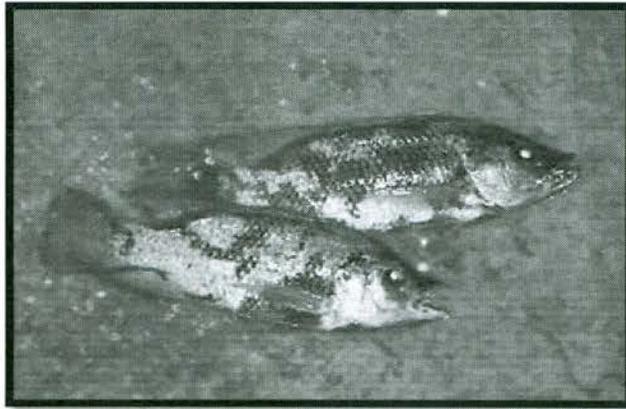
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Financial proposal for Consultancy assignment on

**Rapid risk assessment of the potential invasiveness of
genetically improved farmed Tilapia (GIFT)**



Assam Rural Infrastructure and Agricultural Services (ARIAS) Society

5th May, 2018

Submitted by



**ICAR-Central Inland Fisheries Research Institute
Barrackpore, Kolkata - 700120**

AK Bhattacharjee

Head, Regional Centre
ICAR-CIFRI, Guwahati -06

AK Bhattacharjee

State Project Director
ARIAS Society

Form FIN-2: Summary of Costs

Item	Cost
	Indian Rupees
Cost of the Financial Proposal	
Including:	
(1) Remuneration	3,65,500
(2) Reimbursables	13,77,600
Total Cost of the Financial Proposal:	17,43,100
(i) GST (Service tax 18% of total cost)	3,13,758
(ii) Any other applicable Taxes etc. Intellectual fee @Min. 60% of cost of man-days of staff deployed	2,19,300
Total Estimate for Indirect Local Tax & fees:	5,33,058

Form FIN-3: Breakdown of Remuneration

No.	Name	Position	Remuneration Per-day	Time Input in Person/day	Indian Rupee (INR)
	Key Experts				
K-1	Dr. B. K. Das	Team Leader	6,000	12	72,000
K-2	Dr. B.K. Bhattacharjya	Ecologist	6,000	25	1,50,000
K-3	Dr. P. Das	Fishery Expert	2,500	21	52,500
	None Key Experts				
NK-1	K. K. Sarma	R. S. Staff	3,000	21	63,000
NK-2	A. Kakati	R. S. Staff	1,000	28	28,000
				Total Costs	3,65,500



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FORM FIN-4: Breakdown of Reimbursable Expenses

No.	Type of Reimbursable Expenses	Unit	Unit cost (INR)	Quantity	Indian Rupee (INR)
1	TA/ DA	70 days	3,000	2 persons each	4,20,000
2	Vehicle Hiring	80 days	4,000	80 days	3,20,000
3	Communication costs	Lump sum	-	-	40,000
4	Cost of hiring Project Assistant	4 Persons X 2months	14,000	8 man months	1,12,000
5	Data entry operator	1 Persons X 2months	14,000	2 man months	28,000
6	Production of reports	Lump sum	-	-	1,20,000
7	Office expenses	Lump sum	-	-	80,000
	Sub-total				11,20,000
8	Contingencies	-	@3%	-	33,600
9	Overhead Charges	-	@20%	-	2,24,000
Total Cost					13,77,600

AK Bhattacharya
 Head, Regional Centre
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AK
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 ARIAS Society