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Present status of application of aquaculture inputs in the state of Assam, India

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Abstract

The study was carried out in Central Brahmaputra valley of Assam during 2020-2022 through survey method with an aim to document the aquaculture inputs use by the progressive farmers and fish breeders in the locality. Altogether 402 respondents were interviewed covering 381 numbers of fish farmers and fish breeders and 21 numbers of input dealers under the study. Random sampling technique was followed after identification of fish farming pockets in consultation with Department of Fisheries for the study. The study classified aquaculture inputs in to four broad groups namely, a) Water and soil quality management inputs comprising lime, zeolites, water sanitizers, fertilizer and probiotics b) Feed, feed supplements and growth promoters including vitamin and mineral mixtures c) Hormones for induce breeding and d) Medicines including Anti-parasitic drugs, antibiotics and other chemicals like *ichthyotoxin*, toxin binders *etc.* for apparent documentation of inputs. The study revealed that there were 25 varieties of water and soil management inputs, 6 varieties of fish hormones, 18 varieties of feed supplements and growth promoters and 21 varieties of fish medicine and chemicals available in markets of the study area.

Keywords: Aquaculture, aquaculture inputs, central Brahmaputra valley, input dealers

Introduction

Fisheries sector provides livelihood to more than 28 million people directly at primary as well as more along the fisheries value chain. Present fish production of India is 16.25 MT out of which 12.12 MT contributed by inland fisheries (Handbook of Fisheries Statistics, 2022). Aquaculture is the main contributor (>90%) of fish production from inland fisheries in India. The land locked state Assam has quite significantly progress in fish production as the state jumps 2.64 times during last two decades *i.e.*; 4.17 lakh ton (2021-22) from 1.58 lakh tons (2000-01) in fish production (DoF, 21-22). There was about 3.63 fold increases (from 25,423 ha to 92,386 ha) in aquaculture tank area too in the state during the period (DoF, 21-22). The growth of commercial fish farming leads to use of various aquaculture inputs *viz.*, seed, lime, feedstuffs, manure, fertilizers, hormone and health management products as well as cleaning agents and additives to enhance the production. There were reports of growing worldwide usage of aqua drugs and chemicals (Roy *et al.* 2021, Mishra *et al.* 2017, Rahman *et al.* 2015, Singh & Singh 2018) ^[7, 4, 6]. The increasing productivity from unit area has been always a concern for the practicing farmers. Hence, intensification of farming be it sustainable or short term, is evident in the field. Intensification of production process has been bringing a series of health hazards mainly due to deterioration of farming situation, stress and spread of infectious agents (Mishra, 2017 b) ^[5]. As a result, emergence and wide spreading of infectious fish diseases bringing negative impact on fish production and productivity (Walker, 2010) ^[9]. To combat the evolving situation and to step forward with progress, farmers are using a series of inputs in modern aquaculture. However, importance of aquaculture inputs, its availability and accessibility are major issues from farmers' perspective. There are some issues like unavailability of sufficient inputs on time, lack of quality inputs as well as information of various types of inputs to be use in modern farming system. As a result, productivity at farmers' field is not growing and farmers are facing economic losses due to improper farming. In view of above, present communication have been attempted to document the application of different aquaculture inputs in the study area, combination details of the inputs and to provide guidance in judicious application of inputs as per prescribed dose for sustainable productivity.

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Methodology

The study was conducted in Central Brahmaputra Valley zone of Assam. This zone is constituted by Nagaon and Morigaon districts. These two districts were ranked among top three fish producing districts of Assam. During the year 2017-18, Nagaon ranked 1st and Morigaon ranked 3rd in state fish production (DoF, 2018-19).

The contribution of this zone to the total fish production of the state was around 19% and 44% eco hatcheries existed in this zone. As per data from the Department of Fishery, there were a total of 37041 fish farmers and 21 feed and aqua chemical dealers in both the districts during 2018-19. Altogether 402 respondents were interviewed covering 381 numbers of fish farmers and fish breeders and 21 numbers of input dealers under the study. The number of fish farmers sample was calculated using 95% confidence level and 5% margin of error from the population. Both probability sampling as well as non probability sampling techniques were used as per requirement of the study. Fish farming pockets in the selected districts were identified using available record of Department of Fishery, Govt. of Assam and then fish farmers and hatchery owners as respondents were randomly selected from the list provided by department of Fishery. Semi structured interview schedule was developed to obtain the required information for the study. Data were also generated through group discussion and Participatory Rural Appraisal (PRA) technique in certain situation.

Results and Discussion

Based on the information received during the study, the aqua inputs are classified in to four broad groups namely, a) Water and soil quality management inputs comprising lime, zeolites, water sanitizers, fertilizer, soil and water probiotics b) Feed, feed supplements and growth promoters including feed probiotics, vitamin and mineral mixtures c) Hormones for induce breeding and d) Medicines including Anti-parasitic drugs, antibiotics and other chemicals like ichthyotoxin, toxin binders etc. for apparent documentation of inputs.

a) Water and soil quality management inputs comprising lime, zeolites, water sanitizers, fertilizer, soil probiotics and water probiotics: The starting phase of aquaculture is pre stocking management. Here, farmers prepare the pond to have a congenial environment for culture of fish. In semi intensive farming system, *i.e.*; the existing soil based pond aquaculture practices; the mineralization of pond water is most essential to have a natural productivity. Applications of lime, organic manure, fertilizer in specific dose are prescribed for the same. During the study, it was found that apart from manure, fertilizer and lime; application of zeolite, probiotics as well as water sanitizer were getting popularity in the aquaculture field. Around twenty five water and soil quality management inputs were recorded during the study. The commercial names of those inputs along with their active ingredients and prescribed dose found during the course of study were tabulated in the Table 1.

Table 1: Water and soil quality management inputs comprising lime, zeolites, water sanitizers, fertilizer, soil and water probiotics.

| Commercial name | Type of Input | Active Components | Name of the Manufacturer | Prescribed dose |
|--------------------------------|---|-------------------------------------|------------------------------|--|
| Quick Lime | CaO | Ca | Balaji Trading | As per soil pH |
| Dolomite | CaMgO | Ca, Mg | Samden Dolomite | As per soil pH |
| Fish CaCo3 | CaCo3 | Ca | Essential Aquatech pvt. Ltd | As per pond pH |
| Urea | Chemical Fertilizer | Nitorgen | HFCL | As per soil quality |
| DAP | Chemical Fertilizer | N, P | Arawali phosphate Ltd | As per soil quality |
| SSP | Chemical Fertilizer | P | Arawali phosphate Ltd | As per soil quality |
| Pond Shield | Probiotics | Beneficial microbiota | The Himalaya Drug Company | 1 kg/ ha during pond preparation, 400 gm/ ha/week during culture |
| Medisan | Water sanitizer | Not disclosed | Essential Aquatech Pvt. Ltd | 2.5 l/ha pond |
| Clear Pond | Water sanitizer | Yucca, Bacillus | Essential Aquatech Pvt. Ltd | 2 liter/ha/month |
| Water Soft | Hardness controller | EDTA Stabilizer | Essential Aquatech Pvt. Ltd | 2.5 kg/ha |
| Zeoclean | Soil Probiotics with added nutrients, zeolite | Not disclosed | Krishi Bharati | 10 kg/ bigha during pond preparation & 8 kg/bigha during culture |
| Growmuss | Water productivity enhancer | Bio-NPK, Humic acid, Minerals | Krishi Bharati | 30 kg/ ha |
| Hunter | Water Sanitizer/ anti microbial agent | Not disclosed | Krishi Bharati | 2 lit/ha |
| Eco-Clean-P | Water & Soil Probiotics | 20 strains of beneficial microbes | Bhuvan Biologicals | 1 kg/acre |
| Phyto Plus | Primary productivity enhancer | Spirulina, Chlorella, Bacillus etc. | Bhuvan Biologicals | 1 kg/acre |
| Trudine 20% | Water sanitizer and disinfectant | Iodine 20% | Bhuvan Biologicals | 1 kg/acre |
| Excellent Bottom | Soil Probiotics | Bacillus group of bacteria | Excellar Healthcare Pvt. Ltd | 1 gm/100 kg of fish |
| Aqua Magic Powder and granules | Natural Zeolite | Zeolite | Excellar Healthcare Pvt Ltd | 40-50 kg/acre |
| V5 | Probiotics | 5 strains of microbial elements | Virbac | 1 kg/ha |
| Sucrena WS | Water sanitizer | Didecyldimethylammonium | Virbac | 2 lt/acre |

| | | | | |
|----------------|-----------------|---|----------|-----------------|
| | | chloride 70 mg/g | | |
| Kohrsolin TH | Water sanitizer | Glutaraldehyde etc. | Virbac | 1.5 lt/acre |
| AOP Plus | Water sanitizer | Metaborate Peroxyhydrate | Neospark | 1-2 kg/ha |
| Bionex-80 | Water sanitizer | Alkyl Dimethyl Benzyl Ammonium Chloride | Neospark | 1-2 ppm |
| BioClear | Probiotic | HSAS, Nitrosomonas etc. | Neospark | 5-10 kg/acre |
| Bio Remid-Aqua | Probiotic | Bacillus group of bacteria | Neospark | 5-10 mg/kg feed |

b) Feed, feed supplements and growth promoters including feed probiotics, vitamin and mineral mixtures

Feed based aquaculture were the most common practices of the fish farmers in the study area. Farmers were using both locally available feed ingredients like Rice bran/ polish, Mustard Oil Cake (MOC) as well as formulated fish feed available in the market. There were as many as 19 formulated fish feed manufacturing companies dealing with their feed brands in the study area. Out of these 19 fish feed manufacturers 3 were local feed manufacturer namely NNB, Samrat and Balichanda. Other feed companies were Godrej,

CP, Cargill, Ganga Kaveri, Nexa, Sima, Growel, Abis, Anmol, Kalyani, Waterbase, NG Pro, Shivshakti, Kings fish and Pasupati. Feeds companies were producing three different types of feeds namely, dust feed, sinking pellet feed and floating feeds under different brand name. Again companies were producing various sized of floating feed as per size and nutritional demand of fish. Some companies were focusing on types of fish like Carp feed, Catfish feed *etc.* Apart from feed there were 18 different feed supplements and growth promoters found in the study. Details were given in the Table 2.

Table 2: Feed, feed supplements and growth promoters including feed probiotics, vitamin and mineral mixtures

| Commercial name | Type of Input | Active Components | Name of the Manufacturer | Prescribed dose |
|------------------|--|---|-----------------------------|--|
| Ultra Zyme-P-FS | Growth promoter | Amylase, Cellulose | Neospark | 3-5 gm/kg feed |
| Agrimim | Growth promoter | Phosphorus and Calcium | Virbac | 10 kg/ton of feed |
| Him TRACE | Mineral supplement | Ca, Mg, K | The Himalaya Drug Company | 15-20 kg/ ha during pond preparation, 10 kg/ha/week during culture |
| Liv.52 Protect | Growth promoter | Solanum nigrum, Vitamin C | The Himalaya Drug Company | 2-2.5 kg/ ton of fish feed (powder) 20-25 ml/kg of feed (liquid/gel) |
| HimCal | Mineral Supplement | Ca, K | The Himalaya Drug Company | 10-15 ml/ kg of fish feed |
| Minerax Forte | Vitamin and Mineral mixture | Vitamin A, D3, E, Cobalt, Copper, Fe | Excellar Healthcare Pvt Ltd | 10 kg/ha |
| Minforte+ | Mineral supplement | Ca, Mg, Zn, S, Co etc. | Bhuvan Biologicals | 10 kg/acre |
| Liver Plus | Immunostimulant | Eclipta eratica etc. | Bhuvan Biologicals | 1 kg/ton of feed |
| Biozymes | Feed supplements | Enzyme, Vitamin, Mineral etc. | Bhuvan Biologicals | 10 gm/kg feed |
| Fishmin-SP | Feed supplements | Minerals with vitamin and amino acid | Bhuvan Biologicals | As per aqua consultant advise |
| Fishtech | Feed supplement | Vitamins | Apisa Biotech | 100 gm/acre |
| Bio- KC | Immunomodulator | BKC-80% | Apisa Biotech | 7.5 liter/ha/2 month |
| Chelavet forte | Mineral supplement | Pure calcium | Apisa Biotech | 2.5 lt/acre for 7 days in a month |
| LIV Active | Immunity booster | Vitamin C | Essential Aquatech Pvt. Ltd | 10 ml/kg feed |
| Nutri-Vet Powder | Vitamin and Mineral | Vitamins | Save eco agro Pvt Ltd | 5 gm/100 no of fish |
| Vitabin Gel | Vitamin and Mineral | Vitamins | Essential Aquatech pvt. Ltd | 10 ml/kg of fish |
| ASPHOS C | Vitamin C | L- Ascorbyl 2 mono phosphate | Godrej- Living Acua | 3-5 gm/kg feed |
| Omny Gel | Binding gel for nutritional supplement | Fortified with Protein, Vitamin, Mineral and Carbohydrate | Godrej- Living Acua | 30-50 l/kg feed |

c) Hormones for induce breeding: Induce breeding and seed production of fish is completely relying upon synthetic hormones. The breakthrough of aquaculture may be attributed to development of these hormones. Total six hormone brands

namely Ovasis, Wova- FS, Gonopro, OVATIDE, Spawn pro and Ovafish were found during the study. The details of the synthetic hormones were given in the Table No 3.

Table 3: Hormones for induce breeding

| Commercial name | Type of Input | Active Components | Name of the Manufacturer | Prescribed dose |
|-----------------|-----------------------|---------------------|---------------------------|-----------------|
| Ovasis | Fish breeding hormone | Salmon gonadotropin | Apisa Biotech | 0.5 ml/kg fish |
| OVATIDE | Fish breeding hormone | Salmon gonadotropin | HEMMO Pharma | 0.5 ml/kg fish |
| Wova- FS | Fish breeding hormone | Salmon gonadotropin | Essential | 0.5 ml/kg fish |
| Gonopro | Fish breeding hormone | Salmon gonadotropin | Amrit Pharmaceuticals | 0.5 ml/kg fish |
| Spawn pro | Fish breeding hormone | Salmon gonadotropin | L-Kalija Foods | 0.4 ml/kg fish |
| Ovafish | Fish breeding hormone | Salmon gonadotropin | Bhoomi aqua International | 0.5 ml/kg fish |

d) Medicines including Anti-parasitic drugs, antibiotics and other chemicals like ichthyotoxin, toxin binders etc.:

As the aquaculture progresses from extensive to intensive farming system incident of diseases has been evident in fish farming system. The occurrence of disease has become a primary constraint to sustainable aquaculture production (Mishra, 2017b) [5]. To combat this problem fish farmer were

using medicines and other chemicals as preventive as well as curing measure during farming. Moreover, to maintain a healthy culture environment application of toxin binder, application of ichthyotoxin to eradicate unwanted fish during nursery pond pre stocking management were found in the study. The details of these medicines found were listed in the table no 4.

Table 4: Medicines including Anti-parasitic drugs, antibiotics and other chemicals like ichthyotoxin, toxin binders etc.

| Commercial name | Type of Input | Active Components | Name of the Manufacturer | Prescribed dose |
|-------------------|---|---|-----------------------------|---|
| KMnO ₄ | Antibacterial and antifungal, Oxygen supplier | KMnO ₄ | AGARWAL DRUGS Pvt. Ltd. | 1-5 ppm |
| CEF-XLR Powder | Fish medicine | Cephalexin | Excellar Healthcare Pvt Ltd | 7-10 gm/100 kg of fish for 4-5 days |
| Gasol Rid-FS-AQUA | Toxic gas remover | Yucca extract | Neospark | 100 gm/acre |
| Toximar | Toxin binder | Natural hydrated Sodium Calcium Aluminum Silicates | Virbac | 10-20 kg/ acre |
| Aqua doan | Toxin binder | Silicon oxide, Aluminum oxide etc. | Godrej- Living Acua | 20 kg/ ha |
| Cleaner | Insecticide | Cypermethrin | Virbac | 200 ml/ha |
| Decis | Insecticide | Deltamethrin | Bayer | 1.5-2 ml/lit water |
| Copper Sulphate | Algaecide | Copper Sulphate | Balaji Trading | 2-3 ppm |
| Him- C | Stress Buster | Vitamin C | The Himalaya Drug Company | 5-10 gm/ kg of fish feed |
| Him TOX | Toxin binder | Dipolat toxin binder | The Himalaya Drug Company | 40-80 kg/ ha during pond preparation, 1 kg/ton of fish I feed |
| Yucca fresh | Ammonia binder | Yucca extract | The Himalaya Drug Company | 1 kg/ lakh stock of fish or 5 gm/kg of feed |
| Expell | Deworming medicine | Albendazole | Excellar Healthcare Pvt Ltd | 30-50 gm/100 kg of fish for 4-5 days |
| Endectin Powder | Anti parasitic medicine | IVERMECTIN IP | Excellar Healthcare Pvt Ltd | 1 gm/100 kg of fish |
| Exorena (4S) | Bactericidal and Fungicidal | 4 th Generation Quaternary Ammonium Compound | Excellar Healthcare Pvt Ltd | 4 lt/acre |
| Zeopond | Toxin Binder | Aluminium oxide, Silicate | Essential Aquatech Pvt. Ltd | 10 kg/ha/month |
| C-FAX | Preventive Bactericide | Plant extract | Aspiyer Agro Industry | 250 ml/bigha |
| CIFAX | Fish medicine | Not disclosed | Agarwal aquaculture | 250ml/bigha |
| O2 Marine | Oxygen releasing Tablets | Sodium Perborate | Virbac | 750 gm/ha |
| OXSEA Pearls | Oxygen releasing Tablets | Sodium Perborate | Godrej- Living Acua | 2.5-5 kg/ha |
| DO PLUS | Instant Oxygen supplier | Sodium Perborate, Calcium peroxide | Essential Aquatech Pvt. Ltd | 2 kg tablet/ha |
| OXY Magic-Gran | Instant Oxygen supplement | Sodium Perborate | Bhuvan Biologicals | As per aqua consultant advise |

Conclusion

From the study, it was found that there were 25 varieties of water and soil management inputs, 6 varieties of fish hormones, 18 varieties of feed supplements and growth promoters and 21 varieties of fish medicine and chemicals were available in markets of the study area. Moreover, nineteen different formulated feed companies were selling their feeds in that area.

Reference

1. Fisheries Scenario of Assam, 2021-22, published by Fisheries Information Wing of the Directorate of Fisheries, Govt. of Assam.
2. District Fisheries profile 2018-19 published by Fisheries Information Wing of the Directorate of Fisheries, Assam.
3. Handbook on Fisheries Statistics 2020 published by Fisheries Statistics Division, Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying Government of India.
4. Mishra SS, Das R, Das BK, Choudhary P, Rathod R, *et al.* Status of Aqua-medicines, Drugs and Chemicals Use in India: A Survey Report. J Aquac Fisheries. 2017;1:004.
5. Mishra SS, Das R, Dhiman M, Choudhary P, Debbarma J, *et al.* Present Status of Fish Disease Management in Freshwater Aquaculture in India: State-of-the-Art-Review. J Aquac Fisheries. 2017 b;1:003.
6. Rahman MM, Alam MMM, Khalil SMI, Bari SM, Rashid MM. Status of chemicals and aqua drugs used in freshwater aquaculture in North-Eastern Bangladesh. J. Sylhet Agril. Univ. 2015;2(2):247-256, 2015.
7. Roy A, Ghosh SK, Hauzoukim, Swain S, Bhattacharya K, Mukherjee D, *et al.* Aqua drugs and chemicals used in freshwater aquaculture: A review. The Pharma Innovation Journal. 2021;SP-10(8):317-324
8. Singh M, Singh P. Drugs and chemicals applied in aquaculture industry; a review of commercial availability, recommended dosage and mode of application. Journal of Entomology and zoology Studies. 2018;6(6):903-907.
9. Walker PJ, Winton JR. Emerging viral diseases of fish and shrimp, Vet Res. 2010;41:51.