



KERALA UNIVERSITY OF FISHERIES AND OCEAN STUDIES
(KUFOS)

PANANGAD, KOCHI

DIRECTORATE
OF EXTENSION



REPORT ON THE EXTENSION ACTIVITIES
OF THE DIRECTORATE OF EXTENSION (2020-21)

Funded by Government of Kerala

**REPORT ON THE EXTENSION ACTIVITIES OF
THE DIRECTORATE OF EXTENSION,
KUFOS (2020-21)**

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Acknowledgement

The present project report is an outcome of the 14 extension projects implemented by the Directorate of Extension, the Kerala University of Fisheries and Ocean Studies (KUFOS) during the year 2020-21. These projects are funded by Government of Kerala. The project team wishes to place on record its deep sense of gratitude to the former honorable Vice Chancellor i/c of KUFOS, Smt Tinku Biswal for her support and suggestions regarding the implementation of these projects.

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1. Introduction

In many instances, lack of awareness about the improved technology acts as a major constraint in the adoption of various practices, hindering the development of the concerned sector. Tremendous developments are taking place in many fields and transfer of the same to the stakeholders quickly in an efficient manner is imperative for the progress of the country. In this context, extension, the vital link connecting the technological development with the production system plays a crucial role.

Fisheries sector has witnessed tremendous developments both in aquaculture and capture fisheries. Though so many institutions, State/Central/NGO's are engaged in the transfer of various technologies aimed at the development and welfare of the fish farmers and fisherfolk, it has not yet reached to the desired extent as envisioned. Despite their efforts, fisheries sector continues to be one of the most backward areas. Lack of awareness about various welfare schemes implemented by State/Central Government agencies still continues to be a major barrier in availing the benefits from different agencies, hindering their socio economic development. One of the remedies is to strengthen the extension services to the community. Taking into account of these aspects, Kerala University of Fisheries and Ocean Studies (KUFOS) has implemented various extension projects aimed at the total development of the fisheries sector. These projects have helped in creating mass awareness about the various technologies in the field of fisheries, augmenting the fish production and protein supply to the community by adopting innovative aquaculture practices in an eco-friendly and sustainable manner, creating more employment opportunities in the concerned field, leading to an increase their income and improvement in the quality of life and ensuring livelihood security to them.

2. Extension Projects

Directorate of Extension, Kerala University of Fisheries and Ocean Studies (KUFOS) has implemented the following Plan Projects funded by Government of Kerala during the year 2020-21.

I. Village Adoption for Empowerment and Capacity Building Ensuring Livelihood of Fisherfolk in Central Kerala

Kerala University of Fisheries and Ocean Studies (KUFOS) is implementing the Plan Project “ Village Adoption for Empowerment and Capacity Building Ensuring Livelihood of Fisherfolk in Central Kerala” from the year 2015 onwards. The major objectives of the project are promoting diversified aquaculture practices and allied activities in an eco-friendly and sustainable

manner so as to increase the fish production of the State, creating more employment opportunities to the fish farmers and fisherfolk, thus ensuring livelihood security to them. The project also focuses on transfer of post harvest technologies to the target group with a view to ensure better quality products both for domestic and export market and helps in providing gainful employment by establishing small scale units along the coastal area. While promoting these activities special emphasis is being given for women empowerment also. As part of the project the following activities are carried out.

Demonstration Unit Established at CIAL, Kochi

Golf Club, CIAL, Nedumbassery is having freshwater area of 3 acres. On request of the officials working at Golf club, CIAL, Sri., Premkumar.T and Sri. Sunny Joseph who attended the training programme on “Seed Production and Farming Strategies of Pearlsplit” organized at KUFOS from 29/10/2019 to 31/10/2019 KUFOS, a team comprising of the experts Dr.K Dinesh, Head of the Department of Aquaculture, Faculty of Fisheries, Dr.Anwar Ali P H , Asst. Professor, Department of Fisheries Resource Management of the Faculty of Fisheries, Dr.Daisy.C.Kappen, Director of Extension and Sri Saneer N S, Fishing Technology Assistant visited the CIAL Golf Club during the month of November 2019 to know the prospects for promoting fresh water fish farming in this area. After site inspection, taking into consideration of the physical and chemical parameters and availability of water it was found that the this site is suitable for promoting farming of fishes like pearlsplit, GIFT tilapia, seabass, and carps. Out of the various types of fish farming the practice of cage aquaculture of the above fishes has been identified as the most suitable one taking into consideration of management of water quality parameters, detection of diseases if any, easy harvesting and marketing as per the market demand which ensure better price for the farmers. As the above officials from Golf club, CIAL expressed their interest in the culture of pearlsplit, the signature fish of Kerala having high market demand as an esteemed table fish, the University agreed to conduct a demonstration of the cage aquaculture of pearlsplit. Three hundred numbers of pearlsplit seed measuring 5-6cm were stocked in the cages of 3mx2mx2m size. Growth assessment and continuous monitoring of the water quality parameters are carried out. After a period of cultivation of 9 months 40 kg of fish was harvested with an average size of 200gm and a survival rate of 67%

Demonstration Unit established at CIAL

Harvested Fishes



Training Programme on “GIFT Tilapia Culture”

Kerala Agridevelopment & Sustainable Producer Co.Ltd (KADS PCL) informed that quiet a good number of farmers living on the banks of the Thodupuzha River are interested in freshwater fish farming and come forward to adopt the technology. They made a request to the University to provide technical guidance in this regard. A proposal for promoting aquaculture along the banks of the Thodupuzha River has been worked out in association with the Faculty of Fisheries after conducting a survey in the proposed site on 4/6/2020 and sent to KADS. Later on they informed that about 50 members have come forward for doing GIFT Tilapia culture and requested to conduct a webinar on 25th September 2020 at 3pm. Based on their request a training programme on GIFT Tilapia Culture was organized on 25/9/2021 through on line. Dr. Binu Varghese, Asst. Professor, Department of Aquaculture, Faculty of Fisheries engaged classes to the farmers.

Training programme on GIFT Tilapia Culture at Thodupuzha



Dr. Binu Varghese is engaging classes to the farmers

II. Earn While You Learn (EWYL)

The concept of this programme is to develop entrepreneurship among the students undergoing various courses in the University. Aquaculture and allied subjects dominate in their curriculum and a thorough hands-on exposure in the field will enable them to understand the basic concepts through a more practical oriented approach, to prepare them as capable professionals and turn them to job creators than job seekers. This programme, apart from giving practical exposure, will also enable them to be self-sufficient, confident and efficient managers. Kerala University of Fisheries and Ocean Studies (KUFOS) is implementing this project by utilizing the infrastructure facilities available in the University.

Earn While You Learn Programme-Guidelines

Preamble : Earn While You Learn programme is envisaged to strengthen the link between learning process and field oriented farming practices. This will reinforce the instructional curricula discharge at class room on the one hand and lab to land on the other. It will also help to improve the farming practices by getting innovative ideas from the students (land to lab). This mechanism will help the students to acquire professional competency in the field of fisheries and allied areas.

- Students of KUFOS will be entrusted with this programme and it will be voluntary in nature. Participating students will be given certificate.
- Areas identified for Earn While You Learn Programme are
 1. Aquaculture- mono/polyculture variety species
 2. Integrated farming
 3. Cage/Penculture
 4. Ornamental Fish Culture
 5. Aquaponics
 6. Value addition
- The students will be grouped into batches of 10 each and each group can opt one of the above mentioned areas of activity
- Sales will be through Amenity Centre, KUFOS.

- Service of labourers can be availed of during the period of the programme as per requirement
- Sixty percent of the profit generated through the programme shall be disbursed to the students.
- Remaining portion of the profit and input cost shall be refunded to the University.
- Periodic maintenance of the infrastructure facilities shall be done by the University
- The programme will be jointly implemented by the Directorate of Extension and school concerned
- There shall be a report authenticated by the monitoring committee.
- There shall be a stock register maintained by the faculty concerned, countersigned by the Director of the respective school.
- The programme shall be monitored by a committee consisting of the Director of Extension as the chairman and a faculty member as convener and one faculty nominated by the honorable Vice Chancellor. Director of the school concerned shall be an Ex-Officio member

During the year 2020-21, due to Covid 19 Pandemic and subsequent closing of the University the activities of the project were limited by monitoring and maintaining the brood stock of the various fishes kept in the pond utilizing the service of the labours.

III. Establishment of Farm Radio Station for Hastening Fisheries development in the State

Providing quick information at the right time to the stakeholders in the fisheries sector is indispensable for discharging their diversified activities both in the aquaculture and marine capture fisheries. Though tremendous developments have been made in the field of aquaculture and allied sectors, the technologies have not percolated to the fisherfolk and fish farmers to the desired extent. Lack of adequate knowledge about the various technologies still acts as a major constraint in the wide spread adoption of diversified practices in an eco-friendly and sustainable manner and efficient utilization of

the vast resources in the State of Kerala. Transfer of technologies to the target group at a faster rate using appropriate media will help in the efficient utilization of the various fishery resources, augmenting fish production of the State, creating more employment opportunities to the fisherfolk who are facing problems as low catch, increased fishing effort etc. Similarly, the marine capture sector is also facing various challenges at present, of which the most important one is the more or less stagnant position of the Kerala State in marine fish production during the past few years due to over exploitation, juvenile fishing etc. Creating awareness about the responsible fisheries and need to conserve the fishery resources for the future generation is the need of the hour which requires urgent attention. In addition to these, both State and Central Government Agencies are involved in various types of welfare activities with the objective of the socio economic development fisherfolk and fish farmers and providing both technical and financial support to them. Here also, lack of awareness about these assistance provided by different agencies acts as a major constraint in availing of benefits from the concerned agencies. As the extension education focuses upon the overall development of the people, due attention should be given to their total development in all dimensions viz. financial, social, cultural, spiritual etc. For this, in addition to the dissemination of technologies, conducting value based cultural programmes, leadership and personality development programmes etc. are also required. Such programmes can be organized with the participation of the community which can be recorded, and broadcasted/ telecasted later on for the benefit of the entire community. Besides these, KUFOS as part of the extension activities under various Plan Projects funded by Government of Kerala, is also conducting various programmes for the benefit of the community which can also be transferred. Towards fulfilling the above intentions, as part of the Plan Project "Farm Radio", an Audio Video Recording Studio has started functioning during the year 2018 onwards. Currently a Cameraman cum NLE Editor and a Production Associate are working in this project. The University Governing Council in its 59th meeting held on 27/12/2018 decided to rent out the facilities of the studio to other individuals/institutions etc. so as to generate some revenue to the University. As per this decision, Directorate of Extension is outsourcing the facilities and started creating income to the University. An amount of Rs.34,700/- (Thirty four

thousand and seven hundred only) has been earned during the year 2020-21 by outsourcing the studio facilities. The following activities were carried out during the year 2020-21.



AUDIO VIDEO RECORDING STUDIO

APRIL-2020

- Technical advices for conducting online classes to the students were provided to the teachers over telephone from home.
- Sorting of the photographs of convocation, seminars etc. were carried out from home

MAY-2020

- Technical advices for conducting online classes to the students were provided to the teachers over telephone from home.
- Videography and Video Editing of the MBA online class by Dr.Amblikumar on 26/05/2020
- Provided technical support to Dr.Safeena for conducting online classes to the BFSc

JUNE-2020

- Video Editing of the five day Manage-KUFOS Training on Entrepreneurship programme on 03/06/2020 to 05/06/2020.
- Sorting of the photos of the one day training programme on HYGIENIC HANDLING AND CLEANING OF FISH organized under the plan project, Model Fish Processing Plant and Training on 09/06/2020
- Provided technical support to Dr.Abhilash for conducting online classes to the BFSc on 16/06/2020.

- Video Editing and converting of Dr. Abhilash Sasidharan's online class footage on 17/06/2020.
- Previewing the footage of Vanami shrimp culture ,cage farming and discussion with Director of Extension for re-editing the video on 29/06/2020.

JULY-2020

- Photography of the facilities available at KUFOS for conducting online classes to the students so as to submit a report to the hon'ble Vice-chancellor on 06/07/2020.
- Photography of the General Council video conference on 8/07/2020
- Video shoot of interview with Dr.Dinesh for preparing a video film on Vannamei shrimp farming on 14/07/2020.
- Audio Recording for production of informative video film on Seabass fish farming on 16/07/2020.
- Rough cut of the online classes conducted by Dr. Abhilash Sasidaran for the PG and UG students on 21/07/2020.
- Audio Recording and Editing of the Pilot Episode on "Close-up with Conservation" of the PhD Scholar Arya Sidharthan on 21/07/2020.
- Audio Recording for the production of informative video film on Vannamei shrimp farming on 23/07/2020.
- Final cut of the online classes conducted by Dr. Abhilash Sasidaran for the PG and UG students on 27/07/2020.

AUGUST-2020

- Rough cut preparation of Vanami Shrimp documentary on 1/8/2020
- Collection of details about "fresh water fish farming" for the preparation of screenplay of the same on 3/8/2020.
- Provided technical support to Dr .Daisy C Kappen for conducting online classes to the BFSc students on 3/8/2020 , 5/8/2020, 10/8/2020 and 12/8/2020.
- Recovered data from the storage device for video editing on 7/8/2020.

- Recovered data transferred to other external drive on 10/8/2020 and 11/8/2020
- Discussion with experts and writing of the rough draft of fresh water fish farming on 12/8/2020
- Started working on detailed first draft after consultation with the experts on 14/8/2020

SEPTEMBER -2020

- Note preparation and discussion with Dr. Daisy C. Kappen about fresh water fish farming for the production of a short film on “Freshwater fish farming”
- Writing treatment for screenplay
- Prepared third draft
- Submitted the third draft and feedback and started writing final draft
- Submitted of final draft to Dr. Daisy C. Kappen for taking feedback
- Submitted final draft to P R O Mr. Raju Raphael for offering suggestions and modifications.

OCTOBER- 2020

- Maintenance of all equipment in working condition in the audio video recording studio
- Digitalized screenplay of the short film “Fresh Water Fish Farming”
- Submitted hard copy of screenplay to Director of Extension and Director, Public Relations for further helpful suggestions
- Cinematography of pen culture at Cheppanam – from 19th to 29th October 2020
- Making backups of data after shooting
- Discussion with Director Public Relations regarding the approval of the script on Fresh Water Fish Farming.
- Started narration after receiving the approval.
- Started making the shot division of screenplay

NOVEMBER -2020

- Photography of the ponds located in the western campus for including in the annual report of the Directorate of Extension-2020-21

- Maintenance of the equipment in the studio for keeping it in working condition
- Digitalized screenplay about Vannamei shrimp farming.
- Submitted hard copy of screenplay to the Director of Extension for further helpful suggestions.
- Photography of the MOOC classroom for including in the annual report 2019-20
- keeping backups of data after shooting.
- Photography of the pledge taking in connection with the National Integration day on Nov19
- Associated PRO & HOD, Aquaculture for making introduction video for seminar presentation.
- Photography of the pledge taking in connection with the constitution day on Nov 25
- Photography of the studio for including the annual report 2020.
- Started writing narration for screenplay.

DECEMBER -2020

- Maintenance of the equipment in the studio for keeping it in working condition
- Keeping backups of data after shooting.
- Photography of Biotechnology lab ,Biochemistry lab, Marine microbiology lab, Marine biology lab, Marine chemistry lab, Food science and Technology lab, Quality assurance and sensory lab, Food processing lab, Physical oceanography lab, Soil and water analysis lab, Earth science lab and Centre for bioactive substances from marine organisms lab for including in the annual report.
- Sorting and sending of the photographs to the concerned officers.
- Field visit and videography of the demonstration unit at Thuruthippuram at 9/12/2020.
- Photography of the distribution of cages to the farmers at Pazhambillythuruth.
- Photography of IQAC one day workshop on assessment and accreditation process of NAAC on 15/12/2020.

- Assisted in conducting the practical test to examine the ability in working the cameras and FCP on 22/12/2020.
- Script writing for the production of a video film on the topic “Fresh Water Fish culture”

JANUARY-2021

- Carried out the maintenance of the various equipment in the Audio Video Recording Studio for keeping it working condition
- Photography of 3 Days Entrepreneurship “Training Programme in Bakery Products” jointly Conducted by CASRED and CEFPT, KUFOS on 11th to 13th January 2021
- Sound Recording and Video Editing from 12th to 14th January 2021 for the production of Video film showing the extension activities of the Directorate of Extension , KUFOS for presenting the same to the UGC 12B Expert Team
- Videography and Video Editing of the Visit of UGC 12B Expert Team at KUFOS on 15th to 16th January 2021
- Video editing and Sound Recording showing the activities of the KUFOS in teaching research and extension in connection with the Navakeralam Yuvakeralam programme of Kerala Government-18th to 19th January 2021
- Photography of the Hon. Vice Chancellor's interaction with faculty members, KUFOS on 23rd January 2021
- Photography of newly built Academic block, Mechanical workshop and ponds on 25th January 2021 for publicizing the achievements of the Govt.of Kerala

FEBRUARY-2021

- Carried out the Maintenance of the various equipment in the Audio Video Recording Studio for keeping it working condition.
- Videography and Photography of Seed distribution to the farmers at Chathamma for producing a short film of cage farming on 8/2/2021
- Shooting of the activities and achievements

of the KUFOS in teaching research and extension including an interview with the Vice chancellor as part of producing a video film for uploading the same in the web portal for the Chancellor's award.

- Videography of new academic block, name boards, garden, LED bulbs, ponds, solar panels, rain water harvesting system and Green protocol initiatives from 11-02-2021 to 17-02-2021 as part of producing the above film.
- Sound Recording of the above activities.
- Video editing of four short documentaries for Chancellors award from 8/02/2021 to 19/02/2021.
- Photography of Faculty Development Programme on “Out Come Based Education”. Jointly organized by Internal Quality Assurance Cell, KUFOS and Kerala State Higher Education Council on 16-02-2021

MARCH-2021

- Carried out the Maintenance of the various equipment in the Audio Video Recording Studio for keeping it working condition.
- Shooting for producing pen and cage culture documentaries on 3rd, 6th & 9th March 2021 at various places.
- Video editing of two Documentary films about pen and cage culture from 1st march to 30th march 2021
- Videography and photography of National workshop on "Ensuring Quality in scientific Research & Effective Utilization of e-Resources" organized by Central Library, KUFOS on 16th & 17th March
- Photography of workshop on "Ornamental fish farming" on 23rd to 25th March 2021
- Sound recording and editing of a video film to commemorate the former Vice Chancellor of KUFOS Prof. Dr A Ramachandran on 26th March 2021,
- Photography of the functions arranged in connection with the Remembrance of late Prof. (Dr.) A. Ramachandran, former Vice Chancellor of KUFOS

IV. Establishment of Fisheries Technical, Portal and Knowledge Centre

Fisherfolk engaged in fishing activities both in the inland sector as well as in the marine fisheries sector require timely information while carrying out their fishing operations. Similarly, innovations in the aquaculture including improvement in the existing practices have to be transferred in an effective manner to the fish farmers with the objective of increasing their per capita income, augmenting the fish production of the State, thus ensuring their livelihood security. Also, the dwindling catches in the marine sector indicate the necessity of creating awareness about responsible fisheries among the fisherfolk so as to avoid over-exploitation and to conserve the fishery resources for the future generation. Equally important is the post-harvest technology, as the fish is a highly perishable item, following hygienic handling practices through out the various steps in fish processing is highly essential to ensure a better quality product both for domestic and export market which plays a major role in export earnings of the country.

In the above scenario, establishment of a Fisheries Technical Portal and Knowledge Centre at KUFOS will act as a single window in disseminating all the relevant information and technologies in the field of fisheries to the fisherfolk and fish farmers. It can be transferred to them through publications, conducting awareness and training programmes etc. The research findings, extension activities, academic programmes etc. of the University can be stored as digital files in the center for further use. It will also work as an audio-video library for the use of local people and students. In addition to these, the production of video films in the diversified sectors of fisheries viz. aquaculture and marine capture sector and distributing the same to the public and various institutions engaged in the development of fisheries sector through the centre will contribute to the dissemination of information at a faster rate leading to much progress in the fisheries sector. The Audio Video Recording Studio established at KUFOS has started the production of video films on the above mentioned sectors which can be disseminated among the farming community and fisherfolk through the Portal and Knowledge center established at KUFOS. The center can also provide information on the functions various institutions/ agencies working in the field of fisheries including their welfare activities. In addition to these, problems/constraints

of the stakeholders in the field which require scientific interventions can also be conveyed back to the University for conducting research and offering solutions to them through this center

V. Farm Advisory Services

Lack of knowledge about the improved practices in aquaculture and allied sectors acts as an important constraint in the adoption of better management practices for increasing the fish production of the State. At the same time the technologies which are production-oriented should be promoted in an eco-friendly and sustainable manner. Creating awareness on freshwater and brackish water farming, mariculture, post-harvest technologies, responsible fisheries, need to conserve the fishery resources, judicious exploitation of the fishery wealth etc. plays a vital role in the total development of fisheries sector. Such information can be provided fruitfully to the farmers and fisherfolk by way of publications, conducting training cum demonstration programmes, showing video films, motivating them by distributing various inputs etc. The activities of the center were limited on account of the Covid 19 pandemic during the year 2020-21.

VI. Exhibition Unit

Conducting/ participating in exhibitions organized by different institutions is an important means of transfer of technology. Participation of people in such events and exposure to various technologies will help in developing interest and motivate them in adopting the new technologies at a faster rate. Aquaclinics arranged along with exhibitions ensure the service of the experts working in different sectors of fisheries and help to solve the problems of the farmers. The exhibition unit established at KUFOS has rich collections of specimens, models of various fishing crafts and gears, visual aids showing the activities and achievements of KUFOS, aquarium tanks for setting up of aquariums while participating in exhibitions including a TV for the display of various activities in the field of teaching, research and extension. Though the University was conducting/participating various exhibitions organized by NGO/State/Central Govt

institutions for the last 10 years, due to Covid 19 pandemic KUFOS was not set up any stall during the period 2020-2.

Celebration of Agriculture Education Day

Indian Council of Agricultural Research (ICAR) has been celebrating 3rd December as “**Agricultural Education Day**” to commemorate the birth anniversary of first President of Independent India and Union Minister of Agriculture, Bharat Ratna, **Dr. Rajendra Prasad**. In virtue of this, **Faculty of Fisheries in association with the Directorate of Extension, Kerala University of Fisheries and Ocean Studies (KUFOS)** has organized two programmes on 3rd December, 2020. The event was organized in an ONLINE Platform streaming the live session on Face Book with more than 150 participants.

Programme 1

Time: 10.30 to 12.30 pm

The first programme was aimed at creating interest and awareness on the students and public on the scope and potential of fisheries sector especially aquaculture, ornamental fish culture and fish processing technology as a means of income generation through entrepreneurship.

The programme named as Experts-Students-Public Interaction on Fisheries was kick started at 10.30 am by Prof. (Dr.) Riji John, Dean Fisheries, Kerala University of Fisheries and Ocean Studies (KUFOS) giving an introductory note to the session. Prof. Riji has explained the relevance and importance of celebrating the day under Indian context by detailing the history of the fisheries sector and the growth achieved by the sector planning meticulously planning the fisheries education through Indian Council of Agricultural Research (ICAR). He appreciated the doyens who worked tirelessly towards improving the sector with proper planning and policy making.

Dr. B. Manoj Kumar, Registrar of KUFOS gave the presidential address portraying the struggles undergone by the forerunners to put a solid basement to fisheries education in the country. Because of their effort with the equal cooperation and support from the farming community the country has attained the second position in aquaculture production on a global basis just after China. Now, the country is earning to

the tune of 6-7 billion USD per annum by exporting fishery products. Dr. Manoj urged the student community to be pro active to understand the pros and cons of the sector for taking this as a way of entrepreneurship not only for their personal welfare but also for the comprehensive development of the country. He inaugurated the programme by wishing all success to the student community.

Dr. K. Dinesh, Head, Department of Aquaculture was the moderator of the event. He gave an outline of the programmes and introduced the panel experts to the audience. Dr. Dinesh has asked the students to raise all types of filed related questions to the panel experts encompassing their area after listening to them carefully.

Prof. (Dr.) T.V. Anna Mercy, Former Professor, KUFOS opened up the session by rendering her four decades of experience in fisheries education and research. Being a proud student of (late) Prof. N.K. Balakrishnan Nair, a veteran in fisheries research, she got opportunity to study the blind cat fish, *Horaglanis krishnairi* during her doctoral programme. After that, she was fascinated to the indigenous ornamental fishes of the Western Ghats which hadn't been popular among the public until then. Prof. Mercy got a prestigious project from ICAR to investigate the reproductive biology of these fishes and she could succeed in standardizing the breeding protocols of more than 15 beautiful endemic ornamental fishes of high value in the export market. Such an effort has brought in revolutionary changes in the indigenous aquarium fish trade giving a boost to the industry. Hundreds of students entered enthusiastically to this space for further scientific investigations getting inspired from her work. Prof. Mercy urged the fisheries students to be intuitive to the nature and aquatic ecosystems for securing their future through education and research. In general, productive and prosperous entrepreneurship is an outcome of the efforts taken by the students during their student life.

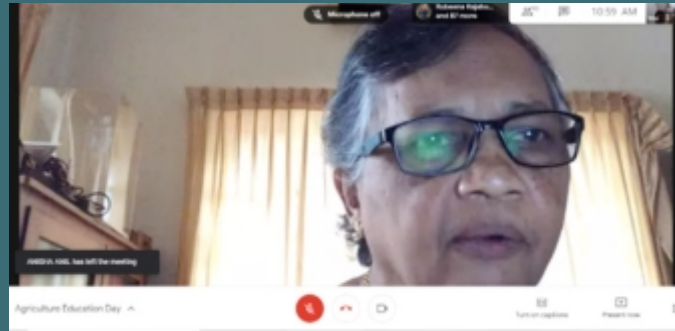
Shri. T. Purushothaman, Chairman of Aquaculture Development Cooperative Society (ADCOS) and the President of Kerala Aqua Farmers' Federation (KAFF) was the next speaker. He shared his three decades of aquaculture experience as a shrimp farmer to the students. The most important problem faced by the farming community of the State is the shortage of quality fish and shrimp seeds. Still we are depending on the seed coming from other States after long term transportation which invites quality deterioration of the seed in terms of disease attack and poor survival. This issue has to be

addressed by the scientific community with due care and emphasis. Students have a great role to play in this regard by getting trained themselves in the required area for securing their future through ensuring income. Aquaculture is ultimately a field research and the educational activities have to be exclusively planned in the farmers' fields. Such an exposure will make the students more confident and competitive to address the field level issues including lower growth, disease attack and crop losses.

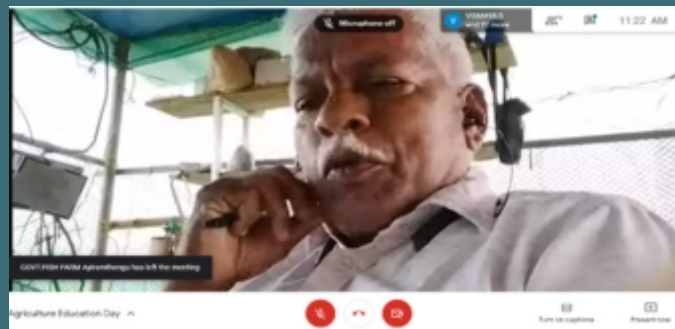
Shri.C.K.Sudhakaran yet another renowned aqua-farmer shared his views on the necessity of protecting the sustainability of the aquaculture sector. We cannot always depend on large areas for fish production due to the shortage of land holdings there is urgent need to develop indoor farming systems like biofloc in Kerala. He opined that private entrepreneurs need to be promoted by the government for increasing the production which is the key component of protein security, employment generation and most importantly, the profitability. He described his long term experience in testing various probiotics developed by scientific organizations in the field and asked the students to devote time to investigate various microbial sources which could effectively play a role supporting the water quality maintenance and animal welfare. Mr. Sudhakaran invited the students to his farm for getting the primary exposure in the best management practices he has been adopting since long.

Prof. (Dr.) Radhika Rajasree, Head, Department of Fish Processing Technology described the enormous opportunities for the students in fish processing and value addition. Further, Dr. Binu Varghese, Assistant Professor elaborated the entrepreneurial possibilities in freshwater and marine ornamental fish culture and seed production. Mr. Rakesh C. G., Project Associate has explained the biofloc technology and its opportunities in a simple manner to the students.

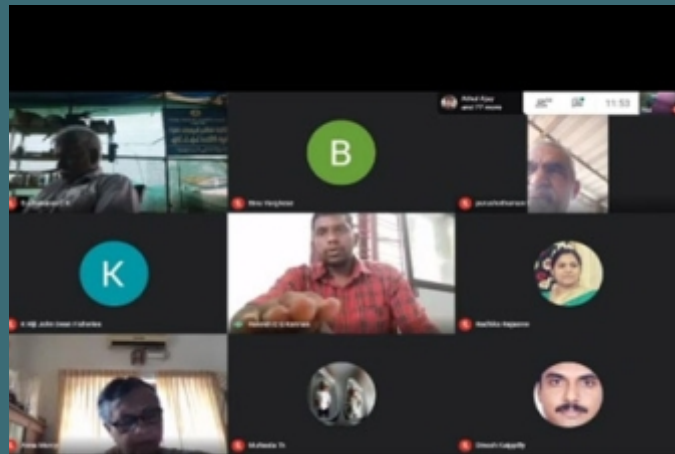
The meeting was very interactive as numerous questions were raised by the students from all the areas and their doubts were clarified by the panelists. The programme came to an end at 12.30 noon with the concluding remarks by Prof. (Dr.) Daisy C Kappen, Directorate of Extension. She proposed the vote of thanks to all the participants and panelists who supported wholeheartedly for making the event a grand success.



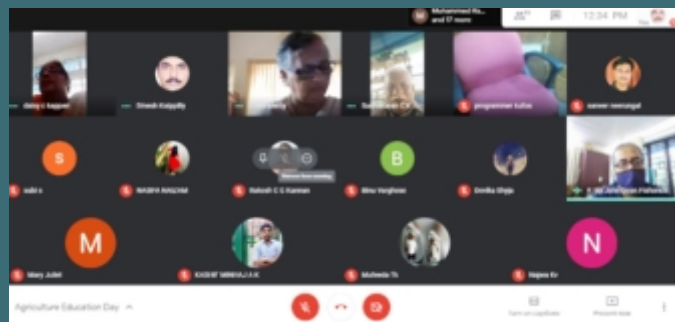
Prof. (Dr.) T.V. Anna Mercy, Former Professor, KUFOS



Shri. C. K. Sudhakaran, Renowned aqua-farmer



Streamed live on Face Book



Virtual gathering of Students-Experts- Public

Programme 2

Time: 2.00 to 3.30 pm

The next programme, Students-Experts Interaction on Ornamental fishes has begun at 2.00 with the opening remarks by Prof. (Dr.) Daisy C Kappen, Directorate of Extension. She has explained the importance of the Agriculture Education Day celebrations and urged all students to be a part of the programme in future also.

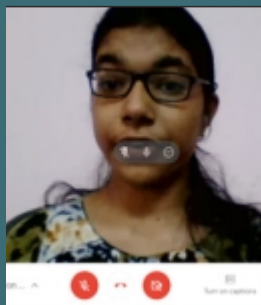
Ms. Suparana R (Class XI) a participant student from the online audience was given the opportunity to propose the welcome address.

Prof. (Dr.) Devika Pillai, Directorate of Research gave the presidential address. She has thrown light on the various activities undertaken by KUFOS in promoting science education among the student community related to the mandates of the University. Prof. Devika has thanked the Vidyodaya School for showing interest and enthusiasm to be a part of the event organized by KUFOS and wished all student a great success in their future career.

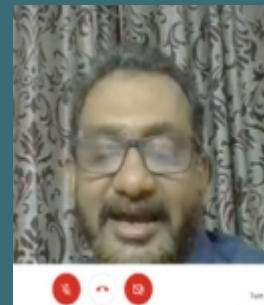
An interesting lecture was rendered by Mr. Santhosh Baby further who is a renowned aquarium expert and Managing Partner of Aqualine Exports. He elaborated his knowledge and experience in ornamental fishing keeping, culture, seed production and trade for the promising future in ornamental aquaculture to the students. The students were enthusiastically interacted with the expert and raised their doubts with regard to the sector. Mr. Saneer N. S., Public Aquarium Staff, KUFOS has also shared his views pertaining to the prospects of ornamental fish culture in India.

Dr. Chiranjiv Pradhan, Assistant Professor, Department of Aquaculture concluded the session by proposing the vote of thanks.

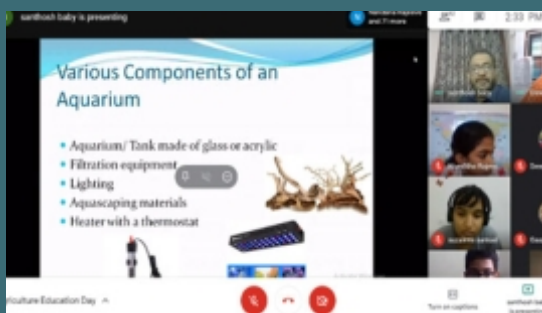
Visit Facebook KUFOS live @ <https://www.facebook.com/100901485011866/posts/186078623160818/?flite=scwspnss>



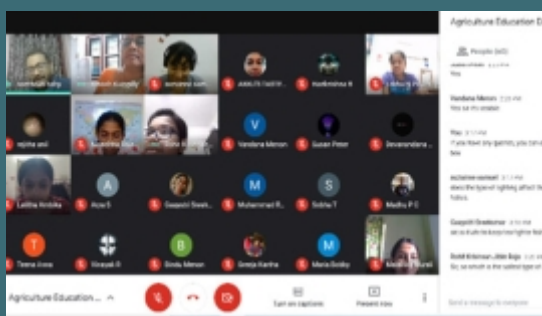
Ms. Suparana R (Class XI), Vidyodaya School addressing the Experts



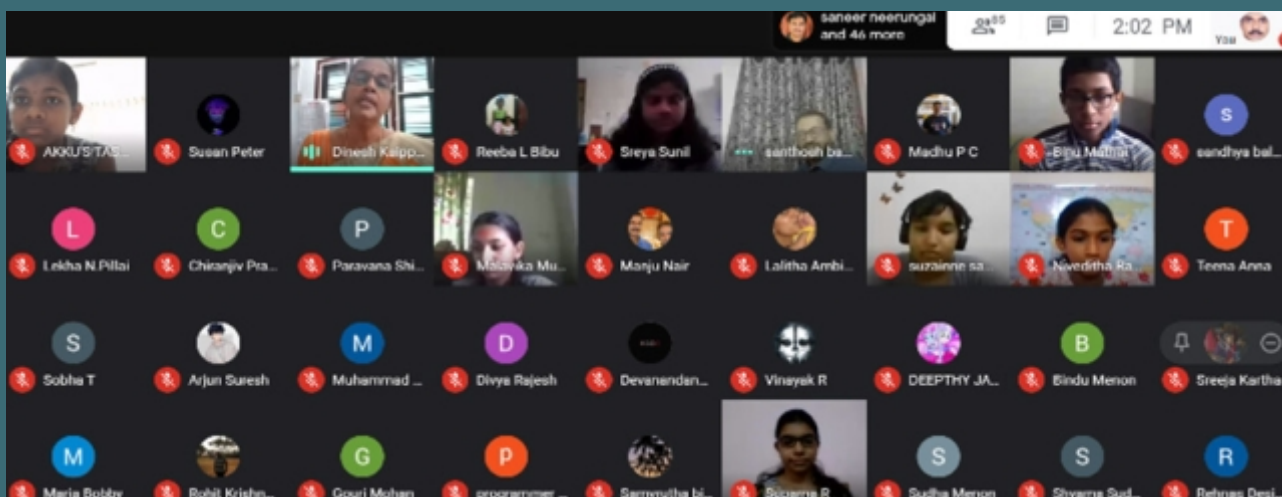
Mr. Santhosh Baby, Renowned Aquarium Expert



Setting of Aquarium explained by Mr. Santhosh Baby



Interaction of students with the Experts



Student participants, Vidyodaya School, Ernakulam

VI. Centre for Field Consultancy and Data Analysis

Taking into account the need for creating a single window system for providing fisheries sector data and the growing demand for consultancy for data analysis in fisheries and allied sector, Faculty of Management Studies, KUFOS launched a Centre for "Field Consultancy and Data Analysis" during the XII Plan period. The center aims to document, analyze and publish data both from primary and secondary sources relating to fisheries and allied sectors. Providing consultancy service on data analysis and interpretation is also envisioned.

The major objectives are

- To collect world and region-wise fisheries sector data relating to resources, production, fisheries trade, etc.
- Collect data on total fish production in India and Kerala, species - wise and category wise and its documentation.
- Collect data relating to marine products export, fishery resources, fisherfolk, etc., of Kerala and India and its documentation.
- Undertake data analysis for industry, researchers, and other agencies on demand.
- Impart training and development services on demand.
- Take up consultancy services in Project preparation and evaluation.
- To suggest policy measures based on the findings of the study

The activities of the Center was limited during the above period.

VIII. Setting up of Cage culture units for production and training in two geographical zones of Kerala for further demonstration and popularization of the technology.

The current project is envisaged to establish cage culture units in two geographical zones of Kerala; North zone and South zone. In North zone, Payyannur, Kannur District has been selected and in South zone, Mundrothuruth,

Kollam was selected for the implementation of the project. The programme is being operated under the Plan Project of Kerala University of Fisheries Ocean Studies (KUFOS) funded exclusively by Government of Kerala. The project was started in January 2019. The major objective of the project is to train interested beneficiaries in two geographical zones of Kerala (Kannur and Kollam Districts) and establish cage culture units for further demonstration and popularization of the technology which was successfully demonstrated by the Directorate of Extension, KUFOS elsewhere. The lead researcher of the programme is Dr. K. Dinesh, Associate Professor and Head, Department of Aquaculture and the Co Investigators are Dr. Daisy C Kappen, Professor and Director of Extension, KUFOS, Dr. B. Manoj Kumar, Registrar, KUFOS and Mr. Prasannan, Special Officer of Kollam Regional Centre of KUFOS. The supporting personnel include one Senior Research Fellow (SRF), Miss. Keerthana T.A. and two Field Assistants, Mr. Al Ameen and Mrs. Chinju Lal. The SRF joined the office on 01.01.2019 and two Field Assistants on 29.12.2018 & 30.12.2018 respectively. Keerthana T.A. (SRF) and Al Ameen N. (Field Assistant) were directed to attend the duty in Regional Centre of KUFOS in Payyanur, Kannur and Chinju Lal (Field Assistant) was directed to work in Kollam.

Work done so far

- The first phase personal surveys were carried out at both stations (Kollam and Payyanur) to assess the interest of the beneficiaries and to collect data on existing fish culture practices in the region. The survey helped to identify the immediate need of the farmers, status of market and current issues faced by farmers in the areas like availability of inputs, disease occurrence, training and marketing assistance required pertaining to cage fish farming.
- At Payyanur, 'Thuruthi' was the area selected for the implementation of the project and at Kollam 'Mandrothuruth' island was the area selected. Both the areas are economically backward and most of

the inhabitants belong to below poverty line.

- The inputs for the projects were procured from various agencies adhering to the Government norms. In both sites, 6 units (3 cages in a single unit) were erected with the dimension of 2x2x1.5 m for a single cage. Each cage unit were allotted to a single group comprising of 3 beneficiaries each. Altogether 6 groups of beneficiaries (18 beneficiaries) were formed at each site. The fish seed, feed, freezers for storing the feed and other necessary inputs were also distributed to the beneficiaries.
- A total number of 4230 *Lates calcarifer* fingerlings were stocked with a stocking density of 250 no. of seed/ cage at Kollam. In Payyannur, only 4 units were stocked with *Lates calcarifer* with a stocking density of 350/ cage. The culture period was from November to June.
- The project team has provided all the necessary technical support to the beneficiaries. Regular monitoring of water quality, feeding pattern and health of animals were also done.
- Partial harvest of both the sites was done during the first week of June. A total of 385 kg of fish was obtained from Payyanur site and a total of 394 kg fish was harvested from Kollam site. The weight and length of the fish varied from 1400 g to 350 g/ fish and 44 cm to 17 cm / fish respectively. The beneficiaries from both the sites got the highest farm gate price available in the market.

ACTIVITIES AND ACHIEVEMENTS (2020-2021)

- Conducted a one-day seminar to all beneficiaries at Payyanur on 28/11/2020 and at Kollam on 09/01/2021 to give, on the farm advice to them with the help of a cage culture expert.

- In, Payyanur, conducted a review meeting on 20/09/2021 with the beneficiaries to assess the benefits achieved from the first culture and the pros and cons related to the implementation of the same.
- In Payyanur, the cleaning and other maintenance works of all the cages and other inputs are going on.
- In Kollam, the activities for the next cycle of culture are in progress.

IX. Maintenance of Museum/Aquarium

The AGK Menon Memorial Museum of Aquatic Animals established at KUFOS during the year 2016 houses a rich collection of finfish and shellfish specimens from marine and inland waters of India which are on display and attracting school and college students, researchers and the general public. The main objective is to impart education and awareness among them about aquatic bio diversity and to build up their competence and confidence

The ornamental fish culture and aquarium keeping have assumed considerable significance as an international hobby and all these have been proved to be lucrative in the global trade scenario. Though the ornamental fish trade with a turnover of US \$ 8 billion and an annual growth rate of 8 percent offers lot of scope for development, India's share in ornamental fish trade is estimated to be less than 1% of the global trade and the major part of the export trade is based on wild collection. Taking into account this, KUFOS focused on popularizing and developing entrepreneurship in ornamental fish culture and conducting training cum demonstration programmes on ornamental fish culture with a view to enabling them in starting small - scale units. The public aquarium at KUFOS named after the visionary, former hon'ble Vice Chancellor of Kerala Agricultural University, Dr. A.M Michel is an exhibition-cum-education center on ornamental fishes. It was opened to the public at a function held on 4th April, 2013 by Shri. K. Babu, hon'ble Minister for Fisheries, Ports and Excise, Govt. of Kerala to

mark the second anniversary of KUFOS. The complex consists of two wings with a total of 46 tanks of assorted sizes-20 each of the size 4'x2'x2.5', four of the size 7'x2'x2' and two plasma tanks. The entrance has a central Koi pond stocked with a variety of koi fish and two beautiful artificial waterfalls. Nearly 1500 fish of different aquatic environment comprising well over 25 species of indigenous and exotic freshwater fishes, such as loach, Miss Kerala, barb, gold fish freshwater shark, angel fish tetras, guppy, platy molly, swordtail, arowana, pacu, yellow sun catfish, eel, severum, dollar fish, different varieties of cichlids, gouramies, parrot fish, oscar devil fish, giant freshwater prawn, brackishwater fishes viz. Mullet, milk fish, pearlspot and marine fish like damsel, clownfish, sea anemone, tentacle anemone, butterfly fish, banner fish surgeon fish etc. are on display in combination with several indigenous and exotic aquatic plants set in different styles. In order to make the project self sustainable, a nominal entry fee of Rs.20/- for adults, Rs.10/- for children of the age 5-15 years and Rs.5/- for students (visiting in groups of not less than ten) is being charged. The fishes kept in the Public Aquarium in addition to providing entertainment to those visiting, also motivate the people to start small scale units. Along with the public aquarium, models of different crafts, gears and photographs showing the activities and achievements of KUFOS in teaching, research and extension are also displayed in a separate building which attracts students, public and officers from different institutions. In addition to this, Faculties of various departments of KUFOS are using this facility to engage classes to the B F Sc students. Since the Public aquarium was closed intermittently in many days due to covid 19 pandemic, only regular monitoring like maintenance of water quality parameters, feeding the live fishes were carried out.

X. Development of Instructional Farm –

Aquaculture is a field - oriented subject, necessitating adequate field training facility for imparting hands- on- training to the students. The students need to be familiarized with all aspects of aquaculture both in the field of freshwater as well as brackish fish farming. Moreover, as it is highly risk - oriented, imparting skill in carrying out different activities viz. preparation of field, determination of physical and chemical water quality parameters, acclimatization, stocking, feeding, quarantining etc.

is highly essential for the students to make them confident in starting and running a farm independently and profitably. This requires an urgent need for upgrading the existing facility at KUFOS to impart quality training needed to equip the students more effectively. It is also essential for popularizing fish culture among the farming community and conducting training cum demonstration programmes to the fish farmers. The University has enough ponds in the western campus and over the last few years modernization of the instructional field training facility is in operation by utilizing the Plan fund allocation. Under this project machineries and equipment necessary for promoting diversified aquaculture practices were purchased and installed for providing hands on training to the students and public.



Instructional farms in the Western campus

XI. Farmers Training Centre

Imparting training to the fisherfolk and fish farmers is an important means for increasing the level of knowledge and rate of adoption of better management practices which, in turn, will help to augment fish production of the State, increasing the income of the farmers, creating more employment opportunities to them and improving the quality of the product for export etc. If such training programmes are residential in nature, it would result in the efficient utilization of more time in a day. As part of the transfer of technology process, KUFOS is conducting various training programmes on aquaculture, harvest and post - harvest technologies under the various extension plan projects. Farmers from all over the State of Kerala are attending these programmes.

While organizing these training programmes providing accommodation in the University campus acts as a major constraint which could be overcome by establishing a Farmers Training Centre having all facilities. University has taken necessary steps for the construction of a Farmer's Training Centre at Puthuveypu.

XII. Model fish processing plant and training center

Though the fisheries sector provides immense employment opportunities in the State of Kerala, very low shelf life of the fish acts as a major constraint in marketing the diversified fishery products both in the domestic and export market. The fishes can be stored only for a few hours after it reaches the ground. Thus, knowledge on the shelf life and ways to preserve it are very important and essential to transfer the same to the target group. The project aims to provide better solutions to the above problems by making the fisherfolk aware of the ways of preservation of fish and preparation of various value-added fishery products under hygienic conditions. It will help in creating more employment opportunities to the fisherfolk and fish farmers including the womenfolk and lower sections of the society, thus leading to women empowerment and uplifting the society particularly along the coastal areas. Equipment for imparting quality training on various aspects of post-harvest technologies were purchased and facilities established under this project is utilizing for imparting quality training to the fisherfolk including the women and students on various aspects viz. techniques of preservation, preparation of value added products, handling of processing and laboratory equipment, quality evaluation methods, sanitation and marketing practices etc.

The outbreak of Corona virus disease (COVID-19) pandemic had an impact on almost all aspects of life. The stringent measures of the Corona virus pandemic such as cancellation of public events, restrictions on gathering, social distancing, closing of public transport, stay-at-home requirements, restrictions on internal and international movements also caused unprecedented disruption in the provision of conducting practical training programs. In order to prevent the financial loss and effective utilization of the financial budget allocated from the government for the project other research studies mentioned below

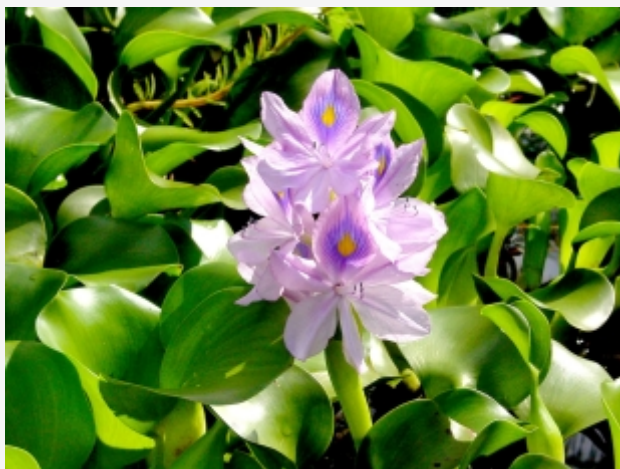
had been done. The studies also focus on the scope of future Patenting and the Intellectual property (IP) rights which contribute to the enrichment of society by promoting the widest possible availability of new and useful goods, services, and technical information that derive from innovative activity based on the production, circulation, and further development of such goods, services and information.

I. DEVELOPMENT OF BIO-FOAM REINFORCED WITH CELLULOSE FIBRE.

Styrofoam is one of the most harmful types of plastic waste that exists today and impacts our planet's ecological system negatively. Styrofoam contains polystyrene which shows excellent properties in many levels of applications such as packaging industry, building industry etc... And also shows high chemical stability. The biggest downside to this high chemical stability is that it takes forever to break down and therefore, once in the environment, it can remain for generations.

Starches and biopolymers such as polylactic acid (PLA) and poly vinyl alcohol (PVA) represent the major components of biodegradable polymers with potential industrial availability in the next decade. Starch foams could be considered as very good alternative to substitute expanded polystyrene (styrofoam) used in packaging industries. Poor mechanical properties of starch materials compared to conventional oil-based polymers could be improved by the incorporation of cellulose-based fibers.

This approach has been applied to the development of starch based biofoam reinforced with cellulose fibre and patenting the technology of development and application of this biofoam. The major raw materials used for the development of this BioFoam are starch and cellulose fibre (extracted from tropical aquatic weed water hyacinth (*Eichhornia crassipes*)). Water Hyacinth is a well-known aquatic weed that found in tropical aquatic bodies with rapid growth and sporadic dispersal; it has destroyed many ecologically and economically important waterbodies and productive wetlands by blocking the water movement and reducing oxygen availability in the water. The control or destruction of these aquatic weed is very difficult due to the higher multiplication rate and lack of naturally occurring enemies and pests. This study also aims to make a way for reducing these aquatic weeds by the utilization of fiber.

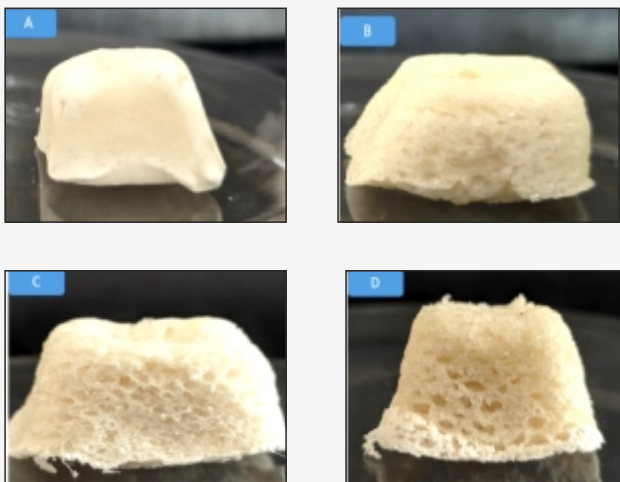


Water Hyacinth (*Eichhornia crassipes*)

Components of biofoam

- Starch,
- Plant Fiber
- PVA (for barrier properties),
- Glycerin,
- Sodium bicarbonate
- Distilled water

Different compositions of developed Biofoam

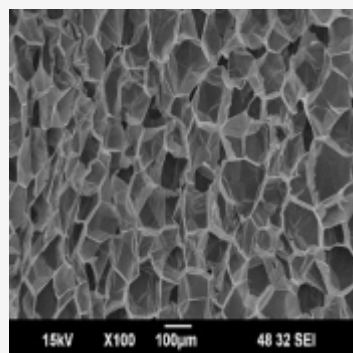


Analysis done for the Biofoam

1. TGA (Thermogravimetric analysis): for determine thermal stability and its fraction of volatile components by monitoring the weight change that occurs as a sample is heated at a constant rate
2. DSC (Differential scanning calorimetry):

measure how physical properties of a sample change along with the temperature against time, measures how much energy a sample absorb or releases during heating or cooling.

3. FTIR (Fourier transform infrared) spectroscopy used to obtain infrared spectrum of absorption emission, and photo conductivity of samples.
4. XRD (X-ray Diffraction): used to analyze the structure of crystalline materials. For finding crystalline materials in sample
5. SEM (scanning electron microscopy): high resolution imaging useful for evaluating pores, fiber presence etc.

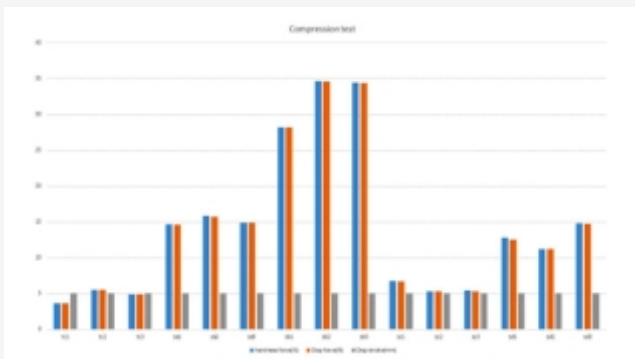


SEM image of Biofoam

6. BIODEGRADABILITY TEST (Soil burial test)

BIODEGRADABILITY TEST (20 days soil burial test)		
SAMPLE	BEFORE SOIL BURRIEL TEST	AFTER SOIL BURRIEL TEST
A		
B		
C		
D		

7. COMPRESSION TEST: ASTM D 3574-03 standard test method for flexible cellular materials.



II. PREPARATION OF TRAINING VIDEOS ON PROCESSING AND VALUE ADDITION OF FISH

Plan to prepare Demonstration training videos on “Processing and value addition of fish” had been started. As an initial step, started writing the script for making practical videos on Preparation of value added products from fish. Also started collecting literatures in order to improve the training booklet on Value addition of fish and planning to publish a new booklet. From the various value added fish products, the following products are selected for the preparation of demonstration training videos.

1. Production of Fish pickle
2. Fish balls
3. Battered and breaded Fish fillet
4. Fish burger
5. Fish sausage
6. Fish finger
7. Fish pickle
8. Battered and breaded Squid rings
9. Fish Biryani
10. Fish Fritters

III. SETTING UP OF MODEL FISH & FISH PRODUCTS SALES OUTLET AT AMENITY CENTRE, KUFOS

Model fish processing plant and training Centre (MFPTC) along with the plan project Earn While You Learn (EWYL) has developed a facility “**Model fish and fish products sales outlet**” at Amenity Centre, KUFOS that can be also be utilized by the

entrepreneurs for test marketing immediately after training. Main aim of this outlet is to make the fish and fish products available for the consumers at the right time and in the right place.

Renewal of Sanitary and License Certificate: It is found that the period of sanitary certificate and License of Model fish & fish products sales outlet has been expired, so it is necessitated to get the validity of license and sanitary certificate. Also the renovation work of model fish and fish products sales outlet has been started. Pictures (i) & (ii) attached below depicts the ongoing works.

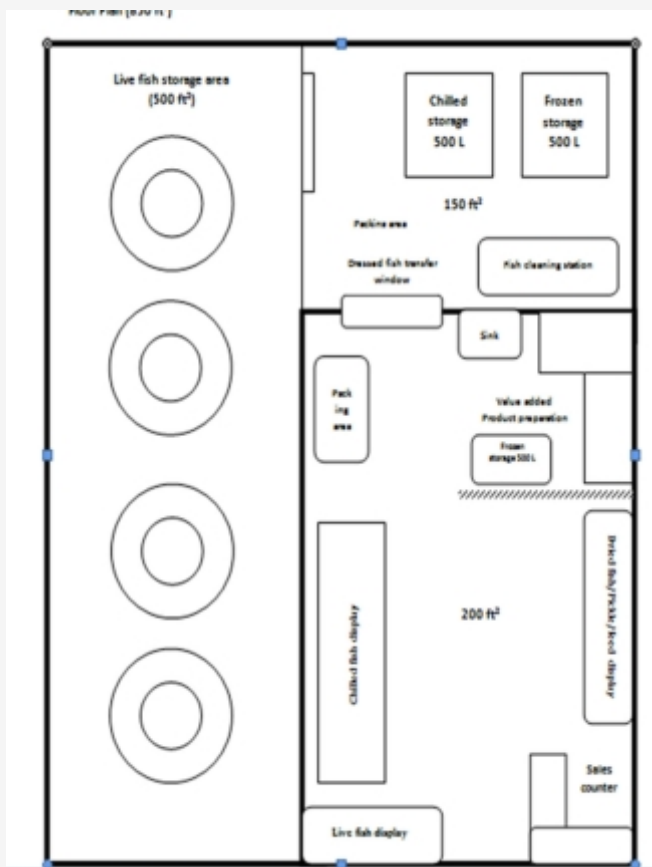


Model fish and fish products sales outlet (initial)



(i) Model fish and fish products sales outlet (Under Construction) (ii)





Plan for Model fish and fish products sales outlet

VI. MODIFICATION OF SPHERIFICATOR

Spherification: Process that converts liquids into squishy spheres, which visually and texturally resemble roe. The below shown equipment is the Spherificator used to perform this process.



Spherificator

This Spherificator is used to produce Caviar substitute and focus on Patent and Intellectual Property.

XIII. Chair for policy studies on livelihood security and sustainable development of fisherfolk

A number of Central and State Government agencies are functioning in Kerala aimed at the development of the fisheries sector. At the same time, the contributions of the private and cooperative sectors are also decisive. Even after the implementation of various projects and programmes with the Central Government and State funding, majority of the fisher-folk continue to lead a miserable life. Improvement is possible in their livelihood through appropriate interventions by effective planning, implementation, skill up-gradation, training, monitoring and evaluation of programmes aimed at the integrated development of the stakeholders of the sector. The project also aims to facilitate comprehensive research and documentation for formulation of appropriate management programmes and suggest policy measures for the sustainable development of the fisheries and allied sectors of the State. Further, a systematic and reliable concurrent data analysis related to the socio-economic and livelihood aspects of the fisher folk and allied sectors is scanty at present and studies in this direction can provide reliable and accurate information for planners, policy makers and administrators. The activities consist of conducting field studies, collecting primary and secondary data of traditional fisherfolk in the maritime and inland Districts of Kerala State.

Centre for Indigenous knowledge of Traditional fisherfolk

The various conventional and customary fish production practices using traditional knowledge and skills need to be recorded and documented for their conservation and potential future utilization. Collection, validation, documentation and appraisal of such practices will be of great use for planning the sustainable use of fisheries resources. Besides, a balance blending of the traditional skills and knowledge with modern science and technology along with professional management will help to address many of the issues prevailing in the fisheries sector. The project has the following objectives:

- i. Developing a nodal centre at KUFOS for aboriginal life of coastal community in KUFOS
- ii. To explore the science of traditional knowledge
- iii. Development of traditional knowledge digital library

iv. Capacity building for sustainable management of coastal resources linking indigenous knowledge to available scientific knowledge.

The activities consist of undertaking field studies and collecting data from traditional fisherfolk both from maritime and inland Districts of Kerala, set up digital library, photo gallery, art gallery, museum and exhibition materials, scientific validation and documentation of traditional knowledge, empowerment of traditional fisherfolk through training and skill development and suggesting measures for appropriate policy measures for conservation and protection of traditional knowledge. As part of the project information on indigenous technical knowledge and dying wisdom pertaining to various aspects having impact on fisheries were unearthed, conducted traditional fisherfolk meet, awareness campaign, exhibitions, indigenous technical knowledge on the medicinal properties of some aquatic organisms including fishes and their application to cure certain chronic diseases were retrieved. Scientific papers were presented in various seminars/ conferences.

XIV. Massive open online courses

For India to emerge as a knowledge super power of the world in the shortest possible time it is imperative to convert our demographic advantage into knowledge powerhouse by nurturing and honing our working population into knowledge or knowledge enabled working population. With an ever expanding field of knowledge, the knowledge and skill sets required by an individual to successfully lead life has also expanded, throwing up challenges of learning more and more throughout one's life. Add to that challenges of pedagogy being faced by the teachers to package more and more for the uptake by the students within the same amount of time available. Fortunately, the ICT as a tool in education is available to us at this juncture. A massive open online course (MOOC) is an online course aimed at large-scale interactive participation and open access via the web. In addition to traditional course materials such as videos, readings, and problem sets, MOOCs provide interactive user forums that help build a community for the students, professors, and teaching assistants (TAs).

MOOCs are a recent and widely researched development in distance education which was first introduced in 2008 and emerged as a popular mode of learning in 2012. Most world renowned Universities are offering MOOC programmes the leading being

MIT currently with 2282 online courses. In India, IITs and many other universities are offering online courses for a wide stream of subjects.

MOOC in KUFOS

Vision: To create an education platform in consortium with top organizations of the country, to offer courses online for all in the field of Fisheries and Ocean Studies

Mission: To provide 100 online courses with a gross enrollment of 1 lakhs users by 2020.



MOOC Classroom at KUFOS

Steps taken

A dedicated website mooc.kufos.ac.in has been launched and the details on student registration, courses being offered and the mode of functioning of MOOC platform has been uploaded. A dedicated server was purchased and a server space of 1 GB was also purchased exclusively for hosting MOOC programmes. A survey among the student fraternity of KUFOS on the type of courses they would like was conducted. Similarly an analysis of other existing MOOC website (NIDM, courser.org, MIT open courseware, Futurelearn.com, Edumine, Accountingcoaching.com) was also done to identify the most sought after MOOC course.

A core committee was constituted which would also act as an Academic Committee for the smooth conduct of the programme. A general guideline for the MOOC programme in KUFOS was prepared and the details are as follows:

Guidelines for coordinators offering massive online open courses

Kerala University of Fisheries and Ocean Studies (KUFOS) propose the following general guidelines for creating Massive Open Online Courses (MOOCs). These recommendations have been formed based on a review of MOOCs offered by peer institutions, deliberations made by the MOOC core committee, and in due consultation with Amrita Vishwapedam, the technology support for MOOC in KUFOS.

Identifying potential subjects

It has been widely discussed about the relevance of KUFOS offering MOOC programmes through its platform, however, the coordinators are encouraged to propose courses that have specific inclination to fields of Fisheries and Ocean Studies in which KUFOS has reasonable expertise. It is also proposed that the coordinators may do a brief search for the availability of such courses elsewhere in the web. Allowances for variation should be considered, as appropriate, based on audience needs, desired learning outcomes, and resource constraints.

General Course Structure

In order to retain as many students as possible, a MOOC should be taught over as short a time period as is reasonable to deliver rigorous content. To that end, KUFOS recommends that MOOCs be approximately eight weeks in length, allowing for variation based on each MOOC's content and design. However existing MOOCs elsewhere have ranged in length from six to 12 weeks. An eight-week MOOC will allow for delivery of substantial content, while not being perceived by students as overly burdensome. Hence after identification of the course the coordinators should prepare a course module, encompassing the contents in such a way that the course would be complete within 8- 10 sessions of one hour lectures. Likewise, it is also requested that the supporting documents in the form of powerpoints, video clips etc. required for sessions may be prepared well in advance. It is envisaged to record individual lectures through A-view the interactive platform at the video conferencing facility of KUFOS and the coordinators are requested to record 50% of the total course lectures in order to start the MOOC course.

Best practices further suggested

Each week of the MOOC be comprised of a lesson with a single topic or themed topics with specified learning outcomes

Learning assets be available at all times so that students across the world can participate fully, no matter the time zone or personal schedule. The video of a particular lecture would be available for the students to view and download for a period of one week after which they would be archived.

Each MOOC be designed according to a rigorous instructional design process and course functionality subjected to a quality assurance process. The Academic committee shall be responsible for checking plagiarism and copyright issues. It is also suggested that the course content be laid with a watermark logo of KUFOS in order to avoid online piracy of materials.

Communication with students should be very clear and consistent and instructors should be very clear about their expectations as well as setting student expectations for the course. Students tend to leave the course if there is confusion. It is also envisaged to conduct a live interaction session at the end of each module, where selected queries from the students shall be answered by the experts.

Course and instructor encourage and enable emergence of learning communities where students connect with each other and with course materials. A repository of the course material shall be retained in KUFOS for further use and modifications, if needed.

Promo

Once the course materials and modules are ready KUFOS intends to attract online users to its MOOC programme through short promo videos (15-20sec) providing a curtain raiser about the proposed course. In this respect the coordinators are required to prepare a brief write up about the MOOC emphasizing the importance and uniqueness of the course. They can record a video showcasing the facilities available, scope of the subject and through a voice over provide this as a flier for the proposed course at least two weeks prior of starting registration.

Registration & Fee

To start with a database of all the students registering for the course shall be maintained in KUFOS and the

same shall be forwarded to Amritha who would assign individual username and password for the users. A student can attend the class only through online registration. At the end of each module or at the end of the course an online test would be necessary for assessing the knowledge base of the student. Successful candidates shall be given certificates of KUFOS, for which a fixed fee (to be decided by the core committee) will have to be paid.

Practice & Engagement

Discussion threads can be used to effectively engage students, who may communicate in discussion board threads each week on key course concepts. These discussion boards are best focused on a case study, problem, or question(s) pertinent to the lesson and should allow participants to share ideas and debate topics. More sophisticated interactive pieces may also be developed, depending on resource constraints. For lessons in which students can appropriately practice skills or concepts, short interactive pieces can effectively supplement other course material.

Assessment

Assessments within MOOCs must accommodate a large number of users and should align with the stated learning objectives, as well as all teaching activities and methods. Ideally, courses should offer both formative assessment to promote deeper learning, critical thinking and reflection, in combination with summative assessments designed to gauge student achievement and/or performance. While any assessment can be formative and/or summative in nature, generally speaking, any activity or assignment that is meant to promote ongoing reflection or help a student improve would be considered formative. Any activity or assignment that results in a final grade or summary, and does not call for additional reflection, would be considered summative. Formative assessments may include ungraded reflection papers, quizzes that can be re-taken, discussion board responses, as well as self- and peer evaluations that are meant to help student improve or identify gaps and weaknesses. Summative assessments may include graded quizzes, reports or projects, or peer assessments if a grade is attached. All summative assessments should have a due date. After the due date, an answer key with explanations should be provided. Overall, assessments may be self-referenced (designed to prompt

reflection on learning and performance); peer referenced (prompting reference on criteria and instructor/course expectations); or instructor (computer-mediated).

The decisions to use different types of assessments should be based on the stated learning objectives for the class

Certificates

Each MOOC is a certificate course. On successful completion of the course students shall be provided a certificate of completion. It is advised that each MOOC programme has a definite template for certificate that can be designed and displayed before the start of each course to attract more students.

Feedbacks

At the end of each course students are encouraged to provide responses on end-of-course surveys. A module or questionnaire in this respect may be prepared by the coordinator to evaluate the effectiveness of the course.

Copyright and Intellectual Property

When creating and teaching MOOCs, copyright and other intellectual property issues typically arise in two contexts: 1) appropriate and allowable use of pre-existing material (images, video, texts, etc.) within the MOOC and 2) ownership of the newly-created MOOC course materials. Each MOOC will likely present different contexts and needs that will necessitate case-by-case identification of intellectual property issues and processes. It is thus encouraged that each coordinator submit the teaching materials well in advance to the academic committee to avoid any copyright issues.

Technical Support

All the technical support required for the preparation, documentation, editing, assessment and evaluation of the course shall be provided by the KUFOS MOOC technical committee. The help of Amrita Vishwapeedam can also be availed for customizing the course content and delivery.

Conclusion

Kerala University of Fisheries and Ocean Studies (KUFOS), the first Fisheries University in the country was established for the development fisheries and ocean studies in the State of Kerala. The University has excellence in the field of teaching, research and extension so far. Department of Extension under KUFOS at present is implementing 14 extension projects funded by Government of Kerala aimed at the integrated development of the community, viz. social, cultural, financial etc. These projects significantly contributed to improving the quality of life of the fisherfolk and fish farmers and also helped in enhancing their socio economic status and welfare. The projects like “Village Adoption for empowerment and Capacity building ensuring livelihood of Fisherfolk in Central Kerala” aimed at empowering the fish farmers of the Panchayaths also helped to preserve the indigenous fish species that are facing threat leading to their extinction.

The Directorate of Extension has introduced an environment - friendly farming system focusing freshwater fish/prawn culture, brackish water fish/shrimp culture, ornamental fish culture, cage culture integrated farming etc. by utilizing the water resources available in private and public sectors of the villages. Besides being efficient in transfer of relevant technology to the fisherfolk including women beneficiaries it was with a gender sensitive approach that the projects were implemented. Through constant and continuous effort the rate of adoption of the technologies by the farmers in the adopted villages increased to a great extent and the technology gap existing at present between the research system and the farmers could be minimized.





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