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ARICARE news

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CONTENTS

भारत का अमृतकाल

From President's Desk

Antiquity of Rice

Rice is a food for 3.5 billion people ,more than half the world sweeping across Asia , South America and Africa . Yet how many of us know the **antiquity** of this food , originating **10,000** years ago in Yangtze Valley in China and **8000** years ago in Ganga's floodplains in India and **3000** years ago in Niger valley in West Africa .Today rice is extensibly cultivated in India , Pakistan , China , Indonesia and Brazil and the global rice Industry is valued at $ 324 billion with 40,000 rice varieties and total annual production of 780 million tones in the World.

Two species of domesticated rice , *Oryza sativa* (Asian) and *Oryza glaberrima* (African) are grown globally. Within Asian cultivated rice , there are two sub species , *Indica* and *Japonica*, the former more dominant in South Asia and the latter in East Asia. Regarding the earliest evidences of rice cultivation , Japonica subspecies or its ancestors are noted in China. We have an early use of wild rice in parts of Northern India. Key **wild species** of rice belong to genus , *Oryza* (over 20 species) which include wild relatives of cultivated Asian and African rice .There was ancient hybridization between East Asian Japonicas and the ancestors of Indica and such hybridization might have occurred 4000 years ago , with an introduced variety coming to India via trade from East Asia.

Rice is unique among cereals cultivated in wetland condition as it requires a lot of water (5000 litres of water to produce 1 kg of grain) and thus its initial cultivation was in Yangtze river basin in China or in Ganges valley in India.Rice cultivation is also spread to upland in dry areas and also in bunded paddy fields with trapped rainwater . So , it is a transformation in **landscape**.

As rice cultivation is expanded in India and South East Asia , a population growth is encouraged with early urbanization and rise of social hierarchy. The rise in urbanisation initiated in rice based agricultural systems was in Iron Age around 3000 years ago. Craft specialization such as Fine Ceramics , stone work , beads and metallurgy was also started in this period.So , the interaction was about **Craft and Agriculture** supported by Rice.

Rice cultivation is also having an impact on **Animal life**. Water Buffalo was suitable to plough in wetlands. Buffalo was domesticated during Harappan period .Paddy field also attract weland small fauna and fish and its cultivation , presently known as Paddy Cum Fish Culture , being a source of protein to the people.

Ther are arguments that rice contributes to climate change as the wetland environment maintained in rice production is producing methane (CH_4) , responsible for **global warming** in addition to fossil fuel use. Methanogenic microorganisms

present in wetland rise are producing methane .Now Rice production is accused in the court of climate change, not only methane but also burning of stubble in North India. Now research is underway to create less methane emitting rice varieties or the adoption of alternate flooding - drying / **System of rice intensification (SRI)** .

Rice what we eat today , is **different** from the ancient varieties . Wild rice populations are mostly red grains while we consume white or brown rice today.There is no evidence that any of the wild rices are fragrant . We now eat **fragrant rice** , basmati or any other locally available types. There is a selection of stickiness in rice in South East Asia with the presence of **glutinous rice** which was not present in wild types of rice.

President Remark in this present issue of Aricare News is centered in Rice as India has achieved the highest production of this staple food recently in the World. The evolutionary history of rice is a complex one . The type of genes involved and geographic / genetic distribution of rice alleles will allow us to better understand our ancestors and breed better rice for our descendents. **Our messages to all in Aricare** are to have the benefit of National food security through sustainable , climate –resilient agriculture and advancing biotechnology to combat malnutrition , such as developing high protein and Zinc / Iron rich rice varieties. We can not think of a single day without a **plate of Rice**. We advocate all to serve society in whatever way we can even after cessation of our daily engagements in ICAR with warm **New Year 2026** greeting to you all and your family members.

From Secretary's Desk

The ARICARE news is a digital half yearly publication of the Association since January, 2017 and it reflects the images of the various activities (meetings/events), research and entrepreneurship information, important scientific news, individual professional achievements performed during the last six months. It is now widely circulated among the retired and serving employees of the different Institutes of ICAR and other organisations. I am very much glad to inform that the Editorial Board members have tried their best for the publication of Volume 10 (1), 2026 of ARICARE news in time like the previous issues. During this period, the different Sub-Committee of ARICARE have performed significant activities with the cooperation the President and all members of the association. All the meetings of the Governing Body and the meetings of different Sub-Committee were held physically at different ICAR Institutes in Kolkata and some meetings were also held on virtual mode. One meeting of Governing Body was held on 23.12.2025 at Scientists' Home, ICAR- NBSS & LUP, Regional Centre, Salt Lake, Kolkata. One meeting of Pension, administration and medical sub-committee was held on 22.8.2025 on virtual mode.

Four meetings of Social and Cultural Sub-committee were held on 06.8.2025, 04.10.2025, 6.11.2025, 15.12.2025 both physically and virtual mode. The meetings of

Tour Sub-committee were held physically on 15.8.2025 and 06.12.2025 respectively. The meeting of Digital Sub-committee was held physically on 8.10.2025 a Scientists' Home, ICAR- NBSS & LUP, Regional Centre, Salt Lake, Kolkata. The meetings of Community Service Sub-committee were held online on 02.9. 2025 and 04.12.2025 respectively on virtual mode. Various important administrative and medical issues, tour programmes at National and Inter-national level, social activities, celebration of Bijaya Sanmelani, Picnic, membership drive etc were discussed and some programmes were completed successfully. Important events performed during the period are: (1) The Illish festival was held on 20.08.2025 at Bhuribhoj Restaurant, Nalban Food Park, Salt Lake, Kolkata. 23 persons with family members were present on the occasion. (2) The members of Community Service Sub-Committee, ARICARE participated an "Awareness Programme and Goat Kid distribution for Rural Livelihood Development jointly implemented by Sasya Shayamala Krishi Vigyan Kendra, Ramkrishna Mission, Vevekananda Educational Research Institute (RKMVERI), Arapanch, Sonarour, South 24-Pgs district and ARICARE, Kolkata on 06.09.2025; (3) the e-publication of the Sharadia Issue, 2025 of "ANWESHA" was published in time, (4) The Bijoya Sammilani, 2025 program of ARICARE was held on 10 th November, 2025 (Monday) in the Indumati Savagriha at Jadavpur University Campus, Kolkata. About 85 persons with their families were present in the programme., (5) National tour in different parts of Gujarat state was organised from 17.11.2025 to 27.11.2025 and 14 persons with families were in the group, Besides the short trips were also arranged (a) at Mahishadal Rajbari and Geokhali, East Medinipur district from 12 th November to 13 th November, 2025 (2days 1 night) and 7 members with their families were present and (b) to Bakkhali and Frazergange, South 24 Pgs district from 9 to 10 th December, 2025 and 13 members with families were present; (5) Annual Picnic of ARICARE was held on 5 th January, 2026 (Monday) at RAMKRISHNA KUTHIR, Rarikhal Co-operative, S. N. Ghosh Avenue, Kolkata - 700103, nearby Narendrapur Ramkrishna Mission main gate. About 66 persons with families and guests were attended in the picnic. I am glad to inform that **58 members of ARICARE** contributed generously to **raise a fund of Rs. 84,611/- (Rupees eighty-four thousand six hundred eleven only)** for maintenance and development of the Association for the year 2025-26. It is also expected from the rest members of ARICARE for their generous contribution to this fund in the coming time to carry out various non-contributary programmes.

During the period, four new numbers have joined in the ARICARE and the Association will be enriched with their new ideas and active role in various activities of ARICARE. All the Members of ARICARE were very much shocked on the sudden demise of Dr.B. K. Bandyopadhyay, Founder member and Ex-Secretary, ARICARE on 11.12.2025. We expressed our heartfelt condolences to the bereaved family members. I wish to express my sincere thanks to the President, Vice-President and all members of the Governing Body; the Chairman, Convener and members of all Sub-committee for organising the above events successfully and also thankful to all participants for their active participation to make the events more enjoyable and emorial. Wishing all the

best to all members and their family for a Very Happy, Peaceful and Prosperous New Year, 2026.

Editorial

Aricare News , January , 2026 issue is ready for e- publication with all our documented activities for the last 6 months from August , 2025 to January , 2026 . Aricare is fostering fellowship among all ICAR retirees . We do express pleasure in bringing together ICAR retired employees to maintain friendship , associated mentality with sharing sxperiences and alleviating monotony of retired life.We do undergo different activities in Aricare to make ourselves well connected and informed and our Aricare Whatsapp has a collection of various information to enrich our knowledge in different horizons. Recently , a new Whatsapp , namely Aricare Programs is launched so as to inform the various activities of Aricare so that all members can participate and take part in programmes.

We have been emphasizing the importance of good health , mental well- being following the health protocols and members are also getting help from Medical IPD Cards issued from ICAR Institutes located in Kolkata to get the medical treatment at the prevailing CGHS rate in various empanelled Hospitals. We sometimes have also plan to organize Health camp to provide basic Medical Treatments to retired Employees and also their dependent family members . Everyone should try to take care of own health and give utmost importance to maintain it as we know that ailments are very common in old age thus having a necessity to undertake precautionary measures.

Aricare activities are channelized through various Sub-committee and Tour Committee is active to organize domestic , local day outings and International Tour so as to engage our members to spend some of their days in tours/journeys along with members /families. Many of us have literary activities such as writing poems , stories , short essays on various topics and this information is being compiled to prepare a magazine ,named as **Anwesha** ,published annually with wide circulation. Here in Aricare News, we are also accommodating Research and Entrepreneurial thoughts so that information on Agriculture and allied activities can be obtained from our News issue. Livelihood Enhancement programmes are also undertaken by Aricare and details of these activities are reflected here in Aricare News. Our heartiest welcome is bestowed for the retired ICAR employees who have become life member of our Association with an earnest request to all of them to get themselves involved in Aricare activities.

Recently our founder Secretary , Dr BK Bandopadhyay had suddenly left us for his heavely abode and we all express our deep condolences to the bereaved family for the demise of Dr Bandopadhyay. His contribution for the formation of Aricare and nurturing it in its present form can not be forgotton and would be remembered by all in the times to come.

Editorial Board has expressed heartfelt thanks to all the members for preparation of this manuscript of Aricare News with various information and a special mention is for Secretary , Asstt. Secretary , Treasurer , Asstt. Treasurer for supplying information required to prepare Aricare News.Thanks are also due to Chairman / Convener and Members of various Sub- committee to remain active throughout the period of the last 6 months for performing actively in various activities of Aricare . **Without any exaggeration , we may say that Aricare in Kolkata is one of the prominently active Association for ICAR retired Employees in India.** We do mention thanks to Dr. P. Das , Dr.KK Satapathy and Dr A Biswas for their contribution in Research / Entrepreneurial thoughts accommodated in this issue of Aricare News. Wishing a Happy New year , 2026 to all members and their families with good health , energy , sound mental wellness and prosperity for the coming days .

Meetings and Events

Governing Body Meeting

2nd Governing Body Meeting for 2025-26 was held in Scientists's Home , NBSS & LUP ,GB Block ,Salt Lake , Kolkata on 23rd December, 2026. Members present in the meeting were Drs M Datta (President) , SM Deb (Vice President) ,DC Nayak (Secretary) ,SK Mahapatra ,K Das ,SS Pal , Mr BK Saha (Treasurer) and Dr D Das (Asstt. Treasurer) .The meeting was initiated through observing 2 minutes silence in the memory of the departed soul of Late Dr Bimal Kumar Bandyopadhaya , Founder Secretary of Aricare who had breathed his last on 11th December , 2025 and Condolence message was read by the President in the meeting . It was decided to hand over this message to his spouse by a group of Aricare Members. Therafter discussion was oriented towards the performance of various Sub-committee and their future course of action.

- Administrative/ Medical / Pension Sub-committee – The chairman of this sub-committee is **Dr S.K. Mahapatra** and the convener is **Mr Sumit Ranjan Sarkar** . There is a need to meet the Director of ICAR – NINFET with a request to include or empanel some more hospitals in Kolkata for treatment (IPD) as required for Pensioners having Medical Card from this ICAR Institute . It is difficult for the Pensioners to inform personally ahead of Planned Treatmet / Surgery to the AMA of Icar Institutes and Information through Whatsapp or E mail may be accepted by the concerned Institute . Request is to made to Director / other Administrative authority of ICAR – NINFET or other Institutes to evolve a modality in order to avoid personal meeting by the Pensioners at this age . All hospitals recognized by CGHS , Govt. of India should be allowed by ICAR Institutes located in Kolkata for Medical treatment of Pensioners , whenever necessary followed by reimbursement . Some empanelled Hospitals have cashless facilility for IPD patients in Kolkata with the maximum amount of Rs 5.0 lakh as admitted by ICAR – NINFET.Manipal Hospital , EM Bypass , formerly Medica Superspeacility , as informed by its Associate Marketting officer

can also give Medical treatment on CGHS rate and appraisal of this facility will be made to all Pensioners of Aricare very soon . A programme on organ donation may also be arranged to know the details to our members.

- Aricare Tour Sub – Committee – The Chairman of this Sub – Committee is Dr **Syamali Chakraborti** with Convener **, Mr BK Saha** . Domestic and one day tour as planned have already been carried out in recent time and now International Tour to Srilanka has been planned and will be held shortly.
- Aricare Social and Cultural Sub committee – The chairman is **Dr Krishnendu Das** with Convener , **Dr Debabrata Das** . The forthcoming programme is to hold Annual Aricare Picnic and attempt will be made for maximum participation.Borshoboron festival may be held in the ensuing month of April, 2026 and decision will be undertaken in the nesxt GB meeting.
- Aricare Community Services Sub –Committee – The Chairman of this Sub-Committee is **Dr SM Deb** with convener,Dr **Krishnendu Das**.Aricare had initiated Goat (Black Bengal Goat) rearing programme in Sonarpur village in collaboration with a KVK under Ramakrishna Mission with a purpose to develop a goat village in Sonarpur.Now IVRI , Regional Station , Kolkata has agreed to become associated with this Goatery programme provided fund will be made available under SC allocation as reported by the present Head of Regional Station.
- Aricare Digital Sub – Committee – The Chairman of this Sub- Committee is **Dr Gautam Bose** with convener **Dr Krishnendu Das** . In continuation of the earlier meeting of Digital Sub- Committee , Aricare website is to be designed /improved properly by a professional website designer and suitable action can be taken up in the time to come. A separate meeting of Digital Sub –Committee may be necessary to initiate the process of recasting the website.
- Administrator Whatsapp – Two persons , **Dr G. Basu and Dr SM Deb** are requested to continue in whatsapp management , Aricare official and Aricare Programs.It may be pertinent to mention that Aricare Programs is only for programme related information to our members and photos will not be posted here.
- Administrator Facebook – It is being managed well by **Dr K Das** and **Mr BK Saha.**
- Editorial Board **–** Aricare News has members , **Dr M. Datta** and **Dr A. Biswas** and Anwesha has members , **Dr SS Pal** and **Dr A Biswas**. Aricare News is published online in the month of January and july every year but there will be publication of Annual issue only for Anwesha during Vijaya Duessehra .

The meeting came to an by Vote of thanks as proposed by **Dr DC Nayak** , Secretary , Aricare for all present in the GB meeting held in NBSS & LUP .


GB meeting held in NBSS & LUP Guest House on 23rd December , 2025

Pension, Administration and Medical sub-committee

Sub- Committee Meeting was held on 22nd August , 2025 on line with the members attended in Google meet , Drs KK Satapathy , M Datta (President) , BK Bandopadhayay , Swarup Kr Chakraborti , DC Nayak (Secretary) , SK Mahapatra(Chairman) , Mr SR Sarkar , Mr BK Saha and Mr B. Chatterjee .

Google meet of Pension Sub- Committee held on 22nd Ausgust, 2025.

Chairman of the Sub- Committee had presented a warm welcome to all the members present in the google meet and the discussion was initiated by the President afterwards. ICAR – NINFET had issued an order on 13th August , 2025 enhancing the cashless medical facility from Rs 3.0 lakh to Rs 5.0 lakh in respect of Pensioners and their dependents from the empanelled hospital.This was possible only after a representation made by Aricare members on 30th April , 2025 with Director , ICAR – NINFET followed by a letter to remove the discrepancy between the cashless limit for Regular and Pensioners. Considering our age , it is difficult to collect the referral letter from AMA of ICAR –NINFET before the planned treatment / Surgery and as such Aricare Members would meet AMA to evolve any modality suitable for the Pensioners. Thus the Google meet came to an end proposing a vote of thanks to all present in the meet.

As per the decision of Medical Sub – Committee , Members of Aricare had met Dr Suman Chattopadhyay , AMA of ICAR – NINFET **on 18th September , 2025** and had requested to issue the referral letterfor planned operations (such as knee replacement , gall bladder surgery and cataract surgery etc) through whatsapp as the pensioners due to age may find difficulty to meet AMA from distant locations. It was advised by the concerned Doctor of the ICAR Institute that the matter may be discussed with the Director . If agreed ,he would not have any objection to issue referral lettersthrough whatsapp, subject to verification by the administration.

ARICARE Tour Sub – Committee

1st meeting of Tour Sub-Committee was held at Food Court of Metropolis Mall, Highland Park , Kolkata on 15th August, 2025 to prepare a tentative tour programme for 2025-26.Dr.K.K.Sathpathy,Dr.Mrinmoy Datta , Dr.Biplab Saha, Dr.Dwijen Barman , Mr.Ratan Saha and Dr.Syamali Chakrabarti (Chairperson) were present in the meeting.

Aricare Tour Sub- Committee Meeting

It was decided that Tour Committee will organize some day out programmeand short trips (2-3 days) if possible every month in Kolkata and nearby locations of Kolkata.The committewill also organize 02 domestic and 01 International Tour in 2025-26.

2nd Meeting of Aricare Tour Committee was held on 6th December , 2025 in the Food Court , Metropolis Mall , Kolkata to finalise the proposed International Tour to SriLanka and other domestic tours during 2026-27. Participants of the meeting were Drs M Datta , KK Satapathy , BK Bandopahyay , DC Nayak , SK Mahapatra , S Chakraborti , M Das , Mr Ratan Das , Mr BK Saha and a Tour operator (Mr Rudra) . This was the last meeting attended by **Late Dr BK Bandopadhyay** .


View of the Tour Committee meeting at Highland Park Mall, Kolkata

Short Tour

Tour committee had organized 1st short tour (2 days and 1 night) to Mahishadal Rajbari and Geokhali , Medinipur , West Bengal during 12th to 13th November , 2025 and the participating persons (10 nos) were Dr KK Satapathy , Dr M Datta , Dr D Nag , Dr S Chakraborti , Dr M Das and Dr S Saha along with families . The history of Mahishadal Rajbari (Now converted to a heritage Hotel) was in 16th Century where Raja Janardhan Upadhya from UP had established the kingdom in 1557 and later Garg dynasty was initiated in Mahishadal. There were descendants of Portugese in the nearby village and Portugese was brought by Raja Gargs for making protection of their kingdom from other nearby Kings during those period.


Mahishadal Rajbari in Purba Medinipur We were with Raja Hara Prasad Garg

2nd Short tour from 9th to 10th Decenber , 2025 to Bakkhali /Fraserganj was organized by Aricare.Members (13 persons) present in the short tour were Drs KK Satapathy , P Mukhopadhyay , S Biswas , KK Datta , S Chakraborti , M Das , SK Mahapatra and M Saha along with their family members.Bakkhali falling under Kakdwip Sub division , is a seaside hamlet in South 24 Parganas in West Bengal , famous for its long serene beaches stretching towards Fraserganj.

Visitors are at Kakdwip ICAR Research Centre and Enjoying food

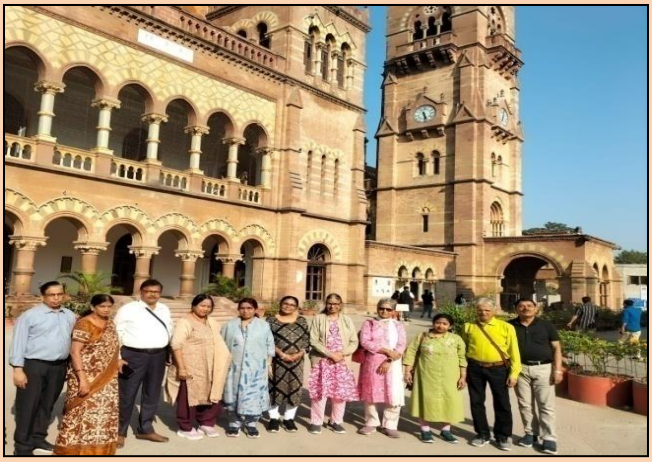
Domestic Tour

Domestic Tour to Gujarat for 11 days was organized by Aricare during the period from 17th to 27th November , 2025 and this tour was availed by 14 persons with Members , Drs M Datta , SS Pal , B Maji , S Chakraborti , NC Pan and Mr BK Saha along with their spouses . Dr (Mrs) P Mukhopadhaya along with her relative and a friend of Dr (Mrs) S Chakraborti were also accompanying the tour to Gujarat. During this period of 11 days , we had paid visit to Ahmedabad , Statue of Unity , Shree Somnath Temple , Gir National Park ,Dwarkashish Temple , Sabarnati Ashram , The Adalaj Stepwell , Lukshmi Vilas Palace , Sabarmati Riverfront , Rani Kivav , Vadodra , Bhuj , Modern Sun Temple , Rann of Kutch etc.

Rann of Kutch in Gujarat

Statue of Unity (Sardar Ballav Bhai Patel)

Sabarmati Ashram (Mahatma Gandhi)



Palace (Pragmahal / Aaina Mahal) at Bhuj in Ahmedabad

International Tour

Aricare has organized an International Tour to SriLanka from 25th January to 3rd February , 2026 (10 days) to visit different places in Sri Lanka and 13 persons are in this group.

Arrived in Sri Lanka

Aricare Members in Sri lankan Island

Aricare Social and Cultural Sub- Committee

Meeting of Social and Cultural Sub- Committee meeting of Aricare was held in Whatsapp mode on 6th August , 2025 at 8.30 PM to discuss about the Illish Utsab for the year 2025-26 and meeting was attended by Drs M Datta (President) , DC Nayak (Secretary) , S Roychoudhury, K Das (Chairman) , S Chakraborti , Tapati Banerjee, Mr SR Sarkar and Mr BK Saha. It was decided to hold Illish Utsab on 20th August at Bhuribhoj, Nalban ,Sector 4 , Salt lake , Kolkata.

Illish Utsab

Illish Utsab as planned at Bhuribhoj , Nalban , Kolkata

Illish Utsab was organized on 20th August by Aricare at Kolkata with background view of East kolkata welands and 23 persons (Drs M Datta , KK Satapathy , SM Deb , DC Nayak , S Chakraborti , , K Das , S Raychoudhury , BK Mahapatra D Barman and Mr BK Saha) along with family members had participated in the utsab .

View of Participating Members with families at Illish Utsab

1st physical meeting of the Social and Cultural subcommittee of ARICARE for 2025-26 was held on 4th October, 2025 (Saturday) at National Council of Education, Bengal (NCEB) Canteen premises, Jadavpur University to have a discussion regarding Vijaya Sanmeloni after Durga Puja which was held during 28th September -2nd October , 2025. The meeting was attended by Drs KK Satapathy, M Datta , K Das (Chairman) , Tapati Banerjee , S Chakrabort , S Raychaoudgury , D Das (Convener) , Mr SR Sarkar , Mr BK Saha and Mr Sk Sinha.

A view of Aricare Social and Cultural Sub-Committee Meeting

Vijaya Sanmeloni (2025-26) of Aricare was held on 10th November , 2025 (Monday) in the Indimati Sabagriha at Jadavpur University campus , Kolkata and 85 along with their family members were present in the programme. Dr P. Das , Former DDG (Agri Extension) and also our Member was also present along with his spouse in the Vijaya Sanmeloni.After a short inaugural programme , cultural event (songs , recitation , Dance , Humorous Verse) was organized in a befitting manner in Savagriha with a packet of snacks distributed among the participating persons in the end. Aricare Literary magazine , **Anwesha (Puja issue)** was released by Dr P Das , Former DDG , ICAR , New Delhi.

Inaugural Function

Cultural Event

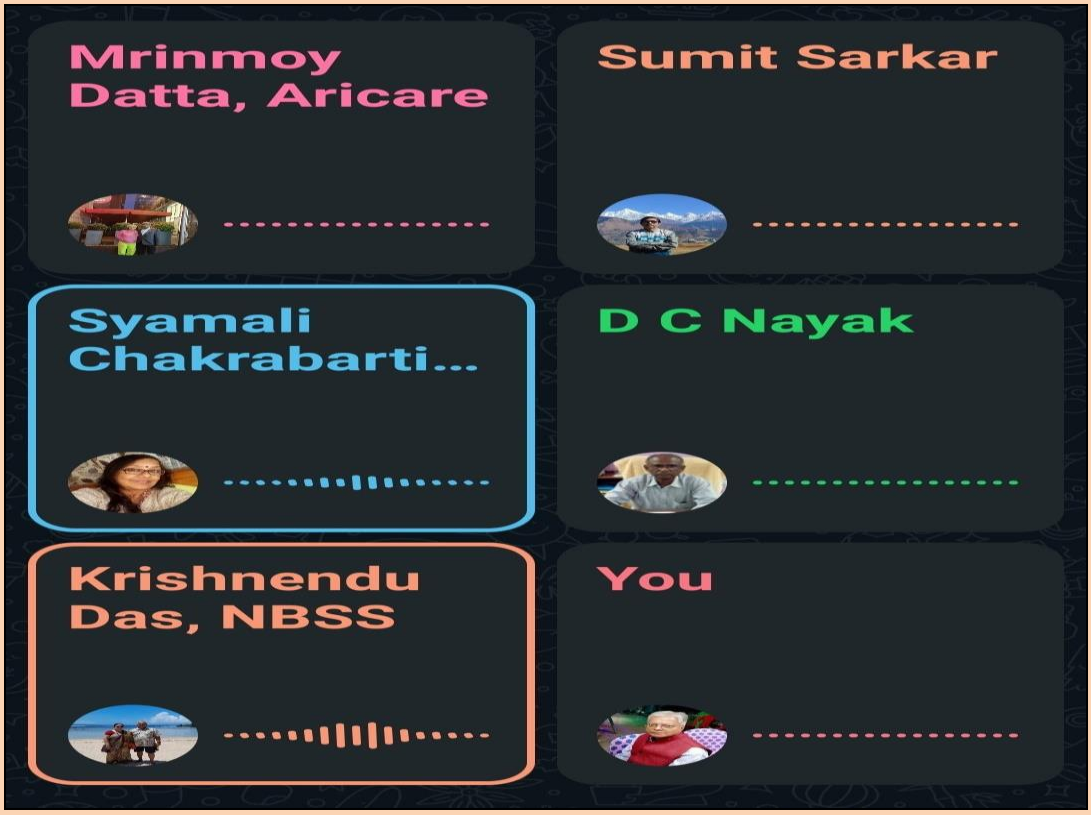
Members and their families attended in Vijaya Sanmeloni

Annual Aricare Picnic

Social and Cultural Sub – Committee meeting was held on 16th November , 2025 in Whatsapp mode to discuss about the date and venue of Aricare Annual Picnic and the video meeting was attended by Drs M Datta , DC Nayak , K Das , S Chakraborti , S Raychoudhury , Tapati Banerjee , Mr SR Sarkar and Mr Mr BK Saha. It was decided to organize Annual Aricare Picnic on 5th January , 2025 and the venue is Ramarishna Kuthir , Ranikhal Cooperative , SN Ghosh Avenue , Near to Narendrapur Ramakrishna Mission , Kolkata.

Screen Photos of Participating Persons in the Meeting

Another video meeting of the sub-committee of Social and Cultural Committee of Aricare was held on 15th December , 2025 and the meeting was attended by Drs M Datta , DC Nayak , K Das , S Chakraborti , Mr SR Sarkar and Mr Mr BK Saha . Food Menue to be prepared along with contribution from the participating members along with their families was discussed in the meeting.



Video Meeting of Social and Cultural Sub –Committee of Aricare for Annual Picnic

Aricare's Annual Picnic was held on 5th January ,2026 (Monday) at Ramakrishna Kutir, Ranikhal Co-operative , SN Ghosh Avenue, Kolkata and 66 persons with their family members /friends had attended / enjoyed the picnic .**Key persons** for organizing the Annual Picnic was Dr K Das , Mr Sumit Ranjan Sarkar , Mr Bk Saha , Dr D Das and Mr B Chatterjee.

Overall View of Participating Persons

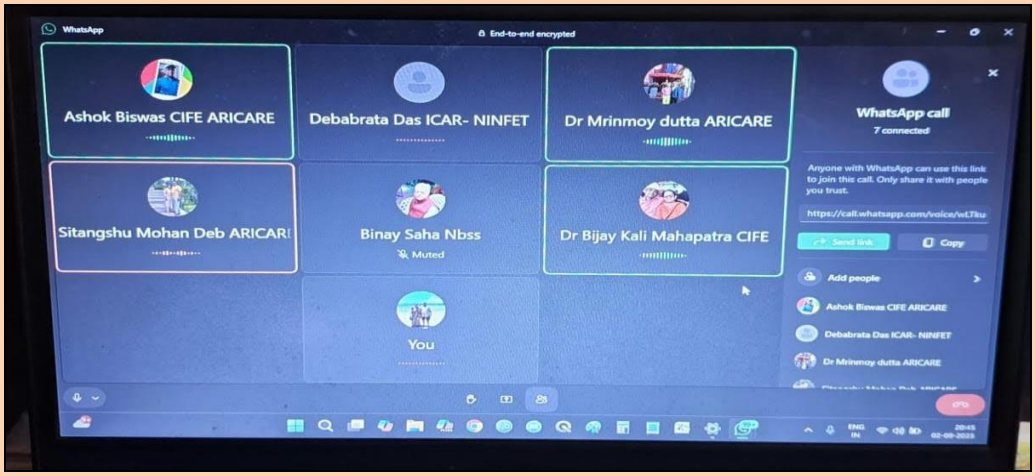
Antyakshari /Song going on in Picnic

Our Condolence Message to Wife/ Daughter of Late Dr BK Bandopadhyay

Participating Members are having sumptuous Breakfast /Lunch in the Picnic

Aricare Community Service Sub –Committee

Video meeting of Aricare Community Service Sub –Committee was held on 2nd September , 2025 and the meeting was attended by Drs M Datta , SM Deb (Chairman) , A Biswas , BK Mahapatra , D Das and Mr BK Saha.



Screen shot of on line meeting of Community Service Sub-Committee

An awareness programme and Black Bengal Goat Distribution for livelihood enhancement was organized by Aricare in collaboration with Sasya Shamala Krishi Vigyan Kendra , Ramakrishna Mission Vivekanada Edicational & Research Institute (RKMVERI) , South 24 Parganas , West Bengal and the programme was attended by Drs M Datta , SM Deb (Chairman) , K Das (Convener) , A . Biswas , D Das , Mr BK Saha and two Senior faculty Members from West Bengal Animal Husbandry & Fisheries University , Kalyani campus . 14 female goat (> 5 months age) and 1 male goat were distributed among 7 farmers of a village in Sonarpur near KVK with a purpose that farmers will be getting Veterinary help/ care from KVK in the time to come . In the meeting one office from Animal Husbandry Department , Govt. of west Bengal was also present and he had assured of rendering necessary help to the farmers. It was decided that one female goat kid would be supplied to the new farmer after the 1st Birth from the distributed goat to the farmers . One Goat farmers having nearly 100 goats was also present in the meeting and she had discussed about her experience of goat rearing and its profitability. A whatsapp group named as Goat Village Nayapattan was created to exchange the information and progress of goat rearing in the village.

Goat Distribution with awareness programme

Farmers receiving Black Bengal Goat from Aricare

On 4th December , 2025 , on line meeting was organized by Regional Centre , ICAR-IVRI , Kolkata in order to make Goatery expansion for development of a Goat village as visualized by Aricare for rural upliftment among the villagers. The meeting was attended by Dr M Datta , Dr SM Deb , Dr K Das and Mr BK Saha from Aricare , **Dr Arnab Sen (ICAR – IVRI)** , Dr Sarbaswarup (KVK , Sonarpur) .

Aricare Digital Sub- Committee

Digital Sub- Committee Meeting was held on 8th October , 2025 in the Scientist Home , NBSS & LUP ,Kolkata and the meeting was attended by Drs KK Satapathy , M Datta , DC Nayak , BK Bandyopadhyay , G Bose , K Das , Tapati Banerjee , SS Pal , Mr Sumit Sarkar , Mr BK Saha and a special Invittee , Mr Sandip Saha , Web Designer.

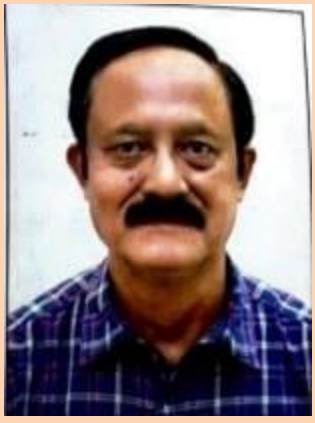
Digital Sub- Committee Meeting

Aricare Website , **www.aricare.in** update was discussed in deatal and a Web developer (Mr Sandip Saha) was invited to help in the process of making the update of our website .The past vendor who had developed the website , would be approached to provide Domain and Hosting C panel , , Username , Password , FTP details of the Server and Customer login details of this web hosting . The website is presently static and this is to be made dynamic with a provision of search facility in the home page for easy accessibility .Mr Sumit Ranjan Sarkar would make a request to the earlier vendor to provide all details and the rate of website updation was also discussed with the new Vendor with a request to keep the cost at a moderate level. Dr M Datta , President had informed the house that there is a need to have another whatsapp (Name – Aricare programs) in addition to our existing whatsapp , Aricare official in order to accommodate only details about the Aricare Programs so that the members can see the ongoing /proposed programs for participation .**No posts/ photos** other than Aricare programs will be entertained in this whatsapp and all members of Aricare would be enrolled in this New Whatsapp.Action to open the New Whatsapp woild be undertaken by the Admins . The meeting came to an end by proposing a vote of thanks.

Life Member

Life Member of Aricare as enrolled during 2025-26 are 1.Dr Partha Pratim Pal , Former Principal Scientist , ICAR –Atari , Kolkata.2.Dr Baidya Nath Paul , Former Principal Scientist , ICAR- CIFA, RRC , Rahara. 3. Prof (Dr.) Anandamoy Kundu , Former Director , ICAR –CIARI, Andaman & Nicober Islands. 4. Mrs Rita Bandopadhyay, Wife of Late Dr BK Bandopadhyay as **family Pensioner**.

Dr Partha Pratim Pal



Dr Baidya Nath Paul

Prof (Dr) Anandamoy Kundu

Mrs Rita Bandopadhyay

Our Achievements/Engagements

Dr. P.Das , Former Deputy Director General (Agri Extension) , ICAR , New Delhi has the following engagements .

Date	Engagements
Aug. 17-20 , 2025	Participated in the Selection Committee Meeting of CAU, Imphal. Held at Barapani, Meghalaya
Sept. 17-20, 2025	Chaired the Research Advisory Committee 11 ATARIs, Delhi.
Oct. 11-13, 2025	Participated in the Selection Committee Meeting of CAU, Imphal. Held at Barapani, Meghalaya.
Oct. 27-31, 2025	-Participated in the Selection Committee Meeting of Visva Bharati. Bolpur. -Address the faculties on Indian Agriculture: Pathway Towards Viksit Bharat by 2047 -Visited the Women FPC "Green Farm" -Visited the villages Socities under the Rural Reconstruction Programme Participated in the Extension Council meeting, CAU, Jhansi (online)
Nov.03, 2025	Participated in the Selection Committee Meeting of Extension Scientist Award,CAU, Imphal.
Nov. 06-07, 2025	**Conferred Doctor of Science (Honoris Causa) by BCKV in their XXIII Convocation.**
Nov 13-17 , 2025	Participated in 9 th Inter Collegiate Youth Festival cum Games and Sports Meet 2025, CAU, Imphal, held at Barapani, Mrgha;aya..

	-Chaired the session on Motivational Talk.. -Chaired the session on 'Mental Well-Being'. -Chaired the session 'Think-A-Thon on Futururistic Education'. Chaired the Technical Session on 'Innovative Business Ideas in Agriculture and Allied Sectors (Students Presentation)', CAU, Imphal held at Barapani,Mrghalaya.
Nov 24-26 , 2025	Attended the International Conference on Extension, held at SOA, Bhubaneswar. -Presented the keynote address -Chief guest at the Validictory Session
Nov.28-29, 2025	Attended the 9 th Extension Education Council Meeting at Rajendra Prasad Central Agricultural University, Pusa, Samastipur, Bihar. -Presented 'Indian Agriculture: Towards Viksit Bharat by 2047' -Participated as an Expert in all the Technical Sessions

Dr SM Deb , Former Director, ICAR-NDRI, Presently – Vice President , Aricare , Kolkata has the following engagements .

Date	**Engagements**
Aug 5 , 2025	Expert member for CAS (Promotion) for Professor/ Associate Professor (AG&B) at Bihar Animal Science University, Patna
Aug 7, 2025	Attended Convocation of West Bengal University of Animal and Fishery Sciences, Kolkata , inaugurated by His Excellency Governor of WB . Member of the QRT of ICAR-CIRB, Hissar, Haryana
Aug 22-24, 2025	Advisory support and site inspection with a team of experts to farmers planning to develop goat farms at tribal village near Dhankamra, Jhargram . West Bengal.
Sept 15 , 2025	Patron of the International Conference ISAGBCON-2025 (Precision animal breeding through genomics, Artificial Intelligence and Machine Learning) held at Biswa Bangla Convention Centre, Kolkata.
Nov 3,2025	Expert member of selection of participants of young scientist award at West Bengal University of Animal and Fishery Sciences, Kolkata
Nov 4 ,2025	Class Biostatistics,WBUAFS
Nov 12-	**Chairman**, Plenary Session II: International Conference ISAGBCON-

14,2025	2025 (Speaker: Dr. Mehar Singh Khatkar, Senior Researcher, School of Animal and Veterinary Science, Adelaide University, Adelaide, Australia; Lecture: Beyond Genomics: Phenomics and Artificial Intelligence to Transform Economic Trait Evaluation in Livestock.)
Nov 28-29,2025	**Chairman** of technical session-I, SVBBICON-2025 (National symposium on Advancing Animal Health and Production through Biochemical and Biotechnological Innovations) at WBUAFS, Kolkata.

Dr BK Mahapatra , Former Principal Scientist and Scientist – In-Charge , ICAR – CIFE , Kolkata has the following engagements .

Date	**Engagements**
Aug 26 , 2025	Participated in an Interactive Session at LINAC-NCDC Fisheries Business Incubation Centre (LIFIC), Govt. of India.
Sept 13 , 2025	Delivered Seminar Lecture at Debra Thana Sahid Khudiram Smriti Mahavidyalaya, Paschim Medinipur, WB.
Sept 22, 2025	Delivered Platinum Jubilee Lecture on the topic " Entrepreneurial Empowerment through Aquaculture:Pathways and Perspectives" for the Department of Zoology (UG&PG)at Vivekananda College, Thakurpukur, Behala.
Oct 22, 2025	Served as an Expert Member for the Selection Committee Interview held at ICAR-CIFRI, Barrackpore.
Oct 28 , 2025	Attended as an Expert on the Occasion of Imparting Training at Sasya Shyamala Krishi Vigyan Kendra, Sonarpur.
Oct 31, 2025	Delivered lectures as a guest teacher in Fisheries Science Semester I ; III at Vidyasagar University.
Nov 19, 2025	Attended as an External Expert in the PhD Committee meeting of the Fishery Sciences Department at Vidyasagar University.
Dec 2 ,2025	Evaluated the Ph.D. thesis entitled "Evaluation of growth, survival and haemato-immunological responses of Amur carp, Cyprinus carpio haematopterus (martens, 1876) in multiple culture systems" submitted by Mr. Mitesh H. Ramteke, Regn No. AQC-PA9-12 (Batch 2019-2022).
Dec 9 , 2025	Recorded in All INDIA Radio Krishi Kathar Asar –Shitkale Macher Porichargoto dik(DISC)-Gitanjali
Dec 11, 2025	Attended as Chief Guest on the occasion of the Fish Farmers Meet at Barnia, Nadia for the promotion of Scientific Fish Culture
Dec 15-19 , 2025	Resource Person in NFDB sponsored training Programme on Integrated Fish Health Management' at Sasya Shyamala Krishi Vigyan Kendra, Sonarpur, Kolkata.
Dec 22, 2025	Guest speaker to deliver a special lecture on 'Aqua- entrepreneurship' and Hands-on training on Fishery to Semester V students as part of their curriculum requirement of the Undergraduate 4 Year Honours Program of Vidyasagar University in Lab 1 (PG Lab) of the Zoology

	Department, Garhbeta College.
Jan 6 , 2026	Resource Person in Seminar on "Advanced Fish Breeding Production Management" on High Quality Ornamental Fishes at East Calcutta Girls' College, Lake Town.
Jan 7 , 2026	Moderation of the Post-Graduate the Question Paper on Fishery Science under Vidyasagasr Unioversity.
Book / Book Chapter /Paper Published	
Mahapatra, B.K. 2026. MCQ Handbook on Fisheries and Aquaculture. Narendra Publishing House, New Delhi, (ISBN: 978-93-5651-791-2) **B. K. Mahapatra,** Surabhi Datta, Traditional Methods of Ornamental Fish Collection in North-East India; Ornamental Fisheries and Aquarium Keeping; P: 290-295. DOI-10.1201/1003318842-16. Surabhi Datta, Manoj Kumar Pati, **B. K. Mahapatra**, Comparative Study of Morphometric Correlations in Green Rocket Shrimp, Caridina hodgarti (Kemp 1913) Concerning Sex Differences; Environment and Ecology 43 (4A) : 1171—1180. Rituraj Dutta, Sobhini Nandy and **B. K. Mahapatra**. 2025. Length-weight relationship and relative condition factor of Bombay duck (Harpadon nehereus, Hamilton, 1822) from the north-east coast of India. International Journal of Fisheries and Aquatic Studies 13(5): 225-229. Rituraj Dutta, Sobhini Nandy and **B. K. Mahapatra**. 2025. Morphometric and meristic status of Harpadon nehereus (Hamilton, 1822) from the north east coast of India. Journal of Entomology and Zoology Studies 13(6): 197-200.	

Dr Krishnendu Das , Former Principal Scientist , ICAR- NBSS & LUP , Regional Centre , Kolkata attended National Seminar on Climate Change , Soil , Environment and Sustainable Agricultural Development , Organised by Department of Agricultural Chemistry & Soil Science in Collaboration with ICAR – CRIJAF during January 10-11 , 2026.

Dr Samar Kumar Gangopadhyay , Former Principal Scientist & Head , Regional Centre, ICAR- NBSS & LUP , Kolkata attended National Seminar on Climate Change , Soil , Environment and Sustainable Agricultural Development , Organised by Department of Agricultural Chemistry & Soil Science in Collaboration with ICAR – CRIJAF during January 10-11 , 2026.

Dr Madhumita Das , Former Director I/C and Principal Scientist , ICAR-IIWM, Bhuvaneswar, Odisha is one the researcher to develop this **technology** - Ranu Rani Sethi (Lead Developer), **Madhumita Das**, Ambast SK (Associate Developer) ICAR-IIWM. Bhubaneshwar, has developed the technology Design and field evaluation of groundwater recharge structure in hard rock areas, ICAR-NRM-IIWM –Technology –

2025-021. **Dr (Ms) Das** has the personal achievement for successful completion of High Altitude trekking and Expedition of Annapurna South Base Camp (13550 ft) in Nepal, Himalayas.

Research / Entrepreneurial Thoughts

Indian Agriculture: Towards Viksit Bharat by 2047

P.Das , Former DDG (Agri Extension) , ICAR , New Delhi

India occupies 2.44% of the world's land area, encompasses 11.28% of the globe's arable land,contains 4.00% of freshwater resources, and is home to 17.73% of the world's population. Additionally, it harbours 12.70% of cattle, an impressive 56.70% of buffaloes, and 14.50% of goats.The country's food grain production is projected to reach a remarkable 353.96 million tonnes by 2024, a notable increase from 330.5 million tonnes in the 2022-23 period, thereby establishing a new record.

India stands as the preeminent nation in global agricultural output for milk, jute, and pulses. It ranks as the second-largest producer of rice, wheat, groundnuts, sugarcane, vegetables, fruits and cotton as of 1st January 2023.This robust agricultural production not only underscores India's pivotal role in global food security but also reflects the diverse climatic and geographical conditions that enable the cultivation of a wide array of crops. The nation's agrarian landscape is characterised by a rich tapestry of traditional farming practices intertwined with modern agricultural innovations, fostering a unique environment for sustainable growth.

As India navigates the complexities of a rapidly changing global economy, the agricultural sector remains a cornerstone of its economic framework, ensuring food security and employment for millions while striving for innovation and resilience in the face of challenges such as climate change and resource scarcity. The nation's agricultural future looks promising, rooted in both heritage and forward-thinking practices, as it endeavours to meet the demands of an ever-growing population.

Agriculture --Yesterday and Today

It is hypothesized that the inception of organised agriculture emerged in West Asia, specifically at the contemporary site of Jermo, a modest village nestled within the fertile crescent of Mesopotamia.This area, spanning approximately 12,000 to 16,000 m^2, has been dated (via carbon-14 analysis) to 7090 BC. The settlement comprised around 25 houses, accommodating approximately 150 inhabitants, characterised by adobe walls and sun-dried mud roofs, which rested upon stone foundations. The architectural layout featured a rudimentary floor plan, excavated from the earth (Wikipedia, accessed on 20th April 2023)1.This early agricultural community is indicative of a significant transition in human society, marking the shift from a nomadic lifestyle to one anchored

in permanent habitation and cultivation. The inhabitants of Jermo likely practised subsistence farming, cultivating essential crops that would sustain their growing population. The strategic location within the fertile crescent provided access to rich soil and abundant water sources, facilitating agricultural productivity.

As these early farmers honed their techniques, they developed a more profound understanding of seasonal cycles, enabling them to optimise their planting and harvesting schedules. This expertise would eventually give rise to more complex agricultural practices and the domestication of various plant species, laying the groundwork for future civilisations.

In essence, the establishment of organised agriculture in Jermo represents more than mere survival; it marks a pivotal moment in the evolution of human society, setting in motion a series of transformations that would ultimately shape the course of history. As these early agriculturalists thrived in their environment, they laid the foundations for the complexities of later civilisations, influencing agricultural practices, social structures, and the very fabric of community life.

Agriculture Today

Today's agriculture sustains nourishment for 2.3 billion households inhabited by 8.02 billion individuals, cultivating between 6,000 and 7,000 species of crops. The global agricultural market is experiencing robust expansion, propelled by an ever-growing global populace and the corresponding surge in demand for sustenance. This growth is further augmented by significant technological innovations in agriculture, such as precision farming and biotechnology, which are significantly enhancing crop yields and operational efficacy. Government policies across the globe are increasingly endorsing sustainable agricultural practices and safeguarding food security, thereby contributing to market advancement. While the Asia-Pacific region presently dominates the market due to its substantial population and extensive agricultural undertakings, North America and Europe continue to be pivotal players through their adoption of cutting-edge agricultural technologies. Nevertheless, the market grapples with challenges posed by climate change, supply chain vulnerabilities, and the exorbitant costs associated with the implementation of novel technologies. Successfully navigating these obstacles while capitalising on technological advancements will be imperative for sustained growth in the agricultural sector.

The Global Agriculture Market Sales Revenue was $ 11.431 trillion in 2021, reaching $ 15. 495 trillion in 2025, and projected to be $ 28.469 trillion. at a CAGR of 7.9%. During the same time, the Indian Agriculture Market Sales Revenue was $ 609.909 billion in 2021, reaching $ 903.395 billion in 2025, and projected to be 1.982 trillion. at a CAGR of 10.32%.(Mali Sneha, Agriculture Market Analysing 2025) 2.

The agricultural sector plays a pivotal role in shaping the global economy, serving as a fundamental cornerstone for food security and livelihoods for millions. Innovations in farming practices, alongside advances in biotechnology, are paving the way for increased productivity and sustainability. As we confront the challenges posed by climate change, resource scarcity, and population growth, the importance of resilient agricultural systems cannot be overstated.

Investments in research and development, coupled with a focus on enhancing supply chains, are essential for meeting the evolving demands of consumers. Furthermore, sustainable agriculture practices foster the responsible use of natural resources, ensuring that future generations can reap the benefits of a thriving agricultural landscape. As we look towards the future, the integration of technology and eco-friendly methodologies will be instrumental in driving the sector forward, ultimately contributing to global economic stability and improved quality of life.

Planetary Boundaries breached because of Human Activities

The planetary boundaries framework underscores the escalating risks arising from human pressures on nine critical global processes that govern the stability and resilience of our planet. This indicates that a singular emphasis on climate change is insufficient for fostering enhanced sustainability. Rather, it necessitates a nuanced understanding of the interplay among these boundaries. Presently, humanity has transgressed six of the nine planetary boundaries essential for maintaining Earth's stability and resilience; which are 1) Climate change, 2) Biosphere integrity encompassing genetic diversity and the energy available to ecosystems. 3) Land system change, 4) Freshwater alterations pertaining to modifications across the entire water cycle over land, 5) Biogeochemical flows (nutrient cycles), and 6) Novel entities including microplastics, endocrine disruptors, and organic pollutants .The planetary boundaries framework elucidates the mounting risks stemming from human impact on these vital global processes. Consequently, a global focus solely on climate change is inadequate for achieving greater sustainability. Instead, it is imperative to comprehend the intricate relationships among these boundaries. "If your blood pressure exceeds 120/80, it does not guarantee a heart attack, but it does elevate the risk. The same principle applies here—the violation of individual boundaries does not signify immediate catastrophe but heightens the likelihood of triggering irreversible processes." (Global Agriculture)3

State of The World's Land and Water Resources System for Food

The Synthesis Report 2021 on the state of the world's land and water resources system for food and agriculture delineates its current condition, the challenges it faces, and the requisite responses and actions (FAO, 2021)4. Integrated solutions must be formulated to enhance land and water governance, and innovative technical and managerial strategies are imperative to alleviate land degradation and water scarcity. To effectively

scale these integrated solutions, they should be developed at all levels and systematically packaged as comprehensive programmes encompassing technical, institutional, governance, and financial support.

Complexities of India's Agriculture

Indian agriculture is thriving. Understanding its complexities—and its areas of opportunity—is critical for growth and value creation. Despite its complexity, India's agriculture sector is also host to multiple structural advantages that could create new opportunities and further accelerate growth.

As we confront the challenges of the planetary boundaries framework, it becomes evident that our survival hinges on a paradigm shift—one that prioritises ecological integrity and the sustainable management of resources over short-term economic gain. By embracing this transformative approach, we can navigate the delicate balance between human development and the preservation of the natural world, ensuring that future generations inherit a thriving and resilient planet. Only through concerted effort and unwavering commitment can we hope to reverse the trajectory of decline and foster a sustainable future for all life on Earth.

Similarly, the adoption of advanced technologies and novel management methodologies can significantly contribute to the rejuvenation of degraded soils and the mitigation of drought and water scarcity. Furthermore, fostering collaborative partnerships among governments, private sectors, and local communities is essential for the effective implementation of these strategies. By harnessing collective expertise and resources, stakeholders can create synergies that enhance the efficiency and sustainability of interventions aimed at improving land and water resource management. Emphasising knowledge dissemination and best practices will empower communities to take proactive measures in addressing their unique challenges related to land and water. In addition, policies must be carefully crafted to promote equitable access to resources, ensuring that marginalised populations are not left behind in the quest for enhanced food security and sustainable agricultural practices. By prioritising inclusivity and social equity, we can create resilient systems capable of withstanding the pressures of climate change and increasing environmental degradation. Ultimately, a concerted effort towards innovation, collaboration, and inclusivity will be indispensable in paving the way for a sustainable future, where the world 's land and water resources are managed wisely to nourish a growing population while preserving the delicate balance of our ecosystems. Some 97.85 million hectares (mha), constituting 29.7% of India's total geographical area (TGA) of 328.72 mha, experienced land degradation in 2021. India has pledged to combat land degradation and restore its ecosystems by 2030, identifying the attainment of land degradation neutrality as a pivotal strategy for recovering biodiversity.

Furthermore, the Government has initiated a multitude of schemes and programmes aimed at this endeavour, including the National Afforestation Program, the Green India Mission, and the Watershed Development Component of the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY). These initiatives collectively contribute to the ambitious target of rehabilitating 26 million hectares of degraded land and achieving land degradation neutrality, with an emphasis on the sustainable and optimal utilisation of land resources (G20 India, 1st Working Group Meeting, 2023)5.The commitment to restore eroded landscapes is underscored by a holistic approach that integrates environmental conservation with community engagement. The Government recognise that fostering local participation is essential for the success of these initiatives, urging stakeholders, including local communities, ecologists, and policymakers, to collaborate in these restorative efforts.

Safeguarding Water Resources in India

About 53.3 per cent of total precipitation is forfeited due to evapotranspiration, resulting in a residual water availability of 1869 BCM. Approximately 40 per cent of the potential water resources cannot be harnessed for beneficial purposes due to topographical limitations and the uneven spatial and temporal distribution of these resources. Consequently, the estimated utilisable water potential stands at 1123 BCM, comprising 690 BCM of surface water and 433 BCM of groundwater (NITI Aayog, April 2023; Ministry of Water Resources (MoWR); and National Commission for Integrated Water Resources Development (NCIWRD))6.

The irrigation requirements, as projected by the National Commission for Integrated Water Resources Development, presuppose an enhancement of irrigation efficiency from the current range of 35 to 40 per cent to 60 per cent (Government of India, Ministry of Water Resources, 2006)7. NITI Aayog has formulated a Composite Water Management Index, serving as a valuable instrument for evaluating and advancing the performance in the efficient management of water resources. This index encompasses a framework of nine themes and 28 key performance indicators (KPI).This meticulously designed index not only facilitates a nuanced understanding of water resource management but also promotes accountability and strategic planning across various sectors. By utilising these comprehensive metrics, stakeholders can effectively identify gaps in water governance and implement targeted interventions to enhance sustainability.

Balancing Demand Side (Ecological Footprint) and Supply Side (Biocapacity)

A widely recognised metric of sustainability, the Ecological Footprint offers a comprehensive, multiscale framework for monitoring the utilisation and overexploitation of natural resources, along with the resultant effects on ecosystems and biodiversity (Mancini, M.S. et al., 2018; Galli, A. et al., 2014)8. The Ecological Footprint operates as an account-based system of indicators, premised on the understanding that Earth

possesses a finite capacity for biological production that sustains all forms of life (Wackernagel et al,2018)9.

In 2024, India's per capita ecological footprint reached approximately 1.19 global hectares (gha), an increase from about 0.8 gha in 2014, a trend propelled by economic advancement. The nation's total ecological footprint encompasses roughly 1.6 billion hectares, with its Earth Overshoot Day occurring on 1st August 2024, signifying the moment when its resource consumption surpassed the regenerative capacity of its ecosystems for the year. India accounts for approximately 6% of the global ecological footprint and 4% of the world's biocapacity. This alarming trajectory underscores the urgent necessity for India to implement sustainable practices that mitigate environmental degradation.

Ecological Deficit/Reserve

Ecological deficit occurs when a population's ecological footprint exceeds the biocapacity. Biocapacity Creditors are those countries where the biocapacity is greater than the footprint and are classified into four groups as >150%, 100% - 150%, 50% - 100%, and 50% - 0%. Similarly, Biocapacity Debtors are those countries where the footprint is greater than biocapacity and are also classified into four groups as >150%, 100% - 150%, 50% - 100%, and 50% - 0%.

For our current population to be sustained, 1.75 Earths would be requisite. By 2050, should the prevailing trends persist, the demand will escalate to three Earths. How do we progress from this juncture? (World Population History)10. The implications of such an unsustainable trajectory necessitate urgent introspection and intervention across multiple domains. It is paramount that we re-evaluate our consumption patterns, enhance resource efficiency, and innovate sustainable practises.Collaborative efforts on a global scale will be indispensable in curbing population growth and mitigating environmental degradation.

As we navigate this critical juncture, it is essential to galvanise policymakers, communities and individuals towards a shared vision of sustainability. Through concerted action and unwavering commitment, we can aspire not just to sustain our current populace but to thrive within the ecological parameters of our planet, ensuring a legacy of harmony between humanity and the natural world for generations to come. In 2025, there exist 96 nations grappling with a Biocapacity Deficit, with India at -78% and the global average at -240%. The nation with the most minimal deficit is Honduras at -6%, while Singapore exhibits an astonishing deficit of -34,000%. Conversely, there are 46 countries classified as Biocapacity Creditors, with Ecuador at 0% and Gabon exhibiting the highest surplus at -663%.(Global Footprint Network, York University, and the Footprint Data Foundation, 2025)11.

India's Agriculture towards 2047

India's agriculture sector ranks among the largest and most rapidly expanding globally. Over the past six years, it has experienced an annual growth rate of 5 per cent, propelled by structural reforms and heightened formalisation. This expansion is anchored within a vast and diverse ecosystem. Across the nation, the sector is characterised by a fragmented landscape of farmers and value chains, rendering the profitable scaling of solutions a formidable challenge.

Foremost among these structural advantages are a burgeoning domestic consumer base, competitive manufacturing costs, favourable feedstock conditions, an evolving digital infrastructure, and a culture of innovation. Should these structural advantages evolve as anticipated, India's agricultural economy has the potential to ascend to $1.4 trillion by 2035 and $3.1 trillion by 2047 in the most accelerated growth scenario (Mckinsey & Company, June 4, 2025)12. To harness this remarkable potential, it is imperative to address the existing challenges within the sector. Enhancing productivity through the adoption of modern agricultural practices, investing in sustainable technologies, and fostering collaboration among stakeholders will be crucial. Moreover, the establishment of robust supply chains and the integration of advanced data analytics can facilitate more efficient resource allocation and market access for farmers. Furthermore, governmental policies aimed at incentivizing innovation and bolstering rural infrastructure will play a pivotal role in transforming the agricultural landscape. By prioritising education and skill development within agrarian communities, India can equip its workforce to adapt to changing market dynamics and technological advancements. India stands on the threshold of a transformative era. Its overall economy is poised to become the third-largest globally by 2030, following the United States and China, surpassing other significant economies such as France, Germany and Japan. The Indian economy is set to become $6.6 trillion economy after China ($22.2 trillion) and the USA ($28.4 trillion) by 2030, leaving behind Japan ($6.4 trillion)and Germany ($4.5 trillion) (Karmik Madhuri, July 21, 2022)13

As the agricultural sector evolves, it will also significantly contribute to food security, not only for the burgeoning population of India but also for the global market. The nexus between agriculture and environmental sustainability must be fortified to ensure long-term resilience and ecological balance. In conclusion, India's agricultural sector stands as a beacon of opportunity, with the potential to reshape the nation's economic landscape. By leveraging its inherent advantages and strategically addressing the prevailing challenges, India can pave the way towards a prosperous and sustainable future, solidifying its position as a leader in the global agricultural arena. The journey ahead is fraught with challenges, yet brimming with opportunities for those willing to innovate and collaborate.

India’s Agricultural boom: Built on a complex foundation

Over the past six years, India’s agricultural sector has experienced an annual growth rate of 5 per cent. The Indian government has implemented a multitude of structural reforms that have bolstered the agriculture sector, including the E20 ethanol blending mandate, an import substitution initiative for pulses, the Digital Agriculture Mission, and the Kisan Credit Card programme. Substantial investments have been made in agriculture, exemplified by the Agriculture Infrastructure Fund. Furthermore, the increased formalisation of the sector has catalysed growth; agricultural financing has surged by over 14 per cent annually from 2022 to 2024, reaching approximately $292 billion today, while the nation's supply chains have been optimised through cooperatives.

Major consequences

About 50% more sustenance would be required, coupled with a diminishing area per capita (from 0.61 hectares in 2018 to 0.49 hectares by 2047). There are diminishing prospects for any substantial reduction in the number of undernourished individuals (957 million) and malnourished populations (approximately 700 million). The escalating pressure on natural resources is exerting a severe impact on land quality and the targeted growth rates of food grain productivity, which have already declined from peak values of roughly 3% to 1.5%. In the absence of sustainable intensification processes, the degradation of soil, water, and biodiversity will exacerbate the erosion of agricultural resilience. Furthermore, without appropriate interventions, the uncertainties surrounding global warming and climate change will become increasingly unpredictable, further influencing agricultural production. Rising incomes and the unfolding dynamics of globalisation are driving an augmented demand for non-cereal and nutrient-dense foods (such as pulses, fruits, vegetables, and animal products), alongside a growing desire for affordable, safe, and nutritious options. The shift in dietary preferences necessitates a recalibration of agricultural strategies to accommodate the burgeoning demand for these diverse food sources. Policymakers and agricultural stakeholders must prioritise innovative practices and technologies that enhance production efficiency while safeguarding environmental integrity.

Embracing agroecological approaches and regenerative practices can play a pivotal role in mitigating the adverse effects of agricultural expansion on ecosystems. Such strategies not only promote the sustainability of vital natural resources but also fortify the resilience of farming systems against the unpredictable repercussions of climate change. Moreover, fostering collaborations among governments, research institutions, and the private sectorwill be essential in driving agricultural innovation. Investment in research and development is imperative to explore resilient crop varieties, enhance soil fertility, and improve water management techniques. To thrive in this complex and evolving landscape, the emphasis must be placed on creating inclusive food systems that ensure equitable access to nutritious food for all populations. By aligning

agricultural practices with the principles of sustainability and equity, we can work towards a future where food security is not merely an aspiration, but a fully realised reality.

Vision and Mission for Agriculture in 2047

Vision

By 2047, India aspires to become a Vishwaguru in agricultural science and innovation to attain sustainable food and nutritional security, improve the environment, and fulfil the zero-carbon emission commitment (Joshi, 2025).

Mission

Transform the agricultural research, education and extension system to improve efficiency and global competitiveness in high-tech sectors, digital power and unicorn value (Aileen Lee) to ensure food and nutrition security, economic prosperity with social inclusion, environmental sustainability and zero carbon emissions (Joshi, P.K.2025)14.

Summary

India's agricultural sector is vital for its economy and global food security, facing challenges like climate change and resource scarcity while striving for innovation. India is a leading producer of milk, jute and pulses and the second-largest producer of rice, wheat, groundnuts, sugarcane, vegetables, fruits and cotton. This highlights its significant role in global food production.

Organised agriculture began in West Asia, specifically in Jermo, Mesopotamia, around 7090 BC,marking a transition from nomadic to settled life with crop cultivation. This represents the roots of agriculture and its impact on societal development. Today's agriculture feeds 8.02 billion people, utilising 6,000-7,000 crop species, with a global market valued at $12.12 trillion in 2024, projected to reach $12.97 trillion in 2025. This underscores the vast scale and economic importance of modern agriculture.

Humanity has exceeded six of nine planetary boundaries, including climate change, biosphere integrity, land system change, freshwater alterations, biogeochemical flows, and novel entities. This emphasises the environmental risks associated with human activities and the need for sustainability. In 2021, 29.7% of India's land area (97.85 million hectares) experienced degradation, prompting initiatives like the National Afforestation Program and Green India Mission. This highlights the challenges of land degradation and efforts to combat it. India loses 53.3% of precipitation to evapotranspiration, with only 1123 BCM of water utilisable due to topographical and distribution issues. The government aims to improve irrigation efficiency from 35-40% to 60%. This focuses on water resource challenges and management strategies. India faces pressing challenges in water resource

management, ecological sustainability, and agricultural development, all of which are interconnected and crucial for its future. NITI Aayog's Composite Water Management Index evaluates and promotes efficient water resource management using nine themes and 28 key performance indicators. This index facilitates understanding, accountability, and strategic planning in water governance. India's ecological footprint reached 1.19 global hectares per capita in 2024, up from 0.8 gha in 2014. The Earth Overshoot Day occurred on 1st August 2024, indicating resource consumption exceeded the year's regenerative capacity. India accounts for 6% of the global ecological footprint and 4% of the world's biocapacity, highlighting the need for sustainable practices. Many countries, including India at face biocapacity deficits of -78%, with the global average at -240%. This deficit underscores the urgency for re-evaluating consumption patterns, enhancing resource efficiency, and innovating sustainable practices. India's agriculture sector, valued between $580 billion and $650 billion, has grown at 5% annually over the past six years. This growth is supported by structural reforms, a large domestic consumer base, and evolving digital infrastructure. India's agricultural economy could potentially reach $1.4 trillion by 2035 and $3.1 trillion by 2047. This requires addressing challenges by enhancing productivity, investing in sustainable technologies, and fostering collaboration among stakeholders (Mckinsey Company, June 4, 2025) 12.

Major challenges include the need for 50% more sustenance, diminishing land per capita, and slow reduction in undernourished populations. Degradation of soil, water, and biodiversity exacerbates these issues, necessitating sustainable intensification processes. Rising incomes and globalization drive demand for non-cereal and nutrient-dense foods, requiring a recalibration of agricultural strategies to accommodate diverse food sources.

Embracing agroecological approaches and regenerative practises is vital for mitigating the adverse effects of agricultural expansion. Collaboration among governments, research institutions, and the private sector is essential for agricultural innovation. As far as the Vision and Mission for Agriculture in 2047 are concerned, India aims to become a Vishwaguru in agricultural science and innovation by 2047, ensuring sustainable food and nutritional security and zero-carbon emissions. The mission involves transforming agricultural research, education, and extension systems to improve efficiency and global competitiveness. Addressing these interconnected challenges through sustainable practices, strategic planning, and collaborative efforts is essential for India's long-term resilience and prosperity.

References

1. Wikipedia. https://en.wikipedia.org/wiki/Jarmo , accessed on 20.04.2023

2. Mali,Sneha. Agriculture Market Analysis 2025. Report ID: CMR 555637. 8 th Edition.

3. Global Agriculture. Six of nine planetary boundaries crossed, scientists warn - GlobalAgriculture . Six of nine planetary boundaries crossed, scientists warn - Global Agriculture

4. FAO. 2021. The state of the world's land and water resources for food and agriculture – Systemsat breaking point. Synthesis report 2021. Rome. https://doi.org/10.4060/cb7654en

5. G20 India: 'Arrest Land Degradation, Restore Ecosystem', discussed at 1st Working GroupMeeting focused on environment, 13 February 2023.

6. NITI Aayog, April 2023; Ministry of Water Resources (MoWR); and National Commission for Integrated Water Resources Development (NCIWRD)).

7. Government of India, Ministry of Water Resources (2006). Report of the Working Group onWater Resources for the XI Five Year Plan (2007-12) New Delhi, December 2006.

8. Mancini, M.S.; Galli, A.; Coscieme, L.; Niccolucci, V.; Lin, D.; Pulselli, F.M.; Bastianoni, S.;Marchettini, N. 2018. Exploring ecosystem services assessment through Ecological Footprint Accounting. Ecosyst. Serv. 2018, 30, 228–235. [Cross Ref)

9. Wackernagel, Ma.; Galli, A.; Hanscom, L.; Lin, D.; Mailhes, L.; Drummond, T. 2018. Chapter 16: Ecological Footprint Accounts: Principles. In Routledge Handbook of Sustainability Indictors; Bell, S., Morse, S., Eds.; Routledge International Handbooks; Routledge: Abingdon, UK, 2018; pp. 244–264.

10. World Population History. https://worldpopulationhistory.org/carrying-capacity/

11. Global Footprint Network-Advancing the Science of Sustainability. Ecological Footprint.https://www.footprintnetwork.org/our-work/ecological-footprint/, accessed on 17.04.2023.

12. Mckinsey Company, June 4, 2025. value Creation in Indian Agriculture. 4th June 2025.13. Karmik Madhuri, 2022. .By 2030, India will be the world's third largest economy—ahead of France and Germany. Markets. July 21,

14. Joshi, P.K. 2025.Indian Agriculture: Vision 2047. In Pathak, H., Joshi, P.K., Lakra, W.S., Singh,A.K., Baranwal, V.K. and Jain, R.K. (2025). Indian Agriculture by 2047: A Roadmap for Research, Education and Extension. National Academy of Agricultural Sciences, New Delhi.

From Innovation to Inclusion: Role of People's technology

K K Satapathy , Former Director , ICAR-NINFET and Former President , Aricare , Kolkata

We live in a breath-taking acceleration. Artificial intelligence is reshaping industries, biotechnology is redefining life itself and quantum computing promises to solve problems, we once thought impossible. Yet amidst this whirlwind innovation, a crucial question echoes:Is it in true sense, for the people. For far too long, technology has been perceived as the domain of a privileged few, confined to glass walled labs, elite institutions and corporate board rooms. The narrative around technology has centered on disruption and market capitalization. While innovation is crucial, our core focus must shift. We must ask a more fundamental question: How does the technology serve common person. In a nation as vast as diverse as ours, technology is not a luxury. It is the most powerful liver for equitable development. It is a tool that can leapfrog decades of conventional progress bridging the gaps between rural and urban, rich and poor, educated and uneducated; the technology must be a force of empowerment not exclusion. The technology when steps out of laboratories and meets the wisdom of ordinary people, it becomes a transformative force to place the power of innovation in the hands of common man.

In today's rapidly changing world, the challenges before us such as climate adaptation, sustainable agriculture, equitable access to digital resources demand not only innovation but also inclusiveness where traditional knowledge meets cutting edge technology where grass root understanding guides global innovation. we would like to envisage a future where farmers are using AI to predict crop yield, the fisherman tracking weather pattern on their smart phones, the students in a remote village learns to code on a low-cost tablet. We must move beyond seeing our citizens mere consumers of technology and start seeing them as its creators and masters. The true measure of technology lied not only in patents or prototypes but lives it changes, the barrier it breaks and communities it uplifts. This means fostering digital literacy that is as fundamental as reading and writing. It means creating tools in local languages, designing institutive interfaces for the nontech savvy and ensuring that a woman in a self-help group can use a digital platform as effortlessly as a financier in metropolitan skyscraper.

There should be a **peoples' technology** movement which provides a platform where academia meets artisan, where startups collaborate with street vendors where policy makers listen to pulse of the people. We must move beyond simply adopting global trends to become global leaders in creating human centric technology models. The conversation should be dedicated making technology truly democratic and inclusive focusing actionable outcomes –innovations that are scalable, affordable and adaptable to grass root realities. There are free software movements in India sometimes frames itself as 'peoples technology' against corporate monopoly. There are movements, organizations that teach villagers,3D printing, LNC machines, IOT for agriculture and the like, **The core principles** are:

- Technology must be affordable by the poorest

- It must create more employment than it displaces
- Local resources and skills should be used
- Women's drudgery must be reduced
- Ecological limits must be respected
- Knowledge should not be patented or enclosed; it belongs to community.

The **primary focus of peoples' technology** remains uplifting of rural economy and quality of life. Some examples:

- Agriculture: Precision farming, mobile based agro advisories, remote sensing, and drones for crop and health monitoring
- Health: Telemedicine and mobile health workers using technology for diagonistics and consultation in remote areas. Low cost sanitary and sanitary pad manufacturing machines.
- Energy: Decentralized, affordable solutions like solar powered irrigation pumps and community biogas plants
- E governance: Digitization of land records, citizen service portals, and efficient public service delivery.
- Handicraft and small manufacturing tools designed for local artisan skilldevelopment.

We must take the **cutting-edge research** translate it into accessible local language tools that our communities can use immediately.

Beginner's Guide to Start a Goat Farm

Asok Biswas , Chief Technical Officer , ICAR – CIFE , Regional Centre , Kolkata

Goat farming in India is a very profitable business with minimum investment. Goat farming can be done in small scale. Therefore, goats are rightly called poor man's cow. Goat farming in India is a well-established, antiquated form of farming especially in places where dry land farming system is practiced. It is generally practiced by farmers who have a very small area of land for farming. Sometimes landless laborers

also undertake goat farming since the risk, initial investments etc. are much lower than other forms of farming.

Advantages of Goat Farming in India

Some advantages of the goat farming - i) almost all sections of the society consume goat meat, ii)initial investment required for a goat farm is much low than dairy farming, iii) farm can be started with just one goat and gradually increased to a herd, iv) goats can tolerate bitter taste to a greater extent than other animals, hence, they consume almost every type of plants that are not eaten by other animals, v) goat milk contains small fat globules that are easily digestible, so goat milk is medically recommended for senior citizens and infants, vi) goats are productive breeders and give birth to three kids within two years and producing twins is a usual feature. Considering all these advantages, it can be said that goats ensure good economic returns in a short period of time.

Black Bengal Goat

For beginner Black Bengal goat farming, focus on sturdy, ventilated housing, balanced feed (green fodder and concentrate), consistent health care (vaccines, deworming), and good management practices like ensuring clean water and dry bedding etc. Black Bengal goats are most commonly found in Assam, West Bengal, Odisha and Bihar. These goats are usually black in colour and are used for both milk and meat purposes. The milk of Black Bengal goats is rich in protein, vitamins and fat. On the other hand, they also provide high quality meat. Goats around eight weeks of age are cheaper and easier to procure than older goats.

Housing

The house/shed should be built on such land that has no waterlogging issues. Elephant grass, rice straw, bamboo, wood, etc. are used to build the house. The goat cage should have a good amount of ventilation system. The slope should be arranged in such a way that water can drain easily and the place is easy to clean.

Feeding

Goats are very cautious eaters and can tolerate bitter food more than other animals. They consume agricultural by-products, waste and other food. Goats can graze on very small grasses, bushes, shrubs and trees. It should be provided with pulses like pulses along with grains like pulses, wheat, maize etc. They generally prefer pulses over hay. Baby goats are given 100 grams of concentrate mix per day; adult goats are given 200-250 grams of concentrate mix per day. On average, each adult goat consumes 5-7 kg of green food and one liter of water per day. Goats eat fruits, flower buds, twigs and leaves of almost all species of trees. Therefore, the cost of carrying it is less than other domestic animals. Their favorite food is high-quality grass such as hybrid napier grass,

maize, oats, hay, leaves of almost all types of trees etc. A mixture of plant leaves, grass and grain concentrate can be given to the goats, which will help in gaining weight and preventing many diseases. Newborn goats should be fed colostrum immediately after birth and for five days thereafter. This will help in improving the Goat's immunity.

Composition of concentrate feed mixture

Ingredient	Kid Ration	Adult Ration
Ground gram	20	15
Crashed Wheat	20	35
Til Cake	35	25
Wheat Bran	20	20
Mineral Mixture	04	04
Salt	01	01
Total	100	100

Breeding Management

Goats mature by the age of 12 months. However, it also depends on the size, body weight and breed.Estrous cycles usually occur every 17-21 days. A goat is in heat suitable for breeding for 18 to 36 hours. To increase the rate of conception, it is kept with a male goat from 10 to 15 hours after the onset of heat. The gestation period lasts for 155 days. Female goats can be used for breeding purposes for 5 to 7 years. For breeding, one male is kept with fifteen to twenty female goats. Usually, male kids are raised for better meat. Therefore, they are castrated at the age of 1-2 months.

Care of Newborn Goat Kids

The nasal and oral mucosa of newborn goats should be cleaned immediately after birth. The umbilical cord should be cut 2.5 cm away from the goat's body. Tincture of iodine or other such antiseptic should be applied to prevent infection and umbilical cord disease. After delivery, the uterus of the goat should be cleaned and disinfected with antiseptic lotion. Immediately after birth and for the next 5 days, the kid should be fed colostrums milk. If more than 2 kids are born, then arrangements should be made to feed the extra kids. Kids can be fed bottled milk up to 2 months age. In winter, hay should be used as bedding to protect the kids from the cold. In summer, kids should be fed glucose energy drinks to avoid heat stroke.

Health Management

Sheds should be thoroughly washed and disinfected at least once a month. Food and water containers should be cleaned regularly. Goats are at risk of intestinal parasite infection. Therefore, deworming should be done once in every six months. Kids are to

be dewormed every three to four months. Animals should be sprayed regularly to avoid lice, mange, etc. Vaccinations should be given regularly against diseases such as goat pox, PPR, FMD, etc. If an infection is detected, sick goats should be isolated immediately and medicine should be given on time.

Vaccination

Prevention is better than cure. An important tool for disease prevention is vaccination. The animal should be free from parasites before vaccination. Name of disease Primary Revaccination Route Dose

Name of the Disease	Primary	Revaccination	Route	Dose
Peste des Petits Ruminants (PPR)	4 months	1 year	Subcutaneous	1 ml
Goat Pox	5 month	According to the Manufacturer's instructions	Subcutaneous	As per Instructions
Foot and Mouth Disease(FMD)	3 months	As per Instructions	Subcutaneous	2 ml
Anthrax	6 months	As per Instructions	Subcutaneous	1 ml

Goat Diseases

Diseases are one of the main causes of loss in goat farms. To raise goats profitably, emphasis must be placed on farm health management. If proper measures are taken against diseases in time, it becomes impossible to avoid losses to the farm. Therefore, utmost importance must be given to disease prevention activities on the farm.

1. Pneumonia

Pneumonia is a serious respiratory disease in goats, usually caused by three types of causes:Causes: 1. Bacterial pneumonia: Pasteurella and other bacteria are the main causes. Spread by cold,dust, contact with infected goats, 2. Viral pneumonia - usually mixed with bacteria to cause complicated pneumonia, 3. Environmental and other causes - sudden temperature changes, unsanitary environment, longterm exposure to rain or cold Symptoms: Increased body temperature (104 - 106° F), runny nose and pus, cough and hoarseness, loss of appetite. Treatment: 1. Antibiotics (for bacterial pneumonia) Oxytetracycline - 10 mg/kg body weight intramuscular injection, 2. Anti-inflammatory and antipyretic drugs: Paracetamol - used to reduce fever, 3. Measures to reduce respiratory distress - the affected goat should be kept in a clean and warm place, ensuring a dust-free environment. Vitamin supplements (especially vitamins A, C and D) help in speeding up recovery.

2. Peste des Petits Ruminants (PPR)

Goat PPR disease is a deadly disease. When infected with this disease, a yellow substance is released from the mouth of the animal; the goat has fever, diarrhea, difficulty breathing, etc. symptoms appear. The mortality rate of goats infected with this disease is about 90 percent. Cause: Goat PPR disease is a viral disease. The virus of the disease is released from the goat's saliva,fluids coming out of the nose or mouth, etc. Unclean environment is a major reason for the spread of this disease. **Symptoms:** The goat suddenly develops fever - the temperature can be between 105 and 107 degrees fahrenheit, a kind of dark fluid starts coming out of the nose, ears, mouth and even the

eyes, the nose may become blocked. Due to which the goat has difficulty breathing. Another symptom is that the affected goat becomes affected by diarrhea. A kind of small sore can be seen on the soft parts of the goat such as the tongue, teeth, palate, etc., a kind of white substance starts coming out of the goat's eyes. Treatment: PPR disease in goats is a fatal disease. The chances of survival of the goat are low. Even then, it may be possible to save it if some effective steps are taken. Secondary bacterial and parasitic infections should be treated with antibiotics. Two drugs called oxytetracycline and chlortetracycline can be applied. To heal the wounds in the goat's mouth, the mouth should be washed with 4.5% boro-glycerin.Prevention: Regularly applying the PPR vaccine to the goat increases the immunity of the goat and there is no possibility of infection. Therefore, farmers should apply the PPR vaccine to the goat every year.

3. Worm infestation

Worm infestation in goats is a very common problem that can cause food intake problems, weight loss, and can lead to death due to severe infections. **Symptoms**: Symptoms may vary depending on the type of worm - loss of appetite, weight loss, loose stools sometimes with blood, and a swollen abdomen. 1. Mucous or bloody stools - caused by worm infestation in the digestive tract.2. Shortness of breath and coughing - seen if worms are in the lungs.3. Rough and dull fur - due to lack of nutrients in the body, the fur becomes rough and discolored.4. Itching around the anus - some worms lay eggs near the anus, causing itching.5. Water retention or anemia (anemia) - especially in bloodsucking hookworm infestation.Treatment: Various deworming drugs are used for worm disease in goats. For stomach worms: Albendazole – 7.5-10 mg/kg body weight.For lung worms: Ivermectin – 0.2 mg/kg body weight by injection. For liver worms: Triclabendazole – Effective in eliminating liver flukes. Dosage: Deworming drugs should generally be given every 4-6 months. If the infection is severe, the dosage can be increased on the advice of a veterinarian. Safe deworming drugs should be used for pregnant goats. Prevention: Maintain cleanliness – keep the farm soil, grass and food area dry and disinfected. Regular deworming – administer deworming drugs every 4-6 months. Adequate nutritious food, ensure good food to increase immunity.

4. Anthrax

Cause: Anthrax is caused by the bacterium Bacillus anthracis. The spores of this bacterium remain active in soil for a long time and enter goat's body through grass. Symptoms: Sudden high fever (up to 106°F), body shaking, weakness, reluctance to eat, black blood coming out of the nose, mouth and anus, swelling in the throat, under the skin and in various parts of the body, in many cases death within 24-48 hours. Treatment: Penicillin and Oxytetracycline – if applied quickly, the infection can be controlled, body of anthrax-infected animals should not be cut or burned, as it can spread disease. Prevention: Annual anthrax vaccination. Do not bring new goats into anthrax-infected areas. Properly bury or burn dead goats.

5. Brucellosis

Cause: Brucellosis is caused by the bacteria Brucella melitensis. It is usually spread through the secretions of aborted goats, milk or contact with infected animals.**Symptoms:** Abortion (most often at 4-5 months), stillbirth, infertility, decreased milk production. In some cases, swelling of the leg joints.Treatment: There is no effective treatment for it; the affected animal must be isolated. Antibiotics such as Oxytetracycline can be used in some cases, but it does not provide a complete cure.Prevention: Use of brucellosis vaccine. Disinfection of aborted goat secretions, feces and all contaminated objects. Do not feed the baby goat with milk from an infected mother.

6. Goat Pox

Cause: It is caused by a virus called goat pox virus. It is spread through the air, saliva, wounds or secretions of infected animals.**Symptoms:** Small sores and blisters on body, fever, weakness and reluctance to eat, pus discharge from nose and eyes. If severe, lung infection can lead to death. Treatment: There is no specific antiviral medicine for goat pox. Antibiotics (Oxytetracycline) can be used to prevent bacterial infection. Clean the wound and apply antiseptic. Give nutritious food and vitamin C to increase immunity. Prevention: Give goat pox vaccine. Quickly isolate the affected animal. Maintain cleanliness and use disinfectants in farm.

7. Foot and Mouth Disease (FMD)

Cause: FMD is one of the highly contagious and severe viral diseases of cloven-hoofed animals.Although FMD can occur in all seasons, the disease is usually more prevalent at the end of the rainy season. Symptoms: Body temperature rises; sores or wounds form on tongue, gums, entire oral cavity, and between the hoofs. As a result of the sores, saliva flows from mouth and white foam comes out. Sometimes blisters form on hooves. The animal starts to lick hooves and has difficulty eating due to sores or wounds in mouth. The animal becomes weak in a short time. The goat cannot eat, and as a result, it becomes weak. If this disease occurs in young goats, they die. Treatment: The affected animal should be kept separate from healthy animals. The

wounds of the sick animal should be washed with water mixed with potash. 10 grams of alum mixed in 1 liter of water should be used to clean mouth. Sohaga khoai and honey should be mixed and applied to the mouth sores. Soft food should be given. The animal should be kept on a dry floor; under no circumstances should it be kept in muddy soil or wet places. 40 grams of baking soda mixed in 1 liter of water should be used to clean the foot sores and then sulfonamide powder should be applied.Prevention: Animal should be vaccinated twice a year (according to the manufacturer's instructions) in a healthy condition.

8. Mastitis

Cause: Mastitis or udder inflammation in dairy goats is caused by 18-20 types of bacteria, including bacteria, viruses, mycoplasma and fungi. Symptoms: In this disease, udder of the goat becomes red and swollen, becomes hard, feels hot when touched with the hand, milk sediment falls into the container when milking, milk production decreases, taste of milk may be salty, in severe cases, pus forms inside the udder. Later, blood comes with milk and it smells bad. There is pain in the udder, so the cow does not want to milk or suckle the baby. Treatment: In the treatment of the disease, antibiotics such as oxytetracycline, benzylpenicillin, cloxacillin, amoxicillin, ampicillin, or erythromycin are recommended for the treatment of mastitis. Antibiotics treatment recommended for 5 days. In addition to this, applying antibiotic cream to udder may be helpful. Prevention: Proper milking practices, good hygiene for milking utensils, and elimination of persistent infectious agents help reduce the incidence of this disease.

9. Goat Diarrhea

Goat diarrhea can be caused by various reasons. Causes: 1. Infection: Bacteria, viruses, parasites (worms and protozoa); 2. Dietary causes: Sudden food change: If you can to get used to new food quickly, excess sugary foods: such as corn, wheat, and other grains, poisonous grass or rotten food, milk digestion problems: In the case of baby goats, it can be due to excessive milk consumption. 3. Environmental causes: unhealthy environment and drinking dirty water, getting wet in rain or weakening the body due to cold weather. **Symptoms:** Symptoms may vary depending on severity and type of diarrhea - thin, foul-smelling stools (often mixed with blood), dehydration, sunken eyes, dry skin, and fever (for bacterial or viral infections). Treatment: 1. Prevention of dehydration: ORS or electrolyte solution: Mix 1 teaspoon of salt and 2 teaspoons of glucose with 1 liter of water and feed several times a day. If diarrhea is severe, Ringer's Lactate or normal saline should be injected. 2. Control of infections: Sulfa drugs (Sulfaquinoxaline or Sulfamethazine) for bacterial infection; Toltrazuril or Amprolium for coccidiosis; Albendazole or Fenbendazole for the treatment of worms. 3. Food and nutrition: Reduce milk and feed warm water and electrolyte mixture, feed quickly digestible food (such as soft hay, dry grass), give probiotics and multivitamins. Prevention: Ensure a clean and germ-free environment. Provide proper nutrition and good quality feed and water, regular deworming recommended. Give anticoccidial medication to kids, change of feed must be done gradually over a period of 7 to 15 days to prevent digestive upsets.

Black Bengal Goat Farm

Aricare under Rural Livelihood Development programme has started distribution of 5 month old female goat kid to the villagers of Sonarpur Block in collaboration with Sasya Shamalya Krishi Vigyan Kendra , RKMVU (Belur Math) at Sonarpur wih a purpose to develop a Goat village in Nayapattan and all necessary technical support would be provided to the villagers by KVK and 18 nos of Doelings / Bucklings Goat were supplied to the villagers.In the village there is a female farmer possessing 100 nos of Black Bengal Goat doing a profitable business with the rearing of Black Bengal Goat.Traning to rear the Black Bengal Goat was also imparted to the farmers to keep and rear Black Bengal Goat in a scientific manner.

Doelings /Bucklings in Farmers' Field (**An initiative of Aricare**)

News/Technology Summary

World's Largest Rice Producer

With the rice production crossing 150 million tonnes , India may have the distinction of producing the highest quantity of rice exceeding China (145 million tones) but this distinction reflects policy distortion ,ecological stress , agrarian distress, not agricultural strength.More Rice production causes water depletion , soil degradation ,climatic stress and increases dependence on chemical fertilizers.

(Source : www.linkedin.com/pulse/who-stands-smart-agricultural-policy-making-india-vs-china)

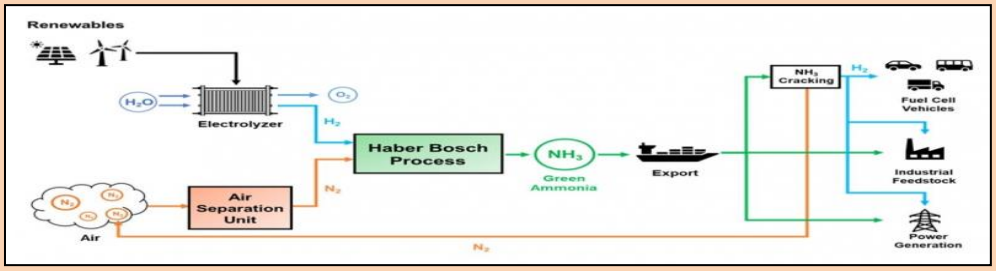
Alarm Bell : Jute in West Bengal on Path to Extinction – Save the Golden Fibre from Peril

West Bengal remains the dominant jute producer in India historically contributing 60-70 % of national jute cultivation.However area under Jute has been falling sharply continuing a downward trend since 2022. Jute acreage ,in 2024-25 is dropped to 4.18 lakh hectares down from 5.13 lakh hectares in 2020.The current crisis is due to distorted procurement ,weak diversification , mill inefficiencies , absence of quality products , poor market demand , absence of proper jute diversified products and so on.

(Source :www.linkedin.com./pulse.alarm-bell- jute-west-bengal-path-extinction –mukti-sadhan-basu-ph-d-1hghc)

Green Ammonia

Ammonia is a primary Nitrogen source. Global ammonia production in 2023 has reached around 150 million metric tons, primarily using the traditional Haber-Bosch process of ammonia synthesis, which relies heavily on fossil fuels and contributes to a substantial carbon footprint. Green ammonia has emerged as a sustainable alternative. Unlike conventional ammonia synthesis, green ammonia is produced through clean and renewable energy sources. To produce green Ammonia , Hydrogen can be obtained from water through electrolysis and Nitrogen is separated from air using renewable energy.However, issues like high initial production costs along with significant capital investments required for renewable energy infrastructure are major concerns in green ammonia production technology.



(Source : Ahire et al , 2025 , Journal of Indian Society of Soil Science , Vol 73 , No 3 , pp 316-323.)

World's Most Expensive Rose

Juliet Rose is the most rarest and expensive rose in the World ,introduced by the renowed British breeder David Austin . It took 15 years to create this peach-apricot hued beauty , becoming a staple in luxury weddings for its distinc cupped , layerd petals and delicate , fragrant charm. It sells Rs 14.5 lakh per stem.

(Source : The Times of India , Calcutta Times , January 23 , 2026)

Electric Eels

Electric eels (*Electrophorus electricus*) are masters of biological engineering , utilizing specialized organs to generate discharges ranging from 600 to 800 volts.These creatures , available in Amazon are actually type of knifefish rather than true eels . This massive surge of energy allows them to navigate murky waters , defend against threatsand immobilize preys with surgical precision. These living generators represent one of the most extreme examples of electrical adaptation in Nature. Electric eels are primarily used in Research in order to study bioelectricity , neurological processes,and as a model of developing flexible biocompatible batteries for medical implants like pacemakers etc.

(Source : Catania KC (2019) The Shocking Predator , Scientific American .)

Obituary

(February 15 ,1951 – December 11, 2025)

We in Aricare are shocked and heartbroken by the sudden demise of Dr Bimal Kumar Bandopadhyay, Former Principal Scientist & Head , Regional Station ,Canning Town (WB) , ICAR-CSSRI and offer our deep sense of condolences to the bereaved family members in this sorrowful period. It may be pertinent to mention that Late Dr Bandopadhyay had visualized the necessity of an association to address redressal of retired ICAR Employees at Kolkata and thereafter had worked assiduously for the formation of this ICAR Retired Association (Aricare) since its inception . **May his Noble Soul attain the highest Heavenly Abode .**