108TH INDIAN SCIENCE CONGRESS
RTM NAGPUR UNIVERSITY, NAGPUR
3-7 JANUARY, 2023

RECOMMENDATIONS FROM SECTIONS

Section: Agricultureand Forestry Sciences

1. Soil research innovation for sustainable natural resources management on soil properties can be managed for optimal agricultural production.
2. Conserving soil is extensively important for sustaining healthy life. However, soil is facing acute challenges not only from agriculture but also due to acute challenges of rising population and diversion of agricultural lands for other sectors.
3. Sustainable Development Goals (SDG) as given by United Nations (2015) and their guidelines can be followed to end hunger and poverty, improve health and education, promote development, reduce inequality and addressing climate change and land degradation. Technological innovations in NRM research and the government and the importance of national resources in promoting inclusive and sustainable growth can be followed.
4. The challenges being faced in achieving targets as agricultural development with positive growth and long-term sustainability on deteriorating natural resource base as evident from loss of soil organic matter, accelerated soil erosion, deterioration of soil physical, chemical, and biological health, poor input (water and nutrient) use efficiency, groundwater pollution, declining water tables, salinization and water logging. Loss of biodiversity including ecosystem services are the need of the hour.
5. Comprehensive mitigating intervention of chronic arsenic toxicity in people requires integrated approaches toward reducing arsenic entry into the food-chain, on one hand, while reducing arsenic in the drinking water below the safe limits, on the other.
6. Rice-wheat cropping system under conventional tillage practices has become unsustainable because of high water requirement, SOC depletion and degradation of soil health. Based on field experiments, zero tilled flatbed with residue retention tillage practices in maize-wheat cropping systems improved SOC sequestration and carbon management index in the Indo-Genetic Plains of India.
7. The natural farming of the Govt's initiatives, schemes, and scopes and the protocols of preparing inputs, and soil health aspects of natural farming, encompassing physical, chemical and biological improvements are needed.
8. In order to reduce the issues of problems of stubble burning and its impact on pollution in adjoining cities, and losses of nutrients, and money, the initiatives on use of crop residues for pulp-making, bio fuel production, liquid hydrocarbon production, bio-methanation,

gasification for cooking and electricity generation may be followed.

9. Bio decomposer like Pusa decomposer, and conservation agriculture were listed as some of potential avenues to reduce the events of burning of residues. It was highlighted the potential of millets in general and with a special relation to Sustainable Development Goals (SDGs).

10. Millets could be linked to a large number of SDGs, e.g., SDG1 (end of poverty), SDG2 (more nutrition), SDG3 (healthy life), SDG5 (gender equality), SDG6 (water use efficiency), SDG12 (responsible production and consumption), SDG13 (climate-resilience) and SDG15 (sustainability of natural systems). She showed how different millets can cater to various food and nutritional needs of the people, and be climate-proof.

11. Various programmes at IARI in collaboration of leading national and international organizations on pre-breeding and germplasm enhancement in chickpea may be used.

12. The schemes and efforts to improve plant immunity on Indian mustard crop using RNAi mediated genetic resistance to aphids with good success, which is considered the most difficult among the approaches. Crop wild relatives for resistance to leaf blight has been explored for developing introgression lines with good potential of success.

13. Pusa Samachar, a multimedia-based extension approach developed at IARI through social media like IARI YouTube channel has been hosting these Samachars which is in Hindi and regional languages of Tamil, Kannada, Bengali, Telegu, Odisha etc. may be used.

14. Available and targeted technologies for ensuring food and nutritional security and the challenges namely, food security and availability, food safety, healthy diets and sustainable diets are to be stressed on the need for integrating nutrition to agri- production, agri-income, women-empowerment, climate-proofing, more-crop-per-drop, indigenous breeds and farm and post-harvest operations.

15. Zinc deficiency is a global challenge. Genetic biofortification (genetics and plant breeding approach) as well as agronomic biofortification approach (application of plant nutrient/ fertilizers) are to be considered and followed.

16. Technology innovations in forage sector for feed security and business opportunity feed and fodder resource management for livestock production through baling and making hey, silage and pellets are needed.

Section: Animal, Veterinary & Fishery Sciences

1. More emphasis should be given to design and propagation of experiential and skill based learning programs.

2. Revamping of educational ecosystem is needed to meet rapidly changing needs. Especially in contract to the NEP.

3. Empower the youth, Specially women, through a set of vocational, employable and entrepreneurial skills.

4. Bio-resources are the wonderful gift of the nature of the mankind, their sustainability can be

effectively linked to rural livelihood and economic development, so science education should aim at attracting students for proper management and sustainable utilization of bio-resources.

5. The assemblage of species with which we share the planet represents a vast untapped genetic library, with undiscovered pharmaceuticals and other beneficial substances. So programs needed to be initiated for the exploration of other less known potential varieties of life forms with a view to ensure livelihood, food health and financial security.
6. Dangers of climate changes to biodiversity should be recognized and integrated measures be undertaken on priority.
7. Biotechnological tools should be used for the conservation, management and restoration of all types of habitats.
8. National funding agencies should provide sufficient funds for research on animal and plant taxonomy as classical taxonomy has gone on back foot during last two decades and proper identification of species of biodiversity become a problem for young researchers.
9. Promotion of public awareness on biodiversity conservation, role of individuals for minimizing ecological footprints and maintenance of health and hygiene in the vicinity in needed.
10. Problems related to diseases (in aquaculture and animal husbandry etc.) and their management should be worked out in details.
11. Documentation of Traditional Technological knowledge (TTK) and indigenous technology, its revival and strengthening of sustainable development in the area of bio-resources and adoption to climate change should be made.
12. Researchers are suggested to work hard for the development of new techniques such as bioremediation (use of microbes to remove pollution), bio-regeneration (renewal or restoration life of supporting process, and bio-augmentation (introduction a group of natural microbes or genetically engineered vibrant to treat contaminated soil, water and air).
13. More research is needed to promote use of biological agents for the production of effective medicines, vaccines, and agricultural and industrial products. Support from corporate sector is much needed in these efforts.

Section: Anthropological and BehaviouralSciences (including Archaeology, Psychology, Education and Military Sciences)

1. **Artefact, Tradition, Cultural and Archaeological Heritage:** The extension of knowledge on India's rich cultural and archaeological heritage has not only potential for tourism, but it also provides substantive evidence of the role of tradition and its use of scientific knowledge. More importantly, it can fill the void with pride in Indian knowledge and traditional, and civilization in the contemporary generation who are living in a cultural vacuum. The untapped national wealth can unleash national pride with the anthropological and allied behavioural sciences.
2. **Inclusive Development, Social and Spatial Cohesion:** The discipline has the potential to

mainstream the marginalized with participatory planning and governance of local resources. Current government efforts in aspirational districts, border development, and North-East regional development are some of the critical schemes and scope for anthropology and allied behavioural sciences to contribute and collaborate with government and development agencies.

3. Finally, the section on anthropology and allied behavioural sciences suggest that Indian Science Congress can leverage technology and direct broadcast all the sessions, along with physical interaction in the conference. This would improve its reach and motivate young scholars to engage in scientific inquiry across the region. And, lastly, the lectures /sessions should be stored in an online library as a reservoir of knowledge for the future generation.

Section: Chemical Sciences

1. The time for question/ answer queries to be raised by the audience should be displayed in the program separately so that the session can be completed in the allotted time.
2. Papers related to different branches of chemistry should be given in different sections in Abstract book.
3. The topical of symposium for 109th ISC session of chemical sciences, should be left for next sectional president to decide.

Section: Earth System Sciences

Recent upcoming subjects on Earth System Sciences such as Artificial Intelligence/ machinelearning / real life problems on Earth System Sciences should been couraged.

Keeping in view of the Govt of India declaration to make carbon zero emission, more research may be carried out on -

(a) Coal so that coal may be utilised without carbon emission.

(b) Rsearch for alternative and renewable energy resources.

Section: Engineering Sciences

1. Many were unknown about the ISCA award schemes for Young Scientist and Best Poster presentation. Due publicity may be done.
2. Oral & Poster presenters were also not aware of the award schemes.

Section: Environmental Sciences

1. For conservation of Bio diversity and to encourage the pollinator gardens in urban areas, it is recommended that small jungles/gardens (15-20% of total area) be made mandatory in all offices and residential are as and they should get proportional rebate in local taxes in proportion to the green biomass developed and preserved by them.
2. To reduce the pollution level, the pollution tax been forced which should be in proportion to the amount of pollution caused by the vehicle/industry/any other; solar and electrical energy be encouraged in place of fossil fuel but only bio degradable batteries be allowed to be used.

The pollution tax collected must be spent on restoration of earth.

3. Recycling and re-use of e-waste, polythene, plastic be made mandatory, microbial diversity be preserved by stopping the use of systemic antimicrobials to maintain soilfertility, then a tural farming been couraged.

4. To increase the ground water levels and to control floods, rain water harvesting be made mandatory and the encroachment of river sides be controlled, river be interconnected and water management system be improved.

5. Education on sustainable development without adversely affecting the environment and to keep a balance between development and nature been forced.

Section: Information and Communication Science & Technology (including Computer Sciences)

1. As honourable PM referred in his inaugural address about 'Quantum Computing' and the section contributed a lot in research papers and membership from the areas of machine learning, blockchain, data science for the theme, recommendations emerged to continue as it separate section. Merging plan with engineering sciences will dilute the quality.

2. The ISC should go for Scopus, science direct or web science indexing.

3. Approx 70% of jobs and startups are in IT field specially in Robotics, data science and machine learning, rural chapters of ISCA should be opened to spread awareness of ICT-CS among farmers and women.

Section: Materials Science

Understanding the materials for mitigating remediation of the environmental pollution is stressed and studies in this area are highly recommended. For this there is a need to understand Nano materials, Biomaterials etc. There is a need to improve the educational side and improve the bench marks and to attract the innovation and talents from the young generation as the Materials Science is common to many scientific discipline.

Section: Mathematical Sciences (including Statistics)

1. Recent upcoming subjects on Mathematics such as Quantum Computing/ Machine/ learning/ Ecology of Mathematics should be encouraged.

2. Modelling of real life and health and environmental related problems mathematically and providing numerical and analytical solutions to these problems should be encouraged.

Section: Medical Sciences (Including Physiology)

1. Giving stresses on fundamental and application oriented research equally for sustaining human health and shaping the nation.

2. Empowering women Scientists who are pursuing research in the field of Medical Sciences (including Physiology).

3. Giving stresses on research in Yoga practices, Indian traditional therapeutic practices (Unani,

Siddha, Ayurveda), and Homeopathy for sustainable future and self-reliance of the country.

4. Establishing "Physiological Survey of India" in line with Zoological/Geological Survey of India.
5. Stresses on developing drugs/antidotes to ameliorate the toxicity of artificial toxins (toxicants), accumulating in the human body through foods, medicines, cosmetics, and packaged drinking water.
6. Developing vaccines and natural medicines against maladies for self-reliant India.
7. Ensuring standards for drinking water, and plant and animal food resources for sustainable future.
8. Conserving ground water reserve and biological diversities for sustainable livelihood of Indian citizens.
9. Preserving water bodies, soil, and ambient air from all sources of pollutions for good health and sustainable future.
10. Emphasize for adequate funding to conduct the clinical and physiological research at a higher level for new innovations for sustainable development.

Section: New Biology (including Biochemistry, Biophysics & Molecular Biology and Biotechnology)

1. To address the clinical implications of stem cell renewal pathways associated with development of uterine cervical carcinoma.
2. To propagate knowledge about HPV infections and chromosomal alterations.
3. To motivate studies on Epigenetic modulations in drug tolerant cells.
4. Molecular mechanism of MSCs to be made extensive research priority area to be studied as promising therapeutic approach for tissue regeneration
5. Gut microbiota studies to be encouraged.
6. Research funding for adipokine and diabetes research to be encouraged.
7. Research opportunities to be increased for Cancer Biology particularly breast, colon, oral, cervical, prostrate and liver cancers.

Following are the *General Recommendations*:

1. To create special schemes for funding research proposal on Women Health.
2. To conduct workshops/orientation programs and skill development programs for Women Scientists' and Academicians to enhance their skills.
3. To make Women Scientists' and Academicians' inclusive into the policy framing of Science.

Section: Physical Sciences

In selecting an invited speaker, we should care that invited professors should have expertise in recent forefront topics of physics, like quantum computation, quantum information system, High energy

physics, Bio/Medical Physics, etc., and needs to be able to get their information across while also keeping the young researcher, teacher, or audience entertained and engaged. Few speakers from IIT, IISC, or highly-ranked central universities must be included.

A better effort must be made for the participation of many young researchers like Ph.D. students and early-stage assistant professors from each part of the country. The number of participants in the young scientist session was only one, and in the best poster presentation were only two in physics. The total number of participants in physics was also the least in physics. Efforts must be made to enhance the young researcher's participation particularly.

Mini symposia on applied physics topics should be organized with the consent of the sectional President, Recorder, and Local Secretary.

Before the organization of the science congress, Coordination among the sectional President, Recorder, and Local Secretary should be maintained.

We feel the pure sciences, in particular Physics, are getting weak with time, so we hereby request the Govt. of India to provide more budget for the pure sciences'. It is well known/accepted that the pure science are the roots of the applied sciences (engineering). Thus, without strengthening the pure sciences, future of the applied sciences also may be affected. Without pure sciences enrichment, where the key factor is missing nowadays the funding/financial boost, no country can emerge as one of the super powers what India is currently dreaming for.

The young generation need to be encouraged to delve into pure science mysteries first before using its knowledge towards application based skills.

Pure sciences based research needs significantly more attention and should be nurtured with much more respect and care. So, Govt of India should provide more funding, more importance, more efforts to prosper pure science based research in both the private and Govt organizations.

Section: Plant Sciences

1. The members expressed their happiness about the smoothly conduction of the various academic sessions for the invited lectures delivered by the invited foreign and Indian Speakers as well as the Sessions for poster Presentations. However, the honourable members resolved that the time for the academic presentation should be started from 11.00 A.M. to 1.00 PM and 2.00 PM to 5.30 PM so that the student participants should also be given time for oral presentation (at present they are asked to present their paper as poster presentation).
2. The senior members advised to make provisions for providing free local hospitality to five more eminent scholars in the subjects.
3. It was resolved that the Invited Speakers should be provided Economy Class Air- fair (presently they are given second class AC fair) so that the invited speaker may participate and deliver their invited talk , since it has been experienced that at the last moments the eminent invited speakers decline.

4. The organizers should be advised to provide memento to the Chairperson and the Recorder of the technical sessions.

5. Provisions should be made to provide at least certificate to the best oral and poster presentations.

6. It was resolved that the botanists, all over India, should make efforts towards patenting their important research work.