

ROLE OF WOMEN SCIENTISTS & TEACHERS IN PROMOTION & APPLICATION OF SCIENCE & TECHNOLOGY



CELEBRATING THE YEAR OF SCIENCE (2012-13)



The National Academy of Sciences, India (NASI), Allahabad

**ROLE OF WOMEN SCIENTISTS & TEACHERS IN
PROMOTION & APPLICATION OF SCIENCE & TECHNOLOGY**

CELEBRATING THE YEAR OF SCIENCE (2012-13)

EDITORS

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&

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DESIGNED BY

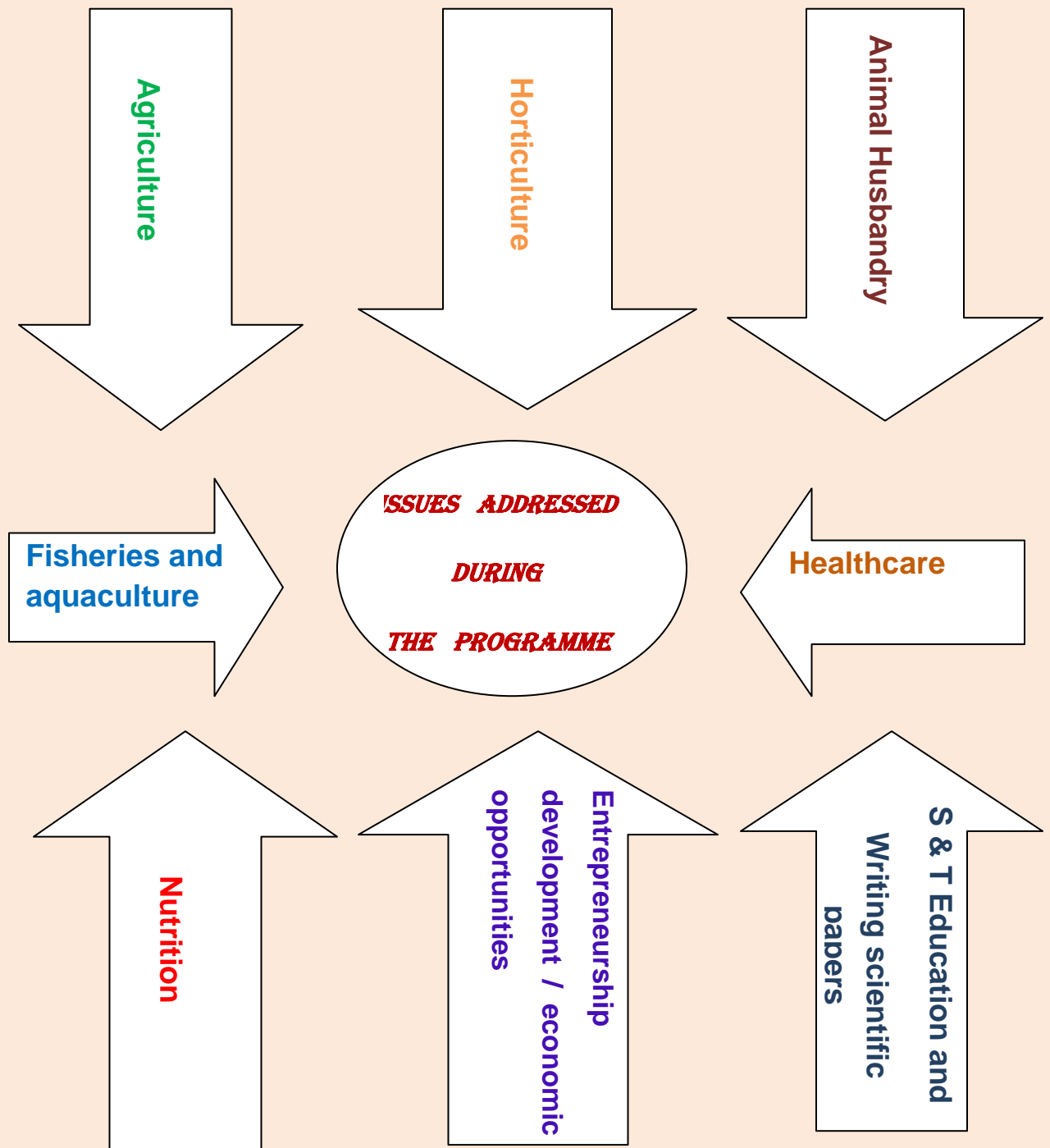
MS. ARCHNA PANT

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The National Academy of Sciences, India (NASI),
Allahabad

EASING THE DRUDGERY OF WOMEN



**REDUCING DRUDGERY & AUGMENTING THE SKILL OF WOMEN THROUGH
SCIENTIFIC INPUTS
RELATED DOMAINS**

Agriculture



Healthcare



Horticulture



Nutrition



Animal Husbandry



Entrepreneurship development



Fisheries and aquaculture



Enhancing academic skills



*S & T Edu. Sensitization &
popularization of science*



Creating awareness



**REPORTS & RECOMMENDATIONS
OF
THE WORKSHOPS HELD UNDER**

“The Year of Science”

on

*“Involvement of women scientists and teachers in
Science & Technology; and application of Science &
Technology for the welfare of Women”*

Organized by



The National Academy of Sciences, India (NASI), Allahabad

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DRAFT FOREWORD

Mahatma Gandhi while appreciating the value of educating women said - *‘When a man is educated, an individual is educated; when a woman is educated, a family and a country are educated’*. Women in India constitute fifty percent of the human resource. The role of women in society is vital for its progress, and their contribution to the development of the knowledge base and use of technology is essential if the millennium challenges are to be met. Despite constituting half of the population, women are an underutilized talent; and need to make their presence felt in science and technology. Dogmas of gender over different periods of time have resulted in women’s exclusion from science for a long time, all over the world. Their participation is still restricted and limited because of widespread discrimination at the basic education level and lack of opportunities for pursuing science as a career, predominantly in rural areas, where the girls find it difficult to participate in science owing to the formidable barriers that stand in their way such as harsh living conditions, religious traditions, negative attitude arising from the orthodox etc.

Science education not only enhances knowledge and empowers women through learning but also, crosses cultural and geographical barriers, bringing women to the forefront of development. It provides a scientific approach to thinking and helps people in understanding the foundation and building blocks behind the phenomena they can see. It enables the girls, particularly of rural background to think critically and

analyze their surrounding related to their socio-economic and health status.

It is also important to support and stimulate young girls to involve in the professional and scientific activities. They should be made aware of the developments in science; and opportunities for their respectful living. Efforts to develop appropriate technologies suited to women's needs as well as to reduce their drudgery' be given special attention. This is possible by stimulating their interest in S&T-related practical skills and providing them with access to science education.

Women scientists can provide an opportunity to make an important contribution in bridging the gender gap, remove the barrier of negative attitudes; thus, paving the way for fruitful participation of women in science. The women scientists and also the teachers can be the role models; and become instrumental in providing the women with greater science literacy and competence for their daily lives as well as future activities, with the skillful application of science and technology. It is really encouraging for them, if the Academy and other such bodies take interest in technologically empowering the women.

My best wishes are for the successful implementation of the strategies chalked out on the basis of the scientific recommendations of the eight workshops, held under the Chairmanship of Dr (Mrs.) Manju Sharma.

*Dr. K. Kasturirangan
President, NASI*

MESSAGE

“I am happy to note that NASI has taken this initiative to organize workshops in different regions of the country to discuss the role of women scientists and teachers in promotion and application of science and technology for the welfare of society. The recommendations appear very meaningful and once implemented they will have a lasting effect on women in general and society as a whole. The themes selected are not only relevant for women but will have a direct impact on the socio-economic progress of the nation. Such initiatives would also ensure proper utilization of our human resource and their skill development towards nation building. I convey my best wishes to all the women scientists who have been actively involved in this activity. I am confident that this Academy would continue its endeavors to promote the application of science and technology for the benefit of the society and in particular technological empowerment of women.”

*Prof. M. G. K. Mennon
Chairman, NASI's new initiatives*

MESSAGE

The aptitude for scientific research and the spirit of enquiry are developed in a child at a young age. A majority of school teachers in our country are women and they play a dominant role in shaping the child's character and aptitudes. At the M S Swaminathan Research Foundation in Chennai, we have a programme titled "Every Child a Scientist". The young age is the age of innovation. Therefore, we owe a deep sense of gratitude to the millions of women school teachers who, in spite of many constraints arising from the multiple burdens on their time, help young students to become scientists in their later life. Women scientists are making important contributions in every field of scientific activity in our country. They are the leaders in areas like nutrition and environmental sciences. Women scientists tend to be particularly interested in fields affecting human wellbeing like food and health. They are also pioneers in frontier areas of technology like biotechnology and information technology. I am therefore happy that NASI has organised eight workshops on the role of women scientists and teachers in strategic, applied and translational research. Women scientists are also leaders in participatory research jointly with rural and tribal women. I hope the initiative of NASI will help to promote a greater understanding and awareness of the need to provide gender specific support services to women scientist and teachers.

M. S. Swaminathan
Past President, NASI

INTRODUCTION

The National Academy of Sciences, India (NASI), the oldest of the Science Academies, was established by a very renowned scientist, visionary and a leader, Dr. Meghnad Saha. The Academy's mandate is Science and Society. Since the last two decades, it has been implementing several programmes on popularisation of science, education, awareness building and on many themes of national relevance. The year 2012-13 was declared by the Hon'ble Prime Minister of India as the **Year of Science**. As part of the activities undertaken by the Academy to celebrate the Year of Science, workshops were organised in different regions of the country on defining the role of women scientists and teachers in promotion and application of science and technology. The first workshop was held in October 2012 at Allahabad (Uttar Pradesh), followed by one in Ahmedabad (Gujrat) in March 2013, Chennai (Tamilnadu) in March 2013, Shillong, Meghalaya (North-East) in May 2013, Dehradun (Uttarakhand) in May 2013 and the last one , again at Allahabad in June 2013. Large number of women from colleges, universities, research institutions and housewives from rural areas participated in these workshops; and their response was tremendous. The purpose of organising these workshops was to sensitise women in science and technology and create more awareness, technological empowerment, especially on environmentally sustainable basis. It is evident from the queries received by NASI that women were really interested and enthusiastic about the subject.

The recommendations of each workshop were put on the website of NASI. These recommendations have been further classified under different headings; and summarised in this report. The annexures provide detailed reports of each of the workshop.

This effort of NASI would continue as the Academy is committed towards the empowerment of 50% of the human resource of the country, for ensuring their contribution in the national progress. In whatever small way it can play the role of a catalyst and/or facilitator, the efforts have to be made with full vigour.



The recommendations would be pursued with the science departments and other concerned ministries. To illustrate this point, one dialogue had been organised with ICAR on the farm instruments, to reduce the drudgery of women and stakeholders. Another detailed dialogue was also held on reducing malnutrition in the country and developing suitable guidelines with the help of National Institute of Nutrition, Hyderabad. These reports would be submitted to the concerned government agencies. NASI, through its Fellowship and Membership will continue to provide aid and advice to further the cause of the women scientists, as well as also to ensure the application of science and technology for women's welfare, especially in rural areas.

*Prof. (Mrs.) Manju Sharma
NASI-Distinguished
Woman Scientist Chair;
& Coordinator, Workshops
on Women Empowerment*

RECOMMENDATIONS

4.1 Policy matters



Concerning Education, Training & Human Resource Development

- High school education should include gender issues and formal sex education in its syllabus uniformly in India. The school girls should be given vocational training for being self-dependent; and enhancement of their socio-economic status.
- The developmental programmes sponsored by the scientific departments of our country (e.g. DST & DBT) should be extended to 5-7 years rather than a year or two for ensuring significant impact of the programmes, especially for the rural India. ***Mahila Kisan Programme*** should be activated to involve more rural women.
- The project proposals sanctioned by the funding agencies viz. the DST & DBT should emphasize on impact assessment of the projects; especially, socio-economic and health aspects particularly those funded for the

upliftment of women. Women from Home Science must be involved in ***Anganwadi Programmes*** to promote the status of women in rural areas.

- There should be schemes for school teachers, especially, who are mostly M.Sc. dropouts. This major human resource could be tapped to encourage more students in S & T.
- Efforts must be made to fund the women scientists in underdeveloped regions to protect losing skilled people in those areas; as well as their recognition in the scientific institutions.
- Introducing new courses for professional development, infrastructural support, emphasis on rigorous academic work, discussion and debate are all essential for good science education.
- Introducing faculty programmes- add-on courses, career options for science students including science option in schools, B.Sc. (4 years) +M.Sc. (optional) +Ph.D. etc., especially designed post-school science programmes and improvement in teaching and research, should also be the part of education.
- Bio-resource complexes should be built around the persons with strong commitments.

Concerning Nutrition, Health & Diseases

- Brochures on nutritional needs and balanced diet should be produced in regional / local languages for the benefit of women and children for generating mass awareness on nutritional foods and balanced diets.
- Nutrition component in school syllabus be introduced for higher classes to reach out to adolescents.
- An Institute of Health and Nutrition focusing on women and children in the North-East region may be considered.
- Special attention needs to be given to MDR strains of emerging diseases, vector-borne diseases; and check addictions viz. smoking and tobacco /

betel-nut chewing, which are the cause of several dreaded diseases. ICMR may be involved in some of these efforts to be undertaken in the prone areas (e.g. North-east India).

- An investigation is required to identify the agricultural crops grown and practices of KAP (Keystone Agricultural Producers) on food and nutrition to identify good and bad farming practices and gaps in knowledge of health and nutrition.
- Mini food processing-cum training centres can be set up with the help of CFTRI (Central Food Technological Research Institute) or some private industries as their contribution to a social cause. These centres can also provide training to the mothers in preparing complementary foods at home and promote correct breast feeding / infant feeding practices.

Concerning Agricultural Practices & Women-Friendly Tools/equipments

- Agricultural issues to be brought to the notice of ICAR; especially, with regards to the need of designing the instruments, as per requirements of women agriculture workers.
- Technology Resource Centres need to be established in villages to make improved tools / equipments available to the women workers for various operations.
- Manufacturers of improved women-friendly tools and machines need to be given incentive through various policy initiatives.
- Protocol for quantification of drudgery needs to be standardized.
- For extension work taken up by NEHU, Shilong, a proposal should be developed to expand it either with the help of the State Government or Centre.
- There is need to review the policy on wild life management.

4.2 Capacity building

- Quality of teaching is very important; building a community for practicing new ideas, a complex network of ideas with continuous enhancement of skills, knowledge and capacity, to be built up.
- Health education (use of the bio-resources, scientific knowledge and computer education) and skill development e.g. agricultural and allied practices like mushroom cultivation, smokeless chullah, biogas technology, floriculture, vermiculture, compost preparation, bee-keeping, fisheries, soil management, low cost bio-fertilizer production, coir mat preparation, fruit and vegetable processing, herbal cosmetics, making traditional paintings etc. (to improve the economic conditions of women); all to be linked to ensure a quality life for women.
- Projects should be done by the students, including paper writing and poster presentations to enhance their capacity and learning.
- It was suggested that a mentor is important for supervising the research activities; and women scientists should look up regularly the CIST website of scientific departments for new developments.
- As regards pursuing the research work, the women/young researchers should come forward with research proposals by blending both local vernacular and modern advanced techniques, so that there will be a good synchronization of work in laboratory and the applied field as well as a step for their capacity building.
- Need for capacity building must be stressed upon by attracting more women to do science by way of offering special scholarships to rural girls to take up science as a career and application of science and technology for betterment of life in the rural sector.
- Since the people of rural areas do not invest in education; the workshops and vocational training programmes pertaining to income generation in rural areas need to be organised to enhance their capability.

- The knowledge and skills of **Anganwadi** and **ASHA** workers be improved. ASHA workers with appropriate training in health can also function as grass-root health and nutrition workers/ entrepreneurs. Local health departments have to be involved and the local doctors/nurses be given orientation training in Nutrition, so that their vision goes beyond disease prevention and treatment (i.e. towards better nutrition).
- Women farmers should also be made capable to become decision makers.
- More efforts are required for documentation, capacity building and networking through use of KVKs, NGOs, and other partners.
- Capacity building and sensitisation of the concerned staff is essential in wild life development and utilization.

4.3 Awareness, sensitisation and science and technology education

- The rural women must be sensitised and encouraged to interact with their families and society to question; and discuss on various issues to communicate more effectively.
- Women must be encouraged for science education to exterminate traditional beliefs; and change their mindsets by developing their thoughts to face the barriers of societal dogmas.
- More Awareness Programmes in rural areas should be organized; and efforts must be made to sensitize the rural women through participatory events and scientific knowledge and by enhancing their access to markets.
- The rural women must be sensitized and encouraged to strengthen their capabilities by utilizing natural resources around them for developing eco-friendly techniques facilitating their sustenance and socio-economic development.
- Attracting more girls to take up Science will help in the socio-economic progress of the country as well as improve the level of awareness in women of the remote areas, as of North-East India. More emphasis be given on bio-resource based education in the North-East.
- Training programmes, especially designed for school teachers, are needed to train them for proper teaching methods and techniques in Science and Mathematics. Training programmes should also include aspects on opportunities available to students for doing science for career advancement.
- Teachers' training program and strengthening of the infrastructure for research in the North-East are the requisites to enhance knowledge in Science; backup support for Science education must be taken up especially to encourage research.

- The problems faced by women in adoption of technologies need to be addressed. S&T interventions are needed in this neglected area.
- The teaching aids for community education in local language be developed after identifying knowledge gaps through the initial survey. The trained local youths/ NSS volunteers need to be involved for creating awareness on issues of health, nutrition, sanitation etc. Emphasising on the link between malnutrition, communicable and non-communicable diseases and productivity loss is essential. Local home science colleges can be involved for imparting such training.
- School education can be started with workshops for school teachers on the lines of 'Feeding minds and fighting hunger' international project. District-level education department will have to be involved for facilitating such workshops.
- The Science education must stress upon the parallel development of chemical and biological sciences and establishing a link between these two. The role of Chemistry in health care sectors like vaccine development and personalized medicine must be emphasized.
- Basic research on adaptation biology, bio-prospecting of genes and metabolic engineering to be encouraged among the young researchers.
- A lecture series on different issues of Science & Technology to be organized with support of NASI in the state of Uttarakhand.
- Workshop on Scientific Writing with support of NASI to be organized in different parts of Uttarakhand.
- Workshops regarding writing of research papers and proposals for financial grant should be held at many places in the country so that more females can be roped in and get the advantage even in remote areas.
- To organize training workshops, research and awareness programmes on use of computers as a versatile lab instruments; efforts must be made for expanding such research programmes (from local to global).

- Regional workshops should be held by identifying priority areas for intervention with project design including the workshops on health, hygiene, nutrition as well as economic problems like self-employment.
- As per the participants' feedback, more lectures / workshops on women empowerment, women employment generation programs & awareness should be held; and the message should reach to the rural masses as well.
- Creating various programmes for inspiring students and interaction of young students with eminent women scientists and Nobel laureates are very critical for knowledge-sharing and problem-solving.
- More teachers to have an access of the talks delivered by experts, which they can procure from NASI website.
- Technology parks for women to be established.
- The females should be educated about the benefits of nutrition, so that they can ensure and provide a proper and nutritious diet to their family and themselves. Since, the rural women lack education as well as awareness on Anaemia prophylaxis, causing a lot of problem during pregnancy; the adolescent girls should be taught about the causes of anaemia, related ailments and cure.
- A cadre of nutrition workers should be trained; and their association with ICDS projects be ensured.
- Awareness to homestead nutri –gardens (farms), back- yard poultry with high egg yielding breeds, dairy and fish ponds be initiated; the relevant emphasis should be on nutrient-dense vegetables like the green leafy vegetables, beans etc. and fruits rich in vitamin C and beta carotene. To ensure such nutri-produce with safe & high yield varieties, provisions for good quality seeds be made and planting material (saplings), organic methods like Vermi-compost, organic pesticides and water harvesting/ water saving methods need to be introduced.
- Since School MDM programme has helped to enhance enrolment and attendance in schools, awareness must be made to strengthen it by

improving nutritional levels among children through addition of vegetables likes GLV besides cereals and pulse.

- Local self-help groups of women can be trained to prepare ready-to-cook cereal/millet-pulse food fortified with iron. The task can be performed in a centralized place under supervision.
- Appropriate messages can be given in local languages through radio and TV during prime-time shows. Icons can be roped in to convey those messages like the one Aamir Khan is currently giving regarding feeding of pregnant women and infants.
- The females are the real fetcher of water. They should be trained and informed formally and informally by govt. and non govt. agencies about the spots which are safe for fetching water. The women must be sensitised on how to deal with the diseases, because most of these diseased people are treated as untouchables.
- Stakeholders must be educated and also made aware about the necessity of testing in areas identified as possible hot spots of contamination by national surveys.
- Women must be made aware for testing adulteration in food materials.
- Awareness about solid waste management is must.
- Intervention of NASI through ICMR to create mass awareness through public campaigns on issues relating to cancer, hazards of smoking, emergence and treatment of MDR diseases, drinking water conservation and safe usage etc are of immediate need.
- Women Science Graduates should be trained as Paramedics to meet any emergencies. Use of First-Aid kits must be taught.
- Training of *dai* along with the training of ASHA workers be introduced to ensure safe delivery, and early initiation of breast feeding, since more than 50% of deliveries in backward districts are still home deliveries. Institutional deliveries should be encouraged.
- Sensitisation meetings with the agriculture and veterinary extension workers are required to orient them towards the problem of malnutrition.

Agriculture and animal husbandry/fishery should promote nutrition security and go beyond income, export and calorie sufficiency as currently perceived. Stress be given to the importance of hidden hunger (deficiency of micronutrients).

- Training for women farmers and farm workers is needed for their skill upgradation to operate various tools and machines for increasing their productivity and reducing drudgery.
- Awareness is required in following areas and equipments which had been identified for research purpose.

Transplanters- manual and power operated, Work place for tractors and self - propelled equipment, Chaff cutter, Devices for load carrying

- (A).Improved tools and equipment available for following operations need to be promoted on a large scale
 - Seeding (Maize dibblers, Direct rice seeders),Transplanting of rice (Rice transplanter),Weeding in uplands (Wheel hoes, long handled weeders) ,Weeding in wetlands (Cono weeder),Harvesting of Wheat and rice (Improved sickle),Maize dehusking and shelling (maize shellers, maize dehusker shellers)
 - Grain cleaning (hand winnowers, Hanging type grain cleaner, pedal cum power operated grain cleaner), Groundnut decortication (sitting type groundnut decorticator), Threshing of paddy (pedal operated paddy thresher, power operated hold on type paddy thresher).
- (B). Awareness to create local grain storage facilities is required for management of the waste food.
- (C) .Attitudinal changes are needed especially amongst the male members about machinery operations by women workers.
- In the end it was strongly recommended that the annual seminars of Women Scientists should be held so that their work is recognized at every forum. Women should be educated and motivated to pursue a career in science so that their drudgery is reduced.

4.4 Agriculture

4.4.1 Farming and livelihood

- Emphasis must be given for field work to generate livelihood for rural women, and the entrepreneurship development.
- More Fellowships are needed for women researchers in the field of agriculture.
- The National Seed Development Corporation can be requested to develop courses and research programmes for women.
- Certification, license and food safety requirements are the vital requisites to deal with commercialization of value added agricultural products.
- Awareness about growing cash crops including initial processing is must among the rural women.
- Use of better techniques for agriculture must be stressed upon.
- Proper use of pesticides and fertilizers must be told to farm women.
- Establishment of small scale projects to process products of commercial use like extracts of medicinal plants.
- Efforts must be made to convert women labourers to women farmers.
- There should be an extensive use of solar energy and effort should be made to reduce the drudgery of women by developing woman-friendly farming instruments; NASI, will have a dialogue with ICAR, N. Delhi, on the kinds of farming instruments, which would suit women farmers.

4.4.2 Horticulture

- The post-harvest losses in fruits and vegetables must be stressed upon. Training programme for women farmers for developing models (such as AMUL model) should be evolved.
- Chemical processing (non-invasive) for enhancing shelf life of fruits/vegetables must be taught.

4.4.3 Animal Husbandry

- The rural women must be made aware and trained to develop cattle feed for their cattle by utilising the natural resources such as plants abundantly available in their areas to meet the nutritional requirement of their cattle to enhance milk production.
- For development of cattle fodder the standard measurement of the ingredients used in making the feed must be made as per the convenience and knowledge of the rural women.

4.4.4 Fisheries and aquaculture

- The rural women should be encouraged to adopt fisheries and aquaculture for commercial purposes to generate employment.
- For making the products of non-commercial fish like *fish papad*, *chakli*, save the locally available resources, tools/ instruments should be encouraged and used.

4.5 Healthcare

- Poor people in urban areas as well as villagers must be given access to balanced diet, clean water and clean environment.
- More awareness programmes on educating the masses about the importance of clean water must be organised.
- Awareness for vaccinations for such ailments as typhoid, hepatitis, rotavirus, cholera etc. should be spread.
- To ensure sanitation and safe drinking water, appropriate measures like bore wells with storage tanks and taps in the village; promotion of household and school latrines are needed. NASI has already launched a national programme on safe water under the leadership of Prof V P Sharma; his inputs be included to make the efforts successful.
- Women must be made aware of complications of gestational diabetes and the added risk involved to both the child and the mother for

developing type-2 diabetes in future; and the care during and post pregnancy that can help in reducing this risk.

- 25-30% health budget should be allocated for malaria. Kits available for testing malaria should be adequately supplied by the government / administration in the tribal areas.
- There should be some guidelines for pregnant women having malaria. The blood of pregnant women taken for testing anaemia can be used for malaria testing.
- Attention needs to be given to occupational health aspects of women agricultural workers.
- Awareness must be generated about the therapeutical use of nanotechnology and traditional systems of medicine in prevention of the diseases such as cancer.
- Laws must be promulgated requiring testing of public water supplies and government should ensure that the laws are strictly followed.

4.6 Nutrition including value addition and supplements – both for rural and urban areas

- More and more women should be made aware in the field of science to cope with such problems as malnutrition and the related ailments.
- Inter-sectoral interventions are required to combat malnutrition.
- The problem in implementation of the available technologies and information on malnutrition should be given due consideration.
- Women can be motivated for home-gardening to combat malnutrition.
- Diversification of food baskets is essential to tackle the malnutrition problem.
- A communication strategy needs to be evolved and the women should be used as catalyst in this process. A multi-sectoral approach is needed.
- The nutritional quality of food can be enhanced using bio-fortification. Since, good nutrition contributes positively to family, community health and development; therefore, with bio-fortification of food and crops the nutrition divide of the country can be bridged to a great extent.
- Ornamental fruits, vegetables and similar products to be chosen for value addition and marketing.
- Methods to be developed for making value added products.
- Value addition of the local product should be stressed to increase its market value.
- Bio-fortified crops like orange and sweet potato, rich in beta carotene; and iron-rich bajra are to be introduced. For the former, the following scientist/institute can help-

Dr. (Mrs) Archana Mukherjee, Principal Scientist, Regional centre of Central Tuber Crops Research Institute, Indian Council of Agricultural Research, Dumduma Housing Board, Bhubaneswar, Odisha, Mob-919437050427; E- Mail: archanapsm2@rediffmail.com

For iron fortified bajra (pearl millet); queries could be made from-Seeds- Nirmal Seeds (Dr Ashish Wele, President, Nirmal

Seeds Pvt Ltd), Bhadgaon Road, Pahora, Jalgaon Dist 424201
(MS), Email: ashishwele@nirmalseedsindia.com.

- **Mini food processing centres** can do value-addition to vegetables and fruits; and prevent wastage, besides generating employment and ensuring nutrition security.
- The ICDS feeding programme's failure to impact on child nutrition is due to its malfunction in targeting the most vulnerable group i.e. 6-36 months old children, for whom take home food is given which is also shared by the family. This (take home food) can be in the form of *ready to cook packaged food*, which is primarily meant for the infants only and not to be shared. This food can also be given to the pregnant women.
- The functioning of ICDS centres be improved with administrative supervision involving local people to ensure that nutritious food is cooked in the *Anganwadis* and consumed by the children.
- Reforms to ensure proper functioning of PDS by involving local people are needed. Inclusion of pulse and if possible some vegetables in PDS package is important.
- NASI will arrange an intense discussion to develop a model for combating malnutrition in different regions of the country with the help of National Institute of Nutrition (NIN), Hyderabad. A one-day dialogue with NIN will be organized by NASI, for this purpose.

4.7 Entrepreneurship development and economic opportunities

- Large scale entrepreneurship development program through technological interventions is important.
- Projects must be based on local resources and local markets; and technologies be developed accordingly for reducing drudgery, enhancing efficiency, developing entrepreneurship and removing hazards.
- Practical and strategic proposals be implemented utilizing the local resources so that resources may be upgraded with their local market; hence, blending local and advanced technologies.
- Gender friendly technologies must be developed keeping in view the agronomical principles.
- Schemes to be launched for post harvest operations, value addition and technological interventions to help women in rural areas.
- Bamboo-cultivation, value addition, product making and marketing are the aspects requiring systematic attention; and proposals can be submitted on different aspects to central and state governments.
- Organic compost making, training of women in this and marketing are essential. Large proposals may be developed for the region.
- Tourism and hospitality industry involving women to be given importance through the start of training and awareness about natural resources-based tourism.
- Science & Technology interventions involving women must be sought for sustainable development and utilisation of bio-resources of the North-East such as spices, mulberry, bamboo, orchids, establishment of herbal gardens etc. for income generation and better life style.
- Workshops and training programmes on entrepreneurship should be started in the region and minimum infrastructural support be provided to keen entrepreneurs in rural areas. Agencies like NEDFI and BCIL can be involved in the efforts.

- There is tremendous scope for taking up Orchids for commercialization; both, for domestic as well as export. Infrastructure at NEHU should be strengthened, specially, the tissue culture laboratory for this purpose. Since, the women are continuous and active users; they must be a part of technology creation process as producers, decision-makers and developers.
- Tissue culture of orchids to be promoted for employment generation.
- Fodder production with technological interventions to be taken up by rural women.
- Suitable employment opportunities must be identified for the women keeping in mind their psychological aspects.

5 Specific Recommendations for the Women Scientists/ Researchers

5.1 Writing scientific papers and giving presentations

- For technical writing and formal presentation 'hard work', 'commitment' and 'passion' are the key words; 'long-term planning' and 'imagination' are the requisites for prolific writing. The words of Abraham Lincoln '*Commitment would transform a promise into reality*' must be followed in this context.
- The self-evaluation is strongly recommended to check the authenticity, correctness, presentation details and preciseness of the write-up.
- 'Essential virtues' like: ethics, no plagiarism, due acknowledgements of any kind and Copyright permissions were suggested to take care before submitting any scientific communication.
- Fundamentals of good work i.e. 'No compromise', 'No short cut', 'No magic' and 'only hard work' must be considered.
- The need for addressing audience and their diversity along with speaker's voice, body language, appearance, purpose and enthusiasm required while delivering the talk must be realised while making presentations. Major verbal skills required to adopt while speaking must be enhanced and given due consideration. For example: slow pace of speaking, clarity of language and avoidance of slide should be taken care of.
- The young women researchers must be guided and made aware for making good presentation highlighting the virtues of presenting their work including Preparation, Eye contact, Vocal skills, Pace, Passion, Illustrations and Creative imaginations for effective communication.
- Work must be done at international level keeping in mind '*Think Globally, Act locally*'; and there has to be an open access for publication and wider exposure.

- For Medical students, clinical observations/ randomized clinical trials are crucial; case control study, meta analysis, systematic reviews and pool of data need to be incorporated for better results.
- There is lack of exposure of women scientists to bio-statistics. It is important to make such information available to women researchers across the country.

5.2 Writing research proposals for financial support

- The young women students and research scholars must be enlightened on how to make research plans/ proposals for submission to the agencies– DBT, DST and CSIR, UGC, ICMR, ICAR etc. under the Ministry of Science and Technology for grants/ funding.
- Development, crystallization and most importantly exchange of multidisciplinary ideas is important among the partners while submitting the research proposal.
- Ideas must be innovative, expanded as well as creative; based on the sound knowledge of the proposal's scientific attributes.
- Self-review and evaluation criteria are important while writing research proposals.
- One has to be pro-active in identifying the funding and collaborative activities.
- Need for framing the final draft of the proposal must be stressed upon; considering the facts such as 'Focus of paper', 'Logical paragraph distribution' of text and 'avoiding jargons' etc.
- It is important to keep in mind the time schedule while formulating the scientific research proposals, so that the work can be completed within the stipulated time frame. Collaborative approach for research will be economically and scientifically valuable for a good research proposal.
- If possible, age relaxation and expeditious approval of the projects for women scientists can be considered by funding agencies.

6 Any other issue

- Schemes to provide loan to rural women should be encouraged to initiate their own business; and to get them employed.
- Indigenous techniques should be upgraded for improving socio-economic status of the rural women.
- Area specific problems must be stressed upon and need to be tackled.
- For public awareness and Science education, a hub like the *Homi Bhabha Center* in Mumbai may be established in some college or university.
- In the villages every woman has to travel up to 5-20 km per day for fetching water. Their drudgery can be reduced provided they get access to water nearby their houses; and they can utilize that time to look after their children and towards their own health.
- Arsenic Fluoride from well water to be tested on random sampling. To test groundwater for multiple elements, projects need to be taken up.
- Iodine deficiency disorders to be studied on a large scale and awareness to be created and data should be shared with state govt., which will help them to make policies.
- Students at the secondary school level to be targeted for larger scale awareness programmes on any campaign undertaken in North-East India.
- Ventures to bring about value addition to the natural / cottage industry resources from the north-eastern region to enhance income generation on the existing activities of the local people.
- Recommendations be sent to all state governments of the North-Eastern Region, especially to all the S&T Departments, Councils and focal points in all the States of North-East India.
- The model of UCOST - NASI partnership has worked very well. The local chapter of NASI in the state has accomplished many programs which can be expanded to cover more women and children in the region especially in rural areas.

- The researchers / teachers are welcome to write to NASI for any information which they need; as well as guidance regarding research proposals, publications etc.
- NASI, through its Fellowships would be able to provide mentorship and guidance to the interested women scientists and teachers on the subject of the workshop and career opportunities in science and technology.
- The participants / young researchers can get in touch with NASI for any query/information / guidance regarding research proposals or publications.
- The capacity building programme of UGC for women scientists can be used by NASI to provide training at various levels. Teachers training programme and their exposure to industrial ventures should also be organised.
- Efforts should be made to provide opportunities to young women researchers to come into the international exchange programmes for enhancing their skills.
- Safety issues with regard to the working conditions in the laboratories and offices must be taken care and strengthened.
- Flexible time and part time opportunities for work would be very useful for women; especially, when they get married and have children.
- There is need for more awards, honour and recognitions for women.
- As numerous studies have shown positive impact of education, particularly women's education on nutrition; efforts should be made to reduce school dropout.
- NASI and ICAR may become partners in training programmes for women in agriculture.
- Awards may be jointly instituted by NASI and ICAR for innovations to help reducing the drudgery of women on farm and in rural areas.
- Govt. Machinery should be urged to treat the nutritional status of our countrymen as an indicator of national development.
- Proper nutrition (its access & affordability) should be our fundamental right.

- There must be a quality control mechanism to ensure safe food supply/access to each and every individual.
- NASI may give training to the govt. personnel for Food Adulteration Testing (NASI has its own kit for testing).
- Entrepreneurship programs should be linked with eradication of malaria.
- NASI proposes to make a “first aid kit” in consultation with 4-5 eminent medical doctors. This kit may in first phase be sent to Principal Secretary (Health), Utter Pradesh with a suggestion that these may be given to groups of rural women (preferably Science graduates) whom NASI can help to train.
- The sanitary napkins must be procured at low cost; thus, production is important.
- Gender consideration in wild life research, management and conservation is important.

ANNEXURES

7.1 Epilogue

Women, the 50% of human resource are vital for the progress of the society. To empower women is to increase their control over the decision-making that affects their lives both within and outside the household. Dogmas of gender and science developed over the period of time resulted in the exclusion of women from science for a long time from all over the world, not only this, the women were barred from their fundamental right of education itself. Even today, their participation is restricted and limited in many areas because of lack of proper means of communication and awareness.



It is important to educate women in the field of science, because science education not only enhances awareness level but also builds a mindset with an ability to judge between right and wrong. It provides a scientific approach to cope up with the problems being faced by the women, ensuring their socio-economic development. The teachers and women scientists can provide the lesser privileged with opportunities by making them aware on several scientific & societal issues, thus bridging the gender gap and removing the barriers of negative attitude. They can be the role models and become instrumental in attracting young girls into science.

Therefore, realizing the gravity of situation as well as the role of women scientists and teachers in providing help, support and solution, the Council of the Academy (NASI), welcomed the proposal of Prof (Mrs.) Manju Sharma, NASI Distinguished Woman Scientist Chair and former Secretary to the Govt. of India, to organize a series of workshops on **“Defining Role of Women Scientists and Teachers in Promotion And Application of Science and Technology”**.

REPORTS



A
Workshop
on
***“Defining Role of Women Scientists and
Teachers in Promotion and Application of
Science and Technology”***

(October 5-6, 2012)

Organized by



The National Academy of Sciences, India
Allahabad

A meeting of the sub-committee comprising Prof Manju Sharma (Chair), Prof Kasturi Datta, Prof Sneh Bhargava, Prof Paramjit Khurana, Prof Krishna Misra and Dr Archana Pandey, to organize the workshop at Allahabad was held at NASI on 21st July, 2012. It was decided to organize the workshop under the convenership of Prof (Mrs.) Manju Sharma on October 05-06, 2012 at NASI, Allahabad.

In the light of above, The National Academy of Sciences, India (**NASI**), **Allahabad** organized a two-day workshop on **Oct.5-6, 2012**.

A large number of distinguished women scientists from all across the country including Women Scientists, members of faculties, women research scholars and post graduate students from the University of Allahabad, P.G. colleges, medical, engineering, agriculture and other scientific institutions of Allahabad and other destinations participated in the workshop held in the auditorium of the Academy.

Inaugural Session

The program commenced with the welcome address by Prof. Krishna Misra, General Secretary, NASI highlighting the importance of education for women. Prof. Misra said that the role of women in society is absolutely vital for the country's progress, as they are a great human resource; and therefore, it is essential to educate them.

Prof. Sneh Bhargava former Director, AIIMS, New Delhi inaugurated the workshop.

Narrating the theme of the workshop Prof. Manju Sharma said, "Women must be educated and Science education is pivotal for women as it provides a scientific approach to thinking, and helps them understand the things better."She further added that women are *knowledge power*, so they could be the role models in spreading awareness to promote Science.



L-R Prof. Sneh Bhargawa, Dr. Manju Sharma lighting the lamp during the Inaugural Session

Prof. Kasturi Datta of the Special Centre for Molecular Medicine, JNU, New Delhi, delivering her keynote address on 'Challenges, Opportunities, Promotion: Can we make it?' said that in case of rural population the factors responsible for the ill fate of women are poverty, food insecurity, sex discrimination, sanitation, illiteracy, inadequate knowledge of local and natural resources and dependence on traditional means for their livelihood. It is challenging for women to maintain a balance in life and work, but opportunities are always there, provided they get the support of the family and society.



Prof. Manju Sharma, Prof. Kasturi Datta, Prof. Krishna Misra addressing the audience during the workshop

Scientific Sessions

After the inauguration of the workshop the Scientific Sessions were held on the following themes:

- Writing research proposals for financial support
- How to write scientific papers and give presentation
- Malnutrition
- Agriculture, Horticulture, Animal Husbandry and Value Addition
- Health Care and Environmental Hygiene
- Availability of Research Funding
- S and T Education, Training and Awareness Building

The Scientific Session on ***Writing research proposals for financial support*** was chaired by Prof. Shelly Bhattyacharya, Department of Zoology, Vishwa Bharti Central University, Shantiniketan. The distinguished speakers were Dr. Madhu Dixit, Scientist 'F', Div. of Pharmacology, CDRI, Lucknow (Title of presentation-“**Strategies to write research proposals for funding**”) and Dr. Renu Swarup, Advisor, DBT, New Delhi (Title of presentation- “**Effective Grant Writing Opportunities in Biotechnology Sector**”). Dr. Roli Mishra, Research Associate, IIT, New Delhi was the Rapporteur of this session.

After the lectures there were several queries from the audience on the various opportunities for getting projects and funding available from such sponsoring agencies.

The Scientific Session on ***How to write scientific papers and give presentation*** was chaired by Prof. Krishna Misra, General Secretary, NASI with Dr. Nitya Singh, IIIT, Allahabad as Rapporteur and Prof. Madhulika Agarwal, Dept. of Botany, BHU, Varanasi (Title of presentation-“**Writing Scientific paper: A procedural approach**”) and Prof. Paramjit Khurana, Department of Plant Molecular Biology, South Campus, University of Delhi (Title of presentation-“**The Art of Writing and Presenting your Science**”) as speakers.

The participants put forth their problems faced by them while writing research papers, which were resolved by the scientists. A discussion was also held why it is essential to have one's own way of writing and how they can make it.

The Scientific Session on **Malnutrition** was chaired by Prof. Manju Sharma. The speakers were Dr. Mahtab Bamji, National Nutritionist, INSA Honorary Scientist, Dangoria Charitable Trust, Hyderabad (Director Grade Scientist, (Retd.)National Institute of Nutrition, Hyderabad) (Title of presentation -“**Development of adolescent girls through scientific and social engineering and skill development**”),

Dr. Shubhra Chakraborty, Staff Scientist-VI, National Institute of Plant Genome Research (NIPGR), New Delhi (Title of presentation-“**Nutritional Genomics: Challenges & Prospects**”), Prof. Indira Chakravarty, *Chief Advisor, PHED, GOWB, Former Addl DGHS, Director and Dean, AIHPH, GOI & Director, Ch National Cancer Inst, GOI* (Title of presentation-“**Malnutrition- The most major public health problem which needs intersectoral interventions**”) and Prof. Jaya Tyagi, Dept. of Biotechnology, AIIMS, New Delhi (Title of presentation-“**Possibility of a link between vitamin C and M. tuberculosis dormancy development**”). Dr. Vibha Tandon, Associate Professor, Department of Chemistry, University of Delhi was the Rapporteur of this session.

A discussion was held on how the children can be at risk for malnutrition even before birth, as their nutrition levels are directly tied to the nutrition of their mothers. There were interesting questions regarding the role of micro-nutrients in nutrition. Queries were also made as how vitamin C could act in making tuberculosis dormant. It was also proposed that the concept of malnutrition must be taught in the school level and must be included in the curriculum to enhance the level of awareness of the students.

The session on **Agriculture, Horticulture, Animal Husbandry and Value Addition** was chaired by Dr. Vinita Sharma, Advisor, Department of Science & Technology (DST), New Delhi. Dr. Rupali Sethi, Guest Faculty, Dept of Chemistry, Univ of Allahabad was the Rapporteur. There were four speakers in the session viz. (1) Dr.

Sudha Nair, former Senior Director, MSSRF, Vice Chairperson, Golden Jubilee Biotechnology Park for Women, Society, Chennai (Title of presentation-"**Institutional Mechanisms for Promotion of Livelihoods / Entrepreneurship for Women**"), (2) Dr. Krishna Srinath, Director, DRWA, Bhuvneswar (Title of presentation-"**Technology Development for Farm Women**"), (3) Dr. Sindhu Sareen, Senior Scientist (Gen. & Cytogenetics), Directorate of Wheat Research (DWR), Karnal (Title of presentation-"**Role of Women in Agricultural Sciences and Technology**") and (4) Dr. Suchitra Banerjee, Scientist, CIMAP, Lucknow (Title of presentation- "**Hairy Root Research: an updated biotechnological approach towards predictive biofactories**") delivered their talks.

In the end of this session an exciting discussion was held regarding opportunities for women in agriculture and ways to promote gender sensitive research in this area. The participants also explained how the research could be aimed to address different models with the concept of bio villages and bio parks.

The session on Health Care and Environmental Hygiene was addressed by the distinguished Speakers Prof. Shelly Bhattacharya, Department of Zoology, Vishwa Bharti Central University, Shantiniketan (Title of presentation-“Environmental Toxicology: Emerging Paradigms”), Dr. Vibha Tandon, Associate Professor, Department of Chemistry, University of Delhi (Title of presentation- “Effect of Toxic metals on human health”), Dr. Neeru Singh, Director, Regional Medical Research Centre For Tribals, Jabalpur (Title of presentation-“Forest Malaria in Balaghat, Madhya Pradesh. A case study in a tribal community”). Prof. Sneha Bhargava, Former Director, AIIMS, New Delhi was the Chairperson and Dr. Archana Pandey, Associate Professor, Dept.of Chemistry, C.M. P. Degree College, Allahabad was the Rapporteur of this session.

In the end queries were made and adequately responded; about general hygiene tips and the diet to ensure better health especially for women.

The session on **Availability of Research Funding** was chaired by Dr. Mahtab Bamji, INSA Honorary Scientist, Dangoria Charitable Trust, Hyderabad (Director Grade

Scientist,(Retd.) National Institute of Nutrition, Hyderabad) with Dr. Sharda Sundaram Sanjay, Associate Professor, Dept. of Chemistry, E. C. C, Allahabad as Rapporteur. Dr. Vinita Sharma, Advisor, Department of Science & Technology (DST), New Delhi (Talk on **career/ research opportunities, diverse fellowship/funding schemes of DST, Govt of India, for women and young girl students and the ways to avail them**) and Dr. V. P. Gupta, Advisor, DBT, New Delhi (Title of presentation-**“DBT Women Biotech Programme – opportunities for Women Scientists”**) addressed on research avenues for women, even at much later stage in life. The queries were made as under what conditions the proposal for the grant could be rejected. The ways to look at diverse systems for allocating research funds were suggested by the scientists.

The session on ***S and T Education, Training and Awareness Building*** was chaired by Dr. Shashi Rana, Senior Scientific Officer, Patent Information Centre, Council of Science & Technology (CST), U. P.Vigyan Bhawan, Lucknow. Dr. Richa Tandon, Assistant Professor, Dept. of Botany, Ishwar Sharan Degree College, Allahabad was the Rapporteur and the speakers included Dr. Pratibha Jolly, Principal, Miranda House, New Delhi (Title of presentation-**“Research, Innovation and Outreach in Science Education: Building Collaborative Networks for Change”**), Dr. Shashi Tyagi, Associate Professor & Vice-Principal, Gargi College, University of Delhi (Title of presentation- **“S and T education beyond classroom for building awareness at undergraduate level”**) and Dr. Archana Pandey, Associate Professor, Dept. of Chemistry, CMP Degree College, Allahabad (Title of presentation-**“Science and Technology for rural women”**).



The interactive session during the workshop underway

To conclude the session there was an informative discussion on the techniques for the women scientists and teachers to be acquainted with and the pragmatic approach to train the rural women in various aspects such as horticulture, floriculture, mushroom cultivation , vermiculture, sericulture, brick-making, bio-gas technology the scientific way. Such training programmes can be held in different Women's Colleges.

The last session of the concluding day of the workshop was on ***Interaction & Conclusion and recommendations*** with Prof. Manju Sharma as the Chair and Prof. Kasturi Datta as the Co-Chair. The Interactive Panel comprised Prof. Krishna Misra, General Secretary, NASI, Prof. Laxmikantam M, Scientist 'G', Head, Inorganic and Physical Chemistry, Indian Institute of Chemical Technology, Hyderabad Dr. Sayani Das, Gender Resource Consultant, Guest Faculty, PSG Institute of Management, R&D Director, LEAD Learning Pvt. Ltd. Dr. Mamta Kapila, Editor, Springer India Pvt.Ltd, New Delhi. Dr. Shonali Chaturvedi, Associate Professor, Dept. of Botany, E. C. C. Allahabad was the Session Rapporteur.

The participants interacted with the eminent scientists with numerous queries which were answered satisfactorily. This session provided an interactive atmosphere for knowledge-sharing and problem-solving.

The entire programme was coordinated and conducted by Dr. Pavitra Tandon and Ms. Archana Pant. Ms. Pant also proposed a vote-of-thanks in the end of the valedictory session of the workshop.

It was decided that all the lectures delivered in this workshop will be published in the form of a news letter and also be put on the website of the academy.

A
Workshop
on
***“Women in Science & Technology:
The path to an empowered India”***
(March 8-9, 2013)
Organized by



The National Academy of Sciences, India
(Ahmedabad Chapter)

The Ahmedabad Chapter, chaired by Professor Alok Dhawan organized the second workshop in the series under the convener'ship of Dr. Ashis Jalote-Parmar on March 8-9, 2013. The workshop "Women in Science and Technology: The path to an empowered India" was held at the Institute of Life Sciences, Ahmedabad University and coincided with the International Women's Day.

Eminent women from leading universities and research institutes, pharmaceutical industry, healthcare sector and government bodies from across India, deliberated on a wide range of topics which can broadly be divided into women & society, skill development and cutting-edge science. A panel discussion on contemporary women issues was also be organized at the end of each day. The audience comprised of undergraduate, postgraduate, doctoral students as well as young scientists from the industry and academia.

Inaugural Session

The General Secretary, NASI, Professor Krishna Misra, inaugurated the workshop and gave an overview of the objectives and activities of the Academy. The academy has a pan India presence with 17 local chapters in various cities including Ahmedabad. She said that the key objectives of NASI were to popularize Science, make public aware of the progress in Science as well as help aspiring scientists to



Prof. Krishna Misra, General Secretary, NASI, lighting the lamp during inaugural ceremony

publish their work; and also discuss it among their peers. Its work focuses on several contemporary issues like natural resource conservation, climate change, water conservation, malnutrition and women empowerment. She highlighted the fact that our government is supporting and encouraging women in Science and technology and mentioned our Prime Minister's address during the National Science Congress last year where he emphasized on the need for encouraging women to take up a career in science, as they are underrepresented.

Professor Alok Dhawan, Chairman, NASI- Ahmedabad Chapter who is also the Director of the Institute of Life Sciences, Ahmedabad University gave the genesis of the workshop. He informed the audience that women in Indian mythology have always been the torch bearers and this endeavor is directed towards reiterating their pivotal role in



Prof. Veena Tandon, Dept of Zoology, NEHU, Shillong addressing the audience

the upliftment of the society. Professor Veena Tandon, Department of Zoology, North Eastern Hill University, Shillong who is also the Chairperson of the North-East Region Chapter of NASI, delivered the keynote address on “Women in science research: present perspectives”. She emphasized on the gender bias that exists in the society and

highlighted issues like strong cultural bias, family commitments and dearth of women role models due to which very few women vouch to take science as a career option.

She also deliberated on the multitude of efforts being done globally to increase participation of women in science & technology.

She informed the audience of the various fellowships, schemes and policy changes in several national institutes that have been initiated to support women in science. The lecture emphasized on the fact that gender inequality will be overcome only if both men and women of our society catalyze and support these government initiatives.

Dr. Dipali Dhawan of the Institute of Life Sciences who was the co-convenor of the workshop proposed the vote of thanks.

Session I

The first session of the day was chaired by Professor Krishna Misra, General Secretary, NASI. The rapporteurs for this session were Ms. Sangeeta Paul and Ms. Krupa Kansara of the Institute of Life Sciences, Ahmedabad University.

It began with a talk by Professor A.V. Vanikar, Institute of Kidney Diseases and Research Centre (IKDRC), Ahmedabad titled “The lesser undertaken journey of stem cell research: from bench to bedside” which demonstrated how their institute had been able to cure several people of debilitating diseases using stem cell therapy; thereby, contributing to the society. Their commendable efforts were applauded by the audience.

This cutting-edge scientific talk was followed by a talk from Professor Urmila Thatte, KEM Hospitals, Mumbai titled “Woman version 2.0”. She shared her personal experiences in balancing professional and social responsibilities and outlined the characteristics that she thought were most important for becoming a truly balanced woman. She opined that both men and women should be equally responsible for the family management so that they can justify their respective roles at the workplaces.

“Patents and bitter pills” was the title for the next talk delivered by Professor N. Lalitha, Gujarat Institute of Development Research (GIDR), Ahmedabad. She highlighted the problems caused due to patenting which make drugs expensive and

inaccessible to the masses. She advocated the protection of intellectual property but opposed to the use of IPR as a means for generating revenue.

Dr. Madhvi Joshi, Sector Specialist, Pharma & Healthcare, Gujarat State Biotechnology Mission portrayed the “Opportunities for women in biotechnology” and called upon young students in the audience to take up science as their career.

Session II

The second session was chaired by Dr. Ashis Jalote-Parmar, Associate Professor, Institute of Information and Communication Technology, Ahmedabad University with Ms. Jincy Johny, Institute of Life Sciences as the rapporteur.

The session opened with a talk titled “Experiences of empowering rural women in delivery of health care services in Vadodara district” by Ms. Archana Joshi, Founder, Deepak Foundation, Baroda. She shared her account of working with women in rural parts of Gujarat and providing them health care facilities and education.

Professor Kiran Kalia, Head, School of Biosciences, Sardar Patel University delivered a lecture on “Gestational diabetes: an added risk for onset of type 2 diabetes mellitus”. She enlightened the audience about the complications of gestational diabetes and the added risk it imparts to both the child and the mother for developing type 2 diabetes in the future. She also said that care, both, during and post pregnancy can help in reducing this risk.

Professor Krutika Khanderao Sawant of the Department of Pharmacy, M.S. University, Baroda, delivered a lecture entitled “Overview of novel drug delivery systems” and talked about the use of nanotechnology for therapy in diseases such as cancer.



**Prof. Krutika Khanderao Sawant,
M.S. University, Baroda**



**Dr. Tanuja Kulshrestha, Quality Assurance,
Zydus Research Centre**

The next lecture “Quality Assurance and Regulatory Affairs” delivered by Dr. Tanuja Kulshrestha, Manager, Quality Assurance, Zydus Research Centre gave a perspective of women in the industrial setup. She talked on how women in quality assurance and regulatory affairs have contributed immensely both in industry and in education. She shared some anecdotes of her professional life as quality assurance personnel.

The first day concluded with a panel discussion “Is the Indian society prepared for embracing empowered women both in the workplaces and at home?” moderated by Dr. Ashis Jalote-Parmar. There were two schools of thought; some panelists were of the opinion that the society is changing and is ready to embrace empowered women whilst others believed the change in attitude is superficial and in reality, the thoughts are still orthodox. It was felt that proactive steps should be taken to increase the number of women at higher levels so that the men at workplace learn to adapt to the changing scenario. Holistic efforts should be made to inculcate the need for women empowerment at all levels of education so that discrimination is eradicated at the grass root itself. The discussion ended on the note that the key to empowerment lies within us; therefore, it is our duty to keep the fire in us burning.



Panel discussion underway: L →R Dr. Ashis Jalote-Parmar, Prof. Krutika Khanderao Sawant, Ms. Archana Joshi, Prof. Kiran Kalia, Prof. Krishna Misra, Prof. Veena Tandon, Dr. Tanuja Kulshrestha, Dr. Jyotinder Kaur

Session III

The chairperson for the 3rd session was Professor Veena Tandon, Department of Zoology, North Eastern Hill University, Shillong. Ms. Ragini Singh of the Institute of Life Sciences, Ahmedabad University was the rapporteur for this session.

The session began with a lecture by Professor Krishna Misra, entitled “Challenges and fascinations in the field of chemical science”. She highlighted the parallel development of chemical and biological sciences and how the study of one would not be possible without the other.

She illustrated the role of chemistry in cutting edge healthcare sectors like vaccine development and personalized medicine. Her talk was followed by a case study presented by Ms. Seema Patel from the Ahmedabad Textile Industry Research Association (ATIRA) on “Converting challenges into opportunities- A case study”. She described the transformation of a loss making textile testing laboratory into a profitable

venture performed single handedly by a woman. Fellow speakers and the audience were inspired by her conviction and spirit and congratulated her on her achievements.

Dr. Ashis Jalote-Parmar who works on designing Information and Communication Technology (ICT) tools explained the benefits and hurdles of using ICT for improving maternal healthcare in the rural areas through the story of a 16 year old girl from Nandeswari area in Gujarat. Her talk was titled “Improving women well being through ICT: a case of maternal care in rural Gujarat”. She stressed on the importance of providing domain specific information, using traditional metaphors to deliver information and encouraging women to question and interact with their families and society to communicate more effectively.

Session IV

This session was chaired by Dr. Alpana Shukla, Head, Department of Botany, M.G. Science Institute, Ahmedabad. She was accompanied by Dr. Dipali Dhawan, Institute of Life Sciences, Ahmedabad University as the rapporteur.

The first lecture entitled “Empowering women promoting gender equality” was delivered by Ms. Heena Timani, senior lecturer of H.L Institute of Computer Applications, Ahmedabad University. She conveyed her views on the current status of women in the society through some very interesting statistics and emphasized on the importance of promoting gender equality.

Subsequently, an informative lecture on “Genetic counseling for women and children” was delivered by Dr. Frenny Sheth, Founder Trustee, Foundation for Research in Genetics and Endocrinology (FRIGE), Institute of Human Genetics. She shared her clinical experience and stressed on the significance of educating women to prevent genetic disorders.

The session concluded with a documentary by SEWA- Self Employed Women’s Association, an organization which supports self employed rural women through various initiatives. One of their initiatives is creating awareness and providing access to tools & equipments of ICT in the hands of poor and rural communities in the remotest villages

of Gujarat. This documentary was made by the women in SEWA who have been trained in videography. The organization was represented by Ms. Leena Patel and Ms. Manjulaben Raval.



L-R: Ms. Manjula Raval, Ms. Leena Patel, SEWA

Session V

The post lunch session was chaired by Dr. Frenny Sheth with Ms. Anokhee Parikh, Institute of Life Sciences, Ahmedabad University as the rapporteur.

Dr. Kamala Vasu, from Department of Medicinal Chemistry, B. V. Patel PERD Centre, Ahmedabad talked about “Structure based drug design” and explained the use of computational technologies in designing therapeutic molecules.



Prof. Chetna Desai, B.J. Medical College, Ahmedabad

Next talk of this session was delivered by Prof. Chetna Desai from Department of Pharmacology, B.J. Medical College, Ahmedabad. She talked on “Pharmacovigilance: a tool to patient safety” and explained the hazards associated with drugs and ways of minimizing the risk to patients.

These informative lectures were followed by an intensive panel discussion on “Career break: A ‘comma’ or a ‘full stop’ in the path to success?” moderated by Prof. Veena Tandon. The panelists and the audience shared their personal experiences and dwelt on how perseverance can transform a ‘full stop’ into a ‘comma’. The panelists pointed out that our government is now encouraging women to restart their careers and has proposed several schemes which can aid them in doing so. The recommendations to the audience were very realistic and encouraging. All the women were of the opinion that if it is your dream, you have to pursue it, give it your 100% and not expect any concession on account for being a woman. Never be disheartened and keep in mind that if one door closes, another opens.



Panel discussion on 'career breaks' underway. L-R: Prof. Veena Tandon, Ms. Heena Timani, Dr. Alpana Shukla, Prof. Krishna Misra, Dr. Kamala Vasu, Dr. Frenny Sheth and Prof. Chetna Desai

Valedictory Session

Prof. Alok Dhawan summarized the proceedings of the workshop. He extended gratitude to NASI for the conceptualization and funding of the event; and to all the members of the Institute of Life Sciences for managing the workshop.

The workshop was concluded with a valedictory address by Prof. Krishna Misra, General Secretary, NASI who shared her delightful experience over the two days. She was impressed with the confidence of the women in the audience and appreciated the interactions. The participants were then presented with their certificates by Prof. Misra. The vote of thanks was proposed by Dr. Dipali Dhawan , the co-convener of the workshop.

**A
Workshop
on
*“Defining Role of Women Scientists and
Teachers in Promotion and Application of
Science and Technology”***

(March 23, 2013)

at

**M. S. Swaminathan Research Foundation
(MSSRF), Chennai**

Organised by



**The National Academy of Sciences, India
Allahabad**

The third workshop in series was held on March 23, 2013 at M. S. Swaminathan Research Foundation (MSSRF), Chennai. A large number of distinguished women scientists including members of faculties, women research scholars and post graduate students from the University of Chennai, P.G. colleges, agriculture and other scientific institutions of Chennai and nearby destinations participated in the workshop.

Inaugural Session

The program commenced with the welcome address by Prof. (Mrs.) Krishna Misra, General Secretary, NASI, introducing the concept and objectives of the Academy. Prof Misra highlighting the importance of Science education for women, stressed on the need to educate them to ensure their growth and development. She further added that a large number of women scientists and teachers have participated in such programmes of NASI and posed their problems as well as given many valuable suggestions. NASI is committed to its mandate of “science and society”. It has many programmes for the benefit of women in science as well as on application of science and technology to benefit the women in rural areas.

Dr. Manju Sharma, while outlining the theme of the workshop said that NASI, as part of the ‘Year of Science’ activities has been organizing such workshops. This is the third in the series. M S Swaminathan Research Foundation is the ideal place to have this workshop as it is Prof. M S Swaminathan who has given tremendous importance to the gender issues, gender parity and inclusiveness. He has been the mentor, guide and a teacher for the women scientists. When he was in the Planning Commission, he included a Chapter on ‘Women and Child Development’ in the Plan document, during the 6th Plan period. In this, a special Section was written about the application of science and technology for the benefit of women and encouraging women to do science. She profusely thanked Prof. Swaminathan for his continued encouragement, guidance and support for the women scientists; and also she thanked Dr. Ajay Parida, Executive Director, MSSRF, Chennai, for his full cooperation extended to organise this workshop.

Prof. M. S. Swaminathan, Member of Parliament, in his Inaugural Address complimented NASI for the establishment of Ganga-gallery, while recalling about *Akshaydara*, i.e. a dance-drama on the holy river Ganges which was performed during his Presidentship of this Academy. In this context, he also mentioned about the statement of Pt. Jawaharlal Nehru who said that “*Ganga is the river of India*”. He further talked about economics of farming, use of fertilizers, seeds, water etc. for sustainable agriculture. He said that it is important to look at the human dimension of the problem and focus on women farmers. Prof. Swaminathan also expressed concern about the mal-nutrition in the country.



Prof. M. S. Swaminathan & Dr, Manju Sharma gracing the inaugural session

He said that about 200 Districts have been identified as malnourished in the country; the problem of anaemia and nutritional deficiencies in women and children are critical issues of concern. Health care is extremely important. Similarly, he mentioned about the education and the first generation learners. Further, he emphasized the importance of nutrition for a healthy body and education for a healthy mind. He said that it is important that science must advance the frontiers; however, women must do transformational technologies because it is important for their advancement and

ensuring happiness. The MSSRF has been engaged in activities which are pro-poor, pro-nature, and pro-women. He specifically pointed out that India had 260 million tonnes of food grain production this year, 250 million tonnes of vegetables and fruits; but ironically we still have a large number of women and children, who are mal-nourished. Therefore, technological empowerment of farmers, especially the women farmers is extremely important.

A video clip of the question hour during the Parliament proceedings in Rajya Sabha attended by him just one day before, i.e. on March 22, 2013 was also shown on this occasion; where he stressed on the need for taking steps for women-empowerment, starting from the rural ones at grass root level. In the end, Prof Swaminathan appreciated the efforts of NASI in this direction and wished the workshop a grand success; also added that he is confident that the workshop will have useful recommendations.

Dr. Ajay Parida described the achievements of M. S. Swaminathan Research Foundation adding that the organization is celebrating 25th years of its foundation; and it has received the “National Award for Application of Science and Technology” for encouraging women’s efforts in Science.

At the end of the inaugural session, Ms Archana Pant, SRF, NASI, profusely thanked Prof. Swaminathan, Prof Manju Sharma and other resource persons, who could spare time from their busy schedule to grace the function; she also thanked all the participants, organizers and guests attending the workshop.

Scientific Sessions

After the inauguration, the Scientific Sessions were held on the following themes:

- Writing Scientific Papers and giving Presentations
- Writing Research Proposals for Financial Support
- Malnutrition and Health Care
- Agriculture and Value Addition

The Scientific Session on “***Writing scientific papers and giving presentation***” was chaired by Prof. Manju Sharma. The distinguished speakers were Prof. Paramjit Khurana, Department of Plant Molecular Biology, South Campus, University of Delhi and Dr. Soumya Swaminathan, Director, National Institute for Research in Tuberculosis, Chennai. After the lectures the participants put forth their problems while writing the research papers. The Scientists emphasized on planning and commitment as pre-requisites to be a prolific writer. They advocated the role of Statistics in scientific presentations for a rational approach; and also suggested why it is essential to be imaginative and have one’s own way of writing; and how they can make it.



The Scientific Sessions during the workshop underway

The Session on “***Writing Research Proposals for Financial Support***” was addressed by Prof. GeethaLakshmi, Tamil Nadu Agriculture University, and Dr. Ajai Parida, Executive Director, MSSRF. The session was chaired by Prof. Paramjit Khurana. There were queries from the participants on various opportunities for getting projects and funding from the sponsoring agencies. *New idea, clear concept, innovation and reviewer’s demand* were suggested as the key points to be incorporated while

writing the research proposal. Collaborative approach in research was also stressed upon by the scientists/speakers to enhance the quality of the research work.

The scientific session on “**Malnutrition and Health Care**” was chaired by Dr. Nanditha Krishna, CPR Centre for Environment Education, Chennai. The speakers for this session included Dr. (Mrs.) Kalpagam Polasa, Director, National Institute of Nutrition (NIN), Hyderabad and Prof. Gagandeep Kang, Head, Division of Gastrointestinal Sciences, Christian Medical College (CMC), Vellore. Discussion was held on how the children can be at risk for malnutrition even before birth, as their nutrition levels are directly tied up with the maternal nutrition. During the interactive session, interesting questions were raised on the role of macro and micro-nutrients in the balanced diet.

The session on “**Agriculture and Value Addition**” was chaired by Dr. S. Nagarajan of MSSRF with Dr. N. Sarla, National Professor, Directorate of Rice Research, Hyderabad and Dr. Rengalakshmi, Programme Coordinator, MSSRF as the speakers. At the end of this session an exciting discussion was held regarding opportunities for women in agriculture and ways to promote gender sensitive research in this area. The participants were given in-depth information regarding value addition, model development and reduction in the lengthy post-harvest process to reduce the drudgery as well as for endorsing entrepreneurship for the alleviation of poverty. **It was also proposed that NASI and MSSRF could join hands to initiate a programme on farmers’ training.**

The concluding session of the workshop was on **Interaction, Conclusion and Recommendations**, with Prof. Manju Sharma as the Chair and Prof. Krishna Misra as the Co-Chair. The discussants of the **Interactive Panel** included Dr. T. S. Lokeshwari, Sri Ramchandra University, Chennai and Dr. Sujata Narayan, Tuberculosis Research Centre, Chennai. The women participants got an opportunity to learn through sharing their doubts, experiences and comments with the learned speakers. This session provided an interactive atmosphere where the confluence of divergent queries came under one roof; and were responded satisfactorily. The entire programme was coordinated and conducted by Dr. Rajlakshmi, MSSRF, Chennai.

At the end of the day, Dr. Niraj Kumar, Executive Secretary, NASI, proposed a vote-of-thanks, reciting his sentiments as-

“They may be malnourished;

they may not be so well-flourished.

But, they are the source of inspiration

for millions of power-driven aspirations.

Just give them respect, opportunities and facilities;

they will prove themselves better than half of our population”.

**A
Workshop
on
*“Defining the Role of Women Scientists and Teachers in
Promotion and Application of Science & Technology: North-
east India Perspectives”***

(May 8-9, 2013)

at

Lady Keane College, Shillong, Meghalaya

Organized by



**The National Academy of Sciences, India
Allahabad**

The workshop was inaugurated by the Chief Guest, Dr. Ampareen Lyngdoh, Hon`ble Minister of Municipal Administration and Urban Affairs, Govt of Meghalaya and was graced by Prof. V.P. Sharma- NASI-ICMR Chair- as the Guest of Honour. Prof. Manju Sharma, Distinguished Woman Scientist and NASI Chair; Prof. P. Tandon, Former Vice-Chancellor, NEHU; Prof. Veena Tandon, Chairperson, NASI NER Chapter; Dr Purnima Sharma, Managing Director BCIL; Dr Soniya Nityanand from SGPGIMS; Dr Neeraj Kumar, Executive Secretary at NASI HQs; Prof BBP Gupta, Prof N. Saha and Dr SR Joshi from NASI NER Chapter, and Dr C. Massar, Principal, Lady Keane College were among the dignitaries present in the inaugural function.

The technical programme was divided into four sessions. The first session on **Health and Nutrition** was chaired by Prof. VP Sharma, in which Dr. Soniya Nityanand from SGPGIMS, Lucknow; Prof. Veena Tandon from North-Eastern Hill University, Shillong; and Dr. Natasha Marak from Central Agricultural University, Tura, Meghalaya presented their talks.

The second session, on the theme **Entrepreneurship & Opportunities**, was chaired by Prof. P. Tandon. This session included four speakers namely, Dr. Purnima Sharma from Biotech Consortium India Limited, Prof. SK Barik from North-Eastern Hill University, Dr. Gaurangi Maitra from DBT Nodal Centre, Tezpur University and Dr. Larisha Lyndem from Visva-Bharati University.

The third session on **Bioresources & Technological Interventions** was chaired by Prof. Veena Tandon and had Dr. A. Pattnayak from ICAR NEHR Complex, Prof. Suman Kumaria from North-Eastern Hill University and Dr. A.G. Ahangar from North-East Indira Gandhi Regional Institute of Health and Medical Sciences, Meghalaya as the speakers.

The last session was a 'Panel Discussion', chaired by Prof. Manju Sharma and co-chaired by Prof. Veena Tandon and Dr. C. Massar.

A
Workshop
on
***“Science & Technology and Sustainable
Bio-economy for Women's Welfare”***
(May 17-18, 2013)

at
Hotel Inderlok, Rajpur Road, Dehradun

Organized by



The National Academy of Sciences, India Allahabad

In Joint Collaboration with

UK Chapter & Uttarakhand State Council for Science & Technology (UCOST)



The Objective of the workshop was to generate awareness & develop scientific temper among Women Scientists, Researchers and Students; and also to focus on the sustainability of Women in prospects of Uttarakhand. The two-day program was held on May 17th and 18th, 2013 at Hotel Inderlok, Rajpur Road, Dehradun. A total of 140 Women Scientist/Researchers/Students attended the workshop out of which 4 participated from G.B Pant University of A&T Pantnagar, 6 from G.B Pant Institute of Himalayan Environment KosiKatarmal, Almora, 2 from Vivekanand Institute Almora, 7 from HNB Garhwal University Srinagar, 16 from Dolphin Institute Dehradun, 4 from Indian Institute of Petroleum, Dehradun, 2 from Wadia Institute Dehradun, 3 from HIHT Jollygrant, Dehradun, 8 from SGRR PG College, Dehradun, 8 from Doon University, Dehradun, 3 from Centre Soil & Water Conservation, Dehradun, 6 from DIT Dehradun, 6 from DBS PG College Dehradun, 7 from DAV PG College, Dehradun, 6 from UPES Dehradun, 2 from CAP Dehradun, 6 from SAI Institute Dehradun, 6 from Baba Farid Institute, Dehradun, 6 from FRI Dehradun, 3 from ZSI Dehradun, 6 from Graphic Era University, Dehradun and 10 from UCOST Dehradun, respectively.



Participants of the workshop with Prof. V. P. Sharma & Prof. (Mrs.) Manju Sharma

The workshop was organized jointly by NASI UK Chapter, UCOST, USERC and Inspire Program Dept. of India, Govt. of India, New Delhi; and focussed on the bio-economy of the region on a sustainable basis, for the welfare of women. It was emphasised that

NASI UK Chapter has been very active in supporting many activities for the welfare of women. The Workshop aimed for women scientist, Researchers & Students of Uttarakhand. The theme of the workshop was, "Science & Technology and Sustainable Bio-economy for Women's Welfare" with the view that prominent driving force of Uttarakhand's social and cultural life, centred on women folks.

Inaugural Session

The formal inaugural session was started with candle lighting and then welcomes speech by Dr. Rajendra Dobhal, Director General, UCOST, Dehradun. He emphasised on the S&T in application chain of bio-resource utilization. He told that bio-resource conversion to the economy should be a priority area with essential S&T intervention. Actively and timely invested capital results the success, however, legal side of science should also be considered on priority basis. He regretted that most of the R&D fund comes from the Govt., while investment from industries is almost negligible. He also introduced about INPIRE Program by supported by DST, Gol, New Delhi.

Then, a National Award for Outstanding effort in S&T popularization among children was given to Dr. Kamla Pant, President, PAHAL NGO, Pithoragarh by Dr.Manju Sharma.

Later, Prof. S.K. Singh, Vice Chancellor, HNB Garhwal University, Srinagar, addressed the gathering by emphasising on spreading awareness by organized efforts to cater the need of women entrepreneurs in Uttarakhand state. Besides, he also pointed out the need of maintaining, caring and nurturing the interest of students to pure science as majority of students is opting commerce as a carrier option. He told that Indian Govt has initiated a special scheme to establish 300 community colleges to develop S&T skills in young students which will be affiliated to existing central universities of the respective states. States have to submit the proposal to Central Govt. for this and Uttarakhand should also take this opportunity as a priority agenda. Later, all the chairpersons of the august gathering released the NASI UK Chapter, Report 2012-13.

Padmashree Dr. V. P. Sharma, Former Director, ICMR, New Delhi, addressed the participants and pointed out the importance of efficient scientific communication in

the rural societies. He shed light on NASI efforts in science communication and awareness in distant societies of the country on some priority areas such as nutrition, water and sanitation.

Prof. Balram Bhargava, Deptt. Of Cardiology, AIIMS, New Delhi emphasised on the exploitation of Intellectual Property Right for innovation and technology.

Dr. J.C. Bhatt, Director, VIPKAS, Almora, in his address motivated the young researchers by telling the efforts made by Dr. Bosi Sen, the founder of VPKAS, Almora (ICAR Laboratory in UK).

Finally, Chief Guest of the Program, Padma Bhusan, Dr. Manju Sharma, Former Secretary, Dept. of Biotechnology, Govt. of India, New Delhi delivered a Key Note address. She expressed her commitment to work for the brilliant, energetic and brainy women work force of our country as has been initiated by Pt. Jawahrlal Nehru and Dr. M.S. Swaminathan. She narrated that it was Dr. Swaminathan who realized to ensure the participation of women folk of our country in S&T activities in order to achieve inclusive growth. His efforts brought them in main stream when he included a chapter, “women and child development” in 6th Five Year Plan. She told that NASI is the oldest of the science academies established in 1930 by a very eminent scientist, a visionary and a patriot Dr. Meghnad Saha. The mandate of the academy is Science & Society. She further said, “The present workshop will deal with the environmentally sustainable livelihood, Bio-economy for the welfare of the region, Drudgery of women in hill areas – physical, time consuming and health issues specially malnutrition and cardio – vascular diseases. It also cover issues relating to women scientists who are doing science, teaching science and would like to craft a career in science. Writing research papers is important and that was discussed in detail”. Dr. Sharma showed her deep concern on problem of malnutrition in women, especially, in Uttarakhand or Himalayan states. She explained that bio-resources are the feed stock of future economy in India and women are the backbone of the mountain societies and therefore, she selected the theme of workshop cantered on women.

Finally, the session was closed with vote of thanks by Dr. B.R. Arora, Former Director, WADIA Institute, Dehradun & Chairman, NASI-UK Chapter.

Ms. Mona Bali, English Lecturer, GGIC & Dr. D. P. Uniyal, Senior Scientific Officer, UCOST & Workshop Coordinator conducted the workshop.

Session 1 - Science and Technology for the welfare of women

The inaugural session was succeeded with first technical session, “S&T for welfare of women”, was chaired by Dr. Manju Sharma, in which lectures were delivered by various invitees. Two important lectures on nutrition and cardio vascular diseases were given. These highlighted the importance of welfare measures, implementation of various schemes, prevention and cure, awareness building etc. Dr. Kalpagam Polasa, Director, National Institute of Nutrition, Hyderabad delivered her lecture on “**Combating Malnutrition**”. She described the types, prevalence and deficiency diseases in India. She provided a glimpse of various governmental programmes such as National Nutritional Program, Integrated Child Development Service Scheme, Mid Day Meal Programme, National Commission on Iodine Deficiency Disorder, Vitamin A Prophylaxis Programme etc. She said that Mid Day Meal programmes ensure the three hundreds Kcal/day for six day in a week for all the primary school children. She pointed out monotonous type of food habit and reach to the specific diet are two prominent drivers of nutrient deficiency in India. She suggested improving our PDS system for adequate and regular supply. She also suggested that some Himalayan herbs are the rich source of vitamin D which should be promoted for their cultivation and utilization. Family counselling, behavioural change, local community education, mass media campaign for family and nutritional health, curative health care, school based intervention, and promotion of homestead gardening are some measures to promote nutritional health of our country. Dr. Balram Bhargava delivered his talk on “**Preventing heart diseases: Recopies for the lifetime**”. He emphasised on the adoption of healthy food habit to prevent heart diseases. He described the good and bad food especially for heart diseases. He emphasized on the prevention of heart and vascular diseases. He told that minimum half an hour daily physical exercise & Yoga is the best solution to prevent the

heart diseases. He told that we should also focus on our daily life style and maintain a balanced food chart. Dr. Kirti Joshi, Scientific Officer, UCOST, Dehradun delivered her lecture on, “**Women in Science: Assessing their participation in S & T**” and shed light on status and opportunities for women in S&T by comparing available data of developed and developing countries. She told that only 15% of undergraduate enrolled women candidates pursue higher degree and left the studies in between due to societal concerns like marriage and family matters. India stand last after Korea, South Africa, Indonesia, Brazil, US and European countries in women employment and pursuing higher studies in S&T.

Session II- Agriculture and Value-addition

The Second session on “**Agriculture and value addition**” was Chaired by Prof. S. K. Singh, VC, HNB Garhwal University, Srinagar. Dr. Nripendra Chauhan, Incharge, Centre for Aromatic Plants, Dehradun, Uttarakhand in his lecture, “**Medicinal Plants of Uttarakhand: An Overview**” gave a very descriptive idea of medicinal plant biodiversity of Uttarakhand and restoration of fellow land by cultivating lemon grass in Pauri District of Uttarakhand. Dr. J.C. Bhatt, Director, VIPKAS, Almora, delivered his talk on, “**Agro-biodiversity in food crops of North-Western Himalaya**”. He showed his serious concern on the ongoing issues of cultivation of few crops and not giving proper attention to pulses and their plant varieties. He told that marginal land holdings and monsoon fed agriculture in hilly states like Uttarakhand is the prominent hurdle in agriculture. Dr. Binita Shah, CEO, Uttarakhand Organic Commodity Board, Dehradun showing her lecture that inhabitants of Uttarakhand practice various cultural activities to ensure viability and germination of seed (*Harela* festival) and compensation of the crop production in adverse climatic condition by growing 12 crops in the same field (In *Baaranaja* practice). She described that Uttarakhand agriculture policy 2001-11 trust on organic agriculture. Therefore Organic Commodity Board of Uttarakhand has developed

200 biovillages and trained 1 lakh farmers for cultivation of almost 40 organic crops. Dr. Brijmohan Sharma, Secretary, SPECS Dehradun, emphasised on energy conservation in the household purposes as well as commercial practices. He highlighted his recent innovation of “**energy efficient light**”, in which women’s of Uttarakhand are actively working in LED preparation and they are earning out of it.

The session was closed with a Special lecture delivered by Dr. V.P Sharma on, “How to write a scientific paper”. He emphasized on the importance of writing scientific paper and skill needed for same. He told about the common errors did authors in writing the scientific paper. He explains the proper method of writing scientific paper. He told about importance of library consultation & clearly defined the topic & problems. Most of the young women researchers appreciated the deliberations of the day.

Session III - Bio- economy

The second day of workshop was started with third session on Bio-economy chaired by Dr. B. R. Arora. Session started with a lecture of Dr. Sanjay Kumar, Scientist, IHBT, Palampur. He highlighted the efforts made by his laboratory and Institute on adaptation biology, its molecular mechanism, bio-fertilizer and various bioactive molecules. They are working on bio-prospecting of Cu/Zn Superoxide Dismutase enzyme that tolerates autoclaving. They have deciphered the molecular mechanisms of COLA gene for stress tolerance. They are studying the Catechin biosynthesis which is a potential antioxidant and also developed virus based pesticide having 9 months shelf life. They are also working on Phagopyritol from Himalayan cereal *Phagopyrum esculantum* (Phafar) which decrease blood-glucose level. Dr. Asha Chandola Saklanai delivered lecture on “**Iodine deficiency disorders in women of Uttarakhand**”. She has developed protein bound iodine method for diagnostic tool. She explained that Indian Salt Iodization has resulted in decrease in prevalence of iodine deficiencies such as cretinism, spontaneous abortion, visible goitres and speech-hearing defects etc. in Uttarakhand women. Prof. Geeta Joshi Pant, HNB, Garhwal University, Srinagar, delivered lecture on “**Prospecting Bio-resources**”. She explained that secondary metabolites are always less in the cultivated plants while natural habitats

promote their elevated synthesis mediated by stress. Dr. Kiran Rawat of HESCO in her lecture described “**Women’s Initiative for Self Employment**” facilitated by HESCO. They have initiated programs such as “Finger Millet Bakery Products”, “Fruit Bar from Apricot and Plums” etc. They have empowered the women of Jammu and Kashmir by Prasad Production from indigenous cereals offered to Vaishno Devi, in which their business has reached Rs. 44 lakh annually. They are working on post-harvest technology, aromatic plants, *Dhoop Agarbatti*, bee-keeping, and fibre yielding plants. Impressed by HESCO’s efforts, Dr. Manju Sharma suggested that UCOST can provide some financial help in their efforts in S&T interventions to the rural society after a brainstorming meeting. Dr. B. R. Arora suggested that Mid Day Meal program can be connected with products of HESCO in order to expend their market demand.

Session IV – Bio-resources

The final and fourth session was chaired by Dr. V. P. Sharma. In the session Dr. Arun Kumar, Former Add. Director, ZSI, Dehradun delivered lecture on “**Bio-economy - new concepts for the use of natural resources**”. He emphasized on sustainable use of bio-resources. He praised the “Beej Bachao Aandolan” of Sri Vijay Jardari, of Chamba Block, Tehri, Garhwal (UK), who is striving to conserve the indigenous seeds of Uttarakhand. Prof. Uma Melkania of GB Pant University of Agriculture and Technology delivered her talk on “**Agriculture and value addition**” in which she emphasized on focusing the changing consumers choice, compact commodity value chain, quality and service of any product. Dr. Ruchi Badola, Scientist, Wildlife Institute of India, Dehradun, delivered lecture on “**Role of women in livelihood security**”. She showed her concern on the fact that most of the women folk are not taken into account in any decision making. At this moment, Dr. Manju Sharma suggested Dr. Melkania to plan a large scale program for women entrepreneurs including technology intervention. With the deliberation of Dr. Badola, the session ended followed by discussion by panelists.

Valedictory Session

(Open Discussion & Conclusion)

Finally in valedictory session, the panelist summarized the recommendations and suggestion of the deliberations. Dr. Rakesh Sundriyal GBPIHED, Kosi, Katarmal, Almora said that the model of North-east India should be adopted for empowerment of Uttarakhand women folk, where women are transforming traditional products in to business product. Dr. Vandana Kumar, GBPUAT, Pant Nagar suggested promotion of entrepreneurship options in ornamental paper and floriculture for women in Uttarakhand. Dr. Anita Kumar, GBPUAT, Pant Nagar said that women are the good manager and women of Uttarakhand should be encouraged to adopt entrepreneurship other than the agriculture work. The valedictory session was summed up with vote of thanks by Dr. Neeraj Kumar, Executive Secretary, NASI, Allahabad.

The session of Workshop was conducted by Dr. D. P. Uniyal, Sr. Scientific Officer, UCOST & Workshop Coordinator. He highlighted that this workshop will provide a pathway to the women researchers and these types of workshops will also organized in different part of the state to strengthen the S&T issues for Women. Sh. Manoj Kanyal, Scientific Assistant, UCOST, assisted Dr. D. P. Uniyal to organize this workshop besides other scientist from UCOST including Dr. B. P. Purohit, Dr. ArunKukshal, Dr. Ashutosh Mishra, Mr. Amit Pokhriyal, Dr. Kirti Joshi, Dr. K. N. Bhardwajand and Dr. J. S. Aswal.

A
Workshop
on
Empowerment of Women using
Environmentally Sustainable Technologies
(June 5-6, 2013)

Jointly organized by



Allahabad Chapter of the National Academy of Sciences, India



The Institute of Applied Sciences, Allahabad (IASc)

&



Institute of Rural Health Research & Development, Allahabad (IRHRD)

The Allahabad Chapter of The National Academy of Sciences, India (NASI), organized a workshop on ***Empowerment of Women using Environmentally Sustainable Technologies*** on the auspicious occasion of the ***World Environment Day*** on **June 5-6, 2013** at NASI, Allahabad in collaboration with The Institute of Applied Sciences (IASC), and Institute of Rural Health Research & Development (IRHRD), Allahabad with the sole objective to focus on Environmentally Sustainable Technologies and their role in making rural/ semi-urban women empowered.

A large number (350 in total) of distinguished women scientists , members of faculties, women research scholars and post graduate students from the University of Allahabad, P.G. colleges, medical, engineering, agriculture and other scientific institutions of Allahabad and other destinations, renowned medical practitioners of the city including women and girls students from rural areas around Allahabad participated in the workshop.

Inaugural Session

The programme commenced with the introduction to the dignitaries on the dais by Dr. Niraj Kumar, Executive Secretary, NASI and his initial remarks regarding the motive of organizing the workshop. He expressed his gratitude and deep regards to Padam Bhushan Dr. (Mrs.) Manju Sharma, NASI Distinguished Woman Scientist Chair for her all efforts and guidance in making this women empowerment programme a major initiative of the Academy, which could be vital in reducing the drudgery of women, especially of rural background.

Dr. Mohd. Masood, the Coordinator of the workshop and Advisor of Allahabad Chapter, NASI welcomed the distinguished guests and participants; including the guest of honour Dr. Vinita Sharma (Advisor, DST, Govt. of India, New Delhi), the guest of honour who herself has made tremendous efforts in developing several programmes of DST, New Delhi for improving the socio-scientific status of women in the country. He also accorded a warm welcome to other dignitaries as Prof. Krishna Misra, General

Secretary, NASI, Prof. G. K. Srivastava, Chairman, Allahabad Chapter of NASI, Dr. B.P. Agarwal, President, IASc, Allahabad and Fellows/ Members of NASI, present on the occasion.

Further, the two major aspects of the workshop i.e. the **Thematic Approach** which was concerned with the theme or the basic idea of the problems/ issues related to women; and the **Pragmatic Approach** dealing with the practical solutions to these problems were explained by Dr. Niraj Kumar, with an appeal to all the women scientists and young researchers to come forward with their potential to utilize the natural resources for the betterment of mankind, especially the rural women.

Prof. G. K. Srivastava, Chairman, Allahabad Chapter NASI, elaborated on the role of Allahabad chapter in establishing a link between the two agencies (IASc & IRHRD) with the NASI to ensure effective participation of the hundreds of rural women.

Dr. B.P. Agarwal, President of the Institute of Applied Sciences (IASc), Allahabad expressed his views on the role of the academy as well IASc to uplift the status rural women.



L- R→ Prof. Manju Sharma, Dr. Vinita Sharma, Prof. Krishna Misra, Dr. Niraj Kumar addressing the audience during the inaugural session.



L- R→ Prof. G. K. Srivastava, Dr. Mohd. Masood, Dr. B. P. Agarwal delivering their talks during the inaugural session; Shri A. K. Srivastava proposing a vote of thanks

Inaugural Session of the workshop underway

Prof. Krishna Misra, General Secretary, NASI highlighted the importance of education for women adding that the role of women in society is absolutely vital for the country's progress, as they are a great human resource; and therefore, it is essential to educate them. She quoted Diane Mariechild's adage; **"A woman is the full circle. Within her is the power to create, nurture and transform"**.

Dr. Vinita Sharma, Head, SEED Division & Advisor, DST, Govt. of India, New Delhi and also the Guest of Honour on the occasion in her address highlighted the programmes generated by the DST for women. 'DISHA' project launched under her leadership has linked DST to the masses. **"12th Five Year programme has come into focus in 2013 to evaluate the project's success with value addition of IT & Biotechnology tools to strengthen its hold. The crux of the 12th Five Year Plan is problem oriented research, which should be based on area specific issues"**, said the advisor of the DST in her address to the august gathering. She inspired the youngsters to make models with innovative ideas by analyzing the problems of rural women (under the Programme named *Chunauti*).

Prof. Manju Sharma, the Chief Guest highlighted the significance of the world environment day. Expressing her illuminating thoughts in her inaugural address she said, **"Technological interventions should be environmentally sustainable to enhance the progress of the nation which has its seeds embedded in the rural areas. Pollution and poverty are the greatest evils and efforts must be made to combat these issues"**, said Dr. Sharma adding that for achieving happiness one needs to work in harmony with environment. She highlighted the definition of sustainable development, biodiversity, capacity building and role of NASI in promoting the women scientists, teachers and students. She spoke about women doing science and on relevance and the application of S & T for the women, especially in rural areas.

In the end of inaugural session Shri A. K. Srivastava, Deputy Executive Secretary, NASI expressed his gratitude to all the eminent Scientists on the dais for sparing their valuable time for the noble cause; and also thanked to all the delegates

and participants of Allahabad University, PG Colleges; and other scientific institutions of five states for their great enthusiasm.

Scientific Sessions (Thematic Approach)

After the inauguration, the Scientific Sessions were held on the following issues/problems in context of the rural women taking into consideration the **thematic approach** to comprehend the basic idea.

- Employment Generation on Environmentally Sustainable Basis
- Malnutrition, Health & Diseases
- Safe water & Communicable diseases

The Scientific session on **Employment Generation on Environmentally Sustainable Basis** was steered by Prof. Krishna Misra, General Secretary, NASI as the Chair and Prof. Anita Gopesh, Dept. of Zoology, Univ of Allahabad as the Co-chair with Dr. Sarita Khandka, Astd. Prof. Dept. of Physics, SHIATS, Alld and Dr. Safiya Khan, A.M.U. as the rapporteurs. The distinguished speakers included Dr. Vinita Sharma, Scientist 'G', Head, SEED Div Advisor, DST, Govt. of India, New Delhi, (*Towards faster and more Inclusive growth*), Dr. Jatinder Kaur Arora, Scientist-G, Director (Biotechnology), MGSIPA, Chandigarh(*S&T interventions for women empowerment at grass root level in the state of Punjab*) and Dr. Kiran Negi ,HESCO, Dehradun (*S&T interventions for women empowerment at grass root level in the state of Uttarakhand*). The speakers stressed on the issues that need to be tackled for linking science with the society; and how the rural women could be involved in developing need based technologies by the sustainable use of local resources.

The Scientific session on **Malnutrition, Health & Diseases** was addressed by the distinguished speakers Prof. Asha Mathur, Head, Dept. of Microbiology & Pathology, Saraswati Dental & Medical College, Lucknow (*'Vector borne communicable diseases'*) and Prof. Ragini Mehrotra, Head, Department of Gynaecology, M. N. Medical College, Allahabad (*Nutrition and Health*).The session was chaired by Prof. Shraddha Dwivedi, Head, Dept of Community Medicine, M.L. N. Medical College, Allahabad. The rapporteurs of this session were Dr. Sharda Sundaram Sanjay, Associate Prof, Dept. of

Chemistry, E.C.C, Allahabad and Dr. Manisha Tripathi, Assistant Prof, Dept of Zoology, ISDC, Allahabad. The speakers elaborated on vector borne diseases such as Malaria, Dengue & DHF and Japanese Encephalitis as well as their causes and diagnosis. They also suggested the remedial measures to prevent them and diverse ways were also proposed to enhance health status by restricting to balanced and nutritious diet.

The session on **Safe water & Communicable diseases** was chaired by Prof. Asha Mathur and co-chaired by Prof. Ragini Mehrotra. The speakers of this session included Prof. Shraddha Dwivedi (*Prevention of Water borne diseases*) and Prof. S. C. Prasad, Department of Civil Engineering, MNNIT, Allahabad (*'Safe Water'*). The rapporteurs included Dr. Shonali Chaturvedi, Associate Prof, Department of Botany, E.C.C. College, Allahabad and Dr. Sasya Nagar, Assistant Professor, Dept of Biological Sciences, SHIATS, Allahabad. The scientists discussed various methods of water management such as safe storage, sedimentation and filtration, boiling, combined flocculation, disinfection system, chlorination; and highlighted the utility of safe water in preventing many diseases.



In the end of all these Scientific Sessions, the participants interacted with the scientists regarding specific problems and their solutions.

On the second day of the workshop, the participants included large number of rural women who were suggested the practical ways to deal with those problems/ issues elucidated on the previous day by taking into account the ***pragmatic approach***.

The programme on the second day commenced with the session on ***Demonstration on Enhanced Value Products***. The **first part** of this session was chaired by Prof. Anita Gopesh, Department of Zoology, Univ of Allahabad and co-chaired by Dr. K. P. Singh, Department of Zoology, Univ of Allahabad. The speakers for this session included Ms Archana Pant, SRF, IASc-NASI and Ms. Vandana Misra, Centre for Food Technology, Univ of Allahabad.

The speakers explained on the **development of cattle feed by utilizing nutritional leaves of the indigenous plants** to meet cattle's nutritional requirements for better milk yield, as well as to provide employment to the rural women. They also elucidated the **use of finger millet (*Raagi / maduwa*) in making nutritional products** such as *pasta* ; and *Aonla (*Embllica officinalis*)* having miraculous medicinal value for making *jam, jalley* and *pickle* to cope with the menace of deficiency disease and ensure healthy status of rural women.

The **second part** of the session was chaired by Prof. U. C. Srivastava, Dept of Zoology, Univ of Allahabad and co-chaired by Prof. Anita Gopesh, Department of Zoology, Univ of Allahabad; and Dr. A. F. Rizvi, Woman Scientist, IASc was the speaker. The rural women were sensitized for the **sustainable use of miscellaneous fishes having nutritive properties by making low cost nutritional (edible) fish products** as *fish papad, fish chakli* and *fish save* by adding phyto-proteins etc. to cope with the deficiency of protein, omega-3 fatty acid and other enhance nutritional requirements of rural women; as well as to generate employment for them.

At the end of the session the rural women interacted with the speakers regarding the utility of ingredients of these products; and how the process of product development can be made easier in rural perspective.

The session on ***Demonstration of Water testing*** was chaired by Dr. S.A.M Meesum, Senior Medical Officer, Dufferin Hospital, Allahabad and co-chaired by Prof.

D. K. Chauhan, Dept of Botany, Univ of Allahabad. The session was addressed by Dr. Mohd. Masood, Hony. Scientific Advisor, IASc & Demonstration was given by Dr. Ayesha Mariya, Project Scientist, IASc. The rural participants were made aware of the utility of safe water, its conservation and also about various contaminants. The scientists gave in-depth information on safe water, the effects of contaminants and the diseases caused by its consumption.

Health awareness session chaired by Dr. Ramesh Kumar, Additional Director, MHFW, was also organized for rural participants on this occasion in which an illustrative and descriptive lecture was given by Dr. S.A.M. Meesum on the precautions to be taken from the stage of early conception during to post natal period.

After the session the rural participants interacted with the panel of the renowned medical practitioners of the city comprising Dr. Ramesh Kumar, Additional Director, MHFW, Dr. B. P. Agarwal, Physician, Dr. Ragini Mehrotra, Gynaecologist, Dr. S.A.M. Meesum, Senior Medical Officer, Dufferin Hospital, Dr. Avinash Chandra, MLCD, SRM, Dr. Sunil Shukla, Senior Epidemiologist, S. R. Hospital, Allahabad, Dr. (Mrs.) Sanju Shukla, Gynaecologist and Dr. Neeta Verma, Gynaecologist.



Dr. B. P. Agarwal examining the rural women after Health Awareness Session

The rural women consulted the doctors for their specific health problems which were diagnosed on the spot; and medical advices were also given to them.

There was a parallel session on **Poster Presentations** on specific themes inaugurated by Dr. (Mrs.) Manju Sharma, Distinguished Woman Scientist Chair, NASI. The posters were evaluated by a team of young women scientists- Dr. Sharda Sundaram Sanjay, Dr. Shonali Chaturvedi, Dr. Pavitra Tandon, Dr. Archana Pandey, Dr. Rupali Sethi, Dr. Sarita Khandka, Dr. Richa Tandon, Dr. Manisha Tripathi, Dr. Snehlata Chandra, Dr. Ayesha Mariya and Dr. Safiya Khan.



Dr. Manju Sharma inaugurating the Poster Session during the second day of workshop

The workshop concluded with the **Interactive Session** and **Valedictory Function**. Prof. K. B. Pandeya, Vice Chancellor, Mahatma Gandhi Chitrakoot Gramodaya Vishwa Vidyalaya, Chitrakoot & Formerly Chairman, UPPSC was the Chief Guest and Prof. P. W. Ramteke Dean, Post Graduate Studies; SHIATS was the Guest of Honour on the occasion. The session was presided over by Prof. (Mrs.) Manju Sharma. The discussants of the **Interactive Panel** included Prof. Krishna Misra, Prof. U. C. Srivastava, Prof. D. K. Chauhan, Prof. Anita Gopesh, Dr. Niraj Kumar, Dr. K. P. Singh, Dr. Mohd. Masood, Dr. A. F. Rizvi, Ms. Archana Pant and the rapporteurs of the

sessions. The participants from rural and urban areas of Allahabad were given certificates and prizes for presentation of the scientifically valued posters.

At the end of the day Dr. K. P. Singh, the co-coordinator of the workshop proposed a vote of thanks to all participants. He expressed his profound gratitude to Dr. (Mrs.) Manju Sharma, NASI distinguished woman scientist chair for sparing her precious time to grace the event as the chief guest and her overall contribution to the women empowerment programme. He offered his profuse thanks to Dr. Vinita Sharma, advisor of the DST, for her support as guest of honour; and also acknowledged the contribution of Prof. Krishna Misra, General Secretary, NASI for her valuable guidance to this entire programme since its inception. He profusely thanked all the eminent Chairs and Co-chairs, distinguished speakers, rapporteurs, doctors, organizers, the participants and NASI staff. In the end he praised the hard work and efforts made by Ms. Archana Pant, Dr. A. F. Rizvi, Dr. Pavitra Tandon and others in making this programme a grand success.

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The Fellows/Members of the National Academy of Sciences, India (NASI) truly deserve a credit for striving to accomplish its mandate by linking Science with Society in prolific way. The Programme on *Technological Empowerment of Women* is another landmark which the Academy envisages to achieve in the years to come. The programme, in its first phase, has been successfully accomplished by the collective endeavour of many resource persons from all over the country. The task is still on; and NASI is indebted to all those who extended a helping hand in its execution. It would not have been possible, but for the support and encouragement of the DST, Govt of India.

We extend our thanks to the distinguished Council Members of the NASI for their approval of this nationwide programme; as well as their support and encouragement.

We also express our profound gratitude to the eminent women scientists of institutions from across the country including Dr. Vinita Sharma, Prof. Kasturi Datta, Prof. Shelly Bhattacharya, Prof. Paramjit Khurana and Prof. Veena Tandon for their valuable contributions to this endeavour for reducing women's drudgery through scientific intervention, thereby uplifting their socio-economic status.

We also extend our thanks to all the distinguished speakers for presenting their works and sharing their knowledge during the workshops held at different regions; and also express the sense of appreciation to women scientists and research scholars of different academic and scientific institutions from all across the country for their active and enthusiastic participation in the workshops held under this programme.

We are thankful to all the host institutions (of Ahmedabad, Chennai, Shilong, Dehradun and Hyderabad) for extending hospitality and facilities during the organization of the workshops by NASI.

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And finally, our sincere thanks to the Print media for giving excellent coverage of the proceedings of workshops; thus with the support of all, we hope that the comprehensive recommendations of this nationwide programme would provide a

plethora of information on the issues (related to women); particularly, to the young women researchers and stimulate them to develop scientific temper.

Editors

