

15<sup>th</sup> IAUA National Symposium of Vice Chancellors  
on

**“Millets for Climate Smart Sustainable  
Agriculture and Sound Human Health”**

*Organized on*

**16-18 November 2023**

*at*

**University of Agricultural Sciences, Dharwad**

**PROCEEDINGS**



*Jointly Organized by*



**University of Agricultural Sciences (UAS) Dharwad, Karnataka  
and**

**Indian Agricultural Universities Association (IAUA)  
New Delhi**







## Organizing Institutions

### University of Agricultural Sciences (UAS), Dharwad



The University of Agricultural Sciences, Dharwad came into existence on 1<sup>st</sup> October 1986 to cater to the needs of the farming community of 12 districts of northern Karnataka. The University presently has 5 Colleges, 27 Research Stations, 6 Agricultural Extension Education Centres, 6 Krishi Vigyan Kendras and Agricultural Technology Information Center (ATIC). In its 38 years of dedicated service, the University has earned the reputation of being the "Farmers' University". The University has been striving to keep pace with the new frontiers of science to overcome the contemporary challenges of social, economic and technical relevance. The University has been adjudged as the Best Agricultural University in the country and conferred twice with the "Sardar Patel Outstanding ICAR Institution Award" during 2000 and 2015 by the Indian Council of Agricultural Research (ICAR), New Delhi. Further, the University has also been conferred with Mahindra Samridhi Krishi Shiksha Samman National Award, Indira Gandhi National NSS Award, among several others. Nine teachers have been chosen for the most prestigious Sir C.V. Raman Young Scientist Award of the Government of Karnataka and 17 Ph.D. students have been conferred with yet another prestigious Jawaharlal Nehru Award for the Best Doctoral / Thesis by the ICAR, New Delhi. The University is accredited with "A" Grade for a period of five years (2019-2024) by the Indian Council of Agricultural Research, New Delhi.



### Indian Agricultural Universities Association (IAUA), New Delhi

IAUA was established on 10<sup>th</sup> November 1967. The main objective of the association is to promote agricultural research, education and extension in the Universities and the States, thereby enabling rural development in the country. It also acts as a bureau of information to facilitate communication, co-ordination and mutual consultation among agricultural universities. Presently, IAUA has 73 member Universities, which includes 65 State Agricultural Universities, 4 Deemed to be Universities (IARI, New Delhi, IVRI, Izatnagar, NDRI, Karnal and CIFE, Mumbai), 3 Central Agricultural Universities (CAU, Imphal; Dr RPCAU, Pusa and RLBCAU, Jhansi) and one Central University with Agriculture Faculty (BHU, Varanasi). By specialization, there are 46 Agricultural, 7 Horticultural, 17 Veterinary and Animal Sciences and 3 Fisheries Science Universities as members in IAUA. All the SAUs and institutions (Deemed-to-be Universities and Central Agricultural Universities) in India, which provide an integrated programme of teaching, research and extension education in agricultural sciences are qualified to become regular members of the Association. The IAUA facilitates organization of conferences, seminars, workshops, lectures and research projects in agricultural and allied programs.



## Organizing Team

### Chief Patron



**Dr. Rameshwar Singh**  
 President, IAUA &  
 Vice-Chancellor, BASU, Patna

### Patron



**Dr. P. L. Patil**  
 Vice-Chancellor  
 UAS, Dharwad

### Organizing Secretary



**Dr. V. R. Kiresur**  
 Director of Education  
 UAS, Dharwad

### Patron



**Dr. Parvinder Kaushal**  
 Vice-President, IAUA &  
 Vice-Chancellor, UHF, Bharsar

### Patron



**Dr. N. H. Khelawala**  
 Secretary-General, IAUA &  
 Vice-Chancellor, KU, Gandhinagar

### Patron



**Dr. Dinesh Kumar**  
 Executive Secretary  
 IAUA, New Delhi

## Session Coordinators

### Technical Session-1



**Dr. B. D. Biradar**  
 Director of Research  
 UAS, Dharwad

### Technical Session-2



**Dr. S. S. Angadi**  
 Director of Extension  
 UAS, Dharwad

### Technical Session-3



**Dr. M. V. Manjunath**  
 Registrar  
 UAS, Dharwad

### Technical Session-4



**Dr. H. B. Babalad**  
 Dean (Agri.)  
 CoA, Dharwad

### Technical Session-5



**Dr. V. S. Patil**  
 Dean (CSc)  
 CoCS, Dharwad

### Keynote Session



**Dr. J. S. Hilli**  
 Dean (Agri.)  
 CoA, Hanumanamatti

### Field Visit



**Dr. R. Vasudeva**  
 Dean (Forestry)  
 CoF, Sirsi

### Cultural Programme



**Dr. Sarojani Karakannavar**  
 Dean (SW)  
 UAS, Dharwad

### Valedictory Session



**Dr. I. K. Kalappanavar**  
 Dean (Agri.)  
 CoA, Vijayapur



## Organizing Committees at UAS, Dharwad

SN	Committees	Chairperson	Co-Chairperson
1	<b>Steering Committee</b>	<b>Dr. P. L. Patil</b> Vice-Chancellor	<b>Dr. V. R. Kiresur</b> Director of Education
2	<b>Programme Committee</b>	<b>Dr. V. R. Kiresur</b> Director of Education	<b>Dr. V. S. Patil</b> Dean (CSc), CoCS, Dharwad
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4	<b>Accommodation Committee</b>	<b>Er. S. C. Mirajkar</b> Estate Officer	<b>Dr. S. A. Gaddanakeri</b> Associate Director of Extension (Hq)
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10	<b>Finance Committee</b>	<b>Dr. M. V. Manjunath</b> Registrar	<b>Shri S. M. Honnalli</b> Comptroller
11	<b>Entertainment Committee</b>	<b>Dr. Sarojani Karakannavar</b> Dean (Student Welfare)	<b>Dr. C. M. Nawalagatti</b> UHOD (Crop Physiol.), CoA, Dharwad

## Logistic / Administrative Facilitators from UAS, Dharwad



**Dr. R. Basavarajappa**  
Dean (PGS)



**Dr. P. V. Patil**  
University Librarian



**Dr. Ravi Hunje**  
Special Officer (Seeds)



**Shri S. M. Honnalli**  
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UHOD (Ag. Engg.)



**Dr. C. M. Nawalagatti**  
UHOD (CPH)



**Dr. Roopa Patil**  
Sr. Scientist & Head, KVK



**15<sup>th</sup> IAUA National Symposium of Vice-Chancellors**  
**on**  
**“Millets for Climate Smart Sustainable Agriculture**  
**and Sound Human Health”**

**Dates: 16-18 November 2023**

**Venue: UAS, Dharwad, Karnataka**

**PROGRAMME**

DATE	TIME	ACTIVITY
<b>16.11.2023 (Thursday)</b>		
	<b>0930-1000</b>	<b>REGISTRATION</b>
	<b>1000-1115</b>	<b>INAUGURAL SESSION:</b>
		1. University Song
		2. Invocation Song <b>Ms. Gaganashree KP</b> , III PhD(GPB) Scholar, UAS, Dharwad
		3. Welcome & Introduction <b>Dr.P.L.Patil</b> , Vice-Chancellor, UAS, Dharwad (KA)
		4. Inauguration Chief Guest
		5. Inaugural Address <b>Dr.Ashok Dalwai</b> , Former CEO, NRAA, New Delhi and Former DDG, UIDAI, GOI
		6. Felicitation of Chief Guest <b>By Dr.P.L.Patil</b> , Vice-Chancellor, UAS, Dharwad (KA)
		7. Guests of Honour <b>Dr.N.H.Kelawala</b> , Secretary-General, IAUA, New Delhi and Vice-Chancellor, KU, Gandhinagar (GJ) <b>Dr.Dinesh Kumar</b> , Executive Secretary, IAUA, New Delhi
		8. Presidential Address <b>Dr.Parvinder Kaushal</b> , Vice-President, IAUA, New Delhi and Vice-Chancellor, UHF, Bharsar (UK)
		9. Vote of Thanks <b>Dr.V.R.Kiresur</b> , Director of Education, UAS, Dharwad & Organising Secretary, 15 <sup>th</sup> IAUA-NS of VCs
	<b>1115-1130</b>	<b>High Tea</b>
	<b>1130-1230</b>	<b>TECHNICAL SESSION-1: Enhancing Productivity and Profitability of Millets – Economic and Ecological Concerns</b>
		Chairperson: <b>Dr.J.V.Goud</b> , Former Vice-Chancellor, UAS, Dharwad
		Lead Speaker: <b>Dr. Vilas Tonapi</b> , Former Director, ICAR-IIMR, Hyderabad
		Panel Discussion: Panelists- <b>Dr.Parvinder Kaushal</b> , Vice-Chancellor, UHF, Bharsar (UK) <b>Dr.R.C.Jagadeesha</b> , Vice-Chancellor, UAHS, Shivamogga (KA) <b>Dr. R.B.Madariya</b> , Director of Research, JAU, Junagadh (GJ)
		Coordinator: <b>Dr.B.D.Biradar</b> , Director of Research, UAS, Dharwad
		Rapporteurs: <b>Dr. O. Sridevi</b> , Professor(GPB), CoA, UAS, Dharwad <b>Dr.S.S.Hallikeri</b> , Prof.&Head (Agron), CoA, UAS, Dharwad
	<b>1230-1330</b>	<b>TECHNICAL SESSION-2: Millets for Sound Human Health</b>
		Chairperson: <b>Dr.J.H.Kulkarni</b> , Former Vice-Chancellor, UAS, Dharwad
		Lead Speaker: <b>Dr. N. G. Malleshi</b> , Retd. HOD of Grain Science and Technology, and Director Grade Scientist, CFTRI, Mysore
		Panel Discussion: Panelists- <b>Dr.N.H.Kelawala</b> , Vice-Chancellor, KU, Gandhinagar (GJ) <b>Dr.M.Hanumanthappa</b> , Vice-Chancellor, UAS, Raichur (KA) <b>Dr.(Smt) Sarada Jayalakshmi Devi</b> , Vice-Chancellor, ANGRAU, Guntur (AP)
		Coordinator: <b>Dr.S.S.Angadi</b> , Director of Extension, UAS, Dharwad
		Rapporteurs: <b>Dr. Hemalatha S. Poddar</b> , Prof.& Head (FPT), CoCS, UAS, Dharwad <b>Dr. Uma Kulkarni</b> , Prof.& Head (FN&FSQA), CoCS, UAS, Dharwad
	<b>1330-1430</b>	<b>Lunch</b>



<b>1430-1530</b>	<b>TECHNICAL SESSION-3: Public-Private Partnership for Collaborative R&amp;D and Trade</b>	
	Chairperson: <b>Dr.R.R.Hanchinal</b> , Former Vice-Chancellor, UAS, Dharwad & Chairperson, PPV&FRA, GOI, New Delhi	
	Lead Speaker: <b>Dr Bhupen Dubey</b> , Global CEO, Advanta Seeds, Dubai, UAE	
	Panel Discussion: Panelists- <b>Dr.K.C.Veeranna</b> , Vice-Chancellor, KVAFSU, Bidar (KA) <b>Dr.S.K.Swain</b> , Dean (Research), OUAT, Bhuvaneshwar (OR) <b>Dr.(Mrs.) A. Mani</b> , Dean(Ag.Engg.), ANGRAU, Guntur (AP)	
	Coordinator: <b>Dr.M.V.Manjunath</b> , Registrar, UAS, Dharwad Rapporteurs: <b>Dr.Naryan Moger</b> , Prof.& Head(Biotech.), CoA, UAS, Dharwad <b>Dr.Sannapamma KJ</b> , Prof.& Head, AICRP-WIA, UAS, Dharwad	
<b>1530-1630</b>	<b>TECHNICAL SESSION-4: Policy and Institutional Framework for Promotion of Millets</b>	
	Chairperson: <b>Dr.D.P.Biradar</b> , Former Vice-Chancellor, UAS, Dharwad	
	Lead Speaker: <b>Dr.P.K.Singh</b> , Agriculture Commissioner, GOI, New Delhi	
	Panel Discussion: Panelists- <b>Prof.(Dr.) Arvind Kumar Shukla</b> , Vice-Chancellor, RVSKVV, Gwalior (MP) <b>Dr.S.B.Hosmani</b> , Former Vice-Chancellor, Rani Channamma University, Belagavi (KN) <b>Dr.A.K.Sharma</b> , Dean, BASU, Patna (BH)	
	Coordinator: <b>Dr.H.B.Babalad</b> , Dean(Agri), CoA, Dharwad [UASD] Rapporteurs: <b>Dr.S.S.Dolli</b> , Prof.& Head (Ag.Ext.), CoA, UAS, Dharwad <b>Dr.S.S.Guledagudda</b> , Prof.& Head (Ag.Econ.), CoA, UAS, Dharwad	
<b>1630-1700</b>	<b>Tea/Snacks</b>	
<b>1730-1830</b>	<b>KEY NOTE ADDRESS:</b>	
	Key Note Speaker: <b>Dr.Ramesh Chand</b> , Hon’ble Member, NITI Aayog, GOI, New Delhi	
	Chairperson: <b>Dr.P.L.Patil</b> , Vice-Chancellor, UAS, Dharwad	
	Coordinator: <b>Dr.J.S.Hilli</b> , Dean(Agri), CoA, Hanumanamatti [UASD]	
	Rapporteurs: <b>Dr.Jones Nirmalnath</b> , Prof. & UHOD(Microbiol.), CoA, UAS, Dharwad <b>Dr.R.A.Yeledhalli</b> , Prof.(ABM), CoA, UAS, Dharwad	
<b>1830-1930</b>	<b>CULTURAL PROGRAMME</b>	
	Coordinator: <b>Dr.Sarojani Karakannavar</b> , Dean(SW), UAS, Dharwad Co-Coordinators: <b>Dr.C.M.Nawalagatti</b> , Prof.& UHoD (Crop Physiology), UASD <b>Dr.V.K.Deshpande</b> , Prof.& HoD (SST), UASD Anchor: <b>Ms.Keerthana R.S.</b> , M.Sc.(Microbiology) Research Scholar, UASD	
<b>2000-2200</b>	<b>Dinner</b>	
<b>17.11.2023 (Friday)</b>		
<b>0600-2200</b>	<b>FIELD VISITS</b>	
	Coordinator: <b>Dr. Vasudeva R.</b> , Dean(Forestry), CoF, Sirsi [UASD] Co-Coordinators: <b>Dr.Ramesh Rathod</b> , Asst.Prof.(Farm Forestry), CoF, Sirsi [UASD] <b>Dr.Hanumantha M.</b> , Asst.Prof.(Forest Utilization), CoF, Sirsi [UASD] Rapporteurs: <b>Dr.Roopaa Patil</b> , Senior Scientist & Head, KVK, Sirsi [UASD] <b>Dr.Yashaswini Sharma</b> , Asst.Prof.(Horticulture), CoF, Sirsi [UASD]	



18.11.2023 (Saturday)	
1000-1115	<b>TECHNICAL SESSION-5: Challenges and Opportunities for SAUs in advancement of Teaching, Research and Extension</b>
	Chairperson: <b>Dr.P.M.Salimath</b> , Former Vice-Chancellor, UAS, Raichur
	Panel Discussion: Panelists- <b>Dr.Praveen Rao</b> , Former Vice-Chancellor, PJTSAU, Hyderabad (TS) <b>Dr.N.K.Hegde</b> , Vice-Chancellor, UHS, Bagalkot (KA) <b>Dr B.Neeraja Prabhakar</b> , Vice-Chancellor, SKLTSHU, Mulugu (TS) <b>Dr.K.Vijayarani</b> , Director of Research, TNVASU, Chennai (TN)
	Coordinator: <b>Dr.V.S.Patil</b> , Dean(CSc), CoCS, Dharwad [UASD] Rapporteurs: <b>Dr.N.G.Hanamaratti</b> , Prof. & Head, AICRP(Sorghum), UAS, Dharwad <b>Dr. Sunil Halakatti</b> , Prof.(Ext.), O/o.Director of Extension, UAS, Dharwad
1115-1130	Tea/Snacks
1130-1300	<b>VALEDICTORY SESSION:</b>
	Chairperson: <b>Dr.N.H.Kelawala</b> , Secretary-General, IAUA & Vice-Chancellor, KU, Gandhinagar (GJ) Co-Chairperson: <b>Dr.P.L.Patil</b> , Vice-Chancellor, UAS, Dharwad (KA)
	Presentation of Rapporteurs’ Reports Technical Session-1: <b>Dr.B.D.Biradar</b> , Director of Research, UASD Technical Session-2: <b>Dr.S.S.Angadi</b> , Director of Extension, UASD Technical Session-3: <b>Dr.M.V.Manjunath</b> , Registrar, UASD Technical Session-4: <b>Dr.H.B.Babalad</b> , Dean(Agri), CoA, Dharwad [UASD] Technical Session-5: <b>Dr.V.S.Patil</b> , Dean(CSc), CoCS, Dharwad [UASD] Keynote Address: <b>Dr.J.S.Hilli</b> , Dean(Agri), CoA, Hanumanamatti [UASD] Field Visits: <b>Dr.Vasudeva R.</b> , Dean(Forestry), CoF, Sirsi [UASD]
	Coordinator: <b>Dr.I.K.Kalappanavar</b> , Dean(Agri), CoA, Vijayapur [UASD] Rapporteurs: <b>Dr.S.A.Gaddankeri</b> , Associate Director of Extension(Hq), UAS, Dharwad <b>Dr.Shekharappa</b> , Associate Director of Research(Hq), UAS, Dharwad
	Vote of Thanks: <b>Dr.V.R.Kiresur</b> , Director of Education, UAS, Dharwad & Organizing Secretary, 15 <sup>th</sup> IAUA-NS of VCs
	National Anthem
1300-1400	Lunch

**Please Note:**

**Venue for**

Inaugural, Technical and Valedictory Sessions : **VC Conference Hall, VC Office, UAS, Dharwad**  
 Cultural Programme : **Farmers’ Knowledge Centre, UAS, Dharwad**



## 1. INAUGURAL SESSION

Processing and value addition of nutri millets is the need of the day said Dr.Ashok Dalwai, IAS, Former Chief Executive Officer of the National Rainfed Area Authority (NRAA), Government of India, New Delhi inaugurating the 15<sup>th</sup> IAUA National Symposium of the Vice-Chancellors on “Millets for Climate Smart Sustainable Agriculture Sound Human Health” organised by the University of Agricultural Sciences (UAS), Dharwad with the financial support from the Indian Agricultural Universities' Association (IAUA), New Delhi on 16-18 November 2023 at UAS, Dharwad. Although all 10 types of cereals are widely cultivated in India, the green revolution has taken place only in major crops, namely, rice and wheat. India ranks 106<sup>th</sup> in the global hunger index. Millets have the potential to mitigate malnutrition in the country. Millets are gluten free and have low glycemic index. He emphasized the popularization and adoption of millet crops which are water use efficient and require less fertilizers. He urged the State Agricultural Universities to develop millet genotypes suitable for diversified soil and climatic conditions and also suitable for degraded lands.



Dr. P. L. Patil, Vice-Chancellor of UAS, Dharwad welcomed the gathering and presented a brief note on the significant achievements of UAS, Dharwad in agricultural education, research and extension and its contributions to the farming community, in particular, and the society at large.

Dr. Parvinder Kaushal, Vice-President, IAUA, New Delhi and the Vice-Chancellor, Veer Chandra Singh Garhwali Uttarakhand University of Horticulture and Forestry, Bharsar (Uttarakhand) presided over the inaugural session. Dr. N. H. Kelawala, Secretary General, IAUA, New Delhi and Vice-Chancellor, Kamadhenu University, Gandhingar (Gujarat) and Dr.Dinesh Kumar, Executive Secretary, IAUA, New Delhi were the guests of honour. Dr. V. R. Kiresur, Director of Education, UAS, Dharwad and

Organizing Secretary of the Symposium proposed the vote of thanks. As many as 50 delegates including Vice-Chancellors of State Agricultural Universities, Former Vice-Chancellors of UAS, Dharwad and UAS, Raichur, eminent resource persons and experts from across the country and abroad and Officers of UAS, Dharwad participated in the Symposium.





## 1.1 Inaugural Address by Dr. Ashok Dalwai

Dr. Ashok Dalwai, IAS, Former CEO, NRAA, Government of India, New Delhi, in his inaugural address, emphasized that collective intelligence surpasses individual intelligence. The domination of the world by humans, despite being the weakest species in the environment, has been attributed solely to their creative and organizational abilities. The transformation of the agricultural scenario in India was noted to have been facilitated by genes that revolutionized agriculture, resulting in a significant leap forward. The green revolution, which primarily focused on paddy and wheat, received initial impetus from government initiatives during the 1960s, and subsequently gained momentum as scientists and farmers collaborated, overcoming obstacles by the 1970s.

However, it was observed that the green revolution led to the complementarities of soil management, organic management, and microbial interaction, all of which were mutually reinforcing. Conversely, soil salinity, alkalinity, and degradation were exacerbated. The failure to maintain soil balance over the years was acknowledged as a significant concern. Equally vital was the emphasis placed on organic carbon management.

Looking ahead to 2047, the imperative to feed 1.6 billion people was reiterated as a formidable challenge. Examining the current state of affairs regarding climate change and nutrition, it was highlighted that India harbors one of the largest chronically undernourished populations globally, ranking 116<sup>th</sup> in the global human capital index.

Further, it was noted that India bears the responsibility of addressing a quarter of the global hunger crisis. The phenomenon of the human body's growth not aligning with age was identified as a potential cause of stunting, which could result in the underutilization of human potential. This discrepancy poses a significant threat to the demographic dividend that India anticipates harnessing over the next three decades to catalyze the anticipated transformative change.

The ramifications of the COVID-19 pandemic were also brought into focus, with the global population witnessing 670 million individuals experiencing chronic undernourishment during the





crisis, followed by an additional 113 million people added to this demographic in the post-pandemic period. The juxtaposition of hunger and the impacts of the green revolution compounded the challenges, further exacerbated by the effects of climate change. The proliferation of extreme weather events has rendered cultivation increasingly strenuous.

Modeling studies have projected a concerning trend of dry spells spanning from 1960 to 2051, with implications extending over the next century. These climatic shifts are anticipated to render agricultural systems increasingly vulnerable, potentially resulting in a yield drop of up to 7.5 quintals per hectare. In this context, it was emphasized that millets offer significant advantages. They exhibit high adaptability, are drought-tolerant, and can thrive on degraded lands. Millets are also recognized for their climate resilience, low glycemic index, gluten-free nature, antioxidative properties, and richness in essential minerals such as calcium, iron, zinc, and folic acid. Their cultivation contributes to a lower carbon footprint and incurs lower water duty charges, making them a sustainable solution.

While discussions on mitigation strategies persist, it was acknowledged that such interventions entail long-term endeavors. However, adaptation strategies were also deemed imperative. Three distinct approaches were outlined: incremental change interventions, intermediate interventions, and transformational interventions. Of these, it was emphasized that transformational intervention is the need of the hour.

As an illustrative example, reconsidering cropping systems was proposed. Given that wheat and paddy currently occupy substantial agricultural acreage, transitioning to more tolerant and less nutrient-demanding crops like millets could prove transformative. This shift aligns with the broader objective of fostering agricultural sustainability and resilience in the face of evolving climatic challenges. However, returning to recreate the agricultural landscape reminiscent of the 1960s necessitates a significant commitment. Notably, prominent millets such as pearl millet, sorghum and finger millet dominate extensive areas across Africa and Asian continents. Globally, these millets cover approximately 73 million hectares, with a production of 98 million tonnes, while India has





15 million hectares with a production output of 17 million tonnes. These statistics underscore India's remarkable leap in productivity, experiencing a 3.71-fold increase attributed largely to the contributions of paddy, wheat and maize, thanks to the green revolution.

However, when juxtaposed with millets, it becomes evident that achieving comparable productivity requires a transformative approach in terms of genetics and breeding methodologies. Unlike the crops propelled by the green revolution, millets necessitate substantial innovation and genetic enhancement to realize their full potential. This recognition underscores the imperative for concerted efforts directed towards the transformational advancement of millet cultivation, thereby fostering agricultural sustainability and food security in India and beyond.

Additionally, the existing policy framework for crop production favors crops with market-driven demand, such as paddy, wheat, maize, and sugarcane, through mechanisms like the Minimum Support Price (MSP). However, millets currently do not benefit from such price supports nor do they feature prominently in the public distribution system. Consequently, there exists a pressing need to stimulate greater demand for millets.

India boasts a rich and diverse genetic base across various crops, including millets. Leveraging the germplasm repositories for non-conventional breeding endeavors, such as genome-assisted breeding, manipulation of photoperiod, and precision phenotyping, holds promise for enhancing millet yields. Adopting a vertical approach to bridge the yield gap while aligning with market demand is imperative. This entails enhancing the shelf life of millets through processing and fortifying agricultural logistics, encompassing storage and transportation, to streamline the farm-to-consumer supply chain.

The importance of integrating processing and value addition initiatives was emphasized, alongside interventions aimed at reducing anti-nutritional factors and enhancing millet digestibility. Reflecting on significant milestones such as the National Year of Millets in 2018 and the International Year of Millets in 2023, it was emphasized that aligning with the first three Sustainable Development Goals (SDGs) of the United Nations—eradicating poverty, eliminating hunger, and promoting good health and well-being—millets emerge as a compelling solution.

While concluding, Dr. Dalwai expressed his sincere gratitude to the organizers and the participants of the Symposium for the opportunity to deliver the inaugural address and for their engagement in the symposium, evidencing their collective commitment towards advancing millet cultivation and promoting holistic well-being.



The session ended with a vote of thanks by Dr. V.R. Kiresur, Director of Education, UAS, Dharwad and the Organizing Secretary of the Symposium.



## 2. Technical Session-1: Enhancing Productivity and Profitability of Millets: Economic and Ecological Concerns



- Chairperson** : Dr. J. V. Goud, Former Vice-Chancellor, UAS, Dharwad
- Lead Speaker** : Dr. Vilas Tonapi, Former Director, ICAR-IIMR, Hyderabad
- Panellists** : Dr. Parvinder Kaushal, Vice-Chancellor, UHF, Bharsa  
Dr. R. C. Jagadeesha, Vice-Chancellor, UAHS, Shivamogg  
Dr. R. B. Madariya, Director of Research, JAU, Junagah
- Coordinator** : Dr. B. D. Biradar, Director of Research, UAS, Dharwad
- Rapporteurs** : Dr. O. Sridevi, Professor (GPB), CoA, UAS, Dharwad  
Dr. S. S. Hallikeri, Prof. & Head (Agron), CoA, UAS, Dharwad

Dr. B. D. Biradar, Director of Research, UAS, Dharwad welcomed the gathering.

### 2.1 Lead Lecture

Lead Speaker Dr. Vilas Tonapi emphasized the need to increase the productivity of millets since the yield potential of the millets is very high. Increasing the productivity of millets, given their high potential yield, calls for implementing a combination of agricultural practices, technological interventions, and support mechanisms. Additionally, he said that millets should also be grown in places that are driven by the market. Prices for millets are high due to a negative production-to-demand skewness, and policies aimed at crop diversification must be developed and put into action to meet this demand. He also opined that investment in research to develop high-yielding millet varieties that are well-adapted to diverse agro-climatic conditions is the need of hour. He also felt that cultivation of millets should be encouraged by giving incentives to the farmers growing millets in states like Punjab, Uttar Pradesh, Haryana and Bihar where farmers are innovative and proactive. Further, he said that in order to improve the value and supply chain, additional market channels must be created.





These channels include, but are not limited to, government regulations that encourage the processing and value addition of millets, as well as APEDA's connection with FPOs that work with millets to facilitate direct exporting of the grain.



Role of millets in improving human health needs to be scientifically verified, and standards need to be created to guarantee that processed foods comprise 50–60% millets. The institutes like CFTRI, NIN, and others could be included for this. The issues related to desirable particle size of millets and shelf life of the produce need to be addressed. He reiterated that in order to give farmers access to high-quality seeds, the Karnataka State Seeds Corporation and Certification Agencies must work with private seed companies, community seed systems, and other organizations to build standard seed systems. He concluded that augmenting the production of millets is need of the day to meet the global demand and to achieve this Indian success story should be replicated in other countries, where millets are grown.

## 2.2 Panel Discussion

Dr. Parvinder Kaushal, Vice-Chancellor of the Veer Chandra Singh Garahmali Uttarakhand University of Horticulture & Forestry in Bharsar, Uttarakhand, who was a panelist, supported the views of Dr. Vilas Tonapi by stating that agricultural diversification is crucial to prevent pollution by





reducing the reliance on chemical inputs, particularly in states like Punjab and Haryana. In his opinion, the establishment of large-scale processing facilities and the growth of millets both need government assistance.

Dr. R. C. Jagadeesha, Vice-Chancellor, Keladi Shivappa Nayak University of Agricultural & Horticultural Sciences, Shivamogga (Karnataka) stated that vertical productivity can be increased by breeding interventions while horizontal productivity has to be through cropping systems. He felt that there is need to register farmers' varieties with PPV&FRA. Agreeing with the others, he also felt that support of Government is essential for millets just like maize and fine cereals. Research and Development activities on millets need to be supported by the Government by sanctioning innovative research projects on millets. Scaling up of technologies at the Universities level is required with the help of private companies.

Since minor millets are rich in micronutrients, Dr. Madariya, Director of Research, Junagadh Agricultural University, Junagadh, felt that data bank on millet germplasm micronutrients needed to be established. The chairman of the session, Dr. J. V. Goud, concluded with the assertion that despite the fact that 60–80% of working-class people depend on millets, the latter have not received the attention they need and that their production needs to be increased.

## 2.3 Recommendations

1. Invest in research and development to create high-yielding millet varieties adaptable to diverse agro-climatic conditions. Identify and promote regions with market-driven demand for millets and explore options for creating market channels and direct exporting mechanisms, leveraging organizations like APEDA and FPOs.





2. Collaborate with research institutes like CFTRI, NIN, and others to validate health benefits and establish standards for millet-based processed foods.
3. Develop policies that support crop diversification and incentivize millet cultivation, particularly in states like Punjab, Uttar Pradesh, Haryana and Bihar where farmers are innovative.
4. Enhance the value chain through collaborations with organizations working on millet processing, focusing on improving shelf life and particle size standards.
5. Enhance productivity in millet cultivation by focussed R & D efforts in developing high-yielding and climate resilient millet varieties.
6. Advocate for the registration of farmers' varieties with the Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) to safeguard traditional and locally adapted millet varieties.
7. Collaborate with private companies to implement and commercialize successful technologies for wider adoption in millet cultivation.
8. Work towards establishing a comprehensive data bank on millet germplasm, specifically focusing on micronutrient content.



Coordinator of the session, Dr. B. D. Biradar, Director of Research, UAS, Dharwad proposed vote of thanks to all who contributed to the session.



### 3. Technical Session-2: Millets for Sound Human Health



- Chairperson** : Dr. J. H. Kulkarni, Former Vice-Chancellor, UAS, Dharwad
- Lead Speaker** : Dr. N. G. Malleshi, Retd. HOD of Grain Science and Technology and Director Grade Scientist, CFTRI, Mysore
- Panellists** : Dr. N. H. Kelawala, Vice-Chancellor, KU, Gandhinagar  
Dr. M. Hanumanthappa, Vice-Chancellor, UAS, Raichur  
Dr. (Smt) Sarada Jayalakshmi Devi, Vice-Chancellor, ANGRAU, Guntur
- Coordinator** : Dr. S. S. Angadi, Director of Extension, UAS, Dharwad.
- Rapporteurs** : Dr. Hemalatha S. Poddar, Prof. & Head (FPT), CoCS, UAS, Dharwad  
Dr. Uma Kulkarni, Prof. & Head (FN&FSQA), CoCS, UAS, Dharwad

Dr. S. S. Angadi, Director of Extension, UAS, Dharwad welcomed the gathering.

#### 3.1 Lead Lecture

Dr. J. H. Kulkarni, Chairperson of the session and Former Vice-Chancellor, UAS, Dharwad, welcomed the delegates and provided an update on the research that is currently being conducted on millets, as well as its role in human health, use and awareness campaigns. These are being carried out at UAS, Dharwad through a variety of projects, including NATP, NAIP, Niche Area of Excellence and others.



Dr. N. G. Malleshi presented at length about the multiple roles of millets in sound human health, such as, anti-diabetic, anti-inflammatory, anti-oxidant and its immunogenic properties. He highlighted the nutraceutical properties, such as, polyphenols, tannins, and its fiber in management of various non-communicable diseases. He also focused on processing techniques of millets for preparation of traditional products with modern technology. Versatile millet based products were projected by the eminent lead speaker in the session.

## 3.2 Panel Discussion

During the panel discussion, Dr. (Smt.) Sarada Jayalakshmi Devi, Vice-Chancellor, Acharya N.G. Ranga Agricultural University, Guntur, shared the millet based research activities including variety release, processing, incubation centre, product development, etc. undertaken at ANGRAU, Guntur. She further suggested the need for region specific millet production, processing and usage, providing incentives to the farmers to encourage them to grow millets, establishment of small processing units in the locale and to have public private partnership to increase the marketability.

Dr. M. Hanumanthappa, Vice-Chancellor, University of Agricultural Sciences, Raichur, explained the millet related activities carried out in UAS, Raichur including facilities for start-ups, incubation centre and millet processing units working 24x7 to address the needs of farmers. He endorsed the need for the establishment of State Millet Mission so that focused activities on millets can be carried out. He also mentioned about the establishment of lead centre on Millet Multi Chain to connect the stakeholders.



Dr. N. H. Kelawala, Vice-Chancellor, Kamadenu University, Gandhinagar, discussed about pearl millet as a staple crop in their state. Further, he appreciated other panellists for their activities on millets. The content provided by the lead lecture as well as panel discussion could be used very fruitfully for R & D activities for popularization of various millets in under-utilized areas.

Dr Sarojani J. Karakannavar from UAS, Dharwad highlighted the millet based activities carried out for more than 25 years in the Department of Food and Nutrition and the latest R & D activities in Food Processing Technology at UAS, Dharwad, which included research on processing, product development, clinical trials, awareness creation and commercialization, among others.



### 3.3 Recommendations

1. Establish region specific millet production, processing and usage which demand the release of variety.
2. Evolve / popularise policies to provide incentives, subsidies and regulatory support to encourage farmers to adopt and cultivate locally adapted millet varieties; and establish small processing units in the locale to work round-the-clock.
3. Create dedicated incubation funds specifically for millet-related startups and encourage a collaborative effort between public and private sectors to provide financial resources, mentorship, and networking opportunities for startups to address challenges specific to the millet sector.
4. Establish dedicated research and development centers for exchange of R & D activities for popularization of various other millet varieties in under-exploited locations.
5. Collaborate with food processing industries and have public private partnership to create a demand for region-specific millet products.
6. Develop and strengthen market linkages for region-specific millet products. Encourage the establishment of value chains/ Millet Multi Chain that connect farmers with processors, retailers, and consumers which will contribute to the economic viability of millet cultivation in the area, besides improving the human health with nutritive value of millets.

The Chairperson concluded by summarizing the discussion of panelists and complimenting Dr. N. G. Malleshi for his lead lecture on the role of millets in management of several human ailments that was supported by science. Director of Extension at UAS, Dharwad and Session Coordinator Dr. S. S. Angadi concluded the meeting with a vote of thanks.





## 4. Technical Session-3: Public-Private Partnership (PPP) for Collaboration in R&D and Trade



- Chairperson** : Dr. R. R. Hanchinal, Former Vice-Chancellor, UAS, Dharwad & Chairperson, PPV & FRA, GOI, New Delhi
- Lead Speaker** : Dr. Bhupen Dubey, Global CEO, Advanta Seeds, Dubai, UAE (online)
- Panellists** : Dr. K. C.,Veeranna, Vice-Chancellor, KVAFSU, Bida  
Dr. S. K. Swain, Dean (Research), OUAT, Bhuvanewar  
Dr.(Mrs.) A. Mani, Dean (Ag. Eng.) ANGRAU, Guntur
- Coordinator** : Dr. M. V. Manjunath, Registrar, UAS, Dharwad
- Rapporteurs** : Dr. Narayan Moger, Prof. & Head (Biotech.) CoA, UAS, Dharwad  
Dr. Sannapamma, K. J., Prof. & Head, AICRP-WIA, UAS, Dharwad

At the outset, Dr. M.V. Manjunath Session Coordinator, welcomed the Chairman, dignitaries and participants of the session. In his opening remarks, the Chairman, Dr. R. R. Hanchinal discussed the importance of Public–Private Partnerships in Agricultural Universities and provided an overview of the accomplishments of UAS, Dharwad in terms of producing and marketing of hybrid seeds through PPP. Additionally, he stressed the significance of a knowledge economy in PPP, emphasizing the need to promote millets to untapped markets.

### 4.1 Lead Lecture



Lead Speaker Dr. Bhupen Dubey, Global CEO, Advanta seeds, Dubai, UAE delivered a lecture on 'Investing in Public-Private Partnership for Sustainable Nutritional Security'. Dr. Dubey highlighted how Advanta Seeds achieved remarkable success through the PPP mode and implemented its working management model globally, addressing diverse aspects such as sorghum technology, carbon zero sorghum, promotion of non-GMO technology

for the new generation, nutrition for animal feed and human consumption, plant breeding, water scarcity, new generation agribusiness, and research collaboration with other agencies. He specifically emphasized thumb rules for PPP, including respecting the work culture, ethics, and goals of participating organizations, and active partner participation to ensure the partnership's success. The principles and models of PPPs were discussed, covering technology development, commercialization, seed production, ABS issues, and expediting technology introduction. The speaker drew attention to triggers and transactions, scientific, management, and policy challenges, outlining a way forward for PPP.

## 4.2 Panel Discussion



Dr. R. R. Hanchinal, Chairman of the session appreciated Advanta Seed Company's efforts for sustainable agriculture and highlighted on few important issues, viz., GMO technologies, IPR issues, role of PPV&FRA, GI tag, patents, pulling the resources for better R & D and market linkages.

Dr. Sarada Jayalaxmi, Hon'ble VC, ANGRAU, Guntur expressed that though Universities are releasing many varieties to the farming community, they are facing problems in getting royalties due to the lack of PPP. This was acknowledged by the house as a major issue that needs to be tackled.

The session was followed by a panel discussion. Dr. K. C. Veeranna, Vice-Chancellor, KVAFSU, Bidar and a panellist stated the role of PPPs in sustainable agriculture and investment in R&D activities for strengthening the animal sector. He focussed on how R & D activities need to be initiated in the field of fodder seed production, animal nutrition, artificial intelligence and the establishment of a super specialty veterinary hospital in PPP mode.



Dr. S. K. Swain, Dean (Research), OUAT, Bhubaneswar and the panellist shared R&D activities carried out in their university to mechanize the millet processing and value addition.

Dr. A. Mani, Dean (Agril. Engg.), Guntur and panellist highlighted the product development and commercialization activity in the areas of manufacture of drone and Robo weeder taken up by ANGRAU, and she further expressed that millet processing and value addition still needs to be strengthened.

Dr. R. C. Jagadeesha, Vice-Chancellor, Keladi Shivappa Nayak University of Agriculture and Horticulture Sciences, Shivamogga, stated that the College of Community Science, UAS, Dharwad has launched many millet-based products that need to be commercialized through PPP mode.

### 4.3 Recommendations

1. Emphasize the importance of diversity and germplasm work in advancing sorghum technology, in developing carbon-zero sorghum and promoting non-GMO technology for the new generation and the role of PPP in doing so.
2. Advocate for transparent Intellectual Property Rights (IPR) frameworks to balance innovation with public interest and also advocate for a balanced patent system that encourages innovation while ensuring accessibility and affordability of seeds for farmers.
3. Reinforce the role of the Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) in safeguarding the rights of farmers and breeders. Advocate for policies that promote fair compensation and recognition for contributors to agricultural diversity.
4. Promote the Geographical Indicator (GI) tagging of agricultural products to protect and market unique regional crops and support research and initiatives aimed at improving the efficiency and scale of millet processing.
5. Leverage PPP models to fund and operate specialized facilities for the betterment of the animal healthcare sector.
6. Support the commercialization of millet-based products and encourage PPP initiatives to scale up the production and market reach of these products.



The session ended with a vote of thanks by Session Coordinator Dr. M. V. Manjunath.



## 5. Technical Session-4 : Policy and Institutional Framework for Promotion of Millets



- Chairperson** : Dr. D. P. Biradar, Former Vice-Chancellor, UAS, Dharwad
- Lead Speaker** : Dr. P. K. Singh, Agriculture Commissioner, GOI, New Delhi
- Panellists** : Prof. (Dr.)Arvind Kumar Shukla, Vice-Chancellor, RVSKVV, Gwalior  
Dr. S. B. Hosmani, Former Vice-Chancellor, RCU, Belagavi  
Dr. A. K. Sharma, Dean, BASU, Patna
- Coordinator** : Dr. H. B. Babalad, Dean (Agri), CoA, UAS, Dharwad
- Rapporteurs** : Dr. S. S. Dolli, Prof. & Head, Dept. of Agril.Extension, CoA, UAS, Dharwad  
Dr. S. S. Guledagudda, Prof. & Head, Dept. of Agril.Economics, CoA, UAS, Dharwad

Dr. H. B. Babalad, Dean (Agri), College of Agriculture, UAS Dharwad & Coordinator of the technical session welcomed the delegates and introduced the chairman, lead presenter and panellists. The session started with an introductory note by the Chairman, who gave a brief account of the celebration of International Year of Millets (IYM) which should not be limited to year 2023, but should go for at least next five years.

### 5.1 Lead Lecture

Lead speaker Dr. P. K. Singh, Agriculture Commissioner, Gol, New Delhi presented the overall scenario of millets, policy and institutional framework for promotion of millets in India. He suggested considering dimensions of performance in Triple Bottom Line theory of economics which comprises People (social performance), Profit (Economic performance) and Planet (Environmental performance). He also stated that the objectives of IYM 2023 are to elevate awareness, inspire stakeholders, and enhance investment in millets production,



processing and promotion. IYM 2023 involved 24 Central Ministries, 36 States & Union Territories. He emphasized that in addition to food security, changes are required in terms of nutritional security.

## 5.2 Panel Discussion

Prof.(Dr.) Arvind Kumar Shukla, Vice-Chancellor, RVSKVV, Gwalior, Madhya Pradesh, expressed the need to allocate fund for enhancing productivity of minor millets since area under millets decreasing. Dr. S. B. Hosamani, Former Vice-Chancellor, Rani Channamma University, Belagavi, Karnataka felt that policy intervention in promotion of millets is neglected. There should be special treatment in terms of price support, quality, production, etc. Obtaining GI tag and certification is important to attract the attention of buyers in the international market. Further, he focused on simplification of the regulatory system and need to adopt exogenous and endogenous systems for promotion of millets.



Dr A. K. Sharma, Dean, BASU, Patna, Bihar suggested for a policy framework for promotion of millets for the benefits of producers in the same manner as milk producers' incentives on cooperative basis.

## 5.3 Recommendations

1. International Year of Millet, though gave boost to millet production and processing, needs to be continued for a decade to bring visible changes in the field. Farm Universities can declare and develop action plan in this regard.
2. Promotion of millets that are good for consumers, cultivators and climate resilience should become peoples' movement to achieve success. Government and farm universities should facilitate this process.



3. In order to render traditional recipes more accessible to both urban and rural customers, they should be presented in a modern way. The calendar of millets for different seasons maybe prepared to highlight health benefits that prompt consumers for consumption.
4. A premium price for millets is required. For millets, the current method of calculating MSP based on cultivation costs is not justified. A special policy/package from government should include support for inputs, cultivation and price is necessary for horizontal and vertical expansion of millet production.
5. The farm universities to take up action research by faculty and PG students on enhancing the productivity of minor millets.
6. The Central Government may consider creating special incentives to attract foreign direct investment (FDI) in millets production, processing and marketing.



Session ended with a vote of thanks by the Session Coordinator Dr. H. B. Babalad, Dean (Agri.), College of Agriculture, UAS, Dharwad

## 6. Field Visits

<b>Topic</b>	:	Field Visits
<b>Date</b>	:	17 <sup>th</sup> November 2023
<b>Venue</b>	:	Uttara Kannada District
<b>Coordinator</b>	:	Dr. Vasudeva R., Dean(Forestry), CoF, Sirsi (UASD)
<b>Co-Coordinators</b>	:	Dr. Ramesh Rathod, Asst. Prof. (Farm Forestry), CoF, Sirsi (UASD)
	:	Dr. Hanumantha M., Asst. Prof. (Forest Utilization), CoF, Sirsi (UASD)
<b>Rapporteurs</b>	:	Dr. Roopa Patil, Senior Scientist & Head, KVK, Sirsi (UASD)
	:	Dr. Yashaswini Sharma, Asst. Prof. (Horticulture), CoF, Sirsi (UASD)

### 6.1 Visit to Mr. Madhukeshwar Hegde's Farm: A Farmer and Bee Entrepreneur



In the morning, all the delegates visited Mr. Madhukeshwar Hegde's farm at Targod, Sirsi, Uttara Kannada. Mr. Madhukeshwar Hegde is a farmer and a bee entrepreneur by profession and, an *Ayurveda* therapist and a trainer by interest. While addressing the Nation on All India Radio, Hon'ble Prime Minister Sri Narendra Modi has also mentioned about Sri Madhukeshwar Hegde in his 91<sup>st</sup> episode of 'Mann Ki Baat' which helped increase his business online. This success led to the inception



of *Savi Madhu Industries* and *Madhumitra Horticulture*, a farmer-producer company with more than 500 members. He explained about his two decades journey from a very modest beginning and how he manages more than 1000 beehives spread across 40 acres in his village and nearby areas. Now, he has been awarded honorary doctorate degree and his honey business encompasses a variety of products such as uni-floral honey, royal jelly, bee pollen and honey boxes with an estimated turnover of over INR 2.0 Crores per annum. His garden consists of over 280 medicinal plants in addition to cardamom, ginger, banana, and many more. From these, he crafts an array of products like lemon squash, garlic honey, and bee pollen, which even include a natural honey jam sold in the Britain market.



The participants interacted on various issues related to bee entrepreneurship and witnessed live demonstration of the honey extraction, bee venom collection, and bee therapy. Further, discussions were held on establishing a honey-based entrepreneurship in rural areas and help build livelihood to rural youth.



## 6.2 Visit to Marine Eco-Park and Mangrove Habitat at Honnavar, Uttara Kannada

In the afternoon, the delegates visited Sharavathi Kandla Mangrove Boardwalk, Honnavar – A wonderful walk in between 'Kandla Vana'. Mr. Ravishankar, Deputy Conservator of Forests, Karnataka Forest Department explained about the diversity and benefits of Mangroves and importance of conservation of native Mangrove vegetation to mitigate climate change. Later visited the Marine eco-park at Honnavar, one of the cleanest beach-parks of India. Mr Hareesh, Manager of the Blue-Flag Eco-Beach, Kasarakod gave firsthand information on Blue-Flag tagged Beaches of India and how eco-tourism can be promoted in the Konkan coast.

The field visit was wrapped up after meeting Sri Vasanth Reddy, Chief Conservator of Forests, Canara Circle who explained the activities of the Forest Department to the participants in promoting Forest Conservation and its association with the College of Forestry, Sirsi. Dr. P. L. Patil, Vice-Chancellor, UAS, Dharwad appreciated the arrangements and the efforts made to showcase the diversity of Uttara Kannada district to the delegates.





## 7. Technical Session-5: Challenges and Opportunities for SAUs in Advancement of Teaching, Research and Extension

- Chairperson** : Dr. P. M. Salimath, Former Vice-Chancellor, UAS, Raichur
- Panellists** : Dr. Senthil, Dean (PGS), TNAU, Coimbatore  
Dr. B. Neeraja Prabhakar, Vice-Chancellor, SKLTSU, Mulugu  
Dr. N. K. Hegde, Vice-Chancellor, UHS, Bagalkot  
Dr. K. Vijayarani, Director of Research, TNVASU, Chennai
- Coordinator** : Dr. V. S. Patil, Dean (Csc), CCSc, Dharwad
- Rapporteurs** : Dr. N. G. Hanumaratti, Prof. & Head, AICRP (Sorghum), UAS, Dharwad  
Dr. Sunil Halakatti, Prof. (Ext.), O/o Director of Extension, UAS, Dharwad

### 7.1 Introductory Remarks by Chairperson



Dr. P. M. Salimath, Chairman of the Session offered the introductory remarks and initiated the panel discussion. Each of the four Panellists presented his/her point of view on different aspects of challenges and opportunities for SAUs in advancement of teaching, research and extension.

In his overview, Chairman Dr. P.M. Salimath emphasized the significant contribution of the agricultural sector to the economy, noting its unique resilience with positive growth during the COVID-19 pandemic, in contrast to negative trends observed in other sectors. He highlighted the critical role of



teaching in State Agricultural Universities (SAUs) for developing employable human resources, emphasizing the need for a dynamic syllabus that reflects the rapid advancements in science. Acknowledging the emergence of online teaching during the Covid era, he advocated for the autonomy of teachers in deciding when to utilize classroom, blackboard, and audio-visual aids for effective teaching. Dr. Salimath suggested utilizing the liberty to modify 20% of the curriculum to update course content and integrating technological applications like drones, artificial intelligence, remote sensing, and nanotechnology into the agricultural science curriculum based on necessity. He stressed the importance of attracting youth to agricultural education and research, advocating for exposure visits for school and pre-university college students to Agriculture College, research stations, and kisan melas. Dr. Salimath highlighted the need for focused research within the National Agricultural Research System (NARS), especially addressing sustainable and value addition challenges for small and marginal farmers. He emphasized the importance of new research proposals addressing climate change challenges, advocating for a balance between basic research and advanced applied programs. Additionally, Dr. Salimath emphasized the continuity of postgraduate students' research by teachers to logical conclusions, the importance of extension activities, and the involvement of farmers in participatory research approaches for effective technology dissemination. Finally, he stressed the holistic importance of Farmer Producer Organizations (FPOs), start-ups, and entrepreneurship in the agricultural domain.

## 7.2 Panel Discussion

Dr. Senthil, Dean, School of PGS, TNAU, Coimbatore, reiterated that the education system in agriculture involves various stakeholders, necessitating quality assurance and that the technological advancements like drone usage require updates in educational curricula to intervene effectively in agricultural education.

Dr. N.K. Hegde, Vice-Chancellor, UHS, Bagalkot, emphasized that continuous updates are essential in agricultural education to align with changing paradigms, as seen in shifts from trimester to semester systems and recent policy adoptions.

Dr. K. Vijayarani, Director of Research, TNVASU, Chennai, mentioned that effective agricultural education incorporates blended learning, adapting teaching methods to modern practices. Integration of research and extension, along with feedback from farmers, fosters collaboration for comprehensive program development.

Dr. Neeraja Prabhakar, Vice-Chancellor, SKLTSHU, Mugulu, opined that the ongoing reforms aim to address equity and quality in agricultural education, exemplified by initiatives like NAHEP. Efforts to raise awareness among school children about agricultural programs are crucial, alongside leveraging online platforms for teaching and youth engagement in agricultural development. Enhancing patents and GI tags in agriculture are urgent priorities.



## 7.3 Recommendations

1. Encourage dynamic syllabus development to keep pace with the rapid advancements in agricultural science and advocate for periodic updates to the curriculum with input from the RAC to ensure relevance to industry needs.
2. Empower teachers to decide the most effective teaching methods, considering the content and the needs of the students.
3. Integrate emerging technologies like drones, artificial intelligence, remote sensing, and nanotechnology into the agricultural science curriculum and ensure that curriculum adjustments are made based on the evolving needs of the agricultural sector.
4. Organize exposure visits for school and pre-university college students to agriculture colleges, research stations, campuses, and Kisan Melas to showcase the prospects and opportunities in the field. Develop awareness programs to attract youth to agricultural education and research
5. Leverage the National Agricultural Research System (NARS) to address the unique challenges faced by the majority of farmers.
6. Prioritize research proposals that address the challenges posed by climate change in the agricultural sector.
7. Encourage and implement approaches like farmers' participatory research, including mother-baby trials, for effective technology dissemination and facilitate collaboration between farmers and researchers to co-create and adapt technologies.
8. Recognize farmers as valuable contributors to the assessment and adoption of technologies developed by scientists.
9. Provide comprehensive support for Farmers Producer Organizations (FPOs), startups, and entrepreneurship in the agricultural sector.





## 8. Valedictory Session

- Chairperson** : Dr. N. H. Kelawala, Secretary-General, IAUA & Vice-Chancellor, Kamadhenu University, Gandhinagar
- Co-Chairperson** : Dr. P. L. Patil, Vice-Chancellor, UAS, Dharwad
- Coordinator** : Dr. I. K. Kalappanavar, Dean(Agri.), College of Agriculture, Vijayapur
- Rapporteurs** : Dr. S. A. Gaddanakeri, Associate Director of Extension (Hq), UAS, Dharwad  
Dr. Ashok Sajjan, Associate Director of Research, Vijayapur (UASD)



Coordinator Dr. I. K. Kalappanavar, Dean(Agri.), College of Agriculture, Vijayapur welcomed the Chairperson, Co-Chairperson and delegates and requested the concerned Session Coordinators to present the proceedings of their respective sessions.

Presentation of Rapporteurs' Reports was done by Coordinators of different technical sessions as follows.

- Technical Session-1** : “Enhancing Productivity and Profitability of Millets–Economic and Ecological Concerns” by Dr. B. D. Biradar, Director of Research, UAS, Dhawad
- Technical Session-2** : “Millets for Sound Health” by Dr. Uma N. Kulkarni, Prof.& Head (FN & FSQA), College of Community Science, UAS, Dharwad
- Technical Session-3** : “Public–Private Partnership for Collaborative R & D and Trade” by Dr. M. V. Manjunath, Registrar, UAS, Dharwad



- Technical Session-4 :** “Policy and Institutional Framework for Promotion of Millets” by Dr. H. B. Babalad, Dean (Agri.), College of Agriculture, Dharwad
- Technical Session-5 :** “Challenges and Opportunities for SAUs in Advancement of Teaching, Research and Extension” by Dr. V. S. Patil, Dean (CSc), College of Community Science, Dharwad
- Field Visits :** Dr. Vasudeva R., Dean (Forestry), College of Forestry, Sirsi



Later, the Chairperson Dr. N. H. Kelawala, Secretary-General, IAUA & Vice-Chancellor, Kamadhenu University, Gandhinagar, asked the delegates for any clarification or suggestions with respect to proceedings and finally after thorough discussion, the house accepted the presented recommendations.

The Chairperson Dr. N. H. Kelawala and Co-Chairperson, Dr. P. L. Patil, offered their concluding remarks.

Nearly 25 delegates from 12 different states have expressed their satisfaction with respect to selection of theme for each session and appreciated deliberations from eminent lead speakers. They also expressed their happiness with respect to panel discussion on each theme. Upon completion, delegates expressed their gratitude for effective organisation of three days symposium including field visit which helped them understand the biodiversity in coastal and hill eco systems of Karnataka. They appreciated the Vice-Chancellor of UAS, Dharwad Dr. P. L. Patil, Organizing Secretary of the 15<sup>th</sup> IAUA National Symposium, Dr. V. R. Kiresur and their team





for meticulous planning and conducting the symposium. They expressed their happiness regarding their stay and hospitality shown to them.

The 15<sup>th</sup> IAUA-National Symposium of Vice-Chancellors concluded with a vote of thanks from Dr. V. R. Kiresur, Director of Education, UAS, Dharwad and Organizing Secretary of the Symposium. He thanked everyone who had contributed to the symposium's smooth functioning, specially the Officers of UAS, Dharwad, the Chairpersons, Co-Chairpersons and members of different committees, and all the delegates, who contributed to the success of the Symposium.





## CULTURAL EVENING











## REFRESHING MOMENTS...





## REFRESHING MOMENTS...





## CANDID MOMENTS...





## CANDID MOMENTS...





## CANDID MOMENTS...





## CANDID MOMENTS...





## Participants of the 15<sup>th</sup> IAUA National Symposium

1	<b>Dr. P. L. Patil</b> Vice-Chancellor University of Agricultural Sciences Dharwad, Karnataka	
2	<b>Dr. Ashok Dalwai, IAS</b> Former CEO, National Rainfed Area Authority (NRAA), Government of India New Delhi	
3	<b>Dr. Parvinder Kaushal</b> Vice-President, IAUA, New Delhi & Vice-Chancellor, Veer Chandra Singh Garahmali Uttarakhand University of Horticulture & Forestry Bharsar, Uttarakhand	
4	<b>Dr. V. R. Kiresur</b> Organizing Secretary, 15 <sup>th</sup> IAUA National Symposium and Director of Education University of Agricultural Sciences Dharwad, Karnataka	
5	<b>Dr. Dinesh Kumar</b> Executive Secretary Indian Agricultural Universities Association (IAUA) New Delhi	
6	<b>Dr. N. H. Kelawala</b> Secretary General, Indian Agricultural University Association (IAUA), New Delhi & Vice-Chancellor, Kamdhenu University Gandhinagar, Gujarat	
7	<b>Dr. P. K. Singh</b> Agriculture Commissioner Government of India New Delhi	
8	<b>Dr. (Ms.) R. Sarada Jayalakshmi Devi</b> Vice-Chancellor Acharya N. G. Ranga Agricultural University Guntur, Andhra Pradesh	



9	<b>Dr. (Ms.) A. Mani</b> Dean (Ag.Engg.) Acharya N. G. Ranga Agricultural University Guntur, Andhra Pradesh	
10	<b>Dr. A. K. Sharma</b> Student Welfare Officer, Bihar Animal Sciences University Patna, Bihar	
11	<b>Dr. P. K. Yadav</b> Director of Prioritization, Monitoring and Evaluation, Swami Keshwanand Rajasthan Agricultural University, Bikaner , Rajasthan	
12	<b>Dr. Bhupen Dubey</b> Global CEO ADVANTA SEEDS Dubai, UAE	
13	<b>Dr. R. B. Madariya</b> Director of Research Junagadh Agricultural University Junagadh, Gujarat	
14	<b>Dr. Vilas Tonapi</b> Former Director ICAR-Indian Institute of Millets Research (IIMR) Hyderabad	
15	<b>Dr. S. K. Swain</b> Dean of Research Odisha University of Agriculture and Technology Bhubaneswar, Odisha	
16	<b>Dr. R. C. Jagadeesha</b> Vice-Chancellor Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka	



17	<b>Dr. S. B. Pawar</b> Associate Director, Vasant Rao Naik Marathwada Krishi Vidyapeeth Parbhani, Maharashtra	
18	<b>Dr. N. G. Malleshi</b> Central Food Technological Research Institute (CFTRI) Mysore, Karnataka	
19	<b>Dr. K. C. Veeranna</b> Vice-Chancellor Karnataka Veterinary Animal and Fisheries Sciences University, Bidar, Karnataka	
20	<b>Dr. M. Hanumanthappa</b> Vice-Chancellor University of Agricultural Sciences Raichur, Karnataka	
21	<b>Prof. (Dr.) Arvind Kumar Shukla</b> Vice-Chancellor Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya Gwalior, Madhya Pradesh	
22	<b>Dr. N. Senthil</b> Dean, School of Postgraduate studies Tamil Nadu Agricultural University Coimbatore, Tamil Nadu	
23	<b>Dr. N. K. Hegde</b> Vice-Chancellor University of Horticultural Sciences Bagalkot, Karnataka	
24	<b>Dr. (Ms.) B. Neeraja Prabhakar</b> Vice-Chancellor Sri Konda Laxman Telangana State Horticultural University, Mulugu, Telangana	
25	<b>Dr. (Ms.) K. Vijayarani</b> Director Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu	



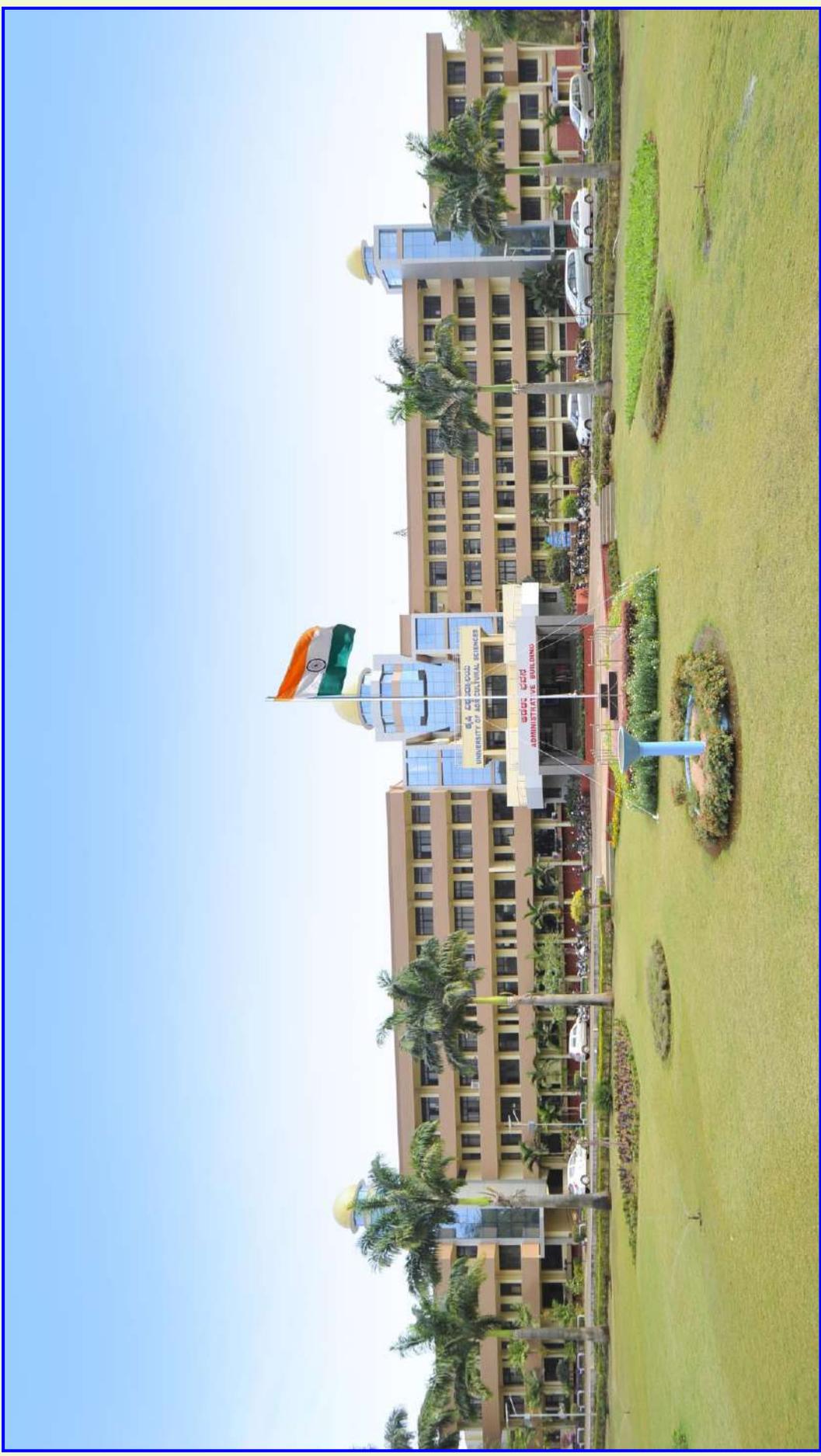
26	<b>Dr. J. V. GOUD</b> Former Vice-Chancellor University of Agricultural Sciences Dharwad, Karnataka	
27	<b>Dr. J. H. Kulkarni</b> Former Vice-Chancellor University of Agricultural Sciences Dharwad, Karnataka	
28	<b>Dr. R. R. Hanchinal</b> Former Vice-Chancellor University of Agricultural Sciences Dharwad, Karnataka	
29	<b>Dr. D. P. Biradar</b> Former Vice-Chancellor University of Agricultural Sciences Dharwad, Karnataka	
30	<b>Dr. P. M. Salimath</b> Former Vice-Chancellor University of Agricultural Sciences Raichur, Karnataka	
31	<b>Dr. S. B. Hosamani</b> Former Vice Chancellor Rani Channamma University Belagavi, Karnataka	
32	<b>Dr. Manjunath M. V.</b> Registrar University of Agricultural Sciences Dharwad, Karnataka	
33	<b>Dr. B. D. Biradar</b> Director of Research University of Agricultural Sciences Dharwad, Karnataka	
34	<b>Dr. S. S. Angadi</b> Director of Extension University of Agricultural Sciences Dharwad, Karnataka	



35	<b>Dr. R. Basavarajappa</b> Dean (PGS) University of Agricultural Sciences Dharwad, Karnataka	
36	<b>Dr. H. B. Babalad</b> Dean(Agri.), College of Agriculture, Dharwad University of Agricultural Sciences Dharwad, Karnataka	
37	<b>Dr. V. S. Patil</b> Dean(CSc), College of Community Science, Dharwad University of Agricultural Sciences Dharwad, Karnataka	
38	<b>Dr. J. S. Hilli</b> Dean(Agri.), College of Agriculture, Hanumanamatti University of Agricultural Sciences Dharwad, Karnataka	
39	<b>Dr. I. K. Kalappanavar</b> Dean(Agri.) College of Agriculture, Vijayapura University of Agricultural Sciences Dharwad, Karnataka	
40	<b>Dr. Vasudeva R.</b> Dean(Forestry), College of Forestry, Sirsi University of Agricultural Sciences Dharwad, Karnataka	
41	<b>Dr. (Ms.) Sarojani Karakannavar</b> Dean (Student Welfare) University of Agricultural Sciences Dharwad, Karnataka	
42	<b>Dr. P. V. Patil</b> University Librarian University of Agricultural Sciences Dharwad, Karnataka	
43	<b>Shri S. M. Honnalli</b> Comptroller University of Agricultural Sciences Dharwad, Karnataka	



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45	<b>Er. S. C. Mirajkar</b> Estate Officer University of Agricultural Sciences Dharwad, Karnataka	
46	<b>Dr. Ravi Hunje</b> Special Officer (Seeds) University of Agricultural Sciences Dharwad, Karnataka	
47	<b>Dr. Shekharappa</b> Associate Director Research (Hq) University of Agricultural Sciences Dharwad, Karnataka	
48	<b>Dr. S. A. Gaddanakeri</b> Associate Director Extension (Hq) University of Agricultural Sciences Dharwad, Karnataka	
49	<b>Dr. Ashok Sajjan</b> Associate Director Research, Vijayapura University of Agricultural Sciences Dharwad, Karnataka	
50	<b>Dr. R. B. Belli</b> Associate Director Extension, Vijayapura University of Agricultural Sciences Dharwad, Karnataka	
51	<b>Dr. P. U. Krishnaraj</b> Head, Project Planning and Monitoring cell University of Agricultural Sciences Dharwad, Karnataka	
52	<b>Dr. C. R. Patil</b> Technical Officer to Vice Chancellor University of Agricultural Sciences Dharwad, Karnataka	



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