

### INNAUGURAL SESSION DETAILS( 25<sup>th</sup> of March, 2022)

The session started with traditional Shabad by students of Akal College of Music, a kind of divine music with its great historical significance and it is actually deeply related to taking blessing from Almighty to begin any activity of great import importance and significance like this presence conference.

The main Anchoring for this was conducted by **Dr Ambika Sharma** from English Language Dept of Eternal University, Baru Sahib and she coordinated the entire session along with the team very well.

Inaugural session started with the welcome addressed by our Hon'ble **PVC SIR, Dr A Singh Ahluwalia** "I welcome you on the beautiful serene campus of Eternal University, Baru Sahib for hosting the International Conference on Water, Agro, Dairy and Food Processing for a sustainable economy."

We appreciate your exceptional efforts in reaching out to this divine place to be with us for deliberating on this topic which is getting so significant in every sphere of our life and research endeavours for a future full of responsible citizens and an inclusive society.

I must acknowledge the blessings of our founders Most honoured Sant Attar Singh ji, whom Pt Mohan Malviya ji requested to lay the foundation stone of BHU, his disciple Sant Teja Singh ji whom Malviya ji appointed the first Principal of Training College BHU, and Brahmngiani Honorable Baba Iqbal Singh ji, Former director Agriculture, Himachal Pradesh, Former President of Kalgidhar Trust and Chancellor, Eternal University whom Govt of India honoured with Padam Shri this year for his exceptional contributions in social services in the field of rural value based education.

Dear delegates and colleagues, we are on the verge of making strides in disciplines like diary, agriculture, food processing and water conservation and its judicious utilization to be sustainable. The climate change fear has been coming true and we have to make efforts to save our deteriorating eco system and depleting resources for future generations as well, by turning into global citizens for sustainable economy. The UN declaration transforming our world i.e. 2030 agenda of sustainable development calls for universal action plan for people, planet, peace, partnership and prosperity. The wisdom of traditional practices, community based indigenous knowledge and their amalgamation with modern technologies can prove to be a boon towards sustainable economy.

The beginning of full-fledged agriculture college in rural Himachal has been the vision and thought of Padam Shri Sant Baba Iqbal Singh ji as Director Agriculture and his close associate Padam Bhusam Dr Khem Singh Gill Ji former VC PAU, a well-known wheat breeder, who were chairperson and vice chairperson of this trust respectively. Hence this idea of organizing this conference by our University Corporate research Centre.

Taking this opportunity, I welcome our sponsors, NABARD, SED and others for their financial support to see this event happening.

Leaving the stage for further programme, it my pleasure to welcome you once again on my behalf and on behalf of everyone from Eternal University and Baru Sahib Campus. Thank you very much.

**The Hon'ble VC (Dr Devender Singh)** and also the president of Kalgidhar Trust, through his words of wisdom, expressed his deep sense of gratitude and extended a warm welcome to all the dignitaries

present during the inaugural session. His brief deliberation also incorporated the vision and mission of the trust and the University and its relevance towards value-based education and woman empowerment and the achievement made so far.

He also beautifully articulated and narrated the significance of this mega conference and its ramification towards a better and inclusive world following the sustainable practices for the verticals as incorporated in our main theme of the conference and role being played by this great university towards this end in the different verticals of this conference and other important areas.

**Dr Ashok Pandey; while introducing the theme** and tone setting expressed his viewpoints beautifully. His essentials are: India is one of the most water-stressed countries among the 17 countries all over the world. It has 16 per cent of the world's population, but possesses only four per cent of fresh water. The country is the world's largest extractor of groundwater, accounting for 25 per cent of the total. Some 70 per cent of our water sources are contaminated and our major rivers are dying because of pollution. In June 2019, 65% of all reservoirs in India reported below-normal water levels, and 12% were completely dry. On 26th June, the city of Chennai report ZERO water availability in its any of its reservoirs. As many as 256 of 700 districts in India have reported 'critical' or 'over-exploited' groundwater levels according to the most recent Central Ground Water Board data. On top of this, there is an increasing demand for groundwater resources for urban populations who need clean drinking water instead of relying on surface sources contaminated by upstream agricultural runoff and wastewater discharge.

The scarcity of water in India affects hundreds of millions of people across the country. In fact it threatens the livelihoods of more than 600 million people. The main issue stems from climate change, which has decreased rainfall and increased temperatures nationwide. It makes it difficult for crops to grow without enough water. As a result, many farmers have been forced into poverty due to crop loss or because they cannot produce as much food with limited access to irrigation methods.

There are several reasons for water shortages - climate change, such as altered weather patterns including droughts or floods, increased pollution, and increased human demand and overuse of water. We have limited water conservation infrastructure -- rainwater harvesting systems, water reuse and recycling, and waste water treatment.

Agriculture production is very closely related with the water for irrigation. However, we have yet another serious issue related to soil, i.e., the poor health of soil due to acute low level of organic carbon in it. Then there is indiscriminate use of inorganic fertilizers, which together with over-exploitation of ground water is leading to un-sustainability in agriculture sector too.

Coming to third aspect of the conference, is dairy. Dairy is the single largest agricultural commodity contributing 5% of the national economy, witnessing 6.4% (CAGR) in the past 5 years. India is the largest milk producer and is ranked 1st in milk production contributing 23 per cent of global milk production. Milk production in the country has grown at a compound annual growth rate of about 6.2 per cent to reach 209.96 mn tonnes in 2020-21 from 146.31 mn tonnes in 2014-15. Dairy market in India reached a value of INR 11,357 billion in 2020. Dairy activities form an essential part of the rural Indian economy, serving as an important source of employment and income. India also has the largest bovine population in the world.

However, milk and milk products also needs serious attention for sustainable development. The milk production per animal in India is significantly low as compared to the other major dairy producers. Moreover, nearly all of the dairy produce in India is consumed domestically, with the majority of it being sold as fluid milk. On account of this, the Indian dairy industry holds tremendous potential for value-addition and overall development.

The fourth highly relevant aspect of the conference is food processing. India's food processing sector is one of the largest in the world and its output is expected to reach \$535 bn by 2025-26. The Food Processing sector in India has a significant role in linking Indian farmers to consumers in the domestic and international markets. It accounts for 32% of the country's total food market. But opportunities are much more.

Thus, this event holds a great promise to discuss highly relevant issues in order to achieve the sustainable development goals.

**As our Guest Of Honour, Dr S. K. Chakraborty, VC, Uttar Banga Krishi Viswavidyalaya, Pundibari, Coochbehar, West Bengal** expressed his view points with the main theme as “Sustainable agriculture: potential of root and tuber crops”.

The gist of his talk is : Sustainable intensification of farming system is the most rational approach for assuring food and nutritional security of growing population in a developing country like India. Crop diversification is a core principle to improve resilience of the farming system to abiotic, biotic and economic stresses. Root and tuber crops have great potential to address this aspect of sustainable crop production, simultaneously ensuring food and nutritional security and farm profitability. They are the third most important food crops after cereals and grain legumes and are unique in their inherent qualities like high dry matter production and capacity to withstand the vagaries of climate change. These crops can be grown under warm humid conditions of tropical as well as sub-tropical agro-ecosystem. They do not need prime land for cultivation and can be grown in marginal farms. They have resilience to adverse climatic conditions and never let down the farmer who can expect a reasonable harvest even when other crops fail. Most of the tuber crops have higher biological efficiency as food producers with high dry matter production per unit area per unit time. They also have the potential of reversing extensive soil degradation primarily caused by intensive cultivation of grain crops. Tuber crops are best suited for sustainable production intensification campaign termed “Save and Grow” by FAO in 2011.

Most of the tuber crops are reservoirs of resistant starch, minerals, vitamins, antioxidants, and dietary fibres. With the rapidly changing food habits and increased migration to urban areas coupled with the projected rise in per capita income, there is a projected increase in demand for processed and ready-to eat convenience foods in the near future. In that context, there exists vast potential to develop prophylactic and therapeutic functional foods from tuber crops. Sweet potato, despite being a health food is seldom consumed by urban and elite and factory level processing does not exist presently in India, unlike in China, Japan, Korea and parts of America. The immense Nutraceutical value of tuber crops due to their anthocyanin and carotenoids content has so far not been fully exploited. Besides, there is immense potential of cassava as raw material for bio-ethanol production. All the above indicators suggest immense potential of tuber crops for rural enterprise development with respect to production of value added food, feed and industrial products, herbal products with medicinal effects, bio-insecticides, natural food colorants, etc. Creation of agriculture

related enterprises would invariably improve livelihood security of rural India. The potential of root and tuber crops in sustainable crop production intensification as well rural development will be addressed in the present topic.

**Dr Dipankar Saha, our key note speaker** delivered his thoughts with the main theme as “Sustainable use of water resource for food and drinking water security in India”.

The main features of his deliberation is : Groundwater is the most important natural resources for extending assured irrigation and drinking water security in India. Though volumetrically it accounts only for 38% of total utilisable water resource, groundwater caters nearly 65% of irrigation need, 85% of rural drinking water supply and more than 50% of urban water demand. About 10% of India’s GDP is contributed by groundwater and its related activities and the value of groundwater-based irrigation economy is pegged as 75 -80 billion US \$/year. Industries are also relying more and more on groundwater. The recently launched Jal Jeeban Mission, where every household is expected to provide safe and adequate drinking water through tap by 2024 in the country is largely dependent on aquifers. The efforts to increase the farmers income by providing them assured irrigation is also putting pressure on this precious natural resource.

Groundwater is annually recharged, mainly from monsoon rainfall and also from other sources. However, reckless and unplanned extraction by wells, much exceeding the annual recharge, is being witnessed in many parts of India, which is referred as overexploitation. Such a situation is creating drying up of wells, decline in water levels and groundwater quality deterioration. About 1/5th geographical area of the country is under influence of serious overexploitation of groundwater resource. The north-western India, covering Punjab- Haryana- Rajasthan-Western UP region is mapped as one of the three most severely water stressed regions in the World. Various geogenic contaminations of groundwater are also expanding over large swath of the country and many researchers link this to overexploitation.

There is an urgent need for sustainable use of groundwater to obviate the threats to food and drinking water security. The supply and demand side interventions are to be adopted carefully, considering the local conditions. It is also important to curb collateral environmental damages that emanates from overexploitation of this resource, which are like, drying up of wetlands, lesser e-flow in rivers, saline water ingress in coastal aquifers etc. Climate change is further adding complication. We need to take a scientific approach to address these issues. The involvement of different stakeholders and communities are also essential.

**Mr Vivek Verma, our special Guest ‘s ‘speech** revolved around about his fascinating experience and exposure along with consulting practices for his clients towards practically no-use of water at all to the best possible extent in every gamut of our life cycle irrespective of any segment of our economy along with house hold sector as well. He beautifully explained about his company’s new technology discovery, patented by govt of India. He also emphasized upon the role an educational institution like ours, can play in upbringing the exiting knowledge base w r t use of Water and its sustainable practices.

**Dr Panjab Singh our CHIEF GUEST presented his thoughts with the theme of “Transformation through Agricultural Innovation”**; a very important and quite relevant area o to address by a person of his calibre for this conference for a country like ours with immense potential to show the path of

inclusive development in the agro sector as a whole AND TOWARDS FARMERS COLLECTIVE WELL BEING.

Indian agriculture employs 42% of workforce, contributes to about 16.5% of GDP, provides food self-sufficiency to 1.38 billion Indian population and about 66% of the population in rural India is dependent on agriculture (263 million agricultural workers). Agriculture has made a splendid growth since independence. To cite a few-food grain production increased from 51 million tons (mt) to 310 mt (X6), milk from 17 mt to 200 mt (X12), horticulture-fruits and vegetables from 32 mt to 325 (X10), fish from 0.75 mt to 14 (X18) and established itself as the second largest agrarian economy after China in the world. The country has transformed itself from ship to mouth and chronic energy deficits to right to food bill situation to net exporter with annual value of exports to 2.52 Lakh crore (2019-20). Since economic reforms began in 1991, India has remained a net exporter of agri-products and occupies a leading position in global trade of agri-products, its total agri-export basket accounts for a little over 2.5 per cent of the world agri-trade. Diversification towards high value crops (commercial and cash crops), transformation towards efficient water use, especially micro irrigation and use of mechanical and electrical sources of farm power are considered some major breakthroughs. In fact, use of animal and human power in agriculture has reduced drastically from 97.4% in 1951 to 12% in 2012-13 and the use of mechanical and electrical power has increased from 2.6% to 88%, of which tractor contributes to 48% in the same period.

Some of the major challenges faced in Indian agriculture are, declining holdings (1.08 ha in 2015-16), 86.2% of the holdings are less than 2 ha with small and marginal farmers, who account for 47% of the total area; declining growth trend in agriculture since 1980s and unabated land degradation and desertification (120 m ha degraded land) and declining organic carbon and soil quality. The major and micro nutrient deficiencies are wide spread indicating 49, 12, 5, 3 and 33 per cent deficiencies of Zn, Fe, M, Cu and Bo, respectively. Over exploitation of ground water especially in western and southern India is a matter of serious concern. India is the largest user (approximately 230 km<sup>3</sup>yr<sup>-1</sup>) of ground water in the world. Agricultural demand of stored water (ground and surface) for irrigation in India is very high and it is expected to rise by 56% by 2050. Today, 1034 blocks in India are considered as over exploited, 253 are critical and 681 are semi-critical. Per capita availability of utilizable water resources, which was 5247 m<sup>3</sup> in 1951 has decreased to 1453 today and is expected to dwindle down to 1170 by 2050. Impact of climate change is yet another challenge to Indian agriculture. Global warming of 1.50c and 20c will be expected during the 21st century unless deep reduction in CO<sub>2</sub> and other greenhouse gas emission occur in the coming decades. Sources indicate that loss of farm revenue due to extreme temperatures and rain fall shocks is estimated to be 12% for monsoon and 6% for winter crops with more impacts on rain fed ecosystems. There are large gaps in major crops in achievable and harvested yields warranting for adoption of best management practices, site specific nutrients management, in-situ moisture management for enhancing productivity for minimising the yield gaps. While India will have sufficient supply of food grains towards 2032/33 and beyond, the country is going to face the massive deficit of oilseeds around 40 million tons and pulses and coarse cereals of 5-7 million tons besides chronic shortage of feed and fodder. Aii said and done, we still have the stigma of owning nearly one-fourth of the world's hungry, one-third of the world's stunted children, and half of the world's wasted children. To meet all these challenges, the agriculture has to be practiced differently and approached holistically using all modern tools, knowledge and technologies. This is also necessary to fulfil our several international agreements and commitments and the latest being to reduce the emission intensity of

its GDP by 45%, reduce emission by 1 billion tons by 2030 and commitment to become carbon neutral by 2070 (COP-26, Glasgow, Nov.2021) besides being signatory to UNCCD and also committed to sustainable land management neutrality (26 mha by 2030).

Among innovative agriculture, promotion of conservation agriculture, practiced on 125 mha globally and 1.25 mha in India, has proved effective in reducing the cost of production (Rs.4000-5000/ha), enhancing productivity (15-20%), save irrigation water (100-220 ha-m) and higher total organic carbon in 0-5 cm soil layer (10-13%). Technologies such as zero tillage, happy seeder, turbo seeder, shredder, bailer, land levelling, FIRB, DSR, green manuring, crop residue incorporation, bio-enriched compost etc. offer great opportunity for conservation agriculture especially in rice-wheat cropping system and irrigated systems. LCC/SPAD/optical sensors (green seeker) for real time N management and farm advisory and yield forecast can save 13-20% N use. Integrated Farming System (IFS) Models could be a mean of sustainable food system besides being highly economical and ecologically sound. Carbon foot print and energy production of different production systems viz., traditional rice-wheat system, diversified cereals (maize based) vegetables, pulses and oilseeds, and integrated farming system (IFS) involving crop, live-stock, poultry, duckery and fisheries showed that Integrated system gave 80 and 38% lower carbon foot print as compared to traditional and diversified systems. The energy production in IFS was 2.5 and 3.5 times higher compared with diversified and traditional systems respectively. There is a need for developing location specific profitable farming system models for irrigated and rain fed ecosystems. Technologies for enhancing adaptive capacity and resilience to climate change and for mitigating GHG and enhancing productivity have been developed and need to be tried for large scale application. Improved nutrient management can significantly enhance carbon sequestration and yield in different rain fed production system. Further, small farm/ smart mechanization for precision application of seeds and fertilizers, crop health management, precision irrigation and harvesting and threshing are the need of the present day farming. Lots of advances have been made in these technologies which need to be refined and delivered at farmer's door steps for use. New technological innovations viz., vertical farming, new fertilizer materials (nano urea), new approaches to weed control, AI, IOTs, use of drones, polyhouse cultivation, ICTs for the spread of information, agro-advisories and technologies will enhance productivity, profitability and resources use efficiency. In summing up, there is a need for a paradigm shift from productivity oriented approach to profitability and enhanced income to farmers, greater focus on resource use efficiency and quality of natural resources, enhancing productivity of oilseeds and pulses, transformation towards knowledge oriented agriculture, innovation in knowledge and transfer of technologies, use of latest/ smart technologies and training with the state-of-the-art facilities to students and other stakeholders are the key for sustainable agriculture