



7.3.1-Portray the performance of the institution in one area distinctive to its priority and thrust

Lab to land programs

Sirmour being remote and under developed district of the state of Himachal Pradesh needs attention for the upliftment of farmers for which outreach programs and education with practical hand-on programs were arranged. Situated in the strategic region the Eternal University is focusing on the inclusive development of the villages cluster around Baru Sahib through extension activities including training courses, workshops, field visits, Kisan Melas and **research in their perspectives**. The feedback from the farmers is used as the basis for planning and undertaking our **academic planning**.

Research and Infrastructure: To give impetus to research number of seats in Masters and Ph.D. have been increased, adequate infrastructure, laboratory facilities (with advanced instrumentation) are being created, and highly qualified faculty is being engaged. A number of research projects have been sanctioned from various funding agencies viz. DBT, DST, NABARD, Ministry of AYUSH, DEST, HIMCOSTE, GIZ and SERB-DST New Delhi. Advanced scientific equipment's worth crores have been procured, installed and are being used. Workshops on IPR were conducted and a number of patents have been filled, published and one awarded.

Research work on number of functional food crops including barley, oats, buck wheat, pearl millet, finger millet, amaranthus, foxtail millet, soybean, sweet sorghum, quality protein maize, maize with beta carotene and anthocyanin is going on. High yielding bio-fortified wheat lines with high grain Zn and Fe have been developed and are being tested in multi-location field trials for commercial cultivation. A number of maize composite cultivars with improved nutritional quality characteristics including essential amino acids tryptophan and lysine, beta carotene and anthocyanin in various combinations have been developed through molecular breeding for commercial cultivation. A grant of **Rs 5.97 crore** from **MoFPI** has been received to establish **"Akali Food Safety and Quality Control Laboratory"** to monitor the quality of processed products of food industries.

For **crop protection** innovative, non-toxic nanoparticles have been developed which are being tested for their use in diverse applications. Biotechnology laboratory has the credit of synthesizing pure and doped wide band gap semiconductor nanomaterials like ZnO, TiO₂ metallic nanoparticles; pure and doped nano-ferrites, nano-crystals using chemical sol-gel, co-precipitation and hydrothermal techniques along with characterizing/analyzing them for various

applications. In cauliflower, capsicum and strawberry combination of different nano-particles have been evaluated for **combating pathogenic attack** at different concentrations.

For the agriculture and horticulture commodities; the lots of **postharvest losses** are observed in this regions. Solar dryer expected to be one of the possible solutions for the local farmers to minimize these losses. Moreover, preservation of the dried fruits and vegetables for off-seasons through solar drying is simple and cost efficient. A solar dryer is designed and developed using locally available low-cost materials such as wood, pine needles and other scrap materials for remote area application.

Insect pests, plant parasitic nematodes and diseases associated with various horticultural crops of this region have been identified. In addition to this horticultural crops integrated nutrient /disease/pest management in garlic, ginger, tomato, cauliflower, capsicum, pea, French bean, strawberry etc. have been recommended. The use of entomopathogenic nematodes (EPNs), Entomopathogenic fungus (EPF) and Entomopathogenic bacteria (EPB) as bio-control agent has been evaluated against major insect pests such as armyworm, cutworm, pod borer, cabbage butterfly (*Spodoptera* sp., *Agrotis* sp., *Helicoverpa* sp., *Pieris* sp.) etc. to control it in the region. Considering the devastating losses in storage of ginger is addressed by providing new storage "**Bamboo mat storage technology**" to the farmers of Sirmour area through demonstration and training programs under GIZ sponsored project. This new technology will enhance the shelf life of seed ginger in storage. The faecal samples of sheep, goat, cow and buffaloes of Sirmour have revealed the prevalence of various nematode and helminth parasites belonging to various genera. In addition, the oocysts of unicellular eukaryotic protozoan parasite *Eimeria* sp. were also detected in the fecal samples of **livestock** from this area. Eco-biological studies on fish fauna inhabiting the Giri River of Himachal Pradesh have been studied, wherein 10 species such as *Tor putitora*, *Acanthocobitis botia*, *Barilius bendelisis*, *Barilius vagra*, *Channa gachua*, *Mastacembelus armatus*, *Pethia conchoniis*, *Schizothorax plegiostomus*, *Opsarius canarensis* and *Schizothorax progastus* have been identified.

Baru Sahib and its adjoining areas are very rich in **medicinal and aromatic plants** wealth. Therefore, R&D in their biodiversity exploration, characterization of phyto-constituents, molecular characterization/ genetic diversity analysis, bioactivities and formation of various herbal products are the prime areas. Presently, more than 100 medicinal plants have been introduced in the Herbal-cum-Botanical Garden. The cytomorphological, phytochemical, pharmacological, morphoanatomical and RAPD marker assisted profiling, *invitro* biological activities of various medicinal plants of genera viz., *Valeriana*, *Berberis*, *Dioscorea*, *Gentiana*, *Plectranthus*, *Colebrookea*, *Scutellaria*, *Adhatoda*, *Tinospora*, *Physalis*, *Roylea*, *Boerhavia* and *Withania* etc., have been completed. A perennial and winter hardy ecotype of *Withania somnifera* with high amount of anolides in leaves has been identified.

The **production and marketing strategies** of major cash crops raised by the farmers have been studied. It revealed that agro-processing units are the need of the hour for such villages, it may not only be helpful to enhance the producers' share in consumers' rupee, rather it may create additional employment opportunities in the study area.

Advanced studies on molecular mapping and breeding for high popping volumes in high yielding lines have been carried out. Moreover, for **housing in cold climate** to provide thermo-

comfort have been investigated by using minimum energy input i.e. thermo-syphoning air heating panels, Sun spacers on the southern façade, airlock lobbies, double glass windows etc. have been suggested to the farmers. A total 1200 endophytic, phyllospheric and rhizospheric bacterial and fungal strains have been isolated and screened for phosphorus (P) and potassium (K), Zinc (Zn), Magnesium (Mg) solubilization and nitrogen (N) fixation attributes. The single as well as microbial consortium [NPK, NP, NK and PK] have been developed for plant growth promotion and soil fertility for crop growing in hilly regions.

Nursing College is actively involved in providing free **medical camps**. Nearly 4-6 such camps are organized every year, wherein free services are provided for expensive surgeries by the Doctors from India and Abroad. The hospital is the only one in the region for providing expensive anti-venom injects to the snake bite patients. The De-addiction centre and Psychiatric services hold regular two camps every month.