‘Science Walk’ organized at ICAR-Central Arid Zone Research Institute, Jodhpur for Kharif season

The experimental activities ongoing at ICAR-CAZRI Research Farm during the current Kharif season were demonstrated to the Scientific, Technical and Administrative staff through a guided scientific tour during 10-11 Sept, 2024. Eight demonstration/fields were identified viz., Integrated Farming Cafeteria, Eddy tower block, Seed production block, Natural resource monitoring field, Agroforestry block, Grass seed production, Integrated Farming System (IFS) and Agri-ecotourism park. At each point, research highlights containing information about the crops, plant species, variety, date of sowing, agronomic practices, seed broadcast methods and spacing were discussed by scientists.

Integrated Farming Cafeteria (IFC), the model demonstration block developed in 2.0 hectates area representing a miniature version of major research activities being undertaken at CAZRI research farm. Crop cafeteria, silvipasture system, year round fodder production, rain water harvesting and horticulture block are the major attractions of this IFC. The crop cafeteria (20% area) showcased 20 improved varieties/ hybrids each of mung bean, moth bean, pearl millet and minor millets. Dr. HR Mahla explained the comparative performance of each crop with respect to sowing date, variety and unique characteristics of each line.

Dr Archana Verma explained the silvi-pastoral model where budded *Prosopis cineraria* and *Melia dubia* are planted in 4×4 m spacing with *Cenchrus ciliaris* as intercrop between the tree rows. She told that budded *P. cineraria* tree yields 4-5 kg green pods and 6-7 kg green fodder after five years of planting.

The horticulture block spread in 40% area of IFC houses five major arid fruits crops viz. ber, pomegranate, date palm, fig and gonda. Date palm (varieties ADP-1, Khunaizi and Navbat Sultan) and gonda (variety Maru Samridhi) have been planted on the boundaries, while ber (varieties Gola, Seb and Umran belonging to early mid and late maturity group), pomegranate (varieties CAZRI Vishal and Bhagwa) and fig (variety Diana) are planted in multiple rows inside the block.

The fodder block spread in 0.25 ha (12.5% area of IFC) has five perennial fodder crops (thornless cactus, bajra napier hybrid, perennial sorghum, moringa and guinea grass) and two seasonal fodder crops (bajra and sorghum in kharif). Dr RN Kumawat and Miss Kajal Arora appraised the visitors that the bajra-lucerne produced 48 quintals, guinea grass 90 quintals, thornless cactus 78 quintals, bajra napier hybrid 120 quintals and perennial sorghum 60 quintals of green fodder during a year. In economic terms the 0.25 ha green fodder block gives gross return of Rs 1,31,850 and can support 10 Adult Cattle Units round the year.

Dr. Deepesh Machiwal demonstrated the rainwater harvesting, water storage and water utilization system along with solar PV pumping system and filtering. The rainwater harvested from 2 ha area is stored in HDPE-lined (500 micron thickness) pond. This year, the pond is at full capacity of 5 lakh litres (3 m depth) from 2nd August onwards after receiving 4 rainy events of total 127 mm. It is experienced that runoff in the catchment occurs when rainfall intensity exceeds 30 mm hr^{-1}. The highest rainfall intensity was 100 mm hr^{-1} on September 04, 2024. It is learnt that rainfall intensity and duration curves are the need of the hour instead of simple column chart representing daily rainfall totals in the arid region.

Eddy tower block

Eddy tower site was demonstrated by Dr. Priyabrata Santra and Dr HM Meena. The tower consists of several sensors e.g. 3 D sonic anemometer, Infra-Red Gas Analyser (IRGA), four component net radiometer, photosynthetic photon flux density (PPFD) sensor, soil moisture sensors, soil heat flux sensor, raingauge etc and logger for measurement of CO2 flux and water flux from pearl millet based production system. Recently the tower has been updated with an advanced sensor for in-situ measurement of solar induced fluorescence (SIF) and its correlation with CO2 flux measured by eddy tower at difference water stress condition.

Seed production of pulses

Dr. RK Kakani provided the details of seed production program undertaken at CAZRI during this kharif season. Mung bean and moth bean seed production plots were appreciated by the visitors.

Natural resource monitoring field

Experiments on quantifying water stress on crops from remote sensing platform and long term study on soil processes under irrigated and rainfed conditions in arid zone were demonstrated. During the visit, the in-situ measurement of soil moisture by soil moisture sensor (Profile probe of PR2, Make: Delta T) was demonstrated by Dr Mahipal Chaudhari. It has been characteristically observed that the surface soil moisture was about 12-14% whereas the subsurface soil moisture content at 60-100 cm soil layer was as high as 30-35%. The difference in plant growth of pearl millet crop with different nutrient management practices was clearly visible.

Agroforestry of Melia dubia and Gmelina arborea

Dr. Archana Verma briefed about the *Melia dubia* and *Gmelina arborea* based agroforestry systems which were established in the year 2021. She told that both the species are performing very well in the region and has very good scope in plywood and timber industries. Both the systems are being evaluated in different row spacings (6×6 m, 6×6 m and 6×12 m) with pearl millet and mung bean as intercrops. The data is recorded for both above and below ground tree-crop interactions. The different treatments of drip irrigation are also applied to develop drip based irrigation schedule for the species. She also told that *M. dubia* trees has good demand in plywood and timber industries due to its fast growing nature, superior wood qualities and wider adaptability.

Grass seed production

The quality seed production of arid grasses includes Anjan grass var. CAZRI Anjan 2178, CAZRI Anjan 358, CAZRI 75, and sewan grass have been taken mostly at wider row spacing. The delegates were delighted by the scenic beauty of well-maintained seed production plots and appreciated the same.

IFS Block

Dr SPS Tanwar explained the Integrated Farming System of 4ha developed with limited irrigated conditions. The model has integrated different components such as kharif crops (pearl millet, green gram), horticulture (ber, pomegranate), fodder crops (Dhaman grass, napier hybrid), agro-forestry trees (khejri, budded khejri) and livestock. Ashwagandha is sown few days ago. He added that different components are integrated in such a way that there is employment and revenue generation throughout the year. The model can be adopted by farmers with minor modifications as per their farming system requirements such as number of livestock and fodder requirement.

Agri-ecotourism park

Dr Saurabh Swami provided brief details of different blocks of the agri-ecotourism park. Further, the new addition in the park was mentioned e.g. guidelines for visiting the park, new horticulture block with date palm, aonla, karonda and ber, ornamental block etc. Visitors walked down at few selected blocks of the park.

The interactive and learning sessions ended with a refreshment served at the central hut of the agri-ecotourism park. Director of the institute, all scientists and technical staff, Chief Administrative Officer, Comptroller, Finance and audit officers participated in the Science walk-2024 with great interest.