Krishi Kaushal
कृषि कौशल

8th Foundation Day of University
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SOUVENIR

Agriculture University Kota 324001 (Raj.)

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परिकल्पना एवं मार्गदर्शन

प्रो. डी. सी. जोशी	–	कुलपति महोदय, कृषि विश्वविद्यालय, कोटा
प्रो. ममता तिवारी	–	निदेशक, प्राथमिकता, निगरानी एवं मूल्यांकन
प्रो. प्रताप सिंह	–	निदेशक, अनुसंधान निदेशालय
प्रो. एस. के. जैन	–	निदेशक, प्रसार शिक्षा एवं मानव संसाधन विकास निदेशालय
प्रो. आई. बी. मोर्य	–	अधिष्ठाता, उद्यानिकी एवं वानिकी महाविद्यालय झालावाड़
प्रो. एम. सी. जैन	–	अधिष्ठाता, कृषि महाविद्यालय कोटा केन्द्र, उम्मेदगंज, कोटा
प्रो. मुकेश गोयल	–	प्रभारी, सूचना एवं जन सम्पर्क अधिकारी
प्रो. जीतमल धाकड	–	निदेशक, शिक्षा निदेशालय
प्रो. जितेन्द्र सिंह	–	निदेशक छात्र कल्याण निदेशालय
प्रो. वीरेंद्र सिंह	–	परीक्षा नियंत्रक
प्रो. एन.एल. मीणा	–	क्षेत्रीय निदेशक अनुसंधान, कृषि अनुसंधान केन्द्र, उम्मेदगंज, कोटा

संकलन एवं सम्पादन

प्रो. एल.के. दशोरा	–	तकनीकी सलाहकार, प्रोफेसर एमेरिटस (आई.सी.ए.आर.), कृषि विश्वविद्यालय, कोटा
प्रो. ममता तिवारी	–	मुख्य सम्पादक, निदेशक, प्राथमिकता, निगरानी एवं मूल्यांकन कृषि विश्वविद्यालय, कोटा
प्रो. मुकेश गोयल	–	सम्पादक, प्रभारी, सूचना एवं जन सम्पर्क अधिकारी, कृषि विश्वविद्यालय, कोटा
डॉ. पी.एस. चौहान,	–	सह सम्पादक, सह आचार्य, उधान एवं बागवानी महाविद्यालय, झालावाड़
डॉ. सुभाष चन्द्र शर्मा	–	सह सम्पादक, सह आचार्य, कृषि अनुसंधान केन्द्र, कोटा
डॉ. बी.एल. ढाका	–	सह सम्पादक, सहायक आचार्य कृषि अनुसंधान केन्द्र, कोटा

प्रकाशक–

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MESSAGE

Indian agriculture has entered in a new and exigent phase of secondary agriculture as major research and development efforts in the green revolution era focused on enhancing production and productivity of selected food grains and other crops. In present scenario of multifarious challenges in agriculture sector, there is a need for reorientation of the agricultural research and development system to make it strong enough to meet the new challenges on account of climate change, value chain requirement, nutritional security, reducing cost and drudgery and enhancing farmers income.

Rajasthan is the largest State of India with a geographical area of 34.2 million hectares. It represents 10.4 percent land area of the country. Agriculture University, Kota was established in year 2013 and its service area accounts for 9.98% geographical area, 12.67% total human population, 9.4% livestock population, 31.59% forest area and 20.6% net sown area of the State. The jurisdiction of Agriculture University, Kota consists of six districts of State viz; Kota, Baran, Bundi, Jhalawar, Karauli and Sawai Madhopur. The University was established with the objective of overall development of agriculture, horticulture, animal husbandry and food processing through innovation in research, education and extension component. The University is engaged in the development of new technologies matching the needs of farming community of humid south eastern plains (Zone V) and flood prone eastern plains (Zones IIIB) of Rajasthan.

I feel immense pleasure to state that within a very small span of time a record of tremendous progress has been made by University and in year 2018-19 we were recognized as a good-performing State Agriculture University with 23rd rank of ICAR and 1st in all five State Agriculture Universities of Rajasthan. Yet we remain committed to achieving excellence in everything that we do.

September 14th, 2020 is a momentous day for the Agriculture University, Kota as we celebrate its 8th Foundation Day. The day is also offers a unique opportunity to celebrate what we have accomplished, to express our gratitude to those who have contributed to the growth of the University and to strengthen our resolve to continue developing our University for our future generations. Our focus should be on providing much better service to our farmers, students and other stakeholders.

As we navigate the new challenges presented by COVID-19, we have to set the agenda for the future that must be based on the creation of inclusion, diversity, innovation and sustainability for humanity. I appreciate the services rendered by all the members of Agriculture University, Kota during the difficult time of COVID-19 pandemic.

Let us also remind ourselves of those areas that we must pursue in our research, teaching and extension and also at an individual level to fulfill our dream of getting our University placed in the top level Institutions of the country. On the occasion of Foundation Day I congratulate to all the staff members of Agriculture University, Kota who are contributing in the progress of this University. I also congratulate to Dr. (Mrs.) Mamta Tiwari, Director, Prioritization Monitoring and Evaluation and her team for publishing "Souvenir-2020 of Agriculture University, Kota".

Jai Hind

(D.C. Joshi)

Prof. Mamta Tiwari
Director,
Prioritization Monitoring
and Evaluation

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Editor's Note

It is a matter of great pleasure that Agriculture University, Kota is celebrating its 8th Foundation Day on 14th September, 2020. This University is established in the year 2013 and has played a pioneering role in introducing scientific agriculture to our farmers, students and other stakeholders by adopting a three-pronged strategy of research, education and extension in bringing out overall agricultural development. The University has established a vibrant two-way relationship with the farm community by taking research from the laboratory to the land. I wish to place on record my appreciation for the untiring efforts of the University in the development of new innovations in the area of agricultural research, extension and education. It was decided to bring out a Souvenir on the occasion of Foundation Day of Agriculture University, Kota covering glimpses of achievements of University as well as views, feelings, ideas of scientists, teachers, students and other staff members of the University in the form of article, poem, chapters etc.

As editor it is both pleasure as well as challenge to chronicle the panoramic view of efforts and achievements of scientist, teachers, students and all staff members in the Souvenir. Putting pen to paper seems to be a more arduous task than using the gift of the gab. But when you put pen to paper, you see a side of yourself that doesn't otherwise reveal itself in conversation or thought. I would like to pay my sincere gratitude to Dr. D.C. Joshi, Hon'ble Vice Chancellor, Agriculture University, Kota for giving opportunity to prepare this important document along with guidance and moral support as and when needed. I would also like to thank to all writers involved, for their hardwork has definitely paid off specially our beloved students. I would also like to place on record my sincere thanks to Prof. L.K. Dashora, Emeritus Professor (ICAR), and members of Editorial Board of University Prof. M.C. Goyal, Associate Director Extension, DEE, Kota, Dr. P.S. Chauhan, Associate Professor, CH&F, Jhalawar, Dr. S.C. Sharma, Associate Professor, ARS, Kota and Dr. B.L. Dhaka, Assistant Professor, COA, Kota without their help and support this document could not be completed.

(Mamta Tiwari)

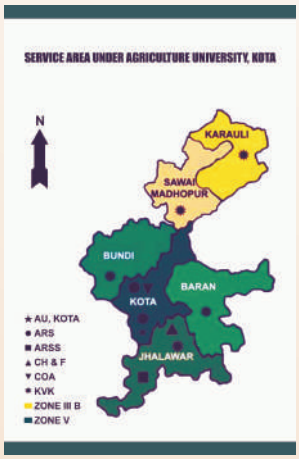
Agriculture University, Kota : An Introduction

Establishment Background and Profile :

Agriculture University, Kota is a public funded agricultural university located at Kota of Rajasthan. The Agriculture University, Kota (AUK) was established on 14th September, 2013 after bifurcation of the Maharana Pratap University of Agriculture & Technology (MPUAT), Udaipur and Swami Keshwanand Rajasthan Agricultural University (SKRAU), Bikaner through promulgation of Act No. 22 of 2013.

The jurisdiction of the University includes all the campuses including Constituents College, ARS, ARSS and KVKs spread over six districts of the South-east Rajasthan. These districts are Kota, Baran, Bundi, Jhalawar, Karauli and Sawai Madhopur. Headquarter of Agriculture University at Borkhera, Kota. Since, inception The AU, Kota playing leading role for research, education and extension. It accounts for 9.98% geographical area, 12.67% total human population, 9.4% livestock population, 31.59% forest area and 20.6% net sown area of the state.

AU, Kota has passed several notable milestones in a short period of time and has consistently improved on many fronts that influence the achievement of academic excellence. Successful attempts have been made to establish the university as a great center for the purpose of creating the wealth of knowledge in its domain area. In addition to quality education, AU, Kota takes responsibility for quintessential agricultural research that meets the growing demands for food grains and animal products, as well as the successful transfer of technologies through a strong network of outreach education delivered to the farmers. The combined efforts have intensified the state's agricultural growth.



AU, Kota is committed to developing competent human resources to serve society in general and farmers and the food industry in particular to achieve sustainable livelihoods, efficient use of natural resources and ensure food security and safety of the nation.

Considering the strengths gained by AU, Kota, and the opportunities that lie ahead for further achievement and advancement, the University is well-prepared to not only continue its ongoing success stories, but is also well-positioned to usher in next phase of excellence and contribution to the prosperous agriculture of Rajasthan and India.

Mission

- To develop human resources and to generate appropriate, efficient & effective technology for sustainable growth in agriculture and allied fields ensuing enhanced food & nutrition security, income generation and environmental safety.

Mandate

- Develop academically qualified human resources through UG, PG, Ph.D and other academic programmes in different branches of agriculture & allied sciences.
- Conduct basic, strategic and need based area specific applied research in Agriculture, Horticulture, Agriculture Engineering, Forestry, Animal Husbandry, Fisheries and other allied fields to develop technologies relevant to farming community for livelihood security and high farm income.
- Undertake extension education and training programmes for improving the agricultural situation of the state and socioeconomic status of weaker sections of the society especially in rural areas.
- Help and provide technical guidance to the state Govt. for development of agriculture in the state.
- Develop collaborative linkages with state agriculture universities, govt. departments,

national & International organizations for fulfilling above objectives.

Research

Agriculture University, Kota has a mandate to develop improved technologies on different aspects of agriculture for the state and particularly for the zone IIIb and V. Since beginning, main focus of research have been on development of high yielding multiple biotic and abiotic stress resistant varieties in field and horticultural crops, integrated nutrient management, resource conservation technologies, climate resilient management practices, integrated farming systems, irrigation water management, integrated pest management and safety in agriculture.

The important varieties developed and notified are RKS 113 of soybean, Mukundra Urd 2 of urdbean, Kota Masoor 1 & Kota Masoor 2 of lentil, Kota Rajmash 1 of Rajmash. In addition to this, a number of improved varieties of different crops like sesame, onion, wheat, lentil, rajmash, coriander, mustard and sugarcane etc. released in the country were tested and recommended to the farmers of AU Kota service area.

The research is also being carried out on system based cropping systems, ntegrated nutrient management, weed management, irrigation water management, organic farming, crop diversification & intensification and other cultural practices for field crops and horticultural crops. A number of recommendations have been finalized and included in the package of practices mainly for the farmers of the zones.

The important field crops like soybean, rice, maize, urdbean, mungbean, sesame, pearlmillet, clusterbean, wheat, mustard, coriander, chickpea, lentil, linseed & sugarcane; garlic, okra, potato, cauliflower, chilli, tomato of vegetables and guava & grapes of fruits are grown in eastern and south eastern parts of Rajasthan are infested by a large number of insect-pests and diseases leading to drastic reduction in production. To manage these insect-pests and diseases, crop protection recommendations have heen given on soybean and pigeonpea for the control of insect-pests and diseases.

For crop diversification and to get higher income and livelihood security of farmers, promotion of horticulture is most important. In horticultural crops, research was conducted on development of production technology for garlic, okra, potato, cauliflower, chilli, tomato of vegetables and guava & grapes of fruits. The technologies finalized and included in the package of practices–insect-pest management in potato; insect-pest & disease management in tomato, varieties & weed management in onion, weed management in garlic, variety & disease management in coriander, disease management in okra, nutrient & disease management in chilli, disease management in mandarin, insect-pest management in papaya and disease management in citrus. The University envisages for developing protected cultivation technology on strawberry, chilli, cucumber and tomato and quality planting saplings for farmers.

University is also engaged in development of technologies of mustard, coriander, fennel and ajwain for enhancing productivity through honeybees and pollinators.

University has established a unique phytosanitory laboratory, a model lab in the state, to facilitate analyses of agro-commodities for issuing phytosanitary certificates. It is equipped with sophisticated equipments. The established lab is being constantly utilized for the examination of export samples as per standard operating procedure issued by DOPRQS for phytosanitary diagnostic test for the issue of phytosanitary certificate. Similarly, soil testing laboratories at different units are functioning for analysis of soil, water and plant samples of field experiments and farmers samples. These are well equipped with advanced modern equipments.

Research Units

There is one Agricultural Research Station located at Kota and two Agricultural Research Sub-Stations located at Aklera-Jhalawar and Khanpur-Jhalawar. Various research programmes are being carried out at these research stations specifically to develop ecologically sound and economically viable production and protection technologies for field as well as horticultural crops to enhance the yield.

The university has decided and classified the lead and verification functions for proper field and lab oriented research work for betterment of farming community which are as follows.

Lead functions: Soybean, urdbean, transplanted paddy, wheat & barley, chickpea, lentil, fieldpea, potato, sugarcane, linseed, mustard, honeybee & pollinators, arid zone fruits, integrated farming system,

citrus, water and soil management including drainage management of salt affected lands and micronutrient research.

Verification Functions : Seed spices, dryland agriculture, maize, arid legumes, onion & garlic, agromet advisory.

The details of research farm lies under the jurisdiction area of the university are as follows:

Agricultural Research Station, Ummedganj, Kota

Agricultural Research Station, Ummedganj, Kota is situated in zone V, covers geographical area of 26.43 lakh ha and represents 7.71 per cent of the total geographical area of the state.

The station is well connected on Kota to kaithoon road and it is 15 km away from Kota railway station and 13 km from roadways bus stand. The mandate of this research station is to undertake basic and applied research and extension activities for enhancing crop productivity, profitability and sustainability of agricultural production in zone-V. There is a research farm of 105 ha, out of which 92 ha is under cultivation. There are 13 AICRPs and 5 voluntary centers along with State Non plan schemes and adhoc research projects are running at this station.

Mechanized Agriculture Farm Ummedganj, Kota

Mechanized Agriculture Farm Ummedganj, Kota is located in agro-climatic zone-V on Kota kaithoon road at a distance of 16 km from Kota city and having gross area of 484 ha. Out of which about 280 ha is under cultivation. Presently, this farm is used for producing quality seed of different crops like soybean, mungbean, urdbean, sesame & paddy in *kharif* season and wheat, gram, mustard, linseed, lentil, pea, coriander & fenugreek in *rabi* season. This farm has been producing breeder seed of different crops as per the indent received from Department of Agriculture Cooperation and farmers welfare, New Delhi. In addition to this, the farm is also producing foundation, certified and truthful level seed of different crops.

Agricultural Research Sub-Station, Aklera (Jhalawar)

Agricultural Research Sub-Station, Aklera (Jhalawar) is located on Jaipur-Jabalpur National Highway (NH 12), 6 km away from Aklera and having gross area of 42 ha. Out of which about 40 ha is under cultivation. The main research aim of this station is on dryland agriculture and seed production under *rainfed* conditions.

Agricultural Research Sub-Station, Khanpur (Jhalawar)

Agricultural Research Sub-Station, Khanpur (Jhalawar) is located on 45 km away from Baran city and having gross area of 52 ha. Out of which about 48 ha is under cultivation. The main research aim of this

station is to develop and validation of field and horticultural crops and seed production.

On-going Research Programmes

Research activities are funded by the state Government, Government of India, Indian Council of Agriculture Research and other public and private agencies. Currently, there are 15 centres of AICRP, aimed to address issues related to crop improvement, crop production, protection management of major crops, etc. Besides, there are 5 volunteer centres of the ICAR, one scheme of IMD (GKMS) and one adhoc research schemes (MIDH), EPBS pulse project funded by the ICAR, one ATMA project, one BRNS project, 20 projects funded under RKVY and 50 Private sponsored projects, etc. are in operation at various units of the university.

Extension Education

Extension education is one of the three major functions of the Agriculture University, Kota. The responsibility for planning, organizing, conducting and coordinating the extension education activities of the university lies with the Directorate of Extension Education. Its main aim is to transfer the well proven/tested technology to the farmers (males and females), livestock owners, rural youth, field staff of State Govt. and other personnel engaged in developmental and professional agencies in the sphere of agriculture, animal husbandry, horticulture, home agencies and other allied areas through its well planned, skill-oriented and need based programmes. An excellent collaboration/ linkage is maintained with the Rajasthan State Govt. Department of Agriculture, Horticulture, Animal Husbandry, Social Welfare (Woman and Child Development) etc. and non-government organization so that technologies may reach to the beneficiaries at their door steps. The approach is educational with major emphasis on whole farm and family development. Since its inception the university has conceived and implemented a unique system of extension education for transfer of technology to its ultimate users. The Directorate acts as bridge between the research scientist and the farmers and other beneficiaries to provide feedback, therefore, the role of the Directorate is twofold, i.e., transfer of technologies from scientists to the ultimate clients through field functionaries and to find out the problems of the field to be passed on to various research departments for working on a solution to the problem.

The Directorate of Extension Education is the nodal agency of Agricultural University, Kota for promoting agricultural development in its service area through quick transfer of technology by providing training, consultancy and farm information to line departments' professional extension personnel and farmers. It also involves the assessment, refinement and adoption of technology through on-farm testing and front-line demonstrations. The directorate provides guidelines, monitors and evaluates the extension programs of Krishi Vigyan Kendras (KVKs) functioning under University. The directorate also extends its support to the state departments through disseminating farm information by publishing literature on different agricultural disciplines and related subjects. The directorate has a team of multi-disciplinary scientists who work in participatory mode in close coordination with the Department of Agriculture, Animal Husbandry, Horticulture, Forestry, Cooperatives, Panchayat Samities and other agencies engaged in the betterment of rural people. Agricultural University, Kota caters the needs of the farming community and has been playing a vital role for socio-economic development particularly in six districts in the jurisdiction area.

Krishi Vigyan Kedras are the functional arms of directorate. There are six Krishi Vigyan Kendra functioning with directorate of Extension Education located at Kota, Bundi, Anta (Baran), Jhalawar, Swai Madhopur and Hindaun (Karauli). All the six KVKs of AU, Kota are well equipped with office, training hall, farmer's hostel, model instructional cum demonstration farm, agricultural equipments and implements including plant health clinic, weather forecast units, demonstration cum vocational units, transportation facilities, etc. The Krishi Vigyan Kendras have played a very important and crucial role in technology dissemination among the farming community. All KVKs are working towards reducing the time lag between generation of technology at the research institution and its application to the location specific farmer fields for increasing production, productivity and net farm income on a sustainable basis. The work done by these KVKs also reflects in receipt of "Pandit Deendayal Upadhyay Rashtriya

Krishi Vigyan Protsahan Puraskar -2016 to KVK Kota and 2018 to KVK Bundi and Cash Less award to KVK, Kota 2016-17 and many other awards to extension scientists of KVKs and progressive farmers. The progressive farmer of KVK Jhalawar Sh. Hukum Chand Patidar received Padam Shree award and number of quality publications including research papers, success stories, extension bulletins, technical bulletins and publication of Krishi Abhinav quarterly magazine.

Live demonstration units at KVKs

KVKs have developed different live demonstration units such as model dairy, food processing & value addition, vermi-compost, model nursery, mother orchard, bio- pesticide, beekeeping, azolla, napier grass, goat, poultry, mineral mixture for imparting skill-oriented trainings to rural and unemployed youths for profitable enterprises and horizontal expansion of these activities in the district. The details of live and other demonstration units at different KVKs are as under :

- **Food processing & value addition unit:** A model food processing and value addition unit has been established under RKVY at KVK, Kota for providing trainings on processing & value addition of soybean, garlic, aonla and other different fruits, vegetables and food materials.
- **Model nursery:** All KVKs are having model/small nursery along with mother orchards for producing genuine planting material of papaya, mango, guava, sapota, pomegranate, lime, ornamental plants, vegetables and plants made available to the farmers.
- **Vermicompost unit:** All KVKs have developed good vermicompost units for imparting practical training and providing vermiculture to farmers for promotion of vermicompost production and organic farming.
- ***Trichoderma* production unit:** To promote oraganic bio-agents, a *Trichoderma* production unit is working at KVK Kota which provides quality *Trichoderma veride* bio fungicide for expermental purpose.
- **Plant health clinic:** Plant health clinics has been established at KVKs for diagnosis of different disease and insect infested plant samples received from farmers. Plant protection scientist available at KVK sanalyses the sample and suggest proper remedial measures.
- **Model dairy units:** Dairy units of cows/goats are established at KVK Kota and Bundi. These units are being used for imparting scientific animal husbandry skill training programmes and demonstrations. Large number of KVK trained farmers established good dairy and milk processing units and earning their livelihoods.
- **Azolla unit:** *Azolla* units have been established at the KVKs of this university for popularising Azolla as nutritious animal feed in the area.
- **Water harvesting structures:** Farm ponds and roof water harvesting are the best ways for harvesting rain water. Farm ponds have been constructed at KVK *Jhalawar*, *Bundi*, *Sawai Madhopur* & *Karauli* and roof water harvesting structures constructed at KVK, *Baran and Sawai Madhopur.* These structures are being not only used for life saving irrigation but also played important role in recharging ground water in the vicinity.
- **Crop technology cafeteria:** To demonstrate the performance of latest varieties & techniques of major crops by establishing crop cafeteria during kharif as well as rabi seasons. Visiting farmers are well convinced with the performance of the new varieties in comparison with existing varieties. This also helps in varietal replacement and adoption of new technology. Some new crops like quinoa, chia and chandrasoor are also demonstrated in cafeteria for crop diversification.
- **Beekeeping:** Under Integrated farming system, beekeeping plays an important role to enhance the income of farmers directly by production of honey and bio-products and indirectly by increasing production of various crops through pollination. Beekeeping units have been established at KVK, Kota and Baran.
- **Pulse seed hub units**: KVK Kota, Bundi and Jhalawar have established seed processing and storage unit under pulse seed hub project. Under these pulse seed hub the seeds of green gram, black gram in Kharif, gram and lentil in Rabi were produced. KVK Kota, Bundi and Jhalawar got appreciation letter from ADG (AE), ICAR, Delhi

for completing the structure and establishing processing unit well in time and achieving the target of pulse seed production. Considering the better performance of pulse seed hubs, a oilseed hub is sanctioned to KVK Kota with a budget out lay of 1.5 crore.

- **Other units**: KVKs are also having micro irrigation systems with solar pumps, super/Nadep compost, organic waste de-composer and bio-pesticides units. These units are being used for training and demonstration to the visiting farmers.

Teaching

Education is one of the three major functions of the Agriculture University, Kota. In order to sustain, diversify and realize the potential of agriculture sectors, University imparts education in agriculture and its allied sciences so as to provide human resource for meeting the future challenges. It imparts education at the level of degree, master's and doctoral level. University has two constituent colleges namely College of Horticulture and Forestry, Jhalawar and College of Agriculture, Kota. *SCRS Govt. College, Sawai Madhopur and* Mata Bhagwati Devi, Dev Sanskriti Mahila Krishi Mahavidhalaya, Siswali district Baran in Rajasthan are affiliated to Agriculture University, Kota.

College of Horticulture and Forestry, Jhalawar

The College of Horticulture and Forestry located at the historical city of Jhalarapatan near Jhalawar. It was established in July 2004. It is a first of its kind in the state which offer under-graduate and post-graduate education in horticulture and forestry. The intake capacity of college in UG programme is 55 and 30 in horticulture and forestry respectively. While in PG programme 17 students in horticulture (5 each in Fruit Science, Vegetable Science and Floriculture & Land Scaping and 2 in Post - harvest Technology) and 5 in forestry are admitted through pre-PG test every year. From 2017 Ph. D programme has also started in Department of Fruit Science with intake of 3 students. The college operates through 10 departments' viz., Department of Fruit Science, Vegetable Science, Floriculture and Landscaping, Post harvest and technology, Plant Protection, agro forestry and Silviculture, forest Products and Utilization, forest Biology and Tree Improvement, basic Science and Natural Resource Management. The campus is spread over an area of 135 ha comprising of administrative building, various department, hostels, play grounds, protected cultivation unit and instructional farms.

College of Agriculture, Ummedganj, Kota

College of Agriculture is the second constituent college of Agriculture University, Kota and situated at countrywide well-known education city -Kota (Rajasthan) with a multicultural, socially diverse and geographically dispersed student population. College provides equal opportunities to students for achieving excellence in academics, cultural, sporting, civic, leadership and social endeavours, in an inclusive environment that supports learning and teaching since its inception. Its educational atmosphere characterised by a quest of all-round high realization, a focus on tertiary preparation, diversity in student programs and high-quality outcomes with attainment of ultimate goal. Excellent performance is not an exception but an expectation to build greater engagement by the wider community – school staffs, students, and parents with the college by recognising and rewarding triumph.

In this academic year (2019-20) 70 students admitted (45 on Normal & 15 on Payment seats & 10 on Merit basis) in B.Sc. (Hons.) Ag., 30 students for M.Sc. (Ag.) in different disciplines including Agronomy (5), Genetics & Plant Breeding (5), Plant Pathology (4), Soil Science & Agricultural Chemistry (4), Entomology (4) Horticulture (4) and Agricultural Extension & Communication (4) through state level Joint Entrance Test. Moreover, seven students got admission in Doctoral degree Programme, two each in Department of Agronomy, Genetics & Plant Breeding and Plant Pathology. However, Sh. B.L. Meena (Assistant Professor, GPB, ARS, Kota) was enrolled in Genetics and plant breeding as an in-service candidate.

University Farms

There is 964.35 ha land area under different units of University Viz. research farms 683 ha KVKs 146.35 ha and college farm 135 ha for experimental trials, student practical's and production of quality breeder and certified seed of improved varieties of major crops.

Quality Seed Production

Seed is the basic and vital input for enhancing agricultural production as the potential of other inputs

like irrigations, fertilizers, pesticides also depends upon the quality of seed used. If seed quality will not be good, we can't imagine good production. University has made untiring efforts in breeder seed production of different crops to make it available to the seed producing agencies for further multiplication and for higher production. Quality seed of different crops namely soybean, rice, urdbean, mungbean, wheat, chickpea, coriander, fenugreek, pea, linseed and mustard being produced at different university farms. The seed has been made available to different government agencies, NGOs' and farmers. Availability of quality seed in such a huge quantity made a significant impact on productivity of different crops in the area. University also produced truthful labelled (TFL) quality seed of different crops like soybean, urdbean, mungbean, paddy, wheat, chickpea, mustard, linseed, fenugreek etc. and made it available to the farmers.

Soil Health Card and Its Importance

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Soil Health Card scheme launched during February, 2015 at Ganganagr, Rajasthan. SHC is a printed report that a farmer will be handed over for each of his holdings. It will contain the status of his soil with respect to 12 parameters, namely N, P, K (Macro-nutrients); S (Secondary-nutrient); Zn, Fe, Cu, Mn, B (Micro-nutrients); and pH, EC, OC (Physical parameters). Based on this, the SHC will also indicate fertilizer recommendations and soil amendment required for the farm.

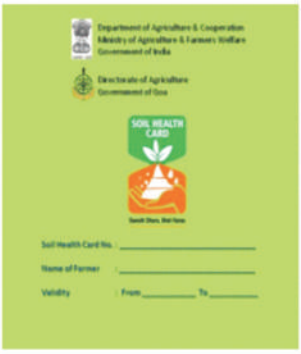
The card will contain an advisory based on the soil nutrient status of a farmer's holding. It will show recommendations on dosage of different nutrients needed. Further, it will advise the farmer on the fertilizers and their quantities he should apply, and also the soil amendments that he should undertake, so as to realize optimal yields. It will be made available once in a cycle of 2 years, which will indicate the status of soil health of a farmer's holding for that particular period. The SHC given in the next cycle of 2 years will be able to record the changes in the soil health for that subsequent period.

Soil samples will be drawn in a grid of 2.5 ha in irrigated area and 10 ha in rain- fed area with the help of GPS tools and revenue maps. The State Government will collect samples through the staff of their Department of Agriculture or through the staff of an outsourced agency. The State Government may also involve the students of local Agriculture / Science Colleges.

Soil Samples are taken generally two times in a year, after harvesting of *rabi* and *kharif* crop respectively or when there is no standing crop in the field. Soil Samples will be collected by a trained person from a depth of 15-20 cm by cutting the soil in a "V" shape. It will be collected from four corners and the center of the field and mixed thoroughly and a part of this picked up as a sample. Areas with shade will be avoided. The sample chosen will be bagged and coded. It will then be transferred to soil test laboratory for analysis.

The soil sample will be tested as per the approved standards for all the agreed 12 parameters in the following way:

1. At the STLs owned by the Department of Agriculture and by their own staff.
2. At the STLs owned by the Department of Agriculture but by the staff of the outsourced agency.
3. At the STLs owned by the outsourced agency and by their staff.
4. At ICAR Institutions including KVKs and SAUs.
5. At the laboratories of the Science Colleges / Universities by the students under supervision of a Professor / Scientist.


Soil Health Card No. _____
Name of Farmer _____
Validity From _____ To _____

SOIL HEALTH CARD		Name of Laboratory	
Farmer's Details			
Name			
Address			
Village			
Sub-District			
District			
PIN			
Aadhaar Number			
Mobile Number			
Soil Sample Details			
Soil Sample Number			
Sample Collected on			
Survey No.			
Khasra No. / Dag No.			
Farm Size			
Geo Position (GPS)	Latitude:	Longitude:	
Irrigated / Rainfed			

SOIL TEST RESULTS

S. No.	Parameter	Test Value	Unit	Rating
1	pH			
2	EC			
3	Organic Carbon (OC)			
4	Available Nitrogen (N)			
5	Available Phosphorus (P)			
6	Available Potassium (K)			
7	Available Sulphur (S)			
8	Available Zinc (Zn)			
9	Available Boron (B)			
10	Available Iron (Fe)			
11	Available Manganese (Mn)			
12	Available Copper (Cu)			

Secondary & Micro Nutrients Recommendations		
Sl. No.	Parameter	Recommendations for Soil Applications
1	Sulphur (S)	
2	Zinc (Zn)	
3	Boron (B)	
4	Iron (Fe)	
5	Manganese (Mn)	
6	Copper (Cu)	
General Recommendations		
1	Organic Manure	
2	Biofertiliser	
3	Lime / Gypsum	

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Fertilizer Recommendations for Reference Yield (with Organic Manure)						
Sl. No.	Crop & Variety	Reference Yield	Fertilizer Combination-1 for N P K		Fertilizer Combination-2 for N P K	
1	Paddy (Dhaan)					
2						
3						
4						
5						
6						

Trichodermaviride: A Boon to Plant Disease Management in South Eastern Rajasthan

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Trichodermaviride can thrive in diverse environmental conditions as aggressive colonizers of soil and the roots of plants and act as natural bioagent to protect plants from infection by soilborne fungal pathogens. It is found naturally in soil and is effective as a seed dressing in the control of seed and soil-borne diseases. It has been shown to provide protection against such soil borne pathogens as *Sclerotium*spp., *Fusarium*spp. *Rhizoctonia*spp., *Pythium*spp. and *Macrophomina* spp. When it is applied at the same time as the seed, it colonizes the seed surface and kills not only the pathogens present on the cuticle, but also provides protection against soil-borne pathogens. This is known for its protective function in different plants and is now exploited in agriculture as a natural biocontrol agent against various soil-borne diseases. *Trichodermaviride* reported the capability of inhibiting the growth and its aflatoxin production of *A. flavus* (Calistru et al., 1997). In fact, the fungi kingdom has approximately 20 known species of Trichoderma which produce enzymes. They are isolated from soil, decomposing plants and air. Trichoderma actually produces a great number of extracellular enzymes, many of which are applied in biotechnology. *Trichodermareesei, Trichodermaviride, Trichodermaatroviride, Trichodermavirens, Trichodermaharzianum, Trichodermalignorum,* and *Trichodermalongibrachiatum* are the best known. It has been well established that microbes closely associated with plant roots can directly influence plant growth and development, and this ability has been reported for Trichoderma species for many years. For example, Lindsey and Baker (1967) reported a significant increase in the height (28%) and weight (8%) of dwarf tomato plants grown in sterile conditions after treatment with *Trichodermaviride*.Early blight of potato caused by *Alternariaalternata* is one of the major diseases causing considerable yield loss. Efficacy of bio-agents was studied and revealed that the four Trichoderma species significantly reduced the mycelial growth of the pathogen over the control by dual culture method. Significantly maximum inhibition of mycelial growth was obtained with *T. viride* followed by *T. azospirillum*, *T. harzianum* and *T. virens* of the pathogen after 48 hours of incubation (Meena, et al. 2020). Seed biopriming application of *T. viride*along with soil application of *T. viride* enriched FYM @ 100g/m^2 resulted in higher seedling emergence of 97.0% and highest vigour index of 3496.0, followed by seed biopriming application of *T. viride*alonewith seedling emergence of 96.0% and high vigour index of 3235.2 (Pratik et al. 2016). Rajput et al. (2010) reported *Trichodermaharzianum* to be most effective under biological seed treatment on chickpea inhibiting *Fusariumoxysporum*f.sp. *ciceri (*63.23%) and *Sclerotiumrolfsii* (86.00%) maximum seedling vigour index (1866.0) was observed in seed treatment with *T. viride*.

Mechanism of Trichoderma

- It is known that the Trichoderma-based biocontrol mechanisms mainly rely on mycoparasitism, production of antibiotic and/or hydrolytic enzymes, competition for nutrients, as well as induced plant resistance; numerous secondary metabolites produced by Trichoderma species could directly inhibit the growth of several plant pathogens. These mechanisms may act directly or indirectly against the targeted plant pathogen.
- Mycoparasitism is a direct mechanism for biological control that works by parasitizing, detecting, growing, and colonizing pathogen.
- It was also reported that the application of *Trichoderma*spp. to cucumber or tomato seedlings increased the concentration of trace and essential elements such as Fe, Zn, Cu, Mn, Mg, Ca, N, P, K, and Na both in the shoots and roots.
- The application of *Trichoderma* spp. results in significant vegetative growth on a wide range of crop plants.

Interaction between *Trichoderma* spp. and the plant triggers enhanced immunity against plant diseases, thus improving plant health. Plant growth enhancement is evidenced by the increase in productivity, nutrient uptake, biomass, resistance to stress, and improvement of plant health.

- *Trichoderma* spp. were reported to induce the synthesis of regulatory proteins in plants especially under certain disease stress, where these regulatory proteins detect microbe effectors and activate the plant's defense systems.
- *Trichoderma*spp. are rich and important sources of secondary metabolites (SMs) used for biological control of plant diseases. It was reported that antibiosis occurs during the interactions between a host plant, pathogens, and *Trichoderma* spp. that resulted in the production of antibiotics and low-molecular-weight compounds by Trichoderma to inhibit the growth of phytopathogenic fungi.

Benefits of *Trichoderma*

- **Disease Control:**Trichoderma is a potent biocontrol agent and used extensively for soil borne diseases. It has been used successfully against pathogenic fungi belonging to various genera, viz. *Fusarium, Phytopthara, Scelerotia, Rhizoctonia, Pythium* and *Macrophomina.*
- **Plant Growth Promoter:**Trichoderma strains solubilize phosphates and micronutrients. The application of Trichoderma strains with plants increases the number of deep roots, thereby increasing the plant's ability to resist drought.
- **Biochemical Elicitors of Disease:**Trichoderma strains are known to induce resistance in plants. Three classes of compounds that are produced by Trichoderma and induce resistance in plants are now known. These compounds induce ethylene production, hypersensitive responses and other defense related reactions in plant cultivars.
- **Transgenic Plants:** Introduction of endochitinase gene from Trichoderma into plants such as tobacco and potato plants has increased their resistance to fungal growth. Selected transgenic lines are highly tolerant to foliar pathogens such as *Alternariaalternata, A. solani*, and *Botrytis cirerea* as well as to the soil-borne pathogen, *Rhizectonia* spp.
- **Bioremediation:** Trichoderma strains play an important role in the bioremediation of soil that are contaminated with pesticides and herbicides. They have the ability to degrade a wide range of insecticides: organochlorines, organophosphates and carbonates.

Compatibility of *Trichodermaviride* with Fungicides

T. viride is completely incompatible with carbendazim 50%WP, propiconazole 25%EC and hexaconazole 5%EC even at 50 ppm concentrations and found lethal. *T. viride* is compatible with Mancozeb 75%WP upto 50 ppm. With thiram 75%WP and chlorothalonil 75%WP *T. viride* is more than 70 % compatible upto 100 ppm. Growth of Trichoderma is inhibited greatly by Tridemorph and thiophanate methyl at 50 ppm concentration and showed its incompatibility with these fungicides (Kumar et al. 2019).

Method of application :

- **Seed treatment:** Mix 6 - 10 g of Trichoderma powder per Kg of seed before sowing.
- **Nursery treatment:** Apply 10 - 25 g of Trichoderma powder per 100 m^2 of nursery bed. Application of neem cake and FYM before treatment increases the efficacy.
- **Cutting and seedling root dip:** Mix 10g of Trichoderma powder along with 100g of well rotten FYM per liter of water and dip the cuttings and seedlings for 10 minutes before planting.
- **Soil treatment:** Apply 5 Kg of Trichoderma powder per hector after turning of sun hemp or dhainch into the soil for green manuring. Or Mix 1kg of Trichoderma formulation in 100 kg of farmyard manure and cover it for 7 days with polythene. Sprinkle the heap with water intermittently. Turn the mixture in every 3-4 days interval and then broadcast in the field.
- **Plant Treatment:** Drench the soil near stem region with 10g Trichoderma powder mixed in a liter of water.

Table 1:Management of plant diseases of cereals by *Trichodermaviride*

Crop	Disease	Pathogens	Mode of application
Rice	Banded blight	*R. solani*	Seed, Soil, Seedling treatment
	Bunt	*Neovossiaindica*	Seed treatment
	Brown spot	*Drechsleraoryzae*	Seed treatment
	Sheath blight	*R. solani*	Soil treatment, seed treatment and foliar spray
Sorghum	Seed pathogens	*A. flavus, A. niger, Alternaria alternata,*	Seed treatment
Wheat	Karnal bunt	*Neovossiaindica*	Seed treatment
	Loose smut	*Ustilagosegatumtritici*	Seed treatment

Table 2: Management of plant diseases of pulses by *Trichodermaviride*

Crop	Disease	Pathogens	Mode of application
Black gram	Dry root rot, Damping-off	*Macrophominaphaseolina Sclerotiumrolfsii*	Seed treatment
Chickpea	Wilt, Seed rot, Root rot, Collar rot	*F. oxysporum* f. sp.*ciceris, S. rolfsii, R. solani R. bataticola M. phaseolina*	Seed & Soil treatment
Cowpea	Root rot, wilt	*M. phaseolina Fusariumoxysporum*f. sp.*tracheiphilum*	Seed & Soil treatment
Mung bean	Root rot	*M. phaseolina*	Seed & Soil treatment
Pea	White rot	*Sclerotiniasclerotiorum*	Soil treatment
Pigeonpea	Wilt	*F. udum*	Seed & seedling treatment
Soybean	Root rot	*M. phaseolina*	Soil treatment

Table 3: Management of plant diseases of oilseed crops by *Trichodermaviride*

Crop	Disease	Pathogens	Mode of application
Groundnut	Collar rot, Root rot, Crown rot	*A. flavus, S. rolfsii, A. niger*	Seed treatment Soil treatment
Mustard	Damping off	*Pythiumaphanidermatum,*	Seed & Soil treatment
Safflower	Root rot	*M. phaseolina*	Soil treatment
Sesamum	Root rot	*M. phaseolina*	Seed & Soil treatment
Soybean	Root rot	*M. phaseolina*	Soil treatment
Sunflower	Root/collar rot	*Sclerotium rolfsii, R. solani, S. sclerotiorum*	Seed treatment

Table 4: Management of plant diseases of commercial crops by *Trichodermaviride*

Crop	Disease	Pathogens	Mode of application
Cotton	Seedling disease	*R. solani*	Seed treatment
	Root rot	*M. phasiolina*	Seed treatment
Sugarcane	Root rot	*Pythiumgraminicola*	Soil treatment
	Red rot	*Colletotrichumfalcatum*	Soil treatment and Spray
	Wilt	*F. moniliformae*	Set treatment
Tobacco	Damping off	*Pythiumaphanidermatum*	Seed treatment Nursery bed treatment

Table 5: Management of plant diseases in vegetable crops by *Trichodermaviride*

Crop	Disease	Pathogens	Mode of application
Cabbage	Damping off	*Rhizoctoniasolani*	Seed treatment
Chilli	Root rot	*S. rolfsii*	Soil treatment
Egg plant	Wilt,damping off	*F.solani, Pythiumaphanidermatum*	Seed & Soil treatment

Cluster bean	Collar rot	*Sclerotiniasclerotiorum*	Soil treatment
Melon	Collar rot	*R. bataticola*	Seed treatment
Mung bean	Root rot	*M. phaseolina*	Seed & Soil treatment
Potato	Black-scurf	*R. solani*	Tuber treatment
Tomato	Damping off	*Pythiumindicum*	Seed & soil treatment

Table 6: Management of plant diseases in Fruit crops by *Trichodermaviride*

Crop	Disease	Pathogens	Mode of application
Citrus (Mandarin)	Root rot	*Phytophthora nicotianae* pv. *parasitica, P. colocasiae*	Soil treatment
Mango	Fruit rot	*Lasiodiplodiatheobromae, Rhizopusarrhinus*	Fruit treatment
Orange	Blue mould	*Penicilliumitalicum*	Fruit dip
Passion fruit	Collar rot	*R. solani*	Seed treatment

Precautions :

- Don't use chemical fungicide after application of Trichoderma for 4-5 days.
- Don't use Trichoderma in dry soil. Moisture is an essential factor for its growth and survivability.
- Don't put the treated seeds in direct sun rays.
- Don't keep the treated FYM for longer duration.

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Role of Microbes in Eco-Intensification for Sustainable Agriculture

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Increase in food production is required for fulfilment of food needs of growing population. For that, framers throughout the world applying chemical agri-inputs in unjustified manner. Therefore, the production is increasing but the quality of food and environmental balance is reducing significantly. The ecological balance of soilmicrobes have been disturbed due to excess use of chemicals. Similarly, uncontrolled use of chemical pesticides also negatively affected non-targeted microbes or induce their tolerance towards chemical pesticides.

Ecological intensification is the process of management of natural resources and conservation of biodiversity to improve agricultural production. Soil microbes play a significant role in ecological balance of various bio-geochemical processes. The balance in such biogeochemical processes not only maintain the soil health but also conserve environmental sustainability. Soil microbial flora also play active role in nutrient cycling, erosion control and pest and pathogen regulation. Organic farming support the growth and conservation of soil microbial flora. It has been reported that organic farming filed has 32 to 84% more microbial biomass containing carbon and nitrogen, phospholipid fatty acid, dehydrogenase, ureases and protease enzymatic activities in comparison to conventional farming (Lori et al., 2017). Organic farming helpful in reducing biodiversity losses, soil degradation and nutrient leakage, which not only support the microbial flora but simultaneously manage environmental balance of the field and improve soil fertility.

Currently, only one percent of farmers in the globe is applying such practices and spreading of awareness around the globe about eco-intensification through organic farming is need of the hour to maintain soil biodiversity for healthy and fertilesoil. Many soil microbes have been shown their utility as plant growth promotion microbes (PGPMs) and further divided into nitrogen fixer, phosphate solubilizers/mobilizers, composting and bio-pesticide (Pathak and Kumar,2016). Such microbes interact with plants and their surrounding soil and ease nutrient availability to the plants and others microbes by various biochemical activities. The microbial consortium with various functionality strongly support plant growth and agroecosystem (Reddy and Saravanan, 2013). Microbes such as *Rhizobium, Azotobacterchroococcum*, *Azospirillum*, *Bacillus megaterium, Paenibacillus, Bradyrhizobium, Pseudomonas, Penicillium, Aspergillus* have been using in nitrogen fixation or phosphate solubilisation or mobilization in the various countries from long back. Nitrogen and phosphorus are among the main nutrient requirement of plants which involved in shoot and root development, plant maturity, seed production, energy transfer, photosynthesis and cell division (Krishnaraj andDahale, 2014). Similarly, root associated microbes such as mycorrhizae also promote plant roots to acquire nutrients by solubilisation of complex substance. Microbes also involved in degradation of organic matter and increase humus content in soil, which improve the soil fertility.

The role of microbes in various activities of soil fertility make them more promising agents for sustainable agriculture but still, the role of microbial consortium in various habitats and weather conditions at local level is unknown and need to explore for novel species. Therefore, conservation of soil biodiversity is necessity in present agricultural practices to maintain food quality and sustainability.

Nutrient Management Through Foliar Application

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Six important pillars (Soil; water; agriculture inputs i.e. seed, fertilizer & insecticides; peasant; climate and farm tools/mechanizations) in modern agriculture in which nutrient management is important pillar and agriculture input in agriculture system. Nutrients are elements which are essential in providing healthy and vigorous plants. They initiate all processes vital for crop growth and development. Therefore, the plant needs nutrients throughout its growing cycle. Plant nutrients are available throughout country and world level in various forms and nutrient ratios. Among the various plant nutrients, whether based of organic or mineral composition, they all can be applied to crops in two ways, such as soil application and foliar application.

The purpose of foliar feeding is not to replace soil fertilization. Supplying a plant's major nutrient needs (N, P & K) is most effective and economical via soil application. However, foliar application has proven to be an excellent method of supplying plant requirements for secondary nutrients (Ca, Mg and S) and micronutrients (Fe, Zn, Cu, Mn, B, and Mo). Early foliar applications can make an already good crop better, either by stimulating more vigorous regrowth or maximizing the yield potential growth stage period.

Soil application of granular plant nutrients and fertilizers is the most widespread methods of feeding the plants. Farmers use this fertilization type to apply nutrients before and during the seedbed preparation practices as well as for supplementary feeding. Granular and powder form fertilizers have many positive effects on plant growth and development, but sometimes they are not enough to provide healthy crop development. For that reason, farmers may apply crop nutrients by foliar application. Since plants take in nutrients more efficiently through plant stomata or pores on their leaves than through the root, foliar fertilization is a great way to rapidly boost plant growth. Foliar nutrient sprays are often applied as mixtures of plant nutrients with compatible adjuvants. Adjuvant acts as a sticker, thus check & preventing the leaking and washing off of spray solution from the plant parts.

The 4R's of nutrient stewardship provides a framework to achieve cropping system goals, such as increased production & productivity, increased farmer profitability, enhanced environmental protection and improved sustainability. The 4R's of nutrient stewardship, or nutrient management, are commonly referred to when talking about proper nutrient application. The 4R's stand for right source, right rate, right time, and right place and serve to guide farmers to the management practices that help keep nutrients on and in the field.

The application of foliar spray is a good agriculture practices and nominee of 4R's of nutrient stewardship. If farmers community were not applied proper dose of fertilizers before sowing of crop than the foliar application is best practice of fertilization. But right time of fertilization is very important aspect in modern farming because the requirement of nutrient element is directly depends on different stages of crop growth and development.

Definition of foliar fertilization: The application of foliar sprays of one or more mineral nutrients to plants to supplement traditional soil applications of water soluble fertilizers. It is a simple nutrient corrective technique used in crops during the growth cycle when soil application is ineffective, impossible, or expensive. Foliar feeding is a technique of feeding plants by applying water soluble and liquid fertilizer directly to their leaves and aerial parts of plants. Plants are able to absorb essential elements through their leaves. The absorption takes place through their stomata and also through their epidermis of leaves. It is the application of fertilizers to foliage of the crop as spray solution is known as foliar spray.

This method is suitable for application of small quantities of fertilizers, especially micronutrients. Major nutrients can also be applied by this method when there is no adequate moisture in top layer of soil. Foliar application is not substitute for soil application, but only a supplement to it. More recently, foliar feeding has been widely used and accepted as an essential part of crop production, especially on horticultural crops. Although not as

widespread on agronomic crops, the benefits of foliar feeding have been well documented and increasing efforts have been made to achieve consistent responses.

Mechanism of foliar fertilization:

In order for a foliar fertilizer nutrient to be utilized by the plant for growth, it must first

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- In order for a foliar fertilizer nutrient to be utilized by the plant for growth, it must first gain entry into the leaf prior to entering the cytoplasm of a cell in the leaf.
- To achieve this nutrient must effectively penetrate the outer cuticle and the wall of the underlying epidermal cell.
- Once penetration has occurred, nutrient absorption by the cell is similar to absorption by the roots. All the components of the pathway of foliar applied nutrients, the cuticle offers the greatest resistance.

Right time of foliar application: This is one of the most critical aspects of a foliar application and feeding program. Foliar applications should be timed to provide needed nutrients during the yield potential determining time frame of plant development, which will in turn favourably influence the post reproductive development stages. Multiple, low rate applications may show the most favourable responses within these time frames, whether a crop is nutritionally sound or not. Careful crop growth stage monitoring on a weekly, and sometimes a daily basis, is essential. The need for foliar application of plant nutrients occurs when there is a lack of a particular nutrient in the soil or when plant roots are not able to absorb the required amounts of nutrients needed due to unfavorable conditions. Since plants are not able to tell us when they have the lack of nutrients, they have developed specific way to show us though. When the lack of nutrients happens, plants show visual symptoms and certain growth disorders including: Reduced height & vegetative growth, leaf discoloration and reduced root growth.

Visual symptoms can often be confused with a pest attack or abiotic symptoms, such as drought, poor drainage, or soil salinity. However, a farmer needs to have a lot of experience and farm knowledge to be able to diagnose and manage correctly.

Generally speaking, crops that are nutritionally sound will be most likely to respond to foliar feeding. This is due to better tissue quality (allowing for maximum absorption of nutrients into leaf and stem) and better growth vigour (allowing for translocatable nutrients to be rapidly moved to the rest of the plant). Crops under heat or moisture stress show less response to foliar applications due to lower leaf and stem absorption rates and/or poor vigour. However, foliar feeding does benefit crop performance and yield if an application was made prior to heat or moisture stress. Recovery from cold growing conditions and herbicide stress can be hastened with proper foliar applications. Good recovery of corn suffering from light to moderate hail damage has been shown where N-S solutions were foliar applied. Under most conditions, however, due to the practical and economic limitations on the amount of nutrients that can be foliar applied to give a favourable growth response, foliar feeding has a limited rescue capability.

Environmental influences, such as time of day, temperature, humidity and wind speed influence the physical and biological aspects of foliar applications. Plant tissue permeability is an important factor in absorption of nutrients into the plant: warm, moist and calm conditions favour highest tissue permeability, conditions found most often in the late evening hours, and occasionally in the early morning hours. Table summarizes meteorological conditions favouring foliar applications.

Foliar feeding:- desirable characteristics:

1. **Solubility**: foliar fertilizers should be able to either dissolve or suspended in water and contain an active ingredient chemical compound as salts, chelates or complexes of mineral nutrients.
2. **Molecular weight & size:** foliar fertilizer must contain low molecular weight or molecules of smaller size in order to have higher penetration of leaf cuticle.
3. **Solution pH:** solution pH should be adjusted for better activity of nutrient and to prevent the scorching or burning effects.

4. **Form of nutrients:** The absorption rate of ammonium ions into the leaves is faster than that for nitrate ions. Urea has higher leaf penetration than other inorganic N fertilizers. KCl fit for use for soil fertilization but unfit for foliar application due to its rapid crystallization over leaf surface.

Fertilizer materials :

1. **Nitrogen materials:** Urea is the most suitable nitrogen source for foliar applications, due to its low salt index and high solubility in comparison to other nitrogen sources. Urea has been shown to stimulate absorption of other nutrients by increasing the permeability of leaf tissue. However, the urea utilized in foliar sprays should be low in biuret content (0.2 percent or less) to lessen urea foliage burn side effects. Urea formulated in today's urea-containing solutions and feed grade products is low enough in biuret to provide no hazard for plants. Other sources of nitrogen can be obtained from ammonium polyphosphates, ammoniated ortho-phosphates (liquid) and ammonium thiosulfate (12-0-0-26S). These sources, when utilized at low foliar rates, are excellent supplemental nitrogen carriers with no/minimal foliage burn side-effects.
2. **Phosphorus materials:** A combination of poly and ortho-phosphates has been shown to lessen leaf burn and aid in leaf phosphate absorption. Secondarily, the polyphosphate advantage may also be due to supplying both ortho and polyphosphate forms simultaneously
3. **Potassium materials:** Depending on availability, potassium polyphosphates are an excellent source of low salt index, highly soluble potassium. Potassium sulfate is suitable also, having a low salt index, but a rather low solubility. Potassium hydroxide, potassium nitrate and potassium thiosulfate sources combine both low salt index and high solubility characteristics.
4. **Secondary and micronutrient materials:** Foliar application of these nutrients (secondary nutrient: Ca, Mg and S; micronutrients: Fe, Zn, Mn, Cu, B, Cl and Mo) can be highly effective, but because of difficulties associated with leaf tissue absorption and translocation of some of these nutrients (notably calcium magnesium, iron, B and Mo), choosing the correct fertilizer sources for these nutrients becomes very critical. Chelate sources, while valuable for soil application, have been shown to be generally unfavorable for foliar application, because most chelating agents have a molecular size too large to be effectively absorbed by leaf tissue. Organic chelating agents (including citric and malic acids, amino acids and phenolic acids) have been shown to enhance secondary and micronutrient foliar absorption.
5. **Mixed & compound fertilizers:** NPK (18:18:18), NPK (19:19:19), Sulphate of potash or NPK (0:0:50), Urea phosphate (17:44:0), Potassium nitrate (13:0:45), Mono potassium phosphate (0:52:34) and Mono ammonium phosphate (12:61:0) are commonly used as foliar application by farmers community in crops, fruit and vegetables.

Table: Formulation of different solutions by solid & liquid compounds for foliar application

S. No.	Solution rate	Solid compound (gm/Ltr.)	Liquid compound (ml/Ltr.)
1.	0.1%	1	1
2.	0.2%	2	2
3.	0.3%	3	3
4.	0.5%	5	5
5.	1.0%	10	10
6.	1.5%	15	15
7.	2.0%	20	20

S. No.	Solution rate	Solid compound (mg/Ltr.)
1.	1 ppm	1
2.	5 ppm	5
3.	10 ppm	10
4.	20 ppm	20
5.	50 ppm	50
6.	100 ppm	100
7.	200 ppm	200

Advantages of foliar application: Foliar fertilization is a method of direct nutrient application onto the aerial parts of plant i.e. leaves. The foliar spray may contain supplemental doses of macro and micronutrients, plant hormones, stimulants, and other beneficial substances. Plants show very positive effects with this type of fertilization. Those effects include:

- It is a highly efficient and timely method of applying needed and/or critical plant nutrients.
- It helps in rapid utilization of applied nutrients and therefore rapid correction of observed nutrient deficiencies.
- It is a means of compensating for soil or environmentally induced nutrient deficiencies.
- Foliar spraying can be combined with other sprayings like insecticides.
- When the soil is deficient in nutrients foliar application is beneficial.
- When a quick growth response is desired foliar application can be sprayed.
- It will help during high fixation of P and K with micronutrients.
- Being highly effective for the immobilized nutrients in the soils, such as iron.
- Foliar spray can be applied when adverse condition like root rot disease, drought condition etc. were noticed in field. Higher resistance to physiological disorders, diseases and insect pests.
- Foliar spray can also be given when there is not adequate moisture in top soil to absorb the nutrients by plant roots.
- Only use small amounts of fertilizer i.e. micronutrients.
- Improved yield and yield quality parameters.
- Foliar spraying can be combined with other sprayings like insecticides
- When the soil is deficient in nutrients foliar application is beneficial
- When a quick growth response is desired foliar application can be sprayed
- It will help during high fixation of P and K
- Foliar spray can be applied when adverse condition like root rot disease, drought
- Foliar spray can also be given when there is not adequ
- Only use small amounts of fertilizer
- Improved yield and yield quality parameters
- Improved soil salinity tolerance and maintain soil health & quality.
- Providing faster responses with applied crop nutrients, only 3-4 days required.
- Better plant nutrient absorption at early crop growth stages, when plant roots are not well developed.

Limitations of foliar application: Despite many positive effects, foliar application, as a good farm practice, can also have certain disadvantages. Therefore, farmers have to pay attention prior to using this type of fertilization system. Otherwise, the following effects may occur or rise:

- It will cause scorching or burning effect if concentration of the spray is high. Possibility of foliar burn with high concentrations.
- It requires sticking agent to get more efficiency.
- The foliar application is **most successful for micronutrients**, whereas soil application is effective for both macro and micronutrients. Only small quantities of fertilizers can be applied through foliar application.
- Foliar application efficiency is depends on climatic conditions like temperature, humidity, wind velocity etc. The **wind is a major influence of the uniformity** of distribution of the nutrient solution. Hence, on a windy day care should be taken to avoid spraying.
- Cost of multiple applications can be prohibitive.
- The foliar applied nutrients will have a reduced influence on plant growth, unlike soil applied.

- ❖ To obtain good efficiency of spray leaf area should be large.

Precautions: Some precautionary measures to be followed during preparation of proper stock & working solution and application are given below:

Do's:

- ❖ Quantity need to be followed strictly as per the recommended rate. Adjust the appropriate solution concentration for spraying (The concentration of solution is very important when applying foliar fertilizer. Too high concentration, easy to burn the leaves of crops, too low concentration, not conducive to plant absorption, cannot meet the requirements of supplementary plant nutrients).
- ❖ Proper mixing of micronutrient fertilizers is required before spray
- ❖ Right stage of foliar application is amenable – After vegetative period (40-45 DAS).
- ❖ Time of spray must be carried out: at early morning 6-9 am or late evening (5-7pm) in cool air.
- ❖ Sprayer and its parts like spray nozzle, spray tank should be tide and clean.
- ❖ Spray solution should be transparent.
- ❖ Deficiency symptom of specific nutrient rectified by 3 spray or more

Don'ts:

- ❖ Don't spray before establishment of crop.
- ❖ Don't use any oxidized salts.
- ❖ Don't combine with water soluble macro nutrient fertilizers (i.e. Urea, DAP, etc).
- ❖ Don't mix with any herbicides (i.e. Glyphosate, etc) and plant growth regulators (PGRs).
- ❖ Don't spray in abnormal weather conditions (Rain and after noon hours when high temperature).

Good agricultural practices (GAP) to get the best out of foliar application :

The effect of foliar application on the plant is dependent upon species, fertilizer form, concentration, and frequency of application, as well as the stage of plant growth. A common farm practice is to apply plant nutrients at specific plant growth stages, i.e. at vegetative (root and shoot development) and generative stages (flowering, fruit setting, maturity). Foliar fertilization is also used in plant recovery from transplant shock, hail damage, and other bad weather conditions which may affect the plant. Foliar fertilization is an important farm practice important for management of sustainable and successful crop production. This is a desirable farm measure due to its positive effects on the entire crop production. It will not only increase the efficiency of plant nutrient uptake and reduce soil pollution but also maximize the crop yield and decrease the total cost of crop production.

Conclusion: Foliar feeding today plays an important role in sustainable crop production & productivity without harnessing of soil fertility. Some crops are fed almost exclusively through the leaves. In many others absorption by aerial parts of plant constitutes the only practical means for supplying specific nutrients. With almost all crops foliar feeding will eventually play some role in their nutrition at one time or another in their development. Leaf feeding is rapidly being standardized as an insurance against specific deficiencies and the hazards of unpredictable weather which may occur during the growth of some crops. The concept that foliar applications should be applied only after the appearance of a deficiency disorder is confirmed, since decline in yield and quality usually precedes the appearance of visual symptoms.

Our Second Mother

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We are all born of our mother but there is one that nurtures us. She is our second mother that is mother earth. As a student what have we done for a second mother? Probably nothing!!! From the day one we start respecting our parents and serve them till their last days. But the earth keep serving us till our last day and does not want anything in return. Earth is the abode of all living as well as non living things. But we never realise its importance and accountability towards nature. Earth fulfills our basic amenities by providing us with the air, water and land.

If human beings cannot kill their parents then how can they think of annihilating the earth?

Earth does not demand anything from us yet its beauty keeps on deteriorating because of us.

God has given us this wonderful and beautiful earth. It has the potential to mesmerize anyone with her beauty. Yet it is said that we never give any significance to earth. What we do is that we cut the trees, we cause deforestation. We use most toxic and harmful chemicals which affect the nature. We pollute the air and increase the sound pollution. This is the gift which we give our earth-our second mother. in the end I just want to say that earth is ours and it's our duty to keep it clean so that we can make our future bright.Our earth is like our mother, as we are her children,so keep her clean and beautiful,rather than destroy her.

One of the famous British author Patrick Ness says that"One hundred and fifty years ago the monster began. This world has become a place of industry , factories grew on the landscape like weeds, trees fell, fields were up ended , rivers blackened. The sky choked on smoke and ash and the people did ,too,spending their days coughing and itching their eyes turned forever towards the ground. Villages grew into towns , towns into cities and people began to live on the earth rather within it."

Agro-Diversity : A Base for Sustainability of Organic Farming

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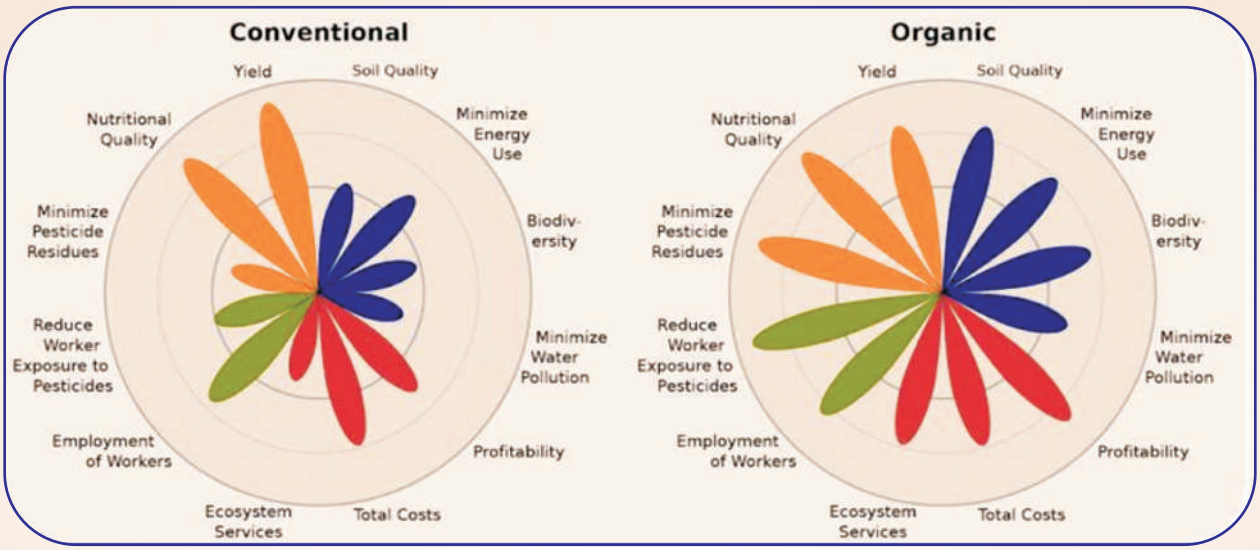
Introduction

Organic farming is commonly understood the exclusion of synthetic external inputs, however in actual it is the ideological differences with conventional farming that makes of friendly both to environment and society. These differences are given below.



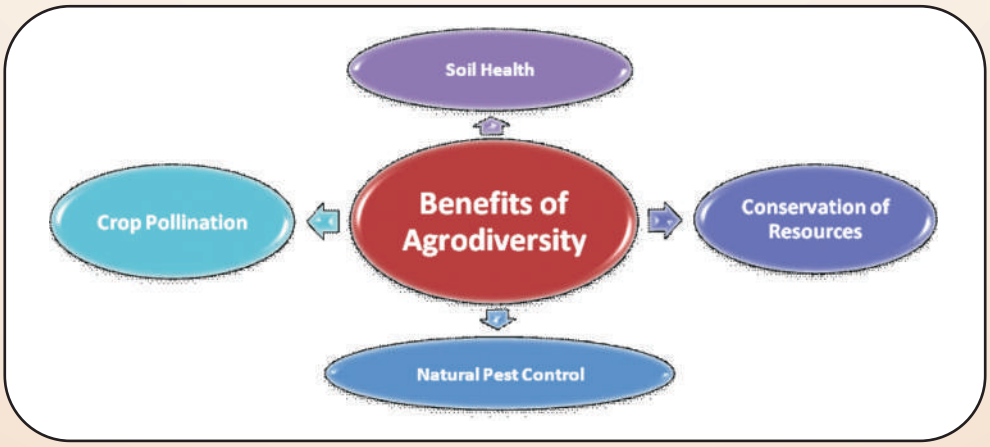
In this table it is clearly mentioned that diversity is one of the major and important component of organic farming system.

Agrodiversity and Organic Farming

Diversity is a gift ofnatureto provide several products and services from one system. Since most of the practices or technologies in organic farming are based on harness nature's potential from all sources with maintaining cyclic use of resources. Diversification makes possible this cyclic utilization e.g. crop is eaten by human and animal and their excreta is used for manuring crop, and make complimentary relation among components results in sustainable production.

Agrodiversity: The variability among living organisms associated with the cultivation of crops and rearing of animals, and the ecological complexes of which those species are part; this includes diversity within and between species, and of ecosystems.

Benefits of Agrodiversity



- **Soil Health:** Soil organisms ensure the maintenance and development of good soil structure, with positive effects on water regulation, erosion, leaching, etc. In addition, a healthy soil ecosystem ensures the release of nutrients and better disease resistance, which are essential to good crop development.
- **Crop pollination**: Crops are mainly pollinated by honeybees, which are introduced for this purpose by beekeepers or in collaboration with them. Wild agrobiodiversity also plays an important supplementary role. A significant portion of fruit production is dependent on pollination by insects.
- **Natural pest control**: Natural enemies of plague insects can help to keep them below the damage threshold, so that the use of crop protection products is limited or not necessary.
- **Conservation of resources**: Natural vegetation can help in erosion control, relieve heat stress in cattle, etc. It also provides a habitat for other useful organisms, such as natural enemies of plague species, and it determines the appearance of the landscape.
- **Enhancing adaptability**: It is vitally important to maintain genetic diversity, in order for agricultural crops and livestock to be able to adapt – naturally or with human intervention – to future needs and challenges.
- **Management of Agrodiversity**
  - There are broadly two types of technologies / methods for maintaining diversity, that are-
  - Technologies for enrichment of diversity -Biofertilizer, Agro-forestry, Mixed farming.
  - Technologies for conserving diversity - Seed of tradition varieties or Landraces, Mulching, Conservation village etc.
  - From management point of view, diversification can be divided into two main groups with their sub groups.
- **At Input level**
  - Diversified nutrient management.
  - Diversified resource conservation.
  - Diversified protection system.
- **At Production Level: Diversified production system**
  - Crop diversification.
  - Agro-forestry
  - Mixed farming.
- One model of diversity in organic farming cannot be prescribed for all agro-ecological conditions, even it differs from farmer to farmer as their resources and priorities are different.
- Therefore, in this chapter various components of diversified system is described with their method of application and how to make them complimentary to the system.
- **Diversification at input level :**
- **Diversified nutrient management**: These are components which suppliers input mainly the nutrients. Some of them are discussed here and others in the related chapters. For management of organic farming soil comes first in relation to nutrition management. There are several resources which are used for nutrition management in soil. These components are: -
  - **Micro Organisms**: It includes mainly nitrogen fixing and phosphorous solubilizing micro-organisms and microorganisms which increase the process of comporting of animal and crop waste. These microorganisms are actually play major role in nutrient availability from natural sources e.g. air, soil reserves. Besides nutrients these microorganisms released several bio-chemical which act as a plant growth promoters and help in boosting plant resilience to pest and drought.

- **Compost:** This is a well decomposed organic material made from diversified agro waste. Besides nutrient provider, this material improves soil structure, water and nutrient retention capacity, and as a food source to all the microorganisms working in soil. Using compost and vermi-compost (by earthworms) is the best way to maintain cyclic system of nutrient supply.
- **Mulching**: Mulch is a decomposable material (grass, bay, leaves, twigs, plant residue, and uprooted weeds) for covering the soil surface so that soil is not exposed to direct sun and beating action of rain drop. The process is called mulcting.

Benefits of mulching :

- Reduces moisture loss from soil and check soil erosion caused to rainfall.
- Improves micro-climate in soil (temperature, moisture) which facilitate better working of micro-organism in soil resulted in continuous availability of nutrient to crop.
- Reduces weed growth.
- Provides nutrient rich humus on decomposition.

Above benefits of mulching is highly beneficial vis a-vis cost effective method of conserving resources in organic farming.

Method of application

Mulch can be applied with two methods. i) Before sowing of crops. ii) After sowing of crops.

- **Mulching before sowing of crops** : This is also a major component in conservation tillage and being practiced successfully in humid tropics of Latin America and Africa due to abundantly available organic residue in humid topics. These residues are spread in crop field to make a permanent cover, crops are sown in lines with special equipments which opened furrow in this mulch and sow seeds**.**
- **Mulching after sowing:** In the semiarid or arid area due to shortage of organic residue, crop is sown in lines and after 20-25 days a layer of 3-5 cm. thick organic residue is spreader in the inter row space of crops. Another way is to do manual weeding in crops after 15-20 days of sowing and these uprooted weeds are allowed to dry for 3-5 days and then spread in inter row space. In this method weeding and mulching followed a relay and thus minimize requirement of organic residue from outside the field. Similar practice can be followed in second and third weeding. Inter-culture has addition advantage of soil moisture conservation and better aerations.

In this method two precautions should be taken.

- Partial drying of weeds for 3-5 days to avoid re-establishment.
- Not to use weeds if seed developed or remove seed portions.

Cover crop or live mulch Many of the leguminous annuals have growing habit of spreading near (20-40 cm.) to soil surface. This character is used to grow these crops in inter row space of tall crops like maize, sorghum, pearl millet etc. This intercropping of spreading legumeshas advantages, additions to the residue mulching.

- It sheds nitrogen rich leaves which are easily decomposable and make natural compost.
- Legumes fixes nitrogen in soil.
- Give additions yield and minimize the risk of drought as legumes show drought escaping nature.

This cover crop or mulching is applicable in both humid to arid region. Only change is the legume species e.g. cover crops for high rain fall areas- mucuna, lablub, cowpea etc. and cover crop for low rainfall areas- clustrerbean, green gram etc. Most of the cover crop are having shorts growing period than main crop therefore require separate sowing, generally after 10-15 days /of sowing of main crop.

Genetic diversification: Improved variety of crops having wider genetic base need to be used in organic farming. Hybrid varieties have very narrow genetic base which make suitable it for specific high input environment. While variety develop from local landraces having wider genetic base which is better adapted to that eco-regions, minimize cost on nutrients, irrigation and pest management. Also developing variety at local level reduces the cost on seed which otherwise farmer has to pay every year, to purchase from the market. Development and use of locally improved variety in organic farming is a series of practice to develop, produce and storage of seeds having diversity in terms of one or multiple characters e.g. colour, taste, aroma, yield, processing quality, tolerance to drought, resistance to pest, dominance to weed, responsive to organic manure and any other character desirable due to market or social demand.

Crop diversification: Instead of monoculture of nutrient extrusive crop like maize, sorghum, wheat, rice, etc., some other crops need to be grown in rotation or intercropping or as green manuring with main crops. This diversity is mainly beneficial to make efficient use of soil fertility, water, for breaking lifecycle of pests and fulfil diversified need of small farmers. Some of the basic guidelines for crop rotation are :-

a) Legume crops should be followed by cereal crops.
b) Crop of same family should not be taken or in rotation e.g. cotton and okra, potato and chili or tomato etc.
c) Deep rooted crop should be taken after shallow rooted crops.

A rotation can be of 3-5 years, followed by fellow period for soil restoration which may be 2-4 months in higher rainfall areas and 4-8 months in low rainfall areas.

Agroforesty:Inclusion of trees in crop field for conservation and sustainable production in a system is called agroforesty.

a) Tree provide permanent cover to soil by canopy, sheds leaves which covers soil, strong root network to conserve soil& water improve micro-climate and this way it acts as permanent mulching.

b) Several nitrogen (N) fixing trees, made available N in soil, the mycorrhiza associated with tree roots solubilize soil phosphorus and tree roots promote microbial activities in soil.

Tree provides shelter to several insectivorous birds, and these birds also drop nutrient rich excreta in soil. Birds maintain diversity by dispersal of seeds and some birds are good pollinator.

Mixed Farming : When animals (Cattle, goat/sheep/pig, poultry, duck, fish, honey bee etc) are integrated with crops production and animal and crop have complimentary relation to each other, the system is called mixed farming. This is the advanced stage of organic farming to make system make self-reliance in both cases i.e. intensive or extensive farming. The advantages and requirements of mixed farming are same as mentioned for the main topici.e.production system.

Component arrangement and management :

- Mixed farming is mainly depending on agro climate of location, resource available to the farmers and his managerial capacity. For example, in rice growing areas from agro climatic point of view rice-duck-fish farming is recommended but adoption by individual farmer depends on his capacity.

- More skill is required in intensive irrigated farming while in extensive rain fed farming, most of the farmers do have mixed farming system. The need is to just increase their knowledge level by training and visit to model farms.
- Some animals, specially birds do help in protectionsalong withproduction like poultry,duck, turkeywhile some others do only protection work e.g. owl, controls rats,bat for nocturnal pest, sparrow for larvae etc. These birds needs either shelter or diversity of plants.

Conclusion

In recent decades there has been growing awareness and recognition in different sectors of society that the conservation and sustainable use of biodiversity is key to human well-being. Biodiversity plays a pertinent role in the provision of ecosystem services, including those that are essential to sustainable agricultural production. Wild plants and animals, the cornerstones of biodiversity, are the origin of all crops and domestic livestock and the variety within them. In addition, components of biodiversity in agricultural landscapes maintain ecosystem services such as pollination, biological pest control, soil and water conservation, nutrient cycling, and climate regulation.

Modified landscape management and alternative farming practices can contribute to biodiversity conservation in various ways. However, biodiversity in and of itself does not automatically translate into ecosystem services such as enhanced pollination or natural pest control. To optimize these benefits, we need to understand which biodiversity elements drive these ecosystem services. Based on this information, benefits to farm productivity can be generated through a rational design and management of agro-ecosystemsand landscape structures. Such management strategies can range from informed choice of non-crop vegetation such as field margins, forests, hedgerows and othernon-crop elements, to conservation tillage, crop diversification or crop rotation.

COVID-19 : A Boon for Pollution Control ?

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With the rise of global pandemic corona virus disease *viz*.COVID-19 all around the world, it has leadto many changes which have become greater challenges for the world economies and people in general. Agricultural production at stake, dairy industries at a shut down, production units at a standstill and the stagnant development have become serious cause of concern for the philosophers, economists, psychologists and government. As far as agriculture is concerned, cropping system has been altered like the area under rice has been reduced due to difficulty in availability of labour, changes in eating habits has been observed due to lack of certain agricultural commodity, exports and imports has been severely threatened, transportation restrictions etc are some of the burning issues that act as a hindrance to the growth of agriculture.

Among all this panic and hysteria the only benefit that has been observed so far is the reduction levels of pollution all around the world. With people being forced to live at their homes has surely lead to the reduced carbon dioxide, carbon monoxide and other green house gases levels in the air since the transportation are in rare use. The industrial activity has been lessoned so the dangerous smoke released from chimneys and poisonous industrial effluents released directly into rivers and ponds have been controlled. The demand for fuel requirement has tremendously been cut short due to reduced functioning of industrial and commercial units. This has lead to decrease in coal burning in thermal power stations and ultimately in gases emissions.One of the excellent example quoted can be seen that of Delhi. It is again enjoying the virtue of green city since the pollution is under control. Ozone layer depletion has been reduced and glaciers have been restored. Since the start of lockdown, many unbelievable views could be seen like clean water reservoirs and clearer skies, the lower peaks of Himalayas could be seen from the terraces of Jalandhar homes, many cities recorded a drop ofair pollution levels of about 60% etc.

According to a survey conducted by Rajasthan State Pollution Control Board, the closure of industries and tourism sector as well as reduction in washing and bathing activities has restored lakes, rivers, reservoirs, dams and canals. The religious and rituals rights are at rest for the past months. Due to this the idols of god and goddesses are not being flushed and dumped into the rivers. As people stayed at home due to lockdown and travel restrictions, some animals have been spotted in cities. Sea turtles were spotted laying eggs on beaches they once avoided (such as the coast of the Bay of Bengal), due to the lowered levels of human interference and light pollution.

As far as noise pollution is concerned, a decreased level of noise has been recorded. The undesirable voice generated by vehicles andindustrial equipments and the unwanted disturbance from loudspeakers due to marriages and religious rituals have also lead to a favourable condition in noise pollution reduction.

In a report presented by medical experts, the spread of COVID-19 has slowed down to a much greater extent due to reduced pollution. The reason behind it being that pollution leads to many lung diseases and hypertension and the death toll by COVID-19 is higher in patients who already suffer from these ailments. So the lesser the ailments, lesser will be the COVID-19 cases and mortality rate.

Benefits are not the only outcome of COVID-19. Apart from many deaths and active cases, economy at a setback, many environmental impact can be seen. For bringing economy back to its track, government has taken several measures which are attracting environmentalists concern since recently. Some of them includes Etalin Hydro Project in Arunachal Pradesh's Dibang Valley, Central Vista Project in New Delhi, a highway project that crosses through Mahavir Wildlife Sanctuary in Goa, allowing open access auctioning of coal mines etc. These decisions have been taken through online video conferencing without taking consideration of site visiting. These projects will take severe toll on the air quality and local flora and fauna. All these projects are detrimental for the environment but boosting economy seems to have more importance for the government than the environment itself.

In a survey it is also reported that in coming days, people will be more interested in buying their personal vehicles since people fear that there are more chances of catching corona virus through public transport. This will ultimately increase the rate of gases emissions like carbon dioxide, nitrogen oxide, sulphur oxide and many other harmful gases through vehicles and thus will lead to increased air pollution.Due to being forced at home for so many days people will prefer to travel more in coming days due to cabin fear and self isolation. People are making wishlist for travelling and chilling out and to visit distant places.All these conditions will directly and indirectly affect the respiratory health of the people in general, a favourable situation for corona perpetuation.

With an end to the lockdown, the production industries and companies will be working tremendously in order to boost up their lost production and profit. This will definitely add to noise, land, water and air pollution to an enormous rate.

The earth is already facing contaminants in all forms whether it be in solid or liquid waste. Due to COVID-19 the use of face masks and sanitizers is at peak. The plastic wastes from sanitizer bottles will be difficult to biodegrade due to it's non-degradable nature. This will result in the disposal problem and thus will directly add to land pollution. The masks on other hand besides acting as a pollutant, will be the active site for the spread of virus if not disposed off properly. The online shopping of essential items is on rise due to people being forced to stay at home. This is leading to more plastic wastes from online shopping sites, again a major additive to pollution.

All these changes in pollution levels and environment whether it be positive or negative, boon or bane or blessing or a curse, these will not last long as far as COVID- 19 is concerned. But what lessons we learnt from this pandemic is the question of importance. Is it really the need for human that when a pandemic will strike, only then he will understand how he is responsible for the devastation he has caused in the name of industrialization, globalization and urbanization? No doubt that all this self isolation time has showered man with introspection and analyzing but is it just the thinking we need or the steps we will take in future that matters?

Digital Tools for Online Teaching During Covid-19 Era

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Introduction

Online learning is a growing and exciting new way to learn about almost anything. If there is a course we have always wanted to take or a skill we have always wanted to learn, but we have not had the time to attend a traditional face-to-face class or there hasn't been an opportunity near us, therefore, online learning might be your answer.Nowadays or in era of COVID 19, online learning opportunities offer everything from one-hour live workshops to online degrees. There is virtually something for everyone and all we have to do is find it.However, learning online is different from learning in a face-to-face setting, and it is important to think about our goals, our needs and our interests before committing yourself to something. We also need to think about the time you have available, our comfort level with using technology and the equipment that is at your disposal. As we all become more familiar with computers and computer access becomes increasingly common, online learning will continue to open doors and offer learning opportunities for those who are interested (Haynie,2014).

We can all think of online services that seemed transformative at the time, and are now obsolete and when we think of investing yourtime into learning a new kind of technology only to have it become outdated a year or two later, we may wonder if it's even worth the effort to break awayfrom traditional teaching methods.

But online education, in itself, is a move away from traditional learning. Exploring new and exciting online teaching tools is just one more way we canbring innovation into language learning.The best resources can transform our teaching, making everything about the classroom, from discussions to presentations and grading, feel effortless.Present the class with teaching material using a series of examples. We can share a document, an embedded recording, a podcast or acombination of all three.

Assign practice activities and give feedback. Online flashcards and interactive games are good ways to accomplish this step.Dive deeper into the topic. Have students interact on a shared blog or create and record dialogues and skits.Assign further practice and homework exercise. Consider an online worksheet aligned to our content standards.Looking to add interactive teaching materials to our online classroom.

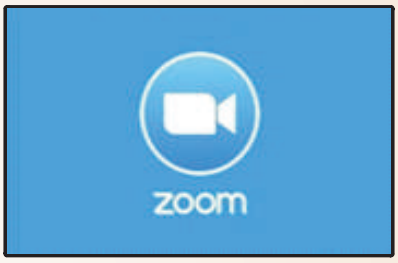
Teaching applications providing the best of real-world content and traditional teaching resources, Online teaching offers a perfect blend of video clips, popmusic, interactive games and digital flashcards to make your online lessons fun and more engaging.

Therefore, this article has been framed or written on this emerging issue and by keeping urgent need of teaching community and students in this critical era of corona virus. In this article we have presented the popular digitals tools or applications for online teaching in this CORONA virus or COVID-19 era which transforms our virtual classroom into aninteractive learning zone.

1. Skype

As an online teacher, we have probably already harnessed the power of video conferencing to chat with students or contentarea experts all over the world. And we probably already know about Skype, as it's been around for at least a decade.

Effective and easy to use, Skype has helped countless online educators bring language and culture to life in their classrooms. Some teachers even enjoy the fun of a unique activity called **Mystery Skype**, in which classes' converse and have to guess what country the other class is from based on their conversation.



Skype has undergone many changes and updates over the years, and has some new and compelling features that you may not know about. For example, it's "**Capture"** feature allows you to easily add images, attach funny **GIPHY** comments and add videos within a message thread. This can give online conversation a whole new dimension of realism. Imagine a lecturer on Spanish architecture including real life photos and video of the buildings as he talks about them, or a conversation about French food enlivened with real video footage of a meal as the speaker describes it.

2. Zoom

In addition to Skype, another free video conferencing tool called Zoom has recently come on the scene. It functions similarly to Skype, but offers a number of extra features that lend themselves exceptionally well to collaboration. Its unique "**Zoom rooms"**make group calls a breeze, facilitating collaborative work as well as conversationswith other classrooms around the world.

Another advantage that Zoom has over Skype,we can record conversations to use for later assessment and feedback, an invaluable tool for helping your students improve.

Collaborative planning tools to help we stay organized. One of the toughest and most important tasks of teaching, whether online or face-to-face, is planning lessons that align with your content standards.

Related to that, it's equally important to communicate your expectations clearly to students and parents, and ensure that they can access the materials they need.

Fortunately, there are some great platforms out there which simplify this process for you.

3. Live Binders

The LiveBinders App gives we quick access to all of the binders from your LiveBinders.com account. Add pictures from your iPad photo library or take pictures to add directly to your binder. We can also view your custom shelves and create new binders from within the App.

Remember those old three-ring binders. They were stuffed with lecture notes, handouts, worksheets and homework in various stages of completion. The idea was to keep everything needed for one class organized in one place-but sadly, this commendable goal often went awry.

LiveBinders is technology's answer to all that old-school paper wrestling and desperation. we can easily upload presentations, documents, worksheets and web resources, appropriately organized under relevant tabs. This makes it easy for students and parents to see what they need to

work on and to track their progress. As an added bonus, it greatly simplifies co-teaching, as lesson plans can be easily shared for collaboration.

4. Planboard

If we struggle with finding or creating just the right template to use for your online lessons, Planboard truly is a lifesaver. we can set up easy-to-use templates aligned to your curriculum standards, which can be used over and over again. we can even add an entire semester's worth of lesson plans to be tweaked and used again next year (with some improvements, of course).

Attachments and images can be added to your lessons with ease.

Even better: you can access the app from any device, so it's easy to make adjustments to your lessons while you're on the go.

Apps for presentation and review to help we engage your student, when presenting or reviewing content, engagement is key. Finding ways to learn material in a way that's fun and memorable is often a challenge in any environment.

Here are two wonderful apps to make your content more engaging and enjoyable.

5. Prezi

A takeoff on the old standby slideshow presentation, this app is an online whiteboard that lets we interact with informationvisually as you speak. Prezi is a versatile app that lets we can make professional-looking presentations. It's like a free, pared-down version of...View full description. PROS.

It look good. Very easy to edit and customize. It allows you to move to any place in your presentation that you want, instead of moving in a linear fashion from one slide to the next. This organized and visual method of presentation can help make even the driest topics morememorable to your audience.

6. Quizlet

This digital flashcard app makes vocabulary memorization more interactive than it ever was before. Students can use the fun, easy-to-use flashcard sets to quiz themselves or each other, or to play games like Matching or Gravity (keep asteroids from destroying your planet by typing the correct vocabulary word). We can create your own flashcards or choose from the pre-made sets.

Quizlet has been around for a while, so you may already be familiar with its functions. But if you haven't used it recently, you may not be aware of a new feature called "Quizlet Live," which is especially great for online teaching. With this app, we can put your students in teams to face each other in a live competition, adding an elusive element of personal interaction to your virtual classroom.

Quizlet also offers opportunities to connect with other language teachers via forums and discussion boards. Help Students Improve Speaking with Audio Recording AppsVerbal communication is a foundational element (if not *the* foundational element) of language teaching. Not only is that, but the ability to record your students when they are speaking important for meaningful feedback and assessment.

But giving your online students the same quantity and quality of verbal communication that they might engage in and receive in a face-to-face classroomcan seem like a daunting task.

Fortunately, technology keeps adapting to make the process of creating and using audio recordings ever simpler.Here are some apps that allow you and your students to communicate with ease.

7. Vocaroo

This popular online recording platform makes the process of creating and uploading voice recordings beautifully simple. Best ofall, it allows you to easily link voice comments to student work in a blog or a cloud

document service like Google Docs or Apple'sPages (if we and our students are using Macs and iPads), making for meaningful and personalized assessment and feedback.

We can also **make your lessons even more personalized** by creating podcasts of your instructions for an activity or ahomework assignment.

8. Audacity

This recording tool has been around for a while, but we're willing to bet that you haven't fully explored all its unique capabilitiesand their implications for online learning.

Similar to Vocaroo, Audacity also gives us the ability to record and upload podcasts with instructions or dictation activities.

But Audacity is also a wonderful tool for your students to use in creating skits, presentations and other projects. We can use itto download audio tracks from Creative Commons or Wikimedia Commons and dub their own voices into them. Imagine thepossibilities! Your students will have so much fun; they won't even realize that they're working on a school project. And they'llhave a great time watching and listening to their classmates' work, too.

Transform Your Online Classroom into an Online Experience. It can be overwhelming to think of trying out all the new online teaching tools that come across your radar from year to year. But the best online teachingresources, like the ones mentioned here, will remain fresh and exciting for years to come. As a result, you can create more engaging activities thatenhance the interactive element of online learning.

9. Cisco Webex

Cisco Webex is an American company that develops and sells web conferencing and videoconferencing applications.It was founded as WebEx in 1995 and taken over by Cisco Systems in 2007. Its headquarters are in Milpitas, California.

Its software products include Webex Meetings, Webex Teams, Training Center, Event Center, Support Center, Sales Center, MeetMeNow, PCNow, Webex AIM Pro Business Edition, WebexWebOffice, and WebEx Connect. All Webex products are part of the Cisco Systems collaboration portfolio.

10. GoogleMeet

It is a video-communication service developed by Google. It is one of two apps that constitute the replacement for Google Hangouts, the other being Google Chat. Google planned to begin retiring Google Hangouts in October 2019.

11. Jitsi Meet

Jitsi Meet is another Instant video conference and efficient to tools which are using widelynow daysthrough this we stay in touch with all your teams, be they family, friends, or colleagues.

Conclusion

Online Education has brought a positive impact in the lives of students and working professionals. It has given an opportunity to take up additional courses along with their studies or job as per their convenience. Online education has also helped the faculty in the institutions to ask students to study some part of syllabus online which do not require much of classroom instructions. So the online study helps the faculty to save time in which they can interact with the students more. The quality of education has improved by online courses and even it has become easy for students to refer the content as per their leisure. In the era of digitalization the scope of online education increase even more and will be beneficial for students, professionals and also institutions.

Impact of Corona Virus on Indian Economy

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INTRODUCTION

The world is facing an unprecedented challenge with communities and economies everywhere affected by the growing COVID-19 pandemic. The world is coming together to combat the COVID-19 pandemic bringing governments, organizations from across industries and sectors and individuals together to help respond to this global outbreak. The outpouring of global solidarity and support sparked by this shared challenge has been phenomenal. The World Health Organization (WHO) is leading and coordinating the global effort, supporting countries to prevent, detect and respond to the pandemic.

The covid-19 epidemic is the first and foremost human disaster in 2020. More than 200 countries and territories have confirmed effective medical cases, caused by coronavirus declared a pandemic by the WHO. Recent growth rate case globally has accelerated to more than 3,311,719 confirmed cases of COVID-19, including 806,410 deaths reported to WHO till August 24, 2020 (WHO).

India is one of the world's worst hit countries in the corona virus pandemic, with reported cases spiking in recent weeks as the country emerged from a strict nationwide lockdown.

Cumulatively, India has reported more than 3,106,348 confirmed cases with 57,542 deaths reported to WHO till August 24, 2020. Though, relative to its population size, the percentage of infected individuals is still low but now fast trend is observing. India also says the number of people who have recovered is higher than those currently affected by the virus.

The country's lockdown began in late March and was subsequently extended several times. Stringent restrictions halted most economic activities and caused millions of people, many of them daily wage earners, to lose their jobs and revenue streams. Investment bank Goldman Sachs last month predicted a massive 45% economic decline in the three months between April to June. Ratings agency Moody's slashed India's credit ratings to the lowest investment grade level.

To mitigate the economic fallout, Prime Minister Narendra Modi's government had announced a $ 266 billion support package containing both fiscal and monetary measures, said to be worth around 10% of India's GDP. But economists have said the package will do little to stimulate growth, as it includes very little planned government spending and benefits of several measures are expected to only be seen in the medium term. While the impact on India's gross domestic product for the current quarter will not be known for a few more months, these charts below paint a snapshot of how economic activities were hampered during the lockdown.

THE SECTOR-WISE IMPACT ON INDIAN INDUSTRY

Restaurants Services- The National Restaurant Association of India (NRAI), which represents 500,000-plus restaurants across the country, has advised its members to shut down dine-in operations starting Wednesday till March 31, 2020. This will impact operations of thousands of dine-in restaurants, pubs, bars and cafes. By extension, food delivery platforms such as Swingy and Zomato that are by it functioning have also taken a big hit. Orders on Swingy and Zomato have dropped 60 per cent amid the pandemic.

Food and Agriculture -The food and agriculture sector contributes the highest in GDP i.e. 16.5% and 43% to the employment sector. The major portion of the food processing sector deals with dairy (29%), edible oil (32%), and cereals (10%). India also stands number one in dairy and spices products at a global scenario (export).

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The supply of the food and Agri - The product will be affected in the coming seasons due to low sowing of the upcoming seasonal crops which will affect the mandi operations as said by the Ministry of Agriculture. The companies which deal with Agro-chemical depend on export for finished goods and import of raw materials. The food retail with the Central government and State governments allowing free movement of fruits and vegetables the Bricks and Mortar grocery retail chains are operating normally but with the shortage of staff is impacting operation. It is expected that with prolonged lockdown the demand for the food supplies will increase. The online food grocery, on the other hand, suffers a huge loss due to the restriction of delivery vehicles. With the shortage of labour, the food processing units are facing a hunch in normal function but the government is trying to ease out the situation until that the factories have to adjust to working with low labour count. A major destination in the grapple of covid-19 for the next few months the Indian export is impacted due to low consumer demand the export-oriented commodities like seafood, mangoes, grapes are crashing this will impact the future crop availability (Mukherjee, 2000)**.**

The Micro, Small and Medium Enterprises (MSMEs): This sector contributes 30% to 35% of the GDP, showing a bifurcation of micro (99%), small (0.52%) and medium (0.01%) enterprise. If we see the sectorial distribution of MSMEs, it shows 49% from rural and 51 % from the semi-urban and urban areas.

Maharashtra, Uttar Pradesh, Bihar, Tamil Nadu, and Madhya Pradesh have the highest number of registered MSMEs, a study by the AIMO estimated that about a quarter of over 75 million is facing closure if the closure goes beyond four weeks and if the lockdown still extends the situation would worsen affecting the employment of 114 million people affecting the GDP. Consumer goods, garments, logistics are facing a sharp drop in the business and the MSMEs engaged in the service sector are still operating, however, is likely to isolate due to plunging liquidity constrains and purchasing capacity.

Sectors which depends on import such as electronics, pharma, consumer durables etc are facing a downfall causing a huge rapture across the value chain. As a splash of relief came the RBI announcement of a three-month moratorium on repayments of loan and reduction in the repo rate as most of the MSMEs depends on the loan funding from the government.

Online Business / Internet Business sector - The online business in today's economy plays a major role in the economy with a market share of USD 950 billion. It contributes 10% to the Indian GDP and showed a drastic in the employment sector in the FY19 viz 8%. Its major segments are the household and personal care products (50 %), healthcare segment (31%) and the food and beverage sector (19%).

At mist the social distancing due to threat of covid-19 the tendency of the consumers to overstock on essential product and commodities viz rice, flour and lentils. This gave rise in the sales of the FMCG companies which it saw fall in the stoke in trade due to distorted supply chain .the e-commerce sector saw a dip in growth with pressure on the supply chain deliveries and the expectations of the consumers on the companies to come up with newer distribution channels focusing on direct to customer routes. In this soaring environment the managing and predicting of demand will play a vital role in the customer relation sector. Categorizing the commodities into part i.e. essential commodities and non-essential commodities showed different responses in the market.

Chemical Industry: Some chemical plants have been shut down in China. So there will be restrictions on shipments/logistics. It was found that 20% of the production has been impacted due to the disruption in raw material supply. China is a major supplier of Indigo that is required for denim. Business in India is likely to get affected so people securing their supplies. However, it is an opportunity. US and EU will try and diversify their markets. Some of the business can be diverted to India which can also be taken as an advantage.

Shipping Industry: Coronavirus outbreak has impacted the business of cargo movement service providers. As per the sources, per day per vessel has declined by more than 75-80% in dry bulk trade.

Auto Industry: Its impact on Indian companies will vary and depend upon the extent of the business with China. China's business no doubt is affected. However, current levels of the inventory seem to be sufficient for the Indian industry. If the shutdown in China continues then it is expected to result in an 8-10% contraction of Indian auto manufacturing in 2020.

Pharmaceuticals Industry : Despite being one of the top formulations of drug exporters in the world, the pharma industry of India relies heavily on import as of bulk drugs. Due to the corona virus outbreak, it will also be impacted.

Textiles Industry: Due to corona virus outbreak, several garments/textile factories in China have halted operations that in turn affecting the exports of fabric, yarn and other raw materials from India.

Solar Power Sector: Indian developers may face some shortfall of raw materials needed in solar panels/cells and limited stocks from China.

According to the KPMG report - It is expected that the course of economic recovery in India will be smoother and faster than that of many other advanced countries.

In terms of trade, China is the world's largest exporter and second-largest importer. It accounts for 13% of world exports and 11% of world imports. Up to a large extent, it will impact the Indian industry. **In imports,** the dependence of India on China is huge. Of the top 20 products (at the two-digit of HS Code) that India imports from the world, China accounts for a significant share in most of them.

India's total **electronic imports** account for 45% of China. Around one-third of machinery and almost two-fifths of **organic chemicals** that India purchases from the world come from China? For automotive parts and fertilisers China's share in India's import is more than 25%. Around 65 to 70% of active **pharmaceutical** ingredients and around 90% of certain **mobile phones** come from China to India.

Therefore, we can say that due to the current outbreak of corona virus in China, the import dependence on China will have a significant impact on the **Indian industry.**

Further, according to the World Bank's assessment, India is expected to grow 1.5 per cent to 2.8 per cent. And IMF projected a GDP growth of 1.9 per cent for India in 2020 because the global economy is affected by the COVID pandemic, the worst recession since the Great Depression in the 1930s. Also, we can't ignore that the lockdown and pandemic hit several sectors including MSME, hospitality, civil aviation, agriculture and allied sector (World Bank 2020)

Conclusion

From the above texts we can stated mostly the negative impact of the lockdown, but we would miss out something if we do not acknowledge the growth of digital infused technological gain. With the advent of the lockdown most of the sector shifted their functioning online the MNC are utilising their work from home option to carry on an uninterrupted working. While these trends were already in the baby steps, they were forced to hit the fast-forward button. The digital world got such a push that the small retail sectors like the Bricks and Mortar stores are also using apps like PayTM and other digital channels. The education sector is now completely based on the digital platforms the colleges and universities are conducting their routine classes being in the comfort of their home with various online platforms such as google classrooms, zoom, etc. they are also introducing new software to their curriculums such as digital campus where the students can access their college library, fee payments, online exams etc. This present crisis has highlighted the importance of investing in technologies like cloud data and cyber security, self-service capabilities, and e-governance.

TULSI- The Wonder Herb

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INTRODUCTION:

Holy basil has been known since the Vedic age for its immense curative and multi-purpose utility. It has been the 'Herb royale' to the French, a sign of love by Italians, and a sacred herb in India. In the first century A.D. Roman naturalist Pliny reported that basil relieves flatulence, which had been subsequently proven true. In the Far East, the herb had been used as a cough medicine, and in Africa, it has been used to expel worms. American colonists considered holy basil is the essential ingredients in a snuff used to ease headaches. Among the plants known for medicinal value, the plants of genus *Ocimum* belonging to family Lamiaceae are very important for their therapeutic potentials. *Ocimum sanctum* has two varieties i.e. black (Krishna Tulsi) and green (Rama Tulsi), with almost similar chemical properties. Tulsi is derived from Sanskrit word which means "**matchless one**". Its medicinal properties have been attributed not only in Ayurveda and Siddha but also in Greek, Roman and Unani systems of medicine. It can be estimated from the literature that it has been used from more than 4000-5000 B.C and was firest used by China for various natural herbal preparations. Earliest references are available in Rigveda which is said to be written between 3500-1600 B.C. Tulsi (Ocimum sanctum), Queen of Herbs, and the Legendary, "Incomparable One" is one of the holiest and most cherished of the many healing and health-giving herbs distributed mainly in the oriental region. Cultivation of tulsi plants has both spiritual and practical significance that connects the grower to the creative powers of nature, and organic cultivation offers solutions for food security, rural poverty, hunger, environmental degradation and climate change. The use of tulsi in daily rituals is a testament to Ayurvedic wisdom and provides an example of ancient knowledge offering solutions to modern problems. The plant grows all over India up to 2000 meters height. It is grown in houses, temples and gardens. An erect annual grows 0.5-1.5 meters in height and has red or purple quadrangular branches. The leaves are opposite, about 2-4 cm long, margins entire or toothed, hairy on both the surfaces, dotted with minute glands and are aromatic. The flowers are tiny, purple and inflorescence is a long spike or 12-14 cm in length. The fruits are small, smooth nut lets, reddish grey in color. Botanically, Tulsi is known as Ocimum sanctum and it belongs to family Lamiacea. The leaves contain an essential oil, which contains eugenol, eugenal, carvacrol, methylchavicol, limatrol and caryophylline. The seeds contain oil composed of fatty acids and sitosterol.

MEDICINAL USES :

Tulsi leaves are widely used in several ancient systems of medicine including Ayurveda, Greek, Roman, Siddha, and Unani. Tulsi leaves are widely used in the preparation of Ayurvedic medicine for treatment of many diseases and disorders. Plant has vast number of therapeutic applications such as in cardiopathy, hemopathy, leukoderma, asthma, bronchitis, catarrhal fever, otalgia, hepatopathy, vomiting, lumbago, hiccups, ophthalmia, gastropathy, genitourinary disorders, ringworm, verminosis and skin diseases. Tulsi is well known for treatment of bronchitis, bronchial asthma, malaria, diarrhea, dysentery, skin diseases, arthritis, painful eye diseases, chronic fever, and insect bite. It is also used for preventing stomach disorders.

As per Ayurveda, various used of Tulsi includes :

- Tulsi has anti-inflammatory properties as it underminedvata. So its external application on swollen area helps to reduce swelling and pain.
- Tulsi cures in many skin disorders. It is efficient in skin rashes, insect bites and itching. Trees of this plant are effectively used in ring worm infection also lucoderma.

- Fresh juice of Tulsi leaves is employ in nasya karma.This technique helps to ease headache and diseases of head and neck. Tulsi leaves act as nerving tonic.
- Extract of Tulsi leaves use to reduce acne, pimples and scars.
- As per Ayurvedic, arrangements of Tulsi are valuable in indigestion, intestinal parasites and constipation.
- Trampled leaves of Tulsi are extremely efficient in fever, cough, bronchitis and other medicinal problem of lungs.
- Tulsi employ as a cardiac tonic and purifies blood.

Health Benefits of Tulsi In Our Daily Life :

- **Healing Power:** The tulsi plant has many medicinal properties. The leaves are a nerve tonic and also sharpen memory. They promote the removal of the catarrhal matter and phlegm from the bronchial tube. The leaves strengthen the stomach and induce copious perspiration. The seed of the plant are mucilaginous.
- **Fever and Common Cold:** The leaves of basil are specific for many fevers. During the rainy season, when malaria and dengue fever are widely prevalent, tender leaves, boiled with tea, act as preventive against theses diseases. In case of acute fevers, a decoction of the leaves boiled with powdered cardamom in half a liter of water and mixed with sugar and milk brings down the temperature. The juice of tulsi leaves can be used to bring down fever. Extract of tulsi leaves in fresh water should be given every 2 to 3 hours. In between one can keep giving sips of cold water. In children, it is every effective in bringing down the temperature.

  Coughs: Tulsi is an important constituent of many Ayurvedic cough syrups and expectorants. It helps to mobilize mucus in bronchitis and asthma. Chewing tulsi leaves relieves cold and flu.

  Sore Throat: Water boiled with basil leaves can be taken as drink in case of sore throat. This water can also be used as a gargle.

  Respiratory Disorder: The herb is useful in the treatment of respiratory system disorder. A decoction of the leaves, with honey and ginger is an effective remedy for bronchitis, asthma, influenza, cough and cold. A decoction of the leaves, cloves and common salt also gives immediate relief in case of influenza. They should be boiled in half a liter of water till only half the water is left and add then taken.

  Kidney Stone: Basil has strengthening effect on the kidney. In case of renal stone the juice of basil leaves and honey, if taken regularly for 6 months it will expel them via the urinary tract.

  Heart Disorder: Basil has a beneficial effect in cardiac disease and the weakness resulting from them. It reduces the level of blood cholesterol.

  Children's Ailments: Common pediatric problems like cough cold, fever, diarrhea and vomiting respond favorably to the juice of basil leaves. If pustules of chicken pox delay their appearance, basil leaves taken with saffron will hasten them.

  Stress: Basil leaves are regarded as an 'adaptogen' or anti-stress agent. Recent studies have shown that the leaves afford significant protection against stress. Even healthy persons can chew 12 leaves of basil, twice a day, to prevent stress. It purifies blood and helps prevent several common elements.

CONCLUSION:

Tulsi is a common herb grown in many households with a wide range of therapeutic properties, and is considered safe to consume in any form. All these remedial properties are well accepted and honored by modern science. Tulsi is the herb that cures the mankind from all odds naturally in today's superficial not-so good lifestyle. It is considered as India's Queen of herbs. It has got medicinal properties as well as cosmetic properties. Water boiled with tulsi leaves is good for sore throat and flu.Tulsi leaf when eaten in the morning purifies blood. It can be used as tooth powder by drying its leaves and mixed with water. Juice of Tulsi and ginger cures stomach ache, cramps and relief from stomach worms. Future research on sacred basil are still continued and emphasized for control of various diseases.

Caution - Empowerment Zone Ahead...!!!

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Women are the "epitome" of Beauty, Strength, Inspiration, Pride, Motivation and above all 'COURAGE.....'

We cannot execute our routine activities without our 'Grandmothers', 'Mothers', 'Sisters' etc. and adhering to the fact women in our homes are only responsible for preparing our food, washing the clothes of the entire family, etc... That's it .....!!

THE STORY ENDS....

But an extensive query of all times .....WHY ONLY WOMEN??

Why not men are amenable for the same!!

Well, we have answers to each and every question, however do not want to think and discuss because men want to dominate always over women in all the areas excluding the 'HOUSEHOLD RESPONSIBILITIES'

Another example where Male dominancy is apparent is in the field of 'MILITARY'

A general opinion for women in the field of military is that they shouldn't be there. But isn't it true that "If women can make the guns are used to fight in the military, then they are far more skilled to use them on the 'War-grounds' for the country's sake as well.

Today's contemporary woman hold up half the sky. !!' and she is much

more intelligent and powerful as compared to the women of ancient

era who were subjected to domestic violence and thereby considered weak and timid.

It is the need of the hour to understand that there is no tool for development more effective than the EMPOWERMENT OF THE WOMEN....

and it is therefore necessary for the Indian men to understand the power of women and let them go ahead to make themselves independent and become the power of the family and the country too.

Before signing of a sweet message to all the beautiful girls...

BE THE HEROINE OF YOUR LIFE NOT THE VICTIM !!

Nutritional and Health Benefits of Dietary Flaxseed

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Dietary flaxseed has an impressive and growing literature of research which supports its use in various health conditions. Although little was known about the health-related effects of flaxseed in the late 20th century, as well as how flaxseed can be eaten to achieve certain health benefits, today is a very different time. Recent information on the impact of flaxseed on diet has increased dramatically. Currently, availability of it have sparked the food processing industry to create a greater variety of foods that contain flaxseed, giving the public an increased opportunity to incorporate flaxseed into their regular diet. We now know that environmental factors like diet can have a profound effect on the maintenance of health and the appearance of disease. This is also becoming clearer that the diagnosis of disease is done not only by pharmacological therapy but also by dietary interventions. Flaxseed is emerging as an important functional food ingredient because of its rich contents of αlinolenic acid (ALA, omega-3 fatty acid), lignans, and fiber. These compounds provide bioactivity of value to the potential health benefits such as in reduction of cardiovascular disease, atherosclerosis, diabetes, cancer, arthritis, osteoporosis, autoimmune and neurological disorders. Flax protein helps in the prevention and treatment of heart disease and in supporting the immune system (Brown *et al*, 2018). As a functional food ingredient, flax or flaxseed oil has been incorporated into baked foods, juices, milk and dairy products, muffins, dry pasta products, macaroni and meat products. The purpose of this review is to provide a broad summary of the research highlights that have supported flaxseed growth as a commodity with significance in the health and medicine fields.

Flaxseed and Its Use in the Diet

Alpha-linolenic acid (ALA), lignans, and fiber are the principal bioactive compounds in flaxseed. Four common forms of flaxseed available for human use include whole flaxseed, soil flaxseed, flaxseed oil and partially defatted flaxseed meal (Parikh *et al*, 2018). Flax "milk" (Pizzey Ingredients Inc, Manitoba, Canada) is a new product available on the marketplace. Flax milk is a finely milled flaxseed mixed with filtered water and other minor compounds as an alternative to "milks" like almond milk. Flax milk is high in ALA and is an ideal alternative to meat, as it does not contain cholesterol or lactose. This is suitable for those with corn, nuts and wheat allergies. Furthermore, flaxseed has been described as having a "nice nutty odor and aroma," and is potentially ideal for incorporation into a variety of foods (Ramicharitrar *et al*, 2005). Now a day flaxseed has been successfully incorporated into the snack bars, muffins, bagels, bread, buns, tea biscuits, cinnamon rolls and pasta in research studies

Table 1 Chemical composition of nutrient and phytochemicals in flaxseed

Nutrients/bioactive compounds	Quantity/ 100 g of seed	Nutrients/bioactive compounds	Quantity/ 100 g of seed
Carbohydrates[a]	29.0 g	Biotin	6 mg
Protein	20.0 g	α-Tocopherol[b]	7 mg
Total fats	41.0 g δ	δ-Tocopherol[b]	10 mg
Linolenic acid	23.0 g	γ-Tocopherol[b]	552 mg
Dietary fiber	28.0 g	Calcium	236 mg
Lignans	10–2,600 mg	Copper	1 mg
Ascorbic acid	0.50 mg	Magnesium	431 mg
Thiamin	0.53 mg	Manganese	3 mg
Riboflavin	0.23 mg	Phosphorus	622 mg

Niacin	3.21 mg	Potassium	831 mg
Pyridoxin	0.61 mg	Sodium	27 mg
Pantothenic acid	0.57 mg	Zinc	4 mg
Folic acid	112 mg		

Source: Flax council of Canada (2007)

a-Values include dietary fiber

b-Values in mg/kg of flaxseed lipids

Dietary Flaxseed and Cardiovascular Disease

The dietary flaxseed has shown powerfully protective effects in humans with cardiovascular disease symptoms. The most remarkable is the diminution of both systolic and diastolic blood pressure in peripheral arterial disease (PAD) patients (Rodriguez *et al*, 2013). Both brachial and central blood pressures were significantly reduced by dietary flaxseed. In the double-blinded, placebo-controlled, randomized FlaxPAD Trial, PAD patients fed 30 g of milled flaxseed every day for 6 months exhibited significant decreases in both systolic and diastolic blood pressure (Rodriguez *et al*, 2011; Rodriguez *et al*, 2013).

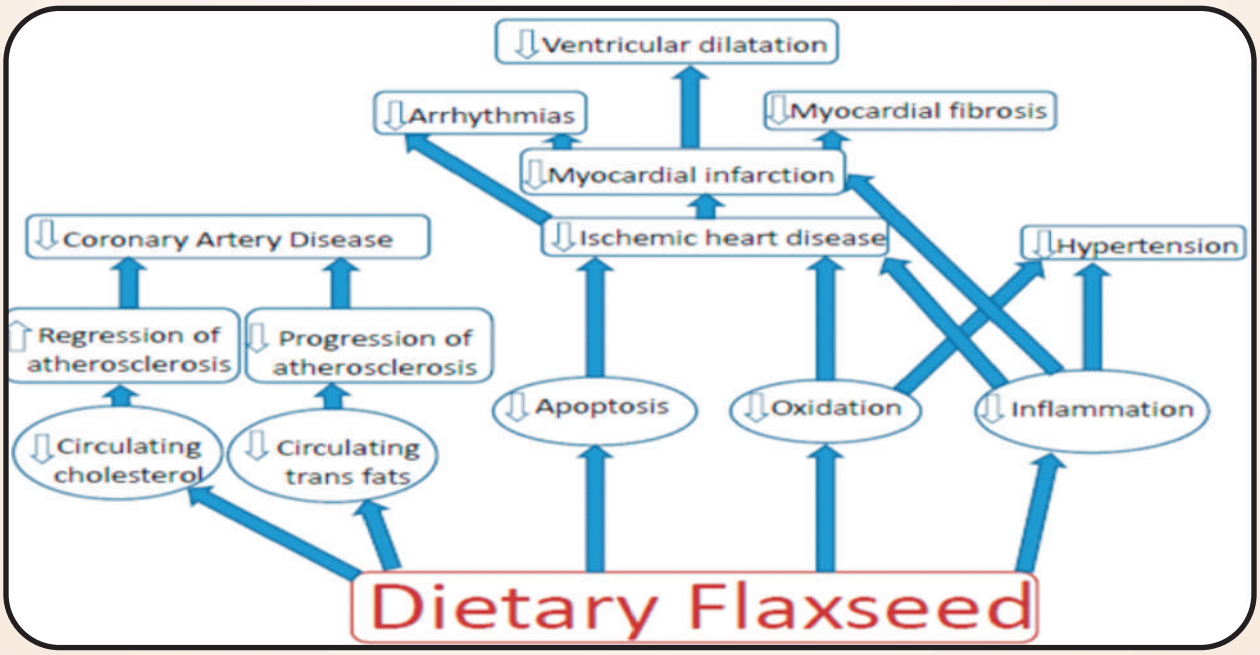

Figure 1. Effect of dietary flaxseed on the various types of cardiovascular disease. Arrows going up denote an increase in a specific parameter whereas arrows going down denote a decrease in a specific parameter (Parikh *et al*, 2019).

Dietary Flaxseed and Diabetes

Flaxseed derived supplement gum and lignan have decreased blood glucose in subjects with type 2 diabetes lowered blood glucose in those with prediabetes. Whether SDG or flaxseed supplementation improves glycemic control in human subjects with Type 1 diabetes remains unknown and could be a topic of experimentation in future (Soltanian *et al*, 2018; Mani *et al*, 2018).

Dietary Flaxseed and Cancers

Flaxseed lignans are no steroidal phytoestrogens that have a chemical structure that resembles mammalian estrogens, and hence produce estrogens-like effects in mammals. Flax lignans are metabolized by intestinal bacteria to become bio available in the plasma (Gaya *et al*, 2016). Epidemiological studies in patients with postmenopausal breast cancer have documented an association of higher enterolactone blood concentrations with reduced breast cancer risk, decreased mortality rate and improved survival. Clinical evidence confirms even the protective role of enterolactone in breast, colon, prostate, intestine and lung cancers (Mali *et al*, 2019).

Dietary Flaxseed and Female Hormonal Status

Dietary flaxseed may also exhibit a protective effect against menopausal symptoms (Landate *et al*, 2015). Several studies have examined the effects of flaxseed or its bioactive ingredients on the quality of life and the frequency and severity of hot flashes in post-menopausal women. The estrogenic action of certain metabolites of flaxseed suggested a potentially positive effect on these post-menopausal symptoms.

Toxicity of Flaxseed

Although no toxicity has ever been reported in clinical studies with dietary supplementation of flaxseed, some compounds within flaxseed such as cyanogenic glycosides and linatine have been identified as potential toxic compounds. Cyanogenic glycosides such as linamarin, linustatin, neolinustatin, lotaustralin and amygdalin are nitrogenuous secondary plant metabolites (Parikh *et al*, 2018). These compounds are not exclusively found in flaxseed, but are also present in other food items including apples, spinach and cassavas.

Conclusions

Supplementation of the diet with milled flaxseed has many healthy benefits to the body. Although cardiovascular disease and cancer are probably the best researched areas that have shown convincing evidence of a beneficial action for dietary flaxseed, other areas like gastro-intestinal health and diabetes have also been receptive to the beneficial effects of dietary flaxseed. Other areas in human health require further research to make definitive conclusions but the preliminary data is encouraging. With little or no evidence of toxicity for dietary supplementation with flaxseed, there appears to be a clear argument to support its inclusion in the daily diet and little reason to oppose it. As a result, flax and flaxseed oil may be preferred ingredients of functional foods and nutraceuticals in future. There is no doubt that a change to an omega-3 rich and high fiber diet would be beneficial. Therefore the use of flaxseed in whole seed or ground form can be recommended as a dietary supplement. Modern techniques like high power ultrasound, micro-fluidization, spray granulation and nanoencapsulation will pave way for new approaches to the processing, stabilization and utilization of flaxseed oil. Further, enrichment of diets of the animals with flax/flaxseed oil for production of ω-3 enriched eggs, milk, meat and other animal origin products could be another approach in utilizing flaxseeds.

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Capacity Building in Human Resource Development

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Capacity building and human resource development co-exist. They are like the two sides of a coin. Human resource development (HRD) is a pre- requisite in every organization for helping its employees to develop their professional, personal and organizational skills, knowledge and abilities. Enhancing quality of human resource is imperative for implementing the organizational objectives and evolving institutional arrangements to face challenges.

Human Resource Development activities include training of employees, their career development, performance management and development, counseling, guiding, progression planning, identification of key employee, and organizational development.

Earlier HRD was merely considered as a system for managing the people in organizations with respect to salaries paid and conducting skill oriented training and other functions that were designed to elevate their skills. However, now the HRD department focuses on empowering and enabling the employees to become capable of fulfilling their ambitions and realization of their maximum potential. HRD department of an organization encompasses several activities in an organization, starting with employee recruitment and training, appraisals and extending the recreational and motivational aspects of employee's overall development. Further, the department of HRD now has taken a role that goes beyond employee satisfaction and the focus now is one ensuring that employees are happy with the working conditions and perform their jobs according to their talent and potentials which are brought to their fore.

People need to manage their work, interpersonal relationships and when the need arises, manage others, organizations and institutions. For this, they need to build their competencies and capacities and improve their knowledge, skills and attitude. To manage their work efficiently and effectively, they need to develop their technical abilities, human capacities as well as conceptual capabilities. Their education prepare them mostly with the technical work skills, however, it is on the job management training that lays a foundation of human and conceptual capacities. Continued technical and managerial development through periodic training is necessary to sharpen the saw from time to time to excel at the cutting edge of performance. The HRD department should aim to actualize this philosophy and try to offer the opportunities to its employees for undergoing such trainings, workshops, hands on experience, etc.

The training programs need to be chalked out according to a rational consideration of training needs. Moreover these capacity building programs need to be evaluated for assessing their effectiveness. So, there are two aspects of training programs - clear planning for implementation and potential evaluation of their effectiveness. Apart from this, training programs need to be implemented based on a calendar that is planned taking into account the availability of participants.

Competencies encompass knowledge, skills and behavior, which are required in an individual for effectively performing the functions of a post. Competencies may be broadly divided into those that are core skills

which scientists and other employees would need to possess with different levels of proficiency for different functions or levels. Some of these competencies pertain to leadership, financial management, people management, information technology, project management and communication. The other set of competencies relate to the professional or specialized skills, which are relevant for specialized functions such as conducting research, teaching, extension, etc. in the areas of plant and animal sciences, natural resources management, social and basic sciences, etc.

In SAU system, the newly recruited Assistant Professor has to undergo a 21 days Orientation Course for agricultural education, research and extension management. This course aims to let new recruits get acquainted about the University system, teaching skills, research management, writing winning research proposals, effective communication, financial management, administrative rules and regulations, soft skills etc.

In second and third stage, the teachers have to undergo refresher courses. These courses aim to provide-

- Advance training to the teachers, researchers and extension SMS in Agricultural sciences and to update them in their field of specialization.
- These courses also provide opportunity to participants to refresh their concepts of basic sciences that are relevant to the understanding of new scientific knowledge earned in their subject.
- To provided to the participants an opportunity to be exposed to specialized technique of teaching, research and also to participate themselves on an experimental basis.
- To foster inter-institutional co- operative research /teaching projects.

Apart from this, the teachers, scientists and officers are given numerous opportunities to undergo short term courses related to their area of specialization and management aspects.

Personality development is one of the important concepts in HRD. By personality, we mean the characters and distinctiveness that make up on individual's mind and determine how he or she interacts with their surroundings. Personality is determined by a number of factors including the characters that one is gifted with as a result of genetic factors and characteristics that has been developed due to his or her interactions with the society.

The employees should be trained in other fronts also such as time management, communication skills, stress management, managing conflicts at work place, social intelligence, gender issues etc. These soft skills will surely help the employees in professional as well as personal front.

Motivation is one of the key concepts in HRD. Motivation of employees is of utmost importance for the health of an organization. Only when employees are motivated sufficiently, they would work with full zeal and be able to give their best.

During last two decades, paperless working system has gained access in every department including University and colleges. Several financial, administrative, academic, research and extension management softwares have been floated in the business. Further, in the present scenario of Covid-19 pandemic situation, when all the schools and colleges are imparting lessons to the students via online mode, it becomes imperative to train the existing human resource of the university in IT tools.

So, our aim should be to make skilled man power so that the University is run effectively and efficiently. With this in the end in my view, only training can play a pivotal role to make a worthy workforce of an organization.

Use of Unmanned Aerial Vehicle (UAV) Technology for Plant Protection in Agriculture

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Agriculture development is important especially for social and economic benefit, where agriculture increases food production, increases net income and improves family productivity, reduces income imbalance between rural agricultural employment and urban income of factory workers, and improves farmers' living condition. Recent advanced technology are emerged, which have been proven a key stone for raising agriculture production for food security in the world.In connection to this, use of unmanned aerial vehicle (UAV) is one of the advanced technology for crop health monitoring and management as digital solution for plant protection. Problems or difficulties being faced in crop management are extreme weather events, infection, diseases and other problems due to chemical application (fungicide, pesticide, insecticide etc.) or insect/ animal bite. The potential use of advanced technology such as UAV in agriculture is for management of pesticides, crop monitoring. The UAV can have more pinpoint accuracy from greater distances farmers and agriculturists are always looking for cheap and effective methods to regularly monitor their crops. Crop sprayingdrones can scan the ground and spray the correct amount of liquid, modulating distance from the ground and spraying in real time for even coverage. The increased efficiency with a reduction of in the amount of chemicals penetrating into groundwater. In fact, experts estimate that aerial spraying can be completed up to five times faster with drones than with traditional machinery. Crop monitoring in vast fields and low efficiency in crop monitoring together create farming's largest obstacle. Monitoring challenges are exacerbated by increasingly unpredictable weather conditions, which drive risk and field maintenance costs. Crop health assessment is essential to assess crop health and spot bacterial or fungal infections on crop as well as nutrient deficiency. Moreover, less use of pesticides reduces environmental damages. Agricultural drone changes farmer's ability to monitor and manage the key aspect of farm business that is impossible to sustain in remote place. The field managementcan be improved by using the UAV and increase the yield of productivity in order to feed the increasingpopulation in the world.

Current uses of UAV in Agriculture

Crop Monitoring

Crop monitoring is the work conducted to predict the abiotic factors, biotic factors, yield or quality of a crop via analysis of crop data. Crop monitoring is essential for ideal crop production and qualitative parameters. However, monitoring a large farm requires significant time and labour and it was difficult to address problem. Very large farms are often monitored via satellite. However, this is not suitable for precision crop monitoring. Crop monitoring via UAVs has been proposed for this. Thus, high-resolution data has been obtained, and weather effects have been reduced.

Precision fertilizer programme planning

Nitrogen deficient areas in a crop can be clearly identified from above using drones fitted with cameras that have enhanced sensors. The sensors are calibrated to limit the effect of changing sunlight levels and allow a more accurate calculation of the green area to be made. Flying operations start from the late winter with drones taking hundreds of images of the crop's developing canopy. The images are then stitched together to form a map and software is used to identify early growth patterns. From there a precise fertilizer programme can be tailored to match the crop's varying nutrient requirements in different areas of the field.

Disease, insect and weed diagnosis

Using similar techniques to the drone operators can accurately evaluate weed and disease levels in various crops. Early diagnosis is essential because damage spreads quickly. A experiment was conducted in which high-resolution RGB cameras and multi-spectrum sensors mounted on UAVs were combined to examine potato fields for infection. They showed accurate and fast pathogen detection using high-quality spectral measurements. The drone gathers data that identifies the differing reflective properties of various plant species and areas of the crop which have succumbed to disease. When this information is allied to software and analyzed, weed species and disease can be pinpointed and targeted with high precision crop control measures. Orchards and other horticulture plants can also make use of the technology with accurate identification and tagging of trees infected with a range of diseases.

Tree and land mapping

As well as the disease control aspect, orchard fruit growers can benefit from reports on tree and row spacing with accurate calculations of canopy coverage. The same applies to forestry and timber production where drones can play an important role in accessing remote sites on terrain that would otherwise be difficult to cover.The ability to cover large ground areas is a major benefit for mapping generally. Hundreds of hectares can be mapped in a day with the most sophisticated systems accurately pinpointing changes in terrain and boundary features. The data captured then creates a 3D computer model to highlight ground features and any changes that may have occurred.The information can be used to give area measurements for administration purposes or fed into machinery software to help the operator avoid hazards such as electric cables, flooded areas, changes in water courses, or drainage hardware.

Crop Spraying

Larger drones are already capable of applying small quantities of pesticide or fertilizer to crops, orchards and forested areas. The main legislative barriers are bans on aerial spraying which were implemented due to environmental concerns and counter terrorism laws that broadly prevent drones from carrying payloads. Work is underway in numerous countries to amend rules to allow spraying to go ahead because of the potential benefits which include:Zero ground compaction, Spraying taller crops (maize), Access to difficult terrain, Spraying under or around power lines pylons, Spot spraying of small diseased areas or pest populations, Lower cost in time, wasted product and fuel, Reduced environmental risks as areas are small. The drones used are approximately 2m in diameter, weigh about 20 kg and can carry a 10 litre payload to treat about 1ha/hr. Active radar systems and real time knowledge (RTK) gps are programmed into the drone which then flies a pre-set route at location accuracies down to 1cm. The forward and downward looking radar systems allow the drone to keep a consistently low height above the crop, minimising the chance of spray drift. Sophisticated object avoidance software also means the drone can navigate around obstructions.

Advantages

UAVs are capable of capturing imagery at high risk situations. They can be flown below clouds and in light rain. They are not limited by physiological conditions that would affect human pilots of light planes. It is capable of flying and capturing imagery in more than 70% weather conditions compared to satellite imagery.

Limitations

A major problem with UAVs is battery and flight time limitations. Although battery management requires constant maintenance, most UAV operators do not pay attention.This causes increased periodic replacement, resulting in additional costs. Currently, it is possible to fly 20–30 min with a fresh battery. However, this does not provide enough time for serious crop work.

Use of UAV for improving agricultural productivity using assessment of crop health monitoring and spraying as per diagnosis of problem for crop health management

Whatsapp : A-connecting Digital Tool Between Farmers to Scientist for Crop Health Management in Agriculture During Covid-19

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The damage to plants caused by competition from weeds and by other pests including viruses, bacteria, fungi, and insects greatly impairs their productivity and in some instances can totally destroy a crop. Crop protection is the science and practice of managing plant diseases, weeds and other pests that damage agricultural crops and forestry. Agricultural crops include field crops, vegetable crops and fruits.The Food and Agriculture Organization (FAO) estimates indicate that pests and diseases are responsible for about 25% of global crop losses.Mobile internet in India has the strong potential to improve small farmer's accessto agricultural knowledge and information during Covid-19. The internet and social media penetration arelikely to increase substantially in near future. Here lies an opportunity to use social media forsharing agrarian information to rural mobile internet users. Social media platforms like Facebook and WhatsApp could be a boon to the agriculture sector in many ways to reaching correct diagnosis and as per management. WhatsApp; one of the mostpopular social media tools offers many unique advantages between farmers to scientist for share scientific information, which makes it as an excellent potentialagricultural extension tool. Knowledge and information gapseems to be one of the major factors for poor agricultural productivity during covid-19.

Thisgap seems to be the result of inadequacies of the current agricultural information deliverysystem for farmers. Yield increases of 50 percent or more often occur; when improved inputs are used in stipulated timeand better knowledge applied as per concern scientist.Diagnosis is important to concern disease, insect and weeds for effective management and sustainable agriculture. It is important to farmers that how to diagnose and treat plant diseases, insects and weeds at field. Plant diseasethat could wipe out the entire crop is one of the biggest risks that farmers face for crop health management. Sometime disease caused by bacteria farmers not identified cause of disease and they spray other fungicide that means it was totally loses money, time as well as disease severity also increase when not manage at proper time. WhatsApp has played a major role for framers to scientist for diagnosis agriculture problem during covid-19 and certain unique advantages in thisregard. First is that it does not suffer from geographical and time limitations. At an instant,farmers can post his/her query without visiting the agriculture centre. This can save aconsiderable amount of time, money as well as the worry of the farmers. They can postpictures of different parts (leaves, stem, fruits, and roots) of infected crops.

This can besupplemented through text or even a short-duration video. WhatsApp provides a goodmedium in which farmers can receive crop diagnostic support services. Besides, the resourceperson has greater freedom to think and even discuss the plant health problem and is moreable to diagnose the problem due to a visual examination which is impossible in case of manyexisting mobiles-based agricultural information services. Furthermore, during answering aquery the other farmers facing a similar type of problem are as well likely to find answers totheir problems. During lockdown whatsapp group for farming solutions in hadoti region get immediate advice about disease, insect, weed and nutrient deficiency in kharif crops viz., Urdbean, soybean, mungbean, paddy, bajra, seasame, clusterbean, fruit crops and vegetable crops. The major disease symptoms of yellow mosaic virus on

urdbean, mungbean and soybean was received on whatsapp by author. Disease and insect appearance depend on whether so every week's new emerging problem was observed through whatsApp. Weeds control in paddy, soybean was on hot spot due to late monsoon. Diseases on various crop was diagnosis on the basis of symptoms and control measure suggested as per recommendation of respective targets against crop. Some farmers upload photographs of their disease-hit crops to seek advice. Whatever problem coming that can be solved with the help of experts. Besides solving farmer's problem, information is also provided on new techniques of cultivation of different crops. On the group good agricultural practices are also shared. During the lockdown, farmers, who were looking for answers on their queries and other agriculture-related information, will get all the essential information without going to the nearest KrishiVigyan Kendra. The farmers will get connected to subject expert scientists of various disciplines related to agriculture throughWhatsApp, as they will respond to their queries. Agricultural scientists will suggests ways to diagnose problem as well as epidemiological influence of abiotic factors thoughWhatsApp. This will be an interactive fruitful communication as farmers will ask their queries with contact numbers of agricultural scientists and the scientists will be available online 24X7 to help for solve their problem for sustainable agriculture production.

Being one of the cheapest ways to share information, there are many agro information-based WhatsApp groups all across India that are helping farmers in obtaining information about the latest happenings in the field of agriculture. These groups consist of a broad range – from crop health to seed availability, soil health, animal health, feed quality, fodder, fertilizers and pesticides and so forth.

Incredible Wildlife and Its Unseen Suffering

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India's fauna and flora is matchless in richness, variety and abundance. Its great latitudinal spread, encompassing a wide range of temperature, condition makes it rich and varied for wildlife.

The rich variety of fauna is in direct relation in the abundance and opulence of the flora. Both are interlinked and interdependent in many ways. The flora depends on the fauna for its fertilization, propagation and spread, while the latter's existence and survival depends on the farmer. There are about 350 sp. of mammals, 1200 sp. of birds, more than 3,000 sp. of insects, apart from great variety of reptiles and fishes.

Fig : Black buck antelope deer

The mammals include the Elephant, Indian Bison, Indian Buffalo, Blue Bull or Nilgai, Four Horned Antelope, Black Bulk, Indian Wild Ass, the famed One Horned Rhinoceros and many varieties of Deer. Under the big giant category come the Indian Lion, Tiger, Panther, Leopard and various species of smaller cat. Different types of Bear roams the western Himalayas, but only the single species of Panda is found.

Several species of Monkey and Apes are common. The Wild Yak inhabits the upper land of Ladakh.

Due to the diversified habitat and ecosystem the wildlife in the Rajasthan desert is very rich in contrast to the other deserts in the world.

Some wildlife species such as Blackbuck, Chinkara and the Indian Wild Ass in the Rann of Kutch which are fast vanishing in the other parts of the country are found here in large number.

Fig 2: Map indicating the GIB habitats in India

Wildlife is an essential and integral part of nature. Wildlife includes all animals and other organisms. The wild birds, animals, insects and reptiles help to maintain a balance in nature, conservation of environment and add to the natural beauty of the earth. God has not created them without purpose. All these species have their respective and definite role to play in the larger scheme of things. Many animals are in the danger and on the verge of extinction due to infrastructural development and population growth. Best example is the state bird of Rajasthan *Ardeotis nigriceps* (Great Indian Bustard) locally known as Godavan, categorized as "Critically Endangered" by the International Union for Conservation of Nature and Natural Resources (IUCN) in July 2011 due to its reduction in population from an estimated 1,260 in 1969 to around 150 in India today.

Human activities are maniac to the animals and they are killed indiscriminately. Some people kill animals for making profits by selling their parts, elephants are killed for their ivory, alligators for their skin, birds for their feathers, furs, and for their meat. The list is non ending.

Hunting of animals is unethical and an unforgivable crime done to the animals, but also a disgraceful thing. By doing this, we make loss of ourselves too.

Wildlife is aesthetically important, not only for beauty and appreciation; but also for recreation activities. Nature maintains a delicate balance between plants and animals. Killing animals create a disparity in the environmental system. We must encourage wildlife awareness, its importance, need among each other. As otherwise ultimately, the loss is ours only.

Taking into consideration the strong need of wildlife conservation, the government of India and various National and International socities have started various projects and conservation related programs such as Project Tiger, Nature Camps and Jungle Lodges to promote the awareness of wildlife among the people. These projects not only help to preserve and protect our natural heritage, but also encourage eco-tourism. Due to the great efforts of government and researchers one can see the rise in population of Tiger in India which is a great success and a big step towards conservation of our incredible wildlife. The Kaziranga National Park in Assam is also big attempt to save the endangered Rhinoceros. Several conservation programs are going on in: Gir National Park & Sanctuary in Gujarat, Sunderbans National Park in West Bengal and Kanha National Park in Madhya Pradesh. So, there is a need of awareness regarding wildlife protection and wildlife conservation. Since, it is as necessary as we ourselves are. So, conserve wildlife and save the life on the Earth.

"The greatness of the nation can be judged by the way its animals are treated"

By Mahatma Gandhi

Relevance of Soil Quality Approach in Sustainable Agriculture Growth

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Soil, a natural medium, has undergone unabated degradation resulting in 173.65 m ha as degraded soils and a reduction of 20 percent in productivity. The increasing population and need of higher production per unit of land increased attention to study about soil quality- promoting practices. Monitoring of soil quality related issues will help in identifying a set of practices which lead to sustainable agriculture growth and ultimate goal to transfer healthy soil to the next generation. Soil quality is an assessment of the fitness of a soil to perform certain functions such as supporting plant growth, partitioning and holding water, and acting as an environmental buffer. According to Soil Science Society of America-

Soil quality is the capacity of a specific kind of soil to function within natural or managed ecosystem boundaries to sustain plant and animal productivity, maintain or enhance water and air quality and support human health and habitation.

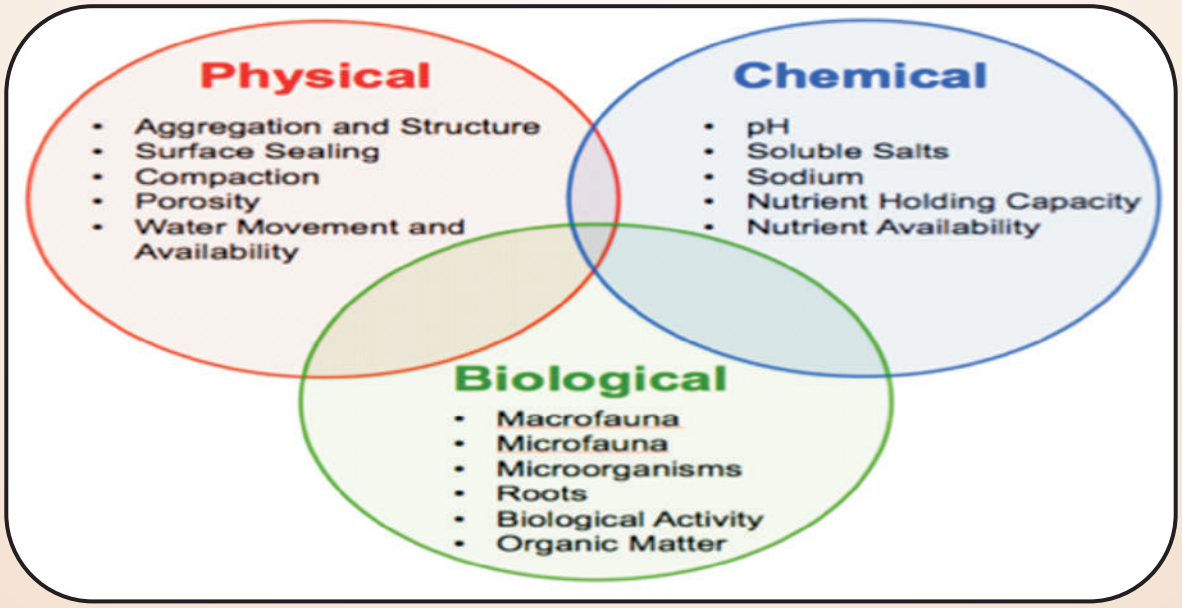
Soil frequently perform several functions such as, sustaining biological activity, regulating water and solute flow, detoxification, cycling nutrients and support to socio-economic structures, however, these all are carried over simultaneously. Soil quality and soil health, used interchangeably, are functional concepts that describe how fit the soil is to support the multitude of roles being played by it.

Factors Affecting Soil Quality

Major causes of poor soil quality are *viz.* nutrient demand–supply gap, imbalanced nutrition, deficiency and toxicity, low organic carbon, low biological activity, accumulation of salts, metal toxicity including heavy metals, erosion and deforestation etc.

Soil Quality Indicators and their Classification

Assessments of soil quality are based on changes in soil functions and vary depending on the purpose of evaluation. As we know that a spoonful of soil contains more micro-organisms than there are people on earth and many of these micro-organisms are key indicators of soil quality. Indicators may be categorized as direct (visual, physical, chemical and biological) and indirect (crop yield, bio-mass, nutrient use, water use, produce quality etc.). The physical, chemical and biological indicators are inter-dependent and is shown as under –



Strategies for Improving Soil Quality

Dynamic soil quality can be maintained or improved if we follow some of the practices as mentioned below:

(1) Enhance Organic Matter

Soil organic matter is a storehouse of several plant nutrients and it considered as the main stay of good soil quality. Regular additions of organic matter improve soil structure, enhance water and nutrient holding capacity, protect soil from erosion, hard setting and compaction and support a healthy community of soil organisms. Practices that increase organic matter include: leaving crop residues in the field, choosing crop rotations, using optimal nutrient and water management practices to grow healthy plants with large amounts of roots and residue, growing cover crops, applying manures or compost, growing perennial forage crops and mulching.

(2) Avoid Excessive Tillage

Tillage is used to loosen surface soil, prepare the seedbed and control weeds and pests. But tillage can also break up soil structure, speed up the decomposition and loss of organic matter, increase the threat of erosion, destroy the habitat of helpful organisms and cause compaction. Reducing tillage minimizes the loss of organic matter and protects the soil surface with plant residue.

(3) Manage Pests and Nutrients Efficiently

Efficient pest and nutrient management means testing and monitoring soil and pests; applying only the necessary chemicals, at the right time and place to get the job done; and taking advantage of non-chemical approaches to pest and nutrient management such as crop rotations, cover crops and manure management. Adoption of IPM and INM concepts in agriculture system is also beneficial to maintain and build up soil quality.

(4) Prevent Soil Compaction

Soil compaction reduces the amount of air, water and space available to roots and soil organisms. Compaction is caused by repeated operations, heavy traffic or traveling on wet soil. Deep compaction by heavy equipment is difficult or impossible to rectify, so prevention is essential. Subsoil tillage is only effective on soils with a clearly defined root-restricting plough pan. In the absence of a plough pan, subsoil tillage to eliminate compaction can reduce yield. Prevention is the best method to manage compaction and not the tillage.

(5) Keep the Ground Covered

Soil without adequate cover or bare soil is very much susceptible to wind and water erosion, and to drying and crusting. Ground cover protects soil; provides habitats for larger soil organisms, such as insects and earthworms and can improve water availability. Ground can be covered by leaving crop residue on the surface or by planting cover crops. In addition to ground cover, living cover crops provide additional organic matter, and continuous cover and food for soil organisms.

(6) Diversify Cropping Systems

Diversity is beneficial for several reasons. Each plant contributes a unique root structure and type of residue to the soil. A diversity of soil organisms can help control pest populations and a diversity of cultural practices can reduce weed and disease pressures. Diversity across the landscape can be increased by using buffer strips, small fields or contour strip cropping. Diversity over time can be increased by using longterm crop rotations.

Changing vegetation across the landscape or over time not only increases plant diversity, but also the types of insects, microorganisms and wildlife that live in the soil.

The ultimate benefit to enhanced soil quality is the protection of a finite natural resource. Maintenance and enhancement of soil quality maintains maximum efficiency in crop productivity over time by enhancing nutrient cycling and encouraging site-specific application of nutrients and pesticides. It protects water and air quality and preserves the beneficial functions of the soil in specific ecosystems. Improvement in quality of soils, ensure that the primary agricultural lands are sustained for future generations. Soils of high quality are essential for the production of a bountiful supply of safe food and fibres. Healthy food translates to a healthy people and a healthy nation.

Nutri Gardening is Useful for Healthy Food Supplying in Lockdown Period-Success Story

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Healthy food is the basic need of human being. Similarly, fresh fruit and vegetable is also requiring for maintaining good health. India with its agro-climatic diversity amenably grows a large variety of medicinal and minor horticultural plants. They play an important role in Indian economy with minimum cost of cultivation and contributing about 30 per cent of GDP from agriculture. Horticulture sector, which includes fruits, vegetables, floriculture, spices, plantation crops, medicinal plants, nuts and tuber crops, among others, covers 25.49 million hectares of land (2018-19) with the total production of 313.85 million tonnes. The feeding nature of haroti region people is the chapatti and juicy sabzi. Use of juicy and spicy vegetable is the liking of most of the poor and middle-class family. KrishiVigyan Kendra, Anta develop a nutri gardening in a 100 sqm piece of land. Keeping the feeding habit of the haroti region people and 10 staff members and his family this center develop the mother block of tomato and perennial bird eye chilli and supplied the tomato cuttings and perennial chilli seedling during the period of June to March in paper cup and in barren rooted to the farmers and kitchen gardener and consumption of 300 g vegetable and 140 g fruit intake is only possible by own developed garden.

A large number of vegetable crops are grown in the district. The people of haroti region like pungent food like Namkin, Kachori, Pakodi. Here People prefer Kath-Bafla, Dal-BatiChurma, in special diet and Sabji-Chapati (used wheat flour) used to take in daily diet. Long shape chilli fruit, round shape and spiny brinjal, white colour potato, red colour carrot, cauliflower, pea, palak are the prime liking of district farmers for Sabji making. In vegetables oil refined Soybean oil mostly preferred by this region people.

In all such scenario, technological innovation led development is much sought-after aspect. Nutri gardening is one of the viable options to develop the backyard or unutilized land to generate the additional income to social community. A diet rich in fruits and vegetables has been shown to prevent cancer, neurological disorders and allergies. Nutrition garden by self can offer fresh and chemical free fruits and vegetables.

Development of Mother Block : Tomato is the crop can be easily grown by soft terminal shoot cuttings throughout the year. The perennial bird eye chilli can be grown throughout the year regularly. Therefore, mother block of these vegetable is developed at KVK for the supply of pure materials to the farmers (Fig.1).

Location and Site : Anta is the tehsil headquarter of district Baran and well connected with the road NH-76 and train, comes under town with the population of 32377 and KrishiVigyan Kendra, Anta is located on railway station road. This centre have a total 15 ha land. Therefore, the 100 sqm piece of land for nutri gardening is selected backyard of the main building.

Crop Rotation: This centre have a mother block of perennial bird eye chilli and tomato variety ArkaRakshak for regular supply of planting materials to the vegetable growers. The following crop rotation are practiced to supply of regular vegetables in the nutri gardening :

1. Tomato –Pea - Bottle gourd
2. Chilli – Tomato –Okra
3. Brinjal –Onion – Pumpkin
4. Kharif Onion –Tomato
5. Tomato –Tomato – Tomato
6. Chilli – Cauliflower/Radish – Okra

7. Chilli – Leafy Fenugreek – Leafy fenugreek
8. Tomato – Palak/Carrot – Brinjal
9. Tomato- brinjal - Bottle gourd
10. Okra – Palak – Onion
11. Brinjal – Tomato - Chilli

Crop Management: The cucurbits are planted around the boundary of plot and the area is divided into10 plots of 10 sqm. The space on both sides of the path is utilized for the cultivation of turmeric and ridges formed in the channels are used in the cultivation of radish, carrot etc. The vegetable crops like tomato, brinjal and bottle gourd was grown during the year 2019-20 (table 2). Tomato plants are grown from cutting of mother block plant during the month of December,2019- January,2020 and planted in field, The brinjal variety Isha and bottle gourd variety Vinayak directly grown from the seed.

Table 2 : Production of zaid season vegetable in nutrigarden.

Name of Crop	Variety	No of Plant/sq m	Plant height (cm)	No of fruit/plant	Weight of fruit(g)	Yield/plant(Kg)
Tomato	ArkaRakshak	9	85.38	28.47	89.21	9.78
Brinjal	Isha	9	76.96	21.53	116.89	6.89
Bottle gourd	Vinayak	2	215.68	32.12	289.58	21.02

Output : The crop rotation No.5 is adopted in kitchen garden for regular supply of tomato to the staff members and farm labourer. The tomato plant was directly planted from stem cutting taken from mother plant (Fig.1) and planted at 45x45 cm distance. The tomato is grown in 100 sqm are of the nutri garden and produced 5.51q in 8 picking from in 4-5 days intervals. These tomato fruits were also used for processing and seed extraction and total income generated Rs 4250 from the tomato fruit besides the production of 150 g seed Rs 16500 from the stem cutting.

Fig.1 Mother plant of tomato variety Arka Rakshak

Fig.2. Selling of tomato to farm labour

Fig. 3 Production of tomato and grading for market sale

Balancing Studies With Hobbies

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"The only way to do great work is to love what you do. Or else later you may have woe; if you haven't found your goal, don't settle. As life is full of big and small battles".

Life of students is undoubtedly full of struggles, competition and confusion. It can be amiable only if you know "yourself". Knowing one's strength and qualities and removing the drawbacks can lead you to be a confident person. School has a vast curriculum. It gives students ample opportunity to participate in dance,sports,drama,debate,music,art& craft and many more.There in and slowly it turns into your hobby.

A few tips below can help you to balance betweenstudies and hobbies.

1. **CHOOSE HOBBIES WISELY:-** You need to understand that hobby doesn't mean escape. The fear of study makes you choose many things that you really do not do justice to. The real issue might be that you hate studying, So "Anything but not study" becomes a hobby. You need to be careful to choose a meaningful hobby that you really care about. Studies are "not superior" to hobbies; the "not studying" attitude produces guilt. The result is that you don't do justice to hobbies as well. It's a fact that studies show that you need to keep "studies" as a priority. It will help you to keep a balance between studies and hobbies.
2. **DO NOT FOLLOW THE RAT RACE:-**It involves doing whatever your friends are picking up. Choose it according to your desire. "Your wish" matter the most. Following the rat race and letter losing interest will lead to frustration. Choose what "you enjoy" not just "popular". This will help you to do justice to your studies too.
3. **Have a schedule for studies for the whole year:-** Studies might be boring compared to self choosing hobbies but there is need to have a good degree or qualification. Which is "your possession" be regular to your school and deposit your assignment on time (Do them yourself) it will give you a sense of accomplishment of academics.If you are tired of studying for long hours, don't force yourself. Immediately pick up your hobby. It's perfectly alright! Do something meaningful, feel refreshed and come back to studies. The best part- If your hobby group is your study group it works even better.

MAKE USE OF EVERY SECOND:-We always keep on complaining that we didn't have enough time and give many more silly excuses.The real problem is not lack of time,but lack of effectiveness. Some students come to school only for the sake of 'attendance' and 'assignment submission'. So, that are only physically present and not 'mentally'. It's a pure wastage of six hours.Instead, whatever you do, ensure that your 'career' is getting built.Remember school life is not just about 'fun memories'. Choose your goal and soon you will get it!

You need not do everything and just anything. Follow your heart, your inspiration and you elder's guidance and not your friends as they are of your age and sailing in the same boat. They may not give correctguidance as experienced people like your teacher, relatives and parents can. Someday you will be a strong person, able to balance your life, "your way". Remember, your mind is a powerful thing, when you fill it with positive thoughts your life will be fruitful and the most important 'enjoyable'.

" Strength doesn't come from what you can do".

It comes from overcoming the things you once thought you couldn't

Enhancing Chickpea Breeder Seed Production for Increased Seed Availability to Farmers

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Seed is the basic and most critical input for sustainable agriculture. The response of all other inputs depends on quality of seeds to a large extent. It is estimated that the direct contribution of quality seed alone to the total production is about 15 – 20% depending upon the crop and it can be further raised up to 45% with efficient management of other inputs. There is significant contribution of enhanced seed production of high yielding varieties in the national endeavour of increasing food production to attain food & nutritional security.

Every farmer should able to access healthy seeds which are genetically pure, with high seed vigour and good germination percentage. Timely availability of good quality seeds at reasonable price ensures good yield and profit to the farmers. The seeds plays a vital role in agriculture and acts as a carrier of the genetic potential of varieties.

A centre of AICRP on Chickpea, ICAR-Indian Institute of Pulses Research, Kanpur (U.P.) is running at ARS, Kota (Agriculture University, Kota) under which the breeder seed production of high yielding varieties of chickpea is taken up regularly. The details of breeder seed production programme taken up in Rajasthan state as a whole and Agriculture University, Kota during last five years are provided in table 1. The perusal of the table shows that the breeder seed production in Agriculture University, Kota has increased from 24 percent of the state share in 2014-15 to 42 percent in 2018-19. The university has ranked second in overall chickpea production of the state. The proactive efforts of various seed related programmes after 2014-15 has resulted in increased chickpea seed production to nearly double. This has also resulted in increase in the seed replacement rate (SRR) of most of the pulses, in general; and chickpea, in particular. It has also helped to bring more number of new, high yielding varieties (HYVs) in seed chain.

Since the food production has to be increased in tune with the increasing human population and decreasing availability of land, water and other resources, therefore, concerted efforts are required to increase the production of quality seed of high yielding varieties of cereals and pulses to make available "balanced diet" for the mankind. It is hoped that Agriculture University, Kota well equipped with fertile clay loam soil, high rainfall and Mechanized Agriculture Farm will successfully produce sufficient seed to cater the seed requirement of the Indian farmers.

State: Rajasthan					
Year	**Centre**	**DAC Indent**	**Allotment BSP-I**	**Production**	**Surplus/deficit**
2014-15	SKRAU, Bikaner	344.00	378.50	514.30	170.30
	AU, Kota	**241.20**	**263.00**	**317.00**	**75.80**
	SKNAU, Jobner	415.60	455.90	406.01	-9.59
	MPUAT, Udaipur	18.00	20.00	51.00	33.00
State Total		**1018.80**	**1117.40**	**1288.31**	**266.51**
% share of AU, Kota		**23.67**	**23.53**	**24.60**	
2015-16	SKRAU, Bikaner	367.5	404	615	247.5
	AU, Kota	**395.2**	**458**	**603**	**207.8**
	SKNAU, Jobner	712.6	787	679	-33.6
	MPUAT, Udaipur	95.7	106	85	-10.7
State Total		**1571**	**1755**	**1982**	**411**

% share of AU, Kota		**25.15**	**26.09**	**30.42**	
2016-17	SKRAU, Bikaner	322	408	454	132
	AU, Kota	**407.3**	**510**	**1085**	**677.7**
	SKNAU, Jobner	392.5	491	335.3	-57.2
	MPUAT, Udaipur	122	152	88	-34.0
State Total		**1243.8**	**1561**	**1962.3**	
% share of AU, Kota		**32.74**	**32.67**	**55.29**	
2017-18	SKRAU, Bikaner	631.6	731.39	633	1.4
	AU, Kota	**344.8**	**400**	**646.8**	**302**
	SKNAU, Jobner	309	355.32	277.8	-31.2
	MPUAT, Udaipur	25	28.75	84.54	59.54
State Total		**1310.4**	**1515.46**	**1642.14**	**331.74**
% share of AU, Kota		**26.31**	**26.39**	**39.38**	
2018-19	SKRAU, Bikaner	759.3	860	869	109.7
	AU, Kota	**659.5**	**815**	**876.84**	**217.34**
	SKNAU, Jobner	176	202.4	259	83
	MPUAT, Udaipur	20	23	54.37	34.37
State Total		**1614.8**	**1900.4**	**2059.21**	**444.41**
% share of AU, Kota		**40.84**	**42.88**	**42.58**	
Source: Annual Report Chickpea, IIPR, Kanpur					

Table2: Seed Replacement Rate of Chickpea

Crop/Year	2014-15	2015-16	2016-17
Chickpea	25	28	32

Source: Crops Division, Government of India, Ministry of Agriculture & Farmers Welfare, Department of Agriculture, Cooperation & Farmers Welfare, Krishi Bhavan, New Delhi

Self Reliant India Through Value Addition in Farm Produce

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Indian agriculture has made substantial progress in the areas of growth, job creation and diversification. As the second most populous country in the world with an agricultural area of 142 million hectares, it provides employment to half of its population. Having moved from a country ravaged by food insecurity to being a food surplus nation, there has also been a shift in the composition of agricultural production. Due to evolving lifestyles and patterns of consumption, the output of horticulture production was 311.7 million tonnes, surpassing that of food grain, estimated at 279.5 million tons in 2017-2018.The most important problem facing the country today is providing remunerative price to the farmers to their produce. This problem could be solved largely in the surplus production in agriculture sector. The value addition coupled with marketing with enormous potential of solving of basic problems of agricultural surplus and produce wastage and it also create rural jobs provide remunerative price to farmer.

In India, only around 8 per cent of the country's total agriculture produce undergoes value addition. The highest value addition is seen in milk (35 per cent) followed by marine (26 per cent), buffalo meat (20 per cent), poultry (6 per cent) and fruits and vegetables (2.2 per cent). The level of value addition is higher in developed countries for the same products; milk (60-70 per cent), fruits and vegetables (65 per cent), buffalo meat, marine and poultry (65-70 per cent). The low value addition is attributed to the non-availability of processable varieties of raw materials, seasonal nature of production, and lack of adequate post-harvest infrastructure such as processing, cold chain, transportation and proper storage facilities.

Value added agriculture refers most generally to manufacturing process that increases the value of primary agricultural commodities. value added agriculture may also refer to increasing the economic the value of a commodity through particular production process e.g. organic produce, or through reasonably branded products that increase consumer appeal and willingness to pay a premium over similar but differentiated products. Value added agriculture is regarded by some, a significant rural strategy.

Small scale processing unit, organic food processing, non traditional crop production and value addition agri tourism bio fuel production are the example of various value added projects that creates good jobs in rural area. When the rural population is active in these sectors, they can gain even more than the raw sale of farm produce.

Agriculture is a large contributor of the state's economy. The state falls into three of the four agro-economic zones in which the whole country is divided. The major crops in Rajasthan are bajra, jowar, maize, barley, wheat, black gram, green gram, gram, cotton, groundnut, sugarcane, rapeseed, mustard and sesame. Rajasthan occupies first place in the production of bajra, rapeseed and mustard in India and Hadoti region is highest producer of cereals (wheat, paddy, Maize and pearl millet), pulses (chickpea, black gram and green gram), fruits (papaya, aonla, guava, beel, mango, lemon, pomegranate), vegetable (tomato, potato, garden pea), spices (turmeric, ginger, chilli, garlic), seed spices (coriander), oil seed (soyabean, seasmum, groundnut).

Value addition of cereals :

- Anaemia is a big global concern. Pearl millet is a rich source of iron. By the value added in pearl millet, biscuits, chocolate, chapatti and bornvitta can be made.
- Wheat paddy and maize, also used for flour (flour milling unit), chapatti (domestic level) papad (small scale unit), kurkure (extruded formula), bakery products, corn flaxes, rice flaxes, puffed rice, bread and semolina. Zein protein present in maize to be useful for the defence of PEM. This is good for SAM children's drugs.

Value addition of Pulses :

- Pulse is a rich source of protein that is very useful for nutritional safety.

  Whole pulses are useful for the preparation of split pulses, besan, candy, namkeen, papad, mangodi, badi and extruded formulations.

Value addition in fruits and vegetable :

- Aonla, candy, papaya and mango cake, fruit jelly , squash, ready to serve drinks, murabba, crushers, beverages , concentrates, pulps, slices, frozen & dehydrated products, pickle, fresh frozen vegetable, chips, wafers, chutney and sauces, frozen pea, beel sharbat and powder etc.

Value addition in oilseed :

- Soya milk, tofu, paneer, poshak, laddu , soya nuggets , peanut butter, peanut mixture for malnourished children , groundnut oil and mustard cooking oil etc.

Value addition in spices :

- whole seed , red chilli powder , chilli pickle , sauces, garlic chilli chutney , saline garlic, garlic pickle, flax, coriander powder,

  Migration from agriculture sector to industry or big cities of rural can be stopped or minimize by establishing of small scale cottage industry in rural area. Rural people can be trained by skill oriented training in different agriculture sector.

There is huge unexplored opportunity underlying in the food processing in the country

Segments	**Primary Processing**	**Secondary Processing**	**Tertiary Processing**
Fruits and Vegetables	Cleaning, Cutting, Sorting	Pulp, Flakes, Paste, Frozen, Diced, Canned	Jams, Jellies, Chips Ready to Serve drinks, Indian ethnic drinks
Grains and Cereals	Sorting and Grading	Rice Puff, Flour, baby food(final product /ingredients)	Cakes, Biscuits, Breakfast cereals, breads, other bakery products, RTC/ RTE products
Oilseeds	Sorting and Grading	Oil Cakes, Refined Oils	Soya Oil, Olive Oil, Mustard Oil, Fortified Oil
Milk	Grading and Refrigeration	Packaged milk, Flavored milk, Cream, Milk powder	Yoghurt, Cheese, Ice cream, Curd, Baby food, other value added products
Meat and Poultry	Sorting and Refrigeration	Chilled/Frozen products	Ready to Eat products
Marine Products	Chilled/Frozen products		Ready to Eat products

How Arhar Became India's Favourite Dal ?

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Pigeon peas or Cajanus Cajan is an alternative crop to the current line of commercial available crops. People are constantly looking for new replacement foods that can form a stable diet with enough bulk such as potatoes, rice and beans. Many of the other commercial crops are actually not stable diet foods that provide enough bulk for a healthy diet. These crops include, tomatoes, onions, peppers, peas, lettuce, spinach etc. Pigeon peas are also known as Red gram and Udali.

There is quite unique way that pulses are used in the Subcontinent, hulled, often split, cooked in water almost like gruel and combined with rice to offer a complete protein diet to vegetarians. Now here in the world such a predominant use of dals in diets is certainly not quite in this fashion. It is equally remarkable is how dals unite disparate culinary traditions in the country. Almost every region, every community historically and geographically separate has a dalliance with dal. All types of dals are cooked almost in identical ways, with water, salt and haldi, even though the tempering or the seasoning may differ from region to region.

The status of India's favourite dal must go to the arhar the yellow pigeon pea. Arhar is what unites the Subcontinent, in its various manifestations in different states, at least so many of them that the rule of chana (in Bengal), moong and urad must be discounted, even if they clamour equally for our palates.

In the North Gangetic plains of UP and Bihar, no self-respecting summer lunch can be complete without watery and mashed up arhar that has been cooked with a bit of raw mango in it. That tartness, along with even a simple tempering of cumin, injects liveliness into dull days. Amchoor arhar and a simply sautéed dish of potatoes with rice is what home meals mean to so many and continue to excite considerable nostalgia.That nostalgia of those from Bihar and UP can perhaps only be countered by the varan-bhaat nostalgia those who grew up in the Deccan have Varan, just plain arhar dal, with boiled rice and toop, a dollop of ghee never quite understood what the excitement was about.

But perhaps it is just about what elsewhere in the country, in Punjab, for instance, would be immediately identified as “maa ke hat ka pyar”

It's really in the South India that the arhar gets more complex and therefore much more interesting. This is the stronghold of the sambhar. We also now know even above the Vindhyas, there is not just one kind of sambhar. From the Udupi version, which comes with onions and tomatoes and is deemed sweeter to the puritanical Tam Brahm version, there are as many different kinds of sambhars as there are communities in India.

The uniqueness of each style of sambhar obviously depends on the sambhar masala as also the souring agent being used. But in this sea of disparity, what gives the dish its character what makes the sambhar really is dal, tuvar dal though there are recipes that suggest using masoor or a mix of dals for sambhar too.

The story of how the sambhar came about is an instructive tale. Apparently, Sambhaji's Maratha army used to the amti (another similar dish that uses a spice mix in the tuvar dal) brought it down further south. Some spices changes, more sourness got added into the favour profile, curry leaves, coconut and other flavours got stirred into the pot and what emerged was the sambhar. It's as delicious a narrative as the dal itself.

In Andhra, the pappu charu is a delicious version of the arhar, soured by tomatoes just like the dal fry of Punjabi dhabas even though the tempering uses different spices in both the cases to give us two distinct . The tale of the arhar dal has many twists and turns, each highlighting culinary ingenuity, same base material, different spices and you get a new dish every few hundred kilometres.

The big advantage of arhar is that it has been become a major part of people's diet of the Country. On the basis of above it is pragmatic that arhar is the dal which has been stretched in the whole country i.e. North to South and East to West and considered as Bharat Ki Dal.

Green Vegetable Pigeonpea for Ultimate Nutritional Health

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Pigeonpea or red gram (Cajanuscajan (L.) Millspaugh) occupies an important place in rainfed agriculture. This crop has a wide range of uses and its use as fresh or canned green peas is common parts of India, Africa, Central America. Vegetable pigeonpea is characterized by large pods and seeds because of easy shelling. Some parts of India prefer green pod colour but the study revealed that pod colour does not play an important role in determining the organo-leptic qualities of vegetable pigeonpea. The anti-nutritional factors like phyto-lectins are also present in pigeonpea, but it is heat sensitive and destroyed during cooking. Vegetable pigeonpea can be grown in backyards, fieldbunds and also as a commercial crop. The fresh seeds can also be frozen and canned for commercialization and export. Vegetable pigeonpea is a good source of protein, vitamins (A, C, B complex), minerals (Ca, Fe, Zn, Cu), carbohydrates and dietary fibre. In comparison to green peas (Pisum sativum), the vegetable pigeonpea has five times more beta carotene content, three times more thiamine, riboflvin and niacin content and double vitamin 'C' content. Besides it has higher shelling percent (72%) than that of green peas (53%). These all factors indicate that pigeonpea is nutritionally rich vegetable and it can be used in daily cuisine.

Abundant Resource of Nutrition :

Pigeon peas, a popular vegetable in tropical countries, are healthy and versatile. Ripe pigeon peas are a common ingredient in dhal, an Indian split-pea soup. Immature pigeonpea seeds, also called green pigeon peas, are reputed as an old folk medicine remedy for liver and kidney ailments, according to Purdue University, but they offer real health benefits today. They are a nutrient-rich addition to rice or a variety of other foods and can supplement your diet with protein, fiber, vitamins and minerals.

Calories, Fat, Protein and Fiber :

Green pigeon peas are moderate in calories and high in nutrients. Each cup of cooked green pigeonpeas has 209 calories, 11 grams of protein, 2.5 grams of fat and 8 grams of fiber. If you are trying to lose weight or increase your fiber intake, you can get more benefits from eating them raw. A cup of uncooked pigeon peas provides only 170 calories, 9 grams of protein, 2 grams of fat and 9.5 grams of fiber. The cooked version is higher in sugar, with 4.6 grams, compared to 3.8 grams of sugar in raw green pigeonpeas.

B-complex Vitamins :

Green pigeonpeas benefit your ability to metabolize food. They contain a wide array of B-complex vitamins that help your body turn fat, protein and carbohydrates into energy. Each cooked cup provides half the thiamin and one-fourth of the riboflavin and niacin you need each day. They also contain 36 percent of your daily requirement for folate and 6 percent for vitamin B-6. When pigeon peas are cooked, some of their water-soluble nutrients are depleted. For that reason, a cup of raw green pigeonpeas provides nearly twice as much folate as its cooked counterpart, giving you 63 percent of your recommended daily intake for that B vitamin.

Vitamins C and K :

Vitamin C is an important antioxidant that benefits your cells and immune system. According scientists men get 90 milligrams of vitamin C per day and that women get 75 milligrams. A cup of cooked green pigeonpeas provides 43 milligrams of vitamin C, but since it is a water-soluble nutrient, a cup of raw green pigeonpeas is significantly higher in vitamin C, with 60 milligrams. Pigeonpeas are also rich in vitamin K, a nutrient that ensures proper blood clotting,

protecting you from bleeding disorders. A cup of pigeonpeas, cooked or raw, gives you more than 100 percent of your daily requirement for vitamin K.

Essential Mineral Benefits :

A cup of cooked pigeonpeas provides one-fourth of your daily requirement for bone-building phosphorus and one-fifth for muscle- and nerve-protecting magnesium. It gives men one-third of the iron and one-tenth of the zinc they need daily. Women need more iron and less zinc, so the same serving size provides women with 13 percent of the iron and 15 percent of the zinc they should get each day. A serving of pigeonpeas also gives you one-seventh of the potassium you need daily, with 698 milligrams of this nutrient that helps your body maintain a healthy balance of water and promotes proper nerve function. Cooking pigeonpeas depletes them of some potassium; a cup of raw pigeonpeas has 850 milligrams of potassium.

Important Attributes of Vegetable Pigeonpea :

A. **Fresh Pod Colour :** There is a large variation for fresh pod colour in pigeonpea and for vegetable market, green pods fetch better price in the market.

B. **Pod and Seed Size :** For vegetable purposes, generally large pods are preferred for they are attractive and relatively shelled easily. Although seed number/pod in the germplasm ranges between 2 and 9, but on an average, the optimum seed number/ pod that is easily marketed is 5-7. Recently, the new vegetable types have been developed with up to 8 – 9 seeds/pod.

C. **Important Quality Parameters :** The green pigeonpea seeds are considered superior to dal in general nutrition. The observations showed that pigeonpea dal is better than vegetable with respect to starch and protein . On the contrary, the green pigeonpea grains have higher crude fibre, fat, and protein digestibility. As far as trace and mineral elements are concerned, the green peas are superior in phosphorus, potassium, zinc, copper, and iron.

The dal however, has more calcium and manganese. Like other legumes, pigeonpea seeds also contain some anti-nutritional factors. In dry pigeonpea seeds, poly–phenol compounds are present which inhibit the normal activity of some digestive enzymes. These include trypsin, chymotrypsin, amylase, poly-phenols, and tannins.

D. **Seed Development in Relation to Chemical Changes :** Pigeonpea plants produce profuse flowers and pods under normal growing environments.

The number of pods on the plants is also genetically related to their pod size. It has been observed that in small seeded varieties, pod load on an individual plant is much higher than those of large seeded. From nutrition and marketing view points, it is essential that the growing pods are harvested at a right stage to optimize the gains with respect to their yield and quality.The amount of crude fibre content in the growing seeds increased slowly with maturation, while soluble sugars and proteins decreased proportionately. The starch content recorded rapid increases between 24 and 32 days after flowering. The minerals and trace elements such as calcium, iron, zinc, magnesium, and copper did not produce significant changes during seed development in pigeonpea.

Commercial Processing of Vegetable Pigeonpea :

Commercial vegetable pigeonpea is commonly processed into canned or frozen peas. The following steps are essential in canning and freezing procedures of vegetable pigeonpea.

- **Vining and Cleaning :** To maintain freshness of harvested green pods, they should be shelled as quickly as possible. This will not only avoid fermenting but also make available necessary oxygen to maintain the quality.

- **Vining :** Small lots of pods is usually done manual vining and the shelled peas are generally consumed in local market either as fresh or frozen peas.The bigger lots are used for commercial purpose where vining and cleaning are performed mechanically. Most commercial canners feed the green pods directly into the vining machine while some use a pre-treatment of heat for better yields and clear brine. For local market, the shelled peas are washed and cleaning operation is carried out to remove unwanted peas and inert materials. The mechanically vined peas are cleaned soon after shelling.
- **Blanching :** Heat treatment or blanching is an essential treatment for both freezing as well as canning. This helps in stabilizing colour and flavour besides improving the texture of seeds. The best blanching is done by heating the peas to 185o F for five minutes in hot water followed by cooling in cold (80°F) water (Sanchez Nieva et al. 1961).

After the above mentioned series of treatments, the processed pigeonpea could be used either for canning or for freezing. These two follow-up treatments are summarized below:

(a) **Freezing :** Two methods of freezing peas are used in Dominican Republic. In the automated freezing system the peas are cooled in water at ambient temperature soon after blanching and then taken to fluidized bed freezer. In this freezer, operating between -10° F to -20° F, the peas are quick-frozen individually while moving inside a vibrating conveyor screen which receives a rapid moving current of cold air from the lower side (Mansfield, 1981). The frozen peas are then hand picked and kept in wax treated cartons and stored at 0° F.

(b) **Canning :** For canning purpose, the blanched peas are taken to volumetric filler through an elevator. Here the cans are filled with peas and 2% brine at near-boiling (195-200° F) temperature.

Marketing of Vegetable Pigeonpea :

In India and Africa, the marketing of vegetable pigeonpea is not well organized. Generally, local venders buy the product from whole-sale vegetable market and sell in local retail market. Hence, there is urgent need to accelerate the marketing and awareness to take the health benefits of this miracle nutritional rich green vegetable pigeonpea.

Higher Agriculture Education in the Span of COVID-19 Pandemic

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The year 2020 is also very crucial as world has been faced a great confront of COVID-19 pandemic resulted in the disruption of all effective activities of life. Although, in the thorny circumstances peoples are living their life in consonance to challenge and performing all the necessary activities for making a balance of work and life. Agricultural Education in India is strengthened and streamlined centrally by the Indian Council of Agricultural Research (ICAR) and is imparted through State Agricultural Universities , Deemed to be Universities, Central Agricultural Universities, Central Universities with Agriculture Faculty and a few other institutions under private and public sectors. Altogether there are thousands of faculty members spread across these Universities who are engaged fulltime in teaching, research and extension pertaining to agricultural and allied sciences, and an estimated lacks of students are pursuing various Undergraduate, Postgraduate and Doctoral programmes in these institutions. The pandemic has caused a serious loss and disruption in all the normal activities of the teaching, learning and skill enhancement. The pandemic has been adversely impacted on the higher agriculture education in whole country mainly on course delivery, professional competence and physical and psychological status of the teachers, students and stake holders related to agricultural higher education such as farmers, government and private personals.

The point wise detail of COVID-19 pandemic is described as under :

(1) **Disruption in teaching and learning time :**

The lockdown imposed following COVID-19, resulted in the loss of days depending on respective State Government decisions. The loss of effective academic learning time and effective faculty time includes time for other activities apart from actual teaching such as preparation, evaluation of records, answer scripts, assignments, etc.

(2) **Limited activities of Institutions :** All higher Agricultural Education Institutions were closed physically and though a few Universities started their online programmes and online engagements, disruption of academic calendar and activities were inevitable fallout of the lockdown.

(3) **Condensed learning by experimentations :** The lockdown had severely impacted the skill component. Unlike traditional degree programmes, courses of agricultural and allied sciences have built-in practical components (around 30%) and experiential learning modules through field experiments and village visits. The lockdown vanished these learning experiences.

(4) **Future carrier uncertainty :** This issue was particularly predominant among the students in the final year of their under-graduation and post graduation in terms of planning their next logical career progression i.e., taking up higher studies, preparing for competitive exams and/or taking up employment in private or public sector.

(5) **Minimum social erudition :** The courses of agriculture and allied sciences have a unique design in which all undergraduate and post graduate students, particularly those in social science area, are engaged in the social learning process. They would get to learn through observation of people's behaviours, and also learn from each other under and from wider social-ecological systems. Lack of access to these social contexts inbuilt in the Agricultural Education Institutions during the lockdown, compromised the opportunities to students from acquiring these experiences.

(6) **Awful impact on attainment of knowledge :** The courses for a typical undergraduate programme in agriculture and allied sciences are well structured with about 18 to 24 credits of theory and practical classes, per semester, depending on their year of standing. Due to the loss of significant instructional

time, the students could not have as much knowledge gain as under normal circumstances, in spite of the significant efforts taken by the Universities to establish online teaching programmes scheduled during most part of the lockdown.

(7) **Ability acquirement :** Most of the agricultural courses have a significant practical component (about one-third) in the course structure, which contributes towards skill upgradation. The course structure also provides for experiential learning, project-based learning and activity-based learning through peer interaction. This component was the most affected one due to the lockdown impact with the closure of all Institutions/ Universities and many times imparting skills through online is a challenge.

(8) **Inadequate faculty guidance :** All the Agricultural Universities have a unique structure for enabling personalized mentorship for the students by instituting Course Coordinators / Student Advisors and few Councillors for each batch of the students across the graduation levels. The benefits to the students through interaction with their Coordinators / Advisors / Councillors, who otherwise constantly stay engaged with the curricular and co-curricular activities of the respective batches were marginally affected due to displacement of students.

(9) **Physical fitness :** As the lockdown largely restricted the mobility of the people, albeit temporarily, their physical health viz. body weight, blood pressure, physical activity, nutrition & diet, and rest & sleep were greatly affected.

(10) **Emotional wellbeing :** The study indicated that the students perceived a significant impact of COVID-19 / lockdown on their psychological wellbeing. They considered that the lockdown adversely affected their self-confidence and overall attitude; caused boredom, frustration, anxiety, depression, uncertainty and ultimately led to loss of collective / group behaviour.

Way ahead to cope up with COVID-19 pandemic :

By adopting following strategies the situation of pandemic -19 can be tackled efficiently for maintaining standard of higher agriculture education.

(i) Institutionalize social distancing with contingency planning for the unforeseen situation of the University staff / students getting infected by COVID-19.

(ii) Careful use of personal digital thing viz., laptops, desktops, tablets, smart phones, etc.

(iii) Implementation of new online course on digital literacy, a non-credit, covering different learning tools, Learning Management Systems and their use.

(iv) Building up of moral of faculty and students.

(v) Help the students to come out of the stress and anxiety related issues by counselling

(vi) Capacity Building of faculty and students

(vii) Teaching with learners perception

(viii) Increased on line activities for all academic assignments

(ix) Development of e-learning infrastructure likes virtual classrooms, smart classrooms; establishment of regional technology enhanced learning labs for content development.

(x) Proper mindset and learning of faculty for e-teaching.

In this way the thorny circumstances of COVID-19 pandemic can be taken as opportunity for the development and well establishment of new modern electronic tools in maintaining standard of quality of higher agriculture education.

Self-Reliant India : Efforts Since Two Decades

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India's self-reliance (Atmanirbhar Bharat) will be based on five pillars — economy, infrastructure, technology driven system, vibrant demography and demand. When India speaks of self-reliance, it does not advocate for a self-centered system. In India's self-reliance there is a concern for the whole world's happiness, cooperation and peace. India has turned a crisis into opportunity. India talks about self-reliance as Vasudhaiva Kutumbakam (the world is one family). India's self-reliant is about comfort and peace of the entire world. The announcements made by the government on Covid-19, decisions of RBI and today's package totals to Rs 20 lakh crore. This is 10 per cent of India's GDP. This will play an important role in the 'Atmanirbhar Bharat Abhiyan'. Five pillars of India's self-reliance (Atmanirbhar Bharat) in detail are as follows :

Economy - an economy that brings Quantum Jump rather than Incremental change.

Infrastructure - an infrastructure that became the identity of modern India.

System - A system that is driven by technology which can fulfill the dreams of the 21st century; a system not based on the policy of the past century.

Demography - Our Vibrant Demography is our strength in the world's largest democracy, our source of energy for self-reliant India.

Demand - The cycle of demand and supply chain in our economy, is the strength that needs to be harnessed to its full potential.

Agriculture University Kota is imparting skilled trainings to rural youth as well as women through its KVKs since last more than 20 years to make India self-reliant. A series of trainings carried out to transmit latest agricultural technologies among rural youth. Training is an important tool for importing knowledge either “Learning by doing” or “learning by seeing”. Skill oriented programme were more emphasized to motivate them in income generating activities. Many other methods were also applied to make the learning more effective and long lasting, such as demonstrations, workshops, field days, field trips, lectures etc. Facilities and technical expertise are available to train the farmwoman, rural youth, school dropouts and extension functionaries for enhancement of the productivity of the crops of the area. This university offered every year many training programmes varying from 3 days short training to 30 days vocational training programs on processing, value addition of food products, organic farming and propagation of fruit plants, animal production, dairy, fruits & vegetable preservation, handicrafts sewing, embroidery etc. To provide self employment to farm women, rural youth and school drop outs, vocational trainings on different aspects such as soya processing, amla processing, value addition of food products, fruits & vegetable preservation, stitching, embroidery, painting, wall paper paintings, ceramic painting, dari, carpet, doomat, candle, agarbatti, dhoop batti, cotton batti, soap, detergent, and file cover making, mahendi designing and preparation of bakery products etc. were conducted, keeping in view the objectives to develop knowledge and skill among farm women, school dropouts and rural youth for latest technology and to promote self employment among rural youth through skill oriented vocational trainings in income generating activities

Technology Transfer Through Self Help Group (SHG)

Training programme on different aspects of women empowerment and their entrepreneurship development were conducted. Feedback was taken from different villages and according to that need based training programme were organized. Training programme were conducted to develop awareness, knowledge and skills among rural women. As a result of skill oriented training programmes SHG's have been formed with KVKs initiative, wherein the members contributed some amount once in a group and this money has been utilized by all the members of one group to start some vocation. The main advantage of these SHGs were that, members became more confident, they have developed the feeling of saving, the money was made easily available to start vocation along with the feeling of

unity. Most of the groups have availed the loan from banks and others now interested to link with banks to get loan for the exposure of these agribusiness at a large scale. Members of SHGs were taken up income generating activities like processing and preparation of soyabean products, preparation of aonla products, value addition of food products, fruits and vegetable preservation, tailoring, embroidery, saree decoration, fabric painting, ceramic painting, foaming of bed cover & cushion, soap detergent, rakhi, soft toy, artificial jewelry with jewelry box etc. In every SHG, 8-10 women are involved. They are preparing and selling vermin compost, soya sattu Nutrameal (Shakti Aahar) of soyabean, pickles of garlic, lemon chili and mixed vegetables, amla juice, murabba, squashes of lemon, orange and rose, khus, mangodi of green gram dal, jewelry box, soft toy, artificial jewellery and processed red chili, garam masala & turmeric powder etc. During COVID-19 pandemic most of the groups are preparing mask at large scale. KVK Kota has rendered logistic support in quality improvement and marketing initiatives and therefore the members of SHGs are earning regularly.

Activities of Self Help Groups and food processing entrepreneurs after vocational trainings

Preparation of processed multigrain Aata

Preparation of processed spices

Preparafion of Amla Juice

Preparation of Soya Milk

Preparation of Garlic products

Preparation of Soya paneer

Preparation of Carry bags

Zerdogi work on saree

Preparation of garments

Preparation of Pickle

Preparation of soft toy & macramé pot holder

Embroidery & decoration on saree

Preparation of tomato sauce

Preparation of Ceremic pots

Preparation of Wall painting

Preparation of green chilly pickle

Each SHG group to get Rs one lakh credit assistance in every district of Chenni and it will be implemented in every states of India. Deendayal Antyodaya Yojana National urban Livelihoods Mission is being implemented in all the states to alleviate poverty in urban households. Covid 19 pandemic lockdown had affected urban households as most of them lost their daily wages due to no work. Union government announced many financial assistance through Atmanirbhar scheme including Rs 500 per month for women PM Jan Dhan account holders. Women empowerment initiatives could sustain only with financial support. The SHG members earn money through various crafts as they have to run the family during hardship period like lockdown. True. It is with this intent that atmanirbharbharat scheme is launched which aims at rejuvenating rural livelihood and offering gainful employment that could prove to be a consistent source of income to rural poor.

Covid-19 Reduce Your Risk of Infection

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Krishi Vigyan Kendra, Bundi

गुणवता युक्त बीज उत्पादन मे खरपतवार प्रबंधन एंव रोगिंग का महत्व

डॉ. मनोज कुमार, डॉ. संध्या, एस. एन. मीणा, रवि किशन सोनी*
कृषि अनुसंधान केन्द्र, उम्मेदगंज, कोटा
*कृषि महाविद्यालय, उम्मेदगंज कोटा

खेती मे उन्नत बीजो का सर्वाधिक महत्व है। केवल उच्च गुणवता वाले बीजो की बुवाई मात्र से ही उपज मे 15–20 प्रतिशत की बढ़ोतरी हो जाती है। अच्छे बीज का पहला गुण यह होता है कि वह शुध्द हो अर्थात उसमे दूसरी किस्म के बीजो का मिश्रण न हो। फसल उगाने के लिये प्रमाणित बीज ही ले जिनकी अंकुरण क्षमता अधिक होती है ये स्वस्थ व निरोगी भी होते है। ये खरपतवारों के बीजो से मुक्त होते है और इनमे किसी अन्य किस्म के बीज की मिलावट नही होती है। उच्चगुणवता युक्त बीज उत्पादन हेतु जरूरी है कि समय समय पर अवांछनिय पौधो को खेत से निकालते रहें। पिछले दो दशको के दौरान खरपतवारों के द्वारा भारतीय कृषि अर्थव्यवस्था मे लगभग 20–30 अरब का आर्थिक नुकसान देखा गया है। खरपतवारों के द्वारा विभिन्न खाद्यान फसलों कि उपज मे 20–70 प्रतिशत कि हानि होती है जो कि फसल मे खरपतवार की प्रकोप की तीव्रता गति एंव प्रबंधन तकनीकी पर निर्भर करती है।

खरपतवार द्वारा विभिन्न फसलों के उत्पादन मे अनुमानित हानि

फसल का नाम	उपज मे हानि (प्रतिशत)
बाजरा	43.3
ज्वार	30.6
मक्का	58.8
गेंहू	34.4
चावल	69.9
चना	44.5
मूँग	30.4
मूँगफली	63.3
तोरिया / सरसों	33.5
सोयाबीन	38
जौ	69.4
बैगन, मिर्ची	50–60
भिंडी	89.9

फसलों के उत्पादन मे समन्वित खरपतवार प्रबंधन द्वारा अतिरिक्त प्रतिवर्ष आय मे बढ़ोतरी की जाइ सकती है। हमारे देश मे प्रतिवर्ष खरपतवार प्रबंधन मे 100 अरब रुपये व्यय किए जाते है। बीज उत्पादन फसल उत्पादन प्रक्रिया से भिन्न है जिसका सीधा संबंध गुणवता युक्त बीज उत्पादन से होता है। बीज उत्पादन मे खरपतवार एक गंभीर समस्या है। खरपतवारों का फैलाव वायु, अशुद्ध बीज, मनुष्य, घरेलु पशु, पक्षियों एंव नहर आदि के द्वारा होता है। खरपतवार खरीफ मौसम एंव रबी मे सिंचित अवस्था मे अधिक मात्रा मे फसल मे आता है। जिससे फसल की गुणवता व उत्पादन दोनों प्रभावित होते है। कुछ खरपतवार ऐसे होते है जिनका एक बार संक्रमण होने के बाद उनको नियंत्रण करना मुश्किल हो जाता है उन्हे आपतिजनक खरपतवार कहते है इनके बीज का आकार एंव माप संबंधित फसल के समान होने से बीज संसाधित संयत्र के द्वारा आसानी से अलग नही किया जा सकता है व इनकी उच्च वृध्दि दर के कारण खरपतवार उक्त फसल के साथ खाद, पानी, प्रकाश आदि के लिये प्रतियोगिता कर बीज फसल पर असर डालते है।

फसल का नाम	आपतिजनक खरपतवार
गेहूँ	हिरणखुरी, गेहूँआ
धान	जंगलीधान
तोरिया / सरसों	सत्यानाशी
कपास, मक्का	चौलाई
भिंडी	जंगलीभिंडी
बरसीम	चिकोरी

अधिक उत्पादन एंव बीज की गुणवता बनाये रखने के लिए खरपतवार का उन्मूलन फसलों की प्रारम्भिक अथवा क्रांतिक अवस्था मे करना चाहिए जिससे इसका अधिकतम लाभ बीज फसल को मिलता है।

विभिन्न फसलों की क्रांतिक अवधि निम्न है :–

फसल का नाम	क्रांतिकअवधि (दिन)
बाजरा, ज्वार, जौ, मूँगफली	20–25
गेहूँ, धानरोपा, चना, टमाटर, मिर्ची	30–45
मूँग,भिण्डी	15–30
मक्का	20–30

बीज की भौतिक शुध्दताबनाये रखने के लिये यह आवश्यक हैकिबीजो मे अन्य किसीभीप्रकार की दूसरीफसलों के बीज, खरपतवारों के बीजऔरअन्य अशुध्दियाँमानकस्तर से नीचेहोनीचाहिये।बीज मे खरपतवारों के बीजो का मिश्रणहोने से खेत मे फसल के पौधो की संख्या कम होजातीहैजिससेफसलउत्पादन कम होताहै।

विभिन्न फसलों के प्रति किलो ग्राम आधार एंव प्रमाणीकृत बीजो मे खरपतवारों के बीजो की अधिकतम मानक संख्या

फसल	आधारबीज	प्रमाणित बीज
बाजरा, धान, गेहूँ, तिल, मिर्ची, प्याज ,जौं	10	20
ज्वार, मूँग, कपास, सोयाबीन	5	10
संकरमक्का, चना, मूंगफली, मटर, टमाटर	0	0

बीज उत्पादन मेरोगिंग का महत्व :–

गुणवता युक्त बीज उत्पादन मे रोगिंग एक महत्वपूर्ण प्रक्रिया होती है। रोगिंग का अभिप्राय बीज फसल से अवांछनिये पौधौ को निकालने से है। जिससे फसल की आनुवांशिक व भौतिक शुद्धता सुनिश्चित होती है। रौगिंग मे पौधे की ऊँचाई, पत्तियों के आकार, लम्बाई व उपस्थित रोयें, फूलों का रंग, फलियों का रंग, आकार व प्रकार आदि गुणो के आधार पर अवांछित पौधो को निकालना है।

कैसे निकाले अवांछित पौधे?

- इन पौधो को संदूषण (केन्टा मिनेशन) फैलने की अवस्था से पूर्व निकाले।
- ऐसे पौधो को जड़ सहित निकाल कर नष्ट करें।
- रौगिंग करने वाले के साथ बोरी या बंद टोकरी हो जिसमे निकाले गये पौधो को सावधानी पूर्वक रख कर जमीन मे गाड़ दे या जला कर नष्ट करें।

रौगिंग की अवस्थाये :

बीज उत्पादन हेतु खरीफ (बाजरा, मक्का, धान, मूँग) एंवरबी (चना, गेहूँ, मसूर, जई, अलसी) फसलों मे रौगिंग दो अवस्थाओ मे करते है तथा कुछ फसलों की संकर प्रजातियों (संकर मक्का,ज्वार,बाजरा) मे चार अवस्था एंव मटर आदि मे तीन अवस्थाओ मे करते है।

- वानस्पति वृध्दि अवस्था : इसमे रोग ग्रस्थ पौधो को निकालते है।
- पुष्पनआने से पहले : इस अवस्था मे पौधो को बाहरी लक्षणो के आधार पर अवांछित पौधो से पहचाना जाता है एंव खेत से बाहर नष्ट किया जाता है।
- पुष्पन अवस्था : इसमे पौधो को रंग, आकार, फूल का रंग इत्यादि के आधार पर पहचान कर अलग करते है।
- परिपक्कवन अवस्था : किस्म के विभिन्न गुणो जैसे पत्ति का रंग, बीज का आकार, रंग आदि के आधार पर पहचाना जाता है।

रोगिंग के लाभ :–

- फसल किस्म की आनुवांशिक शुध्ता बनाये रखने के लिए।
- बीज किस्म के गुणों के अनुरूप उत्पादित करने क लिए।

कोई अर्थ नहीं

डॉ मनोज कुमार विश्नोई
सहायक आचार्य
पादप प्रजनन एवं आनुवंशिकी
कृषि अनुसंधान केंद्र, उम्मेदगंज, कोटा

नित जीवन के संघर्षों से
जब टूट चुका हो अन्तर्मन,
तब सुख के मिले समन्दर का
रह जाता कोई अर्थ नहीं।

जब फसल सूख कर जल के बिन
तिनका – तिनका बन गिर जाये,
फिर होने वाली वर्षा का
रह जाता कोई अर्थ नहीं।

सम्बन्ध कोई भी हो लेकिन
यदि दुःख में साथ न दें अपना,
फिर सुख में उन सम्बन्धों का
रह जाता कोई अर्थ नहीं।

छोटी–छोटी खुशियों के क्षण
निकले जाते हैं रोज जहाँ,
फिर सुख की नित्य प्रतीक्षा का
रह जाता कोई अर्थ नहीं।

मन कटुवाणी से आहत हो
भीतर तक छलनी हो जाये,
फिर बाद कहे प्रिय वचनों का
रह जाता कोई अर्थ नही।

मुख – साचन चाहे जितने हो
पर काया रोगों का घर हो,
फिर उन अगनित सुविधाओं का
रह जाता कोई अर्थ नही

किसान

पुष्पेन्द्र सिंह
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कड़ी धूप हो या शीतकाल, हल चलाकर जो ना होता बेहाल,
ऋरममझम करता होगा सवेरा, इसी आशा मे ना रोकता चाल,
खेती बाड़ी मे जुटाता

तू अपनी खूबियां ढूंढ, कमियां निकालने के लिए लोग है न।

डॉ. सुरेश कुमार जाट
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तू अपनी खुबियां ढूंढ,
कमियां निकालने के लिए लोग है न।
अगर रखना ही है कदम तो आगे रख,
पीछे खींचने के लिए लोग है न।
सपने देखने ही है तो ऊंचे देख,
नीचा दिखाने के लिए लोग है न।
अपने अंदर जुनून की चिंगारी भड़का,
जलने के लिए लोग है न।
अगर बनानी है तो यादे बना,
बातें बनाने के लिए लोग है न।
प्यार करना है तो खुद से भी कर,
दुश्मनी करने के लिए लोग है न।
रहना है तो थोड़ा बच्चा भी बनकर रह,
समझदार बनाने के लिए लोग है न।
भरोसा रखना है तो खुद पर रख,
शक करने के लिए लोग है न।
तू बस संवार ले खुद को,
आइना दिखाने के लिए लोग है न।
खुद की अलग पहचान बना,
भीड़ में चलने के लिए लोग है न।
तू कुछ करके दिखा दुनिया को,
तालीयां बजाने के लिए लोग है न।

सन्तरा उत्पादन : फलन से न बाहर जाए बहार

डॉ. जितेन्द्र सिंह
फल विज्ञान विभाग, उद्यानिकी एवं वानिकी महाविद्यालय,
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परिचय

सन्तरा राष्ट्रीय स्तर पर उगाया जाने वाला महत्वपूर्ण फल है। क्षेत्रफल की दृष्टि से देश में उगाए जाने वाले फलों में आम के बाद सन्तरावर्गीय फलों का स्थान आता है। नींबूवर्गीय फलों में सन्तरा का स्थान सबसे ऊपर है। सन्तरा मैदानी–पठारी भागों के अतिरिक्त दक्षिण भारत की उष्णकटिबंधीय जलवायु समेत उत्तर–पूर्व में एक प्रधान बागवानी फसल के रूप में उगाया जाता है। राजस्थान, मध्यप्रदेश, महाराष्ट्र, छत्तीसगढ़, कर्नाटक, आसाम, मेघालय इत्यादि सन्तरा उत्पादन के महतवपूर्ण क्षेत्र हैं। पौधे की अधिक उत्पादन क्षमता एवं शीत तथा गर्म जलवायुवीय परिस्थितियों के प्रति पुष्पन अनुकूलता के कारण विशेष रूप से पठारी क्षेत्रों में सन्तरे की खेती बहुत प्रचलित है। यह गर्मी में 45° सेल्सियस के असहननीय तापमान से लेकर सर्दी में 0° सेल्सियस तापमान को बखूबी सहन करता है अपितु ताप की उष्णता से सन्तरे के पेड़ों पर एकसार फूल आते है। यही कारण है की अधिक फलनशीलता के कारण एवं बदलते मौसम प्रतिकूलता के प्रति सहिष्णुता के मद्देनजर सन्तरा देश में उगाये जाने वाले अनेक फलों के बीच एक प्रमुख फल के रूप में वर्षों से किसानों–बागवानों में लोकप्रिय है।

बहार : बदलाव जरूरी

सन्तरे के पेड़ पर एक साथ पूरा पेड़ फूलों से लद जाता है । इसे बहार कहते है। सन्तरे में वर्श में तीन बार फरवरी –मार्च, जुलाई–अगस्त तथा सितम्बर – अक्टूबर में फूल आते हैं जिसे अम्बे, मृग तथा हस्त बहार के नाम से जानते है। फूल आने के लिए सन्तरे को तनाव की आवश्यकता होती है। तनाव को प्राकृतिक रूप से उस प्रतिकूल स्थिति के रूप में समझा जाता है जिसके कारण पौधे की गढ़वार बिल्कुल अवरूद्व होती है। यह या तो अति शीत या अति उश्ण स्थिति के कारण होता है। जब सर्दी में तापमान 10° से नीचे लम्बे समय तक बना रहता है, कड़ाके की ठण्ड पड़ती है, तब सन्तरे पर बहुत अधिक संख्या में फूल आते है। उसी तरह ग्रीश्म ऋतु की उश्णता के परिणामस्वरूप भी सन्तरे में आगामी ऋतु में खूब फूल आते है । परन्तु गृश्म ऋतु में फूल आना बरसात से प्रभावित होता है। यदि वर्शा ऋतु के शुरूआती काल जुलाई में पर्याप्त वर्शा (लगभग 10–15 सेमी) नही होती है और बरसात के बीच – बीच में चटक धूप की स्थिति लम्बे समय तक बनी रहती है तो सन्तरे पर फूल आना अनिश्चित हो जाता है। मृग बहार के फूलों का अधिकतम बागवानों में जलमांग बरसाती जल से पूरा हो जाता है, अतः यह बहुत ही प्रचलित है। परन्तु जलवायुवीय परिवर्तन के मद्धेनजर सन्तरे का व्यावसायिक फसल अम्बे बहार के फूलों से फलन प्राप्त करने के विकल्प को चुनना होगा। इस बहार में ठंड से प्राप्त तनाव के कारण फूल आना शत प्रतिशत सुनिश्चित रहता है। परन्तु मई माह में इस बहार में फल पेड़ पर बने रहने के कारण सिंचाई जल की आवश्यकता बढ़ जाती है। अब बरसात की समस्या प्रबल होती जा रही है। सिंचाई जल की मई माह में अनुपलब्धता की चुनौती को अवसर में बदलकर सन्तरा के फलन को अम्बे बहार के फूलों से प्राप्त करने के बदलाव को ओर प्रवृत होना होगा। यह जलवायु परिवर्तन के मद्धेनजर आवश्यक प्रतीत होता है। वर्तमान में अम्बे बहार का सन्तरा फलोत्पादन में 30% योगदान होता है। बहुधा अम्बे बहार फलन से बाहर रहता है ।

फूल से लद जाते है पेड़

फूल आने की ऋतु में सन्तरे का पेड़ फूल से लक–दक लद जाता है। सन्तरे में वर्ष में तीन बार फूल आते है। यह फरवरी–मार्च, जुलाई–अगस्त तथा अक्टूबर–नवम्बर में फूल आने के अवस्था में होता है। सामान्यतः इन ऋतुओं के फूलों का सन्तरा के उत्पादन में क्रमशः 30 प्रतिशत, 60 प्रतिशत एवं 10 प्रतिशत योगदान होता है। जिस वर्ष सर्दी ऋतु में ठण्ड अधिक पड़ती है एवं ग्रीष्म ऋतु में गर्मी अधिक उष्ण होती है सन्तरा के पेड़ो में फूलों की उतनी ही प्रचुर बहार आती है। यदि समूल पेड़ पर सामान्य स्थिति में फूलों की गिनती की जाये तो प्रति एक मीटर शाख पर 800 संख्या में फूल आते है। सकल रूप से देखा जाये तो एक पेड़ पर फूलों की कुल संख्या लगभग तीन लाख होती है। इन फूलों को उत्पादन के अनुकूल जलवायु एवं प्रबंधन मिल जाये तो अधिकाधिक संख्या में फल बन सकते है। सामान्यतः सन्तरे में फल झड़न की दर 90–92 प्रतिशत होती है। यदि इतने अधिक संख्या में गिरने वाले फूलों में से कुछ अंश फूलों को गिरने से बचा लिया जाये तो निश्चय ही सन्तरे के उत्पादन स्तर में बढ़ोत्तरी की जा सकती है।

सन्तरे का पुष्प

सन्तरा के फूलो का रंग सफेद होता है। इसमें पंखुड़ियों की 5 दल होती है इसमें प्रति फूल 15 नर फूल होते है। फूल उभयलिंगी होता है और नर एवं मादा एक ही फूल में स्थित होते है। इसमें फलों का अण्डाशय पुष्पदल के ऊपर स्थित होता है। सन्तरा के फूलो में मकरंद ग्रंथिया (नैक्टरी) बहुत ही विकसित होती है और इसीलिए इसके फूल का आधारीय भाग फुला हुआ प्रतीत होता है। फूल खुशबूदार होते है एवं मधुमक्खियों को आकर्षित करते है। सन्तरे में मिश्रित कलिका पर फूल बनते है। फलन के समय उसी कलिका से पत्ती एवं फूल दोनों ही बनते हैं। सन्तरा लगभग 10 दिन तक पुष्पण काल में रहता है। मौसम के अनुसार फरवरी अन्त से मार्च प्रथम सप्ताह तक सन्तरा के पेड़ फूल से लद जाते है।

जरुरी है उचित संभाल

अम्बे बहार में सन्तरे के पेड़ पर फरवरी–मार्च में फूल आते है। इस फलन के फल पूरी गर्मी फल पेड़ पर लगे रहते हैं। सन्तरा के तने को गर्मी से बचने के लिए इसकी पुताई करना आवश्यक है। पुताई के लिए चूना एवं नीला थोथा मिश्रित घोल का प्रयोग किया जाता है। इसे बनाने के लिए एक भाग बिना बुझा चूना एवं एक भाग नीला थोथा को 15–20 भाग पानी के साथ प्रयोग किया जाता है। घोल तैयार करने हेतु 1 किलोग्राम बिना बुझे चूने को 8–10 लीटर पानी में घोल लिया जाता है। उसी तरह 1 किलोग्राम नीला थोथा को 8–10 लीटर पानी में घोला जाता है। उसके बाद दोनों घोलो को मिलाकर एक घोल तैयार कर लिया जाता है। इस घोल को तने पर पुताई के लिए प्रयोग किया जाता है। घोल को जमीन से लगभग 2 फुट तक पोता जाता है। यह गर्मी में पौधे की छाल को फटने से बचाता है। पुताई पौधे के तने में लगने वाले छाल भक्षक कीटो के आक्रमण को भी रोकता है।

जल प्रबंधन आवश्यक

सन्तरे के बगीचे में उचित जल प्रबंधन एक महत्वपूर्ण घटक है। बदलते कृषि बागवानी के परिवेश में पानी एक ऐसा घटक हो गया है जिसकी आपूर्ति दिनों–दिन घटती जा रही है। अतः जल का उचित प्रबंधन आवश्यक है। बून्द–बून्द सिंचाई इस दृष्टि से सिंचाई का अति प्रभावी तरीका है। जल प्रबंधन में पौधे के लिए जल की मांग जानना आवश्यक है।

भू–वाष्पन पौधे और मिट्टी से नमी ह्रास का मुख्य रास्ता होता है। जब सिंचाई की जाती है तो इससे होने वाले जल की कमी की पूर्ति की जाती है। इस हेतु भू–पौधें वाष्पन की गणना की जाती है। पौधे से वाष्पन द्वारा होने वाली जल की हानि को पौधे की कुल जल मांग के रूप में गिना जाता है। पौधे के लिए जल की आवश्यकता की गणना इस सूत्र से की जाती है :

जल की आवश्यकता (ली./दिन) = पात्र वाष्पोत्सर्जन (मिमी. प्रतिदिन) × पौधे की कतार से कतार की दूरी (मी.) × पौधे से पौधे के बीच की दूरी (मी.) × फसल गुणांक × पात्र गुणांक सिंचाई किये जाने वाले भाग का प्रतिशत। उद्यानिकी फसलों विशेषकर फलों के लिए फसल गुणांक 0.6 लिया जाता है, पात्र गुणांक 0.7 तथा सिंचाई किये जाने वाले भाग का प्रतिशत 0.2–0.3 माना जाता है। ये सब मृदा, जलवायु और पौधे के अनुसार अलग–अलग होते है।

उपर्युक्त सूत्र से पौधे की जल मांग की गणना इस प्रकार की जाती है :

मान लिया जाये कि पात्र वाष्पीकरण	= 10 मिमी.
पौधे की कतार से कतार की दूरी	= 6 मी.
पौधे से पौधे की दूरी	= 6 मी
फसल गुणांक	= 0.6
पात्र गुणांक	= 0.7
संचाई किये जाने वाले भाग का प्रतिशत	= 0.3
अब जल की आवश्यकता होगी	= 10×6×6×0.6×0.7×0.3
	= 30.24 ली. प्रतिदिन

पौधे में सिंचाई तब करनी चाहिए जब फूलों की पंखुड़ियां झड़ गई हो एवं स्पष्ट रूप से फल मटर के छोटे दाने के आकार के बन जाएँ तब सिंचाई प्रारम्भ कर देनी चाहिए।

मेघ नहाए वृक्ष

नमी संरक्षण कर सन्तरे के वृक्षों से अधिक उत्पादन के साथ–साथ गुणवत्तापूर्ण फल प्राप्त किये जा सकते है। इसके लिए घास का बिछावन (मल्चिंग) बहुत ही कारगर है। इस हेतु स्थानीय उपलब्ध घास–फूस का प्रयोग किया जा सकता है। घास की 10–15 सेमी मोटी परत को सन्तरे के पेड़ के फैलाव में जमीन पर बिछा देना चाहिए। इससे नमी संरक्षण के अतिरिक्त ताप नियमन के साथ–साथ खरपतवार नियंत्रण, मृदा को भूरभूरी रखना, सूक्ष्मजीवों की आबादी को बनाये रखना आदि लाभ भी होते है। सन्तरे के पौधे से भी प्रयाप्त मात्रा में पत्तियां झड़ती है। सन्तरे के पेड़ से प्रतिवर्गमीटर लगभग 100 ग्राम सुखी पत्तियां झड़ती है। ये पत्तियां बगीचे में पड़ी–पड़ी स्वतः सड़कर मृदा के कार्बनिक पदार्थ का रूप लेती है और इस तरह इसे उर्वर बनाने में योगदान करती है।

आवश्यक है पौधे को सूखने से बचाना

सन्तरे के कुछ बगीचों में 10–15 वर्श के बाद टहनियों/पेड़ों के सूखने की समस्या देखी जाती है। धीरे–धीरे पूरा पेड़ उपर से नीचे की और सूखने लग जाता है। इसे अवनति (सीट्रस डीक्लाइन) रोग के नाम से भी जाना जाता है। प्रभावित पौधे की कमजोर बढ़वार प्रवृति, पौधे की टहनियों का उपर से नीचे की ओर सूखना, सूखी टहनियों का पेड़ से जुड़े रहना, पौधे पर पत्तियों का विरल होना, पुरानी परिपक्व पत्तियों के मध्य व पार्श्व शिराओं का पीला पड़ना, पत्तियों का पीला पड़ना व गर्मी/शरद ऋतु के शुरूआत के साथ झड़ना, पत्तियों का बेरंग होना, अत्यधिक पुश्पन, फलों का परिपक्वता के पहले झड़न, फलों पर धूप के धब्बे होना, अवशोशक जड़ो की कमी, जड़ो का काला पड़ना, जड़ो की छाल का सड़ना आदि अवनति रोग के लक्षण है।

इन कारकों जिनकी वजह से सन्तरे के बगीचे शीध्र सूखने लग जाते हैं, को ध्यान में रखकर सन्तरे की बागवानी की जाये तो बाग को सूखने से बचाया जा सकता है। इसके साथ ही प्रबन्धकीय कारकों जिसमें बाग की कटाई–छटाई व बिल्कुल बेकार/लगभग सूखे पौधे को काटकर कलिकायन करना शामिल है, के द्वारा भी बेकार हो चुके सन्तरे के पौधे को पुनः फलन में वापस लाया जा सकता है। इस प्रक्रिया को पौधे का जीर्णोद्धार करना कहते है।

कटाई– छँटाई

इसके लिए वे पौधे जिनमें अधिकांश टहनियॉ/शाखायें सूख चुकी हो, ऐसे पौधे को मई–जून या दिसम्बर–जनवरी माह में जब पौधे निष्क्रिय रहते हैं, जमीन से 2.0 मीटर की ऊंचाई से काट देना लाभकर होता है। यदि टहनियॉ मोटी हों तो उन्हें पहले नीचे की सतह से काटना प्रारम्भ करना चाहिये। तत्पश्चात उसी कटान को उपरी सतह से काटना प्रारम्भ कर पौधे की शाखा को काटकर अलग कर देना चाहिये। मोटी शाखा को नीचले सतह से काटना प्रारम्भ करने से छाल चिटक कर नहीं फटती है। काटे गये शाख को ताजे गोबर या नीला थोथा से लेप कर देना चाहिये ताकि किसी बीमारी का प्रकोप न हो। इसे बगीचे से अलग भी रख देना चाहिये ताकि तना छेदक कीट का प्रकोप न हो। काटे गये शाख पर कई फूटान निकलती है। इन फूटानों में से पेड़ के बाहरी फैलाव की ओर स्थित 4–5 शाखाओं को छोड़कर शेष को काटकर अलग कर देना चाहिये। इन शाखाओं से निकलने वाले फूटानों से पौधे का मजबूत ढांचा तैयार होता है। यदि कोई शाखा पौधे के परिधि से बाहर की और फैल रहा हो तो उसे काटकर अलग कर देना चाहिये। पौधे पर कटान लगाने के तीसरे वर्ष से फलन आना प्रारम्भ हो जाता है।

अनुत्पादक पेड़ बने उत्पादक

अनुत्पादक पेड़ को उत्पादक पेड़ बनाने के लिए शीर्ष कलिकायक का कार्य कारगर है। इस कार्य हेतु पौधे को अगस्त माह में जमीन से 15–20 सेमी ऊॅचाई से काट देते हैं। कटान लगाते समय यह ध्यान रखना चाहिये कि कटान मूलवृन्त वाले हिस्से पर ही लगाया गया है। कटान के परिणामस्वरूप पौधे पर अनैक फूटान/नयी शाखाएं निकलती हैं। इन शाखाओं में से एक सबसे मजबूत शाख को चयनित कर लेते हैं। जब यह शाख पेन्सिल इतना मोटाई का हो जाये तब इस पर अक्टूबर माह में कलिकायन का कार्य किया जाता है। कलिकायन के लिए कली स्वस्थ व गुणवत्तापूर्ण मातृवृक्ष से लेनी चाहिये। कली प्राप्त करने के लिये पेन्सिल इतनी मोटी शाखा का मातृ वृक्ष पर चुनाव करतें हैं। यह शाखा 5–6 महीने पुरानी होनी चाहिये। जिस बगीचे में सिंचाई की नियमित व्यवस्था हो उस बगीचे के पौधे से ही कली निकाल पाना संभव होता है अन्यथा कली शाख से समुचित रूप से अलग नहीं हो पाती। इसी तरह मूलवृन्त पौधे की भी नियमित सिंचाई की व्यवस्था होनी चाहिये। जब मूलवृन्त में रस का संचार होता है तब कली का जुड़ाव व फूटान सफल होता है। कली चढ़ाने के लिये 2.5 सेमी लम्बाई एवं लगभग 0.5 सेमी0 चौड़ाई की कली पत्ती को ड़ठल समेत अलग किया

जाता है। इसी माप के टी आकार का कटान मूलवृन्त पर लगाया जाता है। फिर कली को मूलवृन्त के साथ लगाकर पॉलीथिन की पट्टी से नीचे से उपर की ओर बाँध दिया जाता है। कली चढ़ाने का कार्य पौधे पर जमीन से 25 सेमी ऊंचाई पर करते हैं। लगभग 21 दिन बाद फूटान शुरू हो जाती है।

पौधे को रखें स्वस्थ

अधिक एवं गुणवत्तापूर्ण उत्पादन प्राप्त करने के लिए सन्तरे के वृक्षों की समय–समय पर सार संभाल करना अतिआवश्यक है। इसके लिए पौधों में विभिन्न प्रकार की मृदाओं के आधार पर पोषक तत्व उपलब्ध करवाये जाने चाहिए। मृदा में पोषक तत्वों की उपस्थिति की जानकारी के लिए मृदा एवं पौधे में पोषक तत्वों की जाँच करवा लेनी चाहिए। पौधों में पौषक तत्व उनकी बढ़वार के अनुसार समय पर दिए जाने चाहिए अन्यथा पौधों की बढ़वार धीमी पड़ने लगती है एवं उपज भी कम प्राप्त होती है। अतः वृक्षो का उचित पोषण आवश्यक हैं। रोपण के समय प्रति पौधा 20–25 किग्रा सड़ी हुई गोबर की खाद या 6–8 किग्रा वर्मीकम्पोस्ट, 1.0 किग्रा सिगंल सुपर फॉस्फेट डालना अनिवार्य हैं। रोपण के पश्चात प्रति पौधा प्रति वर्श खाद एवं उर्वरक नीचे दी गई तालिकानुसार डालना चाहिए।

तालिकाः सन्तरे में खाद एवं उर्वरक की मात्रा किलोग्राम प्रति पेड़

खाद /उर्वरक	प्रथम वर्ष	द्वितीय वर्ष	तृतीय वर्ष	चतुर्थ वर्ष	पंचम वर्ष एवं इसके बाद	खाद देने का समय	
						अम्बे बहार फरवरी में फूल आना	मृग बहार जुलाई में फूल आना
गोबर की खाद	15.0	30.0	45.0	60.0	75.0	दिसम्बर	मई–जून
यूरिया	0.125	0.250	0.375	0.500	0.625	मार्च–अप्रैल	जून
सुपर फॉस्फेट	0.250	0.500	0.750	1.000	1.250	जनवरी	जून
म्यूरेट ऑफ पोटाश	–	–	0.200	0.200	0.400	जनवरी	जून

उर्वरकों को सक्रिय जड़ क्षेत्र में डालना अधिक लाभकारी है। उर्वरकों को तने से 30–50 सेमी दूर वृक्ष के वानस्पतिक फैलाव के नीचे 20 सेमी. गहरी तथा 15 सेमी. चौड़े थाले मे डालना चाहिए। उर्वरक प्रयोग करते समय यह ध्यान रखना चाहिये कि उर्वरक सीधे तने के सम्पर्क मे न आए तथा एक स्थान पर अधिक मात्रा मे न गिरे क्योंकि इससे जड़ों को क्षति पहुचने की आशंका रहती है। उर्वरकों के प्रयोग के बाद हल्की सिंचाई अवश्य कर देनी चाहिए।

फलों की तुड़ाई एवं उपज

सन्तरे के फलों को उचित अवस्था पर तोडना अत्यंत आवश्यक है। अम्बे और मृग बहार के फलों में कुल घुलनशील पदार्थ की मात्रा 10 प्रतिशत एवं रस लगभग 40 प्रतिशत होना चाहिए। अम्बे बहार के फलो को परिपक्कव होने में लगभग 270 दिन एवं मृग बहार के फलो को पकाने में लगभग 240 दिन का समय लगता है। फलो की तुड़ाई कैंची की सहायता से की जाती है। हाथ से तुड़ाई करते समय फल को धीरे से घुमाकर डंठल के साथ तोडा जाना चाहिए। एक 8 वर्ष पुराने पूर्ण विकसित एवं स्वस्थ सन्तरे के पेड़ से 125–150 किग्रा तक उपज प्राप्त हो जाती है।

1. फूलों से लक–दक सन्तरे का पौधा

3. सन्तरे का पूर्ण विकसित फूल

4.सन्तरे के फूलों में मधुमक्खी द्वारा परागण

2. मिश्रित कलिका पर फलन

5. सन्तरे के फूलों की पंखुड़ियों का

6. प्रारंभिक फल टिकाव

7. जल प्रबंधन

8. चूना एवं नीला थोथा मिश्रित घोल से तने की पुताई

आकांक्षा

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कृषि विश्वविद्यालय कोटा

यह जीवन का है लक्ष्य सखी, तुझको नित आगे बढ़ना है।
आशा का द्वीप, प्रज्जवलित कर, कुसुमित सुरभित जग करना है।

उठ जागे जब हर वनिता मन, तब ही लहरायेगा उपवन।
लो झूम उठा आकाश गगन, ये हर नारी से कहना है।
यह जीवन का है लक्ष्य सखी, तुझको नित आगे बढ़ना है।
आशा का द्वीप, प्रज्जवलित कर, कुसुमित सुरभित जग करना है।

तू मिटा तिमिर रस बहा सुधा, तू जोश जंग अभिलाषा है।
तू बनी धरा की जग जननी, फिर क्यों तेरा मन प्यासा है।
गुमनाम अंधेरे छोड़ अलि, कुछ कर इनको दिखलाना है।

यह जीवन का है लक्ष्य सखी, तुझको नित आगे बढ़ना है।
आशा का द्वीप, प्रज्जवलित कर, कुसुमित सुरभित जग करना है।

जब स्वर कम्पित थे, दिशा भ्रमित थी, अपमान, िनराशा, साथी थे।
जब तू अबला थी, बेचारी, प्रतिघात, अश्रु, हमराही थे।
उठ आज भोर ने दस्तक दी, चेतना भर चल जुटना है।

यह जीवन का है लक्ष्य सखी, तुझको नित आगे बढ़ना है।
आशा का द्वीप, प्रज्जवलित कर, कुसुमित सुरभित जग करना है।

गर तू न जगी जग सोयेगा, रोय गा "ममता" का अतृप्त मन।
ये धरा बनेगी रणभूमि, हर युवा बनेगा एक विक्षिप्त जन।
तू खुद इतनी शशक्त बनकर, अटकलें सभी पराजित कर।
अब सबल देश को करने का, इतिहास तुझी से रचना है।

यह जीवन का है लक्ष्य सखी, तुझको नित आगे बढ़ना है।
आशा का द्वीप, प्रज्जवलित कर, कुसु मित सुरभित जग करना है।

कृषि विश्वविद्यालय का मनाये जन्म दिवस

प्रो. के. एम. गौतम
पूर्व निदेशक, प्रसार शिक्षा
कृषि विश्वविद्यालय, कोटा

आओ हम सब विश्वविद्यालय का जन्म दिवस मनाये।

सब में नवऊर्जा नवचेतना का संचार जगायें।।

बनायें सब परिसरों को हरियाली से आच्छादित।

नवआशा की सब के मन में हो नव किरण प्रफुल्लित।।

सब मिलकर विश्वविद्यालय की प्रगति में आहुति करें।

मन, कर्म, वचन से इसकी आभा का प्रसार करें।।

भू–धरा का हरयाली से नवश्रृंगार करें।

जन–जनमें इस विश्वविद्यालय पहचान बनायें।।

आओ हम सब विश्वविद्यालय का जन्म दिवस मनायें।

कृषक को समृद्ध बनाने के सभी करें प्रयास।।

तभी जगेगा, कृषि विश्वविद्यालय में आत्मविश्वास।

अनुसंधान के क्षैत्र में नित करें नवोचार।।

हर किसान का प्रसार शिक्षा से करें उद्धार।

सब मिलकर विश्वविद्यालय को सुन्दर बनाये।।

आओ सब मिलकर, विश्वविद्यालय का जन्मदिवस मनाये।

युवाओं को प्रसंस्करण एवं मूल्य संवर्धन सिखायें।।

नये उत्पादों से उन को स्वालम्बन बनायें।

सब कर्मचारियों में हो उल्लास एवं विश्वास।।

तभी फैलेगा इसका चारों ओर ज्ञान का प्रकाश।

आओ सब मिलकर, विश्वविद्यालय का जन्म दिवस मनाये।।

कोविड–19 का कृषि तथा किसानों पर प्रभाव

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कृषि अनुसंधान उप केन्द्र, खानपुर
कृषि विश्वविद्यालय, कोटा

कोविड–19 की वजह से अर्थव्यवस्था का लगभग सभी क्षेत्र प्रभावित हो रहा है और कृषि क्षेत्र भी इसका अपवाद नहीं है जो लॉकडाउन की स्थिति में मानव जीवन की बुनियादी आवश्यकता की पूर्ति कर रहा था, भी प्रभावित हुआ है। भारत में लगभग 120 मिलियन छोटे किसान हैं जो लगभग देश के अनाज उत्पादन में 40% से अधिक योगदान देते हैं और इसके आधे से अधिक फल, सब्जियां, तिलहन और अन्य फसलों में भी योगदान देते हैं। मुख्य खाद्य पदार्थों जैसे चावल और गेहूँ के वैश्विक हिस्से का अधिकांश हिस्सा भारत से आता है तथा भारत में लगभग आधी आबादी अपनी आजीविका के लिए कृषि पर निर्भर है।

भारतीय किसान प्रति वर्ष की भांति असमान मानसून व मूल्य अस्थिरता के कारण तो परेशानी में था ही, उस पर **कोविड–19** महामारी से होने वाले जोखिम एक ऐसे क्षेत्र के सामने नई चुनौतियां दे रहा है जो पहले से ही खतरे में है। कोविड–19 के कारण राष्ट्रव्यापी लॉकडाउन किसानों के लिए दुर्भाग्यपूर्ण साबित हो रहा है जिसने श्रम और उपकरण दोनों की कमी पैदा कर दी है। भारत में प्रवासी मजदूर आमतौर पर फसल के दौरान ग्रामीण क्षेत्रों में चले जाते है तथा छोटे किसान अक्सर कटाई के उपकरण किराए पर लेते है क्योंकि यह इसे खरीदने से सस्ता होता है। फलस्वरूप किसान इस सीजन में अपनी अनाज और तिलहन की बम्पर फसल नहीं ले पाए हैं। कुछ स्थानों पर तो फसलों को छोड ही दिया गया है जबकि अन्य में फसल सीमित और अधिक व्यय श्रम के साथ एक महीने से अधिक देरी से आ रही है। लॉकडाउन के कारण एक और जो चिंता का कारण है वह है फसल के लिए बीज, उर्वरक और कीटनाशकों की उपलब्धता और उनकी पहुंच। हालांकि कोविड–19 के समाधानों ने कृषि आदानों के लिए उत्पादन क्षमता को कम कर दिया है और मूल्य में वृद्धि का कारण बना है, जिससे देश में छोटे और सीमांत किसानों के लिए ये संसाधन अप्रभावी हो गए है जबकि बड़े जोत वाले किसान तथा व्यवसाय इन झटकों को सहने में सक्षम हो सकते है। कोविड–19 संकट स्थायी नहीं है लेकिन इसने भारत में खाद्य प्रणाली में पहले से मौजूद कमजोरियों को बढाया है । मुद्दों का जायजा लेने से सरकारों और व्यवसायों को छोटे किसानों को समर्थन देने के लिए मजबूत अधिक लचीली आपूर्ति श्रृंखला बनाने में मदद मिल सकती है जो खाद्य श्रृंखला के लिए महत्वपूर्ण है।

कोविड–19 महामारी ने ग्रामीण भारत और किसान समुदायों के स्वास्थ्य संकट को भी उजागर किया है। बुनियादी निवारक उपाय जैसे नियमित रूप से हाथ धोना, सामाजिक दूरी और आत्म अलगाव ग्रामीण समुदाय के लिए अनूठी चुनौती है। एक ऐसे देश के कुछ ग्रामीण क्षेत्र में जहां पहले से ही जल दुर्लभ है तथा जहां ग्रामीण और शहरी दोनों क्षेत्रों में अनियमित जल आपूर्ति है बार बार हाथ धोना एक विलासिता है जिसे व्यवहार में नहीं लाया जा सकता है। इसके अलावा सामाजिक दूरदर्शिता और आत्म अलगाव कृषि समुदायों तथा छोटे किसानों के लिए एक बडी चुनौती है जो अपने निर्वाह के लिए दैनिक श्रम और मजदूरी पर निर्भर है। जैसा कि हम एक नये सामान्य तथा असामान्य के रूप से व्यवसाय को समायोजित करते है यह भारत जैसे मुख्य रूप से कृषि प्रधान देश के लिए अनिवार्य है कि वह महामारी से सबक ले सके और कृषि समुदाय पर इसके गंभीर प्रभाव पडे। शहरों में अधिकांश प्रवासी श्रमिक ग्रामीण कृषक परिवारों से आते है लॉकडाउन के कारण आपूर्ति श्रृखंलाओं के एक महत्वपूर्ण व्यवधान के कारण एक अंतर तथा अंतर राज्य स्तर पर देखा गया है कि किसानों के लिए दूध, फल व सब्जियों इत्यादि की आपूर्ति में भी व्यवधान पैदा हुआ है। कृषि गतिविधियों को पहल करने के लिए कुछ राहत के बावजूद किसानों को अभी भी शहर व मंडीयों तक उपज ले जाने और अच्छी कीमत प्राप्त करने में मुश्किल हो रही है। यदि उनकी अधिकांश उपज गांवो के भीतर रहती है और काफी हद तक बंधी रहती है तो खाद्य कीमतें गिरती रहेगी और इनमें से अधिकांश किसान परिवारों को परेशानी का सामना करना पड रहा है। इन सभी गतिविधियों को ध्यान में रखते हुए सरकार तथा अन्य संस्थानों को भी किसानों की तरफ ध्यान देने की आवश्यकता है। किसानों को स्थानीय सहकारी शैली के चैनलों में अपनी उपज की अधिक से अधिक बिक्री करने के लिए प्रोत्साहित करके कृषि आपूर्ति श्रृखंला को स्थानीय क्षेत्रों में पुर्न निर्देशित करने की आवश्यकता है।

किसानों को नकदी फसलों जैसे एक वर्ष या उससे अधिक जैसे खाद्य फसलों की जगह खाद्य फसलों में मोटे तौर पर अनाज, दाले, फलियॉ, बीज और नट्स, सब्जियॉ, जडी बूटियॉ और मसाले आदि पर अधिक ध्यान देने की आवश्यकता है। विभिन्न राज्यों ने खाद्य आधारित फसलों के लिए अपनी खेती पद्धति को औपचारिक रूप से स्थानान्तरित कर दिया जो कि शहरी झुग्गी झोपडियों में रहने वाले अधिकांश लोगों के लिए या सीमित खाद्य आपूर्ति वाले ग्रामीण क्षेत्रों में तथा एक ही समय में बड़ी खाद्य असुरक्षा की चिंता को दूर करने में मदद कर सकते है। खाद्य फसलों के लिए स्थानीय क्षेत्रों में किसानो को बेहतर मूल्य प्रदान करने की आवश्यकता है। इसके अतिरिक्त स्थानीय और राज्य सरकार दोनों को सामाजिक संगठनो, गैर–सरकारी संगठनों को स्थानीय किसानों/ किसान उत्पादक संगठनों से आपूर्ति की सीधी खरीद की अनुमति देनी चाहिए तथा एक से अधिक व्यवस्थित स्थानीय वितरण सुनिश्चित करने की आवश्यकता है। यह सुनिश्चित करने के लिए कि खाद्य आपूर्ति लगातार हो अधिक स्थानीय हो तथा विभिन्न राज्यों में किसानों से विविध खाद्य सामग्रियों की सीधी खरीद शामिल हो मोबाइल खाद्य वैन की स्थापना पर विचार किया जा सकता है। प्रत्येक जिले में मोबाइल वैन विभिन्न समुदायों में खाद्य आपूर्ति के लिए अनुमति दे सकते है। सब्जी विक्रेता भी अपने स्टॉक और आपूर्ति को बेचने के लिए इन मोबाइल वैन ऑपरेटरों के साथ सीधे समन्वय स्थापित कर सकते है। यह खुदरा वितरण के लिए भी बड़े पैमाने पर थोक आपूर्ति लाइनों के साथ अधिक मूल रूप से जुडा हुआ है। अंत में यह अत्यंत महत्वपूर्ण है कि आपूर्ति श्रृंखला रसद में शामिल लोगों को सुरक्षा किट और सुरक्षात्मक उपकरण की पर्याप्त मात्रा प्रदान की जाये जो इन कार्यों में कार्यरत लोगों को कोविड–19 संचरण जोखिम को कम करके आपूर्ति सुनिश्चित करने में मदद कर सके।

बागवानी : एक फलता–फूलता कैरियर

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देश में कई ऐसे संस्थान हैं जो कृषि विकास के लिए प्रयत्मनशील हैं। ऐसे में एक नजर बागवानी की ओर जानी चाहिए जो निरंतर कृषि से आय दो गुनी करने के लिए प्रयासरत है। राष्ट्रीय बागवानी समिति के 75 वर्ष पूर्ण होने पर बागवानी खेती की दिशा में बहुत आमूलचूल परिवर्तन हुए हैं। कृषि से अधिक आमदनी बागवानी खेती के बिना संभव नहीं है। इसके अन्तर्गत किसानों को अधिक आमदनी देने वाली फसलों का चुनाव कर खेती करनी चाहिए। इस बीच बागवानी खेती का सकल उत्पादन पहले का अपेक्षा काफी बढ़कर 300 मिलियन टन हो गया है।यदि आप किसी व्यावसायिक बागवान के लिए कार्य करते हैं तो खेतों, उद्यानों, बागों और गोल्फ कोर्स के भूदृश्याकंन, जुताई, रखरखाव तथा पैदावार आदि जैसे कार्य आपको करने होंगे, भूदृश्यांकन उद्देश्य वाले होटल, रिसोर्ट तथा विस्तृत भूमि वाले निजी बंगले भी इस क्षेत्र में रोजगार के अन्य विकल्प हो सकते हैं। निर्माण कंपनियों और भूदृश्य वास्तुकला फार्मों को पौधों एवं पौधों की देखरेख पर सलाह देने के लिए आप सलाहकार के रूप में भी अपनी सेवाएं दे सकते हैं।आपके जन्म–दिन पर आपको उपहार के रूप में कोई विदेशी पौधा मिलता है तो आप हर्ष–विभोर हो जाते हैं?क्या आपको आश्चर्य होता है कि आपके मित्र के मस्तिष्क में यह शानदार विचार कैसे आया! तो, आपकी जानकारी के लिए बता दें कि उपहार के रूप में पौधे देना, पर्यावरण की रक्षा के लिए चिंतित इस विश्व में एक नई परिपाटी है। आपके लिए यह और रुचिकर हो सकता है कि उपहार के पौधे एवं फूल बेचना एक शानदार उद्यम है। इसलिए यदि आप बागवानी में रुचि रखते हैं और इसके माध्यम से आय अर्जित करने के विकल्प तलाश रहे हैं तो ये आपके कॅरिअर को नई दिशा दे सकती है।

बागवानी फलों, सब्जियों, फूलों, मसालों और सजावटी पौधों के उत्पादन से संबंधित है। कार्बनिक उत्पाद, सजावटी फूलों और उपहार में दिए जाने वाले पौधों की मांग के साथ बागवानी क्षेत्र लाभप्रद एवं आकर्षक कॅरिअर के विकल्प के रूप में उभर रहा है।

संभावनाएं :–

उद्यानविज्ञानी सरकारी संगठनों तथा सार्वजनिक क्षेत्र के उपक्रमों में रोजगार प्राप्त कर सकते हैं। आप सरकारी अनुसंधान संगठनों में वैज्ञानिक के रूप में या बागवानी विभाग में बागवानी अधिकारी/सहायक/निरीक्षक/फार्म पर्यवेक्षक या निदेशक के रूप में अपनी भूमिका निभा सकते हैं। बागवानी क्षेत्र के वर्तमान लक्ष्य फलों, सब्जियों/वनस्पति तथा फूलों की नई तथा उन्नत किस्मों को पैदा करना, विदेशी किस्मों का विकास करना, फसल की पैदावार में सुधार लाना, गुणवत्ता तथा पोषण महत्वों को बढ़ाना तथा कीड़ों एवं बीमारियों के प्रतिरोध क्षमता को बढ़ाना है। यदि आप अनुसंधान के क्षेत्र में जाना चाहते हैं तो पादप शरीर विज्ञान, प्रोपेगेशन, जैव रसायन विज्ञान तथा आनुवांशिक इंजीनियरिंग वे क्षेत्र हैं, जिनमें आप कार्य कर सकते हैं। कृषि वैज्ञानिक भर्ती बोर्ड, भा.कृ.अ.प. नई दिल्ली प्रतिवर्श वैज्ञानिकों की भर्ती करता है। जिला बागवानी एवं कृषि अधिकारियों के पद राज्य लोक सेवा आयोग परीक्षाओं के माध्यम से भरे जाते हैं।

कृषि विज्ञान केंद्र के लिए प्रशिक्षण संयोजकों, एसोशिएट तथा सहायक के पदों पर भर्ती करते हैं, सिविल सेवा भी इस क्षेत्र में एक चुनौती पूर्ण विकल्प है।बैंकों में भी ग्रामीण विकास अधिकारी और कृषि वित्त अधिकारी जैसे पद प्राप्त कर सकते हैं।निजी क्षेत्र में कई अवसर हैं। आप निजी बीज उत्पादन एवं अनुसंधान तथा विकास विभागों में वैज्ञानिक के रूप में कार्य कर सकते हैं या निजी बीज या पेस्टीसाइड कंपनी में विपणन अधिकारी के रूप में कार्य कर सकते हैं। जड़ी–बूटी दवाइयों पर आधारित भेषज कंपनियां भी उद्यान वैज्ञानिकों की सेवाएं लेती हैं।यदि आपकी रुचि शिक्षा के क्षेत्र में है तो आप कृषि एवं बागवानी विश्वविद्यालयों में शिक्षक का काम कर सकते हैं। इस क्षेत्र में आप लेक्चरर, रीडर, सहायक प्रोफेसर तथा एसोशिएट प्रोफेसर के अवसर तलाश सकते हैं।

उद्यम की संभावनाओं की बात करें तो आपके पास अपना निजी फार्म, व्यावसायिक पौधशाला (नर्सरी) या बाग लगाने के विकल्प हैं। बीज उत्पादन, लूज फ्लावर या कट फ्लॉवर उद्यम, कोल्ड स्टोरेज, उपहार के पौधों की बिक्री एवं फलों/सब्जियों तथा फूलों का निर्यात अन्य संभावित विकल्प हैं। आजकल ग्रीन डेकोर, गुड लक, स्ट्रेस बस्टर, बोन्साइ तथा सजावटी गमलों में पूलों के

पौधों की अच्छी मांग है। पैदावार बढ़ाने के लिए कृषि में बागवानी एक महत्वपूर्ण भूमिका निभाती है। किसानों को प्रेरणा तथा सलाह देने के लिए आप तकनीकी सलाहकार के रूप में या विपणन कंपनियों के साथ एक मध्यस्थ के रूप में भी कार्य कर सकते हैं।फलों, फूलों और सब्जियों के प्रसंस्करण, परिक्षण तथा विपणन के क्षेत्र में भी अवसर विद्यामान हैं।

शिक्षाएवं सफलता :

अपना निजी व्यवसाय चलाने के लिए पौधों एवं पौधों की सुरक्षा का अच्छा ज्ञान पर्याप्त है। तथापि, औपचारिक गहन प्रशिक्षण आपके विकल्पों को और व्यापक करेगा।बागवानी या कृषि विश्वविद्यालय बागवानी में शैक्षिक डिग्रियां देते हैं। बागवानी में स्नातक पाठ्यक्रम एक चार वर्षीय कार्यक्रम होता है और बागवानी में एम.एससी. दो वर्ष की अवधि की होती है। अधिकांश विश्वविद्यालय पीएच. डी कार्यक्रम चलाते हैं। कुछ विश्वविद्यालय अल्प–कालीन प्रशिक्षण कार्यक्रम भी चलाते हैं।

विषय के प्रति लगाव तथा व्यापक तकनीकी ज्ञान इस क्षेत्र में सफल होने के लिए अनिवार्य है। पौधों पर मिट्टी मौसम तथा उपचार के प्रभाव का ध्यान रखना तथा विश्लेषण करना महत्वपूर्ण है। खेतों में व्यावहारिक रूप में कार्य करके सीखना और फसल के व्यवहार तथा उन पर जलवायु में परिवर्तन के प्रभाव पर ध्यान रखना और उसके बाद निष्ठा, प्रतिबद्धता और कठोर परिश्रम करना अनिवार्य है। अवसरों की प्रतीक्षा न करें, अवसर की तलाश करें। विषय पर तथा साथ ही कॅरिअर के अवसरों पर भी अपने ज्ञान को निरंतर अद्यतन करें।

रूचि :

अपनी रुचि, प्रवृत्ति, योग्यताओं तथा अनुभव के आधार पर आप बागवानी से जुड़े सगठनों में कार्य कर सकते हैं और अपने कॅरिअर में आगे बढ़ सकते हैं। बागवानी के और विशेषज्ञता वाले क्षेत्रों में अतिरिक्त प्रशिक्षण आपकी उन्नति को गति देगा। ये क्षेत्र हैं दृ भूदृश्य, वास्तुकला, शहरी नियोजन, प्रबंधन तथा उपलब्ध अवसरों के अनुसार अन्य विषय। यदि आपका, अपना निजी व्यवसाय चलाने की योजना है तो उस पर ध्यान दें। व्यवसाय तथा बाजार के विभिन्न पहलुओं का आंकलन करें। आधुनिक तकनीकों जैसे ऑनलाइन विपणन तथा विक्रय का उपयोग करने से आपका व्यावसायिक टर्न ओवर थोड़े से समय में पर्याप्त रूप में बढ़ जाएगा।बागवानी के क्षेत्र में कॅरिअर बनाने के इच्छुक व्यक्तियों के लिए प्रचुर अवसर हैं। इसलिए इस मिथक कि इस क्षेत्र में अवसर सीमित हैं, को दूर करके विकल्पों का पता लगाएं और अपनी पसंद पर गंभीरतापूर्वक आगे बढ़ें। आपके प्रयास निश्चय सफल होंगे।

ग्रामीण महिलाओं का डिजिटल सशक्तिकरण

डॉ. कीर्ति, डॉ. एम. सी. जैन एवं डॉ. बी. एल. ढ़ाका
कृषि महाविद्यालय, उम्मेदगंज, कोटा

परिचय :

ग्रामीण भारत में कृषि सहित सभी आर्थिक गतिविधियों में महिलाओं की महत्वपूर्ण भूमिका है। जिनका दिन सूर्योदय से पहले शुरू होता है और सूर्यास्त के बाद जारी रहता है। ये भारत की महिला किसान हैं, जिनकी आवाज अक्सर उनके लिंग के कारण अनसुनी हो जाती है, और जो पितृसत्तात्मक परंपराओं और लिंग समाजीकरण के कारण जमीनी स्तर पर अपनी पहचान स्थापित करने के लिए संघर्ष करती हैं। न केवल भारत में बल्कि दुनिया भर में, कृषि में महिलाओं का योगदान महत्वपूर्ण है। संयुक्त राष्ट्र के खाद्य और कृषि संगठन का अनुमान है कि अगर महिलाओं के पास उत्पादक संसाधनों की पहुंच पुरुषों के समान है, वे अपने खेतों पर पैदावार 20–30% तक बढ़ा सकते हैं। यह विकासशील देशों में कुल कृषि उत्पादन को 4% तक बढ़ा सकता है, जो बदले में दुनिया में भूखे लोगों की संख्या को 12–17% तक कम कर सकता है – यह 100–150 मिलियन लोग हैं।

इस प्रकार एक समावेशी दृष्टिकोण, नीति से कार्यान्वयन तक, कृषि में काम करने वाली महिलाओं को मुख्यधारा में लाने और बेहतर कृषि प्रथाओं के ज्ञान के लिए सीधी पहुंच के साथ उन्हें सशक्त बनाने के लिए आवश्यक है। भारतीय महिलाओं का सशक्तीकरण उन लोगों के सशक्तिकरण के बिना पूरा नहीं होगा जो भारत की अंतिम परिधि में रह रहे हैं।

आईसीटी और उनके ई–वॉयलेशन को ध्वनि और टिकाऊ उत्पादन क्षमता और जीवन स्तर को बेहतर बनाने के लिए समाजों और राष्ट्रों की सहायता करते हुए देखा जाता है जो राष्ट्र के आर्थिक विकास के लिए महत्वपूर्ण हैं। डिजिटलीकरण ने दुनिया भर के किसी भी देश के आर्थिक विकास और रोजगार पर अपने महत्वपूर्ण प्रभाव के कारण खुद को गेम चेंजर साबित किया है। इस अत्यधिक प्रतिस्पर्धी दुनिया में अपनी का एक ही प्रमुख स्थिति और बड़ा सकारात्मक प्रभाव है कि यह भारतीय अर्थव्यवस्था और इसकी जनसंख्या के लिए ला सकता है समझते हुए भारत सरकार की शुरूआत की है एक प्रमुख कार्यक्रम का नाम दिया "डिजिटल इंडिया" के क्रम में करने के लिए एक ज्ञान में देश को बदलने अर्थव्यवस्था और डिजिटल रूप से सशक्त समाज ने विभिन्न ई–गवर्नेंस पहलों का उपयोग करके ताकि डिजिटल विभाजन को बढ़ावा देना और समावेशी विकास को बढ़ावा देना सुनिश्चित किया जा सके। सुरक्षित और सुरक्षित डिजिटल बुनियादी ढांचे की त्रिमूर्ति पर केंद्रित, डिजिटल रूप से नागरिकों की सेवाओं की डिलीवरी और डिजिटल साक्षरता, डिजिटल इंडिया का उद्देश्य बेहतर ऑनलाइन बुनियादी ढांचे और बढ़ी हुई इंटरनेट कनेक्टिविटी के माध्यम से सभी नागरिकों को इलेक्ट्रॉनिक रूप से सरकारी सेवाएं उपलब्ध कराना है। यद्यपि, डिजिटल उपकरणों के उपयोग में व्यक्तियों के बीच सक्षमता के निर्माण के साथ नागरिकों का डिजिटल सशक्तिकरण "डिजिटल इंडिया प्रोग्राम" का एक प्रमुख फोकस क्षेत्र है, इस कार्यक्रम का सपना केवल तभी महसूस किया जा सकता है जब खेत महिलाएं इस बहुआयामी में कुशल हो जाएंगी डिजिटल दुनिया।

यह उच्च समय है जब हमने एक अनुकूल वातावरण बनाने के लिए एक ठोस प्रयास किया–न केवल महिला किसानों को मुख्यधारा में लाने के लिए, बल्कि तकनीकी रूप से और वित्तीय दोनों पर एक स्थापित पहचान और ज्ञान प्रदान करके जमीनी स्तर पर महिला किसानों को सशक्त बनाने के लिए कृषि के पहलू है। उन्हें बेहतर कृषि पद्धतियों और बाजारों के लिंक की जानकारी के लिए सीधी पहुँच की आवश्यकता है। आज की डिजिटल दुनिया में, सूचना और संचार साधनों के बारे में गंभीर रूप से सोचना भी महत्वपूर्ण है, जो उन महिलाओं को मदद कर सकता है जो बाजारों तक पहुंचने के लिए अधिक शारीरिक गतिशीलता का आनंद नहीं ले सकती हैं–जिन्हें आमतौर पर एक पुरुष–केंद्रित क्षेत्र माना जाता है। इस तरह की तकनीक तक पहुंच का अभाव और संचार के इस रूप से जुड़ने की अनिच्छा या अक्षमता एक वास्तविक सामाजिक और सांस्कृतिक विभाजन पैदा कर रही है जो शायद पढ़ने और लिखने की क्षमता की कमी के रूप में संभवतः महत्वपूर्ण है।

भारतीय समाज में डिजिटल विभाजन :

पिछले दो दशकों में डिजिटल मीडिया के तेजी से विकास और वितरण के कारण, इस मीडिया की पहुंच हमारे समकालीन समाज में एक सक्रिय खिलाड़ी बनने के लिए महत्वपूर्ण हो गई है। अधिकांश विकसित देशों में कंप्यूटर और मोबाइल फोन अपरिहार्य हो गए हैं कि लोग कैसे संवाद करते हैं, काम करते हैं और सीखते हैं। यह एक सर्वविदित तथ्य है कि डिजिटलाइजेशन ने समाज पर एक गहन प्रभाव डाला है और लोगों के जीवन पर भी काफी प्रभाव डाला है। भारत में, डिजिटलीकरण के लाभों को स्पष्ट रूप से समाज के हर कोने में देखा गया है और समाज में महान परिवर्तन पैदा कर रहा है। हालाँकि, यह भी एक वास्तविकता है कि सूचना और संचार प्रौद्योगिकियों तक असमान पहुंच ने समाज को डिजिटल रूप से बड़े पैमाने पर विभाजित किया है। यह उन लोगों के बीच

कथित अंतर को संदर्भित करता है जिनके पास नवीनतम सूचना प्रौद्योगिकियों तक पहुंच है और जो नहीं हैं। अनुसंधान हमें बताता है कि इस डिजिटल विभाजन में नस्लीय, आर्थिक, जातीय और शैक्षिक रेखाओं के साथ योगदान करने वाले कई कारक हैं। स्वामित्व और पहुंच हमेशा प्रौद्योगिकी का उपयोग करने वाले लोगों के लिए समान नहीं होती है क्योंकि पहुंच के साथ कई आवश्यक रूप से कुशल उपयोगकर्ता नहीं हैं या प्रभावी रूप से सामग्री तक पहुंचने में असमर्थ हैं।

सशक्तिकरण और डिजिटल सशक्तिकरण की अवधारणा :

लोगों के जीवन को बदलने और दूसरों को प्रेरित करने की क्षमता पर विशेष ध्यान देने के साथ सशक्तिकरण को "मानव की जरूरतों को पूरा करने के लिए अपने स्वयं एवं अपने पर्यावरण पर महारत हासिल करने की प्रक्रिया" के रूप में परिभाषित किया गया है।प्रतिबिंब और कार्रवाई की एक प्रक्रिया सीमांत समूहों को अपनी स्थिति के बारे में अधिक जागरूक बनने में मदद कर सकती है और वे तब अपनी वास्तविकता को बदलने के लिए कदम उठा सकते हैं।"इस तरह के सशक्तीकरण से लोगों को अधिक रणनीतिक जीवन विकल्प बनाने की क्षमता का विस्तार किया जा सकता है और उन्हें अधिक कुशल जीवन जीने की क्षमता और कौशल प्रदान किया जा सकता है"।

आत्म–सम्मान के निर्माण की प्रक्रिया के माध्यम से सशक्तिकरण प्राप्त किया जा सकता है जो कौशल प्राप्त करने और सीखने से आ सकता है, मूल्य की भावना को बढ़ाता है और इसलिए सामाजिक पूंजी को बढ़ाने में मदद करता है। यह एक शब्द है जो विभिन्न तरीकों का वर्णन करता है जिसमें विभिन्न समुदायों के सदस्य प्रभावी ढंग से बातचीत कर सकते हैं। यह पड़ोसियों के साथ चौट करने या मनोरंजक गतिविधियों में शामिल होने, पर्यावरण संगठनों और राजनीतिक दलों में भाग लेने से भिन्न हो सकता है। यह सूचना और समर्थन के नए स्रोतों के अधिग्रहण की भी अनुमति देता है, इस प्रकार सामाजिक विकास के लिए सामाजिक पूंजी को पाटना महत्वपूर्ण माना जाता है। इंटरनेट तक पहुंच और सामग्री उत्पादन कौशल का विकास व्यक्ति की सामाजिक पूंजी को बढ़ाकर बातचीत के नए रूपों का ढेर खोल देता है। यह दुनिया भर के दर्शकों के साथ संवाद करने के अवसर प्रदान करता है और सबसे महत्वपूर्ण बात यह है कि यह पहले की आवाज के लिए एक सार्वजनिक क्षेत्र में एक आवाज प्रदान करता है और इस तरह से वंचित है जो पहले इस हद तक उपलब्ध नहीं था।

डिजिटल सशक्तिकरण की अवधारणा को विभिन्न लेखकों ने विभिन्न तरीकों से परिभाषित किया है। डिजिटल सशक्तीकरण मूल रूप से इसमें दो शब्द थे, डिजिटल और सशक्तिकरण। डिजिटल इलेक्ट्रॉनिक प्रौद्योगिकी का वर्णन करता है जो डेटा उत्पन्न करता है, संग्रहीत करता है, प्रक्रिया करता है और अंक 0 और 1 के संयोजन के द्विआधारी कोड में दर्ज किए जाते हैं, जिन्हें बिट्स भी कहा जाता है, जो शब्दों और छवियों का प्रतिनिधित्व करते हैं। जबकि, सशक्तिकरण विभिन्न तरीकों का वर्णन करता है जिसमें विभिन्न समुदायों के सदस्य प्रभावी ढंग से बातचीत कर सकते हैं। यह सामाजिक–आर्थिक और राजनीतिक स्थितियों के आधार पर व्यक्ति से दूसरे व्यक्ति में भिन्न हो सकता है।

डिजिटल सशक्तिकरण की भूमिका :

जानसेन और स्टोयोनोव (2012) ने डिजिटल उपकरणों और अनुप्रयोगों का उपयोग करने की उनकी क्षमता के आधार पर, व्यक्तियों के डिजिटल सशक्तिकरण का वर्णन किया। डिजिटल क्षमता में उपकरणों और अनुप्रयोगों का उपयोग करना जानने से अधिक शामिल है–जो आईसीटी के साथ–साथ प्रबंधन प्रबंधन कौशल का उपयोग करने के लिए कौशल के साथ जटिल रूप से जुड़ा हुआ है। इसके अलावा, आईसीटी के समझदार और स्वस्थ उपयोग के लिए कानूनी और नैतिक पहलुओं, और गोपनीयता और सुरक्षा के साथ–साथ समाज में आईसीटी की भूमिका की समझ और प्रौद्योगिकी के प्रति संतुलित दृष्टिकोण के बारे में विशेष ज्ञान और दृष्टिकोण की आवश्यकता होती है।

निष्कर्ष :

डिजिटल युग में ग्रामीण महिलाओं के डिजिटल सशक्तीकरण स्तर का व्यापक व्यावहारिक मूल्य है। भारतीय परिदृश्य में, हालांकि महिलाएं कृषि में कई भूमिकाओं में लगी हुई हैं, वे अन्य भागों, जैसे कि बाल स्वास्थ्य, पोषण, रोकथाम और आम बीमारियों के इलाज, रोजगार के अवसर आदि के बारे में जानकारी प्राप्त करने की इच्छुक हैं, ऑनलाइन नौकरियों के लिए आवेदन करने में सक्षम हैं। उन्हें प्रासंगिक जानकारी खोजने के लिए कौशल की आवश्यकता होती है। प्रासंगिक स्वास्थ्य जानकारी प्राप्त करने के लिए, महिलाओं को पोषक तत्वों की खुराक और शोध के सबूतों के आधार पर ठोस जानकारी के लिए एक विपणन चाल के बीच अंतर करने में सक्षम होना चाहिए। ज्ञान निर्माण की कार्यप्रणाली की पूरी समझ और एक विशेष वास्तविकता का प्रतिनिधित्व करने का एक तरीका और एक निश्चित दृष्टिकोण को व्यक्त करना, ऑनलाइन शैक्षिक अवसरों का पूर्ण उपयोग करने के लिए एक आवश्यकता है। महिला सशक्तिकरण के लिए डिजिटल डिवाइड को पाटने की कोशिश करने वालों को आईसीटी उपयोग पैटर्न और ग्रामीण महिलाओं की

विभिन्न सूचना आवश्यकताओं पर आधारित अपनी रणनीतियों का निर्माण करना चाहिए। ग्रामीण महिलाओं के लिए एक गतिशील और प्रासंगिक सामग्री का उभरना एक बड़ी चुनौती के रूप में जारी है। इस गतिविधि के लिए पर्याप्त संसाधनों को आवंटित किए जाने की आवश्यकता है, अगर कनेक्टिविटी और हार्डवेयर में निवेश किए गए संसाधनों से लाभ को प्रचुरता से महसूस किया जाए। आईसीटी के आगमन ने वैश्विक परिदृश्य को बदल दिया है और कई बेरोजगार क्षेत्र अब नकदीकरण के लिए खुले हैं। यह हमारे लिए अधिकतम संभव सीमा तक पेबैक का फायदा उठाने के लिए है।

लोगों को सामाजिक कार्रवाई करने और वास्तव में वास्तविक नागरिक गतिविधियों में संलग्न होने के लिए जो उनके समुदायों में सुधार करते हैं, उन्हें सशक्तिकरण की भावना महसूस करने की आवश्यकता है जो समस्याओं को हल करने के लिए सहयोगी रूप से काम करने से आता है। वैश्विक मंच पर बाहर खड़े होने के लिए, भारत को विकास के लिए एक प्रमुख के रूप में डिजिटल समावेश के माध्यम से समावेशी विकास पर ध्यान देना होगा। आज, प्रत्येक राष्ट्र पूरी तरह से डिजिटल होना चाहता है और डिजिटल इंडिया जैसे कार्यक्रम उपयोगकर्ता और सेवा प्रदाता को समान लाभ प्रदान करने का प्रयास करता है। इसके अलावा इसका उद्देश्य नागरिकों को शासन और सार्वजनिक सेवाएं प्रदान करने के तरीके को बदलना है। डिजिटल सशक्तिकरण दोनों के भविष्य पर एक महिला के जीवन के व्यक्तिगत और सामाजिक पहलुओं पर महत्वपूर्ण प्रभाव डालेगा।

गन्ने की खेती में पादप हार्मोन्स की भूमिका

डॉ. आर.के. मीना, डॉ. एन.आर. कोली एवं मन्जू मीना
कृषि अनुसंधान केन्द्र, उम्मेदगंज, कोटा

पौधों की जैविक क्रियाओं के बीच समन्वय स्थापित करने वाले रासायनिक पदार्थो को पादप हार्मोन (Plant hormones) या फाइटोहार्मोन(Phytohormone) कहते है। पादप हार्मोन वो संकेत अणु होते है। और बहुत कम मात्रा में इनका उत्पादन पौधों में ही होता है। हार्मोन स्थानीय रूप में लक्षित कोशिकाओं में कोशिकाओं प्रक्रियाओं को विनियमित करते है। और जब यह पौधे में एक दूसरे स्थानों पर पहुंचते है। तो वहां कि कोशिकीय प्रक्रियाओं को विनियमित करते है। पौधों में जानवरों की तरह हार्मोन के उत्पादन और स्राव के लिए ग्रन्थियां नही होती है। पादप हार्मोन पौधे को निश्चित आकार देने के साथ बीज विकास पुश्पण का समय फूलों के लिंग पत्तियों और फलों के वार्धक्य (बुढापा) के लिए भी उत्तरदायी होते है। ये पौधों के विभिन्न अंगों में बहुत लघु मात्रा में पहुंचकर वृद्धि एवं अनेक उपापचयी क्रियाओं को नियंत्रित एवं प्रभावित करते है। इनके संश्लेशण का स्थान इनके क्रिया क्षेत्र से दूर होता है। एवं ये विसरण द्वारा क्रिया क्षेत्र तक पहुंचते है। बहुत से कार्बनिक यौगिक जो पौधों से उत्पन्न नही होते परन्तु पादप हार्मोन की तरह ही कार्य करते हे। उन्हे भी वृद्धि नियंत्रक पदार्थ (Growth regulators) कहा जाता है।

हार्मोन पादप के विकास के लिए महत्वपूर्ण है। और इनके अभाव में पादप का विकास असंभव है। पौधों में मुख्यतः पाँच प्रकार के हार्मोन पाए जाते हे।

1. ऑक्जिन (Auxin)
2. जिबरेलिन्स (Gibberellin)
3. साइटोकाइनिन (Cytokinin)
4. ऐबिसिसिक एसिड (Abscisic acid)
5. एथिलीन (Ethylene)

(1) ऑक्जिन (Auxin) :– इसकी खेज 1880 में डार्विन ने की थी इसका सबसे अधिक निर्माण सिरों के शीर्श पर होता है। इसके प्रभाव से केवल अग्र कलिका में वृद्धि होती है। यह परोहा की कोशिकाओं में वर्गीकरण प्रेरित करते हे।

ऑक्जिन कार्बनिक यौगिक का समूह है। जो पौधों में को शिकाओं विभाजन (Cell division)तथा कोशिका दीर्घन (Cell elongation) में भाग लेता है। इन्डोल एसीटिक एसिड (Indole Acetic Acid-IAA)एवं नैफ्थेलीन एसीटिक एसिड (Naphthalene acetic acid-NAA) इसके प्रमुख उदाहरण है। तने में जिस ओर ऑक्जिन की अधिकता होती है। उस ओर वृद्धि अधिक होती है। जड़ में उसकी अधिकता वृद्धि को कम करती है।

कार्य :–

1. ये जड़ो की वृद्धि को नियंत्रित करते है।
2. ऑक्जिन कोशिकाओं दीर्घन द्वारा स्तम्भ या तने की वृद्धि में सहायक होते है।
3. ये बीजरहित फल के उत्पादन में सहायक होते है।
4. पत्तियों के झड़ने तथा फलों के गिरने पर ऑक्जिन का नियंत्रण होता है।
5. गेहू एवं मक्का के खेतों में ऑक्जिन खरपतवारनाशक का कार्य करते है।

गन्ने की फसल में ऑक्जिन का महत्व :– गन्ने में कृत्रिम परिवेश में जड़ों की संख्या तथा पौधे के विकास में ऑक्जिन असरदार पाए गए है। जिसमें सबसे उपयोगी नेप्थेलिस एसिटिक एसिड (NAA), उसके बाद इंडोल–3–ब्यूटिरिक एसिड (IBA), और इंडोल–3–एसिटिक एसिड (IAA),बताया गया है (टोलेरा 2016)। उत्तक संवर्धन तकनीक द्वारा गन्ने में इण्डोल एसिटिक और ऐ.ओ. सी.पी.ऐ (9:1) के संयोजन में इण्डोल एसिटिक एसिड के एकल उपयोग की तुलना में अधिक जड़े उत्पन्न होती हे। इसके अलावा इस उपचार में नाइट्रोजन के अतिरिक्त प्रयोग से परिणामों में और अधिक वृद्धि देखी गई थी (खान और हॉल,1954)।

(2) जिबरेलिन्स (Gibberellin) :– इनकी खेज 1928 ईस्वी में कूरूसेवा ने इसे जबरेला फ्यूजीकोराई नामक कवक से किया था। जिब्बरेलिन एक जटिल कार्बनिक यौगिक है, जिसका मुख्य उदाहरण जिबरैलिक एसिड (Gibberellic acid) है।

कार्य:–

1. जिब्बरेलिन कोशिका विभाजन तथा कोशिका दीर्घन द्वारा तने को लम्बा बनाते है। जिसके कारण पौधे वृहत आकार के हो जाते है।
2. जिब्बरेलिन हार्मोन का प्रयोग करके बीजरहित फलों का उत्पादन किया जाता है।
3. जिब्बरेलिन हार्मोन बीजों के अंकुरण में भाग जेते है। बीजों की सुशुपतावस्था को भंग करके उन्हे अंकुरित होने के लिए प्ररित करते है।
4. बौनी जातियों के पौधों के तनों की लम्बाई में वृद्धि करना।
5. यह बीज की सुशुपतावस्था को तोड़कर उसके अंकुरण में मदद करता है।
6. बीज रहित फल के निर्माण में सहायक।

गन्ने की फसल में जिब्बरेलिन का महत्व :– जिब्बरेलिन गन्ने के पादप क्रियाओं को सामायोजित करके समायोजित करके पौधे के कार्बन ऑक्सीकरण में सुधार करते हे। जिब्बरेलिन के उपयोग द्वारा गन्ने में बढ़वार, पत्ती का रंग,पत्ती का क्षेत्र, पत्ती जनसंख्या घनत्व में वृद्धि होती है। तथा प्रकाश संश्लेशण दक्षता में सुधार के साथ–साथ गन्ने के डंठल के विकास में तेजी लाने के और चीनी की पैदावार बढ़ाने में सहयोग करता है। गन्ने की फसल में गन्ने की फसल में गन्ने की चीनी (सूक्रोज) को इंटरनोड के पैरेन्काइमा को कोशिकाओं में संग्रहित किया जाता हे। जिब्बरेलिन इंटरर्नोड्स के बढ़ाव को उत्तेजित करते है।जिब्बरेलिन के साथ गन्ने की फसल को स्प्रे करने से गन्ने की वृद्धि और चीनी की पैदावर में वृद्धि होती है।

(3) साइटोकाइनिन (Cytokinin):– इसकी खेज मिलर ने 1955 में की थी। काइनेटिन तथा जिएटिन रसायन साइटोकाइनिन का कार्य करते है। साइटोकाइनिन क्षारीय प्रकृति का हार्मोन है। काइनेटिन (kinetin) एक संश्लेशित साइटोकाइनिन है। साइटोकाइनिन का संश्लेशण जड़ो के अग्र सिरो पर होता है जहां कोशिका–विभाजन (Cell division)होता है

कार्य :–

1. साइटोकाइनिन कोशिका विभाजन के लिए एक आवश्यक हार्मोन है।
2. यह ऊतकों एवं कोशिकाओं का विभेदन का कार्य भी करती है।
3. साइटोकाइनिन पार्श्व कलिकाओं (Lateral buds) की वृद्धि को प्रारम्भ करते है।
4. साइटोकाइनिन बीजों के अंकुरण (Germination) को प्ररित करते है।

ऐबसिसिक एसिड (Abscisic Acid) :– यह एक वृद्धिरोधी (Growth inhibitor)हार्मोन है, अर्थात यह पौधे की वृद्धि को रोकता है। यह बीजों एवं कलियों के अंकुरण को संतुलित करके उन्हे सुप्त बनाए रखता।

कार्य :–

1. ऐबिसिसिक अम्ल पौधों की वृद्धि को रोकता है।
2. यह वाश्पोत्सर्जन की क्रिया का नियंत्रण रंध्रों (Stomata) को बन्द करके करता है।
3. यह बीजों तथा कलिकाओं को सुशुप्तावस्था(Dormant stage) में लाता है।
4. यह पत्तियों के झड़ने की क्रिया को नियंत्रित करता हे।
5. ऐबिसिसिक एसिड पौधों से फूलो एवं फलों के पृथ्करण की क्रिया का भी नियंत्रण करता हे।

एथिलीन (Ethylene) एथिलिन गैसीय रूप में पौधें में पाया जाने वाला हार्मोन है। इसके द्वारा पौधों की लम्बाई में वृद्धि होती है। परन्तु ज्यादा मात्रा में यह पौधे की लम्बाई में वृद्धि को रोकता हे। इस हार्मोन का निर्माण पौधे के प्रत्येक भाग में होता है।

कार्य :–

1. एथिलीन के द्वारा पौधों की चौड़ाई में वृद्धि होती है।
2. यह पौधों की पत्तियों एवं फलों के झड़ने की क्रिया को नियंत्रित करता हे।
3. पौधे के विभिन्न भागों की सुशुप्तावस्था को समाप्त कर इसे अंकुरण के लिए प्रेरित करता है।
4. एथिलीन हार्मोन फलों के पकने (Ripening)में मुख्य भूमिका निभाता है।

गन्ने की फसल में एथिलीन का महत्व :– एथेफॉन एक बहुमुखी विकास नियामक है जो कि एक एथिलीन–उत्पादक पदार्थ है। यह एक प्यावरण के अनुकूलन रसायन है। और गन्ने की पैदावार और चीनी उत्पादकता बढ़ाने की जबरदस्त क्षमता है।

एथिलीन को एक कारक के रूप में प्रयोंग किया जाता है। जो बीज के अंकुरण के समय को नियंत्रित करता हे। पांडुरित पत्तियों की दर एवं विस्तार को फल पकने की प्रगति और पौधों में तनाव सम्बन्धि प्रक्रियाओं को नियंत्रित करता है। (ऐंनथेनि और स्केलेर,1996) गन्ने के बीज को रात भर 50 पी.पी.एम. ऐथ्रेल घोल में भिगो के रखने के बाद गन्ने की रोपाई करने से पारम्परिक प्रणाली की तुलना में 18.54 प्रतिशत अंकुरण बढ़ जाता है। (पटेल और चौधरी 2018) एथेफॉन का प्रयोग न केवल एक प्रभावी रसायन जो कि फसल को पकने में उपयोग होता है। के रूप में किया गया था बल्कि शुरूआती विकास चरण में पत्तियों पर कम सांद्रता पर छिड़काव करने तथा रोपाई से पहले बीज को भिगोकर इस्तमाल करने पर यह गन्ने के विकास को बढ़ावा देने में सहायक है। यह भी पाया गया है कि एथेफॉन की कम सांद्रता ने संवहनी बडलों के विशिश्टीकरण को बढ़ावा दिया और पत्तियों में एपीगेनेटीक वाहिकाओं और फ्लोएम के क्षेत्रों को बढ़ाया जिससे पौधो की आन्तरिक परिवहन प्रणाली में सुधार हुआ जड़ो कि गतिविधि में वृद्धि करना पौधों की अवशोशण क्षमता को बढ़ावा देना क्लोरोप्लास्ट की भिन्नता और कुल प्रकाश संश्लेशण क्षेत्र को बढ़ाता है। और क्लोरोफिल सामग्री और प्रकाश संश्लेशण से सम्बन्धित महत्वपूर्ण एंजाइमो की गतिविधियों को भी बढ़ाने में मदद करता है। इनके अलावा कई महत्वपूर्ण एंजाइमो को प्रभावित करता है। जोकि गन्ने के विकास और चीनी संचय से सम्बन्धित है। जिससे अधिक कल्लों का उत्पादन होता है। पौधे की वृद्धि तेजी से होती है। और इनके फलस्वरूप उच्च गन्ना और चीनी का उत्पादन होता है। (लीं 2004) विकास पर इसके लाभकारी प्रभाव के अलावा इथेफॉन (एथ्रेल या 2–क्लोरोइथाइल फॉस्फोनिक एसिड) सामान्य औा देर से लगाई गई परिस्थितियों में बीज द्वारा लगाये गये गन्ना के अंकुरण में वृद्धि करता है। एथेफॉन के उपचार से कल्लों की संख्या मिल योग्य गन्ने और बायोमास उत्पादकता प्रति यूनिट क्षेत्र में बढ जाती है। एथेफॉन भी गन्ने की परिवक्ता प्रक्रिया को तेज करता है। जो शुरूआती मिलिंग का पक्षधर है। और देर से मिलिंग के दौरान फूलों की गुणवत्ता को बनाये रखता है। (लीं और सोलोमन 2003) वसंता और शकीना (2010) ने बताया की एथ्रेल की कम सांद्रता (100 पीपीएम) सी.ओ. 99004 में कल्लों की संख्या को बढाती है। अगस्त के तीसरे सप्ताह में मांडया और मैसूर (कर्नाटक में) के फ्लोवरिंग के लिये उपयुक्त क्षेत्र में इथ्रेल (0.25 किग्रा एआई/हेक्टेयरः 250 ली. पानी में 250 मिली/है.) को कोहरा के रूप में स्प्रे करने से फ्लोवर योग्य किस्म सी.ओ. 62715 में 72 प्रतिशत कम फूल आये। इसने गन्ने के औसत वजन में 0.25 किलोग्राम, ब्रिक्स में 1.2 इकाई और शुद्धता गुणांक में 0.31 इकाई का सुधार किया। गन्ने की पैदावार 8–10 टन हैक्टेयर वृद्धि हुई (बालासुंदरम 2004)

सर्दियों में गन्ने के ठूंठ पर एथ्रेल का स्प्रे करके गन्ने का फुटाव बढ़ाया जा सकता है। क्योंकि एथ्रेल की कम सांद्रता एक विकास प्रवर्तक के रूप में कार्य करती है। और एथ्रेल के छिड़काव से एसिड इनवर्टेज की गतिविधि में एक प्रगतिशील वृद्धि होती है। जिस से अंकुरित कलियों में अपाचायी शर्करा की मात्रा में वृद्धि पाई गई, जो की उगती हुई कलिका में हेक्सोस के उच्च परिवहन को इंगित करता है। ओर फुटाव बढ़ाता है (सोलोमन और कुमार 1987)। राय, (2008) ने बताया कि गन्ने की कटाई से 15 दिन पहले गन्ने की पत्तियों पर 1000 पी.पी.एम. एथेरेल का स्प्रे करने से सर्दी (5–10 सेंटीग्रेड तापमान) में गन्ने के अंकुरण में 40 प्रतिशत की वृद्धि होती है। जिसके परिणामस्वरूप बाद में पेड़ी फसल के कल्लों में वृद्धि होती है। सूखे से ग्रसित गन्ने कि फसल पर 400 मिली ग्रा./ली. पानी में एथेफॉन का स्प्रे करने से गन्ने के पौधों में कुछ रूपतामक परिवर्तनों, पादप चयापचय क्रियाओं के कुछ सुरक्षात्मक एंजाइमों की गतिविधि,प्रोलिन और ओसमेटिक पोटेनशियल बढ़ जाता है। जिसके फलस्वरूप सूखे के प्रतिरोध को सहन काने की क्षमता में वृद्धि होती है (लीं. 2004)।

गन्ने की उच्च सस्य तकनीकें

डॉ. एन.आर. कोली, डॉ. आर.के. मीना एवं मन्जू मीना
कृषि अनुसंधान केन्द्र, उम्मेदगंज, कोटा

गन्ना सामान्यतः बसन्तकाल फरवरी से लेकर ग्रीश्मकाल के मध्य में अप्रैल माह तक बोया जाता है। इसकी बुवाई आलू , तिलहन व रबी की अन्य फसलों जैसै राया,गोभी,तोरिया आदि की कटाई के बाद की जाती है। गेंहू की कटाई के बाद देरी से बुवाई की जाती है। एक बहु–वर्शीय फसल होने के कारण गन्ने की सस्य विज्ञान(**सस्य तकनीकीयों**) के दृश्टिकोण से विशेश देख भाल की जानी चाहिए। अच्छी किस्मो का उपयोग करके एवं विशेश प्रबन्धन से ही अधिक उत्पादन लिया जा सकता है, क्योंकि गन्ना एक द्विवार्शिक या त्रिवार्शिक फसल है, अतः इसकी सफलता पूर्वक खेती के लिए कुछ विशेश बातों का ध्यान रखना अतिआवश्यक है।

बुवाई का समय – मध्य फरवरी से मार्च के अन्त तक का समय बुवाई के लिए सर्वोत्तम है। गेंहू की कटाई के बाद अप्रैल माह में अधिक तापमान के कारण अंकुरण प्रभावित होता है। देरी से बुवाई करने से बचना चाहिए। देरी से बुवाई की दशा में केवल देरी से पकने वाली किस्मों की बुवाई बीज की दर बढ़ाकर (30,000– 35000 तीन कली (ऑख/बड) वाली पोरियां प्रति एकड़) करनी चाहिए।

किस्म का चयन – अधिक उत्पादन प्राप्त करने के लिए अच्छी किस्म का चयन बहुत महत्त्वपूर्ण है। अच्छी फसल लेने के लिए सिफारिश की गयी प्रजातियाँ ही उगानी चाहिए।

को. 98014 – पश्चिमी उत्तर प्रदेश में उगाई जाने वाली यह किस्म किसानों द्वारा औसत रूप से स्वीकृत की गई है। यह प्रजाति गन्ना प्रजनन संस्थान – क्षेत्रिय केन्द्र,करनाल हरियाणा द्वारा विकसित की गई है। यह एक अगेती किस्म है। इसकी पैदावार 75–78 टन प्रति हैक्टेयर के लगभगहोती है। औसत दर्जे की चीनी उत्पादन करने के कारण शुगरमिल भी इसकी सिफारिश करते है। कण्डुवा व लाल सडन बीमारी के लिए इसमें औसत दर्जे की प्रतिरोधक क्षमता पाई जाती है। तना बेधक,चोटी बेधक व कन्सुआ आदि कीटों के लिए भी यह प्रतिरोधी है। यह औसत दर्जे तक सूखा सहन करती। इसका गन्ना लम्बा व हरा पीले रंग का होता है। इसमें काँटियां नही होती। बड़े जावनर जैसै जंगली सूअर,सियार आदि इसको अधिक नुकसान नही पहुँचा पाते।

को. 0238 – पश्चिमी उत्तर प्रदेश में उगाई जाने वाली यह किस्म किसानों द्वारा अत्यधिक रूप से स्वीकृत की गई है। यह एक अगेती किस्म है। इसकी पैदावार 79–82 टन प्रति हैक्टेयर के लगभग होती है। इसका चीनी उत्पादन भी श्रेश्ठ श्रेणी का है। इसके कारण चीनी मिल इसको अधिक प्राथमिकता देते है। इनके प्रयास से पश्चिमी व उत्तर प्रदेश में बोई जाने वाली किस्मों की तुलना में इसका क्षेत्रफल वर्तमान में सबसे अधिक है। कण्डुवा व लाल सड़न बीमारी के लिए इसमें मध्यम प्रतिरोधक क्षमता पाई जाती है। तना बेधक,चोटी बेधक व कन्सुआ आदि कीटों के लिए यह मध्यम दर्जे की संवेदनशील है। यह औसत दर्जे तक सुखा सहन करती हे। इसके गन्ने लम्बे,मध्यम मोटाई वाले व धूसर रंग लिए होते है। इसमें काँटियां नही होती। मई–जून में पत्ती सूखने पर भी इसकी बढ़वार निरन्तर रहती है। यह लवणीय भूमि में भी अच्छा प्रदर्शन करती हे। इस किस्म में कीट प्रबंधन का विशेश ध्यान रखना चाहिए।

को. 0118 – पश्चिमी उत्तर प्रदेश में उगाई जाने वाली यह किस्म किसानों की अच्छी पसन्द नही मानी जाती है। यह एक अगेती किस्म है। इसकी पैदावार 75–79 टन प्रति हैक्टेयर के लगभग होती है।

इसका चीनी उत्पाद 10 प्रतिशत है। इसके कारण यह गन्ना मिल की तो अच्छी पंसद है,परन्तु लाल सडन में कण्डुवा रोंग के लिए कम प्रतिरोधी होना तथा कन्सुआ तना बेधक व चोटी बेधक के लिए संवेदनशील होने के कारण किसान इसको कम पंसद करते है। इसके अतिरिक्त इसकी उत्पादकता भी कम है। अगेती किस्म होने के कारण गन्ना मिल इसको प्राथमिकता के तौर पर शुरू में ही ले लेते है। परन्तु क्योंकि गन्ना मिलों द्वारा किसान के भुगतान में देरी होने के कारण उनको इस अगेती किस्म का)लाभ नही मिल पाता केवल इतना लाभ मिलता है। कि इसकी कटाई के बाद गेंहू व अन्य रबी की फसलों के लिए समय से खेती खाली हो जाती है। अपने फसलचक्र में इस उपयोगिता को समझते हुए भी किसान इसका अंगीकरण करते है। इसमें सघन काँटे पाये जाते है। इसलिए कटाई,ठिलाई की मजदूरी महँगी पड़ती है। यह जलभराव व सूखे की परिस्थितियों में अधिक प्रभावित नही होती तथा इसको नत्रजन की कम मात्रा की आवश्यकता होती है।

को. 0237– पश्चिमी उत्तर प्रदेश में उगाई जाने वाली यह किस्म है। जो किसानों द्वारा औसत रूप से पसंद की जाती है। इसकी पैदावार 68–72 टन प्रति हैक्टेयर के लगभग होती है। यह कण्डुआ व लाल सडन रोग के लिए मध्यम प्रतिरोधी क्षमता रखती हे। यह कन्सुआ के लिए कम संवेदनशील है। तथा अन्य कीट जैसै तना व चोटी बेधक के लिए मध्यम संवेदनशील रखती है। अगेती किस्म

होने के कारण गन्ना मिल शुरूआती दौर में इसकी भी माँग करते है। इसके गन्ने का रंग पीला होता है। तथा पत्तियाँ काँटें रहित होती हे। यह जलभराव से अधिक प्रभावित नही होती है।

को. 05009 – पश्चिमी उत्तर प्रदेश में उगाई जाने वाली यह किस्म है। इसकी पैदावार 73–76 टन प्रति हैक्टेयर के लगभग होती है। यह लाल सड़न व कण्डुवा रोगके लिए मध्यम दर्जे की प्रतिरोधी क्षमता रखती है। तथा सभी प्रकार के कीटों के लिए मध्यम दर्जे की संवेदनशील है। इसके गन्ने बैंगनी रंग के होते है। तथा पत्तियों पर काँटे पाये जाते है। कीडे,बीमारियों के अधिक प्रकोप व कम पैदावार के कारण यह सीमित रूप से अंगीकृत की जाने वाली किस्म रही हैं।

सी.ओ.पि.के.–05191(प्रतापगन्ना–1)– उत्तर भारत में उगाई जाने वाली यह किस्म है। इसकी पैदावार 75–80 टन प्रति हैक्टेयर के लगभग होती है। यह किस्म सूखा, सभी प्रकार के कीटों एवं बीमारियों के प्रति प्रतिरोधी क्षमता रखती है। यह लाल सड़न व कण्डुवा रोगके लिए प्रतिरोधी क्षमता रखती है। यह जलभराव से अधिक प्रभावित नही होती है। तना कठोर होने के कारण गन्ना मिल वाले इसको पसंद कम करते करते है।

बीज का चुनाव व उपचार –जिस प्रकार किसी भी फसल की अधिकतम उपज लेने के लिए बीज एक महत्वपूर्ण कारक है, यह सत्य गन्ने के विशय में भी लागू है। किसान को स्वस्थ व उच्च श्रेणी का बीज तैयार करने हेतु एक अलग बीजशाला तैयार करनी चाहिए। अंकुरण वृद्धि के लिए पोरियों की कांच्छी को 0.25 प्रतिशत टिल्ट में भिगोने चाहिए। इसके लिए 250 टिल्ट मि.ली. 100 लीटर पानी में घोलकर एक एकड़ के बीज को उपचारित किया जा रहा है। इसके अतिरिक्त फसल को दीमक व अगेती तना छेदक से बचाने के लिए 2 लीटर लिंडेन को 500 लीटर पानी में घोलकर कांच्छी के ऊपर छिड़काव करें या 0.3 जी रीजेंट की 10 किग्रा. मात्रा कांच्छियों के ऊपर डालकर तब कूंड को मिट्टी से ढ़कें।

बीज की दर – एक एकड़ के लिए तीन कलियों (आँख) वाली 25000–30000 कांच्छियाँ उक्त बीज दर है। उचित अंकुरण प्राप्त करने के लिए कांच्छियों की कलियों की उपयुक्त संख्या का होना महत्वपूर्ण है। यदि कलियाँ क्षतिग्रस्त या मृत है तो बीजदर को आवश्यकतानुसार बढ़ाकर बुवाई करनी चाहिए।

बुवाई की विधि

(क) समतल क्यारियों में बोना–उपयुक्त बीज दर अपनाते हुए पंक्ति से पंक्ति की दूरी (कूंडो की दूरी) 75 या 90 सेंमी. रखनी चाहिए। अधिक उपज तथा कम पानी के प्रयोंग के सिंद्धान्त को घ्यान में रखते हुए निम्न आधुनिक तरीकों को अपनाना चाहिए।

(ख) नालियों में दोहरी पंक्तियों की बुवाई –इस उन्नतिशील विधि द्वारा 30 सेंमी. चौड़ी तथा 20–25 सेंमी. गहरी नाली में दो पंक्तियों में बीज डाला जाता है। कांच्छियों को नाली के तल से सीधे–सीधे तरीके से दो पंक्तियों में बिछाकर मिट्टी से ढ़क देते हे। नाली से नाली की दूरी 90 सेंमी होनी चाहिए। यह तकनीक पानी की बचत के साथ–साथ खरपतवार नियंत्रण हेतु अन्तःक्रिया गन्ने को गिरने से बचाना व अधिक उत्पादकता हेतु लाभप्रद है।

खरपतवार नियंत्रण – पंक्तियों के बीच की अधिक दूरी,प्रारम्भिक अवस्था में कम बढ़वार दर अधिक सिंचाई के कारण गन्ने में खरपतवार का प्रकोप अधिक होता है। गन्ने में खरपतवार से 10 से 50 प्रतिशत तक उपज में कमी आ जाती है। जो प्रारम्भिक अवस्था में होने वाले खरपतवारों की किस्म व सघनता पर निर्भर करता है। अतः खरपतवार नियंत्रण के लिए 2 से 3 बार हो होइंग करना आवश्यक होता है। जो बैल संचालित कल्टीवेटर या ट्रेक्टर संचालित हल/त्रिफाली द्वारा किया जा सकता है। पंक्तियों के बीच के भाग में पत्तियों /पराली का अच्छादन खरपतवार को नियंत्रित करने के लिए महत्वपमर्ण है। तथा इससे मृदा का नमी का संरक्षण भी होता है। खरपतवारनाशकों का प्रयोग भी आर्थिक रूप से लाभप्रद है। गन्ने के अंकुरण से पूर्व 70 WP (मैट्रीब्यूजिन), या 50 WP, मार्केजिन 50 WP (एट्राजिन) 800 ग्राम प्रति एकड़ की दर से 225 लीटर पानी में छिड़कने से बड़ी पत्तियों वाले खरपतवार व वार्शिक घासें प्रभावी तरीके से नियंत्रण होती है। मोथा (साइप्रस रोटेडस) के प्राकेप के लिए 2,4–डी (सोडियम साल्ट 80 प्रतिशत) 800 ग्राम प्रति एकड़ की दर से 225 लीटर पानी में घोलकर छिड़कना चाहिए।

खाद की मात्रा– बिजाई वाले गन्ने की फसल में 200 किग्रा. नत्रजन की मात्रा दो बार में देनी चाहिए। पेडी के लिए यह मात्रा 300 किग्रा. प्रति है. देनी चाहिए। 60 किग्रा. फॉस्फोरस, 40 किग्रा. पोटेशियम 25 किग्रा. जिंक व अन्य सूक्ष्म तत्वों का मृदा परीक्षण के आधार पर दी गयी सिफारिशों के आधार पर कूंड में बुवाई के समय देनी चाहिए। नत्रजन की आधी मात्रा प्रथम सिंचाई के उपरान्त उचित नमी के स्तर पर देनी चाहिए।

सिंचाई एवं जल निकास – शुश्क व गर्म मौसम होने के कारण अप्रैल से जून तक का समय गन्ने की बढ़वार के लिए बहुत महत्वपूर्ण है। इस दौरान गन्ने 7 से 12 दिन के अन्तराल पर सिंचाई की जानी चाहिए। वर्शा ऋतु में वर्शा की मात्रा व अवधि के अनुसार सिंचाई

करें। भारी वर्शा की स्थिति में अधिक जल को गन्ने के खेत से निकाल देना चाहिए। शरद ऋतु में (नवम्बर से जनवरी तक) फसल की सिंचाई मासिक अंतराल पर करनी चाहिए। फसल को पाले से बचाने के लिए दिसम्बर के मध्य व जनवरी के अन्त में एक–एक सिंचाई कर देनी चाहिए।

पेड़ी प्रबंधन – उत्तर भारत में अधिकतर एक –वार्शिक पेडी की फसल लेने का प्रचलन है। इसका कारण यह है। कि इसकी प्रबंधन लागत 20 से 30 प्रतिशत कम है। तथा यह बिजाई वाली गन्ने की फसल से एक माह पूर्व कटाई योग्य हो जाती है। जिससे किसान आसानी से अग्रिम रबी की फसल ले सकता है। पेडी की फसल का अपेक्षाकृत कम उत्पादन एक सामान्य बात है। इसका कारण पौधों की कम संख्या है।,जो कम कल्ले फूटाने से रह जाती है। तथा बिजाई फसल के कारण मृदा के पोशक तत्वों में कमी आ जाना है। फिर भी निम्न उचित प्रबंधन द्वारा पेडी की फसल की उपज भी बिजाई रोपित फसल से अधिक ली जा सकती है।

पेड़ी की भुरूआत करने की कटाई– नवम्बर के प्रथम सप्ताह के आस–पास बिजाई गन्ना फसल की कटाई कर लेनी चाहिए। अधिक सर्दी के दौरान (दिसम्बर–जनवरी) कटाई करने पर कम फुटवार होती है। इसलिए पेडी फसल के लिए कटाई जनवरी के बाद करनी चाहिए। फरवरी –मार्च पेडी की शुरूआत करने का उचित समय है।

बिजाई गन्ने की कटाई– पेडी की फसल के लिए पूर्व की बिजाई की फसल को तेज धारदार टोका/बलकटी/खडवांसी से काटना चाहिए। अधिक से अधिक नीचे से कटाई करें। क्योकि जमीन से ऊपर की बड/ कलियाँ से होने वाला फुटाव अच्छी पेडी स्थापित नही करता।

खाली जगह का भरना– सामान्यतः कम फुटाव के कारण पेडी में पौधों की संख्या कम रह जाती है। पौधों की संख्या को उचित रूप से सीापित करने के लिए त्रिकालियों की कांच्छियां खाली जगहों पर मार्च के महिने में सीापित कर सकते है।

पोशक तत्वों का उचित प्रबंधन – पेडी की फसल में पोशक त्तवों की माँग बिजाई,फसल की अपेक्षा अधिक होती है। नत्रजन की मात्रा बिजाई फसल की अपेक्षा लगभग डेढ़ गुणा अधिक देनी चाहिए। अतः 90 किग्रा नत्रजन प्रति एकड़ (195 किग्रा. यूरिया प्रति एकड़) की दर से तीन समान भागों में मार्च अप्रैल व मई में दिया जाना चाहिए। फॉस्फोरसको ड्रिल के छेद द्वारा कतारों के पास भूमिगत रूप से मार्च में देना चाहिए। मृदा परीक्षण आधार पर पोटेशियम व सूक्ष्म तत्वों की कमी होने पर लोहा,जिंक आदि को उचित मात्रा में दे सकते है। यदि लौह तत्व के कमी के लक्षण दिखाई दे तो 1 प्रतिशत फेरस सल्फेट को 2–3 बार स्प्रे कर सकते है।

पुआल पर्त का बिछाना (मल्चिंग)– देरी से अपैल–मई में काटी गयी पेडी की शुरूआती फसल को गन्ने की पत्ती या धान की पुआल ढक देने से (20 से 25 कुन्तल प्रति हैक्टेयर) मृदा तापमान कम रहता है। जिससे अधिक मात्रा में कल्ले फूटते है। इसके साथ–साथ नमी संरक्षण व खरपतवार नियत्रंण में भी मदद मिलती है।

बीजीय मसालों में पौध किस्म एवं कृषक अधिकार संरक्षण की महत्ता

डॉ० सुभाष चन्द्र शर्मा एवं भरत लाल मीना
कृषि अनुसंधान केंद्र, उम्मेदगंज, कोटा
कृषि विश्वविधालय, कोटा

भारत विश्व में मसालों का सबसे बड़ा उत्पादक, उपभोक्ता और निर्यातक देश है। बीज मसालों के उत्पादन एवं उपयोग में भारत का विश्व में प्रथम स्थान है। बीजीय मसालों मे जीरा, सौंफ, मेथी, अजवाइन, धनियाँ एवं सुवा शामिल है। इनकी खेती मुख्य रूप से राजस्थान एवं गुजरात मे होती है तथा मध्य प्रदेश, पंजाब, हरियाणा, उत्तर प्रदेश, बिहार एवं आंध्र प्रदेश में भी थोड़ी थोड़ी मात्रा में खेती होती है। भारत वर्ष के कुल बीज मसालों के उत्पादन का लगभग आधा उत्पादन राजस्थान में होता है। राजस्थान की भूमि एवं जलवायु इन बीजीय मसालों के उत्पादन और उनकी गुणवत्ता के लिए अत्यंत उपयुक्त है। जीरे, धनिया व मेथी के उत्पादन में राजस्थान का देश में प्रथम स्थान है। बीजीय मसालों के व्यापार में वर्तमान सदी में बहुत बडी वृद्धि देखने को मिली है। विश्व व्यापार संगठन के प्रभावी होने से वर्तमान में बीजीय मसालों की खेती तथा व्यापार में बहुत सारी तकनीकों का प्रयोग हो रहा है। देश व विदेश में इनकी मांग एवं विविध उपयोग को देखते हुये समय समय पर विभिन्न प्रकार की जलवायु के अनुसार अलग – अलग फसलों में उन्नत किस्मों का विकास किया गया है। भारत में बीजीय मसालों की विभिन्न किस्मों एवं कृषको के अधिकार को संरक्षित रखने के लिए पौध किस्म और कृषक अधिकार संरक्षण अधिनियम, 2001 की स्थापना की गयी। इस अधिनियम के प्रावधानों को लागू करने के लिए पौध किस्म और कृषक अधिकार प्राधिकरण, 2005 की स्थापना की गई। पंजीकरण हेतु भारत सरकार ने अधिसूचित बीजीय मसाला फसलों में मुख्य रूप से धनिया, मेथी इत्यादि को रखा है।

अधिनियम, 2001 के उद्देश्य :

1. पौध किस्मों की सुरक्षा व किसानों और पादप प्रजन को के अधिकारों की सुरक्षा के लिए प्रभावी प्रणाली उपलब्ध करना।
2. नई पौध किस्मों के विकास के लिए पादप आनुवांशिक संसाधनों को उपलब्ध करने, उनके संरक्षण व सुधार मैं किसानों के योग दानो को सम्मान व मान्यता प्रदान करना।
3. अनुसंधान व विकास तथा नई किस्मों के विकास के लिए निवेश को बढाने हेतु पादप प्रजनको के अधिकारो की सुरक्षा।
4. उच्च गुणवत्ता पूर्ण बीजोध्रोपण सामग्री के उत्पादन व उपलब्धता को पूर्ण करने के लिए बीज उधोग की वृद्धि को सुविधा जनक बनाना।

प्राधिकरण के सामान्य कार्य :

- नई पौधा किस्मों, अनिवार्य रूप से व्युत्पन्न किस्मों, विधमान किस्मों का पंजीकरण।
- नई पादप प्रजातियो के लिए डीयुएस (DUS) (विशिष्टता, एकरूपता और स्थायित्व) परीक्षण दिशा निर्देशों का विकास करना।
- पंजीकृत किस्मों के गुणो का विकास व उनका प्रलेखन।
- सभी पौध किस्मों के लिए अनिवार्य सूची पत्रीकरण (कैटालांगिंग) की सुविधा।
- उन कृषकों, कृषक समुदायों, विशेष कर जन जातीय और ग्रामीण समुदाय को मान्यता प्रदान करना और पुरस्कृत करना जो विशेष रूप से पहचाने गए कृषि जैव विविधता वाले हौट–स्पॉट में आर्थिक रूप से महत्वपूर्ण पौधो व उनके वन्य संबंधियों से जुड़े पादप आनुवांशिक संसाधनो के संरक्षण, सुधार और परिरक्षण के कार्य मे संलग्न है।
- पौधा किस्मों के राष्ट्रीय रजिस्टर का रखरखाव करना।

- राष्ट्रीय जीन बैंक का रखरखाव करना।

अधिनियम के अंतर्गत अधिकार :

प्रजनको के अधिकार :

प्रजनको को सुरक्षित किस्म उत्पन्न करने, उसकी बिक्री करने, उसका विपणन करने, वितरण, आयात या निर्यात का एक मात्र अधिकार होगा। अधिकारो के उल्लंघन के मामले मे कानूनी उपचार के लिए प्रजनक एजेंटध्लाइसेंसी नियुक्त कर सकता है व कानूनी अधिकारों का उपयोग कर सकता है।

अनुसंधानकर्ताओं के अधिकार :

अनुसंधानकर्ता प्रयोग या अनुसंधान करने के लिए अधिनियम के अंतर्गत पंजीकृत किसी भी किस्म का उपयोग कर सकता है। इसम में कोई अन्य किस्म विकसित करने के लिए ऐसी किस्म को आरंम्भिक स्त्रोत के रूप मे उपयोग करना भी शामिल है लेकिन यदि सामग्री का बार– बार उपयोग करना पड़े तो इसके लिए पंजीकृत प्रजनक से पूर्व अनुमति लेने की आवश्यकता होगी।

कृषको के अधिकार :

- जिस किसान ने कोई नई किस्म खोजी या विकसित की हो उसे उसी प्रकार अपनी किस्म को सुरक्षा प्रदान करने और पंजीकृत करने का अधिकार है जिस प्रकार, प्रजनक अपनी किस्म को पंजीकृत कराकर सुरक्षा प्रदान करता है।
- कृषक किस्म को विधमान किस्म के रूप मे भी पंजीकृत किया जा सकता है।
- कोई भी किसान पीपीवी और एफआर अधिनियम, 2001 के अंतर्गत संरक्षित किस्म के बीज सहित अपने उत्पाद को उसी प्रकार बचाकर रख सकता है, उपयोग में ले सकता है, बो सकता है, पुनः बो सकता है, उसका विनिमय कर सकता है, साझीदारी कर सकता है या बेच सकता है, जैसा कि अधिनियम के लागू होने के पूर्व कर सकता था। लेकिन इसमें शर्त यह है की कोई किसान पीपीवी और एफआर अधिनियम 2001 के अंतर्गत सुरक्षित किस्म के ब्रांड युक्त बीज की बिक्री नहीं कर सकता है।
- किसान आर्थिक दृष्टी से महत्वपूर्ण भू प्रजातियों तथा उनके वन्य सम्बन्धियो के पादप अनुवंशिकी संसाधनो के संरक्षण के लिए मान्यता प्रदान किए जाने तथा पुरस्कृत किए जाने के पात्र है।
- अधिनियम, 2011 की धारा 39(2) के अंतर्गत किसी भी किस्म के निष्पादन न देने पर किसानो को क्षतिपूर्ती किए जाने का भी प्रावधान है।
- किसानो को प्राधिकरण अथवा पंजीकर अथवा न्यायाधिकारण अथवा उच्च न्यायालय में कोई भी मुकदमा दाखिल करने के लिए इस अधिनियम के तहत कोई शुल्क अदा नहीं करना होगा।

किस्में जो सुरक्षित की जा सकती है :

पौध किस्मों को सुरक्षित रखने के लिए प्राधीकरण मे आवेदन के साथ निर्धारित पंजीकरण शुल्क दिया जाना चाहिए। विभिन्न प्रकार की किस्मों के लिए पंजीकरण शुल्क अलग–अलग है परंतु किसान की किस्म के लिए कोई भी शुल्क नहीं है। निम्न प्रकार की किस्मों का पंजीकरण कराया जा सकता है।

1. नई किस्में।
2. विधमान किस्म– धारा 2 (र)
    - बीज अधिनियम 1966 के अंतर्गत अधिसूचित

- कृषक किस्म
- सामान्य ज्ञान की किस्म

3. अनिवार्य रूप से व्युत्पन्न किस्म दृधारा 2(प)

पौधा किस्मों का राष्ट्रीय रजिस्टर, पौध किस्म जरनल एवं पंजीकरण प्रमाण पत्र।

रजिस्ट्री के मुख्यालय में पौधा किस्मों का राष्ट्रीय रजिस्टर रखा गया है जिसमे सभी पंजीकृत पौधों की किस्मों का नाम, प्रजनकों के नाम व पते, पंजीकृत किस्मों के संदर्भ मे ऐसे प्रजनकों के अधिकारों, प्रत्येक पंजीकृत किस्म के नाम व विवरण, विशेष गुणो की विशेषताओं के साथ बीज अथवा अन्य रोपण सामग्री का विवरण और अन्य सभी संबंधित मामले दर्ज किए जाते है। इसके बाद पंजीकृत किस्मों की सूची भारतीय पौध किस्म जरनल मे प्रकाशित होती है। इस जरनल को विनियमन 2006 के अंतर्गत राजपत्र के समतुल्य दर्जा प्राप्त है। जिन आवेदनो ने सभी अपेक्षाएं पूरी कर ली है तथा जिन्हे पंजीकर ने पंजीकरण हेतु अंतिम रूप से स्वीकार कर लिया है उन्हे पंजीकरण प्रमाणपत्र प्रदान किया जाता है।

राष्ट्रीय जीन बैंक :

प्राधिकरण ने पंजीकृत किस्मों के प्रजनको द्वारा प्रस्तुत पैत्रक वंशक्रमों सहित बीज सामाग्री को स्थापित करने के लिए राष्ट्रीय जीन बैंक स्थापित किया है। इस बैंक मे पंजीकरण की पूरी अवधि के लिए 5० से० के निम्न तापमान पर बीजों को भंडारित किया जाता है।

राष्ट्रीय जीन निधि :

प्राधिकरण ने एक राष्ट्रीय जीन निधि की भी स्थापना की है जिसमे पंजीकृत किस्म से निर्धारित रूप से प्राप्त होने वाली राशि, रौयल्टी के माध्यम से प्राप्त होने वाली राशि, प्रजनको द्वारा जमा की गई क्षतिपूर्ती की राशि, तथा राष्ट्रिय/अंतर्राष्ट्रीय संगठन और अन्य स्त्रोतों से प्राप्त राशि जमा होती है। जिसका उपयोग प्राधिकरण विभिन्न प्रकार से करता है।

जीन निधि का उपयोग :

उपरोक्त जीन निधि का उपयोग प्राधिकरण निम्न प्रकार से करता है।

- लाभ मे भागीदारी के द्वारा अदा के गयी कोई भी राशि।
- कृषक/कृषको के समुदाय को देय क्षतिपूर्ति
- स्वःस्थाने व बहिःस्थाने संकलनों सहित आनुवांशिक संसाधनो के संरक्षण व टिकाऊ उपयोग को सहायता देने पर होने वाला व्यय तथा ऐसे संरक्षण व टिकाऊ उपयोग को संपादित करने के लिए पंचायतों की क्षमता का सबलीकरण।
- लाभ में भागीदारी से संबंधित योजनाओ पर होने वाला व्यय।

किसान को समृद्ध बनाएं

डॉ० सुभाष चन्द्र शर्मा,
कृषि अनुसंधान केन्द्र, उम्मेदगंज, कोटा

आओ एक बीड़ा उठाएं
मरते किसान को समृद्ध बनाएं
जिस कृषि ने पेट भरा सभी का
उस कृषि से फिर रोजगार बनाए
आओ एक बीड़ा उठाए।
हर घर मे सोना चांदी भरकर देश को
फिर सोने की चिड़िया बनाए
अतिथि देवो भवरू के फिर गूंजे नारे आओ
भाईचारे की वो मिसाल फिर भारत बनाए।
आओ एक बीड़ा उठाए।
न फिर कोई दहेज की भेट चढे न हो किसी बेटी का रेप
आओ ये मुहिम चलाए।
न फांसी पर झुलता किसान होगा
न भुख से मरता कोई गरीब होगा
आओ फिर वही भारत बनाए।
आओ एक बीड़ा उठाए।
कौशिक ने तो मन की बात रख दी।
कृषि है प्रकृति का गहना ओर
कौशिक का तो बस यो कहना
आओ किसान को सम्रद्ध बनाए
कृषि को रोजगार बनाए
और जन जीवन की जान बचाए।
आओ एक बीड़ा उठाए।

महान किसान

डॉ० राजेश कुमार,
यांत्रिक कृषि फार्म, उम्मेदगंज, कोटा

कड़ी धूप हो या शीतकाल,

हल चलाकर न होता बेहाल !!

रिमझिम करता होगा सवेरा,

इसी आस में न रोकता चाल !!

खेती बाड़ी में जुटाता ईमान,

महान पुरुष है, है वो किसान !!

छोटे छोटे से बीज बोता,

वही एक बड़ा खेत होता !!

जिसकी दरकार होती उसे,

बोकर उसे वह तभी सोता !!

खेतो का कण कण है जिसकी जान,

महान पुरुष है, है वो किसान !!

पर्यावरण बचाओ

मोहम्मद आरिफ,
शोधार्थी,
कृषि महाविद्यालय, कोटा

आज समय की मांग यही है, पर्यावरण बचाओ.

ध्वनि, मिट्टी, जल, वायु आदि सब, पर्यावरण हमारे.

जीव जगत के मित्र सभी ये, जीवन देते सारे.

इनसे अपना नाता जोड़ो, इनको मित्र बनाओ.

पर्यावरण...

तब तक जीव है जगत में, जब तक जग में पानी.

जब तक वायु शुद्ध रहती है, सोंधी मिट्टी रानी.

तब तक मानव का जीवन है, यह सबको समझाओ.

पर्यावरण...

हरियाली की महिमा समझो, वृक्षों को पहचानो.

ये मानव के जीवन दाता, इनको अपना मानो.

एक वृक्ष यदि कट जाये तो, ग्यारह वृक्ष लगाओ.

पर्यावरण...

जीव जगत की रक्षा करना, अब कर्तव्य हमारा,

शोर और मिट्टी का संकट, दूर करेंगे सारा.

एक वृक्ष हम नित रोपेंगे, आज शपथ ये खाओ.

पर्यावरण ...

आज समय की मांग यही है, पर्यावरण बचाओ.

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