

वार्षिक प्रतिवेदन ANNUAL REPORT 2018-19



RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA RAJA PANCHAM SINGH MARG, GWALIOR-474002 (M.P.)

Mission

To impart education, conduct research and extension activities for enhancing productivity, optimization of profit, sustainability of agriculture and allied sectors and improving rural livelihood in the state of Madhya Pradesh.

Vision

To transform the Agricultural landscape of Madhya Pradesh by producing excellent dynamic and result oriented skilled human resource in modern Agriculture, thereby creating higher income, employment, gender equity, accessibility, sustainable production system and achieving social welfare for all.

Mandate

- To serve as a centre of higher education in the field of agriculture and allied sciences.
- To conduct basic, strategic, applied and anticipatory research in the field of agriculture and allied sciences.
- To disseminate technologies to farmers, extension personnel and organizations engaged in agricultural development through various extension programmes.
- To produce and supply of genuine and quality seed/planting material to the farmers.



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Prof. S.K. Rao Vice-Chancellor

//FOREWORD//

It gives me an immense pleasure to present the Annual Report of the Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya (RVSKVV) for the year 2018-19 to the end users. This report highlights the activities related to education, research and extension carried out by the University staff in the field of agricultural and allied sciences with a focus on enhancing livelihood status of the farming community. The University has developed credible technology in the field of agriculture and Horticulture. Farmers of the State are being benefited through its network of five colleges (four Agriculture and one Horticulture), five Zonal Agricultural Research Stations (ZARS), four Regional Agricultural Research Stations (RARS), six Special Research Stations (SRS), nineteen Krishi Vigyan Kendras (KVKs) and twenty-eight All India Coordinated Research Projects (AICRPs).

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya has grown into a diverse innovative institution of higher education, pursuing excellence in the fields of teaching, research and extension in agricultural sciences. Over the years, the University has sought to make a major contribution in improving the quality of human life in the region through its research-led initiatives in agriculture, environmental related issues and a host of other modern-day challenges including the production of quality seed and genuine planting material. The structure of its activities is rationalized, with emphasis on its distinguished strengths, management of education and development of quality man power and in this direction notable success has been achieved. In addition to the diverse activities related to agricultural sciences, RVSKVV has strong emphases on farmer's skills improvement and empowerment through the nineteen KVKs in the various districts. Teaching and learning quality has been steadily improving in recent years and a large number of capable man powers has been trained here.

In case of research programme, University finds a very special place in NARS through the coordinated projects in pulses, oil seeds, cotton, cereals, horticulture and natural recourses management. Exceptional research work on chickpea improvement, CMS based pigeon pea hybrid, efficient water management for boosting the productivity of other major crops like cotton, soybean, mustard, wheat, medicinal and aromatic plants are some of the noteworthy contributions of the University. RVSKVV is also making sincere efforts to generate cutting edge technologies for enhancing crop productivity was done by the University. Thrust is also given on seed replacement in the state by producing quality seeds of important crops.

The Extension activities viz., trainings, demonstrations, field days, study tours, Kishan Mela, Krishi Goshtis and other farm advisory services were carried out to help the farming community of the region to solve their farm related problems. Biodiversity fair cum exhibition and awareness programme was one of the mega events which served as a platform for integration of farmers and Scientist on bio diversity conservation and display the biodiversity available in the M.P. and Chhattisgarh.

The students' performance in academic, sports and cultural events was impressive. The faculty of teaching, non-teaching and farm laborers joined their hands in fulfilling the mandate of the University.

I express my sincere gratitude to the Government of Madhya Pradesh, the ICAR and Government of India for their continued financial support. The contribution of the Members of the statutory bodies like the Board, the Academic Council and the Administrative Council in smooth functioning of the University has been praise worthy. The contribution of all the Deans, Directors, Heads, Registrar and Comptroller of the University in providing relevant information for the Annual Report is acknowledged.

Present Annual Report 2018-19, brought out by the University, covers the development and progress made in the areas of teaching, research & extension and seed production. It is my firm belief that this Annual Report will aptly serve as a show case of the activities of the University. It will be a good reference for administrators, policy makers, staff, students and even the farming community. I would like to thank all the contributors, members of the Editorial Board and Compilation Committee for compiling and editing this report in a comprehensive and presentable form.

(S.K. Rao)

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EXECUTIVE SUMMARY

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, (RVSKVV) Gwalior (MP) was established on August 19, 2008. The University has been since then, catering to the multi farming needs of farming community Agriculture Development, ICAR and other stockholders. It is a new, but fast emerging promising University in the field of agriculture and allied sciences.

The mandate of the University is teaching, research and extension with a view to evolve appropriate solutions and technologies in the field of agriculture. It has a network of five colleges (four Agriculture and one Horticulture), five Zonal Agricultural Research Stations (ZARS), four Regional Agricultural Research Stations (RARS), six Special Research Stations (SRS), twenty one Krishi Vigyan Kendras (KVKs) and twentyeight All India Coordinated Research Projects (AICRPs) spread across six agro-climatic zones in twenty-six districts of Madhya Pradesh. In addition to this, other ongoing projects/schemes *i.e.* non-plan, plan, tribal sub-plan and adhoc projects are also in operation.

During the year 2018-19, the University has undertaken a number of initiatives for the promotion of quality in its mandated areas. The major activities and achievements of the University are as follows:

TEACHING:

- The University offers two Under Graduate Courses *i.e.* B.Sc. (Hons.) Agriculture and B.Sc. (Hons.) Horticulture, 13 Post Graduate degree and 9 Ph.D. degree programmes in the different disciplines of Agriculture and Horticulture. The total intake capacity was 774 out of which, 364 were in undergraduate (UG), 356 in postgraduate (PG) and 54 in Ph.D. degree programme.
- During the year 2018-19, a total of 1296 boys and 608 girls' (Total Students-1904) students were on the roll of the University, out of which, 901 boys and 429 girls were in UG, 352 boys and 161 girls in PG, and 43 boys and 18 girls were in Ph.D. degree programmes.
- In Ph.D., 28 students submitted their thesis to the Director Instructions for evaluation. 117 students submitted Thesis for Post graduate degree program in Agriculture disciplines and 40 students for Horticulture degree programme.
- In Experiential Learning programme, 354 students of fourth year (B.Sc. Ag. and B.Sc. Hort.) have taken adequate hands-on experience on different aspects of Agriculture/Horticulture to cultivate capabilities suitable to the emerging job markets and build entrepreneurship spirit and business management competence in a way that they will be able to generate employment for themselves and for others.
- The modules of experiential learning programme namely Crop Production, Crop Protection, Horticulture, Nursery Production and Management, Protected cultivation of high value vegetable crops, Floriculture & Landscape Gardening, Mashroom Cultivation and Value addition in horticultural crops are running successfully.
- Under Rural Agriculture/Horticulture Work Experience 365 students of Fourth Year were placed in different villages of Research Stations/KVKs to learn and solve the practical problems of the farmers of adopted villages.
- > 04 Students of the University qualified the JRF examination.

- 63 Students of the University received National Talent Scholarship (NTS) 11 students received scholarship under Vikramaditya Scholarship Yojna.
- During the year, 604 students of the University have received State Government Scholarship, out of which 318 students belonged to OBC, 155 SC and 131 ST categories.
- Under NSS (National Service Scheme) programme, different activities like blood donation camp, Beti Bachao Abhiyan, Social Awareness Camp, Awareness about AIDS, Literacy, Pulse Polio Abhiyan, Mera Gaon Mera Gourav and Environment Day were organized. 12 students were awarded "B" Certificate examination of NSS.
- Under National Cadet Corps (NCC) programme, 36 Cadets passed "B" certificate examination and 21 cadets cleared "C" certificate examination.
- College organized Inter Collegiate Indoor Games Under the title (Spandan2018) Viz, Badminton, Table tennis, Carom, Chess, and outdoor games namely Volley Ball and Kho-Kho Tournament of R.V.S.K.V.V, from 14-16 Dec 2018. College of Agriculture Khandwa was Winner in Carom (Boys and Girls Both) and Badminton (Boys Section) and runner in Kho-Kho.
- Through campus interviews, 70 students have been placed in jobs in leading private sectors, 89 students in Government/public sector and 02 self employed.
- Through different libraries of the constituent Colleges, 1,17,276 books were procured and available to the students out of which 3658 books have been purchased during the reporting year. Apart from that, reports, thesis, CDs, 139 *e*-books, periodicals etc. are also available in the library of constituent Colleges of the University.
- In central library total 9718 printed books,139 e books,07 printed magazines, 1303 gifted books, 15 priented journal and 52 E-magazines were available in Central library of VishwaVidhyalaya.
- During the year (2018-19), 02 Scientists and 01 student (ABSTC Student scholarship programme) of the University went to abroad to participate in various Conferences/Meetings.
- ➤ 132 research papers were published in peer reviewed journals of national and international repute.

RESEARCH:

- **Catchments-Storage** Command Relationship for Enhancing \geq Water Productivity in Micro -watershed: An experimentfor enhancing water productivity in micro -watershed, Soybean and sweet corn for green cobs were sown in *Kharif* season. Whereas, Sweet corn for green cobs, Pea (Vegetable), Tomato were planted in Rabi season. Among the different models, Soybean - Chickpea found the more remunerative as it recorded total net returns Rs. 61478/- per hectare with B: C ratio 2.86 followed by sequentially grown Soybean - Pea for vegetable - (Rs. 56886/- with B: C ratio 2.26). The sweet corn (Suger-75) for green cobs were sown in rainy season recorded net return of Rs. 24931/- per ha. Sequentially grown, Tomato Hy. Laxmi provided net return Rs. 3148/-. The total net return from sweet corn -Tomato gave net return Rs. 28079/- per hectare. Sweet corn (Suger-75) grown in Kharif and Rabi both recorded net return of Rs. 31412/with B: C ratio 1.63.
- Mitigation of Drought Stress by Foliar Application of Chemical Fertilizer on Soybean under Malwa Agro Climatic Zone of M.P. :Spray of chemical fertilizers during dry spell and after reliving of stress/ dry spell, the significant changes in seed yield due to spray of different chemical fertilizers was observed.The treatmentssignificantlyhigher seed yield of soybean (1193 kg/ha, Net return Rs.15184/- and B:C ratio 1.72) was recorded due to spray of complex fertilizer19:19:19(NPK)@0.5% +0.5% Zinc sulphate,followed by treatment spray of Complex fertilizer 19:19:19 (NPK) 0.5% (1165kg/ha with 1.69 B:C ratio) and spray of 2 % Urea solution (1097 kg/ha with 1.60 B:C ratio), which were at par but significantly superior to control and rest of the treatments. Control treatment recorded lowest seed yield 823 kg/ha.
- Evaluation of Chickpea varieties for dryland conditions through farmers' participation : During *Rabi* 2017-18, twenty chickpea varieties were sownjust after harvest of soybean on residual moisture. Among the chickpea variety IG 593 recorded highest seed yield 1300 kg/ha with net return of Rs. 38500 per ha and B: C ratio 2.93, followed by Vishal (1280 kg/ha.), JG 16 (1215 kg/ha), JG-230 (1206 kg/ha) JG- 322 (1158 kg/ha.), RVG-202 (1133 kg/ha) and JAKI 9218 (1089 kg/ha) as compared to other varieties that yielded 742 to 1010 kg/ha. Check variety Ujjain 21 recorded 1036 kg/ha seed yield.
- Survey over 29 villages of the 7 district (Nimar Velly Zone 11) and adjoining area were surveyed for Wilt of pigeon pea and it was noticed that when medium duration varieties viz JKM189, Aasha, JKM7, BSMR736, TJT 501, and private Verities, were grown either as a sole crop or intercropped with Cottan Moong, Maize, Soybean etc. the incidence of wilt was very low on the contrary when local cultures were grown either as sole crop or inter crop the incidence of wilt was quite high. This indicates towards potential of early and medium duration high Yielding varieties in the region. Incidence of wilt (medium) to high may be attributed to average rainfall with more rainy days and high temperature. However in the kharif season of 2017-18 there

was 2 dry spell coupled with low rainfall (590 mm) resulted in less incidence of Wilt in the region.

- In pigeon pea the minimum pod damage (10.7%) by pod fly and (5.1%) by pod borer was recorded in IPM over 31.5% by pod fly and 11.2% by pod borer in farmer's practice as against maximum pod damage by pod fly 45.8% and by pod borer 18.3% was recorded in untreated control. The IPM module gave maximum yield of 2150 kg. / ha with additional yield of 1200 kg/ha.
- The per cent pod damage by pod borer and pod fly in pigeon pea was comparatively higher than last year. Per cent pod damage by pod borer was started in 38 SMW (0.7%) and pod fly in 36 SMW (0.9%) which was their normal appearance of time for Nimar Zone. The pest infestation was increased gradually as the time passed and reached its peak (24.7%) in 52 SMW for pod borer and (63.2%) in 51 SMW for pod fly.
- In evaluation of AVT II entries under different sowing dates, entry RVS 2007-06 gave significantly higher yield at normal date of sowing (24.06.2017). While at second date of sowing (14.7.2017) entry JS 20-116 was better. The seed yield of 24th June sowing was 249 % higher than 20 days delayed sowing.
- Application of NPK (19:19:19) as foliar spray at pod formation stage improved soybean yield over control followed by application of 2 % urea.
- Population of Blue beetle (0.33to 2.33 beetle /mrl) was recorded during 2nd week July- 4th week of July. Grey semilloper *,Gesonia gemma* (1.3to 9.7 l/mrl) Green semilooper *Chrysodexis acuta* (0.6 to 7.4 l /mrl) were recorded during August -September. Extend of damage by stem fly and girdle beetle were recorded 80 and 30.5 per cent respectively.
- Evaluation of Bt 127 SC strain from IIOR, Hyderabad for efficacy against lepidopteran larvae infesting soybean: The new tested Bt 127 SC strain. was at par with tested insecticides Chlorantraniliprile 18.5% SC ,Indoxacarb 15.8% EC and quinalphos 25 EC and found very effective against green and grey semilooper recorded less than 1 larvae/mrl and good yield.
- **Catchments-Storage** Command Relationship \geq for Enhancing Water Productivity in Micro -watershed: An experimentfor enhancing water productivity in micro -watershed, Soybean and sweet corn for green cobs were sown in *Kharif* season. Whereas, Sweet corn for green cobs, Pea (Vegetable), Tomato were planted in Rabi season. Among the different models, Soybean - Chickpea found the more remunerative as it recorded total net returns Rs. 61478/- per hectare with B: C ratio 2.86 followed by sequentially grown Soybean - Pea for vegetable - (Rs. 56886/- with B: C ratio 2.26). The sweet corn (Suger-75) for green cobs were sown in rainy season recorded net return of Rs. 24931/- per ha. Sequentially grown, Tomato *Hy*. Laxmi provided net return Rs. 3148/-. The total net return from sweet corn -Tomato gave net return Rs. 28079/- per hectare. Sweet corn (Suger-75) grown in Kharif and Rabi both recorded net return of Rs. 31412/with B: C ratio 1.63.

- Long Term Manurial Trial in Vertisols: Based on the average of last 26 years, treatments T₆ (FYM 6 t ha-1 + N20 P13) gave highest seed yield of 1934 kg ha⁻¹ was found significantly superior with regards to seed productivity however, treatment T6 was found superior to rest of the treatments with regards to improvement in physical and chemical properties of the soil. The treatment T₁*i.e.,* control was found statistically inferior to all the treatments in respect of yield and fertility status.
- Evaluation of Chickpea varieties for dryland conditions through farmers' participation: During *Rabi* 2017-18, twenty chickpea varieties were sownjust after harvest of soybean on residual moisture. Among the chickpea variety IG 593 recorded highest seed yield 1300 kg/ha with net return of Rs. 38500 per ha and B: C ratio 2.93, followed by Vishal (1280 kg/ha.), JG 16 (1215 kg/ha), JG-230 (1206 kg/ha) JG- 322 (1158 kg/ha.), RVG-202 (1133 kg/ha) and JAKI 9218 (1089 kg/ha) as compared to other varieties that yielded 742 to 1010 kg/ha. Check variety Ujjain 21 recorded 1036 kg/ha seed yield.

SEED PRODUCTION:

- The University is producing breeder and nucleus seeds of several crops, which is has contribution significant in enhancing seed replacement and increasing productivity of crops.
- The seed production in the University is carried out in twenty seven seed production farms. The total farm area is 1210.85 ha., out of which 64.45 per cent (780.37 ha.) is under cultivation. Among the cultivated area, 13.39, 34.59 and 52.02 per cent are covered under irrigated, partially irrigated and rain fed farming, respectively.
- The university produced 8759.50 quintal seed of different crops. During Kharif 2018-19 total production of 3043.50 q. seed has been produced under different crops like Soybean, Green gram, Black gram, Paddy, Cotton, pigeonpea and during Rabi 2018-19 a total of 5356.40 q. seed has been produced under of different Rabi crops like Wheat, Chickpea, Lentil, Mustard and Safflower etc.

EXTENSION ACTIVITIES:

- For the assessment of latest technologies generated by RVSKVV, other universities or ICAR institutes of ICAR, 283 On Farm Trials (OFTs) were conducted at farmers' field on various thematic areas related to crops, animals, machineries, post harvest management etc. that benefitted 2830 farmers.
- For the purpose of popularizing new technologies, Front Line Demonstrations (FLDs) were carried out on various crops in area of 1953.29 ha on the fields of 85668 farmers. In addition to these demonstrations, 307 FLDs on different enterprises like fisheries, live stock management, vermicompost, value addition, post harvest management, malnutrition, farm machinery etc. were also conducted.
- During the year 2018-19 total 1951 trainings were imparted, which benefited 52256 participants including farmers and farm women, rural youth, extension personnel and government officials.
- In order to create awareness among farmers of the region, 28384 extension activities were conducted by the KVKs including Farmers' fairs, Farmers meeting, Field days, Exhibitions, Special days celebration were organized which benefited 999228 farmers. Among live stock based activities 59 AHC and 3 AVC were organised.
- A total number of 106 Folders, 26 Booklets, 15 Books, 04 Newsletters, 07 Training Manuals and 71 Research Papers in Journal were prepared by Krishi Vigyan Kendras. KVK Scientists also published 123 popular articles in various agriculture magazine and news papers.
- A total number of 134538 soil samples were analysed by different KVKs, State Govt. and 231457 soil health cards were prepared and distributed to farmers of the region.
- Under Kisan Mobile Advisory Services, 1291 messages related to new technologies were sent to 1352832 beneficiaries of 20285 villages of 127 blocks.
- 'Mera Gaon Mera Gaurav' programme is being implemented by the Vishwa Vidyalaya through its five colleges and three Zonal Agricultural Research Stations. In this programme, the scientists regularly organizing Krishak Sangoshthies, Demonstrations and advising farmers abut recent agricultural technologies in the selected villages.

कार्यकारी सारांश

राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय, ग्वालियर (म.प्र.) की स्थापना १९ अगस्त २००८ को हुई। विश्वविद्यालय प्रारम्भ से ही कृषि समुदाय की शिक्षा संबंधी आवष्यकताओं की पूर्ति हेतु कार्यरत है। यह विश्वविद्यालय नवीन होने के बावजूद कृषि एवं कृषि संबंधी विज्ञानों के क्षेत्रों में अपनी दूतगामी आशाजनक पहचान बना रहा है।

विश्वविद्यालय का उद्देश्य कृषि क्षेत्र में शैक्षणिक, अनुसंधान एवं प्रसार कार्य, उचित समाधान एवं तकनीक को ध्यान में रखते हुए करना है। विश्वविद्यालय के अन्तर्गत पॉंच महाविद्यालय (चार कृषि एवं एक उद्यानिकी महाविद्यालय), पॉच आंचलिक कृषि अनुसंधान केन्द्र, चार क्षेत्रीय अनुसंधान केन्द्र, छः विषेश अनुसंधान केन्द्र, उन्नीस कृषि विज्ञान केन्द्र एवं अठाईस अखिल भारतीय समन्वित अनुसंधान परियोजनायें शामिल हैं जो कि म.प्र. के छः कृषि जलवायुवीय क्षेत्रों एवं छब्बीस जिलों में फैले हुये हैं। इसके साथ ही दूसरी परियोजनायें जैसे गैर-योजनाकृत, योजनाकृत, आदिवासी उप-योजना एवं अनौपचारिक परियोजनायें भी क्रियाशील हैं।

वर्ष २०१८-१९ के दौरान विश्वविद्यालय द्वारा गुणवत्ता बढाने एवं उद्देश्यों की पूर्ति हेतु नये कदम उठायें गये है, जो इस प्रकार है:-

शिक्षणः-

- विश्वविद्यालय द्वारा कृषि एवं उद्यानिकी के विभिन्न विषयों में दो स्नातक पाट्यक्रम, बी.एससी. (आनर्स) कृषि एवं बी.एससी. (आनर्स) उद्यानिकी, ग्यारह स्नातकोत्तर (एम.एससी.) पाट्यक्रम तथा नौ विद्या वाचस्पिती (पीएच.डी.) विषयों में उपाधि प्रदान की जाती है। कुल ७७४ सीटों में से स्नातक की ३६४, स्नातकोत्तर की ३५६ एवं विद्या वाचस्पति की ५४ सीटों पर नये विद्यार्थियों को प्रवेश दिया जाता है। स्नातक स्तर की ३६४ सीटों में से, ३०८ सीटें बी.एससी. (कुषि) एवं ५६ सीटें बी.एससी. (उद्यानिकी) उपाधि पाट्यक्रम की हैं।
- वर्ष २०१८-१९ में विश्वविद्यालय के अन्तर्गत कुल १,६०४ विद्यार्थियों (१२९६ छात्र एवं ६०८ छात्रायें) ने प्रवेश लिया, इनमें से १,३३० विद्यार्थी (६०१ छात्र एवं ४२६ छात्राऐं) स्नातक पाठ्यक्रम में, ५१३ विद्यार्थी (३५२ छात्र एवं १६१ छात्रायें) स्नातकोत्तर पाठ्यक्रम में तथा ६१ विद्यार्थी (४३ छात्र एवं १८ छात्रायें) विद्या वाचस्पति पाठ्यक्रमों में अध्ययनरत हैं।
- विद्या वाचस्पति उपाधि पाठ्यक्रम के विद्यार्थियों द्वारा २८ एवं स्नात्कोत्तर विद्यार्थियों द्वारा १९७ शोध प्रबंध (थीसिस) मूल्यांकन हेतु निदेशक शिक्षण एवं छात्र कल्याण, रा.वि.सिं.वि.वि., ग्वालियर में प्रस्तुत की गई।
- अनुभव जन्य अधिगम कार्यक्रम के अन्तर्गत चतुर्थ वर्ष के ३५४ छात्र (स्नातक कृषि एवं स्नातक उद्यानिकी) पंजीकृत हुये। कार्यक्रम के अन्तर्गत विद्यार्थियों में वर्तमान प्रतिस्पर्धी युग में कृषि एवं उधानिकी के क्षेत्र में स्वयं एवं अन्य जनो हेतु व्यवसाय प्रबंध एवं उद्यमिता के द्वारा रोजगार के अवसर पैदा करने की क्षमता का विकास तथा छात्रों में बाजार के अन्दर टिक सकने की क्षमता विकसित की जाती है।
- अनुभव जन्य अधिगम कार्यक्रम के अनुखण्ड नामतः फसल उत्पादन, फसल संरक्षण, बागवानी, पौधशाला उत्पादन एवं प्रबंधन, उच्च मूल्य वाली सब्जियों की संरक्षित खेती, फूलो की खेती और भू-दृश्य वास्तुकला एवं उद्यानिकी फसलों में मूल्य संवर्धन सफलतापूर्वक चल रहें हैं।

- प्रामीण कृषि/उद्यानिकी कार्यानुभव कार्यक्रम के अन्तर्गत चतुर्थ वर्ष के ३६५ विद्यार्थियों को विभिन्न गांवो, अनुसंधान केन्द्रों एवं कृषि विज्ञान केन्द्रों पर किसानों की समस्याओं को समझने एवं समाधान करने के लिये भेजा गया।
- > विश्वविद्यालय के ०४ विद्यार्थियों ने कनिष्ठ अनुसंधान अध्येतावृत्ति परीक्षा में अहर्ता प्राप्त की।
- विश्वविद्यालय में ६३ विद्यार्थियों ने राष्ट्रीय प्रतिभा छात्रवृत्ति (एन.टी.एस.), ११ विद्यार्थियों ने विक्रमादित्य छात्रवृत्ति योजना के अंतर्गत छात्रवृत्ति प्राप्त की।
- इस वर्ष विश्वविद्यालय के ६०४ विद्यार्थियों को राज्य सरकार छात्रवृत्ति प्राप्त हुई जिनमे से ३१८ छात्र अन्य पिछड़ा वर्ग, १५५ अनुसूचित जाति एवं १३१ अनुसूचित जनजाति वर्ग के है।
- राष्ट्रीय सेवा योजना के अन्तर्गत विद्यार्थियों द्वारा विभिन्न गतिविधियों जैसे रक्तदान शिविर, बेटी बचाओं अभियान, सामाजिक जागरूकता अभियान, एड्स जागरूकता अभियान, शिक्षा, पल्स पोलियो अभियान, मेरा गांव मेरा गौरव एवं पर्यावरण दिवस आदि आयोजित की गई। राष्ट्रीय सेवा योजना के अन्तर्गत १२ विद्यार्थी "बी" प्रमाण पत्र से सम्मानित किये गये।
- राष्ट्रीय केडेट कोर के अन्तर्गत ३६ छात्रों ने "बी" प्रमाण पत्र एवं २१ छात्रों ने "सी" प्रमाण पत्र परीक्षा उतीर्ण की।
- विश्वविद्यालयीन परिसर साक्षात्कारों के द्वारा ७० विद्यार्थियों ने निजी, ८६ विद्यार्थियों ने सरकारी संस्थानों में और ०२ विद्यार्थियों ने स्वरोजगार प्राप्त किया।
- विश्वविद्यालय के विभिन्न महाविद्यालयों के पुस्तकालयों द्वारा विद्यार्थियों को 9,9७२७६ पुस्तकें उपलब्ध कराई गई, जिसमें से ३६५८ पुस्तकें एवं १३६ ई-पुस्तके इस वर्ष क्रय की गई। इसके अलावा शोधग्रंथ अध्यापन, सघन संग्रहण इकाई, ई-पुस्तक एवं नियतकालिक पत्रिकायें भी सम्बन्धित महाविद्यालयों के पुस्तकालयों में उपलब्ध कराई गई।
- विश्वविद्यालय के नवस्थापित केन्द्रीय पुस्तकालय द्वारा छात्रों, शिक्षको और वैज्ञानिकों को कुल ६७१८ पुस्तकें १३६ ई-पुस्तके, ०७ प्रिन्टेड मैगजीन एवं १३०३ उपहार स्वरूप पुस्तके उपलब्ध कराई गई।
- > विश्वविद्यालय के ०२ वैज्ञानिक एवं ०१ विद्यार्थी सेमीनार/परिचर्चा में शामिल होने के लिये विदेश गये।
- > १३२ शोध पत्र विभिन्न राष्ट्रीय एवं अर्न्तराष्ट्रीय शोध पत्रिकाओं में प्रकाशित किये गये।

अनुसंधानः-

- सूक्ष्म जल ग्रहण क्षेत्र में जल उत्पादकता बढाने हेतु ग्रहण-भंडारण योग्य सबंध इस परीक्षण में खरीफ मौसम में सोयाबीन एवं हरे भुट्टे हेतु मीठी मक्का लगाई गयी तत्पश्चात् रबी मौसममें मीठी मक्का, टमाटर की फसल लगायी गई एवं टपक सिंचाई पद्धति द्वारा वर्षा ऋतु में एकत्रित जल से सिंचाई की गई। ऑकड़े दर्शाते है कि सोयाबीन-चना पद्धति से शुद्ध लाभ रूपये ६१४७८/हे. एवं लाभ लागत अनुपात २.६८ प्राप्त होता है तत्पश्चात् सोयाबीन-मटर (सब्जी हेतु) से शुद्ध लाभ रूपये ५६८८६/हे. (लाभ लागत अनुपात २.२६) प्राप्त होता है। खरीफ मौसम में लगाई गई मीठी मक्का (शुगर ७५) - टमाटर से कुल शुद्ध लाभ रूपये २८०७६/हे. प्राप्त होता है।
- सोयाबीन फसल पर सूखे की स्थिति में रसायानिक उर्वरकों का पर्णीय छिड़काव के प्रभाव का अध्ययन प्रयोग से प्राप्त आंकडे दर्शाते है कि सोयाबीन फसल पर रसायनिक उर्वरकों के पर्णीय छिडकाव का सार्थक प्रभाव देखा गया। संयुक्त उर्वरक १६:१६:१६ (छच्च) ०.५: ०.५: जिंक सल्फेट का पर्णीय छिड़काव करने से सोयाबीन की उपज ११६३ किग्रा./हे., शुद्ध लाभ १५१८४/हे. एवं लाभ लागत अनुपात १.७२ जबकि द्वितीय स्थान पर यूरिया के २ प्रतिशत घोल का पर्णीय छिडकाव करने से उपज १०८७ किग्रा./हे., लाभ लागत अनुपात १.६० प्राप्त हुआ। नियंत्रित उपचार से न्यूनतम उपज ८२३ किग्रा./हे. प्राप्त हुई।
- शुष्क अवस्था में कृषकों की सहभागिता द्वारा चने की किस्मों का आंकलन -रबी मौसम में चने की २० किस्मों के परीक्षण से प्राप्त आंकडें दर्शाते है कि किस्म आई.जी. ५६३ से अधिकतम उपज १३०० कि.ग्रा./हे., शुद्ध लाभ रुपये ३८५००/हे., लाभ लागत अनुपात २.६३ प्राप्त हुआ। अनुशारणार्थ किस्म विशाल उपज१२८० कि. ग्रा./हे., जे.जी. १६ १२१६ कि.ग्रा./हे., आर.व्ही.जी.-२०२ (उपज १९३३ कि.ग्रा./हे.) एवं जाकी-६२१८ (उपज १०८६ कि.ग्रा./हे.) प्राप्त हुई, जो कि अन्य किस्मों (उपज ७४२ से १०१० कि.ग्रा./हे.) की तुलना में अधिकतम प्राप्त हुई। जबकि नियंत्रित किस्म उज्जैन २१ की उपज १०३६ कि.ग्रा./हे. प्राप्त हुई।
- ७ जिलों के २६ गाँव में अरहर के खेतों का सर्वेक्षण किया गया है। अरहर खेतों के सर्वेक्षण से ज्ञात हुआ की जहाँ मुख्य एवं अंतरवर्ती के रूप में अरहर बोई गई है, दोनो दशाओं में सूखा रोग आ सकता है, मध्यम अवधि में पकने वाली प्रजातियाँ जैसे आशा, जेके एम बी एस एम आर-७३६ टीजेटी ५०१, जेके एम १८६ एवं निजी क्षेत्र कुछ प्रजातियों में सूखा रोग कम आता है, जहाँ स्थनिय प्रजातियाँ कपास, सोयाबिन आदि के साथ अंतरवर्तीय फसल के रूप में ली गई वहाँ सूखा रोग अधिक आया, इस वर्ष मानसून मे २ बार मध्यम अवधी का सुखा गिरने के कारण व अधिक तापमान आदी के कारण सूखा रोग की तीव्रता निम्न से मध्यम स्तर की रही, इस मौसम में फली छेदक इल्ली एवं फली मख्खी का प्रकोप भी देखा गया, इन सभी कारणो से उत्पादन का स्तर कम रहा।
- समन्वित कीट एवं रोग प्रबन्धन (अरहर) में फलियों की क्षति फली मक्खी द्वारा १०.७ प्रतिशत, एवं फली छेदक द्वारा ५.१ प्रतिशत रही। जबकि किसान पद्धति में फली मक्खी द्वारा ३१.५ प्रतिशत, फली छेदक द्वारा १९.२ प्रतिशत तथा अनियंत्रित में फली मक्खी का प्रकोप ४५.८ प्रतिशत एवं फली छेदक का प्रकोप १८.३ प्रतिशत रहा। समन्वित कीट प्रबंधन में २१५० कि ग्रा. उपज मिली जो की किसान पद्धति से १२०० किग्रा अधिक थी।
- निमाड क्षेत्र में अरहर के कीटो की स्थिति जानने हेतु खरगोन जिले के विभिन्न ग्रामों की अरहर फसल का निरीक्षण किया। क्षेत्र की अरहर फसल में फली छेदक इल्ली का प्रकोप ३८ वे सप्ताह में ०.७ प्रतिशत एवं फली मक्खी का प्रकोप ३६ वे सप्ताह ०.९ प्रतिशत से शुरू हुआ और सर्वाधिक ५० वे सप्ताह में २४.७ प्रतिशत फली छेदक इल्ली तथा ५१ वे सप्ताह में ६३.२ प्रतिशत फली मक्खी का पाया गया।

- उन्नत प्रजाति परीक्षण में वभन्न प्रजातियों को बोने के सम्ब के लए परीक्षण कया गया ।प्रजाति आर व्ही एस २००७ -०६ ने सामान्य बोने के समय (२४.०६.२०१७) पर सबसे ज्यादा उपज दी। प्रजाति जे. एस. २०-११६ द्वारा देरी से बोने पर अन्य प्रजातियों की तुलना में सार्थक रूप से अ धक उपज प्राप्त हुई । देरी से बोई गई (१४.०७.२०१७) फसल की तुलना में सामान्य समय पर बोआई द्वारा २४९ % अ धक उपज प्राप्त हुई।
- एन.पी.के. (१९:१९:१९) २% घोल का फली बनने की अवस्था पर पर्णीय छिड़काव करने से अधक उपज आंकी गई । इसके पश्चात यूरिया के २ % घोल का फली बनने की अवस्था में पर्णीय छिड़काव करने पर सोयाबीन की उपज में नियंत्रित उपचारकी तुलना में बढ़ोतरी देखी गयी ।
- सोयाबीन फसल में खरीफ २०१७ में कुल ८ कीटों का प्रकोप देखा गया। प्रमुख कीटों में नीलाभृंग ०.३३-२. ३३ भृंग/मीटर लम्बाई जुलाई माह में आंकी गई। हरी एवं भूरी अर्धकुण्डलक इल्लियों की सर्वाधिक संख्या क्रमशः ६.७१ एवम ७.४१ इल्ली/मीटर लम्बाई अगस्त-सितम्बर माह में देखी गई। चक्र भृंग कीट तना मक्खी का प्रकोप क्रमशः ३०.५ तथा ८० प्रतिशत रहा।
- जैविक कीटनाशको के श्रेणि का बी.टी. १२७ एस.सी. एवं अनुमोदित नये कीटनाशक, इन्डक्साकार्ब १५.८ ई. सी./ ३३३ मि.ली./हेक्टर, क्विनालफॉस २५ ई.सी../ १५०० मि.ली./हेक्टर, रायनाक्सीपायर एवं डेल्फीन (बी.टी.) १८.५ एस.सी. के ./ १०० मि.ली./हेक्टर का पत्ती भक्षक इल्लियों के विरुद्ध परिक्षण किया। बी. टी. १२७ एस.सी. कर्मशियल डेल्फीन (बी.टी.) से ज्यादा प्रभावी रहा जबकी रसायनिक कीटनाशकों के लगभग समतुल्य रहा एवं अच्छा उपज (१५७७ से १७५२ ाहधें) दिया।
- सूक्ष्म जल ग्रहण क्षेत्र में जल उत्पादकता बढाने हेतु ग्रहण-भंडारण योग्य सबंध इस परीक्षण में खरीफ मौसम में सोयाबीन एवं हरे भुट्टे हेतु मीठी मक्का लगाई गयी तत्पश्चात् रबी मौसममें मीठी मक्का, टमाटर की फसल लगायी गई एवं टपक सिंचाई पद्धति द्वारा वर्षा ऋतु में एकत्रित जल से सिंचाई की गई। ऑकड़े दर्शाते है कि सोयाबीन-चना पद्धति से शुद्ध लाभ रूपये ६१४७८/हे. एवं लाभ लागत अनुपात २.६८ प्राप्त होता है तत्पश्चात् सोयाबीन-मटर (सब्जी हेतु) से शुद्ध लाभ रूपये ५६८८६/हे. (लाभ लागत अनुपात २.२६) प्राप्त होता है। खरीफ मौसम में लगाई गई मीठी मक्का (शुगर ७५) - टमाटर से कुल शुद्ध लाभ रूपये २८०७६/हे. प्राप्त होता है।
- वर्टीसोल में दीर्घ अवधि खाद प्रयोग २६वर्षों के सत्त प्रयोग के आंकडे दर्शाते है कि सोयाबीन में उपचार एफ वाई एम ६ टन/हे.+ २० कि.ग्रा. नत्रजन + १३ कि.ग्रा. स्फुर प्रति हे. दिये जाने से १९३४ कि.ग्रा./हे. उपज एवं तत्पश्चात् द्वितीय स्थान पर नाइट्रोजन ६० एवं स्फुर ३५ कि.ग्रा./हे. उपज १८०८ कि.ग्रा./हे. प्राप्त हुई। जबकि न्यूनतम उपज १९६६ किग्र./हे. नियंत्रित उपचार से प्राप्त हुई।
- शुष्क अवस्था में कृषकों की सहभागिता द्वारा चने की किस्मों का आंकलन -रबी मौसम में चने की २० किस्मों के परीक्षण से प्राप्त आंकडें दर्शाते है कि किस्म आई.जी. ५९३ से अधिकतम उपज १३०० कि.ग्रा./हे., शुद्ध लाभ रुपये ३८५००/हे., लाभ लागत अनुपात २.९३ प्राप्त हुआ। अनुशारणार्थ किस्म विशाल उपज१२८० कि. ग्रा./हे., जे.जी. १६ १२१६ कि.ग्रा./हे., आर.व्ही.जी.-२०२ (उपज १९३३ कि.ग्रा./हे.) एवं जाकी-९२१८ (उपज १०८९ कि.ग्रा./हे.) प्राप्त हुई, जो कि अन्य किस्मों (उपज ७४२ से १०१० कि.ग्रा./हे.) की तुलना में अधिकतम प्राप्त हुई। जबकि नियंत्रित किस्म उज्जैन २१ की उपज १०३६ कि.ग्रा./हे. प्राप्त हुई।

बीज उत्पादनः

- विश्वविद्यालय के २७ बीज उत्पादन प्रक्षेत्रों के माध्यम से बीज उत्पादन का कार्य चल रहा है। प्रक्षेत्रों का कुल क्षेत्र १२१०.८५ हेक्टेयर है जिसमें से ६४.४५ प्रतिशत (७८०.३७ हेक्टेयर) में बोआई की जाती है। बोआई क्षेत्र क्रमशः १३.३६ प्रतिशत, ३४.५६ प्रतिशत और ५२.०२ प्रतिशत क्षेत्र सिंचित आंशिक सींचित एवं वर्षा अधारित क्षेत्र के अंर्तगत आता है।
- कृषकों को बीज बदलने में मद्द हेतु विश्वविद्यालय विभिन्न फसलों का बीजोत्पादन कर रहा है ताकि फसलों की उत्पादकता को बढ़ाया जा सके।
- विश्वविद्यालय द्वारा वर्ष २०१८-१९ में ८७४९.९० क्विंटल बीज का उत्पादन किया गया। इसके अंतर्गत खरीफ २०१८-१९ में कुल बीज का उत्पादन ३४०३.४० क्विंटल प्रप्त हुआ जिसमें सोयाबीन, मूंग, उड़द, धान, कपास,एवं आधार फसलों का बीज है। इसी प्रकार रबी २०१८-१९ में कुल बीज का उत्पादन ५३५६.४० क्विंटल प्राप्त हुआ। जिसमें गेहूं, चना, सरसों, मसूर, तोरिया, एवं कुसुम फसलों का बीज है।

प्रसार -

- कृषि विज्ञान केन्द्रों द्वारा आर.वी.एस.के.वी.वी, अन्य कृषि विश्वविद्यालयों एवं अन्य संस्थाओं द्वारा विकसित नवीन तकनीकों के प्रभाव का आंकलन करने के लिए विभिन्न क्षेत्रों जैसे फसलोत्पादन, पशुपालन, कृषिअभियांत्रिकी, कटाई उपरान्त प्रबन्धन पर आधारित २८३ प्रक्षेत्र परीक्षण आयोजित किये गये, जिससे २८३० कृषक लाभान्वित हुए।
- नवीन तकनीकों को कृषकों तक पँहुचाने के उद्देश्य से वर्ष २०१८-१९ में १९५३.२९ हे. क्षेत्रफल में फसलों पर ८१६६८ कृषकों के यहाँ अग्रिम पंक्ति प्रदर्शन आयोजित किये गये। इनके अतिरिक्त मछली पालन, पशुपालन, केचुंआ खाद, मूल्य संवर्धन, कटाई उपरान्त प्रबन्धन आदि उद्यमों तथा कुपोषण एवं अभियंत्रण पर ३०७ अग्रिम पंक्ति प्रदर्शन भी आयोजित किये गये।
- इस वर्ष (२०१८-१९) १९५१ प्रशिक्षण आयोजित किये गये, जिससें ५२२५६ किसान, ग्रामीण युवा, महिलायें, प्रसार कार्यकर्ता एवं सरकारी कर्मचारी लाभान्वित हुये।
- क्षेत्र के किसानों में जागरूकता लाने के उद्देश्य से, किसान मेले, बैठक, कृषक दिवस, प्रदर्शनी आदि सहित २८३८४ विस्तार गतिविधियां आयोजित की गई, जिनमें ६९६२२८ कृषक लाभान्वित हुये।
- कृषि विज्ञान केन्द्रों के वैज्ञानिकों द्वारा १०६ फोल्डर्स, २६ पुस्तिकाएं, ०५ बुक्स, ०४ न्यूजलेटर, ०७ प्रशिक्षण मैन्युअल एवं ७१ अनुसंधान प्रपत्र तैयार किये गये। इनके अतिरिक्त विभिन्न कृषि पत्रिकाओं तथा समाचार पत्रों में कृषि विज्ञान केन्द्रों के वैज्ञानिकों के १२३ आलेख भी प्रकाशित हुए।

- कृषि विज्ञान केन्द्रों, विभिन्न प्रशासनिक व सरकारी विभागों के द्वारा १३४५३८ मृदा नमूनों का विश्लेषण कर एवं इनका २३१४५७ मृदा स्वास्थ्य पत्रक तैयार कर कृषकों को वितरित किये गये।
- किसान मोबाईल सलाह सेवा के द्वारा नवीन कृषि तकनीक से संबन्धित १२६१ संदेश भेजे गये, जिसमें १२७ विकासखण्डों के २०२८५ ग्रामों के १३५८२३२ कृषक लाभान्वित हुए।
- विश्वविद्यालय द्वारा ०५ महाविद्यालयों (कृषि महाविद्यालय, ग्वालियर/इन्दौर/सीहोर/खण्डवा एवं उद्यानिकी महाविद्यालय, मंदसौर) तथा ०३ आंचलिक कृषि अनुसंधान केन्द्रों (मुरैना/झाबुआ/खरगौन) के माध्यम से 'मेरा गांव मेरा गौरव' कार्यक्रम संचालित किया जा रहा है। इस कार्यक्रम में विश्वविद्यालय के वैज्ञानिकों द्वारा विभिन्न प्रामों में नियमित रूप से संगोष्ठी तथा प्रदर्शन आयोजित किये जा रहे है तथा कृषकों को नवीन कृषि तकनीकों पर सलाह दी जा रही है।



Srimant Rajmata Vijayaraje Schindia (1919-2001)

1. INTRODUCTION

1. Mission:

• To impart education, conduct research and extension activities for enhancing productivity, optimization of profit, sustainability of agriculture and allied sectors and improving rural livelihood in the state of Madhya Pradesh.

2. Mandate:

- To serve as a centre of higher education in the field of agriculture and allied sciences.
- To conduct basic, strategic, applied and anticipatory research in the field of agriculture and allied sciences.
- To disseminate technologies to farmers, extension personnel and organizations engaged in agricultural development through various extension programmes.
- To produce and supply of genuine seed and planting material to the farmers.

3. Area of Jurisdiction:

RVSKVV, Gwalior is responsible for Agricultural Education, Research and Extension in following 26 revenue districts of the state:

Sheopur, Morena, Bhind, Gwalior, Shivpuri, Guna, Ashoknagar, Datia, Dewas, Shajapur, Agar Malwa, Ujjain, Indore, Dhar, Jhabua, Alirajpur, Ratlam, Mandsaur, Neemuch, Khargone, Badwani, Khandwa, Burhanpur, Bhopal, Sehore and Rajgarh.

The area under University jurisdiction is a part of the Deccan Plateau and comprises plateaus with mean elevation of 1600 feet above mean sea level; inter spread with the mountains of the Vindhya and Satpura ranges. The maximum height of 1350 m is recorded in Satpura range on the other hand 150 m height is found in Chambal Valley. The main river systems are the Betwa, Chambal, Narmada, Sindh and Tapti. Nearly one third of the state area is covered with tropical forest. The area contains three types of soils, varying from alluvial to medium and heavy black Vertisols with six agro climatic zones.

The geographical area of the state under the University jurisdiction is 137.16 lakh hectares out of this, 74.72 lakh hectares is under cultivation, 24.51 lakh hectares under Kharif and 36.45 lakh hectare under rabi fallow. Out of the total cultivated area,

49.42% is irrigated. However, the area under irrigation varies from as low as 18.85% in Jhabua district to as high as 75.63% in Datia district.

The economy of the area is primarily agriculture based. Nearly 75% population is engaged in agriculture. The Malwa region abounds in rich black cotton soil. The low lying areas of Gwalior and Bundelkhand have light soils, whereas the Narmada Valley is formed by deep rich alluvial deposits.

4. Climatic Conditions:

The overall climate varies from semiarid to sub humid with hot summer; cool and dry winter with an average annual rainfall ranging from 600 to1000 mm. Mean annual rainfall is 1029.21mm.

In general, aberrant monsoon behavior is a common feature in the region that usually creates abnormal weather conditions including long dry spells of 8-20 days duration in the middle of the season.

5. Agro Climatic Zones

Out of 11 agro climatic zones of the state, following six are under the jurisdiction of RVSKVV, Gwalior:

- Gird Zone
- Malwa Plateau
- Nimar Valley
- ➢ Ihabua Hills
- Vindhya Plateau (Partial)
- Bundelkhand Zone (Partial)



6. Major Crops and Cropping Pattern

- The main food crops of the area are wheat, rice, mustard, lentil and millets. Important among commercial crops grown in the area are pulses, oil seeds and medicinal crops. The state is poised for a breakthrough in soybean cultivation.
- The area coverage of soybean, groundnut and cotton under the jurisdiction of the University is 69, 66 and 55 per cent, which contributes to about 68, 67 and 56 per cent in total production of these crops in the state respectively. Chickpea, pea, black gram and wheat contributes about 35, 24, 54 and 48 per cent of the total state production from an area of only 20, 05, 46 and 40 per cent, respectively. The productivity of these crops in the state average.
- Area under horticultural crops is showing an increasing trend under the University jurisdiction. Mandarin, sweet oranges and limes under assured irrigation and guava, ber, aonla and custard apple without irrigation in Gird region, orange, grape, chiku, mosambi and acid lime in Malwa plateau; banana, papaya, lime and chiku in Nimar valley and lime, ber, guava, aonla and custard apple in Jhabua hills bloom well. Vegetables like Tomato, Potato, Sweet potato, Brinjal, Okra, Cole crops (Cabbage, Cauliflower), Drumstick, Radish, Carrot, Cucurbits, Arbi, Beans and Leafy vegetables etc. are grown in large acrage. Among the spice crops, turmeric, corriander, ajwain, chillies, garlic, fenugreek and fennel have their own specialties in different agroclimatic zones. The area coverage under seasonal flowers is also showing an increasing trend.

7. Organizational Setup:

Hon'ble Governor of Madhya Pradesh is the Chancellor of the University, and Vice-Chancellor is the Academic Head and Chief Executive of the University, who is supported by the following authorities:

- Board of Management
- Academic Council
- Administrative Council

The University comprises of Faculty of Agriculture headed by Faculty Dean. The constituent colleges are headed by respective Deans. Heads of the Departments are the key persons for teaching, research and extension of the respective discipline/department. Committee of Faculty of Agriculture and Extension Council are also constituted by Vishwa Vidyalaya.

Director Instructions, Director Research Services and Director Extension Services are responsible University authorities for human resource development, research activities and extension activities, respectively. Registrar and Comptroller support the Vice-Chancellor in administration and financial matters. The organizational setup of the University is presented in the following flow chart.



2. ACADEMIC HIGHLIGHTS:

Academic excellence is the backbone of every institute of higher learning. The responsibility increases many folds when the institute aspires for generating world class graduates with the competence to stand tall as a nation builder.

It is through the dissemination of latest technologies and changing knowledge from the global prospective to grass root level that the desirable development in the broad area of agriculture can be attained. The demanding trends in Agriculture/Horticulture need an increase in faculties in such fields and disciplines which have a tremendous market value so that the products of the University are not inclined to government jobs only but would be able to involve themselves in a variety of fields that can boost economy at the State and National level. Therefore resident instruction programme is carried out in the areas of Agriculture and Horticulture in four Agriculture colleges and one Horticulture College in the University.

2.1 Profile of the Colleges:

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya offers undergraduate, post graduate and Ph.D. programmes in the faculty of Agriculture. At present, the University has four Colleges of Agriculture and one college of Horticulture under the faculty of Agriculture. Four constituent Colleges of Agriculture are located at Gwalior, Indore, Sehore and Khandwa and one College of Horticulture is located at Mandsaur.

All these colleges offer Under Graduate and Masters Degree Programmes in different disciplines. Ph.D. programme is offered only at College of Agriculture, Gwalior.

The list of colleges with their location, year of establishment and degree programmes offered is given below.



RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (2008)



S.	Name of College	Year of	f D D Off 1
No.	with location	Establishment	Degree Programme Offered
Ι	Faculty of Agriculture		
			(i) B.Sc. (Ag.)
			(ii) M.Sc. (Ag.)
			(1) Agronomy
			(2) Entomology
			(3) Extension Education
		and the second second	(4) Agriculture Economics & Farm Management
			(5) Plant Breeding and Genetics
			(6) Plant Pathology
			(7) Soil Science & Agricultural Chemistry
			(8) Environmental Science
1	College of Agriculture,	1050	(9) Plant molecular biology & Biotechnology
1.	Gwalior	1950	(10) Fruit Science
			(11) Vegetable Science
			(III) Ph.D.
			(1) Agronomy (2) Entemplogr
			(2) Entoniology (3) Extension Education
			(4) Agriculture Economics & Farm Management
			(5) Plant Breeding and Genetics
			(6) Plant Pathology
			(7) Soil Science & Agricultural Chemistry
1			(8) Fruit Science
			(9) Vegetable Science
			(i) B.Sc. (Ag.)
			(ii) M.Sc. (Ag.)
			(1) Agronomy
	RAK. College of		(2) Entomology
2.	Agriculture.	1952	(3) Extension Education
	Sehore		(4) Agriculture Economics & Farm Management
	Jone -		(5) Plant Breeding and Genetics
			(6) Plant Pathology
			(7) Soil Science & Agricultural Chemistry
			(i) PSc (Ag)
			(i) $MSc(Ag)$
			(1) Agronomy
			(2) Entomology
	College of Agriculture,		(3) Extension Education
3.	Indore	1959	(4) Agriculture Economics & Farm Management
			(5) Plant Breeding and Genetics
			(6) Plant Pathology
			(7) Soil Science & Agricultural Chemistry
			(8) Vegetable Science
4	BM, College of	1987	(i) B.Sc. (Ag.)
-7.	Agriculture, Khandwa	1707	(ii) M.Sc. (Ag.) Plant Pathology
			(i) B.Sc. (Hort.)
			(ii) M.Sc. (Hort.)
5	KNK, College of	2002	(1) Fruit Science
5.	Horticulture, Mandsaur	2002	(2) Vegetable Science
			(3) Plantation, Spices, Medicinal & Aromatic Crops
			(4) Floriculture & Landscape Architecture

2.1.1 Details of the Colleges:

Resident instruction programme is one of the mandates of the University *i.e.* impart education in Agriculture and Horticulture to produce graduates and post graduates ready to face the existing and new challenges in agriculture sector.

The University follows the semester system of education. Completion of a degree programme requires successful study of prescribed courses as approved by the Academic Council of the University. Course contents of all subjects are periodically updated and new courses are occasionally added to the degree requirement to cope up with the challenges of upcoming technologies. The University follows 10 point scale evaluation system approved by ICAR. Individual attention of each and every student is ensured through the advisory system. At Under graduate level, for a group of 5-10 students, one faculty advisor is appointed for each class and at Post-Graduate level, for each student, an advisory committee consisting of 3-4 faculty members is appointed. The teacher/ advisory guide, supervises and monitors the academic performance of his/her advises besides helping them in their personal problems. The advisor also maintains a close contact with parents/guardians of the students and informs them about the progress of their works/performance.

2.2 Admission Procedure

2.2.1 Undergraduate Programmes

Admission in first year of B.Sc. (Hons.) Agriculture/Horticulture is done on the basis of the merit list provided by the Professional Examination Board of the State Government, located at Bhopal. The board conducts a Pre-Agriculture Test (PAT) for B.Sc. (Hons.) Agriculture/Horticulture. The roster for reservation of seats for UG and PG as per provisions made by the State Government for different categories is strictly followed.

All possible efforts are made to fill up all seats of different categories by repeated counseling of the students.

2.2.2 Postgraduate Programmes

Admissions in post graduate programmes are made by the University through joint entrance examination basis. As per merit list, admissions are given to the students in the subject of their choice; subject to the availability of seats. The roster of reservation is also followed for these admissions.

2.2.3 Ph.D. Programmes

Similarly, in Ph.D. programme admission is made through joint entrance examination basis.

2.3 Allocation of Seats and Roster:

During the academic year 2018-19, the total intake capacity was 774 out of which 364 were in undergraduate (UG), 356 in postgraduate (PG) and 54 in Ph.D. degree programme. In the undergraduate level, out of 364 total seats, 308 seats were in B.Sc. (Ag.) and 56 in B.Sc. (Hort.) degree programme. In the post graduate level, out of 364 seats, 260 seats were in M.Sc. (Ag.) and 96 in M.Sc. (Hort.). Similarly, in Ph.D. programme, out of 54 total seats, 42 seats were in agriculture and 12 were in Horticulture discipline.

2.3.1 Intake Capacity (Degree wise):

			100			
S.No.	Faculty	Free	Payment	NRI	ICAR	Total
-		seats	seats		1	
Degre	e Programmes				1.0	19 St 1
1.	B.Sc. (Hons.) Agriculture	220	44	11	33	308
2.	B.Sc. (Hort.) Horticulture	40	08	02	06	56
	Total	260	52	13	39	364
1.	M.Sc. (Ag.)	260	-	-	-	260
2.	M. <mark>Sc. (H</mark> ort.)	96	-	-	-	96
	Total	356	-	-	-	356
1.	Ph.D. Agriculture	42	-	-	-	42
2.	Ph.D. Horticulture	12	-	-	-	12
	Total	54	-	-	-	54
	Grand Total	670	52	13	39	774

2.3.2 Under Graduate: B.Sc. (Ag. /Hort.)

(A) B.Sc. (Ag.)

Allocation of Seats		Boys	Cirle	Total	
Roster		DOYS	GITIS		
Free Seats	General	50	31	81	
	ST	36	14	50	
	SC	24	11	35	
	OBC	44	13	57	
Payment Seats		48	02	50	
NRI Seats	N.		-	06	
Nominee/Fellow ICAR		25	04	29	
Total		227	75	308	

(B.) B.Sc. (Hort.)

Allocation of Seats Roster		Boys	Cirle	Total	
		Doys	GITIS		
Free Seats	Gen.	14	06	20	
	ST	05	03	08	
	SC	05	02	07	
	OBC	03	02	05	
Payment Seats		06	02	08	
NRI Seats		-	-	02	
Nominee/Fellow	ICAR	04	02	06	
Total		37	17	<mark>5</mark> 6	

2.3.3 Post Graduate: M.Sc. (Ag. /Hort.):

(A) M.Sc. Agriculture/Horticulture

S.No.	Subject	Gwalior	Indore	Sehore	Mandsaur	khandwa	Total
		PG	PG	PG	PG	PG	PG
1	Agronomy	12	12	12	-	-	36
2	Soil Sc. & Agri.	12	12	12			26
	Chemistry	12	12	12			50
3	Entomology	12	12	12	-	-	36
4	Genetics & Plant	12	12	12			36
	Breeding	12	12	12			30
5	Agri. Economics	8	8	8	-	-	24
6	Plant Pathology	12	12	12	-	8	44
7	Plant Bio	08					8
	Technology	00					0
8	Environmental	4	_				4
	Science	-					1
9	Extension	12	12	12	_	-	36
	Education						
	Total	92	80	80		8	260
(B) M.	Sc. Horticulture				1		
1	Veg. Science	12	12	12	12	-	48
2	Fruit Science	12	-	-	12		24
3	Floriculture &						
	Landscape	-	-	-	12	-	12
	Architecture						
4	Plantation, Spice,						
	Medicinal and	-	-	-	12	-	12
	Aromatic Crops						
	Total	24	12	12	48	-	96

2.3.4 Ph.D. (Ag./Hort.):

(A) Agriculture:

C No	E	Intake Capacity				Tatal
5.NO .	Faculty	Free seats	Payment seats	NRI	ICAR	lotal
1.	Ph.D. Agriculture	28	14	-	-	42

(B) Horticulture:

S.No.	Faculty		Intake Capacity			
		Free seats	Payment seats	NRI	ICAR	
1.	Ph.D. Horticulture	8	4	-	-	12

2.4 **Students Strength**:

2.4.1 Students Admitted:

S. No.	Degree Programme	No. of Students
1.	B.Sc. (Ag.)	310
2.	B.Sc. (Hort.)	56
	Total	366
1.	M.Sc. (Ag.)	245
2.	M.Sc. (Hort.)	91
	Total	336
1.	Ph.D. (Ag. /Hort.)	36
	Total	36
	Grand Total	738

2.4.2 **Students Strength at a Glance:** During the year 2018-19, total 1904 students were on the roll of the University, out of which 1330 in UG, 513 in PG and 61 in Ph.D. degree programmes.

S. No.	Degree Programme	No. of Students (2018-19)
1.	B.Sc. (Ag.)	1140
2.	B.Sc. (Hort.)	190
	Total	1330
1.	M.Sc. (Ag.)	466
2.	M.Sc. (Hort.)	47
	Total	513
1.	Ph.D. (Agri. /Hort.)	61
	G. Total	1904

2.4.3 Gender Wise Students Strength:

During the year 2018-19, a total of 1296 boys and 608 girls' students were on the roll of the University, out of which, 901 boys and 429 girls were in UG, 352 boys and 161 girls in PG, and 43boys and 18 girls were in Ph.D. degree programmes.

S. No.	Degree Programme	Girls	Boys
		2018-19	2018-19
1.	B.Sc. (Ag.)	355	785
2.	B.Sc. (Hort.)	74	116
	Total	429	901
1.	M.Sc. (Ag.)	143	323
2.	M.Sc. (Hort.)	18	29
	Total	161	352
1.	Ph.D. Agri./Hort.	18	43
	Total	18	43
	Grand Total	608	1296

2.5 **Teaching Status**:

Completion of a degree programme requires successful study of the courses as approved by the Academic Council. Every student has to study a set of prescribed courses per semester. The semester wise courses offered and total credits covered in different undergraduate and postgraduate degree programmes are given below:

2.5.1 Under Graduate: B.Sc. (Ag. /Hort.)

(A) B.Sc. (Ag.)

BSc(Ag)	Courses of	ffered (No.)	Total Credits		
	I Sem.	II Sem.	I Sem.	II Sem.	
I Year	8	9	20 (14+6)	22 (14+8)	
II Year	10	9	26 (15+11)	23 (13+10)	
III Year	8	9	20 (13+7)	18 (10+8)	
VI Year	5*	6**	20 (0+20)	20 (6+14)	
Total	26	33	86 (42+45)	83 (43+40)	

RAWE/RHWE*, ELP**

(B) B.Sc. (Hort.)

	Courses offered (No.)		Total Credits		
B.Sc. (Hort.)	I Sem.	II Sem.	I Sem.	II Sem.	
I Year	11	09	21(13+8)	21(12+9)	
II Year	10	09	25(14+11)	23(13+10)	
III Year	08	08	19(11+8)	20(12+8)	
VI Year	02	02	20(5+15)	20(5+15)	
Total	31	28	85 (43+42) 84 (42+42		

2.5.2 Post Graduate: M.Sc. (Ag. /Hort.):

S.	Subject/Department	Courses offered (No.)		Total Credits	
110.	1	I Sem.	II Sem.	I Sem.	II Sem.
1.	Agronomy	11	09	21 (16+5)	19 (13+6)
2.	Agricultural Economics & Farm Management	10	11	17 (13+4)	22 (14+8)
3.	Entomology	10	11	16 (9+7)	21(13+8)
4.	Extension Education	10	09	18 (12+6)	18 (12+6)
5.	Plant Breeding & Genetics	10	09	20 (13+7)	16 (10+6)
6.	Plant Pathology	11	10	21 (14+7)	19 (12+7)

7.	Soil Science & Agricultural Chemistry	10	09	21 (14+7)	19(13+6)
8.	Fruit Science	10	09	22 (15+7)	16 (10+6)
9.	Vegetable Science	10	09	22 (15+7)	17 (11+6)
10.	Plantation, Spices, Medicinal & Aromatic Crops	10	09	22 (15+7)	17 (11+6)
11.	Floriculture & Landscape Architecture	10	09	22 (15+7)	18 (12+6)

2.5.3 Ph. D. (Ag. /Hort.): (A) Agriculture:

S. No.	Department	Course offered (No)		Total credits	
		I Sem	II Sem	I Sem	II Sem
1.	Agronomy	09	09	17(13+4)	14 (12+2)
2.	Agricultural Economics & FM	09	09	16 (11+5)	17 (11+6)
3.	Entomology	10	10	15 (11+4)	14 (10+4)
4.	Extension Education	09	09	16 (11+5)	18 (12+6)
5.	Plant Breeding & Genetics	09	09	12 (10+3)	16 (12+4)
6.	Plant Pathology	09	09	17 (11+6)	13 (10+3)
7.	Soil Science & Agricultural Chemistry	09	10	15 (12+3)	17 (14+3)

(B) Horticulture:

S. No.	Department	Course offered (No)		Total credits	
		I Sem	II Sem	I Sem	II Sem
1.	Fruit Science	09	08	17 (11+6)	13 (10+3)
2.	Vegetable Science	10	08	19 (12+7)	13 (10+3)

2.6 Experiential Learning Programme: As per the recommendations of Fifth Dean's Committee that the B.Sc. (Ag.)/B.Sc. (Hort.) graduates must have adequate hands on experience on different aspects of agriculture/horticulture. For this purpose, the experiential learning programme has been introduced in the final year that includes different aspects of horticulture and agriculture.

Modules of Experiential learning programme	Nos. of students
A. B.Sc. (Ag.)	306
Module – I Crop Production	
Seed Production Technology	
Remote Sensing, GIS & Land Use Planning	
Integrated Farming System	
Water Management	
Soil Management	
Management of Post Harvest Insect Pests & Diseases	
Module – II Crop Protection	
Integrated Pest & Disease Management	
Management of Post Harvest Insect Pests & Diseases	
Non Insect Pest Management	
Pesticides and Plant Protection Equipments	
Nursery Management of Horticultural Crops	
Integrated Farming System	
Module – III Horticulture	
Commercial Vegetable Production	
Commercial Floriculture	
Nursery Management of Horticultural Crops	
Processing & Value Addition of Horticultural Crops	
Integrated Pest & Disease Management	
Management of Post Harvest Insect Pests & Diseases	
Module IV	
Commercial Vegetable Production	
Nursery Management of Horticulture crops	
Protected cultivation of Horticultural crops and seed production of vegetable and	
flowers	
Processing and value addition of horticultural and crops	
Integrated Pest and Disease Management	
Mushroom cultivation	
Module V	
Nursery Production and management	
Module VI	
Protected cultivation of high value vegetable crops	
Module VII	
Floriculture & Landscane Cardening	
Value addition in horticultural grops	
R B Sc (Hort)	19
D. D.S. (1101 t.)	40
Nursery production and management	
Module II	
Protected Cultivation of High value horticultural crops	
Module III	
Floriculture and Landscape Gardening	
Module IV	
Post harvest technology and value addition	

GLIMPSES OF EXPERIENTIAL LEARNING PROGRAMME



ELP on Post Harvest Management and Value addition



ELP on Massive in vitro propagation of important horticulture and medicinal plants



Turmeric Pickle &Mix Pickle PicklePickle





Aonla Barfi and Aonla Candy





Picking of Bottle Gourd and Pumpkin





Preparation for Mushroom cultivation


Extraction of citrus (lime) seeds



Grading and sorting in okra



Sowing of citrus seeds for rootstock



Transplanting of tomato



Blended RTS



Pineapple RTS

2.7 Rural Agricultural/Horticultural Work Experience (RAWE/RHWE): As a part of regular curriculum, the final year students of B.Sc. (Ag.) and B.Sc. (Hort.) are placed in rural areas for one semester in selected villages through Krishi Vigyan Kendras (KVKs) working in the region, where each student is attached to one host farmer for practical training with regards to crop production, crop protection, economics and also dynamics of the rural society. Further, some social activities were also performed by the students like sanitation in the village, plantation in the premises of primary and middle schools.

S.No.	Particular	Gwalior	Sehore
1	No of student	Boys 54 +Girls 21	Boys 59+Girls27
1.	No. of Student	Total 75	Total 92
1.14	Adopted	KVK, Aron:- Sarkho, Araskheda	KVK, Dewas
2	villages /	KVK, Seopur: - Indrapura,	KVK, Shajapur
4.	KVKs	Lalitpura, Galmania, Baroda,	
	KV K3	Dharampura	
		1. Hybrid Verities of vegetable	Soil testing
		crops	Demonstration on seed treatment and
		2. Water conservation	other new agriculture technology.
		Technology	Use of improved seed
		3 Seed treatment in Kharif and	Seed treatment of different crops.
1.0		rahi crons	Increase the use of organic manures.
		1 Spacing	Water Harvesting.
		F. Diant protoction in conhorn	Biogas plant
		5. Plant protection in soybean,	Proposed improved cultural practices for
-		ground nut, pigeon pea. and	Agricultural crops, vegetables and fruit
		mustard	crops.
		6. Soil sampling,	Mushroom production.
		7. Application of Micro-	Method and Result Demonstration of
		nutrients	different agri.practices
		8. Management Practices of	Participation in Blood Donation Camp,
		animal husbandry	Realth Care Camp& Animal care Camp.
1	Tachnologiac		Civing Information about the cleanliness of
3.	Dessimenated		Teeth Clothe & Hand
	Dessimenated		Establishing a library in a village with the
No.			help of Sarpanch and young people of the
			village
			Organizing Games, Sports, Social Service
			Clubs, Recreation clubs, kisan mandal.
			vuva mandal, mahila mandal, & Bhajan
			mandals.
			Providing information through Bulletins,
			Charts, Graphs and samples.
			Repairing village Roads.
			Construction of soak pits and cleaning of
No.			drainage channels.
			The Case study of the beneficiaries of the
			various agricultural Development
			programmes like DPAP, IRDP, ATMA,
			TRYSEM, JRY, INDIRA AWAS
			YOJNA etc.

RAWE/RHWE AT A GLANCE

S.No.	Particular	Indore	Khandwa	Mandsaur
1	No of student	Boys59+Girls31	Boys42+Girls13	Boys 35+ Girls 18
1.	No. of Student	Total 90	Total 55	Total 53
		KVK, Ujjain	KVK Badwani -	I Semester :-
		KVK, Dhar	Lonsara, Taloon,	Boys 17- KVK, Ratlam
			Balkunwa and	(Village- Maota, Bhimakheda,
			Kalivedi	Sukheda and Ranayara)
			KVK Khargone-	Girls 07– KVK, Neemuch
			Baijapur, Dhibgaon	(Village-, Malkheda and
2.	Adopted			Jaysinghpura)
	villages/KVKs			II Semester :-
				Boys 17– KVK, Neemuch
				(Village-, Jaisinghpura,
				Hanumantiya panwar and
				Malkheda)
				Girls - 07- KVK, Ratlam
				(Village- Talidana and Riyawan)
		Social Activity-	Drip irrigation system	INM in Guava
		Parthanium,	Strategy for cost of	GA3 treatment in Grape
		Eradication, Mid Day	cultivation	Seed treatment in Garlic
1. 100		Meal Program,	Application of PRA	Drip irrigation system in onion.
		Vaccination Camp	technique for the	Harvesting and grading of
-		Plantation	identification of	onion, garlic, bottle gourd and
		Artificial Jewelry	agricultural problem and	fenugreek.
		Making, Festival	planning	Insect pest and disease
		celebration as, Navratri	Nursery management	management in Marigold,
		mandal	Fruit and vegetable	Guava, Grape, Garlic, Lucumber,
	PRA Exercise	preservation	Brinjal, Tomato, Cabbage,	
		Social Mapping	Value addition of crops	Cauliflower, Chilli etc.
		Farm Mapping		Insect pest and disease
		Wealth Ranking		management in onion, Garlic,
		venn diagram	Sampling of soll for	Bottle gourd, fenugreek
		preparation Discussion of Dural	testing Markating strategies	etc.Chrysantnemum, Fenugreek
		Discussion of Rural	Marketing strategies	etc. Droduction in Chrysonthemum
		Problem Domonstration of Water	improved variation of	and strauberry
2	Technologies	Harvosting Tank	Souphoan chilly cotton	Ding hudding in hor
5.	Dessimenated	Organizing Krishak	otc	Lise and importance of blue
1		Sangoshthi	ett.	Sticky trap in opion and garlic
		Other Activities		Use and importance of
		Fruit Preservation		pheromone trans in Guava and
		Particination in Krishi		other field crops
- 11 A		Mahotsay		Use and importance of vellow
		Participation in Krishi		sticky tran in bottle gourd and
		Mela		fenugreek
		Awareness towards the		Use of blue, vellow, orange,
		farmers for the program		sticky traps in various crops
		of Mera Goan Mera	and the second second second	
		Gourav		
		Agricultural Activities		
		Germ Plasm Collection		A CONTRACTOR OF
		Economic Budgeting for		
		the rural family		A second s
		Farmers Meeting		
		Field Meeting		
		Exhibition		

GLIMPSES OF READY (RAWE/RHWE) PROGRAMME



Seed processing and grading



Conducting PRA exercise with RAWE students





Vaccination of the buffalow by students



Evaluation of the RAWE team



Evaluation of the RAWE team



















2.8 Thesis Submitted:

2.8.1 M.Sc. (Agriculture/Horticulture): 117 Students submitted Thesis for Post Graduate degree programme in Agriculture discipline and 40 students for Horticulture degree programme.

2.8.2 Ph.D. thesis submitted to Director Instruction for evaluation: 22 student's submitteed Thesis for Ph.D. Agriculture/Horticulture degree programme.

2.9 Academic Excellence:

2.9.1 Student Performance in ICAR-JRF/SRF examination and other Scholarship/Stipends:

S. No.	Name of Fellowship/Scholarship	No. of Students 2018-19
1.	Junior Research fellowship received	
2	JRF qualified and admitted in different	4
۷.	Universities of India without fellowship	
3.	SRF Qualified without fellowship	
4.	NET	1
5.	National Talent Scholarship	26
6.	Scholarship of Vikramaditya Yojna	11
7.	Scholarship of Gaon Ki Beti Yojna	
8.	Dr. Shyamaprasad Mukharji Scholarship	7
9.	Mukhyamantri Medhavi Vidyarthi Yojana	24
10	Post Metric Scholarship	604
	State Government Scholarship	
	(i) OBC	318
	(ii) SC	155
	(iii) ST	131

3. STUDENTS WELFARE ACTIVITIES:

3.1 National Service Scheme (NSS):

S. No.	Activity(s)	No. of Volunteers Participated
1	No. of students enrolled	303
2	No. of students passed/cleared	66
	'B' certificate examination	00
3	No. of students passed/cleared	
	<i>'C' certificate examination</i>	
4	NSS day celebration/Camp	82
5	Blood donation camp	116
6	Pulse polio camp	12
7	AIDs awareness day	57

8	Beti Bachao Abhiyan	59
9	Malnutrition day	36
10	Parthenium eradication day	121
11	Special camp	38
12	Voter ID awareness camp	212
13	State level camp	1
14	Unit camp	
15	Rastriya Yuva Day	60
16	Sensitization day	20
17	Environment day	134
18	Plantation day	163
19	International Woman's Day	72
20	Awareness Programme	29
21	Pre. RD Camp	

Glimpses of NSS Activities



वृक्षारोपण

गाजरघास उन्मूलन







Dr. G.N. Pandey addressing to the studnets of this College on the Occasion of World AIDS Day conduction on 01.12.2018



Participation of student in speech competion on "Role of Youth in Prevention of AIDS" on the Occation of World AIDS Day on 01.12.2018





Prize distribution to Winner of quiz Competion on "AIDS and Its Control" on World AIDS Day at CoH, Mandsaur



Blood donation camp held at Village Sejpuria during NSS special camp on 15.03.2019 with the help of District Hospital, Mandsaur



Student is donating blood during NSS special camp at Village Sejpuria on 15.03.2019



Dr. S.N. Mishra Dean of College of Horticulture addressing to the students on the occation of Blood and Health checkup camp on 28.03.2019 t CoH,Mandsaur



Shri Ramgopal Patidar addressing the audience on the on the occation of Blood and Health checkup camp on 28.03.2019



Women's faculty is being checking up the haemoglobin level on the occation of Health checkup camp on 28.03.2019



Girl's students of this College are being checking up the haemoglobin level on the occation of Health checkup camp on 28.03.2019 at College of Horticulture, Mandsaur.

3.2 National Cadet Corps (NCC):

<mark>S. No.</mark>		Activity(s)	Total Students
1.	No. of st	udents enrolled	140
2.	Exam.	'B' certificate	53
	passed	'C' certificate	31
3.	No. of ca	dets attended the CATC	52
4.	Army At	tachment at Gwalior	02

Glimpses of NCC activities



Celebration of Surgical Strike Day (Prakram Divaas) on 29.9.18



NCC Cadets celebrating World environment Day 0n 5.6.18





Celebration of National Unity Day on 31.10.18



NCC Cadets presenting Guard of honor to Hon'ble V.C. Prof. S.K. Rao on the occasion of Independence Day, 2018



NCC Cadets involved in Clean Campus drive during "Swachhata hi sewa Pakhwara"







3.3 Students Counseling and Placement:

S. No.	Name of employer / Organization	No. of students employed
1.	Central Govt.	45
2.	Government /public sector	44
3.	Private sector	70
4.	Self employed	2
	Total	161

3.4 Cultural and Sports Activities:

3.4.1 Cultural Activities

3.4.1.1 Cultural activity at University level: A festival of knowledge and culture **Youth Festival** was organized at College of Agriculture, Gwalior (December 26-28, 2018). Five constituent colleges of the Vishwa Vidyalaya *viz.* College of Agriculture, Gwalior, Indore, Sehore, Khandwa and College of Horticulture, Mandsaur participated enthusiastically in the competitions held under 18 categories of singing, dancing, fine arts and theatre.

"Youth Festival" a meeting place for creative minds to discuss their ideas and allow for testing of their ideas in the face of intense competition, rigorous evaluations and a touch of the carnival. Winners of the competitions were awarded certificates, trophies in the intracollege events.

S.No.	Activity	Winner	Runner
1	One Act Play	College of Agriculture, Gwalior	College of Agriculture, Khandwa
2	Folk Dance	College of Agriculture, Gwalior	College of Agriculture, Indore
3	Skit	College of Agriculture, Khandwa	College of Agriculture, Gwalior
4	Elocution	College of Horticultrue, Mandsaur	College of Agriculture, Gwalior
5	Patriotic Song	College of Agriculture, Gwalior	College of Agriculture, Sehore
6	Group Song	College of Agriculture, Sehore	College of Agriculture, Gwalior
7	Rangoli Competition	College of Agriculture, Indore	College of Agriculture, Khandwa
8	Mono Acting	College of Agriculture, Gwalior	College of Agriculture, Indore
9	Cartooning	College of Agriculture, Gwalior	College of Agriculture, Khandwa
10	Poster Making	Colleg <mark>e of Ag</mark> riculture, Gwalior	College of Agriculture, Khandwa
11	Debate (Against)	College of Horticulture, Mandsaur	College of Agriculture, Gwalior
12	Solo Song	College of Agriculture, Gwalior	College of Agriculture, Sehore
13	Extempore	College of Agriculture, Gwalior	College of Agriculture, Khandwa
14	Quiz Competition	College of Agriculture, Gwalior	College of Agriculture, Indore
15	On spot Painting	College of Agriculture, Sehore	College of Agriculture, Gwalior
16	Clay Modeling	College of Agriculture, Indore	College of Agriculture, Sehore
17	Mime	College of Agriculture, Gwalior	College of Agriculture, Khandwa

Glimpses of Cultural Activities







Solo Song





THEATRE EVENT





Participation of students in National Events

Games & sports: Inter collegiate sports/cultural meets have served to link together the five colleges of the university paving the way for participation at national level. The students have participated in Ten inter university agriunisports and Nine youth festivals during 2008 to 2019. The performance of students in various sports and cultural meets has been admired.

National Level Cultural Activities

 18th All India Inter Agricultural University Youth Festival was organized by Sri Venkateswara Veterinary University, Tirupati, Chittoor (Dt) A.P. during 12-16 February, 2018. Students (22) of this university actively participated in the events.



Glimpses of the opening and closing ceremony of 18th All India Inter Agricultural University Youth Festival at Sri Venkateswara Veterinary University, Tirupati, Chittoor (Dt) A.P.

 19th All India Inter Agricultural University Youth Festival was organized by Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Dist: Banaskantha, Gujarat during 03rd to 07th February, 2019. Students (22) of this university actively participated in the events.



Glimpses of the opening and closing ceremony of 19th All India Inter Agricultural University Youth Festival at Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar

3.2 Sports Activities: College of Agriculture, Gwalior: The performance of the various teams is as under:

SN	Activates	M	ale	Fen	nale
3.IV.	Activates	Winner	Runner	Winner	Runner
1	Badminton		1 - A - A - A - A - A - A - A - A - A -		Yes
2	Athletics	Yes	1.0.0	Yes	
3	Table – Tennis	Yes			Yes
4	Volley ball	Yes			-
5	Kabaddi	Yes		6	-
6	Kho – Kho	Yes			-

Infrastructure facilities

The following Infrastructure of Physical Education is available in the collage.

S.N.	Infrastructure	Number	Approximate area
1	Football ground	01	100x100 meter
2	Sports Complex	01	50x30 meter
3	Kabaddi ground	01	20x15 meter
4	Volley ball ground	02	25x15meter
5	Kho – Kho ground	01	35x25 meter
6	Gymnasium	01	13x17meter

Coaching Camp:

For betterment of the players, following coaching Camp have been organized times by the Department of Physical Education.

S.N.	Name of the Events	Duration
01	Chess & Carram (Men/Women)	15 Days
02	Badminton (Men/Women)	15 Days
03	Table – Tennis (Men/Women)	15 Days
04	Kabaddi (Men)	15 Days
05	Kho – Kho (Men)	15 Days
06	Volley ball (Men)	15 Days
07	Athletic (Men/Women)	20 Days

<u>Tournaments</u>:

Inter Class and Inter Collegiate tournament were organized in the College. The details are under:

S.N.	Name of the tournaments	Name of the Events			
	Inter Class	Badminton, T.T., Carrom, Volley ball, Kabaddi, Kho-Kho 8	&		
		Athletics			
	Inter Collegiate	Badminton, T.T., Carrom, Volley ball, Kabaddi,Kho-Kho 8	&		
		Athletics			

Awards

S.N.	Year	Level of	Awards (Medals)			Remarks
		Competition	G <mark>old</mark>	Silver	Bronze	
01	2018 - 19	Inter Collegiate	16	05	04	Won over all Championship

College of Agriculture, Indore: Held at B. M. College of Agriculture, Khandwa during 14-16 December 2018. The details of the performance of the teams as follows:

Activity	Male		Female	
Badminton	MR. Janmoj Yadav	Runner	Ku. Pooja Parmar	
	Mr. Sanjay Verma		Ku. Shraddha Tomar	Participated
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Mr. Shyam Patidar		Ku. Shruti Patil	
			Ku. Krishna Singh	
Т. Т.	Mr. Yashraj <mark>Solanki</mark>	Runner	Ku. Kiran Kharadi	Runner
	Mr. Madhusudan Popandiya		Ku. Ayushi Rathore	
	Mr. Ajay Chouhan		Ku. Babita Rajput	
	Mr. Shrikant Deshmukh		Ku. Vineeta Patidar	
Carrom	Mr. Shubham Badvan	Runner	Ku. Mamta Ahirwar	Participated
	Mr. Rahul Chouhan		Ku. Maya Mewada	
	Mr. Shubham Patidar		Ku. Krishna Singh	

OUTDOOR GAMES - Volly Ball and Kho- Kho tornaments wereheld at B. M. College of Agriculture, Khndwa during 14-16 December 2018. The Kabaddi tournament was held at College of Agriculture, Gwalior during 1-3 November 2018. The details of the performance of the teams as follows:

Volley Ball		Kabaddi		
Mr. Sanjay Verma	Runner	Mr. Sanjay Verma	Runner	
Mr. Aman Patidar		Mr. Chandrashekhar Parmar		
Mr. Nikhil Patil		Mr. Saurabh Lowanshi		
Mr. Pankaj Waskel		Mr. Nilesh Maneria	1	
Mr. Sumit Patel		Mr. Harsh Kasera	34. 16 C	
Mr. Sattyam Upadhyay		Mr. Ravindra Birla		
Mr. Vikas Choudhary		Mr. Rahul Prajapat		
Mr. Shubham Sahu		Mr. Lakhan Patel		
Mr. Shubham Patidar		Mr. Nitesh Chouhan		
Mr. Rohit <mark>Yadav</mark>		Mr. Ajay Chouhan		
Mr. Harsh Kasera		Mr. Sumit Patel		
Mr. Jitendra Solanki		Mr. Deepesh Kumar	1.00	
		Mr. Priyansh Patidar	31.15/16	
	Kh	io-Kho	and the second second	
Mr. Ajay Chouhan	Participated	Mr. Lakhan Patel	Participated	
Mr. Madhusudan Popandiya		Mr. Gambhir Kachware		
Mr. Amitesh Patil		Mr. Nitesh Chouhan		
Mr. Ravindra Singh Rajput		Mr. Ramlakhan Waghela		
Mr. Suresh Chouhan		Mr. Chetan Shah		
Mr. Prakash Sisodiya		Mr. Aniket Chouhan		

Activity	Male		Female	
1 <mark>00 m</mark>	Mr. Amitesh Patil	B	Ku. Ruchika Chopra	S
<mark>200 m</mark>	Mr. Amitesh Patil	S	Ku. Arti Rathore	B
400 m	-	-	-	-
800 m	-	-	Ku. Neha Patel	G
1500 m	-	-	Ku. Pooja Meena	S
4 x 100 m	Mr. Suresh Chauhan	B	Ku. Neha Patel	S
	Mr. Amitesh Patil	B	Ku. Babita Rajput	S
	Mr. Bhagwati Gahlot	B	Ku. Ruchika Chopra	S
	Mr. Hukumchand Iyer	B	Ku. Arti Rathore	S
Shot-put	Mr. Vijay Jamodkar	G	Ku. Anamika Atolia	S
Discuss	Mr.Vijay Jamodkar	G	-	-
Javelin	Mr. Suresh Chauhan	G	-	-
Long Jump	Mr.Suresh Chauhan	G	Ku. Archana Solanki	S
High Jump	Mr. Hukumchand Iyer	B	-	
	Total	telley of N	ledals	
Gold		4		1
<mark>Silve</mark> r		1		5
Bronze		3		1
		8		7

ATHLETICS - The Athletics events were held at College of Agriculture, Gwalior during 1-3 November 2018. The details of the performance of the teams as follows:

12 players from College of Agriculture, Indore were selected in RVSKVV, Team and participated in XIX All India Agricultural University Sports and Games meet 2018-19. The meet was held at **PAU**, **Ludhianaduring 2nd to 5th January 2019**.

Ku. Neha Patel, Ku. Puja Parmar, Ku. Kiran Kharadi, Mr. Suresh Chauhan, Mr. Vijay Jamodkar Mr. Chandrashekhar Parmar, Mr. Saurabh Louvanshi, Mr. Janmoj Yadav, Mr. Yasraj Solanki Mr. Nikhil Patil, Mr. Pankaj Waskel, Mr. Sumit Patel

College of Agriculture, Indore:

S No	Activity	Winner		
5.110.	Activity	Male	Female	
1.	Javelin throw	Second	Third	
2.	Long Jump		Third	
3.	Discuss Throw		Third	
4.	Shot Put		Third	
5.	High Jump	-	Third	
6.	100 M Race		Third	
7.	1500 m Race	Second	First	
8.	400 m Race	Third	First	
9.	800 m Race		Second	
10.	4x100 Relay Race		Third	

RAK, College of Agriculture, Sehore:

Toront (table) and the based 11 10.00 PM-10.00 The second s Ph. And York Control of Control o AND TRACK DOLLARS AND ADDRESS OF THE OWNER. the first where 2 is a proving the second rest. 16 -4 -1 -----. 8.1 ė 41 . - 64 40.000 -Sec. 20. 11 1.01.0 The second participation with the second second -C Marcal In the second state of the second state of the second state - CB -() **b**e 1.00 and a

KNK, College of Horticulture, Mandsaur:

S.No.	Activities	Winner		Runner	
1.1	A DESCRIPTION OF THE OWNER OF THE	Male	Female	Male	Female
1.	Badminton		01	-	
2.	Carom	-	-	-	Runner

GLIMPSES OF SPORTS ACTIVITIES

























National Level Sports Activities Agriunisports

 Forty Two Students (30 boys and 12 girls) of RVSKVV, Gwalior participated in XVIII All India Inter Agricultural University Sports and Games meet "AGRIUNISPORTS 2018" organized at University of Agricultural Sciences, Bengaluru during 30th January to 3rd February, 2018 and their performance was appreciated by one and all.



Inaugural function of XVIII All India Inter Agricultural University Sports and Games Meet at Univer

and Games Meet at University of Agricultural Sciences, Bengaluru

 Forty Three Students (30 boys and 13 girls) of RVSKVV, Gwalior participated in XIX All India Inter Agricultural University Sports and Games meet "AGRIUNISPORTS 2019" organized at Punjab Agricultural University, Ludhiana during 02nd to 05rh January, 2019 and their performance was appreciated by one and all.



Inaugural function of XIX All India Inter Agricultural University Sports and Games Meet at Punjab Agricultural University, Ludhiana

4. RESEARCH HIGHLIGHTS: The research network of the University spreads over six agroclimatic zones of Madhya Pradesh and covers 26 revenue districts. These agroclimatic zones are Gird, Malwa Plateau, Nimar Valley, Jhabua Hills, Vindhyan Plateau and Bundelkhand zones. Accordingly, five Zonal Agricultural Research stations, four Regional Agricultural Research Stations and five Special Research Stations have been operating to enhance the productivity and livelihood security of farming community. Presently, 27 All India Coordinated Research Projects on crop improvement, natural resource management and horticulture are running at different centers. Besides these, 7 plan, 12 non plan, 23 tribal sub plan, 5 Agromet Advisory services, 05 externally funded projects are the research strength of the University. The maintenance breeding of crop varieties and production of nucleus seed, breeder seed, hybrid seed and planting materials are managed with the help of twenty seven seed farms.

S.No.	Particulars	No.	Location and Year of Establishment
1.	Zonal Agricultural Research	05	Indore (1924), Sehore (1952), Khargone
	Station		(1964), Morena (1981) and Jhabua
			(1989)
2.	Regional Agricultural	04	Gwalior (1916), Khandwa (1964) Ujjain
	Research Station		(1989) and Mandsaur (1964)
3.	Special Research Station	06	Enthkedi (1962), Jaora (1964), Bagwai
			(1964), Badwah (1969), Bhind (2010)
100			and Sirsod (2011)

Research Stations of the University

4.1 List of All India Coordinated Research Projects

S.No.	Name of Projects	Centre
1	AICRP on Water Management	Morena
2	AICRP on Groundnut	Gwalior
3	AICRP on Rapeseed & Mustard	Morena
4	AICRP on Safflower	Indore
5	AICRP on Soybean	Sehore
6	AICRP on Cotton Improvement Project	Khandwa
7	AICRP on Sorghum improvement	Indore
8	AICRP on Chickpea	Sehore
9	AICRP on Pigeonpea	Khargone
10	AICRP on Pearl Millets	Gwalior
11	AICRP on Wheat Improvement Project	Gwalior
12	AICRP on Dryland Agriculture	Indore
13	AICRP on Medicinal and Aromatic Plants	Mandsaur
14	AICRP on Salt Affected Soils	Indore
15	AICRP on Weed Control	Gwalior
16	AICRP on Arid Legumes (Guar)	Gwalior
17	AICRP on Pigeonpea (Sub Centre)	Sehore
18	AICRP on MULLaRP	Sehore

19	AICRP on Integrated Cropping System	Indore
20	AICRP on Fruits (Grape)	Mandsaur
21	AICRP on Chickpea	Indore
22	AICRP on Soybean	Morena
23	AICRP on Onion & Garlic	Mandsaur
24.	ICAR Seed Project on Seed Production in Agricultural Crops	Gwalior

4.2 Research Schemes (Non Plan)

S. No.	Name of Scheme/Project	Centre
1	Agriculture Research Lab & Institute	Indore
2	Regional Research Station	Indore
3	Soil Testing Scheme	Indore
4	Regional Research Station	Sehore
5	Regional Research Station	Gwalior
6	Regional Research Station	Bagwai
7	Intensification of Research on Mango Guava & Citrus	Gwalior
8	Soil Testing Scheme	Gwalior
9	Intensification of Research on Mango, Guava & Citrus	Enthkedi
10	Horticulture Research Scheme (Seed production)	Jaora
11	Sugarcane Research Scheme	Indore
12	Potato Aphid Research	Sehore

Seed Farms (Non Plan)

S. No.	Name of Scheme/Project	Centre
1	Agriculture Research Farm	Mandsaur
2	Agriculture Research Farm	Khargone
3	Agriculture Research Farm	Khandwa
4	Agriculture Research Farm	Bagwai
5	Agriculture Research Farm	Gwalior
6	Agriculture Research Farm	Ujjain
7	Agriculture Research Farm	Jaora
8	Agriculture Research Farm	Indore
9	Agriculture Research Farm	Sehore
10	Live Stock Farm	Gwalior
11	Live Stock Farm	Sehore
12	Live Stock Farm	Indore

4.3 Research Schemes (Plan)

S. No.	Name of Scheme/Project	Centre
1	Fodder Research Scheme	Gwalior
2	Strengthening of MP Agriculture Research Institute	Khargone
3	Productivity Improvement of crops under rainfed area	Indore
4	National Agricultural Research Project	Sehore
5	Director of Extension Education	Sehore
6	National Agricultural Research Project	Ujjain

4.4 India Meteorological Department (GOI)

S. No.	Name of Scheme/Project	Centre
1	Agromet Advisory Services	Morena
2	Agromet Advisory Services	Khargone
3	Agromet Advisory Services	Jhabua
4	Agromet Advisory Services	Sehore
5	Agromet Advisory Services	Indore

4.5 Externally Funded Projects

S. No.	Title of the Project	Funding agency	Principal Investigator	Budget (Rs. in lakhs)
01	Establishment of centre for Studies on Organic Cotton	CoA, Khandwa	339.10	RKVY(FWAD)
02	Entrepreneurship development in fruit and vegetable processing	FRS, Entkhedi, Bhopal	7.20	Department of Horticulture and Food Processing, Madhya Pradesh
03	Repairing of protected cultivation structures in the RVSKVV	College/KVK	15.30	Directorate of Horticulture and Fruit Processing, Bhopal
04	TechnologydisseminationthroughFrontlinedemonstrationblts (MIDH)	KVKs	7.50	DirectorateofArecanutandSpice
05	Farm mechanization for soybean based cropping system in central India	College of Agriculture, Indore	31.25	Govt. of India, DAC, Oilseeds Division, New Delhi
06	Insecticide Resistance Management: Dissemination of pink bollworm management strategies	College of Agriculture, Khandwa	8.75	Central Institute for Cotton Research, Nagpur
07	Mainstreaming agricultural	College of	28.832	Biodiversity

New
'

4.6 Salient Research Achievements:

- **Release / Registered / Notified of New varieties**
 - Raj Vijay Kabuli Gram 111 (RVKG 111) is identified for • release for cultivation in Madhya Pradesh in the meeting of M.P-State Seed Sub-committee meeting at Bhopal on May 09, 2018. It has Long plant, bold seeded(26.12g/100 seed), matures in 117 days, resistance to moderately resistance reaction against Fusarium wilt, Dry Root Rot (DRR) and tolerant to pod borer (Helicoverpa) and pulse beetle and



potential yield is 2000-2200 kg/ha. It is recommended for Semi irrigated to irrigated condition of MP.

• Raj Vijay Kabuli Gram 151 (RVKG 151) is identified for release for cultivation in

- Madhya Pradesh in the meeting of M.P-State Seed Subcommittee meeting at Bhopal on May 09, 2018. It has medium tall (38.7cm) and semi spreading plants, bold seeded (54.3g/100 seed), matures in 113 days, resistance to moderately resistance reaction against *Fusarium* wilt, Dry Root Rot (DRR) and tolerant to pod borer (Helicoverpa) and pulse beetle and potential yield is 2000-2100 kg/ha. It is recommended for timely sown semi irrigated to irrigated condition of MP.
- Lentil variety RVL 13-7 is identified for release for cultivation in Madhya Pradesh in the meeting of M.P-State Seed Sub-committee meeting at Bhopal on May 09, 2018. Its plant type is semi erect, medium height (36-40cm) and branches with broad leaf which is very much suitable for intercropping, Mature in 102 days, tolerant to wilt and potential yield is 1300-2300 qt/ha.
- Raj Vijay Toria 3 (RVT 3) identified for release for cultivation in Madhya Pradesh in the meeting of M.P-State Seed Sub-committee meeting at Bhopal on May 09, 2018. Its plant height is 118-138 (cm), maturity 93-99 days, number of Primary branches /plant 5-6, number of Secondary branches 2-3. Seeds are yellow in colour and round in shape; contains oil 41-44%. It is tolerance/ resistance to white rust, Alternaria leaf blight on pods, powdery mildew,

downy mildew and *Sclerotinia* stem rot and less infestation of aphids, tolerant to







drought conditions and gives an average yield of 1105-1600 kg/ha. It is suitable for rainfed and irrigated conditions

Raj Vijay Mustard 2: It was recommended for release by State Variety Release Committee, Department of Farmers Welfare and Agriculture Development, Govt. of M.P., Bhopal on May 09, 2018 for the State of Madhya Pradesh. Moreover, this variety was released and notified by Central Variety release committee earlier for Delhi, Harvana, Punjab, Jammu & Kashmir etc. Plant height is 194-209 (cm), it matures in 134 days and gives seed yield 16.74-22.84

(q/h). Seed are round and reddish brown in color. Seed index is 3.41 to 6.01 (g) and oil content is 39.51 to 41.20%. It is moderately resistant to white rust, Alternaria pod blight, stem rot, powdery and downy mildew, less infestation of Aphids. It is recommended for timely sown irrigated conditions.

- Soybean variety RVS 2007-6 identified in 48th Annual Group Meet of AICRP on
- Soybean held at IGKVV Raipur (CG) from April 15-17, 2018 for release for release in central Zone. Its plant type semi erect spreading type, medium height (70-75 cm) and branches with broad pointed leaf, medium maturing variety (101 days) suitable for double cropping and intercropping in rainfed situation and potential yield is 2068 Kg/ha. It is categorized as multiple resistance charcoal rot, target leaf spot, stem fly, stem borers and defoliators
- Cotton variety RVK 11 has been identified for south Zone (Tamil Nadu, Karnatka, and Andhara Pradesh) belonging to medium maturity group, and found tolerant to sucking pests (below ETL) and for diseases were on par with the check varieties, in rainfed production system system. The highest potential yield was given by the variety was 2404 kg /ha.







Reflections of ongoing projects (Research Achievements)

 All India Network Research Project on Onion and Garlic is running at College of Horticulture Mandsaur since 2015-16. During the year 2017-18 three trails on Onion during kharif and one trial during late kharif were conducted. During Rabi Season three trials on onion i.e. IET, AVT-I and AVT-II and two trials on garlic viz., IET and AVT-I were conducted. Under IET Onion 12 lines were evaluated.



Under AVT-I onion 20 lines were tested. There were 14 lines in case of AVT-II onion trial. Eight entries in addition to local check were tested under Garlic IET and 9 entries plus one check were evaluated under Garlic AVT-I during rabi 2017-18.

• Around 500 adult of *Neochetina bruchi* were released on pond during September 2015 and again in September 2017 in the standing water pond near pilua dam at Morena. After two years releasing of beetles, infestation of *Neochetina spp.* on water hyacinth was observed 90%. On an average 80-90 feeding scars/leaf were

observed. The water level in pond was around 10 feet. It was also observed that feeding of leaves was very high and caused dried. Around 85-90% (1 scale) die back symptoms were observed on water. It's a project on



"Management of problematic weeds" to see the impact of *Neochetina bruchi* on water hyacinth. The Director, DWR Jabalpur visited the place on 29th January, 2018 and appreciated the work done by the AICRP-WM team of Gwalior and ask to prepare a success story on water hyacinth.

 Persistence of herbicides in soil applied in pearl millet crop under Pearl millet-mustard-green gram cropping system: Herbicides atrazine 500 g/ha PE + 2, 4-D 500 g/ha PoE and atrazine 500 g/ha PE + one HW applied to pearl millet persisted in soil for 45 days. No residues of herbicides were left after harvesting of crop



as per bioassay method using barley as test crop. Different tillage practices in pearl millet -mustard cropping system could not affect the persistence of herbicides applied to pearl millet. In pearl millet crop under pearl millet-mustard-green gram cropping system IWM practices (atrazine 500 g/ha PE + 1 HW) significantly reduced the weed population and dry weight of weeds and resulted in significant higher yield (2.61 t/ha) followed by atrazine + 2, 4-D (2.26 t/ha). The highest B:C ratio was obtained in treatment atrazine + 2, 4-D (2.15). Under conservation tillage practices highest grain yield was obtained in conventional tillage T₂ (CT-ZT-

ZT) followed by T_1 (CT-CT) while B:C ratio was highest (2.25) in T_2 (CT-ZT-ZT) followed by 2.24 in T_4 (CT-ZT+R-ZT+R) and 2.20 in T_5 (ZT+R-ZT+R-ZT)

• Weed management in potato under organic farming: Two hand weeding at 20 and 40 DAS gave highest yield (14.58 t/ha) followed by recommended herbicide metribuzin 0.5 kg/ha + one hand weeding. Among organic weed management practices one hand weeding at 20 DAS with straw mulch 5 t/ha controlled the weeds with 74.65% WCE as well as



gave higher yield of potato (13.89 t/ha) followed by one hand hoeing at 20 DAS + one hand weeding at 40 DAS (13.72 t/ha) with 71.83% WCE

 Response of irrigation method, scheduling and fertility levels on soybean-chickpea cropping sequence in alluvial soils: The irrigation scheduling method of irrigation and fertility levels showed significantly effect on seed yield of soybean and chickpea in both the year. The maximum seed yield of soybean and chickpea were record with IW/CPE ratio 2.39 t and 2.77 t ha-1, sprinkler irrigation method 1.95 t and 2.57 t ha-1 and fertility levels 125% RDF 1.93 t and 2.67 t ha-1, respectively. The maximum net returns of soybean and chickpea were realized with 0.6 IW/CPE ratio Rs. 66,898 and 84,877 ha-1, sprinkler irrigation method Rs. 51,536 and 77,595 ha-1 and 125% RDF Rs. 52,236 and 80,875 ha-1,

respectively. The additional returns and B:C ratio also recorded higher as mentioned in above treatments. The integration of irrigation schedules, irrigation method and nutrient in oilseed – pulses (Soybean – chickpea) cropping system will help to obtained maximum production, net returns and maintain soil health in place of fellow-mustard practice. This cropping system also helps to fulfill the increasing demand of pulses and vegetable oils. Soybean-chickpea is a new cropping sequence for this region.

- Effect of long-term application of organic/ green manures at different soil ESP in sodic Vertisols-Incorporation of dhaincha as green manure increased grain and straw yield of wheat by 45.3 and 64.8 % respectively, over control.
- Evaluating performance of drip irrigation under different discharge rate and schedules for growing vegetable crop in sodic black soils- Drip irrigation







system with dripper discharge rate of 1.3 LPH applied on daily basis found remarkably effective for growing Cabbage crops in sodic black soils.

- Performance of wheat crop as influenced by different depth and frequency of irrigation under different methods of irrigation in sodic Vertisols – Light and frequent irrigation (3 cm depth by sprinkler system) at IW/CPE ratio of 1.2 is found effective for irrigating wheat crop in sodic soil.
- In Maize, mean data of two years showed that application of 60 kg P₂O₅/ha + NPK consortia and 60 kg P₂O₅/ha + PSB-II and produced highest grain yield (5462 and 5396 kg/ha), stover yield (5263 and 5205 kg/ha), net returns (Rs 78,594 and 77,559/ha) and B:C ratio (3.56 and 3.54), whereas the lowest values of these parameters were recorded in control (4110, 4059, 56,773 and 2.94, respectively).





- Integrated management of Sclerotinia stem rot in Mustard : The conclusion of this experiment is that the early sown (10 Oct., 8 Oct. and 15 Oct.) (Ist & IInd week) of Oct. is best sowing date of mustard for this region with minimum insect pest & diseases pressure are appeared and maximum seed yield were recorded with high oil content and seed yield size and weight. The maximum seed yield 3122 kg/ha was recorded in seed treatment with Carbandazim 50 wp @ 2g/kg seed + No. irrigation during 25th Dec. to 15th Jan and two foliar spray of Carbendazim 50 wm @ 1g/l of water at 45-50 and 65-70 days after sowing followed by seed treatment with Carbandazim 50 wp @ 2g/kg seed + No. irrigation during 25th Dec. to 15th Jan. with one foliar spray of Carbendazim 50 wp @ 1g/l of water at 60-65 days after sowing. These technologies reduce the severity of all the disease of Rapeseed mustard and also good for seed weight, seed size (Max. 4.96 g (1000).
- Weed management in Pearlmillet based system cropping under conservation agriculture **Cowpea:** In cowpea under pearlmillet based cropping system, integrated management (pendimethalin weed imazethapyr + 1 HW) gave maximum seed yield (718 kg/ha) as well as reduced the weed density



and dry weight of weeds followed by imazethapy (WM) on cowneal maximum seed yield (762 kg/ha) was obtained in T₅ (ZT+R-ZT+R-ZT) tillage practices followed by T₂ (CT–ZT–ZT) (725 kg/ha) significantly.

• **Pearlmillet:** In pearlmillet under pearlmillet based cropping system IWM practices (atrazine



Effect of IWM on conventional tillage in

500 g/ha PE + 1 HW) significantly reduced the weed population and dry weight of weeds and resulted high pearlmillet yield followed by atrazine + 2,4-D. Under conservation tillage practices the highest grain yield was obtained in conventional tillage T_1 (CT-CT) followed by T_2 (CT-ZT).

Weed management in sweet corn (maize) in sweet corn based organic

cropping system: Among all organic weed management practices application of intercrop method (maize+moong) of weed control gave maximum seed yield followed by hoeing at 20 & 40 DAS. However, the highest yield was recorded in RDF + Recommended herbicide (Atrazine 750 g/ha PoE)



Effect of hoeing at 20 & 40 DAS

 Protein profiling in Pearl millet resistant and susceptible genotypes: An attempt has been made to analyze on the basis of molecular protein bands in blast resistant and susceptible genotypes using SDS-PAGE to identify in different genotypes of pearl millet. Since each plant protein is expressed specific bands. The protein bands pattern reveal that the maximum (9 bands) in highly resistant genotype and minimum (3 bands) in highly susceptible genotype. The presence or absence of protein



bands and their intensity may be responsible factors for blast disease in pearl millet.

• Under AICRPDA, during 2018-19, a water-harvesting tank was relined with new sealant material (HDPE sheet) and a



new unlined tank was constructed as percolation tank for ground water recharge. During monsoon season, the lined tank collected 1800 cu.m. runoff water which is



being utilized for providing irrigation water for growing the crops like potato, sweet corn and chickpea. The unlined tank collected huge amount of runoff and percolated it for ground recharge during each runoff event. The process is repeated naturally several times in 2018-19. The construction of percolation tank and lined water harvesting tank helped not only in rain water management very efficiently but also added to ground water recharge thus controlling losses to offsite cultivated fields from getting eroded but also stored an appreciable amount of runoff water for its subsequent use for irrigation purpose

- Survey over 29 villages of the 7 district (Nimar Velly Zone 11) and adjoining area were surveyed for Wilt of pigeon pea and it was noticed that when medium duration varieties viz JKM189, Aasha, JKM7, BSMR736, TJT 501, and private Verities, were grown either as a sole crop or intercropped with Cottan Moong, Maize, Soybean etc. the incidence of wilt was very low on the contrary when local cultures were grown either as sole crop or inter crop the incidence of wilt was quite high. This indicates towards potential of early and medium duration high Yielding varieties in the region. Incidence of wilt (medium) to high may be attributed to average rainfall with more rainy days and high temperature. However in the kharif season of 2017-18 there was 2 dry spell coupled with low rainfall (590 mm) resulted in less incidence of Wilt in the region.
- Crop sequence soybean + maize wheat on ridge and furrow (Rs 0.94 lakh) had the highest net returns and BCR (25.33% and 2.39%) as compared to predominant cropping system soybean- wheat (Rs 0.75 lakh and 2.51 BCR).
- Soybean + maize-wheat cropping system planted under minimum tillage with mulching and 75% RDF +25% Vermi-compost resulted highest net returns and BCR (30.4% and 10.4%) as compared to soybean – wheat under conventional tillage with RDF and without mulching (Rs. 23538/ and 2.07 BCR).
- Maize –wheat cropping system under minimum tillage was found to be most productive (16.47%) and remunerative (35.93% and 25.94%) than soybean –wheat (SEY -3309 kg/ha, NR- 0.64 lakh and BCR- 2.12), respectively.
- Development of RVS 14-1 Genotype of Safflower: Promoted to Advanced Varietal Trial II (AVT II) due to superiority in seed yield under rainfed (1168 kg/ha at Solapur to 1868 kg/ha at Buldana) as well as Irrigated condition (1303 kg/ha at Nandyal to 3861 kg/ha at IIOR ,Hyderabad) against the check

PBNS -12 (Rainfed 1038 kg/ha at Buldhana and 1154 kg/ha at Kalaburagi ,Irrigated 1010 kg/ha at Nandyal and 3657kg/ha at IIOR ,Hyderabad). It is spiny, bold seeded, resistant /moderately resistant to aphids at both testing centres includes i.e. Solapur and IIOR, Hyderabad.

• DNA profile of **Raj Vijay Toria 3** (lane 3) along with controls [PM 67 (lane 1), Pusa bold (lane 2)] generated with primer pairs of genic-SSRs (PUTs). It is evident that primers PUT-96, PUT-154 and PUT-181









are useful in generating unique profile of RVT 3 variety for discriminating it from other varieties. Molecular marker sizes are depicted in bp. This work was accomplished in collaboration with ICAR-NBPGR, New Delhi on October 27, 2018.

4.7.1 Crop Improvement:

Cotton:

- 82 F1's were grown in off season (Green House) and collected sufficient seeds to grow F2 in Kharif 2018.
- In testing of IET-G.hirsutum entries, the highest yielding(kg/ha) entry was BPH 139(1537.9kg/ha), while the highest GOT(%)was recorded by the entries GISV319 and TCH 1828(34.2%).
- In Central Zone Trial 12 entries were tested out of which four entries were shown superiority over local check. The highest seed Cotton Yield was recorded by the entry RCH – 1217(1247.9 kg/ha).
- The initial evaluation of compact genotypes suggested that the highest seed Cotton yielding entry was H1518(1435.5 kg/ha) followed by RHC HD 1420(1354.3 kg/ha).The entry RHC HD 1420 also has the highest GOT %(33.9%).
- Among 12 entries tested in Central Zone Trial, the entry DSC-1501(1128.4 kg/ha) yielded highest Seed Cotton yield followed by ARBC-1601(1032.9 kg/ha) while the GOT % was highest in TCH 1819(36.1%).
- In CVT of *G.arboreum*, 13 entries were tested against Zonal check and Local check, only one entry i.e. CAN 1032 yielded (1263.81 kg/ha) significantly higher seed cotton than zonal check (899.94 kg/ha). The GOT(%) ranged from 26.3 34.0. MIC was ranged between 2.6 3.9.
- The initial evaluation of *G. arboreum* entries suggested that six entries were significantly superior over zonal and local checks among twenty seven entries. The highest seed cotton yield was recorded by GAM 255(1329.3 kg/ha) followed by FDK 274(1288.5kg/ha).
- In CVT of Long Linted *G. arboretum* entries, all the ten entries tested were at par with Zonal and Local checks. The GOT(%) ranged from 23.2 32.5 and MIC ranged from 2.3 3.5.

Wheat:

- **NIVT 2:** Wheat variety MACS6222 (9783 kg/ha) followed byAKAW 5078 (9398 kg/ha) and HI1632 (9114 kg/ha) produced significantly highest grain yield over other new entries and check varieties.
- **NIVT 3 B:** Wheat variety HD2864C (8622 kg/ha) followed by GW509 (8286 kg/ha), HI1634 (8161 kg/ha) produced significantly higher grain yield compared to overall varietal mean and other varieties.
- **AVT- IR- TS- TAD- CZ:** Wheat variety Check GW322 (7286 kg /ha) followed by UAS 465 (5982 kg/ha) and HI 8713 (7049 kg/ha) were at par with test varieties and they were significantly superior over other.

- **AVT- RI- TS- TAD- CZ:** Wheat variety Check DDW47d (7410 kg /ha) was significantly superior over all checks.
- IVT-CZCT- IR- TS: Wheat Genotypes CTCZ-82 (7385 kg /ha) followed by CTCZ 80 (7341 kg/ha), CTCZ-90 (6973 kg /ha), CTCZ-68 (6929 kg /ha) which were at par with RVW 4106 (6141 kg /ha) and MP4010 (5966 kg /ha) produced significantly higher grain yield compared to other varieties.
- **SVT- IR-TS:** Wheat Genotypes RVW 4312 (8140 kg/ha) followed by RVW 4106 (8243 kg/ha), RVW 4314 (7254 kg/ha), RVW 4301 (7138 kg/ha) showed significantly higher grain yield over other test varieties and check variety MP4010 (4776 kg/ha) and RVW4106 (5281 kg/ha).
- **SVT- RI-TS:** Wheat New entries RVW 4300 (7127 kg/ha) followed by RVW 4311 (6753 kg/ha), RVW 4299 (6373 kg/ha), RVW 4316 (6227 kg/ha) and RVW 4306 (6000 kg/ha) showed significantly higher grain yield over other test varieties and over both the checks MP4010 and RVW4106.
- **IVT Barley:** Barley genotype BH946C (6522 kg/ha) followed by RD2899 (5876 kg/ha) produced significantly higher grain yield over other new entries and they recorded non-significant group.
- **AVT IR-FB Barley:** Barley genotype DWRB137C (5278 kg/ha) followed by RD2899C (4654kg/ha) and PL751C (4647 kg/ha) produced significantly higher grain yield over other entries and they recorded non-significant group.
- **Special varietal trial Barley:**Barley genotype SPL6 (2136 kg/ha) followed by SPL4 (1963 kg/ha) and SPL8 (1861 kg/ha) and SPL7 (1850 kg/ha) produced comparatively higher grain yield compared to other entries.

Pearl Millet

- Seventeen AICRP trials (Breeding & Pathology) were conducted during 2017 by the center, along with Ten Hectares Pearl millet FLD's were conducted in 2017 by Shivpuri KVK under technical supervision of AICPMIP, Gwalior.
- The RVSBH-79(ICMA96222X RVS-155-22) hybrid of Pearl millet is proposed for testing in IHT (Medium) in by Gwalior center during 2017.
- Forty nine Single cross Hybrids developed from the center were evaluated for different characters along with standard check RHB-173.Out of these following Five Hybrids appeared promising during Kharif 2017. 81A4xR15601, 81A5xR15103, 81A1xR15103, 81A1xR15585, and 81A5xR15155.
- 57 new Single cross Hybrids with the combination of twelve different male sterile lines background have been developed during Kharif 2017.
- Fifty four hybrids developed by Line X tester design along with parents were used for genetical studies
- Twelve Male sterile lines have been maintained by the center utilizing for breeding programs.


- 140 restorer lines have been evaluated for various traits and selected traits of interest related to productivity.
- 80 Germplasm of Pearl millet have been maintained by selfing/sibbing and are being screened for various traits related to yield and for molecular breeding.

Arid Legume

Twelve genotypes were tested in AVT-1+IVT, out of these, variety X-10 (AVT-1) gave maximum seed yield (2731 kg/ha), net monetary return (1,25,083/ha) and BCR (7.74) of Clusterbean, over all the varieties. The lowest seed yield (1736 kg/ha) was recorded by RGC 1066 variety.

Pigeon pea

- INITIAL VARIETALT TRIAL [E]: Statistical analysis revealed the significant differences for the yield. Highest yield was recorded on the entry NPEK 15-14 [2731kg/ha] followed by Vamban [2671 kg/ha] and UPAS 120 [2455 kg/ha] with the C.D at [5%] and CV of 285 Kg/ha and 6.1 % respectively.
- INITIAL VARIETALT TRIAL [ME]: Statistical analysis revealed the significant differences for the yield. Highest yield was recorded on the entry AKTE 12-04 [2994Kg/h] followed by LRG 223[2838 kg/ha] and TJT 501 [2678 Kg/ha] with the C.D at [5%] and CV of 535 Kg/ha and 7 % respectively.
- **AVT [Medium Early]:** Statistical analysis revealed the significant differences for the yield. Highest yield was recorded on the entry **RVSA 16-04 [1655 Kg/h]** followed by **PT 002[1626 Kg/ha]** and **TJT 501 [1580 Kg/ha]** with the C.D at [5%] and CV of 512 Kg/ha and 8 % respectively.

- INITIAL VARIETALT TRIAL [M]: Statistical analysis revealed the Non significant differences for the yield. Highest yield was recorded on the entry TRG 87 [2948 Kg/h] followed by RVSA 15-9[2809 Kg/ha] and BDN 2 [2793 Kg/ha] with the CV 8 %.
- ADVANCE VARIETALT TRIAL [M]: Statistical analysis revealed the significant differences for the yield. Highest yield was recorded on the entry BDN 2 [2222Kg/ha] followed by MPV 106 [2005 Kg/ha] and ICPL87119 [1988 Kg/ha] with the C.D at [5%] and CV of 189 Kg/ha and 6.1 % respectively.
- STATE VARIETALT TRIAL [M]: Statistical analysis revealed the significant differences for the yield. Highest yield was recorded on the entry RVKT 311(2454kg/ha) followed by TJT 501(2407Kg/ha) and RVKT 310[2253Kg/ha]. These entries were significantly superior over other test entries. CD at 5% and CV were 647 Kg/ha and 6.6% respectively.

Rapeseed & Mustard:

Performance of entries in AICRP network under irrigated condition:

- **Toria:**In IVT Toria the highest seed yield (2519 kg/h) was obtained in RMT-15-2 followed by RAUDT 14-09 (2333 kg/ha.. Entry RMT 15-2 showed highest seed index of 4.6 gm. In AVT-I of Toria the highest seed yield (2245 kg/h) was recorded in Uttara (Filler 2) followed by RAUDT 10-33# (2227 kg/). The highest seed index 4.9 gm was obtained by RAUDT 10-33#.
- **Yellow Mustard:**In IVT- Yellow Mustard the highest seed yield (3056 kg/h) was obtained in entry YSKM 17-1 while national check YSH 0401 yielded 2568 kg/ha. Entry YSKM 17-2 showed maximum test weight of 5.8 gm.
- **Early Mustard:**In IVT Early Mustard the highest seed yield (3438 kg/h) was obtained in RRN 921 followed by DRMRCI 98 (3296 kg/ha.). Entry PRE- 2015-1 showed early maturity (123 days). Noticeably, the highest seed index (6.5 gm) was found in entries DRMRCI 98 and SVJ 104 against national check Pusa Mustard 25 (5.6 gm).
- Timely Sown Mustard: In IVT (TS) Mustard entry KMR 17-3 exhibited highest seed yield (4128 kg/h) followed by PHR 3278 (4059 kg/h). The highest seed index (7.2 g) was obtained in entry RH 1550 followed by SVJ 111 (6.8 g). In AVT-I (TS) Mustard maximum seed yield (4159 kg/h) and highest test weight (7.2 g) was obtained in RH 749 (LR).
- Late Sown Mustard: In IVT of late sown mustard entry RH 1569 gave highest seed yield 3605 kg/h followed by KMR (L) 17-6 (3488 kg/h) against latest release CS 56 (3466 kg/ha). Maximum seed index of 6.4 gm was found in TM 117 followed by HUJM-16-8 (6.3 g). In AVT of late sown mustard the highest seed yield (3297 kg/h) and highest seed index of 5.5 gm was obtained in zonal check NRCHB- 101.
- **Hybrid Mustard** : Among most of the entries of IHT showed significant differences for seed yield (kg/h). The highest seed yield gave by entry KMH 721 (4202 kg/h)

followed by 71J0003 (4133 kg/ha). Remarkably, the highest seed index (7.0 gm) was found in entry KMH 721.

- **Quality Mustard:** In IVT (Quality) Mustard the highest seed yield was obtained in LES- 57 (4189 kg/h) against zonal check RGN 73 (3606 kg/h). The highest seed index (7.1 g) was found in entry Pusa Mustard 30 (LR). In AVT (Quality) Mustard the highest seed yield of 4030 kg/h was recorded in national check RGN-73. The highest seed index (7.0 g) was obtained in Pusa Mustard 30.
- **Taramira**:In IVT Taramira the highest seed yield was obtained in zonal check T-27 (1728 kg/h). The highest seed index (5.3 g) was found in entry RTM-1626.
- SVT-Toria:In SVT Toria out of 20 entries the highest seed yield was obtained in RMT-10-10 (2426 kg/h). The highest seed index (4.7 g) was found in entry RMT-10-15.
- **SVT-I Mustard:** In SVT-I Mustard out of 20 entries the highest seed yield was obtained in Pusa Bold (3827 kg/h). The highest seed index (5.83 g) was found in entry RMM-09-1-1.
- **SVT-II WRR Mustard** : In SVT-II WRR Mustard out of 12 entries the highest seed yield was obtained in RVM-2 (2827 kg/h). The highest seed index (4.28 g) was found in entry Varuna. 31 germplasm of toria and 161 of mustard were evaluated for economic traits for seed yield and quality. 28 new crosses in toria and 124 in Indian mustard were made for improvement in rapeseed and mustard and other advance breeding lines were advanced for better selection in the next generation.

Safflower

- In Initial Varietals Trial I (IVT I),check entry PBNS-12 recorded the highest yield of 2864 kg/ha followed by PBNS-166 (2448 kg/ha).
- In Initial Varietals Trial II (IVTII), also check entry PBNS-12 recorded the highest yield of 2797 kg/ha followed by A-1 (2399 kg/ha).
- In Initial Hybrid Trial entry ISH-401 recorded highest yield of 2901 kg/ha followed by NARI-H-31 (2609 kg/ha).
- Advanced Station varietal trial, spiny tall genotype JSI-134 recorded highest yield of 2696 kg/ha followed by JSI-117(2588 kg/ha), against the spiny check JSF-1 (1969 kg/ha).
- Among the spineless genotypes JSI 121 had higher yield (2458 kg/ha).
- Among the short duration genotypes, JSI 130, JSI 129, JSI 128, JSI 125, JSI 127, JSI 123 and JSI 109 found promising as compared to JSI-99 (short duration check).
- Among the testing of hybrids, the performance of hybrid 3 A x PBNS-12 was excellent

Chickpea

- i. Evaluation and selection of genotypes
- Seed yield ranged from 1797 to 2470 Kg/ha among tested genotypes in SVT-1 (Desi). SAGL 152286 recorded the highest seed yield followed by SAGL 162273.

- Seed yield ranged from 1889 to 2147 Kg/ha among tested genotypes in SVT-2 (Desi). JG 6 recorded the highest seed yield followed by SAGL 152195.
- In Kabuli SVT-1 genotype SAGL 162304 and SAGL 162307 recorded highest yield followed by SAGL 172001
- In State Varietal Trial (ELSK) genotype SAGL 162315 recorded highest yield followed by SAGL 152294 Seed yield was ranged from 1251 to 1791 Kg/ha among tested genotypes.
- In State Varietal Trial (Black) genotype SAGL 163006 recorded highest yield followed by SAGL 163011. Seed yield was ranged from 1093 to 1342 Kg/ha.
- In State Varietal Trial (Green) Seed yield was ranged from 1103 to 1761 Kg/ha, genotype SAGL 161026 recorded highest yield followed by SAGL 161017.
- In PYET (Desi) seed yield ranged from 1174 to 1980 Kg/ha among 25 tested genotypes. SAGL 160017 recorded the highest yield followed by SAGL 160051.
- In PYET (Kabuli) seed yield ranged from 1165 to 1884 Kg/ha among 20 tested genotypes. SAGL 171004 recorded the highest yield followed by SAGL 171003.

ii. Hybridization and selection programmers

- Twenty two cross including seven national crosses as mentioned were made to introduce early maturity, multiple disease resistance and drought tolerance in high yielding genetic background of *desi* and *kabuli* chickpea.
- Seventeen F₁s were grown and true F₁s were identified.
- Twenty three F₂s were raised and superior plants selected and harvested separately.
- Forty two F₃s combinations and their selected individual plant progenies were sown and 2082 superior single plants selected.
- Fifty Eight F₄s were evaluated and 1022 single plant selections were further selected.
- Seventy six F₅, 62 F₆ and 38 F₇ and 27 F₈ generations were advanced and homogeneous and homozygous lines were harvested as bulk.

Soybean

A. Coordinated Trial

- **1. Initial varietal trial:** 46 entries tested in this trial along with checks. NRC 130 and RVS 2011-2 gave (2346 kg/ha) and RSC 11-07 (2321 kg/ha) high yield than checks.
- **2**. **Advance variety trial**: I Eleven entries including checks were evaluated in this trial. Variety RSC 10-71 gave maximum yield (1681 kg/ha) followed by AMS MB-5-18 (1407 kg/ha) than checks.
- 3. Advance varietal trial: II Ten varieties tested in this trial. The trial was sown on 26-6-2017. Entries viz RVS 2007-6 gave the highest yield (2111 kg/ha) followed by JS 20-94 (1893 kg/ha) and check JS 95-60 (1733 Kg/ha).
 B. Station trial
- 1. **Station initial trial**: Fifteen entries were evaluated in this trial entry Bulk no.8 gave high yield (2410 kg/ha) than check.

- **2. Station advance trial:** Twenty bulks were tested in this trial. Entry RVS 2011-4 gave maximum yield (2204 kg/ha) followed by RVS 2009-4 (2104kg/ha) than check JS 335 (1745 kg/ha).
- **3. Hybridization:** 28 crosses were attempted this time.
- **4.** Segregating populations from F2 to F8 were grown and large single plant selection and progeny selection were made.

MULLaRP

- Expt. 1: Initial Varietal Trial (IVT) Urdbean: The genotype PU 14-19 recorded highest seed yield of 1549 kg/ha followed by PU 14-28 (1495 kg/ha). The genotypes KPU 128-105, PU 14-28, RU 03-22 matured in 78 days. 100 seed weight ranged from 2.71 to 4.5 g.
- Expt. 2: Advance Varietal Trial-1 (AVT-1) Mungbean The genotype PKV AKM 4 recorded highest seed yield of 1075 kg/ha followed by RMG 1092 (995kg/ha). The genotypes AKM 8802 matured in 78 days. 100 Seed weight ranged from 2.53-3.53 g.

Medicinal & Aromatic Plants

- MLT evaluation of promising lines of Opium Poppy for higher yield and quality at Mandsaur: Different high yielding lines identified at different centres are tested in multilocation trial. The entries UOP 20, UOP 30, UOP 79, UOP 80, MOP 278 and MOP 511 were promoted to AVT I based on latex yield, seed yield and husk yield.
- A total of 80 germplasm lines of Isabgol were maintained at this centre during the year 2017-18. These lines were evaluated for five characters. Observations were recorded and presented in Table 1.1.3.1. Results showed wide range of variability among the lines. Plant height ranged from 24.33 cm (MIB-1) to 31.77 cm (JI-4). Days to 50% flowering ranged from 58 days (MIB-9) to 92 days (RI-9809). The number of spike per plant varies from 7.67 (SPS-15) to 25.33 (MIB-201). The length of spikes (cm) varies from 2.83 cm (MIB-1) to 5.0 cm (SLS-63). The seed yield (kg/ha) ranged from minimum 100 kg/ha (MIB-1) to 1333 kg/ha (MIB-1004).

Groundnut

• Trial Initial Varietal Trial-I-(VB) :Entry 23+1 (filler), Number of rows=5, Replication=4 Spacing=30 (cm) x 10 (cm), Plot Size= 5 (m) x 1.5 (m). Seeds were treated with fungicide Dithane M-45 @2g/kg seed + Bavistin @ 1 g/kg seed. Hand Weeding was done on 20/07/17, 01/08/17/, 04/09/2017, hoeing on 13/08/2017 and three Irrigation on 03/ 08/17, 19/08/17, 09/09/17. Conducted Initial Varietal Trail-I (23 entry + 1 check) and taken all assigned morphological traits i.e., IPS, FPS, days to 50% flowering, shelling%, pod yield, kernel yield etc. All traits has been measured, data has been send to DGR-Junagadh for oil and protein content and all other data has been submitted timely to DGR. Significance of correlation of different traits was analysed using SPSS V19 software. Coefficient of correlation between all traits was observed at 0.01 and 0.05 level. Dry pod yield was highly significant with karnel yield at 0.01 error rate. Similarly karnel yield was highly significant with Initial

plant stand and final plant stand. Highest karnel yield was observed in entry ISK 5, ISK 15 and ISK 31.

- Trial Initial Varietal Trial-II-(VB): Entry 17+1 (filler), Number of rows=5, Replication=4Spacing=30 (cm) x 10 (cm), Plot Size= 5 (m) x 1.5 (m) Coefficient of correlation between all traits was observed at 0.01 and 0.05 level. Dry pod yield was highly significant with karnel yield at 0.01 error rate. Similarly karnel yield was highly significant with Initial plant stand, Final plant stand and dry pod yield. Initial plant stand varied from 103 to 140/ net plot, final plant stand from 99 to 136/ net plot, dry pod yield from 561 to 1089/net plot, shelling % from 65 to 69, karnel yield from 379 to 712 gm/net plot, maturity from 107 to 114 days, hundred karnel weight from 31 to 41 gm/net plot and sound mature karnel from 81 to 89.
- Evaluation of lines for High Yield and High Oleic Acid Content: We have received advance segregation material (F 4 and F5) from DGR, Junagadh for selection of groundnut for higher yield and high oleic acid content. Higher yield is one of the targeted trait for our center, and groundnut with higher yield and some specific trait can be evaluated for research purpose. All the four cross combinations received from DGR, Junagadh i.e., ICGV-6100 × Sunoleic 95R, ICGV-5141 × Sunoleic 95R, ICGV-6188 × ICGV-7229 and ICGV-98432 × ICGV-7166, performed very well, with higher yield as compared to our local check. Best performed cross combination was ICGV-5141 × Sunoleic 95R and in case of ICGV-6100 × Sunoleic 95R and ICGV-6188 × ICGV-7229 most of the lines were sensitive to late leaf blight. We have selected single plants from some of the lines based on their yield performance, brief feedback is given in table below-

Name of crosses	Gwalior	Selected Single plants progeny	Remarks			
ICGV-6100 × Sunoleic 95R	50	15	Kernels are bold and dark in color			
			higher yield as compare to our local			
			check JGN 3			
3116 6 10 10 10			But These lines were moderately			
			sensitive to tikka disease (LLB)			
			(100 kernel weight 38 gm,			
			Local check JGN 3, 26 gm			
			Haulm fresh weight 42 gm, JGN3, 28			
			gm)			
ICGV-5141 × Sunoleic 95R	40	10	Best performed material at our			
			centre, disease free, very bold			
			kernels,			
			higher yield as compared to our			
			local check JGN 3, Highest haulm			

			fresh weight
			(100 kernel weight 50 gm/
			Local check JGN 3, 26 gm
			Haulm fresh weight 80 gm/ JGN3, 28
			gm)
ICGV-6188 × ICGV-7229	100	40	Performed well as compared to our
			local check But These lines were
			sensitive to tikka disease (LLB)
			(100 kernel weight 41 gm
			Haulm fresh weight 43 gm/ JGN3, 28
			gm)
ICGV-98432 × ICGV-7166	100	40	Performed well as compared to our
			local check
			(100 kernel weight 39 gm
			Haulm fresh weight 34 gm, JGN3, 28
			gm)
Total	290	125	

Morphological and Molecular Characterization using SSR and SNP markers in germplasm lines of Alloteraploid Groundnut (Arachis hypogea L.): Morphological and molecular characterization of 90 uncharacterized germplasm lines and 6 popular varieties of groundnut received from DGR- Junagadh has been done using SSR and SNP markers. Check varieties for the experiment includes TG 26, GPBD4, KDG128, ICGS44, Sunoleic 95 R and JGN3. Total 13 traits were observed .i.e. initial plant stand, final plant stand, days to 50% flowering, days to maturity, fresh weight/plant, dry weight/plant, number of pods /plant, hundred kernel weight, Kernel yield, sound mature kernel, shelling percentage and Harvest index. Analysis of all the trait has been done in SPSS V19 software. Table 3 representing descriptive statics for all the traits studied in groundnut germplasms and check varieties. Range of morphological traits observed fall into distinct categories i.e., fresh weight 120- 574, Number of pods per plant 12-66, weight of pods per plant 18-120, harvest index 7-69. Significance of correlation of different traits was analysed using SPSS V19 software also. Mean value of the data of morphology was observed to see at 0.01 and 0.05 level. Kernel weight is highly significant to Pod weight and Kernel yield, Sound mature kernel is highly significant to Weight of pods, Kernel yield and weight of kernel, Shelling% is highly significant to weight of pods, Kernel yield, weight of kernels and Sound mature Kernel and Harvest index is highly significant to Fresh weight, Pod weight, Kernel yield, Kernel weight and Shelling Percent at 0.01 level. Dendogram prepared using NTSYS V2.1 showed two major clusters GI and GII consisting 7 and 89 genotypes and further subdivided into sub clusters IIA having 8 and II B having 81 germplasms. Most of the germplasm lines can be characterized through the nearest check variety in the cluster as KDG128 carries 12 germplasm lines, so may have traits common with foliar disease resistance and high

yielding. About 11 germplasm lines are distinct or unique that shows different characteristics which does not falls with any of the check varieties

Trait	IPS	FPS	DF_50	DM	FW	DW	NPP	HPW	KYD	HKW	MK	SP	HI
IPS	1	<mark>0.923**</mark>	135	-	.006	010	.047	010	0.065	.144	.131	.087	.009
				.034									
FPS		1	095	-	.110	.079	.032	034	0.025	.082	.100	.041	067
				.004									
DF50			1	.086	011	.014	187	204	188	108	127	167	050
DM				1	0.143	0.185	0.192	077	017	028	092	030	126
FW					1	<mark>0.819**</mark>	0.025	058	004	029	.025	019	628**
DW						1	068	110	044	106	027	078	-519**
NPP							1	<mark>0.283**</mark>	<mark>0.276**</mark>	0.183	0.179	0.250*	0.197
HPW								1	<mark>0.938**</mark>	<mark>0.769**</mark>	<mark>0.496**</mark>	<mark>0.913**</mark>	<mark>0.527**</mark>
KYD									1	<mark>0.899**</mark>	<mark>0.614**</mark>	<mark>0.989**</mark>	<mark>0.444**</mark>
HKW										1	<mark>0.716**</mark>	<mark>0.953**</mark>	<mark>0.339**</mark>
MK									:	*	1	<mark>0.661**</mark>	0.181
SP												1	<mark>0.428**</mark>
HI													1

Fig 1. Cluster Diagram of groundnut germplasm for morphological traits

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

IPS, Initial Plant Stand; **FPS**, Final Plant Stand; **DF50**, Days to 50% flowering; **DM**, Days to maturity; **NPP**, Number of pods per plant; **HPW**, Hundred pod weight; **KYD**, Kernel yield; **HKW**, Hundred kernel weight; **MK**, Sound mature kernel; **SP**, Shelling %; **HI**, Harvest Index

• Principle Co-ordinate analysis and AMOVA for SSR: Principle Co-ordinate analysis (PCA) based on origin formed 4 major population groups. Group 1 included accessions from India, Sudan, Nigeria and Gambia, Group 2 included accessions mainly from India, Taiwan, Sudan, Australia, and Senegal. Third group consisted of accessions from India, Nigeria, Sudan, Senegal, Gambia and the fourth group included accessions were mainly from India, Argentina, Mexico, Myanmar, Nigeria, Senegal. The accessions in all the 4 groups included India. It means all the varieties of India are having highly diversified characteristics (Fig 4). Analysis of molecular variance represented 30 % variation within individual and 62% variation among individual for SSR marker banding patterns.

Source	df	SS	MS	Est. Var.	%
Among Pops	11	174.402	15.8 <mark>55</mark>	0.445	8%
Among Indiv	84	763.494	9.089	3.654	62%
Within Indiv	96	171.000	1.781	1.781	30%
Total	191	1108.896		5.880	100%

• We have identified 9 germplasms having foliar disease resistance using SNP genotyping approach in collaboration with ICRISAT, Hyderabad. Other than objectives of current research additionally gene based oleic acid markers identified 32 genotypes having high oleic acid content which further requires biochemical

analysis for exact characterization. This study also identified diverse clusters of germplasms with known check varieties and some unique clusters representing new traits in germplasm lines, further work can be planned for trait specific studies of groundnut.

Sorghum

- Three genotypes were contributed in Coordinated Trials and tested i.e. One- SPV 2357 in AVT -II(GS), one- SPV 2425 in AVTI (GS), One IV 17-1in IVT (GS)
- Four experimental hybrids were contributed in IIHT trial.
- Three station trials i.e. SVT I(20 entries), SVT II(20 entries) and SHT I (30entries) were conducted.
- 36 Indore bred restorers were evaluated for agronomical traits
- Twenty crosses (IMS 9A and germplasm lines) for identification of germplasm lines for development of New MS lines and Restorers
- Ninety eight experimental hybrids (LXT) were made with MS and new restorers

4.7.2 Crop Production Technologies:

Cotton

- Agronomy for Bt. Hybrids of the region have been evaluated. Use of Bt. Hybrid + Closer spacing (25 % less than recommended) + 125% RDN + recommended foliar spray was obtained highest seed cotton yield result into maximum boll weight, sympodia per plant and final plant population. Technologies for organic cotton production have been worked out. It was concluded that application of RDN through inorganic obtained the highest seed cotton yield because of maximum yield attributing characters.Higher yielder genotypes have been screened under water stress condition. Out of 21 genotypes tested genotypes T SH-327, TCH-1199, AR-9108 and RCH-1217 were found better under water stress condition.
- Seven genotypes were screened for climate change. normal sowing date (DI = 26-6-16) gave maximum yield, while the genotypes G.I (Rasi 659 BG II) and G-4 (JK-5) were recorded maximum yield among interaction DIGI and DIG4 were recorded maximum yield of cotton.seventeen promising entries have been screened for development of repository for sucking pests GISV-267 and GISV-272 were gave better performance. Population dynamics studies have been conducted. Among sucking insects only jassids population was found above ETL during 35 to 50 SMW. Among boll worms 2 or more *Helicoverpa* larvae/5 plants were recorded during 39 to 43 SMW. The number of *Earias* larvae varied from 0.0 to 14.40/20 green bolls. Efficacy of new formulation of insecticides, bio pesticides and neem formulation have been evaluated. Flonicamid 50 WG @ 75 g ai/ha, Pyrifluquinzone @ 75g gai/ha, Buprofezin 25SC@ 250 g ai/ha and Difenthiuron 50 WP @ 300g ai/ha Per formed better among treatments. Mating Disruption Pheromone for the pink boll worm have been

evalvated. Application of Profenophos ,Thiodicarb and Cypermethrin was found singificantly superior for keeping the lowest pink boll. worm population and highest yield.

• Bacterial blight was observed in Ist week of August. The incidence was incresed upto 14.38%. Myrothecium leaf blight of cotton was first observed in IInd week of August. In the month of September, the disease incidence increased upto 11.29%.

Safflower

- In evaluation of AVT- II entries in different fertilizer levels under irrigated conditions, fertilizer application from 50% RDF (2309 kg/ha) to 150% RDF (2492 kg/ha) did not influence the seed yield significantly. Among AVT-II entries, SSF 1307 recorded the highest seed yield (3303 kg/ha) which was on par with that of ISF 764 (3148 kg/ha) and SSF 12-40 (3099 kg/ha).
- Under testing of short duration safflower genotypes in delayed sowing conditions of soybean-safflower systems, (A) the Pooled analysis (2014-15 and 2015-16) indicated that, closer plant spacing (30 x 20 cm) recorded significantly highest seed yield (1320 kg/ha) compared to 45 x 20 cm (1043 kg/ha). Fertilizer levels and short duration cultivars did not influence the seed yield significantly. Therefore, recommended NPK to the short duration cultivars is beneficial. (B) Pooled analysis (2016-17 and 2017-18) indicated that effect on plant spacing on seed yield was not significant. Among different fertilizer levels, 125% NPK recorded significantly highest seed yield. Among the cultivars, Annigeri-1 (normal duration) recorded significantly the highest seed yield (2119 kg/ha).

In identification of suitable wider row spacing for safflower under irrigated conditions

- Pooled analysis (2012-2016) indicated that, the highest seed yield was recorded with 45 x 20 cm plant spacing (1838 kg/ha) and it was on par with that of 30 x 20 cm spacing (1767 kg/ha). Among the cultivars Annigeri-1 recorded significantly highest seed yield (1670 kg/ha).
- Pooled analysis (2016-2018) indicated that significantly highest seed yield was recorded with 45 x 20 cm plant spacing (2595 kg/ha). Among the cultivars Annigeri-1 recorded the significantly highest seed yield (2386 kg/ha) followed by JSF-1 (2240 kg/ha) and PBNS- 12 (1993 kg/ha).

Medicinal & Aromatic Plants

• Effect of organic fertilizer, trichoderma, Neem Cake along with micronutrients on the growth and latex yield of opium poppy crop: The result are found to be significant. The result reveal that the highest latex yield (68.0 kg/ha) recorded in T6 fallowed by T3 (65.0 kg). Under seed yield, highest seed yield recorded in T6 (16.0 q/ha). Treatment T6 recorded highest capsul (3.4) per plant as well as highest plant height (114 cm) recorded in the same treatment. The experiment concluded with the remark that the addition application of sulphure, zinc, boran, trichoderma, vermi compost along with RDF is required for the better latex and seed yield in opium poppy crop.

• **Standardization of drip irrigation in opium poppy crop:** The result are found to be significant due to latex yield, seed yield, plant height and number of capsule. Under drip irrigation the heighest latex yield (56 kg/ha) and seed yield (1033 kg/ha) recorded due to treatment T1 (100 PE) and lowest under T4 (40 PE) under the experiment though the yield recorded due to suface irrigation was better but looking to water economy the drip system of irrigation can have better side.

Wheat

- AGRO I: Performance of new wheat varieties at different dates of sowing under irrigated conditions: 25th November sown wheat crop produced the maximum yield (5734 kg/ha) which was significantly superior to other dates of sowing. On mean basis across sowing time, variety MACS 6222 produced the maximum and significantly higher grain yield (5421 kg/ha) followed by HI 1544 (5409 kg/ha) and HD 2967 (5296 kg/ha).
- Effect on plant growth attributes at 20 days after sowing: Bioproduct Jump Start 2.0 was tested at different doses with ST: Seed Treatment and SA: Soil application, showed significant effects on growth parameters at 20 days after sowings (DAS) viz., plant vigour, root length, fresh plant weight and dry weight of root. Jump Start 2.0 with 0.41ml ST recorded significant high scoring for plant vigour over control but it was at par with other doses of JumpStart 2.0 and Bolt GR 10kg/ha and combination of JumpStart 2.0 + Bolt Gr (0.83 ml ST+ 10 kg/ha SA respectively). Tillers/plant were just initiated around 20DAS, there were lower tillers per plant but application of all these products showed non-significant variation for tillers/plant at 20 DAS. However most of the JumpStart 2.0 doses showed relatively higher tillers per plant. JumpStart 2.0 with doses of 0.41ml ST followed by 1.25 ml ST recorded significantly higher Root Length, Root Dried Weight / plant and Plant dried weight /plant.
- Effect on agronomic traits: Agronomic traits influenced by Bioproduct 'Jump Start 2.0' at different doses with ST: Seed Treatment and SA: Soil application, revealed significant effects only on 1000 grain weight. Jump Start 2.0 with 0.41ml ST followed by 1.65 ml ST recorded significant high 1000 grain weight over control but it was at par with other doses of JumpStart 2.0 and Bolt GR 10kg/ha and combination of JumpStart 2.0 + Bolt Gr (0.83 ml ST+ 10 kg/ha SA, respectively).Plant height, Productive tillers /meter, Biological weight and Grain yield not affected by Bioproduct 'Jump Start 2.0' at different doses with ST: Seed Treatment and SA: Soil application.
- AGRO II: Management of lodging and yield maximization in wheat : The highest yield was recorded under the treatment 150% RDF+FYM (5810 kg/ha) as compared to all other treatments. Among growth retardant treatments two sprays of Lihocin+Folicur (0.2% + 0.1%) produced maximum grain yield (5420 kg/ha) which significantly higher than other treatments.
- **Contractual Trial:** Application of PSB at par with JumpStart and MYC 100 produced highest grain yield of wheat (56.11, 53.23 and 52.82 q/ha, respectively) JumpStartdid not deplete soil nutrients viz., available Phosphorus (P₂O₅) but increased availablepotassium (K₂O) after harvest.

Weed Management

- Cowpea: In cowpea under pearlmillet based cropping system, integrated weed management (pendimethalin + imazethapyr + 1 HW) gave maximum seed yield (630.70 kg/ha) as well as reduced the weed density and dry weight of weeds followed by imazethapyr + imazamox 80 g/ha PoE. The maximum grain yield (757.06 kg/ha) was obtained in T₅ (ZT+R-ZT+R-ZT) tillage practices followed by T₂ (CT-ZT-ZT) (613.64 kg/ha) significantly.
- **PearImillet:** In pearImillet under pearImillet based cropping system IWM practices (atrazine 500 g/ha PE + 1 HW) significantly reduced the weed population and dry weight of weeds and resulted in significant high pearImillet yield (3.06 t/ha) followed by atrazine + 2,4-D (2.58 t/ha). The highest B:C ratio was obtained in treatment atrazine + one HW (2.36). Under conservation tillage practices the highest grain yield was obtained in conventional tillage T₁ (CT-CT) followed by T₂ (CT-ZT) while B:C ratio was higher (2.69) in T₁ (CT-CT) followed by T₂ (2.41).
- **Mustard:** The integrated weed management where oxyfluorfen 0.23 kg/ha was applied as PE *fb* one HW at 25-30 DAS gave maximum seed yield (1.92 t/ha) as well as reduced the weed density and dry weight of weeds *fb* pendimethalin 1.0 kg/ha PE. Conventional tillage practice T₁ (CT-CT) gave maximum seed yield (1.97 t/ha) as compared to other tillage practices. Similarly, the highest B:C ratio was also recorded in T₁ (CT-CT) conventional tillage practices (3.97). In case of weed management practices the highest B:C ratio was obtained in pendimethalin (3.81) *fb* IWM practices (3.70).
- Weed management in green gram under organic cropping system : One hand weeding at 20 DAS with straw mulching 5 t/ha gave maximum seed yield (824 kg/ha) followed by two HW at 20 & 40 DAS (800 kg/ha). However, the highest B:C ratio was recorded in recommended herbicide (2.52) followed by application of recommended herbicide with hand weeding at 40 DAS (2.08). Among organic weed management practices application of white and black plastic mulch resulted in higher productivity of green gram crop but was not economically feasible and viable
- Weed management of problematic weeds in green gram :The cultural method of weed control where two hand weedings at 20 & 40 DAS resulted as the best tool of weed management in green gram crop where productivity is concern (1068 kg/ha). It was followed by the chemical method where the combination of imazethapyr + imazamox (RM) 80g/ha PoE and pendimethalin + imazethapyr 750 g/ha PE resulted in the highest yield of green gram (1013 and 864 kg/ha respectively). As far economics is concern the application of imazethapyr + imazamox (RM) 80g/ha PoE resulted in the highest B:C ratio (2.9), gross & net returns followed by pendimethalin + imazethapyr 750 g/ha PE and two hand weedings at 20 & 40 DAS
- **Biological control of water hyacinth by** *Neochetina spp.* and *Alternaria alternate:*Infestation of *Neochetina spp.* on water hyacinth was observed 90%. On an average 80-90 feeding scars/leaf were observed. The water level in pond was around 10 feet. It was also observed that feeding of leaves was very high and caused dried. Around 85-90% (1 scale) die back symptoms were observed on water hyacinth.

• Persistence of herbicides in soil applied in pearl millet crop under pearlmilletmustard-cowpea cropping system: Herbicides atrazine 500 g/ha PE + 2, 4-D 500 g/ha PoE and atrazine 500 g/ha PE + 1HW applied to pearl millet persisted in soil for 45 days. No residues of herbicides were left after harvest of crop as per bioassay method using barley as test crop. Different tillage practices in pearlmiillet-mustard cropping system could not affect the persistence of herbicides applied to pearl millet.

Pigeonpea

 Out of fifty front line demonstrations were conducted in Khargone districts of Madhya Pradesh by AICRP on pigeonpea centre Khargone during the kharif season 2017-18 Front line demonstrations on Package technology showed 22.08 % (Sol Crop) and 35.28% (Inter crop with soybean) increase in grain yield of pigeonpea over farmer's practices. High yielding wilt resistant varieties: JKM 189, TJT 501 were demonstrated in varietals FLD.

Rapeseed & Mustard

- Long term fertility experiment on cropping systems involving Mustard (Bajra-Mustard): The experiment was laid out in RBD design with three replications. In this experiment, the treatment consisted of ten fertility levels. The Bajra crop was sown on 05.07.2017 and mustard crop was sown on 25.10.2017. The experimental crops were harvested on 03.10.2017 and 13.03.2018. Maximum seed yield of Bajra (2627 kg/ha) was recorded with 150% NPK of RDF during Kharif 2017-18 which was followed by 100% NK (2228kg/ha) whereas the minimum seed yield of 1189 kg/ha was obtained in control plot. On the basis of six year mean, significantly higher seed yield of Bajra (3643 kg/ha) was recorded in 150% NPK as against the control plot (2161 kg/ha) while other all fertility levels produced significantly at par yield with the 150% NPK. During Rabi 2017-18, the maximum seed yield of mustard (4034 kg/ha) was obtained with the treatment 150% NPK which was found significantly superior to all the remaining fertility treatment. On the seven year mean basis, the significantly higher seed yield of mustard (2353kg/ha) was recorded with the treatment 150% NPK as compared to all other treatment tested. The control plot produced minimum seed yield as 979kg/ha.
- Developing resource efficient and resilient rapeseed-mustard based cropping systems under the current and future climate: The trial consisted of three method of planting (main plots) Viz. Raised bed, Zero tillage & conventional method and six crop sequences (sub plots) Viz, Pearlmillet-Mustard, Maize-Mustard, Soybean-Mustard, Green gram-Mustard, Sesamum-Mustard and cluster bean-Mustard. The kharif crops were sown on 11.07.2017 and Mustard crop was sown on 28.11.2017. The Kharif crops were harvested form 01.10.17 to 09.10.2017 while Mustard was on 04.04.2018.Under Raised bed method of planting in kharif the bajra, maize , Soybean , Green gram, sesame and cluster bean occupied first position, producing maximum yield as 3025, 1790, 802,623, 599 and 1043 kg/ha respectively as against the zero tillage and conventional method of planting. The different method of sowing like Raised bed, conventional and zero tillage tasted for over all Kharif crops as mentioned above occupied I,II,III position for producing grain yield as 1314,1137and 941 kg/ha

respectively. The conventional planting method tasted in Rabi 2017-18 for Indian mustard obtained first position for producing maximum seed yield as 2004 kg/ha which followed by Raised bed (1336 kg/ha) and Zero tillage method (1291 Kg/ha). The Maize –Mustard cropping system was found as superior for producing Maximum seed yield of Mustard i.e. 1743 Kg/ha. which followed by Sesame- Mustard (1614 kgha⁻¹). Whereas the cluster bean –Mustard sequence was comparatively very poor which produced minimum seed yield of 1305 kg/ha.The interaction Maize –mustard X conventional planting Recorded maximum seed yield of Mustard (2375 Kg /ha) and Sesamum –Mustard X conventional planting (2027 kg/ha).

• Studies on system of mustard intensification (SMI) in rapeseed mustard through transplanting: In this trial, three brassica species i.e. Brassica carinata, Brassica napus and Brassica Juncea and three method of planting i.e. Transplanting at 45 X 45cm, 60 X 60cm and conventional sowing (30 X 10 cm) were tested in main plot and sub plot treatment respectively. The trial was conducted in split plot design with three replications. The crop was sown on 14.10.2017 in conventional system and nursery also transplanting was done on 11.11.2017 and harvested on 16.03.2018 (napus), 18.03.18 (juncea) and 24.03.2018 (Carinata). The entry Brassica carinta (PC-6) recorded maximum seed yield of 3215 kgha-1 which closely followed by Brassica Juncea (RH-749) yielding 3131 kgha-1. Whereas, the lower seed yield 2399 Kg/ha. obtained with the Brassica napus (GSC-7). The conventional planting method 3223 Kg/ha Was found as the best for seed yield production which seconded by the plot (2896kgha⁻¹) in which the crop transplanted at 45 x 45 cm distance. Whereas the plot in which the crop transplanted at 60 x 60 cm distance produced minimum seed yield of 2626 kgha⁻¹. The interaction Brassica Juncea (RH-749) X conventional planting (3570 kg/ha) was found as superior which closely followed by Brassica carinata (PC-6) X conventional planting (3401 kg/ha) from the seed yield point of view.

Chickpea

- In a trial onBiofortification of Zn and Fe in chickpea through agronomic intervention. The result showed that the variety RVG 202 recorded maximum seed yield of 3019 kg/ha which is significantly superior than JAKI 9218 (2935 kg/ha. As regards nutrient levels, application of RDF + Soil application of ZnSO4 @ 25 kg/ha (Recommended practice) gave maximum seed yield of 3396kg/ha.
- In a trial onOptimizationin productivity of chickpea genotypes amenable to mechanical harvesting. The result indicated that the seed yield was significantly influenced due to different genotypes. The genotype HC 5 produced significantly higher seed yield (3045kg/ha)followed by BRC 1 (2694 kg/ha) as compared to other genotypes.
- Under field screening locally isolated *Rhizobium* strains viz., RVSGRS 121, 122, 123, 124 and the reference strains RVSGRS 119,CH 1233 and F 75 could significantly increase the nodulation and grain yield of chickpea (11.0 to 17.1%) over the uninoculated control (1630 kg/ha) of chickpea variety RVG 202. Two newer *Rhizobium* strains (viz. RVSGRS 131 and RVSGRS 132) were isolated. In a trial on multilocational

testing of *Rhizobium* strains, significant and highest grain yield was recorded with *Rhizobium* strainLGR 14-2 Ludhiana (1953 kg/ha) followed by with strain RVSGRS 119, Sehore and AKCR -05 Akola (1902 kg/ha).

- In a trial on the evaluation of endophytic bacteria with Mesorhizobium in chickpea, maximum yield of 1895kg/ha was recorded with Mesorhizobium+ LNE 1(Pseudomonas aeruoginosa)followed by 1890 kg/ha with Mesorhizobium + HNE 1(Pseudomonas flourescens). Both of these were also superior overMesorhizobium alone which produces grain yield of 1650 kg/ha. Dehydrogenase activity in soil recorded maximum (42.0 µg TPF/g soil/hr) with Mesorhizobium+ HNE 1 (Pseudomonas flourescens).
- Mesorhizobium CR-13 recorded 14.3% higher yield. Microbial consortium II recorded highest yield of 2172 kg/ha (19.3 % higher) followed by Microbial consortium III which recorded 16.9% higher yield over absolute control. Microbial consortium II also recorded highest N uptake. Effect of Genotypes as well as of Mo found significant. JAKI 9218 yielded highest. Interaction was non significant, however JG 16 and RVG 202 responded highest (13.8% yield increase) to molybdenum application.

Soybean

- In evaluation of AVT II entries under different sowing dates, entry RVS 2007-06 gave significantly higher yield at normal date of sowing (24.06.2017). While at second date of sowing (14.7.2017) entry JS 20-116 was better. The seed yield of 24th June sowing was 249 % higher than 20 days delayed sowing.
- Application of NPK (19:19:19) as foliar spray at pod formation stage improved soybean yield over control followed by application of 2 % urea.
- The herbicidal treatments F 8072 premix 725 g/ha gave higher yield of soybean and controlled weed effectively. Increased in seed yield with this weedicide was 52.85 % higher than weedy check.
- Application of NPK on the basis of site specific analysis, the treatment site specific nutrient management (NPK 20:38:40) gave higher yield followed by application of RDF (NPK 20:60:20).

MULLaRP

- Herbicide weed management in Urdbean and its carry over effect on succeeding rabi crops.: Among the weedicide application of Imazamox 35 WG + Imazethapyr 35 WG] @ 60 g/ha PoE at 20 DAS gave the maximum yield 725 kg/ha fallowed by Clodinafop propargyl 8 EC + Aciflourfen sodium 16.5 EC @ 187.5 g/ha at 20 DAS (645 kg/ha).
- Foliar nutrition urdbean productivity: Application of 18:18:18 NPK 2% spray at floweringYielded 629 kg/ha fallowed by TNAU pulse wonder @ 5kg/ha at flowering(593 kg/ha).

Grape: Collection, conservation and evaluation of grapes germplasm :

- **1. Girth:** Among the 51 varieties, maximum girth 77.14 mm was recorded with Chenin Blanc, while the minimum 40.49 mm was recorded with Cabernet France.
- 2. No. of mature canes per vine: Maximum mature canes/vine was observed with Shiraz (50.75) followed by Crimson Seedless (45.50), while it was minimum 16.25 in the Sirius
- **3. Fruitful canes per vine:** Maximum fruitful canes per vine were recorded in Pusa Navrang (44.25) and Shiraz (43.00), while minimum was recorded in Anab-e-Shahi (2.5).
- **4. Period of panicle appearance (days):** Among all the 51 varieties, Period of panicle appearance was ranges in between 17-23 days.
- **5. Period of anthesis (days):** Earliest anthesis was recorded in Bangalore Blue and Pusa Navrang (27.75 and 28.25 days respectively), while Sangiovese and Sirius has taken more number of days for anthesis (42 days) after fruit pruning.
- 6. Period of fruit set (days): Early fruit set was recorded in in Bangalore Blue and Pusa Navrang (37.25 and 38.25 days), while maximum days taken for fruit set after pruning was recorded in H-5 (53.00) and Shiraz (52 days).
- 7. Period of fruit ripening (days): Early fruit ripening was observed in Pusa Navrang (123 days) and New Perlett, (125 days), while more days taken to fruit ripening was observed in Kishmish Rozavis White (165 days).
- 8. Berry length (mm): Maximum berry length was recorded in Dilkhush (30.37 mm) and Rizmat (23.56 mm), while minimum was recorded in Gargenega (10.24 mm), and Cinsault (10.53 mm).
- **9. Berry diameter (mm):** Maximum berry diameter was recorded in Rizmat followed (21.08 mm) by Red Globe (19.96), while minimum was recorded in Sirius (10.77 mm) and Gargenega (10.99 mm).
- **10.** No. of bunches per vine: Maximum number of bunches per vine was recorded in Chenin Blanc (134.50), Sauvignon Blanc (126) and Convent Large Black (115.00), while minimum was recorded in Country Bangalore and Anab-e-Shahi (3) and Ruby Seedless (3.50).
- **11. Bunch weight (g)**: Kishmish Moldowsky has recorded maximum bunch weight (342.35 g), while Tsimlasky Chernyi and Sirius has recorded minimum bunch weight (41.10 and 45.43 g respectively).
- Berry weight (g): Maximum berry weight was recorded in Red Globe (7.05 g) and Rizamat (5.36 g), while minimum was recorded in Country Bangalore (1.14 g), Cabernet Sauvignon (1.16g).

- **13. Weight of 100 berries (g):** Maximum weight of 100 berries was recorded in Red Globe (705.00 g) and Rizamat (535.5 g), while minimum was recorded in Country Bangalore (114.25 g), Cabernet Sauvignon (115.5 g).
- **14. TSS** (**°B**): Maximum TSS (**°B**) was recorded in A 18-3, New Perlette (29.00) and Cinsault (29)while minimum was recorded in Kishmish Moldowsky (19.75) and Convent Large Black Moldowsky (20.75).
- 15. Acidity (%): Maximum Acidity was recorded in Carignane (0.78 %), Sirius (0.77 %) and Bangalore Blue (0.77 %) while minimum was recorded in Sharad Seedless (0.40 %) and Flame Seedless (0.42%).
- **16.** Juice %: Juice % ranges between 72 to 53 % maximum Juice content was recorded in Arka Shyam (71.90 %), while lowest was recorded in Country Bangalore (53.93 %).
- **17. Raisin recovery %:** Maximum raisin recovery % was recorded in Kismish Chorni (25.78 %) and Thompson Seedless (25.43 %), while minimum was recorded in Sonaka (21.89 %) and Fantasy Seedless (21.57 %).
- **18.** No. of Seeds/berry: Maximum number of Seeds/berry was recorded in Tempranilo (3.28), while minimum was recorded in Gargenega (1. 15).
- **19. Weight of 100 Seed (g):** Maximum weight of 100 Seed was recorded in Shiraz (11.53 g), while minimum was recorded in Medika (1.49g).
- 20. Yield (Kg/vine) :
- **Colour seedless varieties:** Maximum yield was recorded in A-18/3 (10.32 kg/vine), while minimum was recorded in Ruby Seedless (1.00 kg/vine).
- **Red Wine varieties:** Maximum yield was recorded in Shiraz (11.19 kg/vine), while minimum was recorded in Cinsault (1.13 kg/vine).
- Seedless table varieties: Maximum yield was recorded in Kishmish Rozavis White (10.00 kg/vine) followed by 2-A Clone (9.88 kg/vine), while minimum was recorded in Superior Seedless (1.00 kg/vine).
- White wine: Maximum yield was recorded in Viognier (8.21 kg/vine), while minimum was recorded in Sirius (1.05 kg/vine).
- Juice varieties: Maximum yield was recorded in Pusa Navrang (8.41 kg/vine), while minimum was recorded in Country Bangalore (0.64 kg/vine).
- **Seeded table varieties:** Maximum yield was recorded in Muscat of Alexandria (7.34 kg/vine), while minimum was recorded in Anab-e-Shahi (0.66 kg/vine).

ONION AND GARLIC

Evaluation of onion lines during *Kharif* 2017-18: The highest marketable yield was recorded with ON 17-62. Highest total yield was found with ON 17-62 which was followed by ON 17-34. Minimum double bulbs were recorded in case of ON 17-56. Minimum bolter bulbs were observed with 17-56. Minimum neck thickness was found in case of ON17-65. Highest average weight of bulb was found with ON17-62 which was

followed by ON17-34.All the entries were found infected with stemphyllium blight and minimum infection was noted in ON17-58. All the entries were infected with purple blotch and minimum infection was recorded in ON17-54. Lowest thrips incidence was recorded in entry ON 17-58, ON17-60 and ON17-69 with equal level of incidence i.e. 3.33 at 1-5 scale .Maximum pyruvic acid content was recorded in ON17-60. Highest reducing sugar was found in ON17-67. Maximum non reducing sugar was observed in case of ON17-54. Total sugar was highest with ON17-54. TSS was highest in ON17-56 (Table 2).After the two months storage lowest total weight loss was recorded in entry ON17-67. Minimum sprout loss was found with ON17-69. No rot loss was found under ON17-62 and ON 17-65.

• Evaluation of garlic germplasm during *Rabi* 2017-18: The highest marketable and total yield was recorded with GN 17-16. Maximum weight of bulb was recorded with GN17-16. Highest number of cloves was recorded in both GN17-16 and GN17-05 i.e.38.67 per bulb. Highest average weight of 10 cloves was found in GN17-14. All the entries were found infected with stemphyllium blight and purple blotch. Lowest stemphyllium blight infection was recorded in GN 17-12, GN17-14 and GN17-19 with equal infection of 11.67%. Minimum purple blotch infection was found in GN17-03. Lowest thrips incidence was recorded in entry GN17-12. There was significant difference among garlic germplasm for pyruvic acid content. Maximum pyruvic acid content was recorded in GN17-19 (Table 29).After the six months storage lowest total weight loss as well as rot loss was found with GN17-03.

Arid legume

- In Clusterbean: The results revealed that the significantly highest clusterbean seed yield (2157 kg/ha), net return (Rs.86712 /ha) were obtained with Conventional Tillage + residue retention @ 3 t/ha followed by Minimum Tillage + residue retention @ 3 t/ha. Whereas nutrient management, the higher clusterbean seed yield (1991 kg/ha), net return (Rs.84911 /ha) were recorded with the application of 75 % RDF, which was at par with 100% RDF.
- GUAR REPORT
- Under rain fed situation, variety RGC-936 and Naveen (branched type) should be sown under agro- climatic condition of Gird region.
- Varieties 5863 selected and developed from local material, had high percentage of gum and possess better yielding capacity.
- For effective control of weeds in guar per-plant application of Fluchloralin@1.5 kg a. i. /ha should be undertaken.
- The critical period of weed crop competition in guar is first 15 to 30 days after sowing.
- First week of July is most appropriate date for gaur sowing.
- Unbranched and branched variety of guar should be shown at 30 and 45 cm of row spacing respectively.
- Under agro-climatic condition of Northern M.P. balanced use of fertilizer viz., 20: 40:20 N:P:K kg/ ha should be adopted.

- Among various cropping system, guar with pearl millet at the ratio 3:1 is found most economical.
- Wheat crop should be grown after guar crop for the saving of 30 kg nitrogen per hectare.
- Application of 40 kg S along with 60 kg P2 05/ha should be done for getting the higher yield of guar under Northern M.P. conditions.
- Bajra- Mustard rotation with full dose of nitrogen ranked first as the rotation fetched net income of Rs.33, 857/ha, while Bajra-Mustard with 3/4th dose of nitrogen was next in order.
- Variety V-218 was found better than the variety local in respect of input levels. In case of input treatments recommended fertilizer+ weed control+ pant protection gave the maximum yield.
- In Guar +Bajra inter-cropping system intercultural after 30 DAS gave effective weed control and increase yield.
- Experiment of cropping system with Guar-Wheat crop sequences revealed that 75 per cent recommended fertilizer application was most remunerative and there was a saving of fertilizer of 26 kg P2O5 in Guar and 30 Kg nitrogen in Wheat per hectare.
- The effect of varieties spacing and fertilizer experiment showed that among the different cowpea varieties GC-3 was superior to all the varieties.
- A row spacing of 45 cm is better over 30 cm spacing. Among the fertilizer the recommended dose proved superiority.
- On the basis of three years result it has been concluded that the application of 60 kg P2O5 / ha+ 10 tonnes F.Y.M./ha with Rhizobium gave maximum net return of 31,087 with B:C Ratio 4.56 of guar crop.
- Thiourea spray at vegetative and at flowering stage with seed soaking gave maximum net return Rs.10, 506 with B: C Ration of 2.40 of Cowpea.
- On the basis of study made of long term cropping system in five years, the best crop system is GUAR-GUAR, which gave Rs.17445 net income, and BCR 4.01 followed by Bajra-Guar with Rs.14165 as net income and 3.18 BCR.
- On the basis of two years the variety HG-365 gave the highest yield. As regard the fertility level he higher yield under wider row spacing (45cm) was obtained over closer spacing.
- On the basis of three years mean the maximum grain yield of Clusterbean, net profit and benefit cost ratio was recorded with S2L4 (50% S as gypsum+50% S elemental sulphur) and next in order was S1L4.
- In Moth-Bajra intercropping system to obtain higher returns per unit area of land, sole month gave highest Bajra equivalent yield.
- To obtain higher seed yield of Moth bean, it should be sown first fortnight of July using 15 kg/ha seed at a row distance of 30cm in Gird region of M.P.
- On the basis of three years study it is concluded that if a farmer has facility of two irrigations then irrigate clusterbean crop at vegetative (25-30 DAS) and 50% flowering stage (40-45 DAS). In case of only one irrigation 50% flowering stage is better at Gwalior condition
- In intercropping system significantly highest clusterbean equivalent seed yield, net return and B.C.ratio were obtained with sole clusterbean .In weed management practices two intercultures at 25 and 45 DAS was remunerative.

- Application of Imazethapyr+ Imazamox @ 40g/ha at 20 DAS in guar provided better weed control and higher crop productivity.
- Application of RDF with FYM @ 2.5 t/ha gave significantly higher seed yield (2026 kg/ha), net monetary returns (Rs. 83297/ha) in clusterbean with life saving irrigation.
- Application of pendimethalin @ 0.75 kg a.i./ha as PE + one inter-cultivation at 20-25 DAS gave significantly higher seed yield (1684 kg/ha), net monetary returns (Rs. 86633/ha) and B:C ratio (5.72) in cowpea with life saving irrigation
- Effect of Integrated weed control in seed yield of Cowpea: Results showed that application of Pendimethalin @ 0.75 kg a.i./ha as PE + One Interculture at 20-25 DAS gave significantly highest seed yield (1004 kg/ha) and net monetary return (Rs. 45190/-ha) over all the treatments, but at par with weed free and Pendimethalin @ 0.75 kg a.i./ha as PE + Imazethapyr @ 40g a.i./ha at 2-3 leaf stage of weeds treatments. However, maximum B:C ratio (3.58) was obtained in treatment of Pendimethalin @ 0.75 kg a.i./ha as PE + Imazethapyr @ 40g a.i./ha at 2-3 leaf stage of weeds. The significantly lowest seed yield (501 kg/ha) was noted in Weedy check (No weeding) treatment.

Agronomical Recommendations as per ICAR workshop:

- Application of RDF with FYM @ 2.5 t/ha gave significantly higher seed yield (2026 kg/ha), net monetary returns (Rs. 83297/ha) in clusterbean with life saving irrigation.
- Application of pendimethalin @ 0.75 kg *a.i.*/ha as PE + one inter-cultivation at 20-25 DAS gave significantly higher seed yield (1684 kg/ha), net monetary returns (Rs. 86633/ha) and B:C ratio (5.72) in cowpea with life saving irrigation.

Groundnut:

GROWTH PARAMETERS

Plant geometry: Sowing of the groundnut at 20×10 cm spacing resulted in significantly highest initial and final plant stand (lakhs ha⁻¹) and followed by the spacing of 25×10 cm and the lowest plant stand was observed with 30×10 cm spacing sown crop (Table 9&10). The significantly tallest plant with highest number of branches plant⁻¹were observed where the crop was sown at the wider spacing of 30×10 cm. Placing crop at spacing of 20×10 cm produced the higher number of branches plant⁻¹ and taller plant but was at par with the plant geometry treatment where crop was sown at litter bit wider spacing of 25×10 cm.

Fertility levels: All the observed growth parameters were significantly influenced under different fertility treatments. The tallest plants, highest number of branches plant⁻¹ and maximum initial and final plant stand was observed under the influence of 25 % higher dose of NPK and was at par with 100% RDF application (Table 9&10). Both the treatments 100% RDF and 125% RDF resulted in significantly taller plants and higher number of branches plant⁻¹ compared to 75% RDF of NPK.

YIELD AND YIELD ATTRIBUTES

Plant geometry: All yield attributes, pod and haulm yield of groundnut were significantly influenced under different plant geometry treatments. Sowing of the groundnut at 30×10 cm spacing resulted in significantly highest number of pods plant⁻¹, pod weight plant⁻¹, kernel

weight plant⁻¹, pod yield and haulm yield (Table 11-14). 100 seed weight, shelling per cent and harvest index were not influenced significantly under different plant geometry treatments. Sowing of crop at 30×10 cm spacing resulted in 7.8%, 19% and 8.5%, 7.6% higher pod and haulm yield over 25×10 cm and 20×10 cm spacing of the crop, respectively.

Fertility levels: Different fertility levels had no significant effect on all yield attributes and yield of groundnut during 2nd year of experimentation. Pod weight plant⁻¹, number of pods plant⁻¹, kernel weight plant⁻¹ and pod yield of groundnut were superior under influence of 25 % higher dose of NPK application compared to the treatment where 100 % and 75% NPK was applied (Table 11-14). The lowest values of all yield parameters and pod & haulm yield of groundnut were recorded with 75% RDF.

ECONOMICS:

Plant geometry: The significantly highest values of gross net returns were obtained where the crop was sown at the spacing of 30×10 cm and the lowest values were obtained at the closer spacing of 20×10 cm. The highest value of B:C was recorded with the crop spacing of 30×10 cm and was at par with 20×10 cm sown crop (Table 15).

Fertility levels: The highest values of gross returns, net returns and B C ratio were obtained where 125% NPK was applied followed by 100% RDF application and the lowest returns were fetched where 75% RDF was applied (Table 15).

Conclusion

Application of 25% higher dose of NPK to the crop sown at the spacing of 30×10 cm to the groundnut crop variety ICHG-00440 in the sandy clay soils of Gwalior produced highest yield and fetched maximum net returns.

Sorghum

- Two trials were conducted on response of pre released genotypes to fertility levels and Enhancing the nutrient use efficiency in kharif grain sorghum :
- Sorghum hybrid SPH 1817 and variety SPV 2357 were found promising but nonsignificant difference against check hybrid CSH 16, CSH 25 and variety check CSV 27.
- All grain sorghum genotypes responded up to 125% RDF (100: 500: 500 kg N: $P_2O_{5:}$ K₂O ha⁻¹).
- RDF alone and different doses of liquid biofertilizer combinations with seed treatment Azospirillum and PSB were at par with each other and produced numerically higher grain and dry fodder yields (5463 and 13208 kg ha⁻¹) from used RDF + (seed treatment with Azospirillum@ 2ml+ PSB @2ml /kg seed but net return and B: C ratio (Rs 84356, 4.51) was obtained by RDF alone as compared to other treatments in sorghum.
- Front Line Sorghum Demonstrations (FLDs):Kharif, 2017-18 a total of 50 sorghum demonstrations covering an area of 20 hectare were conducted on improved technology over farmer's practices in the farmers field in Dewas district (Bagli and Udaynagar) of Madhya Pradesh under FLDs.
- Overall mean basis improved practices recorded 104.77% and 54.31% higher grain and fodder yield over farmer's practices.

Natural Resource Management (NRM)

AICRP for Dryland Agriculture:

Theme: I- Rain Water Management

Catchments-Storage Command Relationship for Enhancing Water Productivity in Micro-watershed:

An experimentfor enhancing water productivity in micro –watershed,Soybean and sweet corn for green cobs were sown in *Kharif* season.Whereas, Sweet corn for green cobs, Pea (Vegetable), Tomato were planted in *Rabi* season. Among the different models, Soybean – Chickpea found the more remunerative as it recorded total net returns Rs. 61478/- per hectare with B: C ratio 2.86 followed by sequentially grown Soybean – Pea for vegetable - (Rs. 56886/- with B: C ratio 2.26). The sweet corn (Suger-75) for green cobs were sown in rainy season recorded net return of Rs. 24931/- per ha. Sequentially grown, Tomato *Hy*. Laxmi provided net return Rs. 3148/-. The total net return from sweet corn – Tomato gave net return Rs. 28079/- per hectare. Sweet corn (Suger-75) grown in *Kharif* and *Rabi* both recorded net return of Rs. 31412/- with B: C ratio 1.63.

Theme II: Crops and Cropping systems

Mitigation of Drought Stress by Foliar Application of Chemical Fertilizer on Soybean under Malwa Agro Climatic Zone of M.P.

Spray of chemical fertilizers during dry spell and after reliving of stress/ dry spell, the significant changes in seed yield due to spray of different chemical fertilizers was observed. The treatments significantly higher seed yield of soybean (1193 kg/ha, Net return Rs.15184/- and B:C ratio 1.72) was recorded due to spray of complex fertilizer 19:19:19(NPK)@0.5% +0.5% Zinc sulphate, followed by treatment spray of Complex fertilizer 19:19:19 (NPK) 0.5% (1165kg/ha with 1.69 B:C ratio) and spray of 2 % Urea solution (1097 kg/ha with 1.60 B:C ratio), which were at par but significantly superior to control and rest of the treatments. Control treatment recorded lowest seed yield 823 kg/ha.

Theme III: Nutrient Management:

Long Term Manurial Trial in Vertisols:

Based on the average of last 26 years, treatments T_6 (FYM 6 t ha-1 + N20 P13) gave highest seed yield of 1934 kg ha⁻¹ was found significantly superior with regards to seed productivity however, treatment T6 was found superior to rest of the treatments with regards to improvement in physical and chemical properties of the soil. The treatment T_1 *i.e.*, control was found statistically inferior to all the treatments in respect of yield and fertility status.

Theme: IV- Energy Management:

Low- till Farming Strategies for Resource Conservation and Improving Soil Quality:

The experiment conducting since 1999 (last 19 years) having the treatments conventional tillage with and without off-season tillage, Low tillage *i.e.*, (plough planting only), combined with sources of organic biomass (soybean crop residues, compost, *Glyricidia* leaves) and hand weeding/herbicide application. The results of study during 2017-18 showed that growth &yield attributing characteristics, Rain water use efficiency energy input output and balance,seed productivity and monitory returns were observed highest with treatmentT3 (LT + 4 t ha⁻¹straw + HW and lowest in T1 (CT + RF (-OT) + HW).

Theme V: Participatory Varietal Selection for Abiotic and Biotic stresses:

Evaluation of Pigeonpea Lines for Dryland Conditions Through Farmers' Participation:

The ten entries were tested along with the two checks. The top ranking entries are C 11 (2173 kg/ha); ICP 8863 –08-40 (1961 kg/ha); ICP 8863 –08-41 (1925 kg/ha)were found superior over rest of the entries under test. Whereas, seed yield of check variety JKM 189 (1692 kg /ha) and JA 4 (1988 kg /ha) recorded lowest.

Evaluation of Chickpea varieties for dryland conditions through farmers' participation

During *Rabi* 2017-18, twenty chickpea varieties were sownjust after harvest of soybean on residual moisture. Among the chickpea variety IG 593 recorded highest seed yield 1300 kg/ha with net return of Rs. 38500 per ha and B: C ratio 2.93, followed by Vishal (1280 kg/ha.), JG 16 (1215 kg/ha), JG-230 (1206 kg/ha) JG- 322 (1158 kg/ha.), RVG-202 (1133 kg/ha) and JAKI 9218 (1089 kg/ha) as compared to other varieties that yielded 742 to 1010 kg/ha. Check variety Ujjain 21 recorded 1036 kg/ha seed yield.

AICRP on Irrigation Water Management:

• Effect of different method of sowing, mulching and irrigation scheduling on Soybean - Mustard cropping system on growth, yield and water productivity in alluvial soils of Chambal Command area:

Soybean: The growth and yield contributory characters, seed and straw yield of soybean improved significantly with method of sowing, mulching and irrigation at 60% CPE through drippers. The seed (1390 kg ha⁻¹) and stover yield (2450 kg ha⁻¹) were recorded significantly higher under permanent broad bed and furrow (PBBF) followed by conventional broad bed and furrow (BBF) method, conventional tillage (CT) and least with zero tillage (ZT) sowing method. Similarly, mulching enhanced seed yield by 4.8% over without mulching. Irrigation at 60% CPE through drippers resulted significantly higher seed yield (1440 kg ha⁻¹) over other irrigation methods. The economic study showed that highest gross returns, net returns, B:C ratio were recorded under PBBF sowing method, with mulching and 60% CPE through drip irrigation method. The total water use was

maximum under CT method of sowing (4260 m⁻³ water), without mulching (4575 m⁻³ water) and conventional method of irrigation (4548 m⁻³ water). The maximum water productivity was obtained higher under PBBF sowing method, mulching and 60% CPE through drip irrigation method compared with other treatments.

Mustard: Growth and yield attributes and yield of mustard did not varied by sowing methods but mulching treatments and irrigation method showed significant variation in growth and yield of mustard. Significantly higher values of growth and yield attribute and yield of mustard and water productivity of water was recorded with mulching with maximum net return and B:C ratio. Amongst irrigation methods, application of irrigation at 60% CPE through dripper produced significantly higher values of yield attributes and yield (2570 kg ha⁻¹) of mustard over other method of irrigation. Similarly, maximum gross return, net return, B:C ration and water productivity of water use was also obtained with irrigation at 60% CPE through dripper. The total water use was maximum under CT method of sowing (2315 m⁻³ water), without mulching (2034 m⁻³ water) and conventional method of irrigation (2271 m⁻³ water). The maximum water productivity was obtained higher under PBBF sowing method, mulching and 60% CPE through drip irrigation method compared with other treatments.

• Effect of crop establishment method, irrigation scheduling and crop residue on pearl millet-mustard-cowpea cropping system:

PearImillet: The growth, yield attributes parameters and yield of mustard significantly influenced with conventional sowing of mustard in paired row, with crop residues and irrigation at 0.4 IW/CPE ratio. The increase in yield by 8.8% compared with ZT at recommended spacing (3664 kg ha⁻¹), whereas with crop residues seed yield increased by 7.5% as compared with without crop residues. Among irrigation method, 0.4 IW/CPE ratio was increased in seed yield by 13.5% as compared by rainfed crop. The economic studies showed that higher gross returns, net returns, B:C ratio was recorded under conventional sowing in paired row. The higher total water use was recorded under CT and water productivity with ZT paired rows. The lesser total water use and higher water productivity was recorded under with crop residue as compared with without crop residues. Similarly the water productivity was recorded maximum under 0.4 IW/CPE ratio compared with other treatment of irrigation.

Mustard: The growth, yield attributes parameters and yield of mustard significantly influenced with conventional sowing of mustard in paired row spacing, with crop residues and irrigation at 0.6 IW/CPE ratio. The increase in yield by 4.8% as compared with conventional sowing at recommended spacing (1975 kg ha⁻¹), whereas with crop residues seed yield increased by 6.9% as compared with without crop residues. Among irrigation method, 0.6 IW/CPE ratio was increased in seed yield by 28.3% as compared by rainfed crop. The economic studies showed that higher gross returns, net returns, B:C ratio, total water use under conventional sowing in paired row spacing, with crop residues and irrigation at 0.60 IW/CPE ratio. Similarly the water productivity was recorded maximum under ZT in paired row sowing, with crop residues and crop grown in rainfed conditions.

Cowpea: The growth, yield attributes parameters and yield of cowpea significantly influenced with conventional sowing in paired row spacing, with crop residues and irrigation at 0.8 IW/CPE ratio. The increase in yield by 11.7% as compared with conventional sowing at recommended spacing (785 kg ha⁻¹), whereas with crop residues seed yield increased by 15.7% as compared with without crop residues. Among irrigation method, 0.8 IW/CPE ratio was increased the seed yield by 25.1% as compared by rainfed crop. The economic studies showed that higher gross returns, net returns, B:C ratio and water productivity was realized under conventional sowing in paired row spacing, with crop residues and irrigation at 0.8 IW/CPE ratio.

• To determine the effect of different sowing and irrigation methods on growth, yield and soil properties under sesame-chickpea crop sequence in alluvial soil: Sesame: The higher growth, yield attributes, yield, gross, net returns, B:C ration and water productivity of sesame was recorded under PBBF sowing and irrigation in all furrow as compared with other methods of sowings. The increase in seed yield was increased by 49.3% with sowing of crop on PBBF as compared with conventional sowing. Similarly irrigation in all furrow increased the seed yield by 93.4% as compared with rainfed crop.

Chickpea: The maximum growth, yield attributes, yield gross and net returns of chick pea was recorded under PBBF sowing and irrigation in all furrow as compared with other methods of sowings. The increase in seed yield was 43.9% with sowing of crop on PBBF as compared with conventional sowing. Similarly irrigation in all furrow increased the seed yield by 44.7% as compared with rainfed crop. The higher total water use was recorded under irrigation in all furrows, whereas water productivity with irrigation in alternate skip furrow.

• Effect of different level of slope and method of irrigation on cluster bean – wheat cropping system on growth, yield and water productivity in alluvial soil:

Custerbean: Higher growth and yield attributing characters, yield were achieved under 0.1% slope through laser land leveller and sowing of crop on BBF compared other treatments. The increase in seed yield was 17.7% with sowing of crop at 0.1% slope as compared with traditional land leveling method, whereas increase by 28.9% with irrigation in furrow with sowing of crop on BBF method as compared with conventional sowing. The higher net returns and B:C ratio was recorded with sowing of crop at 0.1% slope PBBF irrigation method. Similarly irrigation in all furrow increased the seed yield by 93.4% as compared with rainfed crop.

Wheat: Higher growth and yield attributing characters, yield were achieved under 0.1% slope through laser land leveller and sowing of crop on PBBF compared other treatments. The increase in seed yield by 12.9% with sowing of crop at 0.1% slope as compared with traditional land leveling method, whereas increase by 7.2% with irrigation in permanent furrow with sowing of crop on PBBF method as compared with conventional sowing. The higher net returns, B:C ratio and water productivity was recorded with sowing of crop at 0.2% slope with PBBF irrigation method.

• Assessment effect of soil water conservation techniques and cropping systems at head, mid and tail reaches of selected distributaries on farmers' fields (ORP) for increasing yield and water productivity of Chambal canal command area:

Summary: Farm Irrigation Water Management (OFIWM) experiments were conducted at different locations of head, mid and lower reaches of minor Chambal canal command areas. The paddy, pearlmillet, greengram, pigeonpea, clusterbean, sesame in *Kharif* and mustard, wheat and chickpea were taken during *Rabi*. The interventions such as leveling through laser assist land leveling, sowing and irrigation methods were taken. The results showed that at head reaches beneficial crop rotation pigeonpea – wheat followed by paddy – wheat, whereas at mid reaches pigeonpea – wheat followed by clusterbean – wheat and at lower reaches clusterbean – barley followed by pearlmillet – mustard and pearlmillet – chickpea, respectively. Among irrigation method, broad bed and furrow was found best in terms of yield, economic benefits and water productivity in all head, mid and lower reaches of canal command area in all crops except paddy.

• Rain water conservation in pond and its effect on crop-livestock and agroecosystems:

Summary: The construction/renovation of ponds had a great impact on the changes in area of irrigation with storage of water in ponds and recharges of ground water by 10 feet. Resulting increase in irrigated area from 38 to 100%, changes in cropping intensity from 141 to 215% by the adopting system through pond based lift irrigation. The increase in yield was 11 to 179% of rainy season crops, like wise 72 to 84% of winter season crops. Farmers started raising more remunerative crops as well as fodder for milch animals and consequently their annual income increased more than 2 times. Also, there was a significantly higher employment generation, check the migration and overall prosperity. Intangible benefits recharging of ground water had decreased salinity/alkalinity of ground water as well as also checks the formation of ravine land through control the soil erosion, which is serious problem of Chambal division of Madhya Pradesh.

Impact of community based solar lift irrigation system on productivity and economic profitability in rainfed conditions:
 Summary: Construction of small stop dam on river and irrigation with solar lift irrigation system (SLIS) not only improved the productivity and income from agricultural crops by assured and timely irrigation but also increased the income from secondary agriculture of farmers'. In addition to income conserving rain water in small stop dam increased the water table up to 20 feet, resulting in increased irrigated area. After installation of SLIS cropping intensity was increased from 130% to 224%. Early withdrawal of rain conditions irrigation at critical growth stages increasing the productivity of rainy season crop pearl millet was the least (38%), while highest of sesame (92%), followed by that of green gram (58%) and of winter season crop of mustard was much higher (108%) followed by wheat (19%) and chick pea (10%), respectively. The cultivation cost and net income of crops were increased due to timely irrigation at critical stages of crops, adoption of improved package and practices cost

due to assured higher yield. The highest net returns in rainy season crops were recorded with pigeon pea followed by green gram, pearl millet and sesame. Similarly in winter season crops higher net income was obtained from wheat followed by mustard and chickpea. The total net income of 28 farm family from agricultural crops and secondary agriculture was Rs. 4,28,004 and Rs. 8,33,756 yr⁻¹ before SLIS and it was increased after SLIS Rs. 20,61,331 and 14,76,276 yr⁻¹, respectively. The impact of total net annual income from crops and secondary agriculture was Rs. 22.76 Lacs yr⁻¹. The overall (including cost of SLIS) net annual income increase Rs. 17.35 Lacs yr⁻¹. The benefit cost ratio 3.4 and estimated payback period was one and half year. The environmental advantage of the community based SLIS are eco-friendly, cleaner and greener option of irrigation, no expenditure on fuel, low maintenance cost, saved energy, time and labour. Thus the tribal community will be able to generate higher income, raise their living standard by diversified agriculture productionand restraining the migration due to generation of employment in rainfed areas.

AICRP on Management of Salt Affected Soils and Use of Saline Water in Agriculture:

- Water samples were collected from different tehsils of Dewas district: These include samples from open wells and tube wells. The wells/ tube wells vary in depth from 8 to 183 m depth in Dewas district. The details of location, depth of open well / tube well and crops grown.
 - **Results:**
- Dewas Tehsil: The quality of groundwater samples indicate that pH, EC SAR and RSC ranged from 7.1 to 8.25, 0.59 to 4.15 dSm⁻¹, 0.60 to 9.45 and Nil me L⁻¹ respectively (Table 4). Carbonate, bicarbonate, chloride and sulphate ions ranged from Nil, 1.0 to 8.6, 2.0 to 22.4 and 0.6 to 52.0 me L⁻¹, respectively. Similarly the cations like Ca²⁺, Mg²⁺, Na⁺ and K⁺ varied from 1.8 to 18.0, 0.0 to 12.8, 1.18 to 17.67 and 0.01 to 10.30, respectively. Out of thirty two samples, 27 (84.4 %) water samples found under good water category "A". However, 4 (12.5 %) and 1 (3.1 %) samples found under marginally saline water (B₁) and saline (B₂) categories respectively.
- **Bagli Tehsil:** The quality of groundwater of Bagali tehsil indicate that pH, EC, SAR and RSC ranged from 7.50 to 8.14, 0.62 to 1.40 dS m⁻¹, 0.63 to 2.28 and Nil me L⁻¹ respectively (Table 4). Carbonate, bicarbonate, chloride and sulphate ions ranged from Nil, 1.00 to 3.00, 2.20 to 8.80 and 0.80 to 4.40 me L⁻¹, respectively. Similarly the cations like Ca²⁺, Mg²⁺, Na⁺ and K⁺ varied from 2.00 to 7.80, 0.40 to 3.40, 1.01 to 4.45 and 0.00 to 0.30, respectively. Out of 14 samples, 14 (100.0 %) water samples found under good water category "A".
- KannodTehsil: The quality of groundwater samples indicate that pH, EC SAR and RSC ranged from 7.7 to 7.90, 0.59 to 0.89 dSm⁻¹, 0.03 to 2.34 and Nil me L⁻¹ respectively. Carbonate, bicarbonate, chloride and sulphate ions ranged from Nil, 1.6 to 2.8, 3.0 to 5.0 and 0.4 to 2.0 me L⁻¹, respectively. Similarly the cations like Ca²⁺, Mg²⁺, Na⁺ and K⁺ varied from 2.2 to 4.8, 1.20 to 4.40, 0.07 to 3.77 and 0.01 to 0.10, respectively. Out of thirty two samples, 5 (100%) water samples come under good water category "A".

- KhategaonTehsil: The quality of groundwater of Khategaon tehsil indicate that pH, EC, SAR and RSC ranged from 7.40 to 8.0, 0.65 to 1.19 dS m⁻¹, 1.17 to 1.99 and Nil me L⁻¹ respectively. Carbonate, bicarbonate, chloride and sulphate ions ranged from Nil, 2.0 to 3.00, 2.60 to 4.20 and 1.80 to 5.60 me L⁻¹, respectively. Similarly the cations like Ca²⁺, Mg²⁺, Na⁺ and K⁺ varied from 3.80 to 6.40, 0.40 to 2.20, 1.73 to 3.27 and 0.03 to 0.22, respectively.Out of 3 samples, 14 (100.0 %) water samples found under good water category "A".
- Hatpipaliya Tehsil: The quality of groundwater of Hatpipaliya tehsil indicate that pH, EC, SAR and RSC ranged from 7.40 to 8.3, 0.57 to 1.76 dS m⁻¹, 0.42 to 1.67 and Nil me L⁻¹ respectively. Carbonate, bicarbonate, chloride and sulphate ions ranged from Nil, 1.0 to 4.80, 2.0 to 7.0 and 1.0 to 9.6 me L⁻¹, respectively. Similarly the cations like Ca²⁺, Mg²⁺, Na⁺ and K⁺ varied from 2.6 to 9.40, 1.20 to 6.20, 0.7 to 3.27 and 0.03 to 0.21, respectively.Out of 12 samples, 14 (100.0 %) water samples come under good water category "A".
- Sonkatch Tehsil: The quality of groundwater of Sonkatch tehsil indicate that pH, EC, SAR and RSC ranged from 7.20 to 9.3, 0.48 to 3.98 dS m⁻¹, 0.52 to 5.58 and Nil me L⁻¹ respectively. Carbonate, bicarbonate, chloride and sulphate ions ranged from Nil, 1.0 to 5.40, 2.0 to 21.4 and 0.2 to 21.4 me L⁻¹, respectively. Similarly the cations like Ca²⁺, Mg²⁺, Na⁺ and K⁺ varied from 1.60 to 17.0, 0.00 to 13.0, 0.82 to 8.85 and 0.00 to 1.08, respectively. Out of thirty four samples, 34 (97.1 %) water samples come under good water category "A". However, 1 (2.9 %) and 1 (3.1 %) samples fall under marginally saline water (B₁) categories respectively.
- Udaygarh Tehsil: The quality of groundwater of Udaygarhtehsil indicate that pH, EC, SAR and RSC ranged from 7.5 to 8.5, 0.35 to 1.27 dS m⁻¹, 0.29 to 3.50 and Nil me L⁻¹ respectively. Carbonate, bicarbonate, chloride and sulphate ions ranged from Nil, 1.0 to 3.0, 1.4 to 8.2 and 2.0 to 4.8 me L⁻¹, respectively. Similarly the cations like Ca²⁺, Mg²⁺, Na⁺ and K⁺ varied from 1.20 to 5.20, 0.00 to 5.20, 0.38 to 6.07 and 0.00 to 0.60, respectively.Out of 24 samples, 24 (100.0 %) water samples come under good water category "A".
- Tonkkhurd Tehsil: The quality of groundwater samples indicate that pH, EC SAR and RSC ranged from 6.9 to 9.3, 0.52 to 4.58 dSm⁻¹, 0.20 to 10.99 and Nil me L⁻¹ respectively. Carbonate, bicarbonate, chloride and sulphate ions ranged from Nil, 2.0 to 8.00, 1.20 to 31.0 and 0.6 to 28.60 me L⁻¹, respectively. Similarly the cations like Ca²⁺, Mg²⁺, Na⁺ and K⁺ varied from 2.0 to 26.0, 1.0 to 13.4, 0.42 to 17.37 and 0.01 to 1.18, respectively. Out of fourty samples, 20 (50%) water samples come under good water category "A". However, 17 (42.5%) and 3 (7.5%) samples fall under marginally saline water (B₁) and saline (B₂) categories respectively.

• 4.7.3 Crop Protection Technology:

• **Sorghum** :The crop was sown during third week of July as per the protocol. Performance wise except few lines overall germination was uniform ranged from 70 to 95 percent, shoot fly caused damaged to the genotypes at 21 DAE which was more or less remained same up to 28 DAE. The mortality of the crop plants was observed in some of the replications due to weed flora. This year sucking pest infestation on crop Panicle damage caused due to lepidopteron and sap sucking pestswas also at lower population .The overall crop growth was quite satisfactory. Genotypes performed better in their categories in keeping lower shoot fly, stem borer dead hearts and lower panicle damage, among the test varieties and hybrid genotypes .The checks IS 18551 and IS2205 showed their superiority in keeping less pest infestation with comparatively higher yields obtained from them. The maximum shoot and panicle pest damage was observed in susceptible check. In case of seed treatment trial (IPM), seed treated with Imidacloprid 70 WS @ 3g/ kg of seed + whorl application of carbofuran 3G @ 8 kg/ ha. at 30 DAE. Sorghum seed treated with imidacloprid 70 WS @ 3g/kg of seed + spray of 5% NSKE at 45 DAE Sorghum seed treated with Imidacloprid 70 WS @ 3g/ kg of seed + Spray of Metasystox 25 EC @ 2 ml/ litre at 45 DAE. Sorghum seed treated with Imidacloprid 70 WS @ 3g/ kg of seed. Sorghum with furrow application of Carbofuran 3G @20 kg/ha + Spray of Metasystox 25 EC @ 2 ml/ liter at 45 DAE. Sorghum with furrow application of Carbofuran 3G @20 kg/ha + whorl application of carbofuran 3G @ 8 kg/ha at 30 DAE. Over sorghum crop without any application (Control).

- Pearl Millet:
- In initial trial two entries viz., MH2339 and MH 2352 showed multiple disease resistance reaction as these were free from downy mildew, smut and blast.
- In advance testing two entries viz., NBH 5061,MH2155 and Kaveri super boss were free from downy mildew, smut and blast.
- In released hybrid/varietal trial two entries viz., MPMH17 and NBH 5061 free from Smut and blast with less than 5 per cent downy mildew.
- The *Scleresporagraminicola* population at Gwalior location are moderately virulent as it infected (more than 10 per cent downy mildew) 15 entries out of 54 entries.
- In respect of blast reaction a great variability was recorded among the 51 genotypes supplied for PMBVN -2017 .The genotypes were categorized in the range of highly resistance to highly susceptible.
- For the management of downy mildew Metalaxyl seed dressing was found significantly superior over tested bio-control seed dressing.
- Trifloxystrobin + Tebuconazole was found significantly superior over other treatments against Blast.

Protein profiling in Pearl millet resistant and susceptible genotypes

• An attempt has been made to analyze on the basis of molecular protein bands in blast resistant and susceptible genotypes using SDS-PAGE to identify in different genotypes of pearl millet. Since each plant protein is expressed specific bands. The protein bands pattern reveal that the maximum (9 bands) in highly resistant genotype and minimum (3 bands) in highly susceptible genotype. The presence or absence of protein bands and their intensity may be responsible factors for blast disease in pearl millet.

Biochemical Status in the leaf of downy mildew resistant and susceptible genotypes

- Ortho dihydroxy phenol and total phenol were found maximum in downy mildew resistant genotypes than the susceptible genotypes.
- Resistant genotypes exhibited more amount of total sugars as compared to susceptible genotypes.
- Downy mildew infection initially decreased the starch content in highly susceptible cultivars.
- Susceptible genotypes showed less amount of amino acid as compared to resistant genotypes.
- More soluble protein was found in the downy mildew susceptible genotypes as compared to resistant genotypes.

Pigeonpea

- Evaluation of IVT (MD) entries results revealed that out 24 entries 5 entries viz TRG-87, TDRG-59, IBTDRG- 2, IBTDRG-3 & PT 0723-1-2-3 etc. showed resistant against *fusarium udaum* in wilt sick plot. Wilt % ranges from 3 % to 97.00%. In the susceptible check ICP-2376 wilt incidence was 95.49%. Only one entry were recorded moderate resistance reaction (10-30%) against wilt. LSI was 50.63% of IVT (MD) entries in the wilt sick plot.
- Evaluation of IVT late duration entries results revealed that out 15 entries 7 entries viz KA-16-5, KA-16-1, PA-501, PT-0704-1-2, IPA-2014-4A, IPA-2014-2, IPA-15-2 etc showed resistant against *fusarium udaum* in wilt sick plot. Wilt % ranges from 2 % to 65 %. In the susceptible check ICP-2376 wilt incidence was 95.49%. 5 entries were recorded moderate resistance reaction (10-30%) against wilt. LSI was 18 % of IVT Late duration entries in the wilt sick plot.
- Evaluation of AVT entries results revealed that out 12 entries No entries showed resistant against *fusarium udaum* in wilt sick plot. Wilt % ranges from 11 % to 95.00%. In the susceptible check ICP-2376 wilt incidence was 95.49 %. 4 entries were recorded moderate resistance reaction (10-30%) against wilt. LSI was 38.70 % of AVT entries in the wilt sick plot.
- Evaluation of IVT early duration entries results revealed that out 8 entries No entries showed resistant against *fusarium udaum* in wilt sick plot. Wilt % ranges from 20 % to 95.49 %. In the susceptible check ICP-2376 wilt incidence was 95.49%. Only one entries was recorded moderate resistance reaction (10-30%) against wilt. LSI was 64.52 % of IVT Early duration entries in the wilt sick plot.
- Evaluation of AVT mid early, medium and late duration entries results revealed that out 21 entries 1 entry GRG-152, showed resistant against *fusarium udaum* in wilt sick plot. Wilt % ranges from 2 % to 98.98 %. In the susceptible check ICP-2376 wilt incidence was 98.49 %. 6 entries were recorded moderate resistance reaction (10-30%) against wilt. LSI was 50.1% of AVT Mid Early Medium & Late duration entries in the wilt sick plot.
- Evaluation of SVT entries results revealed that out 10 entries 8 entries viz, RVKT 309,310,311,314,315,316 & JK 189, TJT 501 showed resistant against *fusarium udaum*

in wilt sick plot. Wilt % ranges from 0.9 % to 12.45 %. 2 entries were recorded moderate resistance reaction (10-30%) against wilt.

- Survey over 29 villages of the 7 district (Nimar Velly Zone 11) and adjoining area were surveyed for Wilt of pigeon pea and it was noticed that when medium duration varieties viz JKM189, Aasha, JKM7, BSMR736, TJT 501, and private Verities, were grown either as a sole crop or intercropped with Cottan Moong, Maize, Soybean etc. the incidence of wilt was very low on the contrary when local cultures were grown either as sole crop or inter crop the incidence of wilt was quite high. This indicates towards potential of early and medium duration high Yielding varieties in the region. Incidence of wilt (medium) to high may be attributed to average rainfall with more rainy days and high temperature. However in the kharif season of 2017-18 there was 2 dry spell coupled with low rainfall (590 mm) resulted in less incidence of Wilt in the region.
- ICAR- ICRISAT wilt & SMD Nursery trial results revealed that out of 30 entries 16 entries were reported resistant (below 10%) against *fusarium udum* in wilt sick plot, wilt ranges from 0% to 66.07 % .In susceptible check ICP2376 wilt incidence was 66.07 % and LSI was 12.15 %.

Entomology:

- The minimum pod damage (10.7%) by pod fly and (5.1%) by pod borer was recorded in IPM over 31.5% by pod fly and 11.2% by pod borer in farmer's practice as against maximum pod damage by pod fly 45.8% and by pod borer 18.3% was recorded in untreated control. The IPM module gave maximum yield of 2150 kg. / ha with additional yield of 1200 kg/ha.
- Per cent pod damage by pod borer was minimum in GRG 152 . While per cent pod damage by pod fly was minimum in check JKM-189. The per cent grain damage by pod borer was also less in check JKM-189. The per cent grain damage by pod fly was lowest in RVSA 16-4. The grain yield was highest of GRG 152.
- Per cent pod damage by pod borer and pod fly was minimum in check JKM-189. The per cent grain damage by pod borer was also less in check JKM-189 followed by check BDN 2. The per cent grain damage by pod fly was also lowest in check BDN 2. The grain yield was highest of RKPV 527-01.
- Genotype ICPL Ha RL 4985-10 recorded significantly less damage (9.5%) by pod borer and pod fly as against maximum in DA 322 (20.3%). The per cent grain damage by pod borer was minimum in ICPL Ha RL4985-10(1.6%) followed by ICPL Ha RL4989-7.
- All the combination treatment showed higher efficacy against the pest in comparison to sole treatments. Minimum per cent pods (2.5%) and grain (0..37%) damage was recorded in the Chlorantraniliprole 18.5 SC >flubendamide 480 SC>dimethoate 30 EC treated plot while it was maximum (28.0% pod and 8.3% grains damage) in untreated plot. The grain yield of 26.8 q/ha was recorded in chlorantraniliprole>flubendamide>dimethoate treated plot.
- All the insecticidal treatments showed superiority over untreated control and NSKE for reducing the adult beetle population. A botanical treatment i.e. NSKE showed non significant superiority over untreated control only.

• The per cent pod damage by pod borer and pod fly was comparatively higher than last year. Per cent pod damage by pod borer was started in 38 SMW (0.7%) and pod fly in 36 SMW (0.9%) which was their normal appearance of time for Nimar Zone. The pest infestation was increased gradually as the time passed and reached its peak (24.7%) in 52 SMW for pod borer and (63.2%) in 51 SMW for pod fly.

Rapeseed & Mustard:

- SCREENING OF BRASSICA GERMPLASM (AVT-I & AVT-II STRAINS) AND BREEDING MATERIAL AGAINST DIFFERENT DISEASES (UNDER NATURAL CONDITIONS) :The disease severity of Alternaria leaf blight and Alternaria pod blight was observed low to very low in all the experiments in this year due to unfavorable climatic conditions for this disease. BIOYSR, DLSC 1, TS 46 GSL- 1 were found free from the WR and entries CS 2009-154,RH 1573, PRE 2013-10,TH 1402,RAUDT 10-33,PT 2010-5 and LES-54 were found resistant to highly resistant for WR and DM in natural conditions as well as artificial inoculation condition.In case of Sclerotinia stem rot the entry CS 13000-3-1-1-4-2,DRMR 4005, SVJ 68,RH 1573,PRE 2013-10,RH 1326,NPJ 203,RH 761,BIOYSR,PHR 2,RGN 394,DLSC 1,DRMR-1153-12,NIMH 23,CS 700-2-1-4 and CS 900-1-2-2-1-3 were found free from Sclerotinia stem rot in natural conditionsIn case of Powdery Mildew DRMR 4005,SVJ 68,RH 1573,TS 38,TH 1402,RAUDT 10-33 ,NIMH 23,DLSC 1 and GSL 1 were found free from Powdery Mildew in natural conditions.
- UNIFORM DISEASE NURSERY TRIAL (UDN) FOR MAJOR DISEASES OF RAPESEED MUSTARD (UNDER NATURAL CONDITION) :Entry NDYS-424,PDZ-3,GSL 1 ,DRMR-2019 ,DLSC 1 , and DRMRSJ-14-1-2 were found free from White-rust and Downy mildew while entry YSB 9 ,PAB-14-5,PRD-14-11,PRD-14-18,RMM-09-06 ,DRMR 1-5,DRMR-2035,PT 303,JM-1,DRMR 2-11 and DRMR 5206 were found resistant to highly resistant to White-rust and Downy mildew and stagehead in natural conditions In case of powdery mildew the entry YSB 9,NDYS-424,GSL 1 ,DLSC 1 ,PT 303,and DRMR 2-112 were found free from Powdery mildew.In case of Sclerotinia stem rot the entry DRMRSJ 14-1-2,DLSC-1 and DRMR-5206 were found free from SR in natural conditions.
- NATIONAL DISEASE NURSERY TRIAL (NDN) FOR <u>ALTERNARIA BLIGHT</u> UNDER ARTIFICIAL INOCULATION CONDITION :The disease severity of Alternaria leaf blight and Alternaria pod blight was observed low to very low in all the experiments in this year due to unfavorable climatic conditions for this disease . Entry RMWR-09-1,NDYS-424,DRMR-2019 AND RTM -15-29 were found free from White-rust and Downy mildew and entry RMM-09-06 RMWR-09-2,DRMR -2035,DRMR-5206 NPJ-217, EC-399301 and NC-1 were found resistant to highly resistant for WR and DM in natural conditions. In case of powdery mildew the entry NDYS-424,NPJ-217 ,RMT-15-29,RMT-10-13 AND NC-1 were found free from Powdery mildew.In case of Sclerotinia stem rot the entry RH-1378,RMM-09-06 ,RMWR-09-2,RMWR-09-1 ,NDRS-2011,RMM-09-4,EC 399301,PHR-2 and npj-218 were found free from SR in natural conditions.
- NATIONAL DISEASE NURSERY (NDN) FOR <u>WHITE-RUST</u> UNDER ARTIFICIAL INOCULATION CONDITION :Entry DRMRIJ 12-21,BIOYSR ,DRMR 2035,DRMR 2019,DRMRIJ 12-28,DRMRIJ 12-40,DRMRIJ 12-39,NDYS 424 and NPJ 217 were found

free from White-rust and Downy mildew and entry DRMRIJ 12-50,DRMRSJ-14-1-2,DRMRIJ 12-37,DRMRJA 35,NDRS 2009-1-2,NDRS-2011,JM-2,DRMRIJ 12-41 were found resistant to highly resistant for WR and DM in artificial inoculation conditions, rest of the entries were found susceptible, moderately susceptible to highly susceptible for WR and DM.In case of powdery mildew only two entry DRMRIJ 12-28 and NDYS-424 were found free from Powdery mildew in natural conditions. In case of Sclerotinia stem rot the entry DRMRIJ 12-51 AND DRMRIJ 12-28 were found free from SR in natural conditions.

• EPIDEMIOLOGY OF AB,WR,PM,DM AND SR -MORENA : Two varieties Varuna and Rohini were sown in 8 date of sowing (October, 01 to November 19). The disease index % were observed calculated according to rating scale of different disease.

VARUNA VARIETY:

AB Leaf blight and AB Pod blight severity was low to very low in this year

WR, DM :-Minimum WR,DM severity was recorded in 1 Oct.,8 Oct., and 15 Oct. 29 Oct. sowing, while maximum severity were recorded in 29 Oct. sowing.

PM:- The minimum powdery mildew severity was recorded in 8-Oct. sowing while maximum disease severity were recorded on after 19 Nov.(on 96 das) date of sowing. **SR:-**The maximum disease incidence were recorded in 22 Oct. sowing crop while maximum disease incidence was found in late sown crop (29 Oct. 5 Nov., 12 Nov. and 19 Nov.)

ROHINI VARIETY:

WR DM:-

Initiation of WR and DM symptoms were recorded in 54 DAS in 12 Nov. and 19 Nov. sowing crop stage, while WR disease was observed late (68DAS) in 1, 8, and 15 Oct sowing crop stage. The maximum disease (40.9%) was observed in 96 DAS in 29 Oct and 41.8% severity was recorded in 12 Nov. sowing crop stage. DM was observed late in early sown crop while the disease was observed early in late sown conditions. In case of Sclerotinia stem rot disease was started in later stage of crop in early sown condition and early start in late sown crop in both the varieties. The Maximum seed yield (3250kg/ha) was recorded in 22 Oct. date of sowing crop and Maxi. Oil con. % (41.10%) was recorded in 1 Oct. date of sowing crop

INTEGRATED MANAGEMENT OF <u>SCLEROTINIA STEM ROT</u>-2017-18:

The maximum seed yield 3252 kg/ha was recorded in seed treatment with Carbandazim 50 wp @ 2g/kg seed + No. irrigation during 25th Dec. to 15th Jan and two foliar spray of Carbendazim 50 wp@ 1g/l of water at 45-50 and 65-70 days after sowing followed by seed treatment with Carbendazim 50 wp @ 2 g/kg seed + No irrigation during 25th Dec to 15th Jan with one foliar spray of Carbendazim 50 wp @ 1g/l of water at 60-65 days after sowing. These technology reduce the severity of all the diseases of Rapeseed mustard and also good for oil con.(39.47 and 40.65 %).

As for as disease concern the Alternaria blight and pod blight, minimum (18.20% and 8.6%) disease severity was recorded in spray of Propiconazole 25 EC @ 0.05% at 60-65 days after sowing as compare to control (46.37% (AB) 16.43% (A pod B) respectively. While rust, Downey mildew Stage head and Powdery mildew disease was also recorded minimum in spray of Propiconazole 25 EC @ 0.05% at 60-65 days after sowing. In case of SCLEROTINIA STEM ROT the seed treatment of Carbendazim @ 2g/kg and 2 foliar spray @ 1g/l of water at 45-50 and 65-70 days after sowing with no irrigation during 25th Dec. to 15th Jan. was found best to control this disease and get maximum yield (3252 kg/ha).the treatment T-6 and T-5 are the best treatment to reduce WR up to 13.03 to 15.27% as compare to control 45.47% to 44.60%. Treatment T-4 are the best treatment to control SR (11.67%) as compare to control 75% to 81.67%. In case of Powdery mildew the 0.05% Propiconazole 25 EC are most effective against PM at 60-65 DAS.

YIELD LOSSES DUE TO SCLEROTINIA STEM ROT-

Five treatment (Five varieties) were taken in this experiment out of which four varieties were selected area specific recommended along with one recommended management plot (RVM-2 with chemically controlled plot) with 3x5 meter plot size 4 replication under RBD were tagged and observed 90 to 100 days after sowing tagged 20 diseased plant of different ratting scale and observed thoroughly in all varieties after that calculate the yield loss due to SR. Five varieties viz. RH-749, Varuna, Rohini, Kranti and RVM-2 (control) were sown and 387-394 plant population of maintain in each plot. RVM-2 (control plot) varieties seed was treated with Carbendazim@ 2g/kg seed and 2 spray of Carbendazim @ 0.1% were applied on 50 & 60 DAS. Number of Sclerotinia stem rot symptoms were recorded according 4 rating scale in all 4 varieties.Maximum 75 % disease incidence was recorded in Varuna variety followed by Rohini (67.50%).In case of yield loss, the maximum 88.73 % yield loss recorded in 4 rating scale in variety RH 749 followed by Kranti (85.43 %). Maximum 2835.50 kg/ha seed yield and 39.75% oil cont. was recorded in variety RVM-2.

ASSESSEMENT OF PROMISING LINES OF APHID.

Screening of assessement of promising lines of aphid in advance breeding germplasm were tested including suseptible check BSH -1. Aphid pressure was observed to lowest to highest infestation at flowering, pod formation stage . Aphid infestation was recorded , index (0-5 scale), 10 cm top twig per plant. Infestation on the basis of 10 randomaly selected per plant . Total no of entries was Sixty Two (62) from RH15-99-7 toBSH-1 Suseptible check . The lowest I,II,III mean of aphid population was obtaint in entries 1.245S35 , 1.4 NPJ-195 and 1.5RH1514,DRMR15-9 .The highest I,II,III mean of aphid population value was obtaint in entries 3.5 NRCHB-101 , 3.0 RH1599-7 and 2.9 RHH-1561.

ASSESSMENT OF YIELD LOSSES DUE TO INSECT -PEST IN BRASSICA CROPS.

The aphid appereance started low to high at flowering,pod formation stage . Aphid population was recorded on randomaly selected 10 tagged plants per plot/10 cm top twig . Before every spray data was recorded of insect pest population percent reduction. The mean value of aphid was recorded in NRCHB101(142.7) 7& BSH-1 (187.5) in un protected plot. The highest yield was obtained (22.53 q/ha. in P and 19.61 q /ha. in UP)followed by 14.35q/ha. in P and 10.96 q/ha. UP yield was found . The avoidable yield losses was minimum (12.3%) in NRCHB-101 followed by 23.6.

AGRO-ECOLOGICAL ANALYSIS OF VARIOUS INSECT - PEST ON BRASSICA CROPS.

The field experiment was conducted on four different cultivars of Brassica varieties. The variety namely B.J. RH-749, E. Sativa JMTA-06-01, B.napus GSL-1 and B. rapa, NC-1 verities was sown in TS & LS condition in different major insect –pest in Brassica crops . The Result indicate that that the aphid appearance was recorded on SMW 1 st .The highest peak level of aphid population/ top 10 cm top twig 0.4 to 3.0, SMW 3rd to SMW 7th and The highest peak level of aphid population/ top 10 cm top twig 0.4 to 3.5, SMW 1st to SMW 13 th was found in all four varieties in Timely Sown & Late sown Condition. The temperatue range 26to 31° C maximum and 8.1to 15.4° C minimum were conductive for aphid population. The peak activity of coccinelllides appearance of adults /plant 0.2 to 1.4 SMW 6th to SMW 9 th was found in all Brassica varities . The temperature range 26 to 31° C maximum and 8.1to 15.4° C minimum were conductive for aphid population.

Activities of Honey bee *Apis mellifefa L*.pollinators visit /minute/plant on four different cultivars of Brassica varieties. The variety namely B.J. RH-749, E. Sativa JMTA-06-01, B.napus GSL-1 and B. rapa, NC-1 verities was sown in TS &LS condition. The highest peak activity of honeybee 0.2 to 1.0 SMW 1st to SMW 9th was found in all Brassica varies. The temperature range 26 to 31° C maximum and 8.1to 15.4° C minimum. Honey bee *Apis mellifefa L* positively associated with maximum temperature as well as minimum temperature at flowering stage.

Chickpea

- One hundred thirty six entries including ICCL 86111 and ICCL 3137 as checks were screened for their reaction to *Helicoverpa armigera* under pesticides free field conditions. The larval population [mean 0.83 larvae/mrl] was statistically equal. The pod damage was significantly different in all the entries and ranged from 13.79% [CS] 868] to4.42% [RVG 202]. Considering the low population pressure of pod borer, a large number of entries recorded higher yield than the check [ICCL 86111 2481 kg/ha]. The top three entries which recorded higher yields were GJG 1505 [3314 kg/ha]; BG 3062 [3189 kg/ha]; and BRC 1 [3103 kg/ha].
- Despite low pest population and less pod damage; the entries PRC [3619 kg/ha], Phule G 819 [3528 kg/ha], NBeG 807 [3394 kg/ha], and CSJ 855 [3317 kg/ha] exhibited high yield potential under un-protected conditions.
- The larvae of pod borer appeared during the SWW 48 at density of 0.3 and 0.21 l/mrl, respectively on *desi* and *kabuli* chickpeas. The pest activity stopped after SWW 7. Relatively higher level of incidence was observed on *kabuli* than *desi* chickpea.
- The monitoring of *Helicoverpa armigera* male moths through pheromone traps, obtained from NCIPM, New Delhi, was undertaken in chickpea fields during the crop season 2017-18. The moths were trapped from SWW 6 till SWW 13 with a peak [17.28 moths/trap/week] during SWW 7, coinciding the reproductive phase of the crop.
- In Advance Varietal Trial 1 (Desi group) chickpea entries RKG 13-55 was wilt resistant. In Late sown AVT 1 (Desi) entry Pusa 547 was resistant, however some other entries exhibited wilt tolerance.
- In IVT desi, seven chickpea entries *viz.* H 12-63,IPC 2012-108, H 13-36, NBeG 776, BG 3076, BRC 1 and AKG 1303 were resistant to wilt. In late sown IVT group RG 2011-04, GNG 2144, and GNG 2369 were found to be wilt resistant.
- In rain-fed IVT, entry CSJ 515, BDNG 2003-1 exhibited wilt resistance, whereas in AVT group none of the entry was wilt resistant.
- In mechanical harvesting group AVT 1 entry Phule G 0818 was wilt resistant, whereas, entries RCMB 3, JG 2016-24, and BG 3062 were wilt tolerant. In IVT BG 3093 was wilt resistant.
- In kabuli chickpea AVT 1 NBeG 440 and HK 4 were found wilt tolerant, whereas, in AVT (ELSK) Phule G 0517 was wilt tolerant.
- The effect of climate change was studied in different dates of sowing by taking three chickpea varieties. It was found that the crop sown in Ist week of November suffered more due to wilt.
Soybean

Population of Blue beetle (0.33to 2.33 beetle /mrl) was recorded during 2nd week July-4th week of July. Grey semilloper *,Gesonia gemma* (1.3to 9.7 l/mrl) Green semilooper *Chrysodexis acuta* (0.6 to 7.4 l /mrl) were recorded during August - September. Extend of damage by stem fly and girdle beetle were recorded 80 and 30.5 per cent respectively

Bio control agents recorded on semiloopers:

i Parasitic fungus, Beauveria bassiana infected 0.2 to 2.36 larvae/mrl

during September 2nd week.

ii Dipterous fly, Apentalis sp. 0.3-1.36% parasitisation of early instars

during September 2nd week.

Promising Entries Identified under Advanced varietals trial against major pests

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i Stem fly - AMS-MB 5-18 ,DS3106, PS 1572 ,RVS 2010-1 NRC125 and NRC

ii Semiloopers – JS 20-116 , PS 1572, PS 1556 ,RVS 2010-1 ,NRC 125,VLS 89 and SL 1028

iii Girdle Beetle - DSb 32, KDS 980 ,RVS2007-6 15 , JS 20-116,NRC125 ,PS1556, RVS 2010-1 KDS 921

• Evaluation of Bt 127 SC strain from IIOR, Hyderabad for efficacy against lepidopteran larvae infesting soybean.

The new tested Bt127 SC strain.was at par withtested insecticidesChlorantraniliprile18.5% SC ,Indoxacarb15.8% EC and quinalphos25 EC andfound very effective against greenand greysemilooperrecordedlessthan1larvae/mrland good yield.and good yield.and good yield.and good yield.and good yield.and good yield.

 For management of pod blight complex seed treatment either with carboxin + thiram or carbendazin + mancozeb (2g/kg) followed by Thiophanate methyl@ 0.1% at 55 and 75 DAS has increased the germination and effectively managed the disease.

Grape:

 Survey and surveillance of major insect-pests of grape and their natural enemies' status of new emerging insect pests of grapes and their natural enemies: Survey of vineyards was carried out in Ratlam district of Madhya Pradesh. Total 10 vineyards were surveyed for observing the prevalence of different insect pests viz., Mealybug (Maconellicoccus hirsutus), thrips (Rhipiphorothrips cruentatus), flea beetle (Scelodonta trigicollis), mites (Tetranichus urticae), Spodoptera Sp., Helicoverpa Sp., and stem borer (Coelosterna scabrator). It was observed that out of 10 vineyards surveyed, 6 vineyards (60.00%) were found infested with mealy bug, and but all vineyards having low level of infestation. Infestation of thrips was recorded in all 10 vineyards and but the infestation level was low in 6 vineyards (60.00%) while moderate in 4 vineyards (40.00%). The infestation of flea beetle was low to moderate and recorded in 2 vineyards (20.00 %) only. The infestation of stem borer was recorded in 5 vineyards (50.00 %). Spodoptera was observed only in one vineyard (10.00%) during the period. There was no recorded infestation of Helicoverpa and mite during the period under report. Survey indicates that the thrips, stem borer were the major pests in Ratlam and Mandsaur district which leads to weathering the vineyards.

Level of				Pests			
infestation	Mealy bugs	Thrips	Flea beetle	Spodoptera	Helicoverpa	Stem borer	Mite
Low	6 (60)*	6 (60.00)	2 (20.00)	1 (10.00)	-	5 (50.00)	
Moderate	-	4 (40.00)	-	-	-	-	-
High	-	-	-	-	-	-	-
No	4	-	8	9	10	5	10
incidence	(40.00)		(80.00)	(90.00)	(100.00)	(50.00)	(100.00)

- Survey of grape growing areas for important disease to develop digital disease map: survey taken after fruit pruning in the last week of October month i.e. two month after fruit pruning. In the surveyed vineyards there is approx 69% anthracnose in rainy season but no disease incidence found at the time of pruning and 52% Powdery mildew occurrence in the observed vine yards.
- Validation of online interactive weather information based disease and insect pest risk assessment: : After the foundation pruning incidence of powdery mildew was not observed in advisory plot and farmers practice plot. Similarly incidence of downy mildew was also not observed in the range in advisory plot and farmers practice plot. However, after the fruit pruning incidence of powdery mildew was observed in the range of 0 to 38.37 per cent in advisory plot, while 0 to 21 percent incidence seen in farmers practice plot. The incidence of downy mildew was observed Nil in advisory plot as well in farmers plot. In online advisory plot total three sprays applied for management of powdery mildew and three sprays for downy mildew during the season.

In Farmers practice, they applied total five sprays for management of powdery mildew and three sprays for management of downy mildew during the season. The results indicate that there was saving of two sprays for powdery during the period of report by the use of online advisory as compared to farmers practices with reduction in disease intensity. In case of yield parameter AWS plot with less chemical spray also give yield equal to famer practice.

• **Pest Management:** After the foundation pruning the infestation of thrips and leafhopper were seen 11 days after pruning. In all six sprays were given as per advisory for management of thrips and leafhopper. The infestation level of flea beetle, leaf hoppers, mites and caterpillar are low hence not a single spray was given for control of above pests. In farmers practice plot the risk level was high as compared to Advisory plot. In all six sprays were given for the management of majorly for thrips, and jassids in farmers practice plot. The fruit pruning was done on 05.10.2017 in both the plots. The observations of different pests were recorded twice in a week and feeding of data has been done weekly. The spray has been given as per advisory after forward pruning regularly.

Cotton:

• Pest and Disease scenario: Since Bt cotton is growing in most of the areas in the state so sucking pests are only the problem in our state. Among these sucking pests jassid and white flies are the major ones causing problem every year. Sometimes the incidence of aphids and thrips are also recorded during the season red cotton bug and mealy bugs are also observed somewhere but they are minor ones. During last year the incidence of during jassids and white plies was more in the fields during September & October. In general it was observed that the incidence of sucking pests was more in Bt cotton fields than in traditional cotton fields. Incidence of H.armigera, spotted boll worm and pink boll worm was in traditional cotton fields but there was negligible incidence on Bt cotton fields. The incidence of Myrothecium leaf blight, alternaria leaf blight, grey mildew and bacterial leaf blight were observed in almost all the field but damage due to diseases was negligible.

• Observation on the occurrence of the diseases (In farmers field and research farm):

- 1. Myrothecium leaf blight of cotton was first observed in third week of august in the month of September the disease incidence is increases upto 15.75 %. The disease incidence at present is 6.83.
- 2. Bacterial blight was observed in first week of August the incidence is increases upto 10.43. the disease incidence at present 4.22 percent.
- 3. Grey Mildew was first observed in first week of November the disease incidence was increases upto 40.16 percent.
- 4. On the farmers field cotton was sown in early summer and Myrothecium leaf blight was observed in second week of July and BLB was observed in third week of July.
- 5. The incidence of New Wilt in Bt hybrids has not been observed in Research Farm and farmer field in vicinity of Khandwa.

Onion and garlic:

• Survey and monitoring of major diseases of onion and garlic during *Kharif* 2017-18: A survey was conducted during the *Kharif* 2017-18 in different onion and garlic growing villages in district of Mandsaur and Neemuch. The incidence of disease severity was observed are as follows:

Name of diseases	Disease incidence (%)	Disease severity (%)	Month when disease severity was high	Variety	Locality, village, district, state (M.P.)
Onion					
Purple blotch Stemphyllium leaf blight	10-13	15	August - September September	Local, Nasik Red, AFDR Local, Nasik Red, AFDR	Distric Mandsaur : Sabakheda, Dhariya khedi, Bhai parshwnath, Jeran, Kokhra Chach Khedi Badvan,Semli, Naraynagarh, Pipliya, Bani, Lala Choki District: Neemuch : Bamora Karadiya Jeran
Garlic					
Purple blotch	_			Local Ooty	Distric Mandsaur -
T ut pie bioten				Local, Obty	Sabakheda, Dhariya
Stemphyllium leaf blight	-			Local, Ooty Local	khedi,Bhai parshwnath, Jeran, Kokhra Chach Khedi Badvan,Semli, Naraynagarh, Pipliya, Bani, LalaChoki District: Neemuch : Bamora, Karadiya, Jeran

• Survey and Monitoring of major diseases of onion and garlic in Mandsaur during *Rabi* 2017-18: A survey was conducted during the *Rabi* season 2017-18 on the various onion and garlic fields in different villages of Mandsaur and Neemuch districts. The incidence of disease severity was observed to be high during January- February.

	Disease II	ntensity			
Name of diseases	Percent Disease incidence (%)	Percent Disease Index (%)	Date of Collection	Variety	Locality/ Tehsil

Onion					
Purple blotch	7.67- 9.0.00	15	January February	Local, Nasik red,	Mandsaur, Sabakheda, Dalouda, Sitamau, Shamgarh, Jiran, Piploda,
Stemphyllium leaf blight	10.5- 14.33	4-5	January- February	AFLR	Banni Piplia Vishnia Nandavta, Karju Katlar
Garlic	1.00		1.21		
Purple blotch	8.67- 10.00	15	January February	Local, Shankar	Mandsaur, Sabakheda, Dalouda, Sitamau,
Stemphyllium leaf blight	10.30- 13.67	2-3	January- February	Mahadev, Ooty Local G- 2, G-282, Riyavan local	Shamgarh, Jiran, Piploda, Banni Piplia Vishnia Nandavta, Karju Katlar

Sorghum

Entomology Results: - The crop was sown during third week of July 2017 as per the protocol. Performance wise except few lines overall germination was uniform ranged from 70 to 95 percent, shoot fly caused damaged to the genotypes at 21 DAE which was more or less remained same up to 28 DAE. The mortality of the crop plants was observed in some of the replications due to weed flora. This year sucking pest infestation on crop ,Panicle damage caused due to lepidopteron and sap sucking pestswas also at lower population .The overall crop growth was quite satisfactory. Genotypes performed better in their categories in keeping lower shoot fly, stem borer dead hearts and lower panicle damage, among the test varieties and hybrid genotypes .The checks IS 18551 and IS2205 showed their superiority in keeping less pest infestation with comparatively higher yields obtained from them. The maximum shoot and panicle pest damage was observed in susceptible check.

In case of seed treatment trial (IPM), seed treated with Imidacloprid 70 WS @ 3g/ kg of seed + whorl application of carbofuran 3G @ 8 kg/ ha. at 30 DAE. Sorghum seed treated with imidacloprid 70 WS @ 3g/kg of seed + spray of 5% NSKE at 45 DAE Sorghum seed treated with Imidacloprid 70 WS @ 3g/ kg of seed + Spray of Metasystox 25 EC @ 2 ml/ litre at 45 DAE. Sorghum seed treated with Imidacloprid 70 WS @ 3g/ kg of seed. Sorghum with furrow application of Carbofuran 3G @20 kg/ha + Spray of Metasystox 25 EC @ 2 ml/ liter at 45 DAE. Sorghum with furrow application of Carbofuran 3G @20 kg/ha + Spray of Metasystox 25 EC @ 2 ml/ liter at 45 DAE. Sorghum with furrow application of Carbofuran 3G @20 kg/ha + Spray of Metasystox 25 ec @ 2 ml/ liter at 45 DAE. Sorghum with furrow application of Carbofuran 3G @ 8 kg/ha at 30 DAE.Over sorghum crop without any application (Control

4.8 Linkage and Collaborations with National and International Organizations:

S.N Date Place Description Photograph 01 20-25 Joint Training organized by ICAR march Indian Institute of Soil Science Bhopal 2018 and RVSKVV Fruit Research station Entkhedi Bhopal on 5 days Bee **Keeping training Programe** 1 7/2/2018 AICRP on fruit, Centre, Mandsaur, College of Horticulture under the umbrella of ICAR and RVSKVV, Gwalior organized a farmers' field day on 7 February, 2018. It was followed by varietal exhibition, farmer's field visit and interaction of scientist and farmers on scope, area expansion and limitation of grape production in Madhya Pradesh. The event was inaugurated by Dr. S. D. Sawant, Director, ICAR- NRCG, Pune and Dr. Ashok Krishna, Dean, College of Horticulture, Mandsaur and technologies from AICRP. live specimens were displayed for the benefit of the farmers. Farmer of three (Mandsaur, Ratlam districts and Neemuch) with scientist of KVKs, district officials of line department invited for the farmers' field day. 28-05-College of Horticulture Mandsaur 2018 Organized state level buyer and sellers seminar on M & AP crops in the college college of horticulture, by the department of horticulture and NMPB where in the Seminars MLA Sh. Yashpal Singh Sisodiya and Jila Panchayat Adhyksh Smt. Priyanka Goswami were present.

Training And meeting organized/Participated

5 th March	Prof. Trilochan Mohpatra, Secretary,	
2018	DARE and D.G., ICAR, visiting	5 M
	exhibition organized on the occasion of	A CONTRACT OF
	one day Agri-Industry Meet on 5 th	
	March 2018 at RVSKVV, College of	
1.8.1	Horticulture, Mandsaur (M.P.)	
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Distinguished Visitors:

• Director General, ICAR visited M & AP research field -Mandsaur : Dr. T.

Mahapatra, Director General. ICAR and Prof. S.K. Rao Hon'ble Vice Chancellor visited the project research field of opium poppy, Ashwagandha, Asalio, Isabgol, Kalmegh and Tulsi. During visit of Medicinal crops trails D.G. Shown his keen interest in gene bank of medicinal crops specially opium poppy (235), Ashwagandah (120), Isabgol (80), Asalio (40), Kalmegh (12), and Basil (21). He thauurolly visited all the experimental trails of different medicinal crops of the centre discussed with



scientists and appreciated the work. Prof. S.K. Rao Hon'ble Vice Chancellor explained him about the work done at the centre impact of centre among the farmers of the area. After field visit D.G. visited the college premises and participated in farmer's industrialist interface meeting and give his valuable suggestion to the audience. He also visited exhibition organised by college and different KVK of the university zone.

• **QRT Team Visited M & AP Mandsaur Centre:**_QRT team of ICAR for review of work of AICRP on Medicinal and Aromatic plant College of Horticulture, Mandsaur visited the centre on 19-02-2018. The QRT team members Dr. Harihar Ram and Dr. E.V.S. Prakasha Rao with Dr. Nagaraja Reddy, Sr. Scientist, DMAPR Anand visited Medicinal and Aromatic Crops Specially Ashwagandha, growing villages of Neemuch district project scientist also accompanied them. Dr. Harihar Ram very much appreciated the work of project and performance of Ashwagandha variety RVA-100. Dr. Prakash Rao also discussed the agronomic intervention adopted by the farmers. All the member visited Neemuch Mandi and discussed about the problem and prospect of medicinal crops. They saw the trade of Medicinal & Aromaic crops like Ashwagandha, Isabgol and Asalio in the Mandi and appreciated the work. Finally the team visited the project research field of Opium Poppy, Ashwagandha, Asalio, Isabgol, Kalmegh and Tulsi. They very much appreciated the trials of the project and the large number of germplasm of

different species maintained at the centre. The committee member also went village sabakheda and visited opium poppy and isabgol field and also discussed with the farmers about the work of project scientist and technical guidance received from them. The visit was very much successful



• Research Publications in referred journal

s	Author				Pag	Vo	NASS		155	National /
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1	Dubey R.	and yield of								
		cauliflower								
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		botrytis L.).								
	Jatav, A.S.,	Effect of	International	14 (1)	<u>46-</u>	20	4.8	I14	097	National
	Kushwah	potato	Journal of		55.	18	2	6	3-	
	S.S .,	varieties	Agricultural						130	
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	S.N. and	nitrogen								
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		content in plant and soil.								
3	Nargave, Krishnkan t, Sharma R. K., Kushwah S. S. and Singh O. P.	Influence of varieties and fertility levels on growth, yield and quality of radish (<i>Raphanus</i> sativus L.) under Malwa region of Madhya Pradesh.	International Journal of Agriculture Sciences,	10 (5)	537 1- 537 4.	20 18	4.2 0	I15 3	097 5- 371 0	National
4	Gupta Sourav, Kushwah , S. S. and Mishra, S. N.	Chlorophyll content, dry matter accumulati on, marketable bulb yield, quality and post harvest nutrients status of soil as affected with N levels and varieties in kharif onion (Allium cepa L.).	International Journal of Plant & Soil Science, DOI: 10.9734/IJPSS/201 8/39257	22(2)	1- 11.	20 18	4.7 7	128	232 0- 703 5	Internati onal
5	Manisha Shivade, Parihar M.S., Barde P., Haldar A., and R. Thakur	Effect of plant density, nitrogen and phosphoru s level on growth charecters of cowpea	Agriculture Updates	DOI. 10.	169	20 17	4.3 9			National

		(Vigna unguiculata (L.) Walp)								
6.	Mujalde, S., Choudhar y, S.K., Ranade, D.H. and Ranjeet	Seed priming: a new technology for improving early seed emergence & establishm ents of crops in rainfed conditions of india.	Int. J. Curr. Microbiol. App. Sci	Special Issue-7	363 8- 364 1.	20 18				Internati onal
7.	Pawan Kumar, Swati Pratap, RPS Verma, A.N. Tikle and Rekha Malik	Diversity assessment of hulled barley accessions of ICARDA in Indian condition using cluster analysis	Indian J. Agricultural Research	June(Acce pted)		20 18	4.8			National .
8.	Anil Kumar Meena, Anuj Kumar, Vidhya Sankar M. and Roshan Gallani	Response of ood on growth, flowering & seed attributes of French marigold (Tagetes patula L.) cv. Pusa Arpita under Malwa Region of Madhya Pradesh	Green Farming	9(1)	182 - 184	20 18	4.3	G04 5	097 4- 077 5	National
9.	Vineeta Pahade, Vidhya	Effect of plant growth	Green Farming	9 (1)	173 - 175	20 18	4.3 8	G04 5	097 4- 077	National

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22	Om Singh, H Katine Choro, Jyoti Kanwar, SK Dwivedi and Richa Singh	Formulatio n, nutraceutic al profile and storage stability of aloe gel & ginger juice functional beverage blend.	The Pharma Innovation Journal	6(12)	(37 3- 379	20 17	5.0 3	T04 8	227 7- 769 5	National
23	Om Singh, Deepak Choudhar y, S. K. Dwivedi , B. K. Patidar and Richa Singh	Developme nt and shelf life evaluation of therapeutic ready to serve (RTS) beverages prepared from blending of aonla pulp and <i>aloe</i> <i>vera</i> gel.	The Bioscan,	12(2)	909 - 912 -	20 17	5.2	T01 7	097 3- 704 9	National
24	Vikas Bansal, Monica Premi and Khurshee d A. Khan	Optimizatio n of antioxidant rich indigenous food product "burfi" recipe using response surface methodolo gy and its storage study	International Journal of Agricultural Engineering	Volume 11	41-45	20 18	4.4 3	097 4- 266 2		Internati onal
2:	Varsha Satankar, V. Mageshw aran, P. Jagajanant	Oyster mushroom- A viable indigenous food source for rural	International Journal of Agricultural Engineering	Volume 11	173 - 178	20 18	4.4 3	097 4- 266 2		Internati onal

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S.	Author	Title	Journal	Vol	Pag e	Ye	NASS	JID	ISSN	National / Internatio
NU	(3)			u.	No.	ai	Rating			nal
2	Mahesh	Effect of	Annals of Plant and	20	243	201	4.39	A19	0972-	National
8	Rugi, S.S.	transplant	Soil Research	(3)	-	8		0	1959	
	Kushwah	ing dates			249					
	and R.K.	on growth,								
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		of kharif								
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		cena L.)							-	
		varieties								
29	K.K.	Studies on	Legume Research	41(5	722	201	6.12	L01	0250-	Internati
	Kanchan,	seed	0)	-	8		0	5371	onal
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	Joshi ^{1*} ,	managem								Joshi ^{1*} ,
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	D C	yield,			1-4			097	Internati	Sasoue ² ,
30	N.J. Sikarwar ³	water	Legume Research		(LR-	201	612	6-	onal	N.J. Sikarwar
50	Varsha	productivi	Leguine Research		405	8	0.12	057	(Accepte	³ Varsha
	Gupta ⁴	ty and			3)			1	d)	Gupta ⁴
	and B.S.	economics								and B.S.
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		groundnut								
		(Arachis								
		hypogaea								
		L.)								
-	Noolam	Liquid	Int I Curr Microbiol			201		221	Intornati	Noolam
31	Singh	Biofertiliz	Ann Sci	7	1-8	201	5.38	9-	onal	Singh
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		Sasode, R.	Nutrients								S. Sasode,
		S.	Effect on								R. S.
		Sikarwar	Physiologi								Sikarwar
		and G. S.	cal,								and G. S.
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		K.P. Patel,	Screening	J. Plant Dev.	10(409	201	4.5/		2348-	National
		G.N.	of 110-r	Science	9)	-	8			9170	
		Pandey,	root stock			504					
		B.K.	based								
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		Singh*	vine (Vitis								
		and A.	Vinifera								
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			Madhya								
			Pradesh								
		S.B.	Reaction	J. Plant Dev.	10(511	201	4.57		2348-	National
		Singh*,	of Bt	Science	9)	-	8			9170	
		R.P. Patel,	cotton			515					
		and G.S.	hybrids			4					
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			pests in								
			malwa								
			region of								
			Madhya								
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	S.P.	Low Cost	International	7(355	201	5.38		ISSN2319	Internati
	Tripathi1,	Technolog	Journal of Current	10)	4-	8			-7706	onal
	S.P.S.	v of Sov-	Microbiology and		355					
	Somvansh	Paneer	Applied Sciences		8					
	i2*.	(Tofu)	ISSN: 2319-7706							
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34	R.P.	Sovmilk								
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	M5ahesh	Effect of	Annals of Plant and	20	243	201	4.39	A19	0972-	National
	Rugi, S.S.	transplant	Soil Research	(3)	-	8		0	1959	
	Kushwah	ing dates			249					
	and R.K.	on growth,								
	Sharma	marketabl								
		e bulb								
35		yield and								
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		(Allium								
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	and P.P.	with								
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	,	applicatio	Pharmacology and	[6]					1808	
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		Malwa								
		Plateau					-			
		conditions								
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	A Derapi,	and zinc								
	Naruka	on growth,			247					
		yield and	International	6(5	247	201			2221	Intornati
39	K.C.	quality of	Journal of Chemical	0(5	9- 270	201	5.31		4002	anal
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	Punasya,	rooting	International		5-	8			7692	onal
	Jyoti	media	Journal of Current		151					
	Kanwar	influenced	Microbiology and		0					
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		and								
		vegetative								
40		growth in						119		
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41	Choudhar	cronning	Review journal	03	03	8	or		3085	onal
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	Singh	the malwa					4			
40	and S. Nayama Ajay Punasya, Jyoti Kanwar and Rajiv Dubey Dubey Dubey Dubey S.K. Choure, S.K. Choudhar y, Artika	(Coriandru m sativum L.) cv. RCr- 436 IBA and rooting media influenced survival, rooting and vegetative growth in air layering of guava (<i>Psidium</i> <i>guajava</i> L.) cv. L- 49 Developm ent of the best cropping system for the malwa	International Journal of Current Microbiology and Applied Sciences	8	150 5- 151 0	201 8 201 8	5.38 5.38 IP Fact or 5.21 4	I19 0	2319- 7692 2455- 3085	Internati onal Internati onal

	Kuswaha and N.K.	region of M.P.							
42	Deepika Choure, S.K. Choudhar y, and N.K. Sinha	Effect of diversifica tion and intensifica tion in the major cropping system in malwa plateau zone of M.P. under different land configurat ion for improvem ent in yield, physiolog y and nutrient uptake.	Res. Review journal	03	04	201 8	IP Fact or 5.21 4	2455- 3085	Internati onal

Conference Proceedings [Full length papers in Conferences/Symposia/Seminar]

S.	Author	Title	Conference	Page	Year	National /
NU	(5)		Floceeunigs	NU.		Inter national
1	Shalini	Climate smart	Proceedings of National	79	2018	National
	Chakraborty	approaches to rural	Seminar on Climate			
		prosperity by value	Change Organized,			
		addition of underutilized	Environment Planning			
		fruits.	and Coordination	391		
			Organization Department			
			of Environment, GoMP			
	K Alam	Study of Suspended	52 nd Annual Convention of			
	K. Aldill	Particulate Matter in	Indian Society of	199		
2	Patel and	Traditional Seed Spices	Agricultural Engineers at	27	2018	National
		Cleaning-Grading	AAU, Anand from 8-10			
	Tarun Kapur	Industry.	January 2018			

S.	Author	Title	Conference	Page	Voor	National /
No	(s)	The	Proceedings	No.	rear	International
3	G. S. Chouhan, S.	Genetic variability,	Abstract in e-book of	17	CIAH,	2018
	S. Kushwah, O. P.	Heritability and Genetic	abstracts of National		Bikaner	
	Singh and R. K.	advance for yield and	conference on Arid		(Raj.)	
	Sharma	yield attributing traits in	Horticulture for			
		Bottle gourd [<i>Lagenaria</i>	enhancing		1.00	

		siceraria (Mol.) Standl.]	productivity &			
			economic			
			empowermen			
4	Veerbhadreswar,	Studies on Genetic	Abstract in e-book of	26	CIAH,	2018
	S. S. Kushwah, R.	variability, Heritability	abstracts of National		Bikaner	
	K. Sharma and O.	and Genetic advance for	conference on Arid		(Raj.)	
	P. Singh	growth, yield and	Horticulture for			
		quality	enhancing			
		traits in bush type	productivity &			
		Indian bean	economic			1
			empowerment			

Technical bulletin

S.	Author	Title	Voar	ISBN No
No.	(s)	The	Ital	ISDIV NO.
1	Dr. Shalini Chakraborty	Haldi utpadan evam prasanskaran	2018	VP/F.R.S./2017-
	Dr. M.S. Parihar			18/01
2	Dr. Shalini Chakraborty	Lahsun prasanskaran	2018	VP/F.R.S./2017-
	Dr. M.S. Parihar			18/02
	Dr. Shalini Chakraborty	Aay arjan hetu phal sabji	2018	VP/F.R.S./2017-
3	Dr. M.S. Parihar	prasanskaran ke taknikiyan		18/03
4.	Nitin soni and IS Naruka	Research Report of All India	October 2016	-
		Coordinated Research Project on	to September	
		Fruits – Grapes, COH, Mandsaur	17	
5.	Soni N.	Annual Report of All India	2017-18	-
		Coordinated Research Project on		
		Fruits – Grapes, COH, Mandsaur		

S. No.	Author (s)	Title	Year	Name of Journal / Magazine
1	Ranade D.H., Mujalde Santosh, Girothia, O.P., Swarup Indu and Bhagat, D.V.	Samanvit krishi pranali se sambhav hai bharpur kamai	June 2018	Kheti
2	Ranade D.H., Mujalde Santosh, and Swarup Indu	Pattidar sinchai hetu jal prabandhan avam jal bachat pranali.	November 2018	Kheti

Text/Reference Books

S.No	Author(s)	Book Name	Year	ISBN No.
1	Dr. G.N. Pandey, Dr. R.P.Patel, Dr. G.S. Chundawat, Shri B.K. Patidar and Shri D.K. Patidar	"Integrated Disease and Pest Management in Medicinal and Aromatic Crops"	2017- 18	89/2018 Registration No.

Book Chapters:

S.No	Author (s)	Title	Book Name	Page No.	Year	ISBN No.
1	Shalini Chakraborty	Spices Processing	Start-up Opportunities Based on Agricultural Engineering Technologies	157- 166.	2018	CIAE/TTD/2018/484
2	JVNS Prasad, M. Usman, CH Shrinivas Rao, Ashok kumar Indoriya, S. Borkar and Nitin Soni	chapter 19 जलवायु समुथान प्रौद्योगकर्यो का ग्रामीण स्तर पर प्रदर्शन	वर्षा आधारित कृषक्षेत्रों की समस्याएँ एवं समाधान	290- 330	2017	ISBN 978-93-8088 3- 44-1.
3	I.S. Naruka and Nitin soni)	Hi tech grape cultivation	ICAR winder school on "Hi-tech interventions in fruit production towards hastening productivity, nutritional quality and value addition" November 1- 21 2017 by Jitendra singh <i>etal.</i> Published by Department of Fruit science College of Horticulture and forestry Jhalawar (Raj.)	122- 136	2017	
4	Shailendra K Dwivedi	Fruit based fermented beverages.	Proceeding of ICAR- Winter school (during November 1-21, 2017) on "Hi-Tech interventions in fruit production towards hastening productivity, nutritional quality and value addition" organized by Department of fruit science, College of horticulture and forestry, Agriculture University- Kota	385-402	2017	NA
5	Shailendra K Dwivedi	Fruit based fermented beverages.	Proceeding of ICAR- Winter school (during November 1-21, 2017) on "Hi-Tech interventions in fruit	403- 425	2017	NA

		pro has nut valu org Dep scie hor fore Uni	production towards hastening productivity, nutritional quality and value addition" organized by Department of fruit science, College of horticulture and forestry, Agriculture University- Kota.			
S.No	Author (s)	Title	Book Name	Page No.	Year	ISBN No.
6	Varsha Gupta, Ekta Joshi, Deep Singh Sasode and B.S. Kasana	Efficacy of herbicide or combination of herbicides against the problematic weeds in green gram (vigna radiata l.)	Current trends in plant science and molecular biology for food security and climate resilient agriculture	82-90	2018	ISBN-978-93-5321- 456-2
7	Ekta Joshi*, Varsha Gupta, D.S. Sasode, Sushma Tiwari, R.S. Sikarwar and Neelam Singh	Liquid biofertilizer and inorganic nutrients application impact on quality traits and physiology of <i>kharif</i> groundnut (Arachis hypogea L.)	Current trends in plant science and molecular biology for food security and climate resilient agriculture	67-74	2018	ISBN-978-93-5321- 456-2
8	D.S. Sasode, Ekta Joshi, Varsha Gupta, Rajni Sasode B.S. Kasana and Sushma Tiwari	Weed flora dynamics and growth response of black gram (Vigna mungo L.) to weed management practices in black gram - mustard cropping system	Current trends in plant science and molecular biology for food security and climate resilient agriculture	75-81	2018	ISBN-978-93-5321- 456-2
9	Sushma Tiwari , Narendra kumar, Anushree Pramanik, Ekta Joshi , D.S. Sasode, R.S. Sikarwar, R.S. Tomar, M.K. Tripathi, V.S. Kandalkar and A.K. Singh	breeding for foliar disease resistance in groundnut using conventional and molecular approaches	Current trends in plant science and molecular biology for food security and climate resilient agriculture	56-62	2018	ISBN-978-93-5321- 456-2

Other Articles

Thakur, D.S., Sharma, G.K.	Bringing degraded	Indian	68(1)	83-87	2018	National
and Ranade, D.H.	land to agricultural	Farming				
	use impact of soil					
	and water		1.1.1			
	conservation					
	activities and					
	integrated			1		
	approach.					
Ranade, D.H., Mujalde,	Innovative and	Indian	68(2):	17-20	2018	National
Santosh and Swarup Indu	efficient water	farming		1.1		
	management					
	practice through					
	valve system in					
	pipeline.			1		
Ranade D.H., Mujalde	Samanvit krishi	Kheti	(June,	29-31	2018	National
Santosh, Girothia O.P.,	pranali se sambhav		2018):.		11.55	
Swarup Indu and Bhagat	hai bharpoor kamai.					
D.V.						

Breeder seed production Kharif-2018

Сгор	Production (qt)
Soybean	2878.00
Pigeonpea	15.00
Black Gram	33.30
Green Gram	95.50
Pearl Millet	9.80
Sorghum	13.10
Paddy	88.00
Total	3250.60

Breeder seed production *Rabi***-2018-19:** A quantity of 5353.20 quintals of breeder seed of various crops namely Wheat, Gram, Lentil, Pea, Rapeseed & mustard and Toria produced during Rabi 2018-19

S. No.	Crops	Production (qt)
1.	Wheat	2153.00
2.	Gram	3037.00
3.	Lentil	13.60
4.	Pea	72.40
5.	Rapeseed & mustard	42.70
6.	Toria	34.50
	5353.20	

Glimpses of AICRP- Groundnut Experiments



Dr. S. K. Rao, Honorable Vice Chancellor RVSKVV visited ZARS Rapeseed Mustard Research Field and Dr. P. K. Rai, Honorable Director, DRMR, Bharatpur, Rajasthan visited ZARS Rapeseed Mustard Field Research Field







Effect of pendimethalin+imazethapyr + 1 HW (IWM) on cowpea



Effect on cowpea after zero tillage with residue management



Zero tillage practices with integrated weed management

View of potato field with two hand weedings (20&40 DAS)





View of potato field with black plastic mulch



View of potato field with one HW *fb* straw mulch

Rain water management



Water harvesting tank



Sweet corn (Sugar 75)



Soybean - JS 20-29

Chickpea- JG 412

4.9 Activities of Seed Production Farms:

RVSKVV is also making sincere efforts to generate cutting edge technology for enhancing crop productivity. Thrust is also farm seed replacement in the state by producing quality seeds of important crops. It is worthwhile to mention that RVSKVV has produce **8759.90q seeds** with different crops during 2018-19 which helped the farmers in a big way for seed replacement and thereby enhancing the productivity of crops.

The seed activities in the University are managed with the help of twenty seven seed farms, which are located in twenty four districts and six agro-climatic zones of Madhya Pradesh. Out of the total farm area of 1210.85 ha., only 64.45% (780.37 ha.) is under cultivation. Among the cultivated area, 13.39 and 34.59% is irrigated and partially irrigated, respectively. Rest of the cultivated area is under rainfed farming.

The area under plantation crop is about 82.02 ha. Rests of the farm area is fallow or pasture land or occupied by road and buildings.

S. No.	Crops	Qty. (q.)					
(A) Kharif crops							
1.	Soybean	2999.00					
2.	Green gram	105.1					
3.	Black Gram	47.7					
4.	Pearl Millet	9.5					
5.	Sorghum	14.8					
6.	Ground Nut	0					
7.	Pigeon Pea	0					
8.	Paddy	212.0					
9.	Til	15.4					
Total (A) 3403.5							
(B) Rabi crop	S						
1.	Wheat	2153.9					
2.	Gram	3037.0					
3.	Lentil	15.6					
	Pea	72.4					
4.	Rapeseed and Mustard	77.5					
	Safflower	0					
	Maize	0					
	Total (B) 5356.4						
	Grand Total (A+B)	8759.9					

Breeder seed produced in Kharif and Rabi crops:

5. EXTENSION ACTIVITIES:

RVSKVV, Gwaliorhas 27KrishiVigyanKendras (KVKs) under its jurisdiction established with the financial support of ICAR.Out of which,22 are under the administrative control of the University and five under NGOs/ICAR institute, which are functioning under technical guidance of Directorate of Extension Services of the University. The Directorate is committed to serve the farmers through its well organized network of KrishiVigyanKendras, which play a vital role in dissemination and transfer of recent emanated research technologies in agriculture, horticulture, livestock production and allied fields.

The KVKs are assessing the technological needs of the farmers of the districts and revalidating the technology for adoption through On Farm Testing. The KVKs are disseminating technologies and strengthening the farmers through, Front Line Demonstrations, Training Programmes for Farmers and Farm Women, Extension functionaries and Vocational Training for Rural Youth and other regular ExtensionActivities in selected villages of the concerned district. Thus, they contribute in minimizing the gap between prevailing farmers' yield and production potential in specific area.

Mission

Directorate of Extension Services is committed to serve the farmers andto achieve the motto of the University, which isto reach the un-reached through its extension system. The main objectives of the Directorate are:

- **1.** Transfer of technology, assessment, application, refinement and providing feedback to the researchers.
- **2.** Up gradation of knowledge and skill of extension functionaries as well as farming community.
- **3.** Development and dissemination of technology through print and electronic media for mass reach.
- **4.** Catering the needs of farming communities through single window system.
- 5. Linkage with line departments, concerned institutions and NGOs.
- **6.** Reviewing the activities of KVKs and technological backstopping of KVK scientists and help in formulating action plan.
- 7. Popularization of low draft improved agricultural implements.

Krishi Vigyan Kendras

Twenty oneKrishiVigyanKendras of RVSKVV are located at thedistricts of Agar-Malwa, Alirajpur, Ashok Nagar, Badwani, Bhind (Lahar), Datia, Dewas, Dhar, Guna (Aron), Gwalior, Jhabua, Khandwa, Khargone, Mandsaur, Morena, Neemuch, Rajgarh, Shajapur, Sheopur, Shivpuri and Ujjain. KVK Bhopal is workingunder administrative control of ICAR-CIAE and KVKs in districts Indore, Sehore, RatlamandBurhanpur are working under the aegis of reputed NGOs, with technical backstopping of RVSKVV. KVKs facilitate the process of assessment of technology through OFT, skill upgradation through training programmes, and technology dissemination through method and result demonstrations, KisanMelas, Seminars and mass campaigns etc.

Agro-climatic Zone	Features	District / KVK's under the Zone
Gird Zone	Semi-arid climate, situated between 152-	Sheopur, Morena, Bhind,
5 Mar 199	224msl, annual rainfall 566-977 mm and	Gwalior, Shivpuri (Partial),
	soils are Alluvial medium black, mixed red	Guna (Partial) and Ashok
A STATE	black and red yellow in colour.	Nagar
Bundelkhand	High temperature, situated between 266-	Datia, Shivpuri (Partial)
	560msl, annual rainfall 750-1200mm with	
1000	shallow clayey loam soil	
Malwa Plateau	Semi-arid climate, situated between 450-	Neemuch, Mandsaur, Ujjain,
	675 msl , annual rainfall 800-1200mm,	Shajapur, Rajgarh, Dewas
	soil is medium to deep black (vertisol)	and Dhar (Partial), Indore
		Ratlam and Agar-Malwa
Jhabua Hills	Undulated topography, situated between	Alirajpur, Jhabua and Dhar
	450-700 msl, erratic rainfall (600-	(Partial)
	800mm) and shallow to medium skeletal	
	gravely soil	
Nimar Valley	Hot and dry weather, situated between	Badwani, Khargone,
132 10 1	450-700 msl, less annual rainfall (600-	Khandwa, Burhanpur
	800mm), soil is deep black clayey	
	(vertisol)	
Vindhyan	Hot humid climate, undulated topography,	Guna (Partial), Bhopal,
Plateau	situated between 350-600 msl, annual	Sehore
	rainfall, 1000-1200mm and medium black	
	soil.	

Agro-climatic Zone wise Location of KVKs

Mandate of KVK:

The major mandate of KVKs is the assessment, refinement and demonstration of technology/ products.

The major activities of KVKs are given below:

- On farm testing for assessing the suitability of technology farming systems.
- Frontline demonstrations to establish production potentials of newly released technologies on farmers' fields and provide feedback.
- Training of farmers and farmwomen to upgrade their knowledge and skills in modern agricultural technologies and training of extension personnel to orient them in the frontier areas of technology development.
- Work as resource and knowledge centre of agricultural technologies for supporting initiatives of public, private and voluntary sector for improving the agricultural economy of the district.
- Create awareness about frontier technologies through a number of extension activities *viz*: Farmer fair, Field day, Campaign, Ex-trainees meet, etc.
- For enhancing the productivity through increased seed replacement rate and use of quality planting material KVKs are taking up the activities of producing quality seed and planting material.

Thrust Areas:

- Doubling Farmers Income by 2022
- Development of agri-preneurship among farmers
- Enhance crop productivity through, intensive vocational trainings of farmers, farm women and rural youth.
- Demonstrate and disseminate the integrated approach encompassing the feasible components of farming and related technologies targeting towards enhancing the farm family income.
- Crop diversification with suitable oilseed, pulse, fruit and vegetable cultivation.
- Testing of early maturing high yielding varieties of major crops on farmer's field.
- Awareness regarding different methods of water harvesting and conservation including construction of small water retention structures (Rain-Water harvesting)
- Soil fertility improvement to sustain soil health.
- Integrated nutrient management in different crops.
- Popularization of resource conservation technologies.
- Post harvest value addition and entrepreneurship development for agricultural produce.
- Balanced feeding and reproduction of livestock and poultry.
- Clean milk production and processing of dairy products.
- Promotion of exotic and off-season cultivation of vegetables, medicinal and aromatic plants.
- Promotion of organic farming.
- Use of improved implements for drudgery reduction.
- Demonstrations of improved farm machinery to farmers.
- Demonstrations on utilization of innovative traditional knowledge of the farmers.



Major activities of KVKs under RVSKVV, Gwalior

5.1 On Farm Trial

The KVKs conducted 283 On Farm Trials for assessment and refinement of new technologies generated by RVSKVV, Gwalior, other Universities and ICAR Institutes as per local needs and micro farming situations. A total of 2830 farmers were direct beneficiaries of the OFTs as their fields/units chosen for conducting the trials. Details of these OFT are given below:

Host Institute	No. of OFTs	Beneficiaries
OFT on crops		
RVSKVV	234	2340
ICAR & NGO	49	490
Total	283	2830

Thematic area wise details of OFTs conducted on crops are described below.

T	hemat	tic a	rea y	wise	details	of	OFTS
	in china c	ne u	u cu	1000	accuito	01	

Thematic Area	RVSKVV	NGOs
Varietal Evaluation	39	7
Farm Machinery	10	2
Integrated Nutrient Management	58	10
Integrated Crop Management	33	14
Integrated Pest Management	37	10
Integrated Weed Management	16	1
Farmer Interest Group	1	0
ICT	10	0
Horticultural Crops	13	3
Livestock Production and Management	7	0
Fisheries	2	0
Nutritional Aspects	8	2
Total	234	49

5.2 Frontline Demonstrations

Frontline demonstrations are conducted to demonstrate the superiority of recent and location specific proven technologies of agriculture and allied fields among farming community and extension functionaries for up-scaling in the larger area as well as for generating the production data along with the feedback. During the reporting year, a total number of 307 technologies were demonstrated through KVKs.

Thematic Area	RVSKVV	NGOs
Varietal Replacement	58	11
Farm Machinery	5	0
Integrated Nutrient Management	40	14
Integrated Crop Management	46	8
Integrated Disease Management	0	0
Integrated Pest Management	44	14
Integrated Weed Management	25	3
Information Communication		
Technology	3	0
Horticultural Crops	16	4
Livestock Production and		
Management	09	0
Nutritional aspects	02	5
Total	248	59

5.3 Training Programmes

Training has been considered a key component for updating the knowledge and inculcating new skillsamong the participants. The great emphasis has been given on organizing trainings both for the farmers as well as for the trainers. A total of1951 training programmes were organized involving to 52256 beneficiaries including farmers and farm women, rural youth, extension personnel and sponsored from different agencies detail of which are given in following table.

S.	Training	RVSKVV			ICAR & NGO			Total		
No.		No.	D *	Benf.	No.	D*	Benf.	No.	D *	Benf.
1.	Farmers and							160		4264
	Farm Women	1345	1493	35641	261	331	7006	6	1824	7
2.	In-Service	72	89	2025	23	35	519	95	124	2544
3.	Rural Youth	78	294	1617	30	74	677	108	368	2294
4.	Sponsored	57	365	2667	20	171	830	77	536	3497
5.	Vocational	36	1022	963	29	<mark>378</mark>	311	65	1400	1274
	Total	1588	3263	42913	<mark>3</mark> 63	989	9343	19 51	4252	52256

* Total duration in days

5.4 Extension Activities

With the objective of creating awareness about advancedagricultural technologies, a number of extension activities were organised by KVKs at their campuses and in the villages. These extension activities include method demonstrations for small group to KisanMelas for huge gathering. It includes use of old communication techniques of poster exhibition to latest technique of SMS and social media use for transfer of technology. Broadly, these activities are advisory based like farm advisory services, lectures delivered by resource persons, animal health camps and vaccination camp, exhibitions, extension literature and popular article, media based activities like CD/DVD, film show, news paper coverage, radio talks and TV talks, meeting based like ex-trainee Sammelan, celebration of important days, club meet, farmers' seminar, field day, group meet, Gosthi, Mela and SHG meeting Technology week concept was given to the KVKs for showcasing the available technologies to the district level extension functionaries and farmers. Details of various extension activities are given below:

Particulars	A	ctivities 💦 👘	Beneficiaries
	Target	Achievement	
Advisory Services	973	930	366334
Agri mobile clinic	658	659	32120
Animal Health Camp	37	38	1397
Awareness programme	45	98	6947
Beekeeping Awareness programme	1	1	105
Celebration of important days	61	105	9098
Diagnostic visits	453	540	6214
Exhibition	91	114	33393
Exposure visits	31	61	1873
Extension Literature	128	191	<mark>294</mark> 1
Ex-trainees Sammelan	24	26	991
Farm advisory Services	935	1292	289579
Farm Science Club conveners meet	3	5	279
Farmers Seminar/Workshop	29	24	1788
Farmers visit to KVK	9933	18917	57736
Field Day	182	202	11474
Film Show	310	313	11610
Group meetings	127	164	3583
Interface	21	28	1615
International Women's Day	2	2	396
Kharif/Rabi Sammelan	8	13	2439
KisanGhosthi	99	150	6929

Activities for popularization of agriculture technologies
KisanMela	29	38	59141
KrishiGyanDoot meet	5	4	254
Lectures delivered as resource persons	847	1162	54741
MahilaMandals conveners meetings	19	37	1406
Method Demonstrations	48	75	2154
Malnutrition Day	1	2	114
Newspaper coverage	570	808	-
Popular articles	136	178	-
Radio talks	117	165	-
SwachchhataPakhwada	55	58	2151
Scientific visit to farmers field	875	1334	15222
Self Help Group conveners meetings	58	72	2173
Soil health Camp	36	117	1858
Soil test campaigns	31	56	2296
Summer deep ploughing campaigning	146	165	1853
Technology Week Celebration	15	18	2304
TV talks	68	92	782
Workshop	29	30	1694
PM live telecast for farmers	1	1	253
PM live telecast for women	2	5	537
(SHG)farmers			
PM KisanSammanNidhi	1	2	757
Live Interaction of Hon'ble PM with	2	71	365
farmers			
Parthaniyam Awareness week	76	21	332
programme			

5.5 Production and Supply of Technological Inputs

Timely and adequate availability of the quality seeds to ensure better yield is very essential and still remains as a major constraints to the farmers. Therefore, it was taken as a challenge and appropriate steps were taken at the KVKs for helping the farmers in this regard. The KVKs produced 5027.40 q seed of different crops during 2018-19. The details are given in following table.

Name of Crop Type of Quantity Seed available KVK Seed produced(q) for Demonstration **(q)** Soybean, Blackgram, 100.48 0.21 Alirajpur Breeder **Pigeonpea and Gram** and TL

a. Seed Production

Acholmogan	Black gram Chielman	Broadar	62.0	80
Ashokhagai	Diack grain, Chickpea	Dreeder	104.00	0.0
Barwani	Soydean and Unickpea	Breeder	194.00	-
Bhind	Mustard, Wheat and	Breeder	224.09	-
	Barley	and TL		
Datia	Barley and Sunhemp	-	78.37	-
Dewas	Soybean, Chickpea and Wheat	Breeder	490.9	-
Dhar	Soybean and Chickpea	Breeder	442.8	442.8
Guna	Soybean , Black gram	Breeder	195.4	2.0
	and Chickpea	and TL		
Gwalior	Potato (Seed), Okra,	TL	0.8915	
	Fenugreek, Spinach,		1.	
	Sponge gourd			
	Bottle Gourd and			
	Marigold			
Jhabua	Soybean	Breeder	317.9	175.9
Khandwa	Soybean	Breeder	28.0	States -
Khargone	Soybean, Pigeonpea and	Breeder	489.2	-
	Chickpea			
Mandsaur	Soybean, green gram,	Breeder	154.38	-
	chick pea and lentil		Column Second	
Neemuch	Soybean and Chickpea,	Breeder	147	-
	Tulsi and Ashwagandha	and TL		
Rajgarh	Soybean, Wheat and	Breeder	147.6	-
	Lentil			
Shajapur	Soybean and Chickpea	Breeder	251.31	
Sheopur	Soybean, Chickpea and	Breeder	258.05	22.50
	Wheat	and TL		
Shivpuri	Soybean and Chickpea	Breeder	303	
Ujjain	Soybean, Chickpea and	Breeder	814.13	
34.15 4	Wheat			-32124
Burhanpur	Soybean, Pigeonpea,	-	20.00	<u></u>
	Wheat, Chickpea, Maize			
Ratlam	Maize, Wheat, Soybean,	-	87.74	44.18
	Groundnut, Chick pea			
	and Black gram			
Sehore	Soybean, Wheat	TL	220.16	
	Pigeonpea, Barley,			
	Chickpea, Garlic and			
	Ginger			
Total Se	eed Produced at KVK Farm	5027.40	685.59	

Сгор	Quantity (No.)
Vegetables	
Tomato	329293
Brinjal	38645
Chilli	77272
Cabbage	27405
Cauliflower	31220
Broccoli	685
Knol-Khol	810
Bottle Gourd	62
Sponge Gourd	5
Bitter Gourd	50
Fenufreek	40
Kharif Onion	219143
Cucumber	50
Potato	172
Mushroom	4
Fruit Plants	
Mango (Grafted)	2330
Lemon	901
Pomegranate	200
Guava	320
Karonda	1236
Jackfruit	824
Custard Apple	385
Jamun	136
Aonla	1
Drum Stick	18819
Ber Bud	60
Beal	824
Guava	2448
Papaya	500
Imli	37
Almond	19
Ornamental plants	64
Marigold	63632
Ashok	14
Rose	20032
Vidhya	12

b. Planting Material (Seedlings/Saplings) Production

Chameli	1
Harsingar	1
Gladiolus	500
Gaillardia	20
Fodder Crops	0
Napier Grass	0
Forest plants	0
Gudachi	1
Seasum	0
Durenta	189
Meetha Neem	28
Kadwa Neem	9
Gudhal	1
Kesiasama	126
Bamboo	452
Gulmohar	37
Ashok	259
Amltas	5
Mogra	12
Seven	150
Kachnar	82
Karanj	223
Sesum	119
Total	841046

5.6 Soil and Water Sample Analysed

Soil and water testing is an import activity of KVK for improving the soil fertility and sustainability of agricultural production. KVK wise details of soil samples collected, analyzed and numbers of soil Health Card distributed among farmers have been hereunder.

KV	Soil Sample Tested through	Number of Sample Collected	Number ofFunds received for Soil Testing fromSampleDDA/State Govt.Collected(Rs)		Soil Health Card	Target	
Mini So Testin Kit		by DDA/Stat e Govt	For Soil Testing	For Labour	distributed		
Alirajpu r	NIL	9600	NIL	NIL	54387	438	
Ashokn	250	Nil	Nil	Nil	250	500	

agar						
Barwani	660	1000	-	-	10364	2000
Lahar	404		-	-	404	500
Bhind)						
Datia	-	-	-	-	-	-
Dewas	857	298	76500		857	1000
Dhar	1695	695	125000	84000	2432	5000
Guna	394	-	-	-	394	-
Gwalior		6687	988800.0	180000.0	13728	1000
			0	0		
Jhabua	2648	1687	253050		3600	4000
Khandw a	676	676	168300	41514	3730	3000
Khargon e	2173	21745	NIL	NIL	6468	1000
Mandsa ur	262	-		-	262	500
Morena	1000	4228	1,85,334	5523	2500	
Neemuc h	803	15000 (142 given to KVK)	26554		927	600
Rajgarh	500	30967	-	-	113057	12500
Shajapu r	-	28500	-	-	12761	
Sheopur	250	-	-	-	250	
Shivpuri	243	-	-	-	243	500
Ujjain	100	400	Not Received	Not Received	800	1000
Bhopal	Nil	-	-	-		-
Burhan pur	1685	1485	-	-	2845	2500
Ratlam	509	-	-	-	509	200
Sehore	689	-	125000 (NFL)	-	689	500

5.7 Kisan Mobile Advisory Services

Kisan Mobile Advisory (KMA) is the easiest ICT tool working successfully for dissemination of latest information to the farmers and farm women. This is a unique programme for making linkages between different stakeholders who are key players for making agriculture more productive.During the year 2018-19, a total of 1291 farm advisory were issued by the KVKs from which 1352832farmers were directly benefited.In addition to this, KVKs also provided audio, video and photo based advisories through WhatsApp.

Name of KVK	No. of farmers	No. of villages	No. of blocks covered	No. of advisories
	registereu	covered		Jent
Ashoknagar	32800	824	04	54
Barwani	30582	693	07	55
Bhind	15600	891	06	25
Datia	70146	610	03	66
Dewas	38890	1027	06	47
Dhar	126596	1579	13	60
Guna	374000	1260	05	83
Gwalior	26500	717	04	72
KVK Jhabua	13198	813	06	104
Khandwa	33900	710	07	63
Khargone	95154	1407	09	100
Mandsaur	29146	944	05	25
Morena	13710	775	07	87
Neemuch	19456	799	03	29
Rajgarh	69587	922	06	45
Shajapur	24500	579	04	28
Sheopur	50000	610	03	34
Shivpuri	51000	1235	08	40
Ujjain	63061	1096	06	75
Bhopal	65516	422	02	81
Burhanpur	19700	270	02	44
Ratlam	42230	1053	06	43
Sehore	47560	1049	05	31
Total	1352832	20285	127	1291

5.8 Publications by KVKs

Publications	Number		
Research papers in Journals	71		
Abstracts	19		
Book Chapters	15		
Books	05		
Folders, Pamphlet and Leaflet	106		
Popular Article	123		
Technical Booklet	26		
Training Manual	07		
Electronic Media Produced (Audio/Video)	34		
Newsletter (Quarterly)	04 Issues by each KVK		

5.9: Other Important Achievements

5.9.1 Major Awards to KVKs and serving farmers

KVK Name	Name of Awardees and Award	Type of award (Ind./Group/In st./Farmer)	Awarding Organizations
Ashoknagar	Sh. Rajpal Narvariya	Individual	ICAR New Delhi
	Jagjivan Ram Abhinav Kisan Puruskar	Farmer	
Barwani	Mrs. Lalita Mukati	Individual	ICAR, New Delhi
	1. Innovator Farmer Award	Farmer	
	2. Haldhar Organic Farmer		1 C C C C C C C C C C C C C C C C C C C
	Award	1.19.00	
Datia	Best NICRA KVK Award Zone - IX	Institution	ICAR, New Delhi
Dhar	Dr. Kamal Singh Kirar and KVK	KVK Scientists	ICAR, New Delhi
	Team received Fakhruddin Ali		A
	Ahmed Award for Outstanding work in Tribal		1.10
	Farming Systems		
Dhar	Shri Sitaram Nigwal	Individual	ICAR, New Delhi
	1. Pandit Deendayal Upadhyay Antyodaya Krishi Puraskar-	Farmer	

	Zonal		
	2. Pandit Deendayal Upadhyay		
	Antyodaya Krishi Puraskar-		
	National		
Ujjain	Ashwini Singh Chauhan/	Individual	ICAR, New Delhi
	Navonveshi Krishak Puruskar	Farmer	

5.9.2 Programme on International Soil Health Day

On the occasion of International Soil Day on 5th December, 2018 KisanSammelanwere organized at all the KrishiVigyanKendras in these Sammelansand Soil Health Cards were distributed to the farmers.

5.9.3 Registration of local plant species/ land races under PPVFRA

KVKs identified some local germplasm/ land races of different crops for registration under PPVFRA, New Delhi. The details are as follows.

Name of VVV	Name of mon	Varieties	Varieties	Remarks
Name of KVK	Name of crop	Identified	Registered	
	Blackgram	Local	-	
Alirajpur	Blackgram	Green urd (Gaandi)	-	-
	Moong	Moong local	-	-
	Maize	Satthi	-	1000
Mandsaur	Wheat	5	-	-
	Linseed and Garlic	1 each	-	
Khargone	Maize	2	-	1
	Pigeonpea	1	-	
Shivpuri	Groundnut	3	-	-
	Pumpkin, Maize, Wheat, Paddy	1 each	-	
Sehore	Paddy	02	-	Varity collection through Farmers field

5.9.4 Progress of Seed Hub Project

	Gran	Kharif		Rabi		Summe r	Producti	
NVN	Сгор	Area (ha)	Producti on (q)	Area (ha)	Productio n (q)	Area (ha)	on (q)	
	Black gram	100.05	83.92	-	-	-	-	
	Pigeon Pea	13.10	7.12	-	-	-	-	
Datia	Chick Pea	-		12.39	176.51	-	-	
Datia	Field Pea	-	-	20.29	Near about 400 q. field pea seed produced by the farmers but they have not provided the seed due to higher market rate in comparison to procurement rate (Market rate : Rs. 4500-4600, Procurement rate Rs. 2300/q)			
Dewas	Black Gram	19.4	95.68	-	-	-	-	
	Chickpea	-	-	77.60	349.30 (Ungraded)	-	-	
Morena	Pigeon pea	05	18	-	-	-	-	
	Black Gram	03	26	-	-	-	-	
	Chickpea	-	-	07	18	-		
Ujjain	Chickpea	-	-	60.00	432	-	-	

Name of KVK	Training Area	Participants	Participants
		Enrolled	Qualified
Barwani	Nursery Worker	20	20
	Seed Grower	20	20
Dewas	Agriculture machinery	20	Pocult awaited
	operator		Result awaited
	Aquaculture Worker	20	14
Dhar	Poultry and Dairy	20	20
	management		
	Vermicompost Producer	21	20
Gwalior	Mushroom Grower	20	20
	Small Poultry Farming	20	20
Jhabua	Quality Seed Growers	20	19
Sec. Sec.	Small Poultry Farmers	20	19
Khandwa	Small Scale Poultry Farmer	24	Result Awaited
	Community Service	21	
	Provider		
Rajgarh	Vermicompost Producer	20	16
	Citrus fruit grower	20	16
	Green House Operator	20	10
Bhopal	training	20	10
	Tractor Operator training	20	18

5.9.5 Skill Development Training 200 hrs (PMKVY as per NSQF of ASCI)

5.10: Flagship Programmes of ICAR implemented by KVKs/DES

1. National Innovations on Climate Resilient Agriculture (NICRA)

National Innovations on Climate Resilient Agriculture (NICRA) is a network project of the Indian Council of Agricultural Research (ICAR) launched in February, 2011. The project aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration. The research on adaptation and mitigation covers crops, livestock, fisheries and natural resource management. The project consists of four components viz. Strategic Research, Technology Demonstration, Capacity Building and Sponsored/Competitive Grants. The project was formally launched by the Hon'ble Union Minister for Agriculture & Food Processing Industries Shri Sharad Pawarji on 2nd February 2011.

NICRA is being implemented by five KVKs under RVSKVV, Gwalior since 2011. Three KVKs namely Datia, Guna and Morena is implementing the project since its inception in 2011 whereas two more KVKs i.e. Jhabua and Ratlam were included in NICRA during 2015-16. KVK Datia had been awarded as Best NICRA KVK twice during 2014 and 2019 for outstanding work in water conservation under technology demonstration component.





Stored rain water in renovated check dam

Stored rain water in farm pond (scientist of ATARI Zone IX Jabalpur visited the farm pond)



Height of Constructed Poly Bag Check Dam (Bori Bandhan)



Rain water Stored in Bori Bandhan

2. Cluster Front Line Demonstrations (CFLD) on Oilseed and Pulses

A. Pulses

Indian government imports large quantity of pulses to fulfil domestic requirement of pulses. In this regard, to sustain this production and consumption system, the Department of Agriculture, Cooperation and Farmers Welfare had sanctioned the project "Cluster Frontline Demonstrations on pulses from 2015-16" to ICAR-ATARI, Jabalpur through National Food Security Mission. The basic strategy of the Mission is to promote and extend improved technologies, i.e., seed, micronutrients, soil amendments, integrated pest management, farm machinery and implements, irrigation devices along with capacity building of farmers. This project was implemented by all KVKs under RVSKVV, Gwalior with main objective to boost the production and productivity of pulses through CFLDs with latest and specific technologies.



CFLD on Black gram during Kharif 2018



B. Oilseed

Oil seed crops have ecological conditions in India, resulted in the production of 7.87 m tonnes of seed mustard in 2013-2014 and our productivity is 10.9kg/ha. It is now widely accepted fact that training to farmers and farm women increases the technical knowledge regarding package of practices. KVKs are playing a vital role across the rural economy in distinguish field as animal husbandry, horticulture, plant protection and food processing. India is an important rape seed mustard growing country in the world, occupying largest area and has second position in production after China.



Visit of Shri Pradip Agrawal Ji M.L.A. Seonda constituency on cluster front line demonstration of mustard village Raraua Jivan Dated

3. Seed Hub Project

The Government of India has launched Seed Hub Project during 2016-17 to promote indigenous production of pulses in India by creating 150 Seed Hubs in KVKs across the country. ICAR-IIPR, Kanpur has been given responsibility of nodal agency at National level. Four KVKs namely Datia, Dewas, Morena and Ujjain has been selected for implementation of Seed Hub project among KVKs under RVSKVV, Gwalior. Major crop like Black gram, Green gram, Pigeon pea, chick pea and fields pea are being taken up for seed production under the seed hub project.



Crops under Seed Hub Project Datia

4. Attracting and Retaining Youth in Agriculture (ARYA)

In order to create interest and confidence among rural youth in agriculture, there is need to make agriculture more profitable. Retaining youth in agriculture and making agriculture more profitable are thus, big challenges. There is a continuous increase in migration of rural youth to urban areas. On the other hand, small holdings are on the rise which posses challenge to food security for increasing population. Thus, it was felt to bring a comprehensive model for the development of rural youth in general and agricultural youth in particular. Thus, realising the importance of rural youth in agricultural development especially from the point of view of food security of the country, ICAR has initiated a programme on "Attracting and Retaining of Youth in Agriculture (ARYA)" with following objectives;

- 1. To attract and empower the Youth in Rural Areas to take up various Agriculture, allied and service sector enterprises for sustainable income and gainful employment in selected districts.
- 2. To enable the Farm Youth to establish network groups to take up resource and capital intensive activities like processing, value addition and marketing.
- 3. To demonstrate functional linkage with different institutions and stakeholders for convergence of opportunities available under various schemes/program for sustainable development of youth.

KVK, Gwalior was selected for implementing ARYA project during 2016-1 in first phase and currently five KVKs under RVSKVV are implementing this project.

5. Farmers' FIRST Project

The Farmer FIRST as a concept of ICAR is developed as farmer in a centric role for research problem identification, prioritization and conduct of experiments and its management in farmers' conditions. The focus is on farmer's Farm, Innovations, Resources, Science and Technology (FIRST). Two terms 'enriching knowledge' and 'integrating technology' qualify the meaning of Farmer FIRST in Indian context. Enriching knowledge signifies the need for the research system as well as farmers to learn from each other in context to existing farm environment, perception of each other and interactions with the sub-systems established around. Technology integration is looked from the perspective that the scientific outputs coming out from the research institutions, many times do not fit as such in the farmers' conditions and thus, certain alterations and adaptations are required at field level for their acceptance, adoption and success. 'Farmer FIRST' programme aims at enhancing farmer-scientist interface for technology development and application. It will be achieved with focus on innovations, technology, feedback, multiple stakeholder's participation, multiple realities, multi method approaches, vulnerability and livelihood interventions.

The Farmers' FIRST Project is being implemented in RVSKVV since 2016-17 in ZARS/KVK, Morena.

6. **Mera Gaon Mera Gaurav (MGMG):** The programme is being implemented by the University through in five constituent colleges i.e. College of Agriculture, Gwalior, Indore, Sehore, Khandwa and College of Horticulture, Mandsaur and three ZARS viz; Jhabua, Khargore and Morena. The avobe V.V. units are organizing regular extension activities under MGMG in their identified villages.

S. No.	Name of KVKs	Specialization	
1.	Aron (Guna)	Coriander Production Technology	
2.	Ashok Nagar	Durum Wheat Production Technology	
3.	Badwani	Chilli Production and Value addition of spices	
4.	Datia	Natural Resource Management	
5.	Dewas	Integrated Farming System	
6.	Dhar	High tech vegetable cultivation	
7.	Gwalior	Hi tech HorticultureVermi-composting Technology	
8.	Jhabua	Kadaknath rearing in Integrated Farming System	

KVKs identified as Centre of Specialization

9.	Khandwa	Cotton Production Technology
10.	Khargone	Pomegranate & Watermelon Production Technology
11.	Lahar(Bhind)	Crop diversification
12.	Mandsaur	Seed spices
13.	Morena	 Apiculture Conservation agriculture
14.	Neemuch	Garlic Processing Technology
15.	Rajgarh	Hi tech fruit nursery
16.	Shajapur	Mandarin Production Technology
17.	Sheopur	Management of soil & water resources & IFS
18.	Shivpuri	Mechanization in ground nut and Hi - tech tomato production
19.	Ujjain	Integrated Nutrient Management
20.	Bhopal	Farm mechanization
21.	Sehore	Integrated Farming System
22.	Ratlam	Dairy Management and Dairy Technology
23.	Indore	Organic Farming
24.	Burhanpur	Banana Production Technology

2. Major Activities of Directorate of Extension Services

2.1 Meeting of Scientific Committees and monitoring of KVKS

The Scientific Advisory Committee meetings were conducted to give necessary guidance and support to carry out the mandated activities of KVK in a more planned and scientific manner. The Committee monitors progress and facilitate in-depth exchange of views in specific fields. The Committee evolves the scientific and technical vision documents for the KVK, reviews periodically and takes further course of action as deemed fit for furthering scientific and technological activities of the KVK. Activities of KVKs are monitored through these meeting of Scientific Advisory Committees (SAC). Director Extension Services, Joint Director Extension, Deputy Director Extension and other officers from the Directorate of Extension participated in these meetings to reviews previous activities and finalize the action plans for coming season. A total of50 SAC meetings (Kharif and Rabi) were conducted for all 26 KVKs during 2018-19.

2.2 Establishment of new KVKs

The ICAR has established two new KVKs at newly created districts Alirajpur and Agar Malwa and also sanctioned an additional (second) KVK in larger district Dhar. All three KVKs started functioning.

2.3 Establishment of Agriculture Technology Information Centre (ATIC)

After laid out of foundation stone of Agriculture Technology Information Centre by Hon'bleShriRadha Mohan Singh, Union Minister of Agriculture and ShriNarendra Singh Tomar, Union Minister of Rural Development and Panchayati Raj,theconstruction work of ATIC building has been started.

2.4 Training /Workshops/ Meetings organised by the Directorate of Extension Services

Following capacity building/ HRD programmes and workshops/ review workshops were conducted for KVK scientists by the directorate of extension services during the year 2018-19:

Programme	Title of	Date	No. of	Level of
	programme		participant	Participants
CBP/Backstopping	Honey Bee Keeping - An Entrepreneur for Enhancing Farm Income	February 1-3, 2019	33	SS& Head/ Scientist
	Training on Process of e-Tendering	March 12- 13, 2019	23	DDOs/Officers of various V.V. units
Exhibition and Sangosthi	Raj Vijay Fulwari - 2019 (An exhibition on Horticulture and processed products)	February 16-17, 2019	>200	KVKs, Farmers, Nursery, institutions and Industry
	Action Plan Workshop of KVKs for the year2018-19	April 12- 13, 2018	38	SS& Head/ Scientist
Workshop	Workshop for finalization Action Plan of KVKs	February 28- March 01, 2019	33	-
	Workshop for Finalizing action plan for DFI villages	June 6-7, 2019	26	-

	Video	28.05.2018	23	
	Conferencing			
	under PFMS			
	Review Meeting	-		SS& Hoad /
	of KVK	30.08.2018	25	Scientist
Review Meetings	SCIENTIST			Scientist
	Review Meeting			
	of GKMS and	17.06.19	12	Head/PI
	Seed Hub Project			
	Review Meeting	19.06.10	06	Head /NICDA DI
	of NICRA Project	10.00.19	00	neau/MICKA PI

2.5 Swatch Bharat Abhiyan

SwachchtaDiwas and activities on keeping India cleanwere organized in all KrishiVigyanKendrasunder 'Swachcha Bharat Abhiyan' in which farmers and farm women were conveyed the message of cleanliness.

Glimpses of Activities

















6. LIBRARY AND DOCUMENTATION SERVICES:

Library system of different constituent Colleges of Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior continued to play the pivotal role in dissemination of information across the University.

Entire academic community continued to harness the benefits of this useful information system. Textbooks, Reference books, Competitive examination books, digital library e-books, scientific periodical, thesis, report, encyclopedias, CDs relevant to teaching and research activities etc. have been stocked in the library of constituent Colleges of the University.

Books and Journals available:

S.No.	Particulars	No. of books
1.	Total No. of books available in different College Library of Vishwa Vidyalaya.	117276
2.	New books purchased during 2018-19	3658
3.	e-Books	139

Central Library: The fund provided by ICAR has been utilized by the Central Library of the University. The much awaited and highly needed books on various subjects have been purchased. The basic infrastructural facility has been developed that has made the academic atmosphere of the libraries more conductive for the research scholars, students and teachers alike. The computerization of all the e-libraries of Vishwa Vidyalaya has made the functioning smoother now, therefore each and every user is assisted promptly. The e-library is fully functional connecting the local user through World Wide Web to the global scenario of knowledge. The good quality book cases keep study material safe and intact, and the comfortable furniture is a kind of great relief to the voracious readers. In central library total **9718** printed books, **139** e books,07 printed magazines, **1303** gifted books, **15** priented journal and **52** E-magazines were available in Central library of VishwaVidhyalaya.

7. INFRASTRUCTURE DEVELOPMENT:

- a) College of Agriculture, Gwalior: Agriculture Extension and Communication -Cyber Lab
- b) College of Agriculture, Indore: Nil
- c) RAK, College of Agriculture, Sehore: Nil
- **d) BM, College of Agriculture, Khandwa:** The vision of the Institute is to "ensure good governance, flawless administration and sound human resource management to harness the full potential of the staff and the students so as to transform a process driven institution into a result oriented organization".

(1) College Dispensary: The College has recently opened its Dispensary. Presently, the dispensary has a Medical Officer and a Peon. Agriculture College Dispensary is rendering quality medical services round the clock to students, staff and their family members, pensioners and their families. Besides, it shoulders medical accountabilities during seminars, conferences, Health Awareness Camps, routine health check-ups etc. Since the inception of the dispensary, medicines and other medical aid were provided free of cost.

2) Extension of sports complex "Parth"

3) Shelter shade near Polyhouse.

4) Ambedkar Hall (**Conference Hall)**: A newly built conference hall with a sitting capacity of 75, was inaugurated by Hon'ble Vice Chancellor RVSKVV, Dr S.K. Rao with the name "Ambedkar Hall".



"Ambedkar" Conference Hall

5) Soil Science lab



6) Pathology Lab



7) Gym strengthening – Physical exercise is important for maintaining <u>physical</u> <u>fitness</u> and can contribute positively to maintaining a healthy body. College also has a Gymnasium with latest machines like Cardio Equipment, strength equipment, Treadmill, Rehabilitation Upright Bike, Massager etc. Sports complex and Gym is presently used by students as well as by the staff for activity requiring physical effort, carried out to sustain or improve health and fitness. New Machines and other health equipments are purchased in order to strengthen Gymnasium.



8) Organic Turmeric Processing Unit:It is established at Cotton Research Centre, Khandwa. Organic turmeric is produced in the farm and this unit will help us in processing it to the final value added product. Good quality of organic turmeric is a great source of "*Curcumin*" which is good for health.



Organic Turmeric Farming and Processing Unit

9) Vermicompost: This unit is established at Cotton Research Centre, Khandwa and it consist of 12 beds for preparation of Vermicompost, which is used for organic Cotton and Turmeric production in the farm.Vermicomposting uses earthworms to turn organic wastes into very high quality compost, which give all essential micro and macro plant nutrients to plants. Worm casts contain five times more nitrogen, seven times more phosphorus, and 11 times more potassium than ordinary soil.



Vermicompost unit at Cotton Research Centre

10) Organic Bio-char: A new Organic Bio-Char Box has been set in college research farm. It is used for carbon sequestration. The unit is established for preparing coal from crop (cotton) residuals. It will not only provide destroy crop residual but will be an additional source of income for the farmer community. It is also eco-friendly.



Organic Bio-Char

- **11)** Madhav Gaushala: This is cattle husbandry unit with 70 cattle's at cotton research centre and is known as "Madhav Gaushala". It is a large source of cow dung provider, which is supplied in making vermin-compost. The development works carried out at Gaushala.
 - Construction of Cattle Shed.
 - Construction of grass godown.
 - Compound wall.



12) Hydroponic unit: Hydroponic unit at cotton research centre provide green fodder for the cattle in the *Madhav Gaushala*. It optimizes the general health and performance of animals and livestock, while minimizing feed costs. The Fodder Pro Feed System allows you to grow your own nutrient-rich fodder at minimal cost. Hydroponic systems also reduce water waste and the amount of natural resources needed to grow while allowing complete control over climate, nutrients and growing conditions.



Hydroponic unit at cotton research centre

Initiatives towards Organic Farming: Two Vermi-compost units each at College farm and KVK premises have been established. Both the units have six pits and production of vermi-compost has already started and is being used for enriching the soils of the college farm. Besides, under *Krishi Teerth* plan, recently, a vermicompost unit has also been established in which the compost is being made in open bed instead of pits. An area of one hectare has been earmarked for organic farming as per the directives of the VV. Since last three years' organic crops like Cotton, Wheat, Arhar, Turmeric. Gram, Onion, Kinova, Maize, Watermelon, Moringa, Mango, Pomegranate and Custard apple have been cultivated without using any synthetic chemicals. Facilities for micro (drip) irrigation have also been established.

S.No.	Facility developed	Qty	Amount (Lakh)
1.	Digital Teaching device for smart class	1	2.98
2.	Smart class seating chairs	40	2.0
3.	Smart class dual tables with front cover (running feet)	90	2.0
4.	Audio Podium	1	0.35980
5.	Projector	1	0.45500
6.	Construction of badminton court floor in girls hostel	1	2.75000
7.	Sanitary pad vending machine for girls hostel	1	0.38670
8.	Computers for faculty members	3	120,000
9.	Digital Teaching device for smart class	1	2.98
10	Smart class seating chairs	40	2.0
11	Smart class dual tables with front cover (running feet)	90	2.0

e. KNK, College of Horticulture, Mandsaur: Facilities Developed at College level

8. GENERAL ADMINISTRATION:

8.1 **General Administration:** The Board of Management (BoM) of RVSKVV is the apex-body, empowered to make policy decisions with the Vice-Chancellor as its Chairperson who is also the Executive Head of the University. The composition of BoM is given below:

BOARD OF MANAGEMENT

S. No.	NAME AND ADDRESS OF MEMBERS
1	Principal Secretary
	MP Covt Mantralaya Vallabh Bhawan Bhonal (M.P.)
2	Socrotary
2	Department of Finance
	MP Govt., Mantralaya, Vallabh Bhawan, Bhopal (M.P.)
3	Dr. N.S. Rathore
	Deputy Directore General (Agril. Eduaction)
	ICAR, KAB-II, Pusa, New Delhi
4	Dr. Vijay Singh tomar
	Ex. Vice-Chancellor (RVSKVV/JNKVV)
	DH-33 A, DD Nagar, Morar, Gwalior (M.P.)
5	Dr. O.P. Mathuriya
	Agriculture Scientist
	C-333, Kailash Vihar, AV-1
	Kalyanpur, Kanpur-208017 (U.P.)
6	Dr. Sushil Kumar Piyashi
	Agril. Engineear (SWE)
	Andhartal Jahalnur (M.P.)
7	Sh. Praveen Kumar Shinde
	F-108/29. Shivaji Nagar. Bhopal (M.P.)
8	Sh. Shivraj Sharma
	Candhi Colony, Morona (M.P.)
	Sh Ranieet Singh Rana
,	H-32 Purani Court
	Ghasmandi, Morar, Gwalior (M.P.)
10	Dr. Sunanda Singh Raghuwanshi
	E-7/59, SBI Colony,
	Arera Colony, Bhopal (M.P.)

ACADEMIC COUNCIL

The Academic Council is vested with the responsibility of implementing and monitoring all the academic programmes. The council is headed by the Vice-Chancellor, as chairperson and consists of Dean Faculty, Director Instructions, Director Research and Director Extension, University Head of Departments and Professors as members. The composition details are given below:

S. No.	NAME AND ADDRESS OF MEMBERS	OFFICIALS
1	Dr. S.K. Rao	Chairman
	Vice-Chancellor	
	RVSKVV, Gwalior	
2	Dr. Mridula Billore	Member
	Dean, Faculty of Agriculture	13 10 1 10 m
	RVSKVV, Gwalior	Acres 6
3	Dr. B.S. Baghel	Member
	Director, Research Services	
	RVSKVV, Gwalior	
4	Dr. R.N.S. Banafar	Member
	Director, Extension Services	
	RVSKVV, Gwalior	
5	Dr. A.K. Singh	Member
	Director, Instructions and Dean, Student Welfare	
	RVSKVV, Gwalior	
6	Dr. A.K. Singh	Member
	Managing Director, National Horticulture Board	
	Ministry of Agriculture and Farmer Welfare, Govt. of India	
1.00	85, Institutional Area, Sector-18, Gurgaon-122012 (HR)	1000
7	Dr. Rajpal Singh	Member
	Former Professor and Head	
	278-A, Durgesh Vihar, J.K. Road, Bhopal-462041 (M.P.)	
8	Shri D.L. Kori	Member
	Registrar,	Secretary
	RVSKVV, Gwalior	

ADMINISTRATIVE COUNCIL

S. No.	NAME AND ADDRESS OF MEMBERS	OFFICIALS
1	Dr. S.K. Rao	Chairman
	Vice-Chancellor	
	RVSKVV, Gwalior	
2	Dr. Mridula Billore	Member
	Dean, Faculty of Agriculture	
	RVSKVV, Gwalior	
3	Dr. B.S. Baghel	Member
	Director, Research Services	
	RVSKVV, Gwalior	
4	Dr. R.N.S. Banafar	Member
1000	Director, Extension Services	1.00
	RVSKVV, Gwalior	34.10.10
5	Dr. A.K. Singh	Member
	Director, Instruction and Student's Welfare	
	RVSKVV, Gwalior	
6	Two Dean colleges nominated by the Vice-Chancellor for a	Member
	period of two years by rotation-	
	1. Dean, College of Agriculture, Gwalior.	
	2. Dean, College of Agriculture, Indore.	
7	Dr. (Smt.) Sugandhi Tiwari	Member
	Comptroller	
	RVSKVV, Gwalior	
8	Dr. H.S. Bhadauria	Member
	Executive Engineer/In-charge of Work section	
	RVSKVV, Gwalior	
9	Two Heads of Department from Agriculture Faculty by	Member
	rotation according to the seniority for a period of two year-	
	1. Head of Department (Extension Education).	
	2. Head of Department (Genetics Pl. Breeding).	
10	Shri D.L. Kori	Member
	Registrar,	Secretary
	RVSKVV, Gwalior	

9. IMPORTANT EVENTS/INAUGURATIONS:

Independence Day:

RVSKVV, Gwalior celebrated Independence Day on August 15, 2018. Prof. S.K. Rao, Hon'ble Vice Chancellor unfurled the Tricolor in the presence of senior officers, invitees, staff members and students. During Independence Day in his address, he paid tribute to the martyrs of the freedom struggle.



Fifth Convocation:

The Fifth Convocation of Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya,

Gwalior was held on Aug 29, 2018. Hon'ble Shri Narendra Singh Tomar. Cabinet Minister, Rural Development and Panchavati Raj, Govt. of India presided over the function. Smt. Maya Singh, Minister, Women & Child Development, Govt. of M.P was the Guest of Honour, while Dr. N.S. Rathore Deputy Director General (Education)l, Indian Council of Agricultural Research. New Delhi graced the occasion as Chief Guest. Hon'ble Members of Board of Management and Academic Council,



Directors, Deans, Faculty members, Staff, Distinguished guests and recipients of Degrees graced this event. On this occasion Dr. N.S. Rathore delivered the convocation address. The Convocation ceremony began with the academic procession comprising of Hon'ble Shri Narendra Singh Tomar, Cabinet Minister, Rural Development and Panchayati Raj, Govt., Special Guest of Honour, Vice-Chancellor, Members of Board of Management and Academic Council of the University led by the Registrar; walked the aisle in College of Agriculture Auditorium. In the Convocation, a total of 594 students were conferred UG, PG and Ph.D. degrees and five students received Gold Medals.

Swachha Bharat Abhiyan:

Swachha Bharat Summer Internship programme 2018 is being organized in all colleges of University. The Colleges adopted villages to generate the awareness on cleanliness related issues through various activities like using toilet, hand washing, health hygiene through skits, songs, paintings, rallies, door to door contact etc.

University Ranking:

ICAR Ranking: University is ranked Number 10 amongst Agricultural Universities.



India Today Ranking: University is ranked Number 26 amongst Indian Universities and ranked Number 02 amongst Agriculture Universities

Unveiling of Statue of Rajmata Vijayaraje Scindia: Hon'ble Shri Narendra Singh Tomar, Cabinet Minister, Rural Development and Panchayati Raj, Govt. of India unveiled the Statue of Rajmata Vijayaraje Scindia on the occasion of 5th Convocation of the University held on August 29, 2018 at RVSKVV, Gwalior in the gracious presence of **Smt. Maya Singh, Minister, Women & Child Development,** Govt. of M.P., Prof. N.S. Rathore, DDG Education, ICAR and other dignitaries.



Abhinandan 2018:

A ten days student induction programme **"Abhinandan 2018"** was started at College of Agriculture, Gwalior from September 5-18, 2018, as per guidelines of Education Division, Indian Council of Agriculture Research. The main purpose of this programme was to help students in getting familiarized with the institution as well as inculcate in them the ethos and culture of the institution. As per the guidelines the activities carried out under "Abhinandan 2018" covered all aspects of social, mental and career growth of students through diverse lectures as well as practical sessions.



SEMINAR/ SYMPOSIA/ WORKSHOPS/ CONFERENCES/ MEETINGS ORGANIZED:

Board of Management: The 32nd and 33rd meetings of Board of Management of RVSKVV, Gwalior were held on August 28, 2018 and Oct. 01, 2018, respectively under the Chairmanship of Hon'ble Vice Chancellor Prof. S.K. Rao.

Administrative Council Meet: The 29th, 30th and 31st meetings of Administrative Council of RVSKVV, Gwalior was held on Aug. 27, 2018, Sept. 28, 2018 and Dec. 28, 2018, respectively under the Chairmanship of Hon'ble Vice-Chancellor.

Academic Council Meet: The 40th, 41st and 42nd meetings of Academic Council of RVSKVV, Gwalior were held on Aug. 27, 2018, Sept. 28, 2018 and Dec. 28, 2018, respectively under the Chairmanship of Hon'ble Vice Chancellor.

Scientific Advisory Committee Meeting: Scientific Advisory Committee Meetings (Pre-Kharif) were organized at different KVKs under the jurisdiction of RVSKVV, Gwalior



Workshops Organized: NHRDF, Indore organized two days state level Krishak Sangosthi during Sept.10-11, 2018 at Krishi Vigyan Kendra, Dhar. Dr. R.N.S. Banafar, Director Extension Services, RVSKVV, Gwalior chaired the programme as chief guest.



21 Days Training Programme: ICAR sponsored Winter School on "Extension and communication Approaches for Sustainable Agriculture" during September 19 to October 09, 2018 was organized at Department of Agricultural Extension and Communication, College of Agriculture, RVSKVV, Gwalior. Hon'ble Vice Chancellor Prof. S.K. Rao Inaugurated the Winter School. Twenty extension Scientists/Assistant Professors from nine states of the country participated in the course. The eminent resource persons like Prof. V.S. Tomar, Dr. K.D. Kokate, Dr. J.P. Sharma, Dr. Mahesh Chander, Dr. Surya Rathore, Dr Anjani Kumar and many more from leading agricultural and extension institutes and ATARIs interacted with the participants, enriched the contents of the course and motivated the trainees for further achievement of their professional goals.



NAARM Training: ICAR-National Academy of Agricultural Research Management (NAARM) organized three days training programme during Sept. 25-27, 2018 on **"Developing winning research proposals in agricultural research"** at RVSKVV, Gwalior in which 25 scientists/professors of different colleges and research stations participated and received guidance and tips for formulation of an economically viable sound project proposals.

New KVK started: New KVKs at district Agar Malwa and Alirajpur started functioning. One more new KVK has been sanctioned by the ICAR, at Manawar in district Dhar which has been started from Oct. 5, 2018.

Mobile App "Masala Faslen" Released: Mobile App "Masala Faslen" released by Director, ATARI, Jabalpur, during the Zonal KVK Workshop. The KVK Ujjain Mobile App was developed by Smt. Ghazala Khan, Sr. Tech. Officer, KVK Ujjain.



• Two day Training programme of Faculty of different constituent Colleges of RVSKVV, Gwalior for successful conduction of Induction programme "ABHINANDAN 2018" for Orientation of fresher's students was organized at College of Agriculture, Indore from Aug. 11-12, 2018.

Training of Rural Youth

- Eight days Rural Youth Training on different aspects of Nursery management was organized at KVK Dewas during August 20-27, 2018. 18 Rural Youth's participated in this training programme.
- 30 unemployed rural youths participated in on campus vocational training during Sept. 10-14, 2018 at KVK, Mandsaur on "Repair & Maintenance of Tractor" for rural youths. The rural youths trained to serve as tractor mechanic will help them to generate income to raise their livelihood.

Pre-Kharif Kisan Sammelan/ Kisan Gosthi/ Kisan Mela: Krishi Vigyan Kendra, Morena organized Pre-Kharif Kisan Sammelan on June 20, 2018 at Morena in which 120 farmers and farm women were Participated, KVK Scientists provide information on planning of crops, Seed treatment, Plant Protection, Animal health, Soil health etc. for ensuing kharif.



Boot Camp of Startup India Madhya Pradesh Yatra: The Startup India Yatra is a platform which aims to help Entrepreneurs realize their startup dream. Entrepreneurs will also have the opportunity to get incubated to succeed in their journey from idea to enterprise. The Startup India Yatra aims to reach each and every district of the country. Under Startup India initiative, one day Boot Camp of Startup India Madhya Pradesh Yatra was organized at College of Agriculture, Gwalior on July 27, 2018 with the major objective of searching for entrepreneurial talent and to render help in development of startup ecosystem in the state.

The day long boot camp was Chaired by Hon'ble Vice Chancellor Prof S.K. Rao with the dignitaries of the University. The programme included presentations on Startup India and Madhya Pradesh Startup policy followed by an extensive ideation workshop.



Skill development training on Beekeeping and its management: Krishi Vigyan Kendra, Morena organised 5 days skill development training on Beekeeping and its management for rural youth and farmers of the district from July 9-13, 2018. KVK Entomologist Dr. A.S. Yadav provided technical information for beekeeping role of honey bee in agriculture, seasonal and insect pest management, floral calendar, migration, production of honey and other bee produce, processing, packaging and marketing. Twenty five rural youth and farmers attended this training programme and gained practical knowledge to raise their income and livelihood.



Vocational Training

- Krishi Vigyan Kendra, Morena organized five days vocational training programme on "Preservation and value addition of seasonal fruits and vegetables" from September 18-22, 2018. A total of 41 participants along with anganwadi workers of Morena district benefitted through this programme.
- Eight days Rural Youth Training on Ornamental fish production techniques for entrepreneurship development was organized at KVK Dewas during Oct. 23-30, 2018. Twenty eight Rural Youths participated in this training programme and motivated for self-employment.





Field Day

- A Field day of Soybean JS 20-29 was organized at Mankund village on Sept. 14, 2018. In this programme production technology of kharif crops was discussed. Forty farmers participated in this training programme and took keen interest and interacted with the scientists.
- Field day of Maize organized at Khuntkheda village of Sonkuchh block on Oct. 01, 2018. In this programme we discussed about production technology of various kharif crops. 30 farmers were participated in this training programme.

World Food Day: The World Food Day was celebrated in all KVKs of RVSKVV on Oct. 16, 2018. This programme emphasized on food importance, reduction of food wastage, timely saving of perishable food etc. The group was catalyzed to put personnel efforts for elimination of hunger by providing food and service in the society.

Celebration of Mahila Kisan Diwas in Satelite village

Mahila Kisan Diwas was celebrated on October 15, 2018 by RVSKVV- Krishi Vigyan Kendra Morena in Satelite village Bisangpura of Joura block. A total of 50 farm women and adolescent girls actively participated in this programme. An essay writing competition was also organized for them.





Women Farmer Day

The women farmer day was celebrated at KVK, Mandsaur on Dated Oct. 15, 2018 in which women farmers were stimulated to come forward for acquiring knowledge about hi tech agriculture, horticulture, dairy, processing of food commodity etc. by creating awareness to empower women in the field of agriculture.

National Farmers' Day (Kisan Diwas)

National Farmers' Day was celebrated on Dec. 23, 2018 all the campi of the university scientists and experts give technical guidance to the farming community and rendered solution to their problems. Farmers educated on various innovative technologies and entrepreneurial opportunities exists in agriculture to double the income.

Parthenium Awareness Week

During parthenium awareness week from August 16-22, 2018, scientist of AICRP – WM went to different KVKs, Colleges and villages in Gwalior and Datia district to create awareness among the public, students and farmers about ill-effects of Parthenium and its control measures.

Farmers' need assessment through PRA

Scientists assessed the farmers' need through KVK Participatory Rural Appraisal at Mahudiya village on July 7-8, 2018. Under this programme the farmers' problems and their needs were assessed and Social map, Resource map etc. made with the participation of KVK scientists, READY students and farmers.

Agri-Entrepreneurship Meet

Two days Agri-Entrepreneurs meet was organised at Deen Dayal Research Institute, Chitrakoot jointly by DDRI, Chitrakoot and Agricultural Technology Application Research Institute (ATARI), Zone IX, Jabalpur on December 7-8, 2018. Mrs. Nidhi Katare Agri-Entrepreneur trained by KVK Gwalior under ARYA Project on Mushroom Cultivation attended the programm. She made presentation on her journey from mushroom cultivation to

commercial spawn production for motivation & benefits to other participants and exhibited various value added products *viz.* Mushroom Soup Powder, Mushroom Pickle and Mushroom Powder. The DG, ICAR Dr. Trilochan Mahapatra and Director ATARI, Jabalpur Dr. Anupam Mishra, visited her stall on mushroom and appreciated her achievements and hard work.











Live webcast of Hon'ble Prime minister Interaction with SHG of Progressive farm women

Live webcast of interaction of Hon'ble Prime minister Sh. Narendra Modi ji with Self Help Group of farm women for improvement of socio- economic status on country was telecasted on July 12, 2018 at KVK Gwalior. Hon'ble Vice Chancellor Dr. S. K. Rao was the chief guest of the programme. Dr. R. N. S. Banafar, DES, RVSKVV Gwalior, Dr. U. P. S. Bhadauria JDE, RVSKVV Gwalior, Dr. Raj Singh Kushwah Principal Scientist & Head KVK Gwalior and all scientists of KVK and progressive farm women were present on this occasion. Total 77 progressive farm women and member of SHG were present.



AWARDS:

• Dr. I.S. Tomar, Principal Scientist and Head, Krishi Vigyan Kendra, Jhabua conferred with Swami Sahajanand Saraswati Award-2017 on the occasion of Foundation Day of ICAR at New Delhi on July 16, 2018.


10. HUMAN RESOURCE DEVELOPMENT:

Participation of Scientist in National/International Seminars/Symposia/ Conferences/ Short term Courses /Trainings/Workshops/Summer and Winter Schools etc.

S. No.	Title of training	No. of participants nominated
1.	Summer/Winter Schools	28
2.	National/International/Seminars/Symposia/Conference	9
3.	Short term courses	3
4.	Workshop	6

11. AWARDS AND RECOGNITIONS BY COLLEGES:

(1) College of Agriculture, Gwalior:

S. No.	Name of person	Name of the Award	Awarding Organization
1	Dr. P.D. Singh	Prashasti Patra was conferred in the "7th Shikshak Samman	Utthan Nyas, Gwalior (M.P.)
2	Dr. P.D. Singh	Certificate of Appreciation conferred in the Inter-Collegiate Cultural Meet "Anugoonj"	College of Agriculture, Gwalior (M.P.)
3	Dr. R. Lekhi	Best Poster Presentation	Rajmata Vijayraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh
4	Dr. R. Lekhi	Best Poster Presentation	Department of Horticulture Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh
5	Dr. R. Lekhi	Krishi Vigyan Gaurav	Bhartiya Krishi Anusandhan Patrika
6	Dr. D.S. Sasode	Certificate of Honor	Jan jagriti samaj se <mark>va</mark> kalian samiti, Gwalior
7	Dr. D.S. Sasode	Best teacher award	Jan uthanNyas, Gwalior
8	Dr .Ekta Joshi	Best teacher award	Jan uthanNyas, Gwalior
9	Dr. Ekta Joshi	Certificate of Honor	Jan jagriti samaj seva kalian samiti, Gwalior
10	Dr. Varsha Gupta	Best teacher award	Jan uthanNyas, Gwalior
11	Dr M K Tripathi	Science Renown Award in Plant Biotechnology	Bioinformatics Technologies of India, Bareilly, U. P. India

12	Dr M K Tripathi	Distinguished Scientist Award	AASTHA Foundation
13	Dr Sushma Tiwari	Eminent Scientist of the year award	National Environmental Science Academy, New Delhi on 15/12/2018
14	Dr Sushma Tiwari	Prestigious Scientist award	Bioinformatics Technologies of India, Bareilly on 24/11/18

(2) College of Agriculture, Indore: Jain NR and Barche, S (2018) received Second position in poster presentation entitled "Effect of germination and seedling vigor for the most ideal soil media of different varieties of Drumstick. During the National seminar on "Advances and challenges in Horticulture" 26-27 February, 2019 at JNKVV, Jabalpur (M.P.) and World book of records: मेरा तिरंगा मेरा अभमान, वश्व का सबसे लम्बा तिरंगा, १२ कमी ९ डॉ. एच.एल. खापेडया

(3) RAK, College of Agriculture, Sehore: Nil

(4) BM, College of Agriculture, Khandwa: Shri Subhash Rawat – *Excellence in Extension award* by Aastha Foundation, Jaipur, Rajasthan.

(5) KNK, College of Horticulture, Mandsaur:

- Dr. Vidhya Sankar, received Bharat Ratna Indira Gandhi Gold Medal Award By Global Economic Progress And Research Association (GEPRA), NEW DELHI on the occasion of 62nd National Unity Conference on "National Economic Growth through Individual Contribution" on 9th March 2019 at Bangalore.
- Dr. S.B. Singh received Excellence in Research Award for outstanding contribution in the field of entomology on the occasion of International Conference on Global Research Initiatives for Sustainable Agriculture and Allied sciences (GRISAAS-2018) at RAU, Durgapura, Jaipur, from 28-30, October, 2018.
- Dr. R.P. Patel conferred member of organizing committee of International Conference on Global Research Initiatives for Sustainable Agriculture and Allied sciences (**GRISAAS-2018**) at RAU, Durgapura, Jaipur, from 28-30, October, 2018.
- to Dr. R.P. Patel received Excellence in Research Award for outstanding contribution in the field of Plant Pathology on the occasion of International Conference on Global Research Initiatives for Sustainable Agriculture and Allied sciences (GRISAAS-2018) at RAU, Durgapura, Jaipur, from 28-30, October, 2018.
- Shri H.C. Bharvey received best research paper poster award on "Analytic study of M.Sc. (Horticulture) thesis under the department of plantation, spices, medicinal and aromatic crops at KNK College of Horticulture,

Mandsaur (M.P.)" Authored by H.C. Bharvey, R.N. Sharma and R.P. Patel. (2018). In International conference on Global Research Initiatives for Sustainable Agriculture and Allied sciences (GRISAAS-2018) at RAU, Durgapura, Jaipur, from 28-30, October, 2018.

- Dr. S.B. Singh, received best research paper poster award on "Reaction of Bt cotton hybrids against sucking insect pests in Malwa region of Madhya Pradesh" Authored by S. B. Singh, R. P. Patel, and G. S. Chundavat (2018). In International conference on Global Research Initiatives for Sustainable Agriculture and Allied sciences (GRISAAS-2018) at RAU, Durgapura, Jaipur, from 28-30, October, 2018.
- **12. VISITS ABROAD:** Dr S.K. VERMA, HOD, Soil Science ,visited France and Spain during Chief Ministers Foreign exposure to farmers to farmers, team of 18 farmers along with nodal officer 9DDA Hosangabad)visited to SOME Farmers /Societies in France and Spain during May 10-20, 2018.



Student Visited Abroad (Spain) and presented research work: MSc. Final year student, Mr Vinod Kumar Sahu, Got ABSTC student scholarship from international society for biosafety research (ISBR) and attended 15th ISBR syposium held at Tarragona, Spain and preseanted his work on topic "Cross Compatible Transferability Of Ground Nut Microsatellite Primers (SSR) Across With Pearl Millets And Chickpea Crops"

13. Distinguished Visitors:(1) College of Agriculture, Gwalior:

S. No.	Name	Designation	Date
1	Dr. P.K. Singh	Director, DWR, Jabalpur	25-26 February, 2019
2	Dr. P.M.Reddy,	Scientist, ANGRAU, Hyderabad	07, September 2018
3	Dr. V. S. Tomar	Former Vice chancellor RVSKVV & JNKVV	02 March, 2019
4	Dr. D.L.N. Rao	Former Director IISS, Bhopal	02 March, 2019
5	Pramod Jha,	Principal Scientist	03 March, 2019
6	Dr. D. R. Biswas	Principal Scientist	03 March, 2019
7	S.C.Gupta	Prof. RAK College of Agriculture, Sehore	03 March, 2019
8	Dr.S. V. Saiparasad	Head, IARI ,Indore	31/08/2018
9	Dr.A. Satyanarayan	Retd. Prof. ANPAU A.P.	20/09/2018
10	Dr.S.R.Maloo	Ex, Dean, MPAUT, Udaipur	20/09/2018

(2) College of Agriculture, Indore: Nil

(3) RAK, College of Agriculture, Sehore: BARC and ICRISAT Scientists visited Chickpea Experiment at RAK, CoA, Sehore.

(4) BM, College of Agriculture, Khandwa: 04

(5) KNK, College of Horticulture, Mandsaur:

S. No.	Name of dignatory	Designation	Period	Purpose
1	Jim Rushing currently works with JIFSAN as the Manager of International Training Programs	Director of the Risk Analysis program at JIFSAN, USA	12/02/2019	Training programme for Spices farm worker on food safety with joint Institute for food safety and applied nutrients
2	Dr. Clare Narrod	Director of the Risk Analysis program at JIFSAN, USA	12/02/2019	Training programme for Spices farm worker on food safety with joint Institute for food safety and applied nutrients
3	Dr. Ashok Vyas	ELT Expert Teachers trainer Writer English grammar and speaking Director NETIZEN PEDAGOGY	4-6 Feb, 2019	Capacity building programme for faculty and students

14. PUBLICATIONS:

Research papers/Abstract (Presented & Published)/Books/Book Chapters/ Teaching Manual/ Popular Articles etc.

S. No.	Category of publication	Nos
1	Papers Published in National and International Journals	125
2	Research paper presented in the seminar/ Souvenir/ Symposia/ Conferences	33
3	Books	12
4	Practical Manual	04
5	Popular Article	26
6	Book Chapter	06

14.1 Papers Published in National and International Journals:

S.No.	Author (s)	Title	Journal	Vol ume	Page No.	Ye ar	NAS S Rati ng	JID	ISS N	Nation al / Interna tional
1	Gautam S., Tomar S.P.S., Singh P.D., Suryawanshi D.K., and Singh U.C.	Screening of brinjal (solanum melongena L.) varieties against insect pest complex.	Intern. J. Agri. Sci.	Volu me 11(0 7)	8180 - 8182	20 19	4.82			Interna tional
2	Tarun Kumar, SPS Tomar, Pradyumn Singh, NKS Bhadauria, and NS Bhadauria	Seasonal incidence of major insect pests of soybean in gird region central India.	Journal of Entomology and Zoology Studies	7 (1):.	447- 450	20 19	5.53			
3	Tarun Kumar, SPS Tomar, NKS Bhadauria, Pradyumn Singh and NS Bhadauria	"Efficacy of insecticides against major insect-pests of soybean in gird region at central India". ".	International Journal of Chemical Studies.	7;2	13- 18.	20 19	5.31			
4	Bharat Lal, N.S. Bhadauria and S.P.S. Tomar	Biology and Morphometics of Plume Moth, Exelastis atomosa (Wals.) on Pigeonpea Variety- Saket under Laboratory Conditions in Gwalior, Madhya Pradesh Region	India". Int.J.Curr.Microbio I.App.Sci	8(2)	1880 - 1886	20 19	5.38			
5	Prahalad Mandloi, Tomar S.P.S., Pradyumn Singh, N.K.S. Bhadauria and N.S. Bhadauria	Study of chickpea varieties against pulse beetle (callosobruchus chinensis) in storage	Flora And Fauna	24; 2	228- 230	20 18	4.55			

6	Prahalad Mandloi, Pradyumn Singh, Tomar S.P.S., N.K.S. Bhadauria And V.K. Shrivastava	Evaluation of morphological characters and protein content of chickpea (cicer arietinum) in realtion to resistance against pulse beetle (callosobruchus chinensis)	Flora And Fauna	24; 2	255- 262	20 18	4.55			
7	Mandloi S., Suryawanshi D.K., Tomar S.P.S., Singh P.D., and Singh U.C.	Impact of biotic factors on the incidence of insect pest of okra.	Intern. J. Agri. Sci.	10; 19	7324 - 7327	20 18	4.20			
8	Singh Y.P., Tomar SPS and Singh Sudhir	Impact of biotic stress management technologies on yield, economics, and energy indices of pigeon pea (<i>Cajanus</i> <i>cajan</i>) grown in Central India	Legume Research online			20 18	6.12			
9	Khan Shahin, Tomar SPS and Raghuwanshi Pawan Kumar	Effect of number of spray and time of application of monocrotophos for the control of mustard aphid Lipaphis erysimi (Kalt.) On mustard	International Journal of Chemical Studies.	6;2	665- 666	20 18	5.31			
10	Khadse Sachin Ramesh, Khandwe Nanda, Sinha Sandhya and Tomar SPS	Studies on correlation of gram pod borer, <i>Helicoverpa</i> <i>armigera</i> (Hubner) with abiotic factors by pheromone traps	International Journal of Chemical Studies.	6;2	872- 875	20 18	5.31			
11	Sharma, Prabhakar; Tomar Sadhna; Sharma Prashant and Daipuria, O.P.	Problem faced by the beneficiaries in adoption of watershed management practices	Progressive Research: An international	13 (1)	84-87	2018	3.84	P1 60	097 3- 641 7	Interna tional
12	Gurjar, Lakan Singh; Daipuria, O.P.; Sharma, Prashant; Sharma, Prabhakar and Patel, M.M.	Constraints Faced by Beneficiaries of front line Demonstration in Adoption of improved pulse production	Journal of community Mobilization and Sustainable Development	13 (2)	313-316	2018	5.30	J15 4	223 0- 904 7	Nationa l

		Technology						-		
13	Rawat, Reena; Prabhakar, Sharm; Sharma, P. and Singh, Arvind Kumar	A study on the assessment of constraints in effective credit utilization pattern and repayment behavior in Datia district of Madhya Pradesh	International Journal of Chemical Studies	6 (6)	2510- 2512	2018	5.31	I18 5	234 9- 852 8	Interna tional
14	Yadav, A.; Gupta S.; Sharma, P. & Sikarwar	Analytical study of level of knowledge beneficiary and non-beneficiary farmers regarding potato production technology	Journal of Pharmacognosy and Phytochemistry	issue-I	419- 421.	2019	5.21	J39 9	234 9- 823 4	Nationa 1
15	Patidar, J. K.; Singh, P. K.; Kashyap, V.; Singh, Reeti and Patidar, S.	Screening of chickpea lines against dry root rot of chickpea caused by <i>Rhizoctonia</i> <i>bataticola</i> (Taub.) butler	Journal of Pharmacognosy and Phytochemistry	8 (1) :	1030 - 1032.	20 19	5.21	450 51	227 8- 413 6	
16	Patidar, J.K.; Kashyap, V.; Singh, P. K.; Singh, Reeti and Singh R.K.	Bio-control potential of native strains of <i>Trichoderma</i> against <i>Rhizoctonia</i> bataticola causing dry root rot of chickpea	International Journal of Agriculture Science	10 (2)-	5066 - 5068.	20 18	4.20	115 9	097 5- 371 0	
17	Pachori, Amita; Sharma, O.P. and Singh, Reeti	Evaluation of mycotoxicity of commercial fungicides against <i>C. capsici</i> f. sp. <i>Cyamopsicola</i>	Journal of Pharmacognosy and Phytochemistry	7(1) :	2816 - 2817 `.	20 18	5.21	450 51	227 8- 413 6	
18	Singh, Prashant Kumar; Patidar, Jagdish Kumar; Singh, Reeti; Roy, S. and Pandya, R.K	Evaluation of culture media for the growth of <i>Rhizoctonia solani</i> causing black scurf of potato.	Internat. J. Chem. Stud.,	7(2) :	2189 - 2192.	20 19	5.31	I18 5	232 1- 490 2	
19	Verma, Deepak Kumar; Sasode Rajni Singh; Harne, A.R. and Singh, Reeti	Survey for severity of anthracnose of cluster bean in northern Madhya Pradesh	Journal of Pharmacognosy and Phytochemistry	8 (1) :	1043 - 1044.	20 19	5.21	450 51	227 8- 413 6	

20	Yadida, Mannasa and Singh, Reeti Yadida, Mannasa and Singh, Reeti	Field evaluation of chemicals and botanicals against <i>Alternaria</i> <i>cyamopsidis</i> causing Alternaria blight of clusterbean <i>In vitro</i> evaluation of botanicals against <i>Alternaria</i> <i>cyamopsidis</i> causing Alternaria blight of clusterbean	Multilogic in Science International Journal of Current Microbiology and Applied Science	8 : 7(9) :	196- 197 3060 - 3063.	20 18 20 18	5.20	M0 88 I19 9	227 7- 760 1 231 9- 769 2	
22	Fatehpuria. P. K., Pandya. R.K., Sasode. R.S., Patidar. J.K and Singh. Reeti	Screening and <i>in- vitro</i> comparative evaluation of different isolates of Sclerotiniascleroti orumunder five selective media	International J. Chemical Studies	7(1) :	849- 852.	20 19	5.31	I18 5	232 1- 490 2	
23	Sasode. , R.S, Pandya, R.K., and Fatehpuria. P. K	Management of Pearl millet downy mildew by the application of bio-agents, chemicals and botanicals.	Inter. J. Chem. Studies	6(1) :	606- 608	20 18	5.31	I18 5	232 1- 490 2	
24	Sasode. , R.S, Fatehpuria. P. K, A. patidar, and Pandya, R.K.,	Reaction of pearl millet genotype against Downy mildew disease	International Journal of Pure and Applied Bioscience	.6(2):	1158 - 1162	20 18	4.74	I31 4	232 0- 705 1	
25	Kushwah, Artika Singh, Choudhary, S.K., Rawat, G.S. and Sinha, N.K.	System productivity and economic returns of differnet cropping system under Malwa conditions of M.P.	Indian Research Journal of Extension Education	19 (1)	84- 86	20 18	4.81	110 6	097 2- 218 1	Nationa l
26	Rawat, G.S.	Effect of promising varieties of clusterbean on yield attributes, yield and economics in northern M.P.	BhartiyaKrishiAn usandhanPatrika	34 (1)	68- 70	20 19	3.07	B0 28	030 3- 382 1	Nationa l
27	Dhakad Rahul, Rawat, G.S. and Patel Ramkesh	Effect of foliar application of nutrients on growth and yield of clusterbean [<i>Cyamopsistetrag</i> onoloba (L.) Taub].	BhartiyaKrishiAn usandhanPatrika	34 (1)	71- 73	20 19	3.07	B0 28	030 3- 382 1	Nationa 1
28	Patel Ramkesh, Rawat, G.S. and Dha <mark>kad Rah</mark> ul	Effect of foliar application of nutrients on	BhartiyaKrishiAn usandhanPatrika	34 (1)	74- 76	20 19	3.07	B0 28	030 3- 382	Nationa l

		growth and yield of cowpea [Vignaunguiculat a (L.) Walp]							1	
29	Joshi Ekta, Sasode, D.S., Sikarwar, R.S., Gupta Varsha&Kasana B.S.	Optimizing crop geometry and nutrient management for yield, water productivity and economics of Kharif groundnut	Legume Research	LR- 405 3	1-4	20 18	3.07	B0 28	030 3- 382 1	Nationa l
30	Singh Neelam, Joshi Ekta, Sasode D.S, Sikarwar, R.S. and Rawat, G.S.	Liquid Biofertilizer and inorganic nutrients effect on physiological, quality parameters and productivity of kharif Groundnut	International Journal of Current Microbiology and Applied Sciences	7 (09)	729- 735	20 18	5.68	119 9	231 9- 770 6	Interna tional
31	V.P.S. Bhadauria, Varsha Gupta and F.M. Prasad	Effect on growth parameters and oil content of lemongrass with respect to iron pyrite under and continuous use of RSC rich irrigation water	Journal of Plant Development Sciences	11(1)	57- 60.	20 19	4.57	J41 8	097 4- 638 2	Nationa 1
32	M.S. Argal, S.K. Verma and Sunil Rajput	Ameliorating effects of nutrient management on different form of nitrogen and Nutrient Use efficiency in Chambal Ravine of Madhya Pradesh	International Journal of Pure & Applied Bioscience	6	No 6180	20 18	4.74	127 2	232 0- 705 1	Interna tional
33	M.S. Argal, S.K. Verma and B.K.Trivedia	Impact of Nutrient Management on Plant nutrient content and Nutrient uptake of wheat (<i>Triticum</i> <i>aestivum</i> L.) under degraded land of Chambal ravine.	International Journal of Pure & Applied Bioscience. (Submitted	7	No 6181).	20 18	4.74	127 2	232 0- 705 1	Interna tional
34	Jamra Shweta, S.K. Trivedi, Jitendra Patidar, Hemlata Dhakad, and Priyanka Jadon	Effect of levels and sources of phosphorus on yield and uptake of nutrients in black gram (<i>Phaseolus mungo</i> L.). An Special	Journals of science, Agriculture & Engineering.	Vol. VII,	рр 311- 313.	20 18				Interna tional

		Issue ICAAATSD								
35	Radha Gupta, Shashi S. Yadav, S. K. Verma and S. K. Dubey (2018).	Siderophore Production and Biocontrol Potential of Rhizobium Isolated from Non- Traditional Leguminous Crop in M.P.	International journal of pure and Applied Bioscience	6 (2)	142- 145	20 18	4.74	127 2	232 0- 705 1	Interna tional
36	Meena B,singh A yadav S.S. bhadauriaS.Ds. and khambalkar P A.	Pedological perspective of ravine erosion sites with in gird region of madhya pradesh	International Journal of Agriculture Sciences	10	6687 - 6690	20 18	4.20	I13 5	097 3- 130 X	Interna tional
37	Bhadouria A, Yadav Shashi S,Gupta Subhash,P A Khambalkar and singh Akhilesh	Effect of various Integrated management practices on growth and yield of Pearlmillet crop grown on Typic ustochrepts Soils of Gwalior region in Madhya oradesh	International Journal of Chemical Studies	6(6)	958- 962	20 18	5.31	116 4	234 9- 852 8	Interna tional
38	Jadon,priyanka.,S eladurai,R., Yadav Shashi S., Munuswamy,V.C.	Enhancing plant growth , yield and Nitrogen Use Efficiency of Maize through application of coated urea fertilizers	International Journal of Chemical Studies	6(6)	2430 - 2437	20 18	5.31	116 4	234 9- 852 8	Interna tional
39	Khan Sjita,Singh Akhilesh,bhadour ia S.S.,Yadav S.S. Manoj Kumar, Verma SK, Priyadarshani A Khambalkar, Asha Arora and Narendra Singh	Influence of tillage practices and weed control methods on organic carbon pools and physical properties of sandy clay loam soil in north central India	International Journal of Chemical Studies	6(6)	1699 - 1705	20 18	5.31	116 4	234 9- 852 8	Interna tional
40	Anushree Pramanik, Sushma Tiwari , M.K. Tripathi, R.S. Tomar and A. K. Singh	Molecular characterization of groundnut (<i>Arachishypogaea</i> L.) germplasm lines for yield attributed traits	Indian J. Genet	79 (1)	56- 65	20 19	6.4		ISS N 001 9- 520 0	Nationa 1

41	Tinee Adlak, Sushma Tiwari , M. K. Tripathi, Neha Gupta, Vinod Kumar Sahu, PunamchandBha war and V. S.	Biotechnology: An Advanced Tool for Crop Improvement. Current Status	Current Journal of Applied Science and Technology	33(1)	1-11	20 19	5.3		ISS N: 245 7- 102 4 ISS	Interna tional
42	Sanjeev Kumar Yadav, Vinod Kumar Sahu and M.K. Tripathi	and Future Prospects of Marker Assisted Breeding for Genetic	International Journal of Current Microbiology and Applied Sciences	7(12):	2587 - 2590	20 18	5.3		N: 231 9- 770 6	
43	Bele, D., Mishra, Nishi, Tiwari, Sushma Tripathi, M.K. and Tiwari, G.	Massive <i>in vitro</i> cloning of sandalwood (<i>santalum album</i> linn.) <i>Via</i> cultured nodal segments	Current Journal of Applied Science and Technology.	33(1):	1-14	20 19	5.32	NA AS ID 119 0	ISS N: 245 7- 102 4	
44	Sharma, D.K., Tripathi, M.K ., Tiwari, R. Baghel, B. S.and Ahuja A.	Somatic embryogenesis and plantlet regeneration via embryogenic suspensions of grape (Vitis vinifera L.)	Asian Journal of Microbiology, Biotechnology and Environmental Science:	20 Feb sup pl.	S112 -125	20 18	4.9 3		ISS N: 097 2- 300 5 SCO PUS - H Ind	
45	Malviya Ram Kanya, Tripathi M. K., Vidhyashankar M. Patel R.P. and Ahuja, A.	Effect of different phytohormones on plant regeneration of gladiolus (<i>Gladiolus</i> <i>hybridus</i> HORT.) from cultured cormel	Asian Journal of Microbiology, Biotechnology and Environmental Science	19(2)1	55- 165.	20 18	4.9 3		ISS N: 097 2- 300 5 SCO PUS - H Ind	
46	Tripathi, M.K., Mishra, Nishi, Tiwari, S.,Singh, S.,Shyam, C. and Ahuja A.	Plant tissue culture technology: sustainable option for mining high value pharmaceutical compounds	Intrnational Journal of Current Mcrobiology and applied sciences (IJCMAS).	8(2) 10	2- 110	20 19	5.3 8, ICV: 92. 3			
47	Tripathi, M.K. Tiwari, S. Mishra, N. Sharma, A. and Ahuja, A	Bioprospection for Bioactive Molecules of Pharmaceuticals Importance	Indian Journal of Biotechnology and Pharmaceutical Research	6(4) :	22- 24	20 19			ISS N: 234 7- 326 6	
48	R K Singh, Sunil Silavat, Jagdish Kumar Patidar And Vivek Kashyap	Development of chickpea wilt (Fusarium oxysporum f. sp. ciceri)	Indian Journal of Agricultural Sciences	89	215- 9	20 19	6.2 2	IO 29		

49	R K Singh, Sunil Silavat, Jagdish Kumar Patidar And Vivek Kashyap	Influence of date of sowing and chickpea varieties on occurrence of	International Journal of Chemical Studies	6	240- 243	20 18	5.3 1	I18 5		
50	Mujalde, S., Choudhary, S.K., Ranade, D.H. and Ranjeet (2018)	Seed priming: a new technology for improving early seed emergence &	Int. J. Curr. Microbiol. App. Sci	7	363 8- 364 1	20 18				
51	Ranade D.H., Mujalde Santosh, and Swarup Indu	Modified traditional water harvesting system for irrigation	Indian J. Dryland Agric. Res. & Dev.	33(2)	86- 88	20 18	4.7			
52	Ranade D.H., Mujalde Santosh, Girothia, O.P., Swarup Indu	Samanvit krishi pranali se sambhav hai bharpur kamai.	Kheti	6	29- 31	20 18				
53	Ranade D.H.	Jal sangrhan tatlab ke nirman se bhrpur utpadan – ek safal gatha.	Jalchetna	7(2)	56- 58	20 18				
54	Ranade D.H., Mujalde Santosh, and Swarup Indu	Pattidar sinchai hetu jal prabandhan avam jal bachat pranali	Kheti	11	30- 33	20 18				
55	Ranade D.H., Mujalde Santosh, and Swarup Indu	Modified traditional water harvesting system for	Indian farming	68(12):	24- 27.	20 18				
56	Ranade D.H. and Jadav M.L.	Navin va sasti sinchai padhatiyan	Kheti	2	17- 19.	20 19				
57	Jain, NR., Barche, S and Ranjeet	Effect of germination and seedling vigour for the most ideal soil	Int. J. chem. stud	6(5)	182 7- 183 0	20 18	5.3 1	0.5 65	Int. J. che m.s tud	Intern ational
58	. Dhakad S.S, Asati K.P., Chouhan S.S., Badaya, A.K. Kirar K.S. and Ambawatia G.R.	FLD on the yield and economics of cicer aeritinum L. in tribal area of M.P., India	IJCMB AS	7 (5)	366 2- 366 6	20 18	5.3 8	4.1 19		Intern ational
59	Kumawat, A., Gupta, N.K., Jain, NR and Nayama, S	Studies on the effect of PGRs and micronutrient on okra cv. Parbhani Kranti	IJCMB AS	9 01	321 6- 322 3	20 19	5.3 8	4.1 19		Intern ational

60	Dhakad, S.S., Ambawatiya, G.R., Singh, Mukesh and Verma, G.	Effect of ridge and furrow seed cum fertilizer drill on growth characters and ield of soybean in Shajapur district of M.P.	Int. Curr.Microbiol. App.Sci.	8(4)	229 8- 230 4	20 19		
61	Field Screening of Sorghum Genotypes for Resistance to Shoot fly, Atherigona soccata and Stem borer, Chilo partellus	S N Upadhayay and R S Marabi	March – April 2019	Bulleti n of Enviro nment , Pharm acolog y and Life Scienc	4.95			
62	Effect of wheat [Triticum aestivum (L.)] varieties under fertility levels and seed rates on growth and economics of crop plant	Anil Kumar Rai, JP Dixit, Jan Mejay Sharma, Dharmendra Gaur and Dinesh Kumar Paliwal	April, 2018	Journa l of Pharm acogn osy and Phytoc hemist ry	5.21			
63	Effect of weed management practices in different physiological aspects on wheat crop [(L.)]	Narayan Shakya , Sudarshan Chicham, Anil Kumar Rai, Aneeta Shakya and D.K. Paliwal	July-August, 2018	Green Farmi ng	4.38			
64	Growth, productivity and quality of wheat varieties in late sown condition under different fertility levels and seed rates in gird region	Anil Kumar Rai, J. P. Dixit, Ajay Singh , D. K. Paliwal, M.K. Tarwariya and Navneet Satankar	April, 2018	Multil ogic in scienc e	5.20			
65	Effect of wheat [Triticum aestivum (L.)] varieties under fertility levels and seed rates on physiological parameter, nutrient content and uptake of crop plant	Anil Kumar Rai, JP Dixit, Dharmendra Gaur, Dinesh Kumar Paliwal and Kalpana Sharma	November, 2018	Intern ationa l Journa l of Chemi cal Studie s	5.31			

66	In Vivo Evaluation of Fungicides against Alternaria Leaf Blight of Tomato in Cited by Alternaria Solani	S.K. Arsia1, Subhash Rawat, Mukesh Dongre	2018	Progre ssive Resear ch – An Intern ationa I Journa I	Print ISSN : 0973- 6417, Online ISSN			
67	Measuring Scholarly Publication Output of Pt. Ravishankar Shukla University, Raipur during the year 2005-2014: a scientometric study	Jayendra Kumar Singh	OCT.– DEC. 2018 VOLUME 5 I ISSUE 4	IJRAR- Intern ationa l Journa l of Resear ch and Analyt ical Revie ws	E ISSN 2348 – 1269, PRINT ISSN 2349- 5138			
68	Indian Writers and their connection with Booker prize	Dr. O.P. Sharma	Jan 2019 Vol. 1	Tapti Resear ch Journa l	ISSN No. 2455- 0906			

- Nisha, N.; Sharma, R.K.; Kushwah, S.S. and Gallani, R. (2018). Effect of irrigation regimes and varieties on growth, bulb yield and quality of onion (*Allium cepa* L.). *International Journal of Current Microbiology and Applied Sciences* 7 (5): 1104-1111.
- Rugi, M.; Kushwah, S. S. and Sharma, R. K. (2018). Effect of transplanting dates on growth, marketable bulb yield and economics of kharif onion (*Allium cepa* L.) varieties. *Annals of Plant and Soil Research* 20 (3): 243–249.
- 71. Bharvey, H.C.; Sharma, R.N. and Patel, R.P. 2018. Analytic Study of M.Sc. (Horticulture) Thesis under the Department of Plantation, Spices, Medicinal and Aromatic Crops at KNK College of Horticulture Mandsaur (M.P.). Progressive Research- An International Journal. Vol.13 (Spacial): 434-436
- 72. Punasya, A.; Kanwar, J. and Dubey, R. (2018). IBA and Rooting Media Influenced Survival, Rooting and Vegetative Growth in Air Layering of Guava (*Psidium guajava* L.) cv. L-49. *Int. J. Curr. Microbiol. App. Sci.* 7(**8**): 1505-1510
- Choudhary, R.C.; Kanwar, J.; Chouhan, G.S.; Singh, P. and Tanwar, D.R. (2018).
 Effect of ga3 and growing media on seedling growth of papaya (Carica papaya L.) cv. pusa Nanha. *International Journal of Chemical Studies* 6(6): 1008-1012
- 74. Kanchan K.K.; Kushwah, S.S. Kushwah;, Mishra, S.N.; Naruka, I.S. and Singh, P.P (2018). Studies on seed production of pea (*Pisum sativum* L.) varieties with phosphorus levels under Malwa Plateau conditions. *Legume Research*, 41(5): 722-727.

- 75. Sirwaiya, Sonam and Kushwah, S.S. (2018). Assessment of different sowing dates and varieties on growth, yield and quality of seed in garden pea (*Pisum sativum* L.). *Int. J. Curr. Microbiol. App. Sci*, 7(3): 1387-1396.
- Gupta, Sourav and Kushwah, S.S. (2018). Effect of nitrogen levels on growth and yield on kharif onion (*Allium cepa* L.) cultivars. *Journal of Allium Research*, 1(1): 66.70.
- 77. Veerbhadreswar; Kushwah, S. S.; Sharma, R.K. and Singh, O.P. 2018. Studies on genetic variability, heritability and correlation analysis for growth, yield and quality traits in bush type Indian bean. National Conference on Arid Horticulture for Enhancing Productivity & Economic Empowerment organised by Indian Society for Arid Horticulture in association with ICAR-Central Institute for Arid Horticulture, Bikaner at CIAH, Bikaner from 27- 29 October 2018.
- 78. Rokade, A.; M. Vidhya Sankar and Kumar A. (2018). Effect of biofertilizers on growth and flowering in French marigold cv. Pusa Arpita. *Journal of Ornamental Horticulture.* 21(3&4): 86-94.
- 79. Nagar, D.; Kanpure, RN.; Tiwari, Rajesh and Bhandari, J. (2018). Effect of preharvest spray of alar, calcium chloride and potassium sulphate on post-harvest behavior of guava fruits (*psidium guajava* L.) cv. Chittidar. *Multilogic in Science*, 8 Special issues (D):20-25.
- 80. Kumrawat, D.; Kumar, P.; Kanpure, R.N. and, Haldar, A. (2018).Effect of integrated nutrient management on morphological and physical parameter of guava cv. L-49. *Technofame- A multidisciplinary Advance Research*, 7 (1):114-118.
- Kumrawat, D.; Kanpure, R.N.; Singh, O.P.; Bhandari, J. and Kachouli, B. (2018). Effect of integrated nutrient management on quality and yield parameters of guava (*Psidium guajava* L.) cv. L-49. *Pharmacognosy and Phytochemistry*, 7 (5):1668-1670.
- Tirkey, N.R.; Kanpure, R.N.; Kachouli, B.K.; Bhandari, J. and Patidar, D.K. (2018) Effect of foliar nutrition of Zinc sulphate, borax and NAA on yield and quality of guava (*Psidium guajava* L.) *cv*. Allahabad Safeda. *International Journal of Chemical Studies*, 6 (4): 2295-2298.
- 83. Chouhan, A.; Sonkar, P.; Kanpure, R. N.; Anjanawe, S. R. and Haldar, A. (2018). Response of foliar spray of urea, boron and 2,4-d in acid lime (*citrus aurantifolia* swingle) under malwa plateau conditions. *International Journal of Agriculture Sciences*, 10 (7):5727-5729.
- Kurve, G.; Vidhya Sankar M.; Kumar, A. and Singh, O.P. (2018). Effect Of pre soaking of bulbs in plant growth regulators on flowering and vase life of Tuberose (*Polianthes tuberose* Linn.). *International Journal of Chemical Studies*, 6(1):1485-1490
- 85. Bhandari, J.; Kanpure, R. N.; Singh, O.P. ; Kachouli, B. and Patidar, D.K. (2018). Effect of organic And inorganic nutrient sources on growth, yield and quality of

acid lime (*Citrus aurantifolia* Swingle). *International Journal of chemical studies* 6(1) :1635-39

- 86. Nargave, K. ; Sharma, R.K. ; Kushwah, S.S. and Singh, O.P.(2018). Influence of varieties and fertility levels on growth, yield and quality of Radish (*Raphanus sativus* L.) under malwa region of Madhya Pradesh. *International Journal of Agricultural Sciences*, 10(5) :5371-5374
- 87. Sharanya, B.R.; Naruka, I. S.; Shaktwat, R.P.S.; Kushwah, S.S.; Singh O.P. and Singh D. (2018). Effect of plant geometry on growth, yield and quality of different varieties of fenugreek (*Trigonella foenum-graecum* L.). *Indian Journal of Agricultural Research*, 52(**3**): 323-326
- 88. Gallani, R.; Wankhede, R. and Pandey, A. (2019). Assessment of economic sulphur doses of soybean (Glycine max Merill L.) in Malwa region of western M.P. Journal of Pharmacognosy and Phytochemistry: SP2: 440-442.
- 89. Jagdish, P.; M. Vidhya Sankar and Mishra, S. N. (2018). Effect of foliar spray of micronutrients on pigment content in pot mum cultivars Ajina Purple and Dolly White, *International Journal of Current Microbiology and Applied Sciences*.
- Shambhu, Meena, K.C.; Haldar, A.; Patidar, D.K. and Abdul, R. (2018). Effect of Sowing Time and Plant Geometry on Growth, Yield and Quality of Chandrasur (*Lepidium sativum* L.), *Int. J. Curr. Microbiol. App. Sci* (2019) 8(3): 1985-1991.
- 91. Monu, Naruka, I. S.; Meena, K.C.; Haldar, A. and Singh P. P. (2018). Effect of potassium and zinc on growth, yield and quality of garlic (*Allium sativum* L.). *India Journal of Arid Horticulture*, 13 (**1-2**):74-78.
- 92. Soni, N.; Patil, P.; Meena, K.C.; Haldar, A.; Patidar, D.K. and Tiwari, R. (2019). Evaluation of different coloured varieties of grapes under nontraditional area of Malwa Plateau: A Thin Line Tool for Doubling the Farmer Income. *Int. J. Curr. Microbiol. App. Sci* 8(3): 1968-1976.
- 93. Patel, R.P.; Pandey, G.N.; Patidar, B.K.; Soni, N.; Singh, S.B. and Haldar, A. (2018) Screening of 110-r root stock based table vareities of grape vine (Vitis vinifera l.) against anthracnose disease caused by Elsinoe ampelina (de bary) sher in Mandsaur district of Madhya Pradesh. *Journal of Plant Development Sciences*,10 (9): 499-504
- 94. Dwivedi, S. K. and Joshi, V. K. (2018). Extraction of crude anthocyanins from plum waste for Antioxidant and Antimicrobial evaluation. *Progressive Horticulture* 50(1): 1-5.
- 95. Pandey, A.; Dubey, N. and Dwivedi, Shailendra K. (2019). Effect of pre-harvest treatments on storage quality of aonla cv. NA 7 and Chakiya. *Journal of Pharmacognosy and Phytochemistry.* 8(2): 785-789.
- 96. Jain, P.; Singh, S.B; Borban, K. and Badaya, A. K. (2018). Bio-efficacy of novel insecticides against chilli aphid, *Aphis gossypii*, Glover and thrips (*Scirtothrips dorsalis* Hood) in Malwa region of Madhya Pradesh. *Annals of Plant and Soil Research*, 20(2): 172-177.

- 97. Jain, P.; Singh, S.B; Borban, K. and Badaya, A. K. (2018). Bio-efficacy of novel insecticides against chilli whitefly (*Bemisia tabaci* Genn. in Malwa region of Madhya Pradesh. *Annals of Plant and Soil Research*, 20 (2): 210-213
- 98. Singh, S.B; Badaya, A. K; Sharma, N. and Upadhyay, S. N. (2018). Comparative bio-efficacy of bio insecticides, *Metarhizium anisopliae* (Metchnikoff) Sorokin against chilli thrips, (*Scirtothrips dorsalis* Hood). *Journal of Plant Development Science*, 10(7): 415-418
- 99. Singh, S.B; Chundavat, G. S; Badaya, A. K. and Upadhyay, S. N. (2018). Assessment of losses due to various insect pests in BT cotton hybrids in Malwa region of Madhya Pradesh. *Annals of Plant and Soil Research*, 20(4): 354-358
- 100. Singh, S.B; Patel, R.P. and Chundavat, G.S. (2018). Reaction of BT cotton hybrids against sucking insect pests in Malwa Region of Madhya Pradesh. *Journal of Plant Development Sciences*, 10 (9): 511-515.
- 101. Patel, R.P; Pandey, G.N; Patidar, B.K; Soni, N.; Singh S.B. and Haldar. A. (2018). Screening of 110-r root stock based table vareities of grape vine (*Vitis ViniferA* L.) against anthracnose disease caused by *Elsinoe Ampelina* (DE BARY) SHER in Mandsaur district of Madhya Pradesh. *Journal of Plant Development Sciences*, 10 (9): 499-504.
- Patel, R.P; Pandey G.N; and Singh S.B. (2018). Two genus of powdery mildew fungi (Leveillula and Sphaerotheca) recorded on cluster bean (*Cymopsis tetragonoloba* L. Taub.) in western Madhya Pradesh. *Progressive Research*, 13 (3): 247-249,
- 103. Bhardwaj, N. and Singh, S.B. (2019). Weather factors affecting insect pests' activities on soybean in Malwa region of Madhya Prades, India. Int. J. Curr. Microbiol. App. Sci. Special Issue, 8:89-93
- 104. Verma, B.; Bhardwaj, N.; Singh, S.B. and Sharma, M. (2019). Alternation of insecticidal sprays for the management of thrips (*Thrips tabaci* Lindeman) and whitefly (*Bemisia tabaci* Gennadius) pest of Bt cotton in Malwa region of Madhya Pradesh. Int.J.Curr.Microbiol.App.Sci 8(2): 2293-2300.
- 105. Bansal, V.; Premi, M.; Khan, K. A. (2018).Optimization of antioxidant rich indigenous food product "burfi" recipe using response surface methodology and its storage study. *International Journal of Agricultural Engineering*. Sp. issue 11: 41-45.
- 106. Dabas, K. and Khan, K. A.(2018). An approach towards fortification of rice. *Food Science Research Journal*. 9(2): 135-138.
- 107. Satankar, V.; Mageshwaran, V; Jagajanantha, P; Khan, Khursheed Alam (2018). Oyster mushroom-A viable indigenous food source for rural masses. *International Journal of Agricultural Engineering*. Sp. issue 11: 173-178.
- Sharma, R. and Khan, K. A. (2018). High hydrostatic pressure food processing: An overview. *International Journal of Agricultural Engineering*. Sp. issue 11: 70-75.

- 109. Yadav, S.; Khan, K. A. and Agrawal, V.(2018). Formulation of lacto-fermented orange juice with incorporation of dairy whey. *International Journal of Agricultural Engineering*. Sp. issue 11: 29-36.
- 110. Chouhan, A, Sonkar, P. and S. R. Anjanawe (2018). Effect of foliar application of urea, boron and 2,4-D in acid lime (*Citrus aurantifolia* Swingle) under Malwa Plateau conditions. *Bulletin of Environment, Pharmacology and Life Sciences*. Volume 7 (6): 41-44.
- 111. Gami, J; Sonkar, P.; Haldar, A and Patidar, D.K. (2019). Effect of prte harvest spray of ZnSO₄, KNO₃ and NAA on growth, yield and quality of ber (*Zizyphus mauritiana* Lamk.) cv. Seb under Malwa Plateau conditions.
- 112. Jain,Ramesh Chandra,Khan Nikhat Afroz,and Jain, Nimisha Raj.(2018) Integrated nutrients Management in enhancing soybean productivity in black soil.(vertisol).A book published at International level by Lambert Acadmic Publishing member of OmniScriptum Publishing group, Beau Bassin (2018) ISBN: 978-613-9-82335-2.
- 113. Kumar, Sunil, Vishwakarma Diksha, Lanka, Sangeeta and Jain R.C.(2018) Effect of conservation tillage and organics and inorganics on soil fertlity and different aggregate size cllases. Annals of plant and soil Research 20 (2): 168–171 PP.**NASS RATING 4.38**.
- 114. Jain, Nimisha Raj, Sukla, Anita and Jain R.C.(2018) Effect of graded doses of N,P and bio-fertilizer on nutrient composition (NPK & S) Of fenugreek in vertisol of central India.*Int.J. Agricult.Stat.Sci.*Vol.14(2),PP.599-600 NASS RATING 5.5
- 115. Pawan Kumar, Swati Pratap, RP.S. Verma, A.N. Tikle and Rekha Malik (2018) Diversity assessment of hulled barley (*Hordeum vulgare* L.) accessions of ICARDA in Indian condition using cluster analysis *Indian J. Agric. Res.*, 52(4): 429-433.
- 116. **Gupta, S.C.**, Trivedia, B and Singh, P. (2018).Effect of diverse nutrient application on symbiotic traits, yield attributes, nutrient uptake, microbial population, DHA activity and productivity of Chickpea in black soils. *Legume Res.*(online IISN:0976-0571).(NAAS Rating 6.23)
- 117. Mandale P., B.L. Lakariya ,S.B.Aher,A.B.Singh and **S.C. Gupta** (2018).Potassium concentration , uptake and partitioning in maize (Zea mays L.) cultivars grown in organic agriculture. *Res. On Crops.* 19(4):587-592.). (NAAS Rating 4.75).
- 118. Mandale P., B.L.Lakariya, S.C. Gupta, A.B.Singh S.B.Aher and Sonam Sirwaiya (2018). Growth and yield response of maize cultivars to organic farming in central India. *The Pharma Innovation*.7 (10): 138-142.). (NAAS Rating 5.03).
- 119. Mandale, P. B.L.Lakariya ,S.B.Aher, A.B.Singh and S.C. Gupta (2018). Performance evaluation of maize cultivars for organic production. *Journal of pharmacognosy and phytochemistry*. 7(5): 2433-2440.) (NAAS Rating 5.21).
- 120. Diksha Vishwakarma, JK Thakur, **S.C. Gupta** (2018).Isolation & Evaluation of PGPR from different habitat for quantitative .Estimation of P solubilisation

ability of situated bacterial isolation. *Multilogic in Science* Vol VIII, special issue (A) August. (NAAS Rating 5.20).

- 121. Simaiya Vidya; Vyas, M.D. (2018) Efficacy of tank mixed herbicides with Insecticides in growth and yield of soybean (*Glycine max.* (L.) Merrill) *Journal of Pharmacognosy and Phytochemistry*; 7(2): 3933-3940
- 122. Jamliya, G.S. and **Vyas, M.D.** (2018) Effect of fertilizers with and without FYM on growth, yields attributes and yields of soybean (*Glycine max.* (L.) Merrill) varities in medium black (Vertisol) of Vindhyan Plateau of Madhya Pradesh, India *Plant Archives* 17 (2): 421-1424
- 123. Jamliya, G.S. and **Vyas, M.D.** (2018) Quality, yield and economics of soybean (*Glycine max.* (L.) Merrill) varieties as influenced by interaction effect of fertilizer levels with and without FYM *Indian Journal of Tropical Biodiversity*, 25(2):233-235
- 124. Saxena, D.R., Saxena, M. & Tiwari, N. (2018). Morphological and cultural variability in Fusarium oxysporum f.sp. Lentis causing wilt of lentil. Indian Phytopathology https://doi.org/10.1007/s42360-018-0087-y.
- 125. Vijayvergiya D.,Ali S.A.,DasMP.Ramgriryp.,andUikey S.,Effect of preemergeneeherbicides on weed control of Kharif onion,in vindhayan plateau of M.P.(2018:7(I):376-378.

S.No	Author (s)	Title	Conference Proceedings		Year	National / Internation al
1	Fatehpuria Pramod K*, Pandya R.K., Sasode. R. S., Patidar J.K., Gupta. J.C. and Singh Reeti	Oxalic acid production among Sclerotiniasclerotio rum isolate of grid Pradesh.ISMPP 38th Annual Conference & National Symposium on Plant and Soil Health Management: New		PP 287	Nov. 16-18 2018	National
2	FatehpuriaPramod K*, Pandya R.K., Gupta. J.C., Sasode. R. S., Patidar J.K. and Singh Reeti	<i>In-vitro</i> evaluation of <i>Sclerotiniascleroti</i> <i>orum</i> isolates grid zone of M. P. under five selective media	4th National Brassica Conference (NBC- 2019). CSAUA & T, Kanpur	PP 66	Feb. 01-03. 2019	National
3	Khambalkar Priyadarshani Arun, Shashi S. Yadav and S. K. Verma	Biofertilizers – key player for sustainable agriculture	Strategies for Soil Health Management: Achievements & Researchable Issues		2018	National
4	M.K. Tripathi, S.P.Singh, Sushma Tiwari, Nishi Mishra, Shikha Upadhyay,	Role of biotechnology to combat against different abiotic	International Journal of Advance and Innovative Research	78- 81	2018	Internation al

14.2 Abstract published in various conference/souvenir:

	Akash Sharma, Jyoti Singh 1, Shagun Nehra 1, R.S. Sikarwar, V.S. Kandalkar and A.K. Singh	stresses.	proceeding of conference held at Vijayraje Institute of Science & Management, Gwalior (M.P.) during 20-21 December 2018			
5	Sushma Tiwari, Neha Gupta and M. K. Tripathi	Genomics Assisted Molecular Breeding for Crop Improvement: Status and Prospects.	International Journal of Advance and Innovative Research proceeding of conference held at Vijayraje Institute of Science & Management, Gwalior (M.P.) during 20-21 December 2018	27 - 30	2019	National
6	M. K. Tripathi, Sushma Tiwari, Nishi Mishra, Neha Gupta, Aakash Sharma, Shagun Nehra, Jyoti Singh, Chitrlekha Shyam, Sonali Singh, Shikha Upadhyay, Tinee Adlak, Vinod Shahu, Punam chand Bhawar, Avitash Parmar, M. S. Rathore, Rahul Verma, Sunil Yadav, Sivani Singh Rana, M. L. Chaudhary, Sanjeev Sharma, R. S. Sikarwar, Ashok Ahuja, V. S. Kandalkar and A. K. Singh	Role Of Tissue Culture In Conservation Of Biodiversity And Crop Improvement.	International Journal of Advance and Innovative Research proceeding of conference held at Vijayraje Institute of Science & Management, Gwalior (M.P.) during 20-21 December 2018	11 - 26	2019	National
7	Pradeep Kumar Yadav, Neha Gupta, Sushma Tiwari, M K Tripathi and V S Kandalkar	Approaches and Applications of Bioprospecting of Genes for Crop Improvement	International Journal of Advance and Innovative Research proceeding of conference held at Vijayraje Institute of Science & Management, Gwalior (M.P.) during 20-21	59 - 62	2019	National

			December 2018			
8	Sonali Singh, M. K. Tripathi, Sushma Tiwari and Ashok Ahuja	Giloe (Tinospora Cordifolia Willd.): Multi-Efficacious Plant of Medicinal Value.	International Journal of Advance and Innovative Research proceeding of conference held at Vijayraje Institute of Science & Management, Gwalior (M.P.) during 20-21 December 2018	117 _ 124	2019	National

- 9. Chouhan G.S., Kushwah S.S., Singh O.P. and Sharma R.K. (2018) presented research paper on 'Genetic variability, Heritability and Genetic advance for yield and yield attributing traits in Bottle gourd *[lagenaria siceraria* (Mol.) Standl.]' in the National conference on arid horticulture for enhancing productivity & economic empowerment organized by Indian Socity for arid horticulture from 27-29 October 2018 at ICAR-Central Institute for Arid Horticulture, Bikaner.
- 10. P.S. Dhakad and Om Singh presented research paper on Effect of weed management practices on 'weed control efficiency, growth, yield and economics of coriander (Coriandrum sativum L.)' Climate Change and Adaptive Crop Protection for Sustainable Agri-horticulture Land Scape. 2018 ICAR- NRCSS, Tabiji, Ajmer (Raj.) & Society of Plant Protection Sciences ICAR-NCIPM, Pusa Campus, New Delhi
- Dr. S.K. Dwivedi presented expert talk on topic "Fermentation Technology for value addition in underutilized fruit crops" dated 04/08/2018 during summer school organized by SKUAST- Shalimar- Srinagar, J&K (July-6 Aug 2018)
- 12. Khan, Khursheed A presented *invited lecture* on '*Food Processing Techniques and their Impacts on Nutritive Value'*. in National conference on "Indigenous foods: How to promote it" organized by Department of food processing technology at Bilaspur university, Bilaspur from 19-20 April, 2018.
- 13. Kumar, Anit; Sehrawat, Rachna; Khan, Khursheed A; Upadhyay, Ashutosh; Babar, Onkar; Nigan, Shubhangi. 2018. Natural colorants: Enhancement of extraction yield from wastage of grapes pomace using micro-fluidization. Poster presented in 18th International Conference on Recent Advances in Food Processing Technology at Indian Institute of Food Processing Technology, Thanjavur, Tamil Nadu, India.
- 14. Patel, R.P; Pandey, G.N; Patidar, B.K; Singh S.B. and Chundavat. G.S.(2019) presented research paper on 'Severity of powdery mildew on okra (*Abelmoschus esculentus* L. Moench) caused by (erisiphe cichoracearum DC) in shaded and non shaded field in Mandsaur district of Madhya Pradesh' at 8th Indian Horticulture Congress-2019 (IHC) at Indira Gandhi Krishi Vishwavidyalaya , Raipur Chhattishgarh 17-21 January,2019.

- 15. G.S. Chouhan, S.S. Kushwah, O.P. Singh and R. K. Sharma (2018). Genetic variability, heritability and genetic advance for yield and yield attributing traits in bottle gourd [*Lagenaria siceraria* (Mol.) Standl.]. E-book of abstracts, Saroj, P.L., Sharma, B.D. and Reddy, S.V.R. (Ed.), National Conference on Arid Horticulture for Enhancing Productivity & Economic Empowerment during 27-29 October 2018 at ICAR-Central Institute for Arid Horticulture, Bikaner.:17.
- Mukesh Dawar, Anuj Kumar, Vidhya Sankar M. and Roshan Gallani (2018). Effect of biofertilizers on growth and flowering of tuberose (Polianthes tuberosa L.) under Malwa Plateu of M.P. Abst. National Conference on Ornamental Horticulture to Uplift Rural Economy (11-13 January, 2019) at RCA, MPUAT, Udaipur (Raj.).
- Asha Rokade, Vidhya Sankar M. and Kumar Anuj (2018). Response of in French marigold cv. Pusa Arpita to Biofertlizers. Abst. National Conference on Ornamental Horticulture to Uplift Rural Economy (11-13 January, 2019) at RCA, MPUAT, Udaipur (Raj.) p. 89
- Bhandari, J and Kanpure, R.N. 2019 Effect of INM on growth, yield and quality of Acid lime (*Citrus aurantifolia* Swingle). National seminar on technological advancement in horticulture for 21st century during 18-19 February 2019 at College of Horticulture and Forestry, Jhalawar (Raj.) pp 285.
- 19. Nargave Krishnkant, Sharma R.K., Kushwah S.S. and Singh O.P. (2018) Effect of varieties and fertility levels on growth, yield and quality of radish(*Raphanus sativus* L.) Under Malwa region of Madhya Pradesh.National conference on Innovative technological interventions for doubling farmer's income held from February 08-10,2018 organized by Society for integrated development of agriculture, veterinary and ecological sciences at Sher-e-Kashmir university of agricultural sciences and technology of Jammu(J&K)
- 20. Kumrawat D., Kanpure R.N.,SinghO.P., Bhandari J,and Kachouli B. (2018)Effect of integrated nutrient management on quality and yield parameters of guava (*Psidium Guajava L.*)CV,1-49. International Conference on Global Research Initatives for Sustainable Agriculture & Allied Sciences (GRISAAS-2018) during 28-30 October 2018 at Rajasthan Agricultural Research Institute, Durgapura, Jaipur, Rajasthan
- 21. Chouhan G.S., Kushwah S.S., Singh O.P. and Sharma R.K. (2018) Genetic variability, Heritability and Genetic advance for yield and yield attributing traits in Bottle gourd *[lagenaria siceraria* (Mol.) Standl.] National conference on arid horticulture for enhancing productivity & economic empowerment organized by Indian Socity for arid horticulture from 27-29 October 2018 at ICAR-Central Institute for Arid Horticulture, Bikaner
- 22. Veerbhadreswar, Kushwah S.S.,Sharma R.K., and Singh O.P. (2018) Studies on genetic variability, Heritability and Genetic advance for growth, yield and quality traits in bush type Indian bean. National conference on arid horticulture for enhancing productivity & economic empowerment organized by Indian

Socity for arid horticulture from 27-29 October 2018 atICAR-Central Institute for Arid Horticulture, Bikaner

- 23. Haldar, A., Meena KC, Patidar, D.K., and Soni, N. (2018). Miricle Plant Fenugreek: A review, on the occasion of 2nd International Conference on Advances in Agricultural, Biological and Applied Sciences for Sustainable Future (ABAS 2018) during 20-22 October, 2018 at Sardar Patel Auditorium Swami Viviakanand Subharti University, Meerut, Uttar Pradesh, India. Published by Shri Gyan Sagar Publications, Indra Nagar I, Meerut, (ISBN: 978-81-937106-7-8)
- 24. Soni Nitin, Meena Kilash Chandra , Haldar Ajay, Patidar Dharmendra K., Tiwari Rajesh and Patil Prakash (2018) Valuation Of Different Colored Varieties Grapes Under Nontraditional Area Malwa Plateau : A Thin Line Tool For Doubling The Farmer Income" 8th Indian Horticulture Congress-2018 to January 17-21, 2019 at IGKV, Raipur(CG) :595
- 25. Soni Nitin, Pandey S.K., Singh S.S.,Meena Kilash Chandra , Haldar Ajay and Patidar Dharmendra K. (2018) "Influence of growing media and Indole Butyric Acid on clonal propagation through stem cutting in Guava (Psidium guajava L.) Allhabad Safeda"8th Indian Horticulture Congress-2018 to January 17-21, 2019 at IGKV, Raipur(CG) :596
- 26. Haldar, A., Meena KC, Patidar, D.K., and Soni, N. (2018). Miricle Plant Fenugreek: A review, on the occasion of 2nd International Conference on Advances in Agricultural, Biological and Applied Sciences for Sustainable Future (ABAS 2018) during 20-22 October, 2018 at Sardar Patel Auditorium Swami Viviakanand Subharti University, Meerut, Uttar Pradesh, India. Published by Shri Gyan Sagar Publications, Indra Nagar I, Meerut, (ISBN: 978-81-937106-7-8)
- 27. Saniya khan, Jyoti kanwar, Naruka I.S and Singh P.P (2018). Genetic variability and association among colour and white seedless genotypes of grape (*Vitis vinifera*). *Indian Journal of Agricultural Sciences*, 88(5):737-45
- 28. Abdulrazaq Bepari, Naruka I.S, Meena K.C, Haldar A and Nayma S (2018). Effect of Sulphur and Zinc on growth, yield and quality of Coriander (Coriandrum sativum L.) cv.RCr-436. *International Journal of Chemical Studies*, 6(5): 2479-2483.
- 29. Singh, S.B.; Patel, R.P. and Chundavat. G.S.2018. Reaction of Bt cotton hybrids against sucking insect pests in Malwa region of Madhya Pradesh. International Conference on Global Research Initiatives for Sustainable Agriculture and Allied sciences (GRISAAS-2018) at RAU, Durgapura, Jaipur, from 28-30, October, 2018.
- 30. Dawar, M.; Kumar, A.; M Vidhya Sankar. and Gallani, R. (2019) Effect of biofertilizers on growth and flowering of tuberose (*Polianthes tuberosa* L.) under Malwa Plateau of M. P. Book of Abstracts National Conference on Ornamental Horticulture to Uplift Rural Economy. Organized by ISOH, New Delhi and MPUAT, Udaipur, Rajasthan: pp 78
- 31. Asha, R.; Vidhya Sankar. M and Kumar, A. (2019). Response of French marigold cv. Pusa Arpita to biofertilizers. Book of Abstracts National Conference on

Ornamental Horticulture to Uplift Rural Economy. Organized by ISOH, New Delhi and MPUAT, Udaipur, Rajasthan: pp 89

- 32. Parihar, R.; M. Vidhya Sankar and Kumar, A. (2019). Performance of spray chrysanthemum (*Dendranthema grandiflora* Tzvelev.) cultivars in the Malwa region of Madhya Pradesh. Book of Abstracts National Conference on Ornamental Horticulture to Uplift Rural Economy. Organized by ISOH, New Delhi and MPUAT, Udaipur, Rajasthan: pp 105
- 33. H.C. Bharvey, R.N. Sharma and R.P. Patel presented research paper on "Analytic study of M.Sc. (Horticulture) thesis under the department of plantation, spices, medicinal and aromatic crops at KNK College of Horticulture, Mandsaur (M.P.)" In International conference on Global Research Initiatives for Sustainable Agriculture and Allied sciences (GRISAAS-2018) at RAU, Durgapura, Jaipur, from 28-30, October, 2018.

14.3 BooK:

S.N o	Author (s)	Title	Book Name	Page No.	Year	ISBN No.
1	Ajay Kumar, Pragti Saini, J.N. Shrivastava, R.S. Sasode, R.K. Pandya and Reeti Singh	Bio control agents for sustainable agriculture	Diseases in Plant s and their Manageme nt		2018	978817132890 1.
2	Sasode Singh,Rajani,Pand ya R. K., Kumar Ajay, Saini Pragati, Singh Reeti, Chobe Devashish R., and Fatehpuria Pramod	Diseases of cereals and their integrated disease management	Diseases in Plant s and their Manageme nt		2018	978817132890 1.
4	Ekta Joshi, Varsha Gupta, D.S. Sasode, Sushma Tiwari, R.S. Sikarwar and Neelam Singh	Liquid biofertilizer and inorganic nutrients application impact on quality traits and physiology of <i>kharif</i> groundn ut (<i>Arachis</i> <i>hypogea</i> L.)	Current trends in plant science and molecular biology for food security and climate resilient agriculture	67- 74	2018	978-93-5321- 456-2
5	D.S. Sasode, Ekta Joshi, Varsha Gupta, RajniSasode B.S. Kasana and Sushma Tiwari	Weed flora dynamics and growth response of black gram (Vigna mungo L.) to weed management practices in black gram - mustard cropping system	Current trends in plant science and molecular biology for food security and climate resilient agriculture	75- 81	2018	978-93-5321- 456-2
6	Varsha Gupta, Ekta Joshi, Deep Singh Sasode and B.S. Kasana	Efficacy of herbicide or combination of herbicides against the problematic weeds in green gram (vignaradiata	Current trends in plant science and molecular biology for food security and climate	82- 90	2018	978-93-5321- 456-2

		l.)	resilient agriculture			
7	Sushma Tiwari, Narendra Kumar, AnushreePramani k, Ekta Joshi, D.S. Sasode, R.S. Sikarwar, R.S. Tomar, M.K. Tripathi, V.S. Kandalkar and A.K. Singh	Breeding for Foliar Disease Resistance in Groundnut Using Conventional and Molecular Approaches.	Proceeding of National Conference Current Trends in Plant Science and Molecular Biology for Food Security and Climate Resilient Agriculture held at College of Agriculture Gwalior on 15 - 16 February 2018. Published on 15/12/18 during National Symposium at Delhi University.	56- 62	(2018)	ISBN-978-93- 5321-456-2
8	Mishra, Y.D.; Gupta, S. & Patel ,M.M.	Extension Approaches for Agricultural development	-	978- 81- 7622- 452-9	2018	
9	Ranade D.H., Mujalde Santosh, Swarup Indu,Akhilesh Singh, Bhagat, D.V. and Girothia, O.P.	Shushka kheti ki vagyanik padhdhati.	Biotech books, New Delhi	978- 81- 7622 - 441- 3.	2019	

10	Ranade D.H., Mujalde Santosh, Swarup Indu, Akhilesh singh, Bhagat, D.V. and Girothia, O.P.	Natural resource management in dryland agriculture.	Biotech books, New Delhi	978- 81- 7622 - 442- 0	2019	
11	Dr R P S Dhiman, DrVirendra Kumar Shukla and Dr Ashok Kumar Sharma	Introductory Agro meteorology and Climate Change	Rama Publishing House, Meerut	-	2018	
12	Pardeep Kumar R. K. Singh	Biological Control of postharvest diseases in vegetables	The Vegetable Pathosystem: Ecology, Diseaese Mechanism and management Apple Academic Press CRC Press Taylor and francis group	2019	978- 177188 -776-2.	

14.4 Practical Manuals:

S. No.	Author (s)	Title	Year	ISBN No.	ISSN No.
1	Dr. H.K. Khapediya, Dr. D. Khandwe, Dr. S.K. Sharma	Practical Manual on Environmental Studies and Disaster Management	2018	Univ. 92	
2	Dr. S. Choudhary, Dr. D. Gargav, Dr. D. Verma	Instructional Manual on Comprehension& Skill Development – II	2018		
3	Dr. S.N. Upadhyay, Dr. R.K. Choudhary, Dr. A.K. Badaya	Manual on Toxiarjan Insecticide	2018		
3	Dr. H.S. Thakur, Dr. S.K. Choudhary	कृ षवकास का आधार	2018		
4	Dr. H.L. Khapediya, Dr. S.K. Sharma, Y.K. Bhuarya	College profile	2018- 19		

14.5 Popular Articles:-

- 1. Sharma, R. K. (2018). Tamatar utpadan ki unnat takniki, Krishak Jagat, 28 may, 2018 pp- 6.
- 2. Sharma, R. K. and Kumar, Anuj (2018). Kharif pyaj utpadan taknik, Krishak Chetana, May- June, 2018 pp- 63-64.
- 3. R.K. Sharma & Anuj Kumar (2018)- Kharif pyaj utpadan technique, Krishak Chetna] May-june Pp- 63 2018
- 4. कचोली बसंत, कानपुरे. आर.एन, सिंह ओ.पी., (२०१८) खीरा की उन्नत खेती कैसे करें, हरित कृशिराज, नीमच, अप्रैल २०१८
- 5. कचोली बसंत, कानपुरे. आर.एन, सिंह ओ.पी., (२०१८) बीज प्रमाणीकरण का महत्व, हरित कृशिराज, नीमच, अप्रैल २०१८
- 6. कचोली बसंत, सिंह ओ.पी (२०१८) कम लागत पर हल्दी की खेती कैसे करें हरित कृशिराज, नीमच, अप्रैल २०१८
- टुबे राजीव, टुबे डी.पी., तिवारी, डी.के., सिंह, ओ.पी. एवं कचौली बसंत (२०१९) बरसीम उत्पादन की उन्नत सस्य तकनीकी, कृशक चेतना, वर्श ०८, अंक ०६, जबलपूर, जनवरी-फरवरी (२०१९).

- ओम सिंह एवं अंकित पाण्डेय फर्टिगेशन (उर्बर सिंचाई): बागवानी फसलों में टपक सिंचाई के साथ उर्वरक प्रयोग RNI No. UPHIN/2013/56443 बगवानी: उत्तर प्रदेश डेवलपमेन्ट फाउण्डेशन 4/15 डालीबाग, लखनऊ, उत्तर प्रदेश 46–50
- डॉ. आई.एस. नरूका, एस.आर. अंजनावे, ज्योति कंवर, अजय हलदर और रोहताश सिंह भदौरिया (2018) अंगूर की वाइन प्रजातियों की सफल बागवानी, फल-फूल, सितम्बर अवटूबर, 2018, पेज नं. 32–35.
- 10. एस.बी. सिंह (२०१८) सब्जियों में कीट प्रकोप की स्थिति एवं प्रबंधन । किसान समाज : १५ दिसंबर, २०१८.
- 11. एस.बी. सिंह (२०१८). मिर्च के कीट एवं उनका नियंत्रण । किसान समाज : १५ दिसंबर, २०१८.
- 12. एस.बी. सिंह एवं जी. एस. चुन्डावत (२०१८). कीटों में बढ़ता कीटनासक प्रतिरोध । पौध संरक्षण विशेशांक, कृशक जगत, ६ अगस्त २०१८
- 13. नितिन सोनी, के.सी. मिणा, डॉ. अजय हलदार, कैलाष चौकीकर एवं रवि सिंह चौहान २०१८ चन्द्रसूर की खेती तृण सन्देष हिंदी पत्रिका अंक १३, २०१८ पेज नंबर ७०-७१
- 14. नितिन सोनी, के.सी. मिणा, डॉ. अजय हलदार, कैलाष चौकीकर अदरक की खेती, मुनाफे का सौदा तृण सन्देष हिंदी पत्रिका अंक १३, २०१८ पेज नंबर ५२-५४
- 15. नितिन सोनी, के.सी. मिणा, डॉ. अजय हलदार, एवं अभिशेक चौहान २०१८ बेल पड़ती भूमि के लिए वरदान तृण सन्देष हिंदी पत्रिका अंक १३, २०१८ पेज नंबर ६४-६६
- 16. षोभाराम अंजनावे, डॉ. नेहा षर्मा, अनसिंह निनामा, डॉ. प्रियमवदा सोनकर एवं डॉ. बसंत कचौली २०१६ कटहन की व्यवसायिक खेती समसामायिक मध्य भारत कृशिक भारती, ग्वालियर फरवरी २०१६ पेज नंबर १३.
- 17. Rajiv Dubey (2018). Residual effect of herbicides on aquatic eco-system. Readers shelf, April, 2018, volume 14 issue no. 07, page-51-53.
- 18. रिया ठाकुर, डॉ. अजय हलदार, डॉ. राजीव दुबे (२०१८) सब्जी पोषक वाटिकाः उत्तम स्वास्थ्य एवं समृद्धि। कृषक चेतना मार्च-अप्रैलए पेज ५२-५४डाॅ. राजीव दुबे, डॉ. डी.पी. दुबें, डॉ. आर.पी. पटेल, डॉ. डी.के. तिवारी (२०१८) अरहर की धारवाड़ पद्धति या रोपा पद्धति से लें भरपूर उत्पादन। कृषक चौपाल जुलाई पेज १२-१३
- 19. बसंत कुमार कचौली एवं डॉ. राजीव दुबे (२०१८) वर्शा आधारित फसलों से कैसे अधिकतम उपज प्राप्त करें। हरित कृषिराज १ जूनए पेज ०३
- 20. राजीव दुबे, बसन्त कचौली, राकेष षर्मा एवं डी. पी. दुबे (२०१८) हल्दी उगाएँ लाभ कमाएँ। कृषक चेतना मई-जूनए पेज ६१-६२.
- 21. राजीव दुबे, डी.पी. दुबे, बसंत कचौली, रोषन गलानी एवं अंकित पाण्डेय (२०१८) अरहर के विपुल उत्पादन हेतु उन्नत तकनीक। कृषक चेतना मई-जूनए पेज १९-२०
- 22. डा. राजीव दुवे, डा. डी.पी.दुवे, डा. डी. के. तिवारी, डा. धीर सिंह (२०१८) श्री पद्धति से करें धान का विपुल उत्पादन। कृषक दूत, भोपाल ०३-०६ जुलाई, पेज नंबरः ०४-०६
- 23. बसन्त कचौली, डॉ. राजीव दुबे (२०१८) वर्शाकालीन लौकी की खेती से भरपूर उत्पादन। कृषक दूत, भोपाल ०७-१३ अगस्त, पेज नंबरः ०७
- 24. राजीव दुबे, डी.पी. दुबे, एस. बी. सिंह, आर. पी. पटेल (२०१८) बसंत कचौली अरहर में पौध संरक्षण के उपाय। कृषक दूत, भोपाल २१-२७ अगस्त, पेज नंबर: ११

- 25. डॉ. राजीव दुबे, डॉ. डी.पी. दुबे, डॉ. आर.पी. पटेल, ''डॉ. डी.के. तिवारी, डॉ. बसन्त कचौली (२०१८) भिंडी के विपूल उत्पादन हेतू उन्नत शस्य तकनीकी। कृषक चेतना जूलाई-अगस्तए पेज ५१-५२
- 26. राजीव दुबे, डी.पी. दुबे, बसंत कचौली, आर.पी. पटेल (२०१९) बरसीम की खेती। कृषक चेतना जनवरी-फरवरीए पेज ५२

14.6 Book Chapter:

- G.N. Pandey, R. P. Patel, G.S. Chundavat, B. K. Patidar, D. K. Patidar (2018). Strategies Adopted for Integrated Disease and Pest Management in Medicinal and Aromatic Crops. Ref No. /DI/2018/96/dated 13-04-2018. Registration No.89/2018.
- 2. डॉ. एस.पी. त्रिपाठी, डॉ. ओम सिंह, डॉ. जी.एस. चुण्डावत, इंजी. राजेष गुप्ता एवं डॉ. आर.सी. आसवानी मालवा में लहसून की वैज्ञानिक खेती एवं प्रसंस्कृत उत्पाद अधिक आमदनी का साधन 2018.
- K.C. Meena, R. K. Verma and Nitin Soni (2018) Studies of seed storability of Withania somnifera (Ashwagandha) published by Lambert Academic Publication, Europe. ISBN - 978-3-330-31841-0
- Nitin Soni, S.K. Pandey and D. K. Patidar (2018) Influence of growing media and Indole Butyric Acid on clonal propagation through stem cutting in Guava (Psidium guajava L.) Cv. Allhabad safeda" published by Lambert Academic Publication, Europe. ISBN No- 978-3-659-48355-4
- 5. Published a practical Manual on "Weed Management in Horticultural Crops"
- 6. Published a practical Manual on "Weed Management in Horticultural Crops"

15. COLLEGES PUBLICATION AT A GLANCE:

