17th RESEARCH COUNCIL MEETING
March 20th, 2018

DIRECTORATE OF RESEARCH

Main campus Chatha

Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu (J&K)

Index

Agenda for 17th Research Council Meeting on March,20, 2018

Agenda No. 1: Confirmation of the Proceedings of 16th Research Council Meeting

The 16th RCM was held on March,9, 2017 and the proceedings were circulated to all the participants. No comments have been received from any of the participants, it is requested that the proceedings may be confirmed. (**Annexure-I**).

Agenda No. 2. Action Taken Report of 16th RCM:

S.No.	Proposed Action in 16th RCM	Action Taken
1	**Technical Session I** **FoA Chatha** Joint Director, Department of Horticulture,Jammu highlighted various problems being encountered in the field of horticulture and sought intervention of SKUAST-Jammu on the issues.He requested the SKUAST-Jammu to develop a separate package of practices for high density apple plantation w.r.t. Jammu province. **Action: RHRSS, Bhaderwah**	Trial is going on at RHRSS,Bhaderwah for high density plantation in apples, wherein MM106 and MM111 rootstocks are being used for different recommended varieties of apples.
2	Joint Director, Department of Horticulture requested the university authorities for assistance from the disciplines of Economics & Horticulture for the Horticulture census being taken up by the Department. **(Action : Division of Economics)**	Division of Economics was not approached by Department of Horticulture for such type of activity. Moreover division has already calculated economics of major Horticultural crops.
3	Sh.R.N.Pandita, Joint Director, Fisheries raised certain issues in the light of instructions issued by the Govt. of J&K to double the Fish production in the state. -Introduction of fingerlings of Mangur (cat fish) on the similar lines as in the states like U.P. and Bihar. He further added that the seed of Mangur is also available in these states. -Development of high protein feed	Project proposal on the same has been submitted under competitive Grant of National Innovations on Climate resilient Agriculture (NICRA) on the topic "Standardization of Grow out Production and Technology of *Clarias batrachus* for Adoption of Climate Resilient Aquaculture in Jammu region "

	formulations especially to tackle the problem of mortality of fishes at juvenile stage. (**Action: Scientist Fisheries, F.V.Sc. R.S.Pura**)	University funded Research Project on feed formulation using locally available ingredient in Jammu has been sanctioned. It is in progress.
4	The following issues were highlighted by Hon'ble Vice Chancellor, SKUAST-Jammu for attention of the concerned units of the university. -Development of package and practices w.r.t. high density plantation of mangoes and other horticultural crops. **(Action: ACHR, Udheywala)**	❖ The calendar of operations for high density orcharding of guava was developed and handed over to Department of Horticulture ❖ **Standardization of planting density in guava**: Planting distance of 6.0 m x 3.0 m (row to row and plant to plant) accommodating 555 plants per hectare has been standardized and recommended for high density orcharding in guava. **Standardization of planting density in mango:** Planting distance of 4.5 m x 4.5 m (row to row and plant to plant) accommodating 495 plants per hectare has been standardized and recommended for high density orcharding in mango.
5	To bridge yield gaps by improving the productivity of various crops particularly in rainfed areas of the Jammu region. He further desired scientists should write multidisc-ciplinary projects based on the site-specific problems and requirements. **(Action: I/c KVKs and Directorate of Research)**	Multidisciplinary projects have been launched in wheat, basmati and in organic farming.
6	Hon'ble Vice Chancellor, SKUAST-Jammu directed Dr. K.K. Sood, Prof. & Head, Agroforestry to estimate biomass/volume of the trees growing in the farming system unit at Chatha and calculate the economics involved. **(Action: Division of Agroforestry)**	-The estimates of biomass/ volume of tree species planting the FSR model has been worked out and communicated to the Incharge, Farming System Research. The total gross value of poplar trees of different diameter was Rs.11,843.98/- whereas, the value of *Albizia lebbeck* was Rs.428.46/- at the time of measurement and prevailing market rates.
7	Chairman directed the Scientists that the recommendations for laying out OFTs should be routed through respective Deans and Director Research or as the case may be.	It is being followed .

	(Action: Director Research, Dean FoA& Dean FVSc)	
8	A uniform naming system for varieties, need to be adopted by the University.	It is being followed.
9	On presentation of results of experiment on the "Effect of hydrogel and limited irrigations on growth and yield of wheat" Hon'ble Vice Chancellor desired that this trial should be repeated under rainfed conditions for further validation of results and recommendations thereof. **(Action:ACRA, Dhiansar/ Agronomy)**	The Experiment entitled **"Effect of different hydrogel doses and row spacing's in wheat under rainfed conditions"** has been laid out at ACRA, Dhiansar for second year in the current *rabi* season of 2017-18 and data recording as per the technical programme of the same is in progress.
10	Recommendations on "Impact of foliar application of zinc, iron, and boron on morpho-physiological characteristics of Kinnow mandarin" and "Effect of foliar application of calcium nitrate, silver nitrate and zinc sulphate on yield, quality and shelf-life of peach (cv. Shan-e-Punjab) under Jammu sub-tropics". **(Action: Division of Fruit Science)**	-Minimum fruit drop was observed with the application of 0.4% ZnSO4+0.6% FeSO4 + 0.4% H_3BO_3 twice, i.e. after fruit set and six weeks after fruit set. -Fruits of peach cv. Shan-e-Punjab treated with 2.0% calcium nitrate showed maximum yield, best quality and minimum physiological loss in weight and proved to be best in enhancing the shelf life of fruits.
11	The Chairman directed to the Dr. Lalit Mohan Gupta, Assoc. Prof., Division of Agro forestry to layout On Farm Trials of the "Conservation, Production and Sustainable Management of Shatavar (*Asparagus recemosus* Willd)" in addition to minikit trials to arrive at final recommendations. **(Action: Division of Agroforestry)**	On Farm Trials of the outstanding accession no. IC 471923 of *Asparagus racemosus* has been laid out at village Lower Kathar, Block Dansal, District Jammu and at village Mearth, Block Barnoti of Kathua district in the Kharif season, 2017 and the accession is being assessed with respect to its growth and yield at the farmers field. The trials have been laid out in collaboration with KVK, Jammu and Kathua, respectively.
12	The house directed to Dr.K.R. Sharma, Prof. and Head, Division of Soil Science & Agricultural Chemistry to test the recommendation on "studies on soil boron dynamics and	The project/OFT is in progress.

	nutrition in broccoli (*Brassicca oleracea var. italica*" at farmers field through KVK's for inclusion in package and practices. **(Action: Division of Soil Science &Ag. Chemistry and I/c, KVKs)**	
13	The Chairman directed to Dr. A. Samanta, Senior Scientist, Water Management Research Centre, Chatha on project "studies on alternate wetting and drying irrigation regimes management in basmati rice through field water measuring tube device under light texture soil" to discuss it with Director Research and to continue the experiment till final recommendation is made for onward listing in OFT on farmers field through KVKs. **(Action: Water Management Research Centre and I/c KVKs)**	It may recommended to farmers that irrigation after 7 cm drop of water level below surface from 7 DAT to 10 days prior to harvest produced grain yield 2803 kg/ha, straw yield 6562 kg/ha of basmati rice and benefit cost ratio 1.75 under light texture soil. The water saving was found in tune of 18.73% higher over farmer practices
14	Dr. R.K. Gupta, Professor and Head, Division of Vegetable Sciences and floriculture informed the house that varieties of Spinach, beet, fenugreek and coriander are ready for release by the division. The Hon'ble Vice Chancellor, SKUAST-Jammu directed the concerned Scientist for submission of revised proposals to the Directorate of Research for release through SVRC. **(Action: Division of Vegetable Sciences and Floriculture)**	Varieties have been released
15	The Chairman directed to submit of release proposal after testing the mulberry variety S1635 on farmers field.The validation of the findings should be conducted in association with Sericulture Department and KVKs. **Division of Sericulture.**	Mulberry cuttings of variety S1635 was planted during monsoon season (2017). The farmers have been identified at Sunderbani and Reasi and the saplings are being transplanted to farmers field in Ist week of January 2018 through KVK Rajouri and KVK Reasi.

	The Chairman, directed Dr. Bodu Ram Bazaya, Senior Scientist, AICRP concerned Scientist to test the recommendation of "Weedy rice management strategies in basmati rice (*Oryza sativa* L.)" at farmers' field as OFT through KVK's for inclusion of technology in university package and practices. **(Action: Division of Agronomy and Directorate of Extension)**	Action taken completed as recommendation
16	Dr. Meenakshi Gupta was directed to test the recommendation of Effect of graded levels of N, P and K on growth, yield and quality of fine grain rice (*Oryza sativa*) cultivars under subtropical conditions" and "Effect of zinc ferti-fortification on yield and quality of basmati rice under subtropical conditions of Jammu" at farmers field as OFT through KVK's for inclusion in package and practices. **(Action: Division of Agronomy)**	The experiments on the performance of Pusa-1121, SJR-129 and Pusa-1509 rice cultivars under different doses of nutrients were conducted individually for two years and the results so obtained were presented in the 16th RCM. The nutrient doses for each of these varieties on the basis of two years of experimentation conducted during *Kharif* 2015 and 2016 were as under: a. Pusa-1121: $N : P_2O_5 : K_2O$ :: 45 : 25 :15 kg/ha b. SJR-129 : $N : P_2O_5 : K_2O$ :: 60 : 25 :15 kg/ha **c.** Pusa-1509: $N : P_2O_5 : K_2O$ :: 60 - 90 : 25 :15 kg/ha.
17	Dr. Ram Phool Puniya, Junior Scientist, AICRP was directed to test the recommendation of "weed management practices on growth and yield of rice (*Oryza sativa L.*) under aerobic conditions" at farmers field as OFT through KVK's for inclusion in package and practices. **(Action: Division of Agronomy)**	As regards the action taken it is to communicate that it will be send to KVK,Kathua and KVK Jammu for revalidation of the results through their OFTs in the ensuing khrif 2018.
18	The chairman, Professor P.K. Sharma asked the HOD, Agronomy to club all trials pertaining to nutrient management in fine rice grain cultivars for making final recommendation during the ensuing season and directed the concerned Scientists to validate the final	The experiment on the performance of Pusa-1121, SJR-129 and Pusa-1509 rice cultivars under different doses of nutrients had been conducted individually for two years and the results so obtained were presented in the 16th RCM. The nutrient doses for each of these varieties on the basis of two years of experimentation conducted during *Kharif* 2015

	recommendation at farmers field as OFT through KVK's for inclusion in package and practices. **(Action: Division of Agronomy)**	and 2016 were as under: a. Pusa-1121: N : P_2O_5 : K_2O :: 45 : 25 :15 kg/ha b. SJR-129 : N : P_2O_5 : K_2O :: 60 : 25 :15 kg/ha **c.** Pusa-1509: N : P_2O_5 : K_2O :: 60-90 : 25 :15 kg/ha.
18	Dr. Jyoti Kachroo, Professor and Head, Division of Agricultural economics & ABM presented the results of concluded study "Economic contribution of Farming System components towards livelihood security in Jammu region" The chairman, Professor P.K. Sharma asked the HOD to prepare a comprehensive survey report in 3 months for the benefit of farming community. **(Action: Division of Agricultural Economics & ABM)**	The comprehensive report in the shape of book entitled " Agriculture Development in India" is prepared and is also released by the HVC during the MSAE Conference which was held w.e.f. 23-24,October,2017. Whereas IInd report entitled "Economic contribution of Farming System components towards livelihood security in Jammu region" is also compiled and is with the publisher for final printing.
19	**Division of Food Science & Technology** Emphasis should be on value addition, increasing shelf life and packaging of the value added products	➢ The department has already conducted research trials on increasing shelf life and packaging of fruits and vegetables, viz okra, carrot and peach, pear and peach, guava, litchi, potato**.** ➢ Research trials on standardization of methodologies for value addition of crops like aonla, bael, beetroot, litchi, phalsa, pear, mango, cereals and legumes, and oilseeds etc. have been conducted
20	Dr. BrijNandan, Sr. Scientist-Agronomy, PRSS, Samba The concerned Scientist was directed to test PU-31 in KVK's, farmers' field and zero till for inclusion in package and practices. **(Action:PRSS, Samba and Directorate of Extension)**	It is tested in KVK Samba and Kathua.
Technical Session II: Faculty of Veterinary Sciences		

21	Hon'ble Vice-Chancellor desired that a set of recommendations on "Evaluation of Hygienic Quality of Raw Meat (Mutton And Chicken) and Characterization of Isolated Pathogens" specifically for butchers, consumers and food inspectors should be prepared and communicated through extension booklets/leaflets. **(Action: Veterinary Public Health and Epidemiology).**	1. Sanitary inspectors/Food inspectors be trained to follow the HACCP system. 2. Proper antemortem of birds brought for slaughtering as appropriate antemortem may aid in identification and elimination of infections having non-significant postmortem lesions and expert postmortem inspection of slaughtered birds; if this is not possible, butchers for detection of disease lesions during postmortem and disposal of such infected meat. 3. Training of butchers on various aspects of slaughter to maximize their economic benefits and safeguarding the public health by preventing transmission of zoonotic diseases 4. Provision of facilities for disposal of condemned meat 5. Provision of running water at the outlets for carcass dressing 6. Layout of the outlets be as per the recommended guidelines. **Butchers:** 1. They should maintain good personal hygiene 2. Preventing slaughtering of birds seemed unfit during antemortem examination 3. Proper disposal of condemned meat as prescribed by food inspectors 4. Appropriate disinfection procedures of slaughter house effluents 5. Adopt sanitary measures such as washing and disinfection, premises should be white washed every six months **6.** The live birds should not be kept in close viscinity of the slaughtering and processing unit because it can affect the sanitation of the area.

		Leaflets is under preparation.
22	Role of ultrasonography in diagnosis of surgical affections of gastrointestinal tract in bovine" in the 16th RCM, the expert of eminence in the fields of Veterinary Sciences, Dr. Kusumakar Sharma, Former ADG (Edu. Division), Indian Council of Agricultural Research, New Delhi, advised that the importance and relevance of ultrasonography should be recommended to field Veterinarians of J&K state government.	The field Veterinarians of AH Deptt. Jammu, were given two training on the applications of ultrasonography under field conditions conducted in TVCC, R.S.Pura.

Agenda No. 3. Research Findings / Recommendations of Concluded Projects:

Technical Session –I: Faculty of Agriculture, Chatha, Jammu:

1. Division of Agronomy, Chatha

i).Title: Performance of fine rice cultivars under varying N levels (PI: Dr. Meenakshi Gupta
Recommendations:

P**usa -1121** recorded highest grain yield at 90 kg N/ha (45.16 q/ha) which was statistically at par with the application of 75 kg N/ha (44.24 q/ha) and 60 kg N/ha (43.08q/ha) and significantly superior to 45kg N/ha which in turn was at par with 60 N kg/ha. The application of 45 kg/ha of nitrogen recorded B: C ratio of 2.38.

SJR-129 recorded highest grain yield at 90 kg N /ha (41.78q/ha) which was statistically at par with the application of 75kg N/ha (40.80q/ha) and 60 kg N/ha (39.45q/ha) and all these nitrogen levels were significantly superior to 45kg N/ha which recorded a grain yield of 35.39q/ha. The application of 60 kg/ha of nitrogen also recorded highest B:C ratio of 2.20.

Pusa-1509 also recorded highest grain yield at 90 kg N/ha (47.06 q/ha) which was statistically similar to application of 75 kg N/ha (45.24 q/ha) and both these levels were significantly superior to 60 kg N/ha (41.68 q/ha) and 45kgN/ha (37.58 q/ha) which in turn were also significantly different from one another. The application of 75 kg/ha of nitrogen also recorded highest B:C ratio of 2.48.

Table 1: Two way table showing effect of varieties and nitrogen levels on grain yield (q/ha)

Cultivars / N levels	N_1- 45	N_2- 60	N_3- 75	N_4- 90	Mean
Pusa-1121	40.20	43.08	44.24	45.16	43.17
SJR-129	35.39	39.45	40.80	41.78	39.35
Pusa-1509	37.58	41.68	45.24	47.06	42.89
Mean	37.72	41.40	43.42	44.67	

	A	B	AX B
CD (5 %)	1.18	2.06	3.26
Sem (±)	0.42	0.68	1.08

Table 2: Two way table showing effect of varieties and N levels on B:C ratio

Cultivars/N levels	N_1- 45	N_2- 60	N_3- 75	N_4- 90	Mean
Pusa-1121	2.30	2.48	2.47	2.46	2.42
SJR-129	1.86	2.22	2.19	2.17	2.11
Pusa-1509	2.05	2.31	2.48	2.41	2.31
Mean	2.07	2.33	2.37	2.34	

Recommendation:

On the basis of grain yield and B:C ratio, the economic doses of N:P_2O_5:K_2O worked out for each of these fine rice cultivars are as under:

A Pusa-1121: N : P_2O_5 : K_2O :: 45 : 25 :15 kg/ha
A. SJR-129 : N : P_2O_5 : K_2O :: 60 : 25 :15 kg/ha
B. Pusa-1509: N : P_2O_5 : K_2O :: 75: 25 :15 kg/ha

ii). Manual Portable – Multi functional Rice/ Wheat Ferti-Seeder:

Need for invention:

In spite of the persuasion by so many extension agencies, farmers in India are normally not adopting the scientific methods of sowing crops. May it be due to the non availability of seed cum fertilizer drills at the peak periods of sowing coupled with their unaffordable hiring charges.Broadcasting of seeds and fertilizers are divesting from attaining the optimum seed and fertilizer use efficiencies. The land holdings in India are not only shrinking day by day but are also becoming fragmented with no any concrete policy in force for consolidation of cultivable lands. Thus keeping all this in mind, a machine named "Manual Portable – Multi functional Rice/Wheat Ferti-Seeder" which may not only be cost effective but will also perform all the functions of a power operated seed cum fertilizer drill and may suit to the small farmers of plain areas in general and hill area farmers in particular was designed and developed as this will also counter the constraints and drudgery of lobour and facilitate timely sowing of rice and wheat crops.

All about Rice/Wheat Ferti. Seeder:

- Machine is made up of steel and is portable as all parts of the machine i.e. drums, wheels, handle, planker are detachable from basic mounting frame and can be assembled and run manually with ease as it is just about 28 kg in weight.
- Two persons may sow about 0.5 ha of land in 6-8 hours.
- It has four drums two each for applying fertilizer and seeds which are placed over the shafts. In case of rice and wheat sowings, the only change required is to replace the seed drums besides regulation of fertilizer vents as the need be.

- ❖ The multifunctional operations of the machine includes simultaneous opening of four furrows at specified spacing's recommended for rice and wheat crops, dropping of desired quantity of fertilizer DAP as well as seed and closing of furrows by planker in a single pass.
- ❖ To optimize the functioning efficiency of this machine, the field is required to be prepared as per the conventional tilling techniques consisting of harrowing twice followed by use of tiller/ rotavator and planking.
- ❖ The estimated cost of the machine would be worth within the purchasing power of an average farmer.

The preliminary performance of machine under field and laboratory tests has been found Outstanding.

iii). Weedy rice management strategies in transplanted:

The stale seed-bed with glyphosate @1.5 kg/ha or paraquat @ 0.8 kg/ha application prior to transplanting (15 day) has been found to be most effective and economical method for control of the weedy rice in transplanted rice. The results of the OFT laid out by KVK Jammu are also in agreement with the research findings of these herbicides.

iv).Moisture stress mitigation in Rapeseed mustard using agrochemicals:

Foliar application of 0.05 % Thio-urea twice at 50% flowering and 50 % siliquae filling stages was found to be the most economical treatment in mitigation of moisture stress resulting significant increase in seed yield of Indian mustard (*Brassica juncea*) as compared to other treatments and thus may be recommended to mitigate the effect of moisture stress in Rapeseed mustard under rainfed conditions of Jammu region.

Research Stations / Sub Stations:

i) Advanced Centre for Rainfed Agriculture, Dhiansar :

Recommendation:

Title: Evaluation of the most efficient maize-based intercropping system under rainfed conditions of Jammu (PI: Dr. A.P.Singh , Agronomy)

Table: Mean Maize equivalent Yield, LER, RWUE and B:C ratio's under different intercropping systems (Kharif *2013-16)*

Treatment	**Maize equivalent yield (Kg/ha)**	**LER***	**RWUE (kg/ha-mm)**	**B:C Ratio**
T_1: 2 rows of maize + 2 rows of cowpea	2634	1.25	4.30	1.92
T_2: 2 rows of maize + 3 rows of cowpea	2407	1.13	3.95	1.67

T_3: 2 rows of maize + 2 rows of til	2243	1.07	3.54	1.70
T_4: 2 rows of maize + 3 rows of til	2162	1.06	3.40	1.57
T_5: 2 rows of maize + 2 rows of groundnut	2353	0.61	3.59	1.45
T_6: 2 rows of maize + 3 rows of groundnut	2278	0.56	3.54	1.23
T_7: Sole maize	1715		3.31	1.97
T_8: Sole cowpea	1730		2.83	1.74
T_9: Sole Til	1343		2.07	1.57
T_{10}: Sole groundnut	1095		1.36	0.83

*LER-Land equivalent ratio

Among the different intercropping systems, highest mean maize equivalent yield (MEY) of 2634kg/ha was obtained in paired rows of maize with 2 rows of cowpea with the corresponding highest LER, B:C ratio and RWUE values of 1.25, 1.92 and 4.30 kg/ha-mm, respectively while the lowest MEY of 1095 kg/ha was registered in sole groundnut treatment. The planting of two rows of cowpea as intercrop in two rows of maize as additive series resulted in improvement in soil fertility with 22, 15, 13 and 9 % increase in organic carbon, available nitrogen, phosphorous and potassium respectively over their respective initial content.

Recommendation: Planting two rows of cowpea as intercrop in two rows of maize as additive series is recommended to attain higher productivity and profitability with concomitant improvement in soil fertility.

RHRSS, Raya:

Title of the Project: Studies on epidemiology and management of powdery mildew (*Oidium mangiferae*) of mango in rainfed subtropics. (P.I. Dr. V B Singh)

Table- 1. Occurrence and severity of powdery mildew of mango under rain-fed sub-tropics of Jammu

Name of Location	Time of Appearance		Severity (%)		Pooled
	2014-15	2015-16	2014-15	2015-16	
Raya	4th wk Feb	1st wk March	40.9	20.5	30.7
Ranjari	1st wk March	4th wk Feb	8.2	56.8	32.5
Badhori	4th wk Feb	4th wk Feb	37.5	47.5	42.5
Jandi	1st wk March	1st wk March	30.8	38.7	34.75
Pathwal	3rd wk Feb	4th wk Feb	32.2	27.8	30
Sarore	1st wk March	1st wk March	33.6	28	30.8
Guraslathia	3rd wk Feb	1st wk March	42	33.6	37.8
Mandal	1st wk March	1st wk March	29.5	43.9	36.7
Ismailpur	1st wk March	1st wk March	32.5	30.5	31.5
Baroi	3rd wk Feb	3rd wk Feb	24.1	32.9	28.5

Table 2. Effect of weather parameters on development of powdery mildew

Weather Parameter	Relationship
Temperature (maximum and minimum) Relative humidity (Morning and evening)	Positively correlated
Rainfall	Negatively correlated

Table-3 Management of Powdery Mildew of Mango

Treatment	Conc. (%)	Severity (%)			
		2014-15	2015-16	Pooled	Control (%)
Copper oxychloride	0.25	42.82	39.5	41.16	24.75
Dinocap	0.10	39.2	34.66	36.93	32.5
Carbendazim	0.10	40.52	36.32	38.41	29.78
Wettable sulphur	0.20	42.50	36.80	39.65	27.5
Mancozeb	0.25	40.55	40.73	40.64	25.7
Hexaconazole	0.10	34.6	30.44	32.52	40.55
DSKE	4.0	48.4	40.32	44.36	18.9
NSKE	4.0	44.7	40.08	42.39	22.5
Control	-	57.50	51.90	54.70	-
LSD(P =0.05)		3.45	3.78	3.58	

Recommendations:

1. The disease ranged to the tune of 8.5- 42.5 per cent. The Maximum incidence (42.5 %) was recorded in village Badhori in district Samba.
2. The weather parameters i.e. Temperature (maximum and minimum) Relative humidity (morning and evening) were significantly and positively co- related with the development of the powdery mildew of mango. However, rainfall was negatively co-related with the powdery mildew development.
3. The fungicide hexaconzole was found most efficacious in reducing the disease severity (40.55%). It was followed dinocap (32.5%).

iii). Regional Agricultural Research Station, Rajouri

Standardization of seed production technology of okra var. Seli Special under intermediate zone of J&K .(Dr. Anil Bhushan).

Summary: A two year experiment was conducted at RARS, Rajouri to standardize the seed production technology of okra var. Seli Special during rainy seasons of 2016 and 2017under organic system. The experiment was laid in RBD with three replications per treatment. The treatments comprised of FYM, Vermicompost and Poultry manure alone or in combinations were compared with control (recommended fertilizer dose. The pooled data revealed

significantly highest seed yield (152. kg/ha) in treatment combination T_7- Half dose FYM + 1/4th dose each (VC @ 1.87t/ha + PM @ 1.25t/ha) followed by T_8- Control (149.3 kg/ha) which is significantly higher as compared to other organic treatments.

(Data pooled for two years i.e. 2016 & 2017)

Treat-ments	Plant height (cm)			No. of pods per plant			Pod weight (g)			No. of seeds per pod			Seed yield (kg/ha)		
	2016	2017	Mean	2016	2017	Mean	2016	2017	Mean	2016	2017	Mean	2016	2017	Mean
T_1	84.7	89.7	87.2	8.5	11.3	9.9	7.8	8.9	8.3	27.5	30.4	28.9	116.5	125.5	121.0
T_2	89.2	96.6	92.9	8.7	12.3	10.5	7.9	10.4	9.1	28.3	32.2	30.2	117.4	137.8	127.6
T_3	82.6	84.5	83.5	8.3	12.0	10.1	7.6	8.8	8.2	26.3	25.7	26.0	126.8	125.9	126.3
T_4	92.4	100.6	96.5	9.3	14.3	11.8	8.4	10.2	9.3	31.0	32.5	31.7	132.5	150.6	141.5
T_5	91.0	98.8	94.9	9.2	16.4	12.8	8.1	9.8	8.9	29.2	34.1	31.6	107.6	138.3	122.9
T_6	91.6	96.8	94.2	9.4	16.8	13.1	8.3	9.9	9.1	32.5	36.3	34.4	118.3	136.1	127.2
T_7	93.9	98.3	96.1	10.2	18.2	14.2	9.2	10.7	9.9	34.6	37.3	35.9	142.8	162.6	152.7
T_8	94.6	99.0	96.8	10.5	19.2	14.8	9.3	11.9	10.6	35.2	39.2	37.2	139.3	159.3	149.3
CD (*p*=0.05)	**2.3**	**3.2**	**1.4**	**0.8**	**1.3**	**1.4**	**0.5**	**1.3**	**0.8**	**1.7**	**3.4**	**2.2**	**5.2**	**8.7**	**6.2**

iv). OFRC, Chatha:

Performance of different varieties of basmati rice under organic environment

It is observed that on the basis of mean performance of Basmati varieties over two years under Organic Environment, OR-2 found to be early maturing variety followed by OR-6 (92.67 and 108 days) and OR 10 (106 and 94 days). OR-2 is also having long Kernel length among all varieties in both the years' i.e.(8.96 and 8.91mm) followed by OR-09 (8.08 and 8.76mm). It has also been observed that OR-09 (515.59q/ ha.) is highest yielding variety followed by OR-10(47.22 q/ha).

	Year 2016-17			Year 2017-18		
Varieties	**DM**	**KL(mm)**	**Y (q/ha.)**	**DOM**	**KL(mm)**	**Y(q/ha.)**
OR-1	109.33	7.13	34.86	137.00	7.91	30.92
OR-2	83.67	8.96	26.05	**98.00**	**8.91**	28.84
OR-3	110.33	8.68	23.75	147.00	8.86	39.03
OR-4	101.00	7.88	32.75	139.00	8.57	37.14
OR-5	90.00	7.56	34.30	131.00	7.34	36.42
OR-6	92.67	7.2	34.80	108.00	7.37	37.67
OR-7	108.00	7.14	32.41	142.00	7.12	31.03
OR-8	96.00	7.33	41.36	131.00	7.13	38.11
OR-9	109.67	8.08	51.58	138.00	8.76	51.59
OR-10	94.00	8.42	46.72	106.00	8.50	47.22
OR-11	113.00	7.06	39.30	141.00	7.17	35.00
OR-12	110.67	6.63	31.47	150.00	8.87	36.05
OR-13	102.33	8.63	28.50	123.00	8.50	37.32
OR-14	110.00	7.21	23.64	131.00	7.21	31.23
OR-15	121.67	7.09	21.16	136.00	7.20	23.14
				131.00	7.22	31.35
CD@5%	**5.575**	**0.64**	**14.723**	**14.72**	**0.373**	**12.11**
S.Em(±)	**1.915**	**0.21**	**5.056**	**5.07**	**0.128**	**4.17**

v). Advance Centre for Horticulture Research, Udheywalla, Jammu:

Title: Package of practices for high density planting of mango and other horticultural crops. (P.I. Dr.Akash Sharma)

- The calendar of operations for high density orcharding of guava was developed and handed over to Department of Horticulture
- **Standardization of planting density in guava**: Planting distance of 6.0 m x 3.0 m (row to row and plant to plant) accommodating 555 plants per hectare has been standardized and recommended for high density orcharding in guava. The demonstration of this planting density in guava has been successfully demonstrated in the district of Samba and Jammu for

its commercialization. This recommendation has been incorporated in the Package of practices for Horticulture crops 2015 of SKUAST-J pp 35.

- **Standardization of planting density in mango:** Planting distance of 4.5 m x 4.5 m (row to row and plant to plant) accommodating 495 plants per hectare has been standardized and recommended for high density orcharding in mango. The demonstration of this planting density in mango has been successfully demonstrated in the district of Samba and Jammu for its commercialization and has been incorporated in SKUAST-J Package of practices 2015 pp. 12.

AICRPs:

i) AICRP on Integreated Weed Management:

i).Title of the project: Time of application of imazethapyr and its ready mix combination with Imazamox (Odyssey) against weeds in summer blackgram

PI & co-PI: Dr. B. R. Bazaya, Dr. R. Puniya, Amit Mahajan ,Anil Kumar and Dr. A.P.Singh

Table:1. Effect of different weed management practices on weed density (No./ m^2) and weed biomass (g/m^2) in summer blackgram

Treatments	Weed density (No./m^2) at 60 DAS		Weed biomass (g/m^2) at 60 DAS	
	2015	2016	2015	2016
Imazethapyr @ 70g (Pre-emergence)	8.81 (76.67)	9.17 (83.00)	4.64 (20.58)	4.93 (23.36)
Imazethapyr @ 80g (Pre-emergence)	8.54 (72.00)	8.77 (76.00)	457 (19.88)	4.84 (22.38)
Imazethapyr @ 70g (3-4 leaf stage)	6.45 (40.67)	6.68 (43.67)	3.93 (14.48)	4.17 (16.45)
Imazethapyr @ 80g (3-4 leaf stage)	6.11 (36.33)	6.29 (38.67)	3.83 (13.67)	4.08 (15.65)
Imazethapyr + imazamox (RM) @ 70 g (Pre-emergence)	8.54 (72.00)	8.85 (77.33)	4.61 (20.28)	4.88 (22.80)
Imazethapyr + imazamox (RM) @ 80g (Pre-emergence)	8.41 (69.67)	8.60 (73.00)	4.52 (19.47)	4.77 (21.71)
Imazethapyr + imazamox (RM) @ 70 g (3-4 leaf stage)	6.22 (37.67)	6.48 (41.00)	3.88 (14.06)	4.12 (15.97)
Imazethapyr + imazamox (RM) @ 80g (3-4 leaf stage)	5.99 (35.00)	6.4 0 (40.00)	3.74 (13.01)	3.95 (14.63)
Pendimethalin @ 1000g (Pre-emergence)	8.99 (80.00)	9.30 (85.67)	4.70 (21.06)	4.98 (23.79)
Imazethapyr + pendimethalin (RM) @ 1000g (Pre-emergence)	5.87 (33.67)	5.8 5 (33.33)	3.67 (12.46)	3.86 (13.88)
Hoeing (2) 15 & 30 DAS	5.65 (31.33)	5.98 (35.00)	3.19 (9.15)	3.36 (10.29)
Weedy check	11.54	11.94	6.26	6.63

	(132.33)	(141.67)	(38.19)	(42.99)
Weed free	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
SEm (±)	0.21	0.19	0.1	0.11
LSD (p=0.05)	0.61	0.56	0.3	0.32

Data was subjected to square root transformation √ X+1. Original values are in parenthesis

Table: 2. Effect of different weed management practices on grain yield and benefit cost ratio of summer blackgram.

Treatments	Grain yield (kg/ha)			B:C ratio		
	2015	2016	Mean	2015	2016	mean
Imazethapyr @ 70g (Pre-emergence)	623	581	602	1.97	1.71	1.84
Imazethapyr @ 80g (Pre-emergence)	686	642	664	2.23	1.96	2.10
Imazethapyr @ 70g (3-4 leaf stage)	730	690	710	2.48	2.22	2.35
Imazethapyr @ 80g (3-4 leaf stage)	746	695	721	2.52	2.21	2.37
Imazethapyr + imazamox (RM) @ 70 g (Pre-emergence)	666	621	644	2.08	1.81	1.95
Imazethapyr + imazamox (RM) @ 80g (Pre-emergence)	688	639	664	2.13	1.88	2.01
Imazethapyr + imazamox (RM) @ 70g (3-4 leaf stage)	743	690	717	2.44	2.13	2.29
Imazethapyr + imazamox (RM) @ 80g (3-4 leaf stage)	759	711	735	2.46	2.17	2.32
Pendimethalin @ 1000g (Pre-emergence)	620	565	593	1.94	1.62	1.78
Imazethapyr + pendimethalin (RM) @ 1000g (Pre-emergence)	786	743	765	2.56	2.29	2.43
Hoeing (2) 15 & 30 DAS	820	782	801	1.92	1.74	1.83
Weedy check	316	297	307	0.68	0.55	0.62
Weed free	910	883	897	1.43	1.33	1.38
SEm (±)	33	34	34	-	-	-
LSD (p=0.05)	96	102	99	-	-	-

Results/Summary: The experimental field was dominated by *Cyperus spp.*, *Cynodon dactylon, Digitaria sanguinalis, Solanum nigrum, Physalis minima* and *Phyllanthus niruri, Setaria glauca* and *Equisetum spp*. weeds. Among the herbicidal treatments, the lowest weed density and weed biomass were recorded with pre-emergence application of imazethapyr + pendimethalin (RM) 1000 g/ha which was statistically at par with post-emergent applications of imazethapyr 70 or 80 g/ha and imazethapyr + imazamox 70 or 80 g/ha. The highest grain was recorded with imazethapyr + pendimethalin (RM) 1000 g/ha which was statistically at par with the all the post-emergent applications of herbicides. Highest net returns and B.C ratio were recorded in with imazethapyr + pendimethalin (RM) @ 1000 g/ha followed by imazethapyr @ 70 or 80 g/ha.

There was no visual phytotoxicity observed in any of the herbicidal treatments in blackgram as well as in the succeeding transplanted rice crop.

Recommendations: The imazethapyr + pendimethalin (RM) 1000 g/ha as pre-emergence or imazethapyr 70 g/ha as post emergence is recommended for most effective control of the weeds in summer blackgram in blackgram-rice cropping system.

ii). AICRP on Irrigation Water Management (IWM):

i).Studies on alternate wetting and drying irrigation regimes management in basmati rice through field water measuring tube device under light texture soil: Er. N.K. Gupta

Result/ Summary:

- Farmer practice (T-8) produced significantly higher grain yield (2976.6 kg/ha) and straw yield (6684 kg/ha) which was statistically at par with (T_1)-Irrigation after 7 cm drop of water level below surface from 7 DAT to 10 days prior to harvest (grain yield 2803.6 kg/ha and straw yield 6562 kg/ha).
- B:C ratio of 1.78 was observed in FP (T_8) followed by (T_1)= Irrigation after 7 cm drop of water level below surface from 7 DAT to 10 days prior to harvest 1.75.
- The highest water use efficiency (2.06 kg/ha-mm) was recorded under (T_3)= Irrigation after 15 cm drop of water level below surface from 7 DAT to 10 days prior to harvest where as lowest (1.22 kg/ha-mm) under farmer practice (T_8).

The maximum water saving (50%) was recorded under (T_3) treatment (Irrigation after 15 cm drop of water level below surface from 7 DAT to 10 days prior to harvest) over (T_8)-Farmer practice.

Recommendations:

- It may recommended to farmers that irrigation after 7 cm drop of water level below surface from 7 DAT to 10 days prior to harvest produced grain yield 2803 kg/ha, straw yield 6562 kg/ha of basmati rice and benefit cost ratio 1.75 under light texture soil. The water saving was found in tune of 18.73% higher over farmer practices.

Concluded: Project:

Evaluation of basmati rice varieties under aerobic system and wheat established under conventional and zero-till planting for irrigated plains of Jammu.(Dr. Vijay Bharti, Sr. Scientist).

Recommendations:

- Farmers of Jammu may adopt aerobic technique of growing fine rice in medium textured soils of command by applying irrigation either at 0.2 bar (Tensiometer based) with depth of each irrigation 40 mm or alternatively, by applying sprinkler irrigation with depth of 150 % PE on 2 days frequency.

- These techniques shall save water by 40 % and 67.5 % over FP with compromise on yield reduction by 10.7 % and 16.3 % as compared to FP.
- The farmers of Jammu may adopt growing Basmati-370 with this agro-technique in comparison to Pusa varieties within 30 to 40% potential area of command.
- B:C ratio of Basmati-370 in comparison to Pusa- 1121 and Pusa- 1509 is 2.02 which is 2.4 and 5.0 times higher than these two varieties.

Table: Effect of irrigation regimes and varieties on yield and water use under aerobic rice

(pool data of kharif, 2014 - 2016)

Treatments / **Irrigation Regimes**	**Grain yield (Kg/ha)**	**Straw yield (Kg/ha)**	**Harvest index (%)**	**Irrigation applied (mm)**	**Rainfall (mm)**	**E R (mm)**	**Total water applied (mm)**	**WUE (kg /ha-mm)**
I_1	**2986**	5282	36.11	934	724	560	**1494**	**1.99**
I_2	2664	4760	35.88	557	718	555	1112	2.39
I_3	2236	4133	35.10	478	718	555	1033	2.16
I_4	2116	3943	34.92	260	718	555	815	2.59
I_5	**2497**	4467	35.85	303	718	555	**858**	**2.91**
CD(5%)	346	549	NS					
Varieties								
Basmati-370	2426	4829	33.43	506	719	555	1061	2.28
Pusa-1121	2709	4691	36.60	506	719	555	1061	2.55
Pusa-1509	2367	4033	36.98	506	719	555	1061	2.23
CD(5%)	156	220	NS					

TECHNICAL SESSION –II

Faculty of Veterinary Sciences & A. H. , R.S.Pura, Jammu

i). Division of Animal Nutrition:

1. Augmenting Utilization of Paddy Straw in Ruminant Ration. (Dr.Ankur Rastogi, Asstt. Prof., 'PI'; Dr. R K Sharma, Prof., 'Co-PI', Dr. A. K. Pathak, Asstt. Prof. 'Co-PI').

Livestock feeding in tropics is mainly based on plant residues. Last few decades have witnessed a severe shortage in the availability of straw for feeding of livestock and thus pushed the prices of straw to unrealistic value causing a deep dent in fiscal viability of livestock keeping. Paddy straw is not a favored roughage among livestock farmers. Its alternative usage as bedding, thatch and fuel leads to wastage of a significant potential energy source for livestock.

To improve the utilization of paddy straw in ruminants' diets, this project was carried out with following objectives: To screen locally cultivated paddy varieties for nutrient profile of their straw; To scrutinize efficacy of various physical, chemical and biological processing methods for paddy straw through *in vitro* degradability of diets; To investigate effect of dietary incorporation of processed/ unprocessed paddy straw on nutrient utilization by goats and to examine the effect of various nutrient supplementation strategies on improving the nutrient utilization from paddy straw by goats.

Following recommendations emerged from various experiments conducted as a part of this project:

- Locally available paddy straw was found to contain 88.80± 1.57% organic matter, 1.92±0.57 per cent crude protein, 1.00± 0.30% ether extract, 11.20±1.57% total ash, 2.75± 0.98% calcium and 1.79±0.07% phosphorus on dry matter basis. Among anti-nutritional factors, it was found to contain 1.98±0.02% oxalic acid and 7.59±0.02% acid insoluble ash on dry matter basis, which is indicative of silica content.
- Supplementation of concentrate mixture (60 straw: 40 concentrate mixture) and concentrate mixture with 5% molasses can increase the *in vitro* dry matter digestibility by 13.99 and 26.00 per cent, respectively. *In vitro* digestibility of paddy straw was significantly ($P<0.05$) higher than wheat straw although wheat straw responded better to supplementation with concentrate mixture and molasses.
- Locally cultivated varieties of paddy straw (SJR-5; K-39; Basmati 564; IET-1410; Giza-14; Pusa-1121; Basmati 1509; Basmati 370; Ranbir Basmati; Ratna; SJR-51 and K-343) revealed varietal differences in terms of chemical composition, anti-nutritional factors and *in vitro* DM degradability. Varieties also differ in their response to water soaking, urea treatment and concentrate supplementation. Urea-ammoniation levelled the varietal differences in IVDMD. *In vivo* utilization of studied paddy straw varieties differed in their ADF digestibility and calcium balance without impacting the feed intake and utilization of other nutrients.
- Complete feed block formulated utilizing paddy straw, kinnow waste, wheat flour, molasses, wheat bran, urea, mineral mixture, common salt and water was found to have lowbulk density and durability indicating poor compression ability of paddy straw. However, paddy straw based complete feed can be used for feeding of goats without affecting nutrient intake, digestibility, plane of nutrition and nutrient balance.

- Particle size variation can be utilized to improve paddy straw utilization in ruminant feeding. Single blade chaffing of paddy straw may be recommended for optimum feed intake and digestibility by goats.
- Paddy or wheat straw can be used as sole roughage or in combination without effecting nutrient intake and utilization of goats, however, calcium uptake is negatively affected under paddy straw based diet, which can be partially alleviated by using 60:40 combination of wheat and paddy straw.

ii). Division of Veterinary Medicine:

1. Title of the project: Unraveling occurrence pattern, molecular details of etiology and cost effective preventive measures of bovine mastitis and its impact on milk quality and dairy food safety. (**P.I.Dr. Neelesh Sharma**, Division of Veterinary Medicine, F.V.Sc. & A.H., SKUAST-J, R.S. Pura, Jammu)

Achievements/Summary/Research Findings:

Overall animal-wise prevalence of mastitis was 72.50% and 31.50% in cows and buffaloes; respectively with the overall prevalence of bovine mastitis was 58.70%. At organized dairy farms animal-wise prevalence of bovine mastitis was 64.36% and 24.00% in cows and buffaloes, respectively, while at unorganized dairy farms prevalence was 79.38% and 36.00% in cows and buffaloes, respectively. Various possible risk factors responsible for development of mastitis in dairy cows were recorded and analysed relationship of these factors with the occurrence of mastitis.

On etiological study, it was found that *Staphylococcus aureus* (49.45%) was chief etiological agent of bovine mastitis followed by *Escherichia coli*, CNS, *S. agalactiae*, *K. pneumoni*, *S. typhi, E. faecalis*, *P. vulgaris*, *C. diphtheriae*, *B. cereus* and fungus includes *Aspergillus brasiliensis* and *Sacchromyces cerevisiae*. Molecular characterization of isolated bacteria was conducted using PCR with specific genes .Antibiogram results showed Amoxyclav was highly sensitive to most of organisms, while penicillin was resistant to all isolates .

Impact of mastitis on milk quality was assessed and the present study revealed that with increasing of severity of mastitis that is mCMT grading from '0' to '3', the milk SCC was also significantly ($p < 0.05$) increased 96.00±3.60 ($x10^3$/ml) to 1738.70±79.40 ($x10^3$/ml). It was concluded that mastitis significantly reduced the quality of milk with decreasing fat, protein and lactose in mastitic milk.

In the present study, we analysed cytokines (IL-1α, IL-8) and acute phase proteins (Hp) in the healthy and mastitic cows blood serum and milk whey in relation to milk SCC. Vitamin E and Se was used as preventive measure by reducing oxidative stress and increasing udder immunity.

In the final step, technologies were developed in the study were transferred to the farmers Under the "Lab-to-Land Technology Transfer" basic knowledge and technologies were transferred to the dairy farmers at their door step by conducting various training programmes (Fig. 3). . A total of 273 farmers of various classes including general, OBC, SC and ST belonged from 18 villages. Farmers were trained for the best livestock managemental practices and better animal health through using technical knowledge.

Recommendations:

1. Prevalence rate of mastitis is very high in cattle and buffaloes particularly at un-organized farms than organized, which suggest that study should carry out in whole state to exactly find out the status of mastitis in the J&K state, so that economic losses due to mastitis to farmers can be reduced.
2. Heifer cows have more than 90% mastitis, which is alarming situation for the management of this disease at an early stage.
3. Prevalence of sub-clinical mastitis is very high than clinical, hence farmers should treat the animals at this stage to minimize the development of clinical mastitis.
4. Mastitis milk origin pathogenic bacteria had various toxic factors/gene, those are dangerous for the human health also, hence people should avoid use of mastitic animals milk.
5. Present study confirmed mastitis significantly reduced the quality of milk with decreasing fat, protein and lactose in mastitic milk.
6. There is utmost need of establishment of micro-biological laboratories at the District/Technsil level in the state for the confirmation of etiological agents and after antibiotic sensitivity, most effective antibiotics can be used to control blind use of antibiotics and antibiotic residue in milk and milk products.
7. Most of bacterial isolates (100%) showed resistance against penicillin antibiotic, hence it is advised to Vets/farmers for judicious use of antibiotics for treatment of mastitis in Jammu.
8. Present study suggested that IL-8 and Hp are best early mastitis diagnostic tests for mastitis in dairy animals than IL-1α and SCC.
9. As the mastitis causes heavy economic losses to dairy farmers and carry zoonotic importance, most important aspect is prevention and control of mastitis in dairy animals, which can be achieved by awareness among dairy farmers and their trainings for simple field diagnostic tests and timely treatment.
10. 1% Solution of Potassium permanganate can be used by farmers as post-milking teat dip for the prevention and control of mastitis.
11. Prevention and control strategies should be adopt during advance pregnancy to control occurrence of mastitis immediate after calving which most vulnerable period for the development of mastitis. Vitamin-E and Selenium in combination and Copper can be used as an effective anti-oxidant and as immune-stimulant for the control of mastitis.

iii). **Division of Veterinary Anatomy**

Salient research findings:

Research was conducted on the Thyroid gland of Bakerwali goat at different postnatal ages. The important findings were observed as under:-

- The mean biometrical values of the thyroid gland increased between succeeding age groups.
- Histologically, the small and medium size follicles were mostly seen in the peripheral zones whereas larger and abnormally large follicles were seen in the deeper zone of the gland.
- In prepubertal group only small and medium sized follicles were observed.
- In pubertal group, small, medium and large size follicles were seen while in senile group abnormally large size follicles were also observed besides the medium and large size follicles.
- Various micrometrical parameters showed significant ($P \leq 0.05$) difference between prepubertal and senile age groups.
- The content of neutral mucopolysaccharides, basic proteins and glycogen in thyroid gland increased with age.
- The level of T_3 and T_4 increased from prepubertal to pubertal group and then decreased in senile group.

iv). Division of Livestock Products Technology:

Concluded Research Projects:

- **Development of *Commiphora wightii* (Shuddha Guggulu) and *Rubia cordifolia* (Manjishtha) incorporated edible film for chicken nuggets**

Achievements/ Summary/ Research findings:

Edible film incorporated with 0.25%, 0.50% and 0.75% *Commiphora wightii* extract was successfully prepared. Incorporation of *Commiphora wightii* affected physical properties of edible film. *Commiphora wightii* based edible film exhibited its anti-lipolytic, anti-bacterial and anti-oxidant properties on vacuum packaged chicken nuggets. The sensory attributes of 0.50% *Commiphora wightii* extract based edible film was adjudged the best as compared to other variants. Edible film incorporated with 0.5%, 0.75% and 0.1% *Rubia cordifolia* extract was successfully prepared. Incorporation of *Rubia cordifolia* affected physical properties of edible film. *Rubia cordifolia* based edible film exhibited its anti-lipolytic, anti-bacterial and anti-oxidant properties on vacuum packaged chicken nuggets. The sensory attributes of 0.75% *Rubia cordifolia* extract based edible film was adjudged the best as compared to other variants. Therefore, the hurdle technology applied proved to be revelation to preserve chicken nuggets for long duration without affecting its quality parameters.

Recommendations: The chicken nuggets prepared with 0.50% *Commiphora wightii* extract based edible film was adjudged the best as compared to other variants. The chicken nuggets

prepared with 0.75% *Rubia cordifolia* extract based edible film was adjudged the best as compared to other variants.

- **Quality Attributes of Ghee Residue based burfi '*Ghurfi*':**

Achievements/ Summary/ Research findings:

Initially, burfi was prepared by incorporating with ghee residue in the proportion of 10%, 20%, 30%, 40% and 50% by replacing respective proportions of khoa and 40% ghee residue was optimised along with 30g sugar. Further, different levels of gram flour (GF), refined wheat flour (RWF) and corn flour (CF) was standardised in the formulation of ghee residue burfi. The products were evaluated for proximate, physicochemical properties and sensory attributes. It was found that the gram flour, refined wheat flour and corn flour could be suitably added into the burfi at the levels of 3%, 6% and 6% respectively without affecting the sensory attributes of the product. Inclusion of the flours also improved the texture and increased the moisture content. Storage studies of the burfi samples (with optimized levels of the flours) and treated with different levels of Jackfruit seed powder (JSP) and Sea Buckthorn seed extract (SBT) was conducted at 7±1°C. The various levels of JSP non significantly decreased the pH and TBARS while increased the moisture content of the burfi samples. An increase in the most of sensory parameters was seen at 2% level for RWF and CF burfi while scores for flavour were higher at 3% level in case of GF burfi. In case of SBT treated samples, a significant reduction in TBARS and microbial load was seen till day 21. Considering the results obtained in the study, it may be concluded that inclusion of Jackfruit seed powder and Sea Buckthorn in burfi samples would extend the shelf life of the product upto 15 days and 21 days, respectively without any marked loss of physico-chemical, microbial and sensory quality.

Recommendations: After processing, Ghee residue up to 40%, may be successfully incorporated for preparation of burfi. .In ghee residue based burfi, Jackfruit seed powder and Sea Buckthorn may be incorporated to extend the shelf life of the product without any marked loss of physico-chemical, microbial and sensory quality.

v). Division of Veterinary Public Health & Epidemiology:

Studies on Hygienic Status of Retail Poultry Outlets in Jammu with special reference to zoonotically important bacteria. (Dr. M.A.Malik)

Recommendations:

Sanitary inspectors/food inspectors:

7. Sanitary inspectors/Food inspectors be trained to follow the the HACCP system.
8. Proper antemortem of birds brought for slaughtering as appropriate antemortem may aid in identification and elimination of infections having non-significant postmortem lesions and expert postmortem inspection of slaughtered birds; if this is not possible, butchers for detection of disease lesions during postmortem and disposal of such infected meat.
9. Training of butchers on various aspects of slaughter to maximize their economic benefits and safeguarding the public health by preventing transmission of zoonotic diseases

10. Provision of facilities for disposal of condemned meat
11. Provision of running water at the outlets for carcass dressing
12. Layout of the outlets be as per the recommended guidelines.

Butchers:

7. They should maintain good personal hygiene
8. Preventing slaughtering of birds seemed unfit during antemortem examination
9. Proper disposal of condemned meat as prescribed by food inspectors
10. Appropriate disinfection procedures of slaughter house effluents
11. Adopt sanitary measures such as washing and disinfection, premises should be white washed every six months
12. The live birds should not be kept in close viscinity of the slaughtering and processing unit because it can affect the sanitation of the area

vi). Division of Veterinary Parasitology:

Research Finding:

a). Anthelmintic Resistance in *Haemonchus contortus* of small ruminants in Jammu.

The emergence of anthelmintic resistance on government and private farms (2 each) in Jammu, India was investigated using Faecal egg count reduction test (FECRT) for fenbendazole (FBZ) and levamisole (LEV), Egg hatch assay (EHA) for benzimidazole (BZ) and Egg hatch paralysis assay (EHPA) for LEV. For FECRT, a total of 240 naturally infected animals (Sheep and Goats) of 3-6 months of age were divided randomly in 3 groups of 20 animals each. At each farm, Group 1 and Group 2 animals were given FBZ (@ 5.0 mg/kg body weight) and LEV (@ 7.5mg/kg body weight) orally as drench, respectively and Group 3 animals were kept untreated. Faecal samples were collected per rectum 14 days post-treatment. FECR after treatment with FBZ and LEV were found to be 58 and 44 percent (farm 1), 61 and 49 percent (farm 2), 51 and 60 percent (farm 3), 68 and 86 percent (farm 4) respectively. On EHA, the ED_{50} values for the isolates of *Haemonchus contortus* were 0.171, 0.163, 0.178 and 0.156 µg of TBZ/ml in farm 1, 2, 3 and 4 respectively. The ED_{50} values on EHPA for the isolates of *H. contortus* were 4.445, 1.050, 0.698 and 0.282µg/mL of LEV in farm 1, 2, 3 and 4, respectively. The *H. contortus* larvae isolated from animals were genotyped for detection of mutation in the β-tubulin isotype 1 gene using AS-PCR. A total of 144 larvae, 36 from each farm were used in the study. In farm 1, the prevalence of different genotypes varied significantly ($p<0.001$) with 80 percent 'rr' type, 11 percent 'rS' and 8 percent 'SS' types. In farm 2, the types of genotypes varied significantly ($p<0.001$) with 72 percent 'rr', 17 percent 'rS' and 11 percent 'SS'. In farm 3, 89 percent were found to be of 'rr' genotype, 8 percent of 'rS' genotype and 3 percent of 'SS' genotype. In farm 4, the prevalence was predominated by 'rS' genotype (50 percent) followed by 'rr' genotype (36 percent) and 'SS' genotype (14 percent). The results of AS-PCR from the pasture larvae showed the overall predominance of 'rr' genotype (60 percent) followed by 'rS' (33 percent) genotype and 'SS' (7 percent) genotype. Thus prevalence of BZ resistant (r) allele was significantly ($p<0.001$) higher (76.5 percent) as compared to the 23.5 percent prevalence of BZ susceptible (S) allele.

b). Prevalence of Gastrointestinal Helminthic parasites in stray and pet dogs of Jammu, Jammu and Kashmir

Coproscopic examination of 270 stray dogs and 78 pet dogs revealed gasterointestinal helminthic parasites in 84.44% and 39.74% animals respectively. Among stray animals higher prevalence was observed in rural dogs (77.60%) than urban (72.46%). Statistically significant ($P< 0.05$) differences between stary and pet dogs were observed in occurrence of hookworm, ascrid, taenid and trichurid. Among stray animals highest prevalence was observed in monsoon (76.35%) and lowest in winter (60.80%), but it varied non significantly ($p<0.05$). Pet animals showed highest prevalence during post monsoon season (42.00%)and it varied significantly with winter ($P< 0.05$) and non significantly with summer and monsoon. Hookworm eggs were predominant in all the seasons in stray animals, whereas, in pet animals eggs of hookworm were maximum during monsoon and post monsoon. Ascarid was having highest frequency in summer and winter. Among pet animals taenid and *Diphylobothrium latum* eggs were only observed in summer season. In all the seasons, mean egg per gram (epg) of faeces of strongylid and aascrid was higher in stray animals then pet animal. Further postmortem examination of 32 dogs died in road accidents revealed that 30 (93.75%) harboured one or more GI nematodes. It was observed all examined females (20) and 83.33% of examined male and were infected with GI nematode. As per age, it was observed that all young dogs examined were infected and no significant difference in the prevalence between sex and age was observed. Among the infected animals 82.30% were found with hookworms followed by 60.20% with ascarid , 24.32% with *Dipylidium caninum*, 14.00% with *Trichuris* spp., 8.40% with *Opisthorchis* spp. *Taenia,* and *Spirocerca lupi* were recorded in one animal each.

c). Acaricide resistance against ticks of Jammu region

Acaricide resistance has been determined against commonly used synthetic pyrethroids (deltamethrin and cypermethrin) in *Rhipicephalus* (*Boophilus*) *microplus* tick collected from eight districts of Jammu region. Ticks collected from plain areas/low altitudes had showed severe resistance, while those of collected from middle altitudes showed moderate resistance. However, ticks collected from high altitudes had low resistance or shown susceptiblility to synthetic pyrethroids.

S. No.	District	Status of Deltamethrin	Status of Cypermethrin
1	Jammu	Severe	Moderate
2	Samba	Severe	Moderate
3	Rajouri	Severe	Low
4	Poonch	Moderate	Moderate
5	Doda	Susceptible	Susceptible
6	Kishtwar	Low	Susceptible
7	Kathua	Moderate	Low
8	Udhampur	Moderate	Low

Externally Funded Projects:

i).Establishment of Nuts Center in Intermediated Agro-climatic Zone of Jammu Province to Augment Requirement of Quality Planting Material.(P.I. Dr. Rajesh Kumar) RKVY

Summary (2014-2015):

- Procurement of 5000 rootstocks from Green Nursery Nowpora, Kulgam .
- Procurement of 2000 rootstocks (seedlings) of Pecan nut from Department of Horticulture, CSKHPKV, Palampur .
- Planted those rootstocks (seedlings) of Walnut and Pecan Nut at Regional Agricultural Research Station Rajouri, SKUAST-J for further grafting with elite type scions of walnut and pecan nut.
- Purchased the equipments and tools required in grafting and production of planting material of walnut and pecan nut.
- Establishment of two low cost shed net houses at Regional Agricultural Research Station Rajouri, SKUAST-J.

2015-2016

- Procurement of 5000 rootstocks of walnut and 3000 pecan nut seedling from department of Horticulture, Poonch.
- Procurement of 5000 rootstocks of Pecan nut from Department of Horticulture, CSKHPKV, Palmpur.
- Procurement of 2000 walnut rootstocks and 600 pecan nut rootstocks from department of Horticulture, Rajouri.
- 2000 rootstocks of walnut are procured from Mughal nursery, Ghambhir Mugla, Rajouri.
- Planted those rootstocks of walnut and pecan nut seedling at Regional Agricultural Research Station Rajouri, SKUAST-Jammu for establishment and for further grafting purpose with elite type scions of walnut and pecan nut.
- 1.6 quintals walnut and 0.30 quintal pecan nut seeds were scarified and stratification for breaking the dormancy of seeds.
- The treated seeds were sown under low cost polyhouses and under open field conditions at RARS, Rajouri for germination.
- Establishment of five poly houses at RARS, Rajouri which were procured from Agriculture Research Engineer, Govt. Agriculture Workshop, Talab Tillo, Jammu for raising of rootstocks.
- High quality scion was procured from Poonch and Palampur for grafting
- The grafting of 5000 walnut rootstock and 3000 pecan nut was done by the professional grafter.

ii). **Title of the Project: Development of Aonla based Cropping System for Jammu Sub-tropics.(** Dr. Deep Ji Bhat, Assistant Professor, Division of Fruit Science)

Maintenance cost and return analysis of Aonla fruit crop (Rs/ha)

Items	**Amount (Rs.)**
Basin preparation	3571.50
FYM	15000.00
Urea	1980.00
DAP	2530.00
MOP	1530.00
Labour	7500.00
Miscellaneous (irrigation, plant protection measures, harvesting of fruits etc)	21339.50
Total	53451.00
Interest on working capital @6% p.a	3207.50
Cost A	56658.50
Rental Value of Owned Land	0.00
Cost B	56658.50
Family Labour	3200.00
Cost C	59858.50
Cost C*	65844.25
Total number of plants	100.00
Yield (Q/ha)	63.76
Rate per quintal	1500.00
Gross return	95640.00
Net returns	29795.75
Cost Benefit ratio	1:1.45

Achievements /Summary:

To increase farm income and improve soil health, experiments were conducted at rain-fed areas of Jammu like Samba and Akhnoor under perennial fruit trees of aonla. Several crop modifications using short, medium and long duration cash vegetable crops and low canopy minor fruits like phalsa were grown under the vacant patches of the aonla cultivation in different fashions to improve soil fertility and increase farm income. The system involves creation of 90-150cm wide, 15-20 cm high raised beds for vegetables. The beds must be stable for 2 to 4 years and conveniently adopted to planting of vegetable crops in rows spaced at 15cm (onion), 30cm (French beans, marigold, lettuce), 45cm (Okra, Broccoli, beetroot), 75cm (Cucumber, Turmeric, brinjal) or 150 cm (Bottle gourd). The phalsa trees were planting in between the established aonla planting at a spacing of 2.5mx2.5m. Cropping modules with several seasonal vegetables

were tried like Tomato + Cucumber + okra; Brinjal + Cucumber + okra; Bottle gourd + okra; French bean + Bottlegourd + okra; French beans + F1 marigold + Turmeric during Kharif season. During Rabi Season, modules like Broccoli + Radish + Knolkhol; Marigold + Peas+ Onion; Knolkhol + Beetroot were tried for economic enhancement of the farm. Intercropping of short growing legumes like peas and beans in wider inter-row spaces of crops provide sufficient cover on the ground there by reducing erosion hazards from the sloping cultivated fields. Cost benefit ratio of different intercrops and the main crop was calculated.

Recommendation

Experiments conducted at rain-fed areas of Jammu like Samba, Kathua, Akhnoor etc showed that yield increase with turmeric, bottle gourd and okra with contour cultivation resulted in B:C ratio of 1:3 during Kharif season. Besides, it reduces runoff by 10 percent and nutrient loss by 40 percent compared to plots with cultivation along the slope. In rabi season, a B:C ratio of more than 4.0 is achievable with crops like beetroot and broccoli. Hence,it is advised to the farmers of rainfed areas to adopt intercropping of vegetables particularly beet root and broccoli during summers and bottlegourd, turmeric and okra during winters in their established aonla orchards to increase their farm income. Intercropping of phalsa with the existing aonla plants has also shown better results on economic basis. Such type of farm practices i.e., by growing two or more crops simultaneously on the same piece of land, not only generates additional income per unit area but also acts as an insurance against crop failures in abnormal years.

iii). Title of the project: Interventional strategies for prevention and control of common parasitic zoonoses of sheep, goats and nomadic women for socio-economic upliftment of nomads. (**P.I.**: Dr. Mohd Rashid, Associate Professor,Division of Veterinary Public Health & Epidemiology).

Recommendations:

- There is a need of continuous surveillance and monitoring of parasitic diseases among the flocks of nomads to eliminate the parasitic diseases burden.
- Drug sensitivity/resistance trials should be conducted on the flocks to overcome the heavy infestation.
- Such types of studies should be conducted in other villages of Rajouri & Poonch Districts and other parts of state where these nomads come during winter and partially settled down.
- Besides the parasitic disease other bacterial and viral diseases should also be targeted by fast diagnostic techniques where ever possible.
- The external parasites live and lay eggs in cracks and crevices of walls, floor etc so flock owners should be directed to make the livestock habitation free from such cracks and crevices and must be educated about life cycle and transmission so that they can take preventive measures at their own level.

iv). Title of the project: Unraveling occurrence pattern, molecular details of etiology and cost effective preventive measures of bovine mastitis and its impact on milk quality and dairy food safety.(PI:Dr.Neelesh Sharma,Division of Veterinary Medicine, F.V.Sc. & A.H., SKUAST-J, R.S. Pura, Jammu.

Recommendations:

I. Prevalence rate of mastitis is very high in cattle and buffaloes particularly at un-organized farms than organized, which suggest that study should carry out in whole state to exactly find out the status of mastitis in the J&K state, so that economic losses due to mastitis to farmers can be reduced.

II. Heifer cows have more than 90% mastitis, which is alarming situation for the management of this disease at an early stage.

III. Prevalence of sub-clinical mastitis is very high than clinical, hence farmers should treat the animals at this stage to minimize the development of clinical mastitis.

IV. Mastitis milk origin pathogenic bacteria had various toxic factors/gene, those are dangerous for the human health also, hence people should avoid use of mastitic animals milk.

V. Present study confirmed mastitis significantly reduced the quality of milk with decreasing fat, protein and lactose in mastitic milk.

VI. There is utmost need of establishment of micro-biological laboratories at the District/Tehsil level in the state for the confirmation of etiological agents and after antibiotic sensitivity, most effective antibiotics can be used to control blind use of antibiotics and antibiotic residue in milk and milk products.

VII. Most of bacterial isolates (100%) showed resistance against penicillin antibiotic, hence it is advised to Vets/farmers for judicious use of antibiotics for treatment of mastitis in Jammu.

VIII. Present study suggested that IL-8 and Hp are best early mastitis diagnostic tests for mastitis in dairy animals than IL-1α and SCC.

IX. As the mastitis causes heavy economic losses to dairy farmers and carry zoonotic importance, most important aspect is prevention and control of mastitis in dairy animals, which can be achieved by awareness among dairy farmers and their trainings for simple field diagnostic tests and timely treatment.

X. 1% Solution of Potassium permanganate can be used by farmers as post-milking teat dip for the prevention and control of mastitis.

XI. Prevention and control strategies should be adopt during advance pregnancy to control occurrence of mastitis immediate after calving which most vulnerable period for the development of mastitis. Vitamin-E and Selenium in combination and Copper can be used as an effective anti-oxidant and as immune-stimulant for the control of mastitis.

v). Diagnosis and interventional strategies for prevention and control of common parasitic zoonoses of livestock and their rearers belonging to schedule caste and schedule tribe population for socio-economic upliftment. (Principal Investigator: Dr. Mohd Rashid, Associate Professor, Division of VPH & Epidemiology, FVSc & A.H, SKUAST-Jammu, R.S.Pura-181102.).

a. Recommendation:

i. Long Term

- ⇨ Regular monitoring and treatment of flocks and herds of nomads for determining the incidence and prevalence of zoonotic diseases
- ⇨ Quantifying the animal sources of Toxocara environmental contamination will provide the information on infection/ infestation routes and will assistant in better targeting of control strategies.
- ⇨ Production of tissue culture vaccines for sheep and goat pox
- ⇨ Diagnostic kits for diagnoses of myiasis, hydatidosis & toxoplasmosis etc

ii. Immediate

- ➢ Motivation of livestock rearers for proper disposal of offals, cysts from local slaughtering sites, proper disposal of dung, dog and human excreta for prevention of contamination of soil and water bodies vis a vis prevention and control of diseases.
- ➢ Good hygienic practices like hand hygiene, rinsing of fresh produce from gardens and prevention of geophagia especially in children will reduce the disease incidence among the society.
- ➢ Reduction of diseases burden by treating the infested livestock and minimizing further spread.
- ➢ By reaching to unreached strata of population, confidence is build and active participation is achieved which is key factor for reducing burden of diseases.

vii). Studies on Hygienic Status of Retail Poultry Outlets in Jammu with special reference to zoonotically important bacteria" PI: Dr. M.A.Malik

Recommendations: Sanitary inspectors/food inspectors:

13. Sanitary inspectors/Food inspectors be trained to follow the the HACCP system.
14. Proper antemortem of birds brought for slaughtering as appropriate antemortem may aid in identification and elimination of infections having non-significant postmortem lesions and expert postmortem inspection of slaughtered birds; if this is not possible, butchers for detection of disease lesions during postmortem and disposal of such infected meat.
15. Training of butchers on various aspects of slaughter to maximize their economic benefits and safeguarding the public health by preventing transmission of zoonotic diseases
16. Provision of facilities for disposal of condemned meat
17. Provision of running water at the outlets for carcass dressing
18. Layout of the outlets be as per the recommended guidelines.

Butchers:

13. They should maintain good personal hygiene
14. Preventing slaughtering of birds seemed unfit during antemortem examination
15. Proper disposal of condemned meat as prescribed by food inspectors
16. Appropriate disinfection procedures of slaughter house effluents
17. Adopt sanitary measures such as washing and disinfection, premises should be white washed every six months
18. The live birds should not be kept in close viscinity of the slaughtering and processing unit because it can affect the sanitation of the area

vi). Outreach Programme on Zoonotic Diseases (P.I.: Dr. M.A.Malik).

Achievements of the Project :

Study assessed prevalence of anti-rabies antibodies in vaccinated dog sera (180) in and around Jammu by ELISA and carried Knowledge, Attitude and Practices (KAP) of urban/rural dog owners. Quantitatively assayed seroprevalence was 56.43% in different age groups. Predominant seroprevalence was recorded in category III (yearly booster vaccination). Quantitatively assayed 43 positive samples revealed predominant sero-prevalence (61.55%) in category III dogs. Overall prevalence being49.44 and 55.81% respectively. Protective titre > 0.5 IU/microlitre was recorded in 34/43 (79.06) sera samples. Annual boosters offered better protection , so recommended for field vaccination practices. KAP analysis using pre-tested and structured questionaires on 200 respondents interviewed comprised urban 130 (65%) and rural (35%) respondents. Respondents 157 (76%) were males and 48 (24%) were females with maximum from age group of 18-29 years (55%). Respondents. About 77% of respondents had heard about rabies and its fatal consequences. Significant results observed in knowledge and attitude vis-à-vis dog ownership. Urban population (98.9%) belived rabies to be fatal, transmitted by dog or other species. Besides, 94% believed that owned dog must receive antirabies vaccine, 89-94% believed reporting to hospital or higher authority about dog bite and outbreak of rabies in community whereas, 78% believed to kill rabies suspected stray dog. Dog owners followed good practices as compared to non-owners. KAP with respect to prevention and treatment of rabies were inadequate amongst rural population necessitating community based health education and rabies awareness in these areas.

Salient epidemiological features of Rabies in Jammu: A total of 6673 bite cases in humans were reported from January 2017 to September 2017 in Government Medical College, Jammu; among them majority were males (73.55%) while only 26.45% were of females. The majority of bites reported were of Type III and were of dog bite. Among animals, in 2017-18, a total of 1310 postbite vaccinations were reported with highest number of 431 from Poonch followed by from Jammu (312), Udhampur (272) and Kathua (271). Twenty outbreaks of rabies in animals were reported in 2017-18 with highest number (14) in April, 2017. A total of 3806 prophylactic vaccinations in animals were done from 1st April 2017 till date.

Recommendations:

- KAP with respect to prevention and control of rabies were inadequate amongst rural population.There is need of community based health education and rabies awareness in these areas.
- Dog owners be educated to follow the schedule of rabies vaccination rigorously.
- Creation of awareness regarding rabies; its prevention and control among the masses through various means of communication.

ix). **Screening of suspected animal samples for the presence of *Coxiella burnetii* (**Dr. H.K.Sharma, Asstt. Prof.)

Research Findings: Collection of sheep samples in the current lambing season have been/being collected in collaboration with Sheep Husbandry Department from Reasi,Panthal and Billawar Farms.As per the objectives of the project,collected 178 sera samples,53 placental and vaginal swabs from aborted and normally parturited animals.67 samples of ticks from cattle,buffalo,sheep and goats have been collected from different clusters of villages for further dispatch to DRDE Laboratory for handling and processing samples and further ELISA based screening has been developed.

Recommendations: 21 sheep samples physically present in GSB&R,Farm Reasi(Dugala) were found positive by serologically and by molecular techniques(PCR) as reported by DRDE and further recommended to collect placental bits,vaginal swabs as well faecal material from above mentioned positive samples as well healthy flock at Dugala Farm.Collected samples shall be transported to DRDE Laboratory for isolation and identification of an agent i.e.*Coxiella burnetii*

Agenda 4: Awards to the scientists who have developed technology. It is proposed to award a research project of Rs.2.0 lakh (maximum) for a period of 3 years subject to submission of concept note with research areas identified by SKUAST-Jammu

Agenda 5: Post graduate research should be linked with the research programmes of the University and with regular monitoring, assessment and submission of final report to the Directorate of Research along with outcome and recommendations.

Agenda 6: Any other items with permission with chair.

Annexure I

Minutes of 16th Research Council Meeting held on 9th March, 2017

16th Research Council Meeting (RCM) of Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu was convened on 09th March, 2017 in the Conference Hall, SKUAST-J, Main Campus, Chatha under the Chairmanship of Prof. Pradeep K. Sharma, Hon'ble Vice-Chancellor, SKUAST-Jammu to assess the status of on-going research and chalk out the road map for research to be taken in future.

Dr. A.K.Sarial, Hon'ble Vice-Chancellor, CSKHPKVV, Palampur, H.P. and Dr. Kusumakar Sharma, Former ADG (Edu. Division), Indian Council of Agricultural Research, New Delhi were the experts of eminence in the fields of Agriculture and Veterinary Sciences, respectively. Dr. Jag Paul Sharma, Director Research, SKUAST-J, Dr.K.S.Risam, Director Extension, SKUAST-J, Dr. T.A.S.Ganai, Director Education, SKUAST-J, Dr. Deepak Kher, PPMO, SKUAST-J, Dr. D.P.Abrol, Dean, Faculty of Agriculture, Dr. M.M.S. Zama, Dean, Faculty of Veterinary Sciences and Animal Husbandry,Dr. S.A.Mallick, Dean, Faculty of Basic Sciences, Dr. R.K.Arora, I/c KVKs, Heads of Divisions of all three faculties, Coordinator, School of Biotechnology and Directors of the line departments, In-charge Stations/Sub-Stations and concerned scientists participated in the meeting (Annexure 'A').

At the outset, Director Research & Member Secretary of Research Council Meeting welcomed Prof. Pradeep K. Sharma, Hon'ble Vice-Chancellor, SKUAST-J and Chairman of the Research Council Meeting, invited experts Dr. A.K. Sarial, Vice-Chancellor, CSKHPKVV, Palampur, H.P. and Dr. Kusumakar Sharma, Former ADG (Education Division), ICAR, New Delhi, Officers of the University, Heads of various divisions of all the three faculties, Officers from Line Departments, In-charge Stations, Sub-stations and others for being a part of 16th Research Council Meeting. Thereafter, Director Research made a power point presentation on"Research at a glance: New horizons" and briefed the house about activities of Directorate of Research, including 08 Research Stations. He informed the house that the university currently undertaking 124 externally funded adhoc research projects, having financial outlay of approximately Rs. 45.0 Crores. He expressed concern over the huge yield gaps in farmers' fields and experimental fields in major crops, viz. rice, maize and wheat. Director Research also highlighted the focused areas of research, encompassing yellow rust resistant varieties in wheat, refinement of local strains of Rajmah and Basmati, development of composites in maize especially for hilly areas, quality seed production in vegetables, and development of soil fertility maps. He emphasized on the "Participatory Research" as the major thrust area in future and also informed that the approach was, already in vogue at Regional Horticultural Research Sub Station (RHRS), Bhaderwah for rajmash seed production.

Director Research proposed that research programmes in the University should be crop and issue specific. Hence, presentation in RCM should also be programme specific, which was approved by the council. He proposed the following researchable areas where SKUAST-Jammu would focus accordingly all faculties and research stations would set priorities as per these programmes. The programmes were discussed threadbare and given the final nod and upon that the experiments falling under these programmes would be adequately funded subject to the available financial resources. The research programmes are as under:

1. Basmati improvement program with focus on RS Pura Basmati.
2. Wheat improvement program with focus on drought and yellow rust resistant varieties.
3. Maize improvement program with focus on composites.

4. Oil seeds and Pulses improvement programmes.
5. Organic Farming.
6. Bio-prospecting of herbal plants.
7. Improvement of fruits, vegetables, ornamental crops and value addition.
8. Improvement of livestock production and productivity.
9. Characterization and improvement in indigenous breeds.
10. Diagnosis and management of important livestock diseases.
11. Livestock feed, fodder and forage crops.
12. Epidemiology of important livestock diseases and their zoonotic potential.
13. Food safety and environmental hygiene.
14. Designing/ importing prototype for farm machineries relevant to hill and mountain agriculture.

Feedback from line departments was taken which is as under:

Joint Director, Department of Horticulture: highlighted various problems being encountered in the field of horticulture and sought intervention of SKUAST-Jammu on the issues.

- He substantiated that Govt. of J&K has sanctioned Rs. 32.0 lakhs/ha for encouraging high density apple plantations and apprised the house that these high density apple plantations are doing very well in Kashmir province. He requested the SKUAST-Jammu to develop a separate package of practices for high density apple plantation w.r.t. Jammu province.

(**Action: RHRSS, Bhaderwah)**

- He apprised the house that Horticulture census shall hopefully be completed by April, 2017, and to complete this important task help of SKUAST-Jammu shall be required in terms of preparation of formats especially for calculation of economics involved in horticultural activity. He requested the university authorities for assistance from the disciplines of Economics & Horticulture for the Horticulture census being taken up by the Department.

(Action: Division of Fruit Science, Division of Agricultural Economics and Statistics)

Sh.R.N.Pandita, Joint Director, Fisheries: represented the Department of Fisheries, Govt. of J&K. He raised certain issues in the light of instructions issued by the Govt. of J&K to double the Fish production in the state.

- Introduction of other fingerlings of Mangur (cat fish) on the similar lines as in the states like U.P. and Bihar. He further added that the seed of Mangur is also available in these states.
- Development of high protein feed formulations especially to tackle the problem of mortality of fishes at juvenile stage.

(**Action: Scientist Fisheries, F.V.Sc. R.S.Pura)**

Dr. Sant Ram, Director, Department of Sheep Husbandry: raised the problem of inbreeding in sheep because of lack of importation of sheep breeds from outside the state. He requested SKUAST-Jammu to make efforts for import of good sheep stocks for breeding purpose to improve wool and mutton production in this region of the state.

Hon'ble Vice Chancellor, SKUAST-Jammu, Prof. Pradeep K. Sharma in his opening remarks emphasized that right direction was very important to reach the desired goals in research. He further stressed upon to concentrate more on site-specific research and strategic research to have deliverable outcomes. He appreciated the efforts of Director Research, SKUAST-Jammu for

giving the insight of research activities going on in the SKUAST-Jammu in a very meticulous manner.

The following issues were highlighted by Hon'ble Vice Chancellor, SKUAST-Jammu for attention of the concerned units of the university.

- Development of package and practices w.r.t. high density plantation of mangoes and other horticultural crops.

(Action: ACHR, Udheywala)

- To frame a committee under the chairmanship of Sr. Scientist, AICRP on Agro-meteorology to redefine the agro-climatic zones taking all the standard guidelines in to account. Due consideration must be given to micro-climatic conditions and not just confine to elevation and rainfall etc. while delineation of agro-climatic zones/agro-climatic situations existing in Jammu province.

(Action: AICRPAM, Chatha)

- To bridge yield gaps by improving the productivity of various crops particularly in rainfed areas of the Jammu region. He further desired that scientists should write multidisciplinary projects based on the site-specific problems and requirements.

(Action: I/c KVKs and Directorate of Research)

TECHNICAL SESSION- I

At the outset Director Research, SKUAST-Jammu presented the proceedings of the 15th RCM and placed before the house for confirmation. The same were confirmed by the house.

Hon'ble Vice Chancellor, SKUAST-Jammu directed Dr. K.K. Sood, Prof. & Head, Agroforestry to estimate biomass/volume of the trees growing in the farming system unit at Chatha and calculate the economics involved.

(Action: Division of Agroforestry)

Chairman directed the Scientists that the recommendations for laying out OFTs should be routed through respective Deans and Director Research or as the case may be.

(Action: Director Research, Dean FoA& Dean FVSc)

A uniform naming system for varieties, need to be adopted by the University. Dr. A.K.Sarail,Hon'ble Vice Chancellor, CSKHPKV, Palampur suggested that it should be done by adding Jammu as prefix, followed by name of concerned crop. But as there was no consensus in the house, the Hon'ble Vice Chancellor, SKUAST-Jammu directed the Director Research to frame a committee for finalization and recommendation of uniform nomenclature of crop varieties of SKUAST-Jammu.

(Action: Director Research)

On presentation of results of experiment on the "Effect of hydrogel and limited irrigations on growth and yield of wheat"Hon'ble Vice Chancellor, SKUAST-Jammu desired that this trial should be repeated under rainfed conditions for further validation of results and recommendations thereof. **(Action: ACRA, Dhainsar)**

Dr. V.K. Wali presented the data on ongoing student experiments of the Division of Pomology namely "Impact of foliar application of zinc, iron, and boron on morpho-physiological characteristics of Kinnow mandarin" and "Effect of foliar application of calcium nitrate, silver nitrate and zinc sulphate on yield, quality and shelf-life of peach (cv. Shan-e-Punjab) under Jammu sub-tropics". The Chairman directed the concerned Scientist to present the final recommendations after completion of the experiment in the next RCM and added that on farm

validation by laying out OFTs in collaboration with KVKs should be done before giving final recommendations.

(Action: Division of Fruit Science)

Dr. Lalit Mohan Gupta, Assoc. Prof., Division of Agro forestry presented the results of concluded project, "Conservation, Production and Sustainable Management of Shatavar (*Asparagus recemosus* Willd)" and reported that 4 accessions of Shatavar viz., IC471923, IC471922, IC471911 & IC471909 were found superior over others in terms of higher dried tuber yield. He further informed that minikit trials of IC 471923 shall be laid out in the ensuing season. The Chairman directed the concerned Scientist to layout On Farm Trials of the said accession also in addition to minikit trials to arrive at final recommendations.

(Action: Division of Agroforestry)

Dr. Asim Kumar Mondal. Prof. Division of Soil Science & Agricultural Chemistry presented the results of concluded experiment on "studies of zinc in rice wheat growing soils in subtropical areas of Jammu region" and reported that application of $ZnSO_4.7H_2O$ @ 10 kg ha^{-1} resulted in highest grain protein and sugar content in basmati rice. He further reported decline in starch content % of Basmati rice with increase in dosage $ZnSO_4.7H_2O$ @ 30 kg ha^{-1}. Prof. A.K. Sarial, eminent expert directed the concerned Scientist to formulate an experiment in collaboration with division of Agronomy and validate the results on both soil and the crop.

(Action: Division of Soil Science & Ag. Chemistry and Division of Agronomy)

Dr. K. R. Sharma, Prof. and Head, Division of Soil Science & Agricultural Chemistry presented the results of concluded experiment on "studies on soil boron dynamics and nutrition in broccoli (*Brassicca oleracea var. italica*" and reported that soil application of borax @ 15 kg ha^{-1} along with recommended application of N, P and K and 100% FYM resulted in significant increase in yield of broccoli than other treatments in comparison. Also, spraying of borax @ 0.3% at 45 days along with recommended application of N,P and K and 100% FYM after transplanting resulted in higher boron content in broccoli at curd initiation as well as harvest stage than other treatments in comparison. The house directed the concerned Scientist to test the recommendation at farmers field through KVK's for inclusion in package and practices.

(Action: Division of Soil Science &Ag. Chemistry and I/c, KVKs)

Dr. A. Samanta, Senior Scientist, Water Management Research Centre, Chatha presented the results of concluded experiment on "studies on alternate wetting and drying irrigation regimes management in basmati rice through field water measuring tube device under light texture soil" and reported that application of irrigation after 7 cm drop of water level below surface from 7 DAT to 10 days prior to harvest stage resulted in significant increase in grain yield of basmati rice than farmers practice thereby resulting in 18 % water saving. The Chairman directed the concerned Scientist to discuss it with Director Research and to continue the experiment till final recommendation is made for onward listing in OFT on farmers field through KVKs.

(Action: Water Management Research Centre and I/c KVKs)

Dr. R.K. Gupta, Professor and Head, Division of Vegetable Sciences and floriculture informed the house that varieties of Spinach, beet, fenugreek and coriander are ready for release by the division. The Hon'ble Vice Chancellor, SKUAST-Jammu directed the concerned Scientist for submission of revised proposals to the Directorate of Research for release through SVRC.

(Action: Division of Vegetable Sciences and Floriculture)

Dr. R.K. Bali, Professor and Head, Division of Sericulture informed the house that out of 6 varieties of mulberry the feeding of leaves of variety S 1635 resulted in highest single cocoon weight, single shell weight and total filament length than other varieties in comparison. Hence

the recommendation of variety S 1635 can be taken to the field for commercial propagation at field level. The chairman directed to submit of release proposal after testing it on farmers field. He should conduct the further validation of the findings in association with sericulture (department and KVKs).

(Action: Division of Sericulture & I/c KVKs)

Dr. Bodhu Ram Bazaya, Senior Scientist, AICRP (Weed Management) presented the results of concluded experiment entitled "Weedy rice management strategies in basmati rice (*Oryza sativa* L.) under subtropical irrigated conditions of Jammu" and recommended that the stale seed bed treated with glyphosate @ 1.5 kg ha^{-1} or paraquat @ 0.8 kg ha^{-1} as the most economical and effective method of weed control for weedy rice in transplanted rice. The Chairman, Prof. Pradeep Kumar Sharma directed the concerned Scientist to test the recommendation at farmers' field as OFT through KVK's for inclusion of technology in university package and practices.

(Action: Division of Agronomy and Directorate of Extension)

Dr. Meenakshi Gupta, Associate Professor, Division of Agronomy presented the results of concluded experiment "Effect of graded levels of N, P and K on growth, yield and quality of fine grain rice (*Oryza sativa*) cultivars under subtropical conditions" and "Effect of zinc ferti-fortification on yield and quality of basmati rice under subtropical conditions of Jammu" and reported that application of $N:P_2O_5:K_2O$ @ 60:35:15 kg ha^{-1} and 4 % Zinc through zincates urea + 0.2% Zn foliar spray along with recommended levels of P & K significantly increased the grain yield of fine rice and basmati rice respectively than other treatment in comparison. She was directed to test the recommendation at farmers field as OFT through KVK's for inclusion in package and practices. **(Action: Division of Agronomy and I/c KVKs)**

Dr. Ram Phool Puniya, Junior Scientist, AICRP (Weed Management) presented the results of concluded experiment "Effect of weed management practices on growth and yield of rice (*Oryza sativa L.*) under aerobic conditions" and recommended that application of pendimethalin @ 1.0 kg ha^{-1} (Pre.) followed by bispyribac Sodium @ 30 g ha^{-1} at 25 DAS followed by fenoxaprop-p-ethyl @ 60 g ha^{-1} and pendimethalin @ 1.0 kg ha^{-1} (Pre.) followed by azimsulfuron @ 25 g ha^{-1} at 25 DAS followed by fenoxaprop-p-ethyl @ 60 g ha^{-1} at 30 DAS were the most effective and economical treatments in controlling weeds in aerobic rice. He was directed to test the recommendation at farmers field as OFT through KVK's for inclusion in package and practices.

(Action: Division of Agronomy and I/c KVKs)

Dr. Vijay Khajuria, Jr. scientist-Agronomy, presented the results of concluded experiment "Effect of graded levels of N, P and K on growth, yield and quality of fine rice (*Oryza sativa* var. Pusa 1509) cultivars under subtropical conditions" and reported that application of $N:P_2O_5:K_2O$ @ 90:60:60 kg ha^{-1} significantly increased the grain yield of fine rice than other treatment in comparison. The co-chairman, Prof. A.K. Sarial informed the house that Pusa 1509 has not taken up as expected in the farmers field and hence the experimentation on it is a mere wastage of resources. However, The chairman, Professor P.K. Sharma asked the HOD to club all trials pertaining to nutrient management in fine rice grain cultivars for making final recommendation during the ensuing season and directed the concerned Scientists to validate the final recommendation at farmers field as OFT through KVK's for inclusion in package and practices.

(Action: Division of Agronomy and I/c KVKs)

Dr. Jyoti Kachroo, Professor and Head, Division of Agricultural economics & ABM presented the results of concluded study "Economic contribution of Farming System components towards

livelihood security in Jammu region" The chairman, Professor P.K. Sharma asked the HOD to prepare a comprehensive survey report in 3 months for the benefit of farming community.

(Action: Division of Agricultural Economics & ABM)

Dr. BrijNandan, Sr. Scientist-Agronomy, PRSS, Samba presented the results of two concluded experiments under AICRP (Pulses) entitled "Evaluation of kharif urd bean cultivars under rainfed conditions of Jammu region" and "Conservation agricultural practices for enhancing productivity of Chickpea based cropping systems (Cereal/Oilseed/Pulse-Chickpea) in rainfed areas" and reported that PU 31 variety of Urd bean resulted in significant increase in crop yield of Him Mash 1 and other varieties in comparison. Whereas, among the conservation tillage treatments maximum seed yield of chickpea was recorded in conventional tillage plots coupled with mulching which was found to be significantly higher than reduced and zero tillage in comparison. The concerned Scientist was directed to test PU-31 in KVK's, farmers' field and zero till for inclusion in package and practices.

(Action: PRSS, Samba and Directorate of Extension)

Technical Session II: Faculty of Veterinary Sciences:

Dr. S.K. Kotwal, Prof. & Head, Division of Veterinary Public Health and Epidemiology presented the concluded projects. He presented salient achievements of all research projects.

Prevalence of *Listeria monocytogenes* in sheep and goat flocks of nomads:

A total of one hundred and sixty five samples comprising of Sheep faeces (n=33), Sheep rectal swabs (n=30), Goat faeces (n=32), Goat rectal swabs (n=30), Nomadic handlers hand swabs (n=20) and Nomadic handlers stool samples (n=20) were processed that revealed 32 (19.39%) isolates of *Listeria*species. Out of these 13 (7.87%) were identified as *L. Monocytogenes* and 19 (11.51%) other *Listeria* species. The prevalence of *L. Monocytogenes* from sheep and goat faeces and rectal swabs was 6.06%, 10.00%, 9.37% and 16.66% respectively.

Incidence of bacterial pathogens in ready-to-eat milk products and study their biofilm production potential:

The study assessed the occurrence of *Staphylococcus aureus, Escherichia coli, Bacillus cereus* and *Listeria monocytogenes* in ready to eat milk products. Out of 100 samples of ready to eat milk products(cream roll, burfi, rasmalai, badaam milk and milkcake, 20 each), a total of 69 bacterial isolates comprised of 38 of *E. coli*, 19 of *S. aureus* and 12 of *B. cereus* were obtained.The highest incidence of *E. coli*, *S. aureus* and *B. cereus* was in cream roll as 40%, 45% and 20%, respectively.

Isolation of Bacterial Pathogens from Veterinary Hospitals and their Assessment for Biofilm Production Potential:

The study assessed the bacterial pathogens circulating in veterinary hospitals of Jammu including their biofilm production. A total of 170 samples origining from veterinary clinical cases {diarrhea (n=45), mastitis (n=45), wounds (n=30), *Otitis externa* (n=17) and cystitis (n=3)} and veterinary hospital environment {table tops (n=5), trevis (n=5), medical instruments (n=10) and hand swabs (n= 10)} were analyzed. One hundred and eighteen bacterial isolates, 94 from veterinary clinical cases and 24 from hospital environment were obtained.

Studies on Isolation and Characterization of *Escherichia coli* from sheep, goats and their handlers:

A total of 170 samples comprising of 30 faecal samples and 30 rectal swabs of each sheep and goats, 25 stool samples and 25 hand swabs of their handlers were collected from in and around Jammu district and processed for the isolation of *E. coli.* Sixty five biochemically confirmed isolates including 27 of sheep, 26 of goats and 12 of their handlers were obtained. In vitro virulence characterization of isolates exhibited that 55.5% of isolates of sheep and 50% isolates of goats took colour of Congo red dye, similarly 25.9% and 34.6% isolates of sheep and goats respectively were haemolytic on blood agar, but none of human isolate was found pathogenic on both of the in vitro pathogenicity assays.

Sero-prevalence Studies of brucellosis among goats and humans using different serological tests:

A study was conducted to determine the prevalence of Brucellosis in goats and humans in and around border areas of Jammu, J&K, India using different serological tests viz. RBPT, STAT and I-ELISA. A total of 425 serum samples, 350 from goats and 75 from humans were tested by RBPT, STAT and I-ELISA. Overall sero-prevalence of 1.14% was recorded in goats.

Studies on incidence and the enterotoxigenic profile of *B. cereus* in meat and meat products:

A total of 150 samples comprising 50 each of, raw mutton, raw chicken and chicken biryani were analyzed for incidence and the enterotoxigenic profile of *Bacillus cereus*. Out of 52 presumptive *B. cereus* isolates confirmed by conventional biochemical methods, 44 isolates produced a product of 475 base pairs on PCR by targeting species specific gyrB gene.

Evaluation of Hygienic Quality of Raw Meat (Mutton And Chicken) and Characterization of Isolated Pathogens:

The present study was undertaken to evaluate the hygienic quality of raw mutton and chicken along with characterization of the isolated pathogens. A total of 145 samples (mutton-75, chicken-70) were collected from different locations of Jammu city. Mean ± SE values (log10cfu/g) of standard plate count, E. coli count and Staphylococcus aureus count in mutton samples were 6.12±0.08, 3.30±0.55 and 4.08±0.15, respectively and the counts in chicken samples were 6.17±0.05, 3.99±0.13 and 4.16±0.09, respectively. Hon'ble Vice-Chancellor desired that a set of recommendations specifically for butchers, consumers and food inspectors should be prepared and communicated through extension booklets/leaflets.

(Action: Veterinary Public Health and Epidemiology)

Dr.A.K.Gupta, Assoc. Prof. & Head, presented concluded project "Role of ultrasonography in diagnosis of surgical affections of gastrointestinal tract in bovine on clinical cases of bovines suffering from surgical affections of GI tract it is recommended that intestinal obstruction and ileus in cattle could be confirmed with 100% accuracy based on presence of distended intestinal loops with passive movement fluid ingesta and presence of peritoneal fluid between intestinal loops. Intestinal obstruction could be confirmed with 100% accuracy based on presence of distended intestinal loops with clear hyper echoic near and far walls; and freely moving echogenic intestinal contents.

Presence of peritoneal fluid &lesser no. of loops/field Because of early & accurate diagnosis of intestinal obstruction success rate following surgery is >90%.

Reticular abscess can be seen as hypo echoic to anechoic cavity only when located close to right abdominal wall. However, there may be false negative cases

Diaphragmatic hernia should be suspected when crescent shaped reticulum is seen cranial to 5th intercostal space. However, there may be false positive cases.Dr. Kusumakar Sharma advised that field Veterinarians of J.&K. state government should be recommended to the importance and relevance of ultrasonography.

(Action: Veterinary Surgery and Radiology)

Dr. Mudasir Sultana, Prof. and Head, Division of Veterinary Pharmacology and Toxicology, made presentation on "studies on the effect of Querectin on diabetic wound and hypertension in rats". She concluded that Quercetin @ 100mg/kg B.W. produced antidiabetic effect in streptozotocin induced diabetes. Wound healing property has been excellently produced by 1% topical application of Quercetin alone and 1% topical application + 100mg/kg B.W. of Quercetin orally in diabetic wound. Quercetin @ 20mg/kg B.W for six weeks in rats was sufficient enough to reduce DOCA-salt induced hypertension and recommended that these lab animal models study can be further used for human models too.

Dr. S. Kumar**,** Assoc. Prof., & Head, Division of Livestock Products and Technology, presented concluded projects "Effect of *Tribulus terresteris* and *Asparagus racemosus* on storage quality of chevon sausages", "Effect of *Colocasia esculenta*, *Ipomea batatas* and *Coffea arabica* on the quality attributes of restructured mutton blocks", "Effect of *Bacopam onnieri* and *Ocimum sanctum* on storage quality of chicken nuggets", and also presented salient achievements of DST funded project "Empowerment of rural women through training programme on development of value added livestock products:

Effect of *Tribulusterrestris and Asparagus racemosus* on storage quality of chevon sausages:

Chevon sausages were used as a model meat product and incorporated with different concentrations of *Tribulu sterrestris* and *Asparagus racemosus* (0.25%, 0.50%, 0.75%) separately and were vacuum packaged and assessed for various lipid oxidative stability and storage quality parameters under refrigerated (4 ± 1^0C) conditions at regular intervals of 0, 14, 28, 42 and 56 days. Both *Tribulu sterrestris* and *Asparagus racemosus* showed a significant ($P<0.05$) effect on the lipid oxidative stability as the treated products exhibited significantly ($P<0.05$) lower TBARS (mg malonaldehyde/ kg) values. A significant ($P<0.05$) effect was also observed on the microbiological characteristics of the products as treated products showed significantly lower values for microbial and yeast and mould counts and for free fatty acid (% oleic acid) values.

Effect of *Colocasiaesculenta, Ipomoea batatas* and *Coffeaarabica* on the quality attributes of restructured mutton blocks:

The present study was undertaken to evaluate the effect of *Colocasia esculenta, Ipomoea batatas* and *Coffea Arabica* on the quality attributes of restructured mutton blocks. Based on product yield and sensory scores, 15% added water level, 18 minutes of massaging time and 40 minutes of cooking time were found to be optimum for the development of restructured mutton blocks. *Colocasia esculenta* powder was incorporated at three different levels viz. 1%, 3% and 5% and was adjudged as optimum at 3% level on the basis of various quality parameters. *Ipomoea batatas* powder was also incorporated at three different levels viz. 1%, 3% and 5% and was also adjudged as optimum at 3% level on the basis of various quality parameters.

Effect of *Bacopam onnieri* and *Ocimum sanctum* on storage quality of chicken nuggets.

The study was undertaken to explore the antioxidant properties of locally available herbs viz. *Bacopam onnieri* and *Ocimum sanctum* in enhancing the shelf-life of chicken nuggets. Meat products are very vulnerable to spoilage due to excessive fats and protein contents. Therefore, chicken nuggets fortified with 1, 2, and 3% of extracts of *Bacopam onnieri* and *Ocimum sanctum* along with control was studied to explore the potency of these locally available herbs on oxidative stability and storage quality of chicken nuggets on 0, 7, 14 and 21 days in refrigerated (4 ± 1^0C) condition.

Dr.A.K.Taku, Head, Division of Veterinary Microbiology and Immunology presented two concluded externally funded projects "National Center on Veterinary Type Culture Collection (VTCC)". He presented projects highlight and salient achievements of the projects. Culture accessioned during 2016-17 given as under:

- This is a network project in which we act as a nodal centre for collection of veterinary microbes from field samples.
- The clinical samples are processed for isolation, identification, biochemical and molecular characterization. Authentication of the microbial cultures is carried out by at least two or three full-length genes.
- So far more than 127 bacterial cultures belonging to *Staphylococcus aureus*, *Escherichia coli, Proteus, Salmonella, Bacillus, and Streptococcus* isolated from Jammu region have been accessioned and submitted to the Veterinary Type Culture Collection centre, Hissar having veterinary significance.

Division of Parasitology:

1. **Anthelmintic Resistance in *Haemonchus contortus* of small ruminants in Jammu.**

   The emergence of anthelmintic resistance on government and private farms (2 each) in Jammu, India was investigated using Faecal egg count reduction test (FECRT) for fenbendazole (FBZ) and levamisole (LEV), Egg hatch assay (EHA) for benzimidazole (BZ) and Egg hatch paralysis assay (EHPA) for LEV. For FECRT, a total of 240 naturally infected animals (Sheep and Goats) of 3-6 months of age were divided randomly in 3 groups of 20 animals each. At each farm, Group 1 and Group 2 animals were given FBZ (@ 5.0 mg/kg body weight) and LEV (@ 7.5mg/kg body weight) orally as drench, respectively and Group 3 animals were kept untreated. Faecal samples were collected per rectum 14 days post-treatment. FECR after treatment with FBZ and LEV were found to be 58 and 44 percent (farm 1), 61 and 49 percent (farm 2), 51 and 60 percent (farm 3), 68 and 86 percent (farm 4) respectively. On EHA, the ED_{50} values for the isolates of *Haemonchus contortus* were 0.171, 0.163, 0.178 and 0.156 µg of TBZ/ml in farm 1, 2, 3 and 4 respectively. The ED_{50} values on EHPA for the isolates of *H. contortus* were 4.445, 1.050, 0.698 and 0.282µg/mL of LEV in farm 1, 2, 3 and 4, respectively. The *H. contortus* larvae isolated from animals were genotyped for detection of mutation in the β-tubulin isotype 1 gene using AS-PCR. A total of 144 larvae, 36 from each farm were used in the study. In farm 1, the prevalence of different genotypes varied significantly ($p<0.001$) with 80 percent 'rr' type, 11 percent 'rS' and 8 percent 'SS' types. In farm 2, the types of genotypes varied significantly ($p<0.001$) with 72 percent 'rr', 17 percent 'rS' and 11 percent 'SS'. In farm 3, 89 percent were found to be of 'rr' genotype, 8 percent of 'rS' genotype and 3 percent of 'SS' genotype. In farm 4, the prevalence was predominated by 'rS' genotype (50 percent) followed by 'rr' genotype (36 percent) and

'SS' genotype (14 percent). The results of AS-PCR from the pasture larvae showed the overall predominance of 'rr' genotype (60 percent) followed by 'rS' (33 percent) genotype and 'SS' (7 percent) genotype. Thus prevalence of BZ resistant (r) allele was significantly ($p<0.001$) higher (76.5 percent) as compared to the 23.5 percent prevalence of BZ susceptible (S) allele.

2. Prevalence of Gastrointestinal Helminthic parasites in stray and pet dogs of Jammu, Jammu and Kashmir

Coproscopic examination of 270 stray dogs and 78 pet dogs revealed gasterointestinal helminthic parasites in 84.44% and 39.74% animals respectively. Among stray animals higher prevalence was observed in rural dogs (77.60%) than urban (72.46%). Statistically significant ($P< 0.05$) differences between stary and pet dogs were observed in occurrence of hookworm, ascrid, taenid and trichurid. Among stray animals highest prevalence was observed in monsoon (76.35%) and lowest in winter (60.80%), but it varied non significantly ($p<0.05$). Pet animals showed highest prevalence during post monsoon season (42.00%)and it varied significantly with winter ($P< 0.05$) and non significantly with summer and monsoon. Hookworm eggs were predominant in all the seasons in stray animals, whereas, in pet animals eggs of hookworm were maximum during monsoon and post monsoon. Ascarid was having highest frequency in summer and winter. Among pet animals taenid and *Diphylobothrium latum* eggs were only observed in summer season. In all the seasons, mean egg per gram (epg) of faeces of strongylid and aascrid was higher in stray animals then pet animal. Further postmortem examination of 32 dogs died in road accidents revealed that 30 (93.75%) harboured one or more GI nematodes. It was observed all examined females (20) and 83.33% of examined male and were infected with GI nematode. As per age, it was observed that all young dogs examined were infected and no significant difference in the prevalence between sex and age was observed. Among the infected animals 82.30% were found with hookworms followed by 60.20% with ascarid , 24.32% with *Dipylidium caninum*, 14.00% with *Trichuris* spp., 8.40% with *Opisthorchis* spp. *Taenia,* and *Spirocerca lupi* were recorded in one animal each.

3. Acaricide resistance against ticks of Jammu region

Acaricide resistance has been determined against commonly used synthetic pyrethroids (deltamethrin and cypermethrin) in *Rhipicephalus* (*Boophilus*) *microplus* tick collected from eight districts of Jammu region.

Ticks collected from plain areas/low altitudes had showed severe resistance, while those of collected from middle altitudes showed moderate resistance. However, ticks collected from high altitudes had low resistance or shown susceptiblility to synthetic pyrethroids.

S. No.	District	Status of Deltamethrin	Status of Cypermethrin
1	Jammu	Severe	Moderate
2	Samba	Severe	Moderate
3	Rajouri	Severe	Low
4	Poonch	Moderate	Moderate
5	Doda	Susceptible	Susceptible

6	Kishtwar	Low	Susceptible
7	Kathua	Moderate	Low
8	Udhampur	Moderate	Low

Remarks of eminent expert Dr. Kusumakar Sharma, Former-ADG (ICAR):

Dr. Kusumakar Sharma, Former-ADG (ICAR) suggested about the scrutinizing of the project proposals through an in-house evaluation committee designated by Director Research, SKUAST-Jammu before their final submission to the funding agencies. He further floated few suggestions before the house as under:

- Participatory research is very important component. It not only tests the efficiency of technology but also provide opportunity for midterm corrections if any.
- Interdisciplinary research should be encouraged to achieve maximum output.
- Integrated farming system and value addition can double the income of farmers.
- Our aim should be as to how the best we can contribute to the National Livestock Policy.
- Exhaustive study should be carryout on characterization and conservation of indigenous breeds of cattle.
- Quality assurance of Indian medicine is essential to make them popular and formulation of Indian medicine with quality control. Fool proof raw material and quality of end product should be assured.
- Diagnosis of livestock diseases should be given emphasis.
- More emphasis should be laid on prevention of diseases in cattle and small ruminants as "Prevention is an investment, treatment is expenditure".
- Faculty should submit more research projects both at institutional and multi-institutional levels.

Remarks of eminent expert Dr. Ashok Sariyal:

Dr. A.K Sarial, Vice-Chancellor, CSKHPKVV, Palampur, in his concluding remarks stressed that both basic and strategic research are the need of the hour. He also pointed out that the difference in production and productivity between rainfed and irrigated conditions needs to be minimized and water conservation should be given more emphasis to increase the irrigation potential of the fields. He observed that Jammu region, especially the R.S Pura, is well known for quality Basmati, and stressed upon the scientists to make efforts so that maximum quality features of the local germplasm should remain intact. He also remarked that Integrated Farming System is the need of the hour and more focus should be given to IFS. In addition, he also wanted the involvement of Krishi Vigyan Kendras to test the newly developed technologies in the form of On farm Trials. He also suggested to take polyhouse cultivation of vegetables in higher altitude areas and characterization and release of local rice of Bhaderwah region.

Dr. Ashok Sarial, Hon'ble Vice Chancellor, CSKHPKVV, Palampur further made some suggestions as under:

- Climatic zones should be delineated to develop climate resilient technologies.
- Climate change should not always be taken in negative perspective but also considered as an opportunity.
- Adaptive changes should be in our practice to counter climatic change.
- Problem oriented research (adaptive research) should be given emphasis.
- Doubling the farmer's income, emphasis should be on their enterprises.

- Prioritize action of compilation researchable areas in time along with line departments.
- Technology must be tested on-farm before recommending.

Remarks of Chairman, RCM Hon'ble Vice Chancellor, SKUAST-Jammu

In his concluding remarks, Hon'ble Vice Chancellor, SKUAST-Jammu, Prof. Pardeep K. Sharma hoped that the research issues highlighted during the current meeting will be kept in mind and the directions will be adhered to in right perspective for speeding up the research programmes for speedy development and transfer of technologies for the benefits of the farming community. He advised research findings be compiled and booklet so developed be distributed to all concerned departments for their use, revalidation and feedback. The chairman thanked the experts for their fruitful remarks and wished that their valuable suggestions shall be taken care of and it will definitely strengthen the research programmes of SKUAST-Jammu for the benefit of farming community.

- Production gap between actual and potential on all crops should be minimized
- Effect of pesticides on fish fauna should be addressed
- Introduction of minor carps to meet state population demand of fish
- Finalize the committee on fish diseases.

The Research Council Meeting ended-up with vote of thanks presented by Dr. Pramod Baru, Associate Director Research.

List of participants in 16th RCM

S.No.	Name of Officers	Designation
1.	Prof. Pradeep Kumar Sharma	Hon'ble Vice-Chancellor, SKUAST-Jammu
2.	Dr. A.K Sarial	Hon'ble Vice Chancellor, CSKHPKVV, Palampur
3.	Dr.Kusumakar Sharma	Former ADG, ICAR (Edu. Division), New Delhi
4.	Dr. Jag Paul Sharma,	Director Research & Member Secretary, RCM,SKUAST-Jammu.
5.	Dr.K.S.Risam	Director Extension
6.	Dr. T.A.S Ganai	Director Education
7.	Prof. Deepak Kher	PPMO, SKUAST-Jammu
8.	Dr. D.P Abrol,	Dean, Faculty of Agriculture
9.	Dr. M.M.S Zama,	Dean, Faculty of Veterinary Sciences and Animal Husbandry, R.S.Pura, Jammu
10.	Dr. S.A Mallick	Dean, Faculty of Basic Sciences, Chatha
11.	Dr.R.K.Arora	I/c KVKs & ADE, Directorate of Extension, Chatha
12.	Dr. ShahidAhamad	Deputy Director Research, Directorate of Research, SKUAST-Jammu
13.	Dr.Vikas Sharma	Assoc. Prof, Division of Soil Science
14.	Dr.Satish K. Sharma	Asstt. Professor/Farm Manager, Chakroi
15.	Dr. Ramesh Bali	Assoc. Prof., Sericulture, Udheywala
16.	Dr.V.B.Singh	I/C ,FRRSS, Raya
17.	Dr. Praveen Singh	Asstt. Professor ,PBG
18.	Dr. R. Katoch	Prof.&Head, VPA
19.	Dr. M.S. Bhadwal	Assoc. Dean,F.V.Sc.,R.S.Pura
20.	Dr. Anil Kumar	ADR, ACRA, RakhDhiansar
21.	Dr. S.K. Gupta	Professor , Division of Agro Forestry
22.	Dr. Kamal Sharma	Assoc. Prof, Division of VAN
23.	Dr.Vinod Gupta	I/C RARS, Rajouri
24.	Dr.Meenakshi Gupta	Assoc. Prof.(Agronomy)
25.	Dr.P.S.Mahapatra	Assoc. Prof., Division of VPB
26.	Dr.R.K.Sharma	Prof.& HOD , Division of AWN
27.	Dr.S.K.Kotwal	Prof.& HOD, Division of VPHE
28.	Dr. A K Sharma	Assoc. Prof. Division of Agronomy
29.	Dr.Upma Dutta	Asst. Prof (Microbiology)
30.	Dr.Neetu Sharma	Asstt.Prof. Division of Agronomy
31.	Dr.SonikaJamwal	Jr.Scientist (Pl.Path.)
32.	Dr.N.P.Thakur	I/c FSR, Chatha
33.	Dr. A.K. Gupta	Assoc. Professor ,FSR, Chatha
34.	Dr.Brinder Singh	ACRA, Dhainsar
35.	Dr.Rakesh Kumar	Asstt. Professor, RRSS, Raya
36.	Dr.Ravinder Singh Sudan	Sr. Scientist & I/C AICRIP Maize, Udhampur

37.	Dr.V.K.Wali	Prof.& Head , Division of Fruit Science
38.	Dr. D. Chakarborty	Asstt. Prof. , Division of AGB
39.	Dr.M.C.Dwivedi	Asstt. Professor / F.M., Chatha
40.	Dr.Mudasir Sultana	Head, Division of VPT
41.	Dr. Anil Gupta	Professor & Head Division of Plant Pathology
42.	Dr.L.M.Gupta	Assoc.Prof. Division of Agroforestry
43.	Dr.K.K.Sood	Prof.& Head, Division of Agroforestry
44.	Dr.Utsav Sharma	Head, Division of VGO
45.	Dr.MahitalJamwal	Senior Scientist & Head, RHRSS, Bhaderwah
46.	Dr.Manmohan Sharma	Assoc.Prof. SBT, Chatha
47.	Dr. R. R. Jat	Assoc. Dir. Extension, Chatha
48.	Dr, B. R. Bazaya	Assoc. Professor & I/C AICRIP, Division of Agronomy
49.	Dr.NarinderPanotra	Jr. Scientist, OFRC, Chatha
50.	Dr. S. K. Gupta	Prof & Head Division of, F.V.Sc.
51.	Dr. Sunil Kumar	Assoc. Prof. LPT, R. S. Pura
52.	Dr. S.E. H. Rizvi	Prof & Head div. of statistics & CS
53.	Dr. R. Puniya	Jr. Scientist , Agronomy
54.	Dr. P. Baru	Associate Director Research (H.Q.)
55.	Dr. B. S. Jamwal	Chief Scientist, I/C PRSS Samba
56.	Dr.A.K.Razdan	Professor &Head, Division of PBG
57.	Dr.K.R. Sharma	HOD, Soil Science
58.	Dr. A.P. Rai	Asstt. Prof. Soil Science
59.	Dr. A K. Mondal	Prof. Soil Science
60.	Dr. M. P. Sharma	Prof. Division of Soil Science
61.	Dr.Arvind Kumar	Asstt. Prof. LPT
62.	Dr. Vishal Raina	Asstt.Prof.(PBG)
63.	Dr.PardeepWali	Associate Director Research
64.	Dr. A P. Singh	Sr. Scientist, AICRPDA
65.	Dr. R K Gupta	Prof & Head, Veg. Science & Floriculture
66.	Dr. V. Kaul	Prof & Head, Entomology
67.	Dr.AnjuBhat	Assoc. Prof. PHT
68.	Dr.Sant Ram	Director ,SHDJ
69.	Dr.AbhijitSamanta	Sr. Scientist ,WMRC
70.	Dr. Vijay Bharti	Sr. Scientist WMRC
71.	Dr. A K. Gupta	Assoc. Prof. ,Division of VSR.
72.	Dr. P.K. Gupta	Joint, Director A. H .Department, Jammu
73.	Dr. D.K. Chauhan	Jr. Scientist, RHRS,Doda
74.	Dr. Sushil Sharma	Prof &Head ,Agri. Engg.
75.	Dr. Vijay Khajuria	Jr. Scientist, Division of Agronomy
76.	Dr. S. K. Gupta	HOD, ILFC, R. S. Pura
77.	Dr.JyotiKachroo	Prof & Head, AEABM
78.	Dr. Anil Bhat	Asst. Prof. AEABM
79.	Dr.Reena	Sr. Scientist, ACRA Dhainsar
80.	Dr.ParshantBakshi	Incharge, ACHR, Udheywalla
81.	Dr. R.N. Pandita	Joint Director Fisheries
82.	Dr.Rohit Sharma	Jr. Scientist, Jammu

83.	Dr.Sanjesh Gupta	Project Officer Fisheries, Jammu
84.	Dr.BrijNandan	Sr. Scientist, PRSS,Samba
85.	Dr.VikasAbrol	Sr. Scientist, ACRA, SKUAST-Jammu
86.	Dr. Tarvinder Singh	Jt. Director, Horticulture, Jammu
87	Dr. Anil Taku	Head, Vety. Microbiology
88	Dr.Gurdev Chand	Div. Plant Physiology
89	Dr.Peeyush Sharma	Div. of Soil Science & Ag. Chemistry
90	Dr.BalbirDhotra	Asstt. Prof. ACHR, Udhewala
91	Dr. Rajeev Bharat	Jr. Scientist Agronomy
92	Dr.Rajinder Raina	Head VAHEE, FVSc
93	Dr. S.K Singh	Asstt. Prof.Pl.Path. Directorate of Research
94	Dr.R.K.Salgotra	Coordinator, School of Biotechnology
95	Dr. A K Raina	Chief Scientist, Water Management, Chatha
96	Dr. ShaguftaAzmi	Prof & Head, Division of Veterinary Pathology
97	Dr. R. Singh	Prof., Division Veterinary Medicine
98	Dr.Anjani Kumar Singh	Asstt. Prof. (PBG), Chatha
99	Dr. J. S. Soodan	Prof.& Head, TVCC,
100	Dr. Akash Sharma	Asstt. Prof., ACHR, Udheywalla
101	Dr. Devinder Sharma	Entomology, Asstt. Prof., division of Entomology
102	Dr.Vivek M. Arya	Asstt. Professor, Division of Soil Science
103	Dr.Amitesh Sharma	Asstt. Prof.,PBG, Directorate of Research
104	Dr.Vikas Sharma	Asstt.Prof., Division of Plant Physiology & Biochemistry.
105	Dr.Magdeshwar Sharma	Asstt.Prof.(Entomology), Megaseed, Chatha