

## **SECTION-I: PROCEEDINGS OF THE 35<sup>th</sup> GROUP MEETING**

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The 35<sup>th</sup> Group Meeting of the All India Coordinated Research Project on Potato [AICRP (Potato)] was organized at Bidhan Chandra Krishi Viswavidyalaya (BCKV), Kalyani (West Bengal) from September 15-18, 2017. The programme of the Group Meeting and List of Participants are attached at **Annexure-I** and **Annexure-II**, respectively.

### **INAUGURAL SESSION (September 15, 2017)**

- President** : Dr DD Patra, Hon'ble VC, BCKV, Kalyani
- Chief Guest** : Sh PK Majumdar, Advisor to CM, Govt. of West Bengal
- Guests of Honour** : Dr Tapas Mondal, Member of Parliament, West Bengal  
Dr T Janakiram, ADG, Horticultural Science, ICAR, New Delhi  
Dr Jurgen Kroschel, CIP, New Delhi  
Prof Sri Kumar Pal, Director Research, BCKV, Kalyani
- Rapporteur** : Dr Vinod Kumar (ICAR-CPRI, Shimla)

Inaugural session of 35<sup>th</sup> Group Meeting of AICRP (Potato) was held at Farmers Academy and Convention Centre, BCKV, Kalyani (West Bengal). The program started with lighting of the lamp and ICAR song. On this Occasion, three publications entitled "Training cum lab manual on high-tech seed potato production", "Technologies developed and transformed/commercialized by CPRI" and "Status of potato cultivation in West Bengal" were released.

At the outset, Prof Sri Kumar Pal, Director Research, BCKV, Kalyani welcomed all the dignitaries and participants for gracious presence at the 35<sup>th</sup> group meeting of potato. Dr SK Chakrabarti, Director, ICAR-CPRI Shimla & Project Coordinator, AICRP (Potato) Shimla narrated the timeline of different activities occurred at national level in potato improvement in the country since 1949. He acknowledged the contribution of ICAR- CPRI for enhancing potato production from 1.5 million tonnes to over 45 million tonnes in the country and developing its own seed supply system through seed plot technique. The developments of late blight resistant varieties; diagnostics of viruses including field level diagnostic were appreciated.

Sh PK Majumdar, Advisor to CM, Govt. of West Bengal and Chief Guest of the function emphasized that most of the farmers of West Bengal are marginal and facing seed potato deficit. He further narrated that mechanism should be developed for quick multiplication of planting material of Processing varieties. He also showed concern about inadequate cold storage facility in the state.

Dr Tapas Mondal, Member of Parliament, West Bengal appreciated the significant achievements of ICAR-CPRI and AICRP (Potato) for implementing need based research which has been reflected in the country potato production. He also emphasized the need of minimum support price to potato farmers. Further, he urged ICAR to help farmers in doubling their farm income by 2022.

Dr T Janakiram, ADG (Horticulture Sciences) appreciated the contribution of ICAR-CPRI in potato research and development. He stated that Horticultural crops has surpassed field crop with a production of 300 million tonnes with vegetable crops share of 4.8 %. Among vegetables, potato tops the list with production of 48.2 million tones. He also emphasized the need of potato export council and also to explore the possibility of detection of plant diseases using X-rays and organization of a certificate course for cold storage.

Dr DD Patra, VC, BCKV, Kalian emphasized that nutritional aspect of potato should be given top priority. He also insisted to develop technologies for round the year supply of raw material to potato processing industry. He also stated that every effort should be made to double the farmer's income either by reducing the cost of cultivation or by other means. He also suggested to explore the possibility of intercropping of potato with medicinal plants. Dr Jurgen Kroschel, Regional Leader, CIP, New Delhi briefed about their activities in South West Asia and also highlighted the role of CIP germplasm in varietal development programmes in India.

Dr VK Dua, Head, Division of Crop Production, ICAR-CPRI Shimla presented the vote of thanks to all the dignitaries and participants.

#### **ACTION TAKEN REPORT (September 16, 2017)**

**Chairperson** : Dr T Janakiram, ADG (Horticultural Science), ICAR, New Delhi  
**Co-chairperson** : Dr SK Chakrabarti, Director, ICAR-CPRI, Shimla  
**Rapporteurs** : Dr's VK Gupta (ICAR-CPRIRS, Modipuram) and EP Venkatasalam (ICAR-CPRS, Ooty)

Dr Vinod Kumar, PS, AICRP (Potato) presented the action taken report on the recommendations of 34<sup>th</sup> Group Meeting held at ICAR- CPRI, Shimla from August 20-22, 2016. The Chairman appreciated the achievements and after thorough discussions the recommendations were developed.

1. Digital data submission in AICRP need to be adopted. **(Action: Project Coordinator(Potato), ICAR-CPRI, Shimla)**
2. Involvement of centers Jorhat, Kalyani, Kanpur and Deesa for crossing work to develop Region specific variety. **(Action: Project Coordinator(Potato), ICAR-CPRI, Shimla and Head, Crop Improvement)**
3. A link of micronutrient status map of the Indian soils, which is available at ICAR-IISS, Bhopal website, may be provided on ICAR-CPRI web site. **(Action: Project Coordinator(Potato), ICAR-CPRI, Shimla and Head, Crop Production)**
4. Quality parameters in nitrogen experiments need to be discussed. **(Action: Head, Crop Production, ICAR-CPRI, Shimla)**
5. Recommendation of AICRP technologies alongwith packages and practices should be provided to the line departments of different states. **(Action: Project Coordinator(Potato), ICAR-CPRI, Shimla)**

## **TECHNICAL SESSION-I: CROP IMPROVEMENT (September 16, 2017)**

- Chairperson** : Dr PS Naik, Ex Director, ICAR-IIVR, Varanasi (UP)
- Co-Chairpersons** : Dr Pranab Hajra, Professor, Department of Vegetable Crops, BCKV, Kalyani and Dr Subrata Maity, Ex Professor, BCKV, Kalyani
- Rapporteurs** : Drs Vinod Kumar, PS, PC Unit, ICAR-CPRI, Shimla and VK Gupta, PS, ICAR-CPRIRS, Modipuram

A summary presentation on achievements in Potato Improvement was made by Dr Vinay Bhardwaj, Acting Head, Division of Crop Improvement, ICAR-CPRI, Shimla. Thorough discussions were held on all aspects of presentation made by Dr Vinay Bhardwaj. Thereafter, following 6 hybrids were proposed for recommending them for release as varieties.

Hybrid	Proposed by
MS/08-1565	Dr SK Luthra
CP 4054	Dr Vinay Bhardwaj
MS/06-1947	Dr SK Luthra
MP/04-578	Dr VK Gupta
PS/06-88	Dr Shambhu Kumar
OS/01-497	Dr EP Venkatasalam

After in depth discussions on yield, various other attributes and feedbacks from all AICRP Centres, 4 hybrids were recommended for release.

The following recommendations emerged in the session.

### **Specific recommendations**

1. Medium maturing (75-90 days), high yielding (35-40 t/ha), white skinned advanced table potato hybrid MS/06-1947 is recommended for release as a new variety for North Indian plains. It produces attractive white-cream ovoid uniform tubers with shallow eyes and white-cream flesh. It possesses field resistance to late blight, good keeping/culinary quality. **(Action: Director, ICAR-CPRI, Shimla and Head, Crop Improvement)**
2. First ever, purple skinned, medium maturing (75-90 days) with higher anthocyanin/carotenoids content and high yielding (35-38 t/ha) advanced potato hybrid MS/08-1565 is recommended for release as a new variety for North Indian plains. It produces attractive purple coloured ovoid uniform tubers with shallow eyes and yellow flesh. It possesses field resistance to late blight, good keeping/culinary quality. **(Action: Director, ICAR-CPRI, Shimla and Head, Crop Improvement)**
3. Advanced table potato hybrid CP-4054 developed under ICAR-CIP collaboration is recommended for release as a new variety for North Indian plains with yield potential of 15-20 t/ha under heat stress and 30-35 t/ha under 15-20 days early planting condition. It produces attractive white-cream ovoid uniform tubers with shallow eyes and white-cream flesh. It possesses tolerance to hopper and mite burn, good keeping and culinary quality. **(Action: Director, ICAR-CPRI, Shimla and Head, Crop Improvement)**
4. The advanced medium maturing (110-120 days) hybrid, OS/01-497 developed at CPRS, Ooty possessing combined resistance to late blight and cyst nematode having yield

potential of 30-35 t/ha is recommended for state release as new variety for The Nilgiri hills of Tamilnadu. **(Action: Director, ICAR-CPRI, Shimla and Head, Crop Improvement)**

5. The advanced processing (French fry) hybrid MP/4-578 proposed for release may be evaluated for one more year with popular exotic varieties Shepody, Santana, Innovator and Kennebec. **(Action: Project Coordinator (Potato) and Head, Crop Improvement)**.
6. The red skinned advanced hybrid PS/06-88 proposed for released may be re-evaluated for one more year to see its consistency in performance with respect to yield and quality parameters using Kufri Sindhuri, Kufri Lalima, Kufri Arun and Kufri Lalit. **(Action: PC Potato and Head, Crop Improvement)**

### **General recommendations**

1. With reference to regional breeding, it has been decided that tubers of clones from F<sub>1</sub>C<sub>3</sub> or F<sub>1</sub>C<sub>4</sub> from different breeding projects will be supplied to appropriately identified AICRP centers for their evaluation. **(Action: Head, Crop Improvement)**
2. After thorough discussion it has been decided that table purpose and processing purpose hybrids should not be evaluated in plains beyond 75 DAP and 90 DAP, respectively i.e. Crop durations for these trials cannot be more than 75 and 90 days, respectively. **(Action: PC, Potato & Head, Crop Improvement, ICAR-CPRI)**.
3. Henceforth no hybrid having less than 18% dry matter (except early maturing hybrid) shall be accepted in AICRP trials. **(Action: PC, Potato)**.
4. In future, all hybrids bred for resistance to cyst nematodes must have Rf value less than 1. **(Action: Head, Crop Improvement and CPRS, Ooty)**
5. All AICRP centres should record transportation damage in all hybrids and varieties received by them from SPU, Modipuram or any other CPRI Centre. A proforma for recording transportation damage needs to be developed at ICAR-CPRI and supplied to all AICRP centres. **(Action: PC, Potato, CPRI SPUs and all AICRP Centres)**.
6. All the scientists involved from AICRP centers in evaluation of AICRP hybrids may be given credit by including their names as Associate Workers in variety release document as an Annexure to the variety release proforma. **(Action: Director and PC (Potato), ICAR-CPRI, Shimla)**.
7. Yields of hybrids having desirable traits of interest/economic attributes can be compromised to the extent of 5% of the best control while considering them for recommending for release. **(Action: PC (Potato) and Potato breeders)**.
8. PC Unit should present performances of AICRP centres including timeliness in submission of various reports in annual Group Meetings in a session on Action Taken Report. A time schedule for submission of quarterly reports, annual reports, data, AUCs etc. needs to be developed by PC Unit and circulated among all AICRP centres. Possibility of on-line submission may also be explored. **(Action: PC, Potato)**.
9. For supply of planting material from one SPU in same physiological stage, Director, ICAR-CPRI; PC, Potato and PIs of crop improvement, production and protection may work out logistics for multiplication and supply of planting material of hybrids and varieties needed for all AICRP trials from Modipuram in plains and Kufri in hills **(Action: Director; PC, Potato and PIs)**
10. Old local varieties producing baby type potatoes in north eastern states may be collected, made virus free and tested at Jorhat, Patna, Shillong and any other locations in north eastern plains **(Action: Head, Crop Improvement)**.

### TECHNICAL SESSION III: CROP PRODUCTION (September 17, 2017)

- Chairperson** : Dr PM Govindakrishnan, Former PC (Potato), ICAR-CPRI, Shimla
- Co-Chairpersons** : Prof SK Mukhopadhaya, AICRP on Integrated farming system, BCKV, Kalyani and Dr Shyam Sunder Mondal, Retd Professor, BCKV, Kalyani
- Rapporteurs** : Dr Sanjay Rawal(ICAR-CPRI, Modipuram), Dr SP Singh (CPRS, Gwalior) and Dr RK Singh (CPRS, Patna)

#### Recommendation for extension agencies

1. At Srinagar, Kufri Himalini and Kufri Girdhari should be fertilized with 225 kg N per ha along with 100 percent of the recommended P&K doses. The recommendation should be communicated to line department along with exact doses of N, P and K.  
**(Action: Project Coordinator (Potato), Head, Crop Production, Department of Agriculture/Horticulture, Govt. of J&K and AICRP (Potato) Srinagar center)**
2. Application of Zn @ 1.5 kg/ha for Bhubaneswar, Pantnagar & Pune; @ 3 kg/ha for Chhindwara, Kalyani, Patna, Raipur & Pasighat; @ 4.5 kg/ha for Dholi, Hisar, Jorhat & Kanpur and @ 6.0 kg/ha for Faizabad may be recommended.  
**(Action: Project Coordinator (Potato), Head, Crop Production, Department of Agriculture/Horticulture, Govt. of Odisha, Uttarakhand, Maharashtra, Madhya Pradesh, West Bengal, Bihar, Chhattisgarh, Arunachal Pradesh, Haryana, Assam & Uttar Pradesh and AICRP (Potato) centers Bhubaneswar, Chhindwara, Dholi, Faizabad, Hisar, Jorhat, Kalyani, Kanpur, Pantnagar, Pasighat, Patna, Pune and Raipur)**

#### General recommendations

1. While developing region specific decision support system (DSS) based upon the model developed using data from site specific nutrient management trials, centers should be given recognition. **(Action: Project Coordinator (Potato) and Head, Crop Production)**
2. System based nutrient management recommendations should come up at least with most popular cropping system for the region. **(Action: Head, Crop Production)**
3. On conclusion of the trials, economics should be worked out in all the agronomic experiments. **(Action: Head, Crop Production and All AICRP (Potato) centers)**
4. Potato-onion crop sequence trial should be discontinued at Kalyani, but it must be continued at Burdwan and carried out by Kalyani Centre. **(Action: Head, Crop Production and AICRP (Potato) Kalyani center)**
5. Micro nutrient formulation experiment should be concluded. No recommendation from AICRP should be given till IIHR potato and vegetable special micro nutrient formulation get registered. **(Action: Project Coordinator (Potato) and Head, Crop Production)**
6. In potassium experiment at Deesa, one treatment of higher dose should be included. **(Action: Project Coordinator (Potato) and Head, Crop Production)**
7. For evaluation of advanced hybrids/new cultivars should be tried through micro irrigation in addition to furrow irrigation. **(Action: Head, Crop Production)**
8. Organic trial will continue for next two to three years to arrive at any conclusion. **(Action: Project Coordinator (Potato) and Head, Crop Production)**

9. An experiment proposed for Srinagar center on processing varieties has been accepted with recommended dose of NPK in addition to other treatments. **(Action: Head, Crop Production and AICRP (Potato) Srinagar center)**
10. Proposed experiment for Hassan center for raised bed and fertigation with drip has been approved. **(Action: Project Coordinator (Potato) and Head, Crop Production)**
11. A new experiment to validate QUEFTS model shall be initiated and conducted at Kanpur, Dholi, Hisar, Kalyani and Kota centres from next year. **(Action: Project Coordinator (Potato) and Head, Crop Production)**

Dr PM Govindkrishnan, Chairperson and Dr Mondal & Dr Mukhopadhaya Co-chairpersons expressed their satisfaction with deliberations and achievements of the Crop Production division.

#### **TECHNICAL SESSION IV: CROP PROTECTION (September 17, 2017)**

- Chairperson** : Dr BP Singh, Former Director, ICAR-CPRI, Shimla
- Co-Chairpersons** : Prof A Basu, Head, Dept. of Plant Pathology, BCKV, Kalyani  
Dr S Roy, Head, ICAR-CPRS, Gwalior
- Rapporteurs** : Dr Kamlesh Malik (ICAR-CPRI, Modipuram), Dr RP Singh (Pantnagar) and Dr JK Patel (Deesa)

#### **General recommendations**

1. It was observed that most of the centres are not entering meteorological data for validating Indo-Blight cast model in their respective regions. Therefore, it was decided that it is mandatory for every centre to enter meteorological data daily during crop season to forecast the appearance of late blight in respective regions **(Action: All AICRP Centers & Head, Plant Protection, ICAR-CPRI, Shimla)**.
2. It was observed that at Bhubaneswar there was no aphid appearance but virus incidence was there during last crop season. Therefore, it was decided that either PI of the project or any other scientists should visit the Bhubaneswar centre during this crop season to verify aphid appearance **(Action: Head, Plant Protection, ICAR-CPRI, Shimla & PC, AICRP on Potato)**.
3. It is mandatory under Path-1 & Path-2 to send the late blight and virus infected samples for population structure studies and virus profiling. But most of the centres are not doing so. Therefore, it was re-iterated that every centre should ensure timely supply of late blight and virus infected samples to Head, Plant Protection, ICAR-CPRI, Shimla for profiling. **(Action: All AICRP Centres & Head, Plant Protection, ICAR-CPRI, Shimla)**.
4. In degeneration trial (Path-4), include all centres of warmer areas. Data on virus incidence is mandatory to record along with virus profiling. It was also advised that old varieties like Kufri Jyoti and Kufri Badshah may be dropped from this experiment as information on degeneration of these varieties is already available and data on degeneration of new varieties may be generated from next year onward **(Action: Head, Plant Protection, ICAR-CPRI, Shimla)**.
5. Pesticides (including bio-pesticides & botanicals) with label claim should only be included in treatments for management trials. A letter should go from Director, ICAR-

CPRI, Shimla to ADG (PP& B) to seek clarification on the issue (**Action: Head, Plant Protection, ICAR-CPRI, Shimla & PC, AICRP on Potato**).

6. Results of organic potato production are encouraging and there is need to develop full package for organic production of potato. Therefore, it was decided to develop an IPM package for organic potato production (**Action: Head, Plant Protection, ICAR-CPRI, Shimla**).
7. In Kanpur areas of Uttar Pradesh there is a serious problem of common scab and farmers are not following tuber seed treatment practice developed by ICAR-CPRI, Shimla for the management of common scab. Therefore, it was decided that Kanpur centre will conduct five FLDs on management of common scab using tuber seed treatment with boric acid (3%) in nearby areas at farmers' fields (**Action: AICRP Centre, Kanpur**).
8. New work plan in consultation with respective centres may be developed for Plant Protection scientists for subsequent years (**Action: All AICRP Centres & Head, Plant Protection, ICAR-CPRI, Shimla**).

#### **TECHNICAL SESSION IV: PLENARY SESSION (September 18, 2017)**

**Chairperson** : Dr Jitesh Hore, Dean, Horticulture, BCKV, Kalyani  
**Co-Chairperson** : Dr Manoj Kumar, Joint Director, ICAR-CPRI RS, Modipuram  
**Rapporteurs** : Drs SK Luthra and Sanjay Rawal, (ICAR-CPRI RS, Modipuram)

1. The crop duration for evaluation of advanced hybrids for table/processing should not be more than 90 days. (**Action: Project Coordinator (Potato) and Head, Crop Improvement**)
2. Main season advanced hybrid should possess dry matter contents around 18 percent. (**Action: Head, Crop Improvement**)
3. The seed production of newly released advanced hybrids should be taken on priority bases. (**Action: Head, Seed Technology, ICAR-CPRI, Shimla**)
4. All the AICRP centres will deliver 5-minute presentation and for finalization of technical programme minimum two hours' times will be allocated for Crop Improvement, Crop Production and Crop Protection. (**Action: Project Coordinator (Potato) and All AICRP (Potato) centers**)

#### **Remarks of Dr T Janakiram, ADG (Horticultural Science-II), ICAR, New Delhi**

1. Digitalization of AICRP on Potato should be done on priority basis and online submission of data and reporting should be started. (**Action: Project Coordinator (Potato), ICAR-CPRI, Shimla**)
2. Commercialization/Revenue generation from AICRP should be initiated. (**Action: Project Coordinator (Potato), ICAR-CPRI, Shimla**)
3. Immediate submission of proposals must be ensured to the Central Varietal Release Committee for release of four new advanced hybrids, which have been approved in AICRP Meeting. (**Action: Director, ICAR-CPRI, Shimla and Head, Crop Improvement**)
4. Success stories of AICRP on Potato should be uploaded on KVK Portal. (**Action: Project Coordinator (Potato), ICAR-CPRI, Shimla**)

5. Brain storming session should be organized on seed production/planting material at the earliest. **(Action: Director, ICAR-CPRI, Shimla and Head, Seed Technology, ICAR-CPRI, Shimla)**
6. State wise recommendations of AICRP centers on potato for different technologies may be submitted to SMD for onward submission to DG, ICAR. **(Action: Project Coordinator (Potato), ICAR-CPRI, Shimla)**
7. Large scale technology demonstration in KVKs should be carried out. **(Action: Project Coordinator (Potato), ICAR-CPRI, Shimla)**
8. Use of social media should be encouraged for visibility of the achievements made by AICRP. **(Action: Project Coordinator (Potato), ICAR-CPRI, Shimla)**
9. Elite germplasm registration should be done with NBPGR on regular basis. **(Action: Director, ICAR-CPRI, Shimla and Head, Crop Improvement)**

Chairperson Dr Jitesh Hore, Dean, Horticulture, BCKV, Kalyani concluded the session by giving his valuable comments. In the end he congratulated the scientists for the good work done but cautioned that the future is more difficult due to international competition and we have to strengthen ourselves and be vigilant.

Dr Manoj Kumar, Joint Director, ICAR-CPRI RS, Modipuram co-chaired the session and he suggested that recommendations should be followed in letter and spirit, and sincerity should be there in working. The AICRP (Potato) Head quarter should be contacted in case of any doubt.

Dr Vinod Kumar, Principal Scientist, AICRP (Potato), ICAR-CPRI, Shimla thanked Chairpersons, Co-Chairpersons and the house for fruitful discussion, valuable suggestions and relevant recommendations for improving the working of AICRP (Potato). The 35<sup>th</sup> Group Meeting of AICRP (Potato) ended with vote of thanks proposed by Dr Vinod Kumar, Principal Scientist, AICRP (Potato), ICAR-CPRI, Shimla.

## SECTION-II: TECHNICAL PROGRAMME FOR 2017-2018

### SUMMARY OF TRIALS ALLOTTED TO DIFFERENT AICRP (POTATO) CENTERS

Sl. No	Name of the Center	Crop Improvement	Crop Production	Crop Protection		Total
				Path.	Ent.	
1.	Bhubaneshwar	Gen.4,5,6,7,8,9,10,11	Agron.2,3,5	Path.2	Ent.1,2,3	15
2.	Chhindwara	Gen. 4,5,6,7,8,9,10	Agron. 3	Path.2	Ent.1,2,3	12
3.	Deesa	Gen.3,4,5,6,7,8,9,10,11	Agron. 3,8	Path.2,5	Ent.1,2,3	16
4.	Dharwad	Gen.1,4,5,6,7,8,9,10	Agron.2, 3	Path.2	Ent.1,2	13
5.	Dholi	Gen.3,4,5,6,7,8,9	Agron.2,3,4,7,14	Path.1,2,3	Ent.1,2	17
6.	Faizabad	Gen. 4,5,6,7,8,9,10,11	Agron. 2,4,6,7	Path.1,2,3	Ent.1,2	17
7.	Gwalior	Gen. 4,5,6,7,8,9, 10,11	Agron.2,3,4,5,7,14	Path.2	Ent.1,2	17
8.	Hassan	Gen.1,4,5,6,7,8,9,10	Agron. 2,3	Path.1,2,3,5	Ent.1,2,3,5	18
9.	Hisar	Gen.1,4,5,6,7,8,9,10,11	Agron.7,9,10,14	Path.2,5	Ent.1,2	17
10.	Jalandhar	Gen. 4,5,6,7,8,9,10	Agron. 3,4,5,14	Path.1,2,3	Ent.1,2	16
11.	Jorhat	Gen.1,3,4, 5,6,7,8,9	Agron. 2,7	Path.1,2,4	Ent.1,2	15
12.	Kalyani	Gen.3,4 5,6,7,8,9,10	Agron. 2,3,6,11,14	Path.1,2,3,5	Ent.1,2	19
13.	Kanpur	Gen.3,4,5,6,7,8,9,10	Agron.4,5,14	Path.1,2,3,6	Ent.1,2	17
14.	Kota	Gen. 4,5,6,7,8,9,10,11	Agron. 3,14	Path.1,2	Ent.1,2	14
15.	Kufri (Shimla)	Gen.2	-	-	Ent.1	2
16.	Modipuram	Gen.2,4,5,6,7,8,9,10,11	Agron.5,14	Path.2	Ent.1,2	14
17.	Ooty	-	Agron. 3,7	Path.1,2	Ent.1,2,4,5	8
18.	Pantnagar	Gen. 4,5,6,7,8,9,10	Agron. 3,4	Path.1,2,3	Ent.1,2	14
19.	Pasighat	Gen. 4,5,6,7,8,9	Agron. 3,7	Path.1,2,4	Ent.1,2	13
20.	Patna	Gen. 4,5,6,7,8,9	Agron. 2,3,5,6	Path.1,2,3	Ent.1,2	15
21.	Pune	Gen. 4,5,6,7,8,9	Agron. 2	Path.1,2,3,5	Ent.1,2,3,5	15
22.	Raipur	Gen. 4,5,6,7,8,9,10,11	Agron.1,3,12	Path.2,5	Ent.1,2,3	16
23.	Ranichauri	Gen.8,9	-	-	Ent.	0
24.	Shillong	-	-	Path.1,2,3	Ent.1,2,4	6
25.	Srinagar	Gen.3,4,5,6,7,8,9	Agron. 2,7,13	Path.1,2,3	Ent.1,2	15

## CROP IMPROVEMENT

### GENET. 1: EVALUATION OF GERMPLASM

Location : Dharwad, Hassan, Hisar and Jorhat

#### a) Evaluation for adaptability in Kharif season

Locations: Dharwad and Hassan

Design	:	RBD
Replication	:	2
Plot size	:	5 tubers row
Material	:	100 <i>tuberosum</i> accessions supplied by CPRS, Jalandhar
Controls	:	AICRP-C-13, AICRP-C-16, AICRP-C- 17, AICRP-C-24
		K Jyoti, K Surya, K Pukhraj, K Himalini

#### Observations to be recorded:

1. Plant emergence (%) at 30 days after planting
2. Foliage senescence (%) at haulms cutting (Rating of canopy for yellowing of leaves 1-10 scale where 1= 10% leaf yellowing and 10= 100% leaf yellowing)
3. Yield per plant (90 days harvest)
4. No. of tubers per plant (90 days harvest)
5. Incidence of any major diseases (final score).

#### b) Evaluation for Potato Apical Leaf Curl Disease (ToALCNDV):

Locations : Hisar

Design	:	RBD
Replication	:	2
Plot size	:	5 tubers row
Material	:	100 germplasm accessions from CPRS Jalandhar
Controls	:	AICRP-C-5, AICRP-C-6, AICRP-C-13, AICRP-C-14, AICRP-C-17, AICRP-C-18, AICRP-C-19
		K Badshah, K Bahar, K Jyoti, K Khyati, K Pukhraj, K Pushkar, K Sadabahar

#### Observations to be recorded:

1. Plant emergence (%) at 30 days after planting
2. Incidence of PALCD at 10 days interval after emergence to haulms cutting
3. No. of tubers per plant (90 days harvest)
4. Yield per plant (90 days harvest)

#### c) Evaluation for late blight resistance:

Locations: Jorhat

Design	:	RBD
Replication	:	2
Plot size	:	10 tubers row
Material	:	100 germplasm accessions from CPRS Jalandhar
Controls	:	AICRP-C-13, AICRP-C-23, AICRP-C-24

**Observations to be recorded:**

1. Plant emergence (%) at 30 days after planting
2. Incidence of LB at 10 days interval after 1<sup>st</sup> appearance of disease.
3. No. of tubers per plant (90 days harvest)
4. Yield per plant (90 days harvest).

**GENET.2: MULTIPLICATION OF GENETIC MATERIAL**

Multiplication of recently introduced hybrids, 1 early maturing (J/9-141), 2 medium maturing, red hybrids (MS/11-664, CP 4393), 1 heat tolerant (HT/11-03), 1 processing (MP/10-172) and 2 with resistance to biotic stresses (HR 9-4, SM/03-23).

Other hybrids viz., J/7-5, J/7-15, J/7-37, J/8-85 and J/8-91, MS/10-1529, MS/9-2196, PS/07-07, PS-05/75, MP/04-816, MS/8-1148, PS/06-88, MP/08-1900, MP/04-578, MP/09-28, HT/07-1329, HT/07-1105, J/93-58 and J/92-167, WS/05-146, PS/07-07 and PS/09-9, PS/8-31, D-150 and 92-PT-27 (both parents) under AICRP and control varieties will be done at Seed Preparatory Units (SPUs) located at Modipuram and Kufri for supply to the AICRP centers in the plains and hills, respectively. Besides, the tubers of K. Kesar and K. Sukhyati will also be multiplied at Modipuram so as to conduct the multi-location trials from next season onwards.

**GENET.3: REGION SPECIFIC BREEDING PROGRAMMES AT SAU BASED CENTERS**

Sr. No.	AICRP location (s)*	Affiliated CPRI centre (s)	Regional/variety requirements
1	Srinagar, Jorhat	CPRS, Kufri	High yield & Late Blight resistance
2	Deesa, Dholi, Kalyani, Kanpur	CPRI RS, Modipuram, Patna and Jalandhar	Virus resistance, Moderate resistance to late blight, heat tolerance and high yield

\*F1C3/ F1C4 produce, from Modipuram, Jalandhar and Patna will be shared with the AICRP centres.

**GENET.4: ADVANCED VARIETAL TRIAL (AVT) WITH MEDIUM MATURING HYBRIDS**  
**[Nodal Scientist: Dr SK Luthra, CPRI, RS, Modipuram]**

Location : All locations in the plains  
 Design : RBD  
 Replication : 4 (each for 75 & 90 days crop)  
 Plot size : 3.0 m x 2.4 m (5 rows of 12 tubers)  
 Cultural practices : As recommended for the region.

**Treatments**

Zone	Hybrids
	AICRP-P-7, AICRP-P-12, AICRP-P-24 (AVT-2), AICRP-P-22 (AVT-1)
	Controls
Northern plains	AICRP-P-9, AICRP-C-14, AICRP-C-17, AICRP-C-6, K Garima, K Mohan, K Lalit, AICRP-C-15
Central plains	AICRP-P-9, AICRP-C-14, AICRP-C-17, AICRP-C-6, K Garima, K Mohan, K Lalit, AICRP-C-15
Eastern plains	AICRP-P-9, AICRP-C-14, AICRP-C-17, AICRP-C-4, K Garima, K Mohan, AICRP-C-13, K

	Lalit, AICRP-C-15
Plateau region	AICRP-P-9, AICRP-C-17, AICRP-C-18, AICRP-C-20, AICRP-C-24, AICRP-C-13, K Mohan, AICRP-C-15, K Lalit

**Observations to be recorded:**

1. Seed wt./plot (Kg)
2. Plant emergence (%) at 30 days after planting.
3. Incidence of any major diseases, final score.
4. Tubers rot in the plot (weight) at the time of harvesting.
5. Foliage senescence and total & marketable tuber yield (t/ha) at 75 & 90 days crop and at senescence (75% foliage maturity)\*.
6. Tuber dry matter (%) at 75 & 90 days and senescence. Corresponding haulm dry wt. (%) should also be recorded. Final haulms weight (Fresh weight and dry weight) is to be recorded at start of senescence. Dry matter estimation in tuber should be done within a week after harvest.
7. Meteorological data.
8. Total weight loss after 75 days storage at ambient temperature.
9. Mean Canopy Cover<sup>#</sup> at 10 days interval till senescence (75% foliage maturity) with digital camera or by Burstall & Harris (1983) method (Grid method).
10. Storage losses in heaps (at respective CPRI stations).

**\* If 75% foliage senescence is earlier to any of the harvest dates mentioned then its date should be recorded and final harvest recorded at that date.**

**GENET.5: INITIAL VARIETAL TRIAL (IVT) WITH MEDIUM MATURING WHITE SKINNED HYBRIDS  
[Nodal Scientist: Dr SK Luthra, CPRI, RS, Modipuram]**

Location : All locations in the plains  
 Design : RBD  
 Replication : 4 (each for 75 & 90 days crop)  
 Plot size : 3.0 m x 2.4 m (5 rows of 12 tubers)  
 Cultural practices : As recommended for the region.

**Treatments**

Zone	Hybrids
	AICRP-P-30, AICRP-P-28, (IVT-2); AICRP-P-43 (IVT-1)
	Controls
Northern plains	AICRP-C-14, AICRP-C-17, AICRP-C-18, AICRP-C-6, K Garima, K Mohan, AICRP-P-9
Central plains	AICRP-C-14, AICRP-C-17, AICRP-C-18, AICRP-C-6, K Garima, K Mohan, AICRP-P-9
Eastern plains	AICRP-C-14, AICRP-C-17, AICRP-C-18, AICRP-C-4, K Garima, K Mohan, AICRP-C-13, AICRP-P-9
Plateau region	AICRP-C-17, AICRP-C-18, AICRP-C-20, AICRP-C-24, AICRP-C-13, K Mohan, AICRP-P-9

**Observations to be recorded:**

1. Seed wt./plot (Kg)
2. Plant emergence (%) at 30 days after planting.
3. Incidence of any major diseases, final score.
4. Tubers rot in the plot (weight) at the time of harvesting.

5. Foliage senescence and total & marketable tuber yield (t/ha) at 75 & 90 days crop and at senescence (75% foliage maturity)\*.
6. Tuber dry matter (%) at 75 & 90 days and senescence. Corresponding haulm dry wt. (%) should also be recorded. Final haulms weight (Fresh weight and dry weight) is to be recorded at start of senescence. Dry matter estimation in tuber should be done within a week after harvest.
7. Meteorological data.
8. Total weight loss after 75 days storage at ambient temperature.
9. Storage losses in heaps (at respective CPRI stations).

**\* If 75% foliage senescence is earlier to any of the harvest dates mentioned then its date should be recorded and final harvest recorded at that date.**

#### **GENET.6: INITIAL VARIETAL TRIAL (IVT) WITH EARLY MATURING HYBRIDS**

**[Nodal Scientist: Dr Raj Kumar, CPRS, Jalandhar]**

Location : All locations in the plains  
 Design : RBD  
 Replication : 4 (for 60 days crop)  
 Plot size : 3.0 m x 2.4 m (5 rows of 12 tubers)

#### **Treatments**

Zone	Hybrids/Varieties
	AICRP-P-27, AICRP-P-29, AICRP-P-31 (IVT-2); AICRP-P-40, AICRP-P-36 (IVT-1)
	Controls
Northern plains	AICRP-C-14, AICRP-C-17, AICRP-C-18, AICRP-C-6, K Garima, K Mohan, AICRP-P-9
Central plains	AICRP-C-14, AICRP-C-17, AICRP-C-18, AICRP-C-16, K Garima, K Mohan, AICRP-P-9
Eastern plains	AICRP-C-14, AICRP-C-17, AICRP-C-18, AICRP-C-4, K Mohan, AICRP-P-9, AICRP-C-13
Plateau region	AICRP-C-17, AICRP-C-18, AICRP-C-20, AICRP-C-24, AICRP-C-13, AICRP-C-16, K Mohan, AICRP-P-9

#### **Observations to be recorded:**

1. Seed wt. per plot (Kg)
2. Plant emergence (%) at 30 days after planting.
3. Incidence of any major diseases, final score.
4. Tuber rottage in the plot (weight) at the time of harvesting.
5. Foliage senescence and total & marketable tuber yield (t/ha) at 60 days crop and at senescence (75% foliage maturity)\*.
6. Tuber dry matter (%) at 60 days and senescence. Corresponding haulm dry wt. (%) should also be recorded. Final haulms weight is to be recorded at start of senescence. Dry matter estimation in tuber should be done within a week after harvest.
7. Total weight loss after 75 storage at ambient temperature
8. Mean Canopy Cover<sup>#</sup> at 10 days interval till senescence (75% foliage maturity) with digital camera or by Burstall & Harris (1983) method (Grid method).
9. Meteorological data.

**\* If 75% foliage senescence is earlier to any of the harvest dates mentioned then its date should be recorded and final harvest recorded at that date.**

**Note:**

- An additional replication will be planted to record data on # Mean Canopy Cover.
- Sufficient tubers should be multiplied and kept to conduct 2<sup>nd</sup> year trial i.e. 600-800 tubers for new hybrids and 3500-4000 tubers for old hybrids during the next year.

**GENET.7: INITIAL VARIETAL TRIAL (IVT) WITH RED SKINNED HYBRIDS**

[Nodal Scientist: Dr Shambhu Kumar, CPRS, Patna]

Location : All locations in the plains  
 Design : RBD  
 Replication : 4 (each for 60 & 75 days crop)  
 Plot size : 3.0 m x 2.4 m (5 rows of 12 tubers)  
 Cultural practices : As recommended for the region.

**Treatments**

Zone	Hybrids/Varieties
	AICRP-P-26 (IVT-2), AICRP-P-34, AICRP-P-35 (IVT-1)
	Controls
Northern plains	AICRP-C-14, AICRP-C-17, AICRP-C-18, AICRP-C-6, K Mohan, K Lalit, AICRP-C-15, AICRP-P-14
Central plains	AICRP-C-14, AICRP-C-17, AICRP-C-18, AICRP-C-16, K Mohan, K Lalit, AICRP-C-15, AICRP-P-14
Eastern plains	AICRP-C-14, AICRP-C-17, AICRP-C-18, AICRP-C-4, AICRP-C-15, K Lalit, K Mohan, AICRP-C-13, AICRP-P-14
Plateau region	AICRP-C-17, AICRP-C-18, AICRP-C-20, AICRP-C-24, AICRP-C-13, AICRP-C-16, K Mohan, K Lalit, AICRP-C-15, AICRP-P-14

**Observations to be recorded:**

1. Seed wt. per plot (Kg)
2. Plant emergence (%) at 30 days after planting.
3. Incidence of any major diseases, final score.
4. Tuber rottage in the plot (weight) at the time of harvesting.
5. Foliage senescence and total & marketable tuber yield (t/ha) at 60 and 75 days crop and at senescence (75% foliage maturity)\*.
6. Tuber dry matter (%) at 60 and 75 days and senescence. Corresponding haulm dry wt. (%) should also be recorded. Final haulms weight is to be recorded at start of senescence. Dry matter estimation in tuber should be done within a week after harvest.
7. Total weight loss after 75 storage at ambient temperature
8. Mean Canopy Cover<sup>#</sup> at 10 days interval till senescence (75% foliage maturity) with digital camera or by Burstall & Harris (1983) method (Grid method).
9. Meteorological data.

**\* If 75% foliage senescence is earlier to any of the harvest dates mentioned then its date should be recorded and final harvest recorded at that date.**

**Note:**

- An additional replication will be planted to record data on # Mean Canopy Cover. Sufficient tubers should be multiplied and kept to conduct 2<sup>nd</sup> year trial i.e. 600-800 tubers for new hybrids and 3500-4000 tubers for old hybrid during the next year.

**GENET. 8:        ADVANCED VARIETAL TRIAL-2 (AVT-2) WITH PROCESSING (FRENCH FRIES) HYBRIDS**  
**[Nodal Scientist: Dr VK Gupta, CPRIC, Modipuram]**

Location               :    All AICRP centers  
Design                 :    RBD  
Replication           :    5 each for 75 & 90 days  
Plot size              :    2.64 x 3.0 m (4 rows of 15 tubers)  
Spacing                :    66 X 20 cm  
Cultural practices    :    As recommended for the region.

**Treatments**

<b>Hybrids</b>	<b>AICRP-P-4 (AVT-2)</b>
<b>Controls</b>	AICRP-C-8, AICRP-C-10, AICRP-C-11, Sephody, Santana, Innovator and Kenebec

**Observations to be recorded:**

1. Seed wt. per plot (Kg)
2. Plant emergence (%) at 30 days after planting.
3. Incidence of any major diseases, final score.
4. Tubers rot in the plot (weight) at the time of harvesting.
5. Foliage senescence and total & French fry grade yield (t/ha) at 75 and 90 days and at senescence (75% foliage maturity)\*.
6. Total weight loss 75 days after storage at ambient temperature
7. Tuber dry matter (%), French fry colour and reducing sugar at 75 and 90 days harvest at selected centres (Jalandhar and Modipuram). **Other centres to supply 5-8 tubers to Jt Director, CPRI, RS Modipuram immediately after harvest.**
8. Mean Canopy Cover<sup>#</sup> at 10 days interval till senescence (75% foliage maturity).
9. Storage losses in heaps (at respective CPRI stations).
10. Meteorological data.

**\* If 75% foliage senescence is earlier to any of the harvest dates mentioned then its date should be recorded and final harvest recorded at that date.**

**Note:**

- Nitrogen and Potash Fertilizers should be applied 1.25 times of the recommended dose of table potato
- An additional replication will be planted to record data on <sup>#</sup> Mean Canopy Cover.
- Sufficient tubers should be multiplied and kept to conduct 2<sup>nd</sup> year trials (3500-4000 tubers) during the next year.
- In case of shortage of tubers, the rows and tubers/row may be adjusted appropriately.

**GENET. 9:        INITIAL VARIETAL TRIAL (IVT) WITH PROCESSING (CHIPS) HYBRIDS**  
**[Nodal Scientist: Dr VK Gupta, CPRIC, Modipuram]**

Location               :    All AICRP centers  
Design                 :    RBD  
Replication           :    4 each for 75 and 90 days  
Plot size              :    2.64 x 3.75 m (4 rows of 15 tubers)  
Spacing                :    66 X 25 cm  
Cultural practices    :    As recommended for the region.

## Treatments

<b>Hybrids</b>	<b>AICRP-P-11, AICRP-P-33 (IVT-2); AICRP-P-41 (IVT-1)</b>
<b>Controls</b>	AICRP-C-1, AICRP-C-8, AICRP-C-10, AICRP-PH-3, K Surya

### Observations to be recorded:

1. Seed wt. per plot (Kg)
2. Plant emergence (%) at 30 days after planting.
3. Incidence of any major diseases, final score.
4. Tubers rot in the plot (weight) at the time of harvesting.
5. Foliage senescence and total & process grade yield (t/ha) at 75 and 90 days and at senescence (75% foliage maturity)\*.
6. Total weight loss 75 days after storage at ambient temperature
7. Tuber dry matter (%), chip colour and reducing sugar at 75 and 90 days harvest at selected centres (Jalandhar and Modipuram). **Other centers to supply 5-8 tubers to Jt Director, CPRIC, Modipuram immediately after harvest.**
8. Mean Canopy Cover<sup>#</sup> at 10 days interval till senescence (75% foliage maturity) with digital camera or by Burstall & Harris (1983) method (Grid method).
9. Meteorological data.

**\* If 75% foliage senescence is earlier to any of the harvest dates mentioned then its date should be recorded and final harvest recorded at that date.**

### Note:

- Nitrogen and Potash Fertilizers should be 1.25 times of the recommended dose of table potatoes
- An additional replication will be planted to record data on <sup>#</sup> Mean Canopy Cover.
- Sufficient tubers should be multiplied and kept to conduct 2<sup>nd</sup> year trials (3500-4000 tubers) during the next year.
- In case of shortage of tubers, the rows and tubers/row may be adjusted appropriately.

### **GENET.10: TRIAL FOR HEAT TOLERANCE [Nodal Scientist: Dr VK Gupta, CPRIC, Modipuram]**

Location	: Bhubaneshwar, Chhindwara, Deesa, Faizabad, Gwalior, Jalandhar, Kanpur, Kalyani, Pantnagar, Raipur, Hisar, Modipuram, Kota ( <b>Rabi crop</b> ). Dharwad, Hassan & Pune ( <b>Kharif</b> crop)
Design	: RBD
Replication	: 4 (each for 60, 75 & 90 days crop)
Plot size	: 3.0 m x 2.4 m (5 rows of 12 tubers)
Spacing	: 60 x 20 cm

### Treatments

<b>Hybrids</b>	: <b>AICRP-P-23 (AVT-1), AICRP-P-25 (IVT-2) AICRP-P-42 (IVT-1)</b>
<b>Controls</b>	: <b>Rabi crop*</b>
Bhubaneshwar	: K Surya, K Khyati, K Pukhraj, AICRP-C-28
Chhindwara	: K Surya, K Khyati, AICRP-C-28
Deesa	: K Badshah, K Pukhraj, K Surya, AICRP-C-28
Faizabad	: K Surya, K Khyati, K Pukhraj, AICRP-C-28
Gwalior	: K Surya, K Khyati, K Pukhraj, AICRP-C-28

Jalandhar	:	K Surya, K Khyati, K Pukhraj, AICRP-C-28
Kanpur	:	K Surya, K Khyati, K Pukhraj, AICRP-C-28
Kalyani	:	K Surya, K Jyoti, K Khyati, AICRP-C-28
Pantnagar	:	K Surya, K Khyati, K Pukhraj, AICRP-C-28
Raipur	:	K Surya, K Khyati, K Pukhraj, AICRP-C-28
Hisar	:	K Surya, K Bahar, K Pukhraj, AICRP-C-28
Modipuram	:	K Surya, K Bahar, K Pukhraj, AICRP-C-28
		<b><i>Kharif crop*</i></b>
Dharwad	:	K Surya, K Lauvkar, K Himalini, K Pukhraj, AICRP-C-28
Hassan	:	K Surya, K Lauvkar, K Himalini, K Pukhraj, AICRP-C-28
Pune	:	K Surya, K Lauvkar, K Himalini, K Pukhraj, AICRP-C-28

**\* including the controls of the region.**

Cultural practices : As recommended for the region.

#### **Observations to be recorded:**

1. Seed wt. per plot (Kg)
2. Plant emergence (%)
3. Plant vigor 60 days after planting (1-5 scale)
4. Foliage senescence and total & marketable tuber yield (t/ha) at 60, 75 & 90 days and at senescence (75% foliage maturity)\*.
5. Tuber rottage in the plot (weight) at the time of harvesting
6. Total weight loss at 75 days after storage at ambient temperature.
7. Incidence of any major diseases.
8. Tuber dry matter (%) at 60, 75 & 90 days harvest. Corresponding haulm dry wt. (%) should also be recorded. Dry matter estimation in tuber should be done within a week after harvest.
9. Meteorological data.
10. Mean Canopy Cover<sup>#</sup> at 10 days interval till senescence (75% foliage maturity) with digital camera or by Burstall & Harris (1983) method (Grid method).
11. Storage losses in heaps (at respective CPRI station)

**\* If 75% foliage senescence is earlier to any of the harvest dates mentioned then its date should be recorded and final harvest recorded at that date.**

#### **Note:**

- Sufficient tubers should be multiplied and kept to conduct 2<sup>nd</sup> year trials (3500-4000 tubers) during the next year.
- In case of shortage of tubers, the rows and tubers/row may be adjusted appropriately.

#### **GENET.11: EVALUATION OF WATER STRESS TOLERANT HYBRID [Nodal Scientist: Dr Name Singh, CPRIC, Modipuram]**

<b>Locations</b>	:	Bhubaneswar, Deesa, Faizabad, Gwalior, Hisar, Kota, Raipur, Modipuram
<b>Design</b>	:	Split-plot design
<b>Replications</b>	:	4 (each for 75 & 90 days crop)
<b>Plot size (Gross)</b>	:	4.2 m x 3.4 m
<b>Plot size (Net)</b>	:	3.0 m x 3.0 m
<b>Total plots</b>	:	4 x 2 x 4 = 32
<b>Spacing</b>	:	60 X 20 cm

**Treatments : a). Main-plot treatments :** Irrigation levels – Four

**Treatment A:** Gwalior, Hisar, Modipuram

**Treatment B:** Bhubaneswar, Deesa, Faizabad, Kota, Raipur

- A    I<sub>1</sub> : 2.5 IW : CPE ratio (6, adequate irrigations)  
      I<sub>2</sub> : 2.0 IW : CPE ratio (5, sub-optimal irrigations)  
      I<sub>3</sub> : 1.5 IW : CPE ratio (4, irrigations at critical stages viz. SF, TI, ETES & LTES)  
      I<sub>4</sub> : I<sub>3</sub> + paddy straw mulch @ 5 t/ha at planting

**OR**

- B    I<sub>1</sub> : Irrigation at 20 mm CPE (6, adequate irrigations)  
      I<sub>2</sub> : Irrigation at 25 mm CPE (5, sub-optimal irrigations)  
      I<sub>3</sub> : Irrigation at 30 mm CPE (4, irrigations at critical stages viz. SF, TI, ETES & LTES)  
      I<sub>4</sub> : I<sub>3</sub> + paddy straw mulch @ 5 t/ha at planting

**Note :** Depth of irrigation = 50 mm. The first irrigation at 7-10 days after planting should be given to all the plots, thereafter, irrigation treatments will be started.

**b). Sub- plot treatments:** Potato varieties – Three

- V1 : **AICRP-P-21**  
V2 : **AICRP-P-32**  
V3 : **AICRP-P-37**  
V4 : **AICRP-P-38**  
V5 : K. Sindhuri, K Pukhraj, K Jyoti or Recommended variety for the respective area (control)

**Observations to be recorded:**

1. Initial fertility status of the soil (p<sup>H</sup>, Organic carbon and available N, P & K).
2. Plant emergence at 30 days.
3. Plant growth, number of shoots and leaves per plant at 60 days after planting.
4. Yield and number of tubers in each grade (0-25 g, 25-75 g and above 75 g)
5. Amount of water applied in each irrigation under different treatments.

**Note:**

- No spray of fungicides against late blight incidence
- Sufficient tubers should be multiplied and kept to conduct 2<sup>nd</sup> year trials (3500-4000 tubers for old hybrid) during the next year.

Controls for various trials of AICRP  
(Based on decision of AICRP Workshop 2011)

A. For Trials with early maturing hybrids

<u>Zone</u>	<u>Control</u>
Northern plains	AICRP-C-14, AICRP-C-17
Central plains	AICRP-C-14, AICRP-C-17, AICRP-C-16
Eastern plains	AICRP-C-14, AICRP-C-17, AICRP-C-4
Plateau region	AICRP-C-17, AICRP-C-20, AICRP-C-24

B. For Trials with medium maturing hybrids

<u>Zone</u>	<u>Control</u>
Northern plains	AICRP-C-6, AICRP-C-19 & K. Gaurav
Central plains	AICRP-C-6 & K. Garima
Eastern plains	AICRP-C-14, AICRP-C-17
Plateau region	AICRP-C-17, AICRP-C-24, AICRP-C-13, AICRP-C-16

C. For Trials in hills

AICRP-C-23, AICRP-C-13 and AICRP-C-24

D. For Trials with Red Cultures

AICRP-C-15 and K Lalit

E. For Trials with Processing hybrids

Early: AICRP-C-1, AICRP-C-10

Med.: AICRP-C-8

FF: AICRP-C-11, AICRP-C-8

## CROP PRODUCTION

### Note:

- ✓ **Unless specified, only the recommended variety of the region should be used and should not be changed over different years**
- ✓ In all the trials of Crop Production, potato crop should be taken under the most popular cropping system of the region, unless it is not a system based experiment and the following details should be provided for all the experiments:

1. Crops in the system before potato
2. Date of planting and harvesting (of each crop)
3. Yield (Approximately in t/ha)
4. Fertilizers applied (kg/ha)

### **AGRON.1: INTERCROPPING STUDIES IN POTATO. [Nodal Scientist- Dr Praveen Sharma, IGKV, Raipur]**

Locations	:	Raipur
Design	:	RBD
Replication	:	3
Plot-size	:	Gross: 3.6m x 3.6 m (5 rows of 15 plants) Net: 2.4m x 3.2 m

<u>Crop</u>	<u>Variety</u>	<u>Spacing</u>
Potato	K. Pukhraj	60 x 20 cm
Cluster beans	Pusa Navbahar	30 x 7.5 cm
Cabbage	Golden Acre	60 x 60 cm

### Treatments

T1	:	Sole Potato
T2	:	Sole Cluster bean
T3	:	Sole Cabbage
T4	:	Potato+ Cluster bean (1:1 ratio)
T5	:	Potato+ Cabbage (1:1 ratio)
T6	:	Potato+ Cluster bean (2:1 ratio)
T7	:	Potato+ Cabbage (2:1 ratio)

### Observations to be recorded

1. Soil fertility status of the experimental plot before and after experiment (pH, organic carbon and available NPK).
2. Per cent emergence at 30 days after planting.
3. Incidence of diseases/pests.
4. Grade-wise yield of potato tubers (0-25g, 25-50g, 50-75g and >75g) and total yield of other crops (t/ha).
5. Economics of various treatments indicating the cost involved and the net gain (Rs/ha)

### Note:

- (1) All calculations should be made with net plot size only.
- (2) Recommended varieties of different crops should be used and same varieties should be used during 2018-19.

**AGRON.2: NITROGEN REQUIREMENT FOR RELEASED POTATO CULTIVARS  
(Testing/validating of ASNMP). [Nodal Scientist-Dr SP Singh, CPRS, Gwalior]**

Locations : Bhubaneshwar, Dharwad, Dholi, Faizabad, Gwalior, Hassan, Jorhat, Kalyani, Patna and Pune

Design : RBD  
Spacing : 60 cm x 20 cm  
Replications : 4 (Four)  
Plot size : Gross: 4.8 m x 3.4 m  
Net : 3.6 m x 3.0 m

**Treatments**

**Recently released potato Varieties:** Varieties to be tested at different AICRPP Centers

	Name of the Center	Varieties
1.	Bhubaneshwar	Kufri Surya
2.	Dharwad	Kufri Surya
3.	Dholi	Kufri Surya
4.	Faizabad	Kufri Sadabahar
5.	Gwalior	Kufri Surya
6.	Hassan	Kufri Surya, Kufri Girdhari and Kufri Himalini
7.	Jorhat	Kufri Himalini and Kufri Girdhari
8.	Kalyani	Kufri Shailja and Kufri Himalini
9.	Patna	Kufri Surya
10.	Pune	Kufri Surya

**5 Nitrogen levels (kg/ha):**

N0: 0, N1: 75 kg/ha, N2: 150 kg/ha, N3: 225 kg/ha and N4: 300 kg/ha

**Observations to be recorded**

1. Initial fertility status of soil (pH, organic carbon, soil texture and available N, P and K).
2. Plant emergence at 30 days.
3. Plant height and number of shoots per plant at 50 days after planting.
4. Yield of tubers in each grade (0-25g, 25-50g, 50-75g and >75g).
5. Nutrient (NPK) removal (tuber+haulm) and the effect on soil fertility behavior, pH, organic carbon, available N, P and K status of soil.
6. Dry matter content of tubers (%) and tuber yield on dry weight basis (kg/ha)
7. Halum yield on dry weight basis (kg/ha)
8. Economics of various treatments indicating the cost involved and the net gain (Rs/ha).

**Note:**

- a) All calculations should be made with Net plot size only.
- b) Soil, tuber and plant samples (dried samples) to be sent to Dr SP Singh, CPRS, Gwalior.
- c) Do not use paper tags in soil samples.

**AGRON.3: DEVELOP SITE SPECIFIC NPK REQUIREMENTS [Nodal Scientist-Dr Jagdev Sharma, ICAR-CPRI Shimla]**

Locations: Bhubaneshwar, Chhindwara, Deesa, Dharwad, Dholi, Gwalior, Hassan, Jalandhar, Kalyani, Kota, Ooty, Pantnagar, Pasighat, Pune, Patna and Raipur (Dharwad and Hassan will conduct this experiment in *kharif*)

Replications : Four  
Design : RBD  
Spacing : 60 cm x 20cm  
Replications : 4 (Four)  
Plot size : Gross: 4.8 m x 4.0 m  
Net: 3.6 m x 3.6 m

**Treatments of N, P, and K fertilizers**

T1 50% RDF of NPK  
T2 100% RDF of NPK  
T3 150% RDF of NPK  
T4 Without N fertilizer (PK)  
T5 Without P (NK)  
T6 Without K (NP)  
T7 Without NPK (Absolute control)

**Observations to be recorded:**

1. Initial fertility status of soil (pH, organic carbon, soil texture and available N, P and K).
2. Plant emergence at 30 days.
3. Plant height and number of shoots per plant at 50 days after planting.
4. Yield of tubers in each grade (0-25g, 25-50g, 50-75g and >75g).
5. Nutrient (NPK) removal (tuber + haulm) and the effect on soil fertility behavior, pH, organic carbon, available N, P and K status of soil.
6. Dry matter content of tubers (%) and tuber & haulm yield on dry weight basis (kg/ha)
7. Concentration of NPK in haulm & tuber
8. Nutrient uptake by tuber and haulm
9. Economics of various treatments indicating the cost involved and the net gain (Rs/ha).

**Note:**

- a) All calculations should be made with Net plot size only.
- b) Soil, tuber and plant samples (dried samples) to be sent to Head, Crop Production, CPRI, Shimla.
- c) Do not use paper tags in soil samples.

**AGRON 4: OPTIMIZING PHOSPHORUS REQUIREMENTS OF POTATO UNDER CURRENT SCENARIO OF P USE BY THE FARMERS. (Nodal Scientist-Dr Prince, CPRS, Jalandhar)**

Locations : Farmers' field at Faizabad, Dholi, Gwalior, Jalandhar, Kanpur and Pantnagar  
Design : RBD  
Replications : 4  
Plot-size : Minimum 5 rows and 15 plants/row  
Variety : Recommended of the region (most popular variety of the region)

### **Treatments**

- T1 : Farmer's practice (to be explained)
- T2 : Zero P ( control)
- T3 : 30 kg P<sub>2</sub>O<sub>5</sub>/ha
- T4 : 60 kg P<sub>2</sub>O<sub>5</sub>/ha
- T5 : 90 kg P<sub>2</sub>O<sub>5</sub>/ha
- T6 : 120 kg P<sub>2</sub>O<sub>5</sub>/ha
- T7 : Recommended dose of the region

### **Observations to be recorded:**

1. Farmers' practice must be defined and reported.
2. Soil fertility status of the experimental field before and after experiment (pH, soil texture, organic carbon, EC and available NPK).
3. Dry matter content and nutrient composition of manure.
4. Final emergence count.
5. Graded and total tuber number and yield (0-25g, 25-50g, 50-75g and >75g).
6. NPK uptake by tubers.
7. Economics of various treatments indicating the cost involved and the net gain (Rs/ha).

### **Note:**

1. P to be applied as DAP and balance N requirement to be met through urea.
2. In T2 to T7, recommended NK + FYM should be applied.

### **AGRON 5: ROLE OF BORON IN REDUCING TUBER CRACKING IN PROCESSING VARIETY KUFRI CHIPSONA-3 [Nodal Scientist-Dr Sanjay Rawal, CPRI RS, Modipuram]**

Locations	:	Bhubaneswar, Jalandhar, Modipuram, Gwalior, Kanpur and Patna
Design	:	RBD
Replications	:	4
Plot-size	:	Minimum 5 rows and 15 plants/row
Variety	:	Kufri Chipsona-3

### **Treatments (No FYM may be applied in all the treatments)**

- T1 : RDF of NPK only
- T2 : RDF of NPK+2.0 kg B/ha as soil application
- T3 : RDF of NPK+0.1% boric acid as foliar application at 40 DAP
- T4 : RDF of NPK+0.1% boric acid as foliar application in two equal splits at 40 and 60 DAP
- T5 : RDF of NPK + 0.1% boric acid as foliar application in three times at 40, 50 and 60 DAP.

### **Observations to be recorded:**

1. Soil fertility status of the experimental field before and after experiment (pH, soil texture, organic carbon, EC and available NPK and B).
2. Final emergence count.
3. Graded and total tuber (including cracked) number and yield (0-40g, 40-100g, 100-150g and >150g) per plot.
4. Number and yield of cracked tubers/plot. **(Only more than 1 cm long crack to be considered)**
5. Dry matter content of tubers (%) and tuber yield on dry weight basis (kg/ha)

6. Haulm yield on dry weight basis (kg/ha)
7. Economics of various treatments indicating the cost involved and the net gain (Rs/ha).

**Note:**

- a) B to be applied as sodium tetra borate. Amount to be calculated to supply 2 kg B/ha.
- b) Crop should be grown till full maturity.
- c) Do not use paper tags in soil samples.

**AGRON 6: EVALUATION OF POTATO - TRANSPLANTED ONION SEQUENCE.  
[Nodal Scientist- Dr Sanjib Kumar Das, BCKV, Kalyani]**

Locations	:	Faizabad, Patna and Kalyani
Design	:	RBD
Replications (Min.)	:	4
Plot-size (Min.)	:	Minimum 5 rows and 15 plants/row
Variety	:	Recommended and popular of the region.

Both the crops to be raised with the recommended package of practices.

**Treatments: combinations of planting and harvesting dates of potato**

Dates of planting	:	3 (optimum, 10 days before and 10 days after optimum)
Dates of harvesting	:	2 (80 and 90 days after planting)

**Onion is to be transplanted immediately after harvesting of potato.**

**Observations to be recorded:**

1. Final emergence (%) of both the crops.
2. Grade-wise yield of potato tubers (0-25g, 25-50g, 50-75g and >75g) and total yield of onion.
3. Dry matter content and nutrient composition of manure.
4. NPK uptake by potato and onion.
5. Economics of various treatments indicating the cost involved and the net gain (Rs/ha)

**Note:** Onion and potato will be raised under standard package of practices except for date of planting.

**AGRON. 7: DEVELOPMENT OF ORGANIC BASED FARMING SYSTEM FOR POTATO  
[Nodal Scientist-Dr AK Bhatia, CCSHAU, Hisar]**

Locations	:	Dholi, Faizabad, Gwalior, Hisar, Jorhat, Ooty, Pasighat and Srinagar
Design	:	RBD
Replications	:	4
Plot size	:	Gross : 4.8m x 4.0m Net : 3.6m x 3.6m
Cropping sequence	:	Paddy-Potato OR Maize-Potato [Any sequence as per importance for the region]
Varieties	:	Promising varieties of the region: K Khyati, K Garima, K Anand, K Pushkar, K Bahar, K Chipsona-3. [K Swarna, K Neelima, for Ooty only] Likewise recommended varieties of sequential crop

## Treatments

- T1 : Absolute control  
T2 : Inorganic practices standard technology  
T3 : Crop residue based compositing of available cheaper crop/weed residues (like NADEP method) + Crop residue incorporation (Main crop/catch/green manuring/bio-fumigation crop) + biofertilizer (*Azotobacter* and Phosphobacteria) + microbial culture to decompose crop residues  
T4 : T3 + FYM @ 25 t/ha  
T5 : T3 + Vermicompost 7.5 t/ha

## Observations to be recorded

1. Initial fertility status of the experimental plot (pH, organic carbon & available N, P and K) and fertility status at annual basis.
2. Crop emergence/growth parameters.
3. Yield attributes and yield i.e total, non-marketable and marketable (<25 g and >25 g) of potato and sequential crops.
4. Nutrient (NPK) removal by component crops and nutrient balance sheet.
5. Quality parameters of economic produce
6. Economics- variable cost, gross and net return and B:C ratio.
7. Diseases development.

## Notes

- Experiments are to be laid out on fixed plots. Organic farming system treatments are to be managed as per NPOP, Ministry of Commerce, GOI, guidelines.
- Quantity of organics/residues should be constant in treatments and recorded.
- Locally available organic inputs should be used to make organic farming economically feasible.
- Pest and diseases should be managed culturally or through approved chemicals for organic farming.

## AGRON. 8: POTASSIUM REQUIREMENT OF POTATO UNDER DIFFERENT IRRIGATION METHODS [Nodal Scientist-Dr Sunil Kumar Chongtham, SKDUA&T, Deesa]

Location	:	Deesa and Srinagar
Design	:	Split-Split Plot Design
Spacing	:	75 cm x 20 cm (paired row)
Replications	:	3 (three)
Plot size	:	Gross: 4.5 m x 4 m      Net : 3.6 m x 3.6 m
Variety	:	Kufri Pukhraj for Deesa; Kufri Giridhari for Srinagar

## Treatments

### Main plot: Irrigation methods

- M<sub>1</sub>: Drip irrigation  
M<sub>2</sub>: Furrow irrigation

### Sub-plot: KSB treatment

- K<sub>1</sub>: No treatment of KSB (Potassium solubilizing bacteria)  
K<sub>2</sub>: Treatment with KSB (tuber treatment)

**Sub-sub-plot: K levels**

	<b>Deesa</b>	<b>Srinagar</b>
S <sub>1</sub>	140 kg K <sub>2</sub> O/ha	75 kg K <sub>2</sub> O/ha
S <sub>2</sub>	210 kg K <sub>2</sub> O/ha	100 kg K <sub>2</sub> O/ha
S <sub>3</sub>	280 kg K <sub>2</sub> O/ha	125 kg K <sub>2</sub> O/ha
S <sub>4</sub>	350 kg K <sub>2</sub> O/ha	150 kg K <sub>2</sub> O/ha

**Observations to be recorded**

1. Initial fertility status of soil (pH, organic carbon, soil texture and available N, P and K).
2. Plant emergence at 30 days.
3. Plant height and number of shoots per plant at 50 days after planting.
4. Yield of tubers in each grade (0-25g, 25-50g, 50-75g and >75g).
5. Nutrient (NPK) removal and the effect on soil fertility behavior, pH, organic carbon, available N, P and K status of soil.
6. Dry matter content of tubers (%) and tuber yield on dry weight basis (kg/ha)
7. Haulm yield on dry weight basis (kg/ha)
8. Economics of various treatments indicating the cost involved and the net gain (Rs/ha).
9. Incidence of disease

**AGRON 9: EFFECT OF METHODS OF IRRIGATION THROUGH MICRO-SPRINKLERS AND DATE OF PLANTING ON POTATO VARIETY CV. KUFRI SURYA [Nodal Scientist-Dr AK Bhatia, CCSHAU, Hisar]**

Location	: Hisar
Design	: Split Plot
Replication	: 4 (Four)
Spacing (cm)	: 60 x 20
Variety	: Kufri Surya
Recommended dose of N: P: K (kg/ha)	: 150:50:100

**Treatments:****A. Main plot treatment**

Irrigation methods: Two

- i) Furrow irrigation (20 mm CPE)
- ii) Micro-sprinkler (100% of 10 mm CPE)

Crop duration: Two

- i) 75 days crop
- ii) 90 days crop

**B. Sub plot treatment**

Dates of planting

- |      |                            |
|------|----------------------------|
| :    | Four                       |
| i)   | 1 <sup>st</sup> September  |
| ii)  | 15 <sup>th</sup> September |
| iii) | 30 <sup>th</sup> September |
| iv)  | 15 <sup>th</sup> October   |

**Observations to be recorded:**

1. Soil fertility status of the experimental field before and after experiment (pH, soil texture, organic carbon, EC and available NPK).
2. Final emergence count.
3. Graded and total tuber number and yield (0-25g, 25-50g, 50-75g and >75g) per plot.
4. NPK uptake by potato.
5. Economics of various treatments indicating the cost involved and the net gain (Rs/ha).

**AGRON 10: PERFORMANCE OF POTATO CULTIVARS UNDER DRIP IRRIGATION**  
**[Nodal Scientist-Dr AK Bhatia, CCS HAU, Hisar]**

Location	:	Hisar
Design	:	RBD
Replication	:	4 (Four)
Spacing (cm)	:	60 x 20
Recommended dose of N: P: K (kg/ha)	:	150:50:100
Date of planting	:	20 <sup>th</sup> October
Varieties	:	Four

**Treatments:**

1. Crop duration: Two
  - i) 75 days crop
  - ii) 90 days crop
2. Varieties : Four

**Observations to be recorded:**

1. Soil fertility status of the experimental field before and after experiment (pH, soil texture, organic carbon, EC and available NPK).
2. Final emergence count.
3. Graded and total tuber number and yield (0-25g, 25-50g, 50-75g and >75g) per plot.
4. NPK uptake by potato.
5. Economics of various treatments indicating the cost involved and the net gain (Rs/ha).

**AGRON 11: EFFECT OF SPACING, FERTILITY LEVELS AND DATES OF HAULM CUTTING ON QUALITY SEED GRADE TUBER PRODUCTION OF POTATO [Nodal Scientist- Dr Sanjib Kumar Das, BCKV, Kalyani]**

Locations	:	Kalyani
Design	:	Split plot
Spacing	:	As per treatments
Replications	:	4 (Four)
Plot size	:	Gross: 4.8 m x 3.4 m Net : 3.6 m x 3.0 m
Variety	:	

**Treatments**

**A. Spacing- 2 levels**

- 60cm X 20cm
- 60cm X 15cm

**B. Fertility – 3 Levels**

- 100% RDF of NPK+ 0.1% boric acid as foliar application in three times at 40, 50 and 60 DAP
- 75% RDF of NPK+ 0.1% boric acid as foliar application in three times at 40, 50 and 60 DAP
- 50% RDF of NPK+ 0.1% boric acid as foliar application in three times at 40, 50 and 60 DAP

**C. Date of haulm cutting**

- 65 days after planting
- 75 days after planting

### Observations to be recorded

1. Initial fertility status of soil (pH, organic carbon, soil texture and available N, P and K).
2. Plant emergence at 30 DAP.
3. Plant height and number of shoots per plant at 50 days after planting.
4. Yield of tubers in each grade (0-25g, 25-50g, 50-75g and >75g).
5. Nutrient (NPK) removal and the effect on soil fertility behavior, pH, organic carbon, available N, P and K status of soil.
6. Haulm yield on dry weight basis (kg/ha) to be recorded at start of senescence
7. Economics of various treatments indicating the cost involved and the net gain (Rs/ha)

### AGRON 12: EFFECT OF PLANT GROWTH REGULATOR ON TUBER YIELD OF POTATO [Nodal Scientist- Dr Praveen Sharma, IGKV, Raipur]

Location : Raipur

#### Treatments:

#### A. Methods of PGR application,

1. M1 (Seed treatment) and
2. M2 (Spray treatment) and

#### B. Levels of plant growth regulators

1. T1 : (control) Plain water spray
2. T2 : (GA<sub>3</sub> 25 ppm)
3. T3 : (GA<sub>3</sub> 50 ppm)
4. T4 : (IBA 100 ppm) and
5. T5 : (IBA 200 ppm)PGR

Application of PGR by spraying to leaf at early (30 DAT) and late (60 DAT) stages.

**Variety:** Kufri Pukhraj, Kufri Khyati or Kufri Surya

### Observations to be recorded

1. Initial fertility status of soil (pH, organic carbon, soil texture and available N, P and K).
2. Plant emergence at 30 DAP.
3. Plant height and number of shoots per plant at 50 days after planting.
4. Yield of tubers in each grade (0-25g, 25-50g, 50-75g and >75g).
5. Nutrient (NPK) removal and the effect on soil fertility behavior, pH, organic carbon, available N, P and K status of soil.
6. Haulm yield on dry weight basis (kg/ha) to be recorded at start of senescence
7. Economics of various treatments indicating the cost involved and the net gain (Rs/ha)

### AGRON 13: STUDIES ON MULCHING IN POTATO UNDER RAINFED CONDITIONS. [Nodal Scientist- Dr Faheema Mushtaq, SKUAS&T, Srinagar]

Location : Srinagar

Design : RBD

#### Treatments:

1. Black polythene mulch
2. Transparent mulch

3. Silver color mulch
4. Pine needle mulch (10 t/ha)
5. Straw mulch (10 t/ha)
6. FYM as mulch (15 t/ha)
7. Control

**Observations to be recorded**

1. Initial fertility status of soil (pH, organic carbon, soil texture and available N, P and K).
2. Plant emergence at 30 DAP.
3. Plant height and number of shoots per plant at 50 days after planting.
4. Yield of tubers in each grade (0-25g, 25-50g, 50-75g and >75g).
5. Nutrient (NPK) removal and the effect on soil fertility behavior, pH, organic carbon, available N, P and K status of soil.
6. Halum yield on dry weight basis (kg/ha) to be recorded at start of senescence
7. Soil temperature (at 10 days interval)
8. Soil moisture content (at 10 days interval)
9. Economics of various treatments indicating the cost involved and the net gain (Rs/ha)

**AGRON. 14: VALIDATION OF QUEFTS MODEL [Nodal Scientist- Dr Jagdev Sharma, ICAR-CPRI, Shimla]**

Locations : Kanpur, Dhoil, Hisar, Kalyani, Modipuram, Jalandhar, Gwalior and Kota  
 Design : RBD  
 Replications : Four  
 Variety : Recommended for the region  
 Spacing : 60X20 cm  
 Plot size : Gross : 4.8 m x 3.4 m  
                   Net : 3.6 m x 3.0 m  
 Total plots : 6 x 4 = 24

**Treatments:**

- T1 : 100% NPK as per recommendation  
 T2 : 75% NPK as per recommendation  
 T3 : 125% NPK as per recommendation  
 T4 : 100% NPK as per QEFTS model  
 T5 : 75% NPK as per QEFTS model  
 T6 : 125% NPK as per QEFTS model

**Observations to be recorded:**

1. Initial and final fertility status (Soil pH, Organic carbon and available N, P & K).  
 (Soil samples of the experimental field should be collected and sent to Division of Crop Production, ICAR- CPRI at least by 15<sup>th</sup> July 2018 since the doses for T4 to T5 may be arrived only after soil analysis)
2. Plant emergence at 30 days.
3. Plant height, number of shoots & leaves/plant at 70 days after planting.
4. Total and graded tuber yields and numbers (0-25 g, 25-75 g and above 75 g).
5. Nutrient (N P K) removal by potato (Samples should be sent to ICAR-CPRI, Shimla after processing).
6. Economics.
7. Name of variety and recommended doses of NPK must be provided.

## CROP PROTECTION

### **PATHOLOGY**

**PATH.1: MONITORING OF LATE BLIGHT AND A2 MATING TYPE OF *PHYTOPHTHORA INFESTANS* IN STANDING CROP AND TUBERS AT HARVEST AND AFTER COLD STORAGE [Nodal Scientist-Dr Sanjeev Sharma, CPRI, Shimla].**

Locations: Dholi, Faizabad, Hassan\*, Jalandhar, Jorhat, Kalyani, Kanpur, Kota, Ootacamund, Pantnagar, Pasighat, Patna, Pune, Shillong and Srinagar.

**Experimental details:** Plant an area of 0.1 ha with Kufri Chandramukhi/Kufri Bahar or any other recommended late blight susceptible variety at three different dates at each center at an interval of 15 days (early, optimum and late). The crop is not to be sprayed with any fungicide.

**\* One planting date at optimum time.**

#### **Observations to be recorded**

1. Daily meteorological data of the year to be uploaded in INDO-BLIGHTCAST model for validation.
2. Date of first appearance of disease in the crop.
3. Disease severity of late blights in foliage and stem at 7, 14, 21 and 28 days after disease appearance (As per SOPs supplied).
4. Incidence of disease in tubers at harvest.
5. Incidence of disease in tubers after cold storage.
6. Send late blight inoculated/infected tuber samples to the Head, Division of Plant Protection, ICAR-CPRI, Shimla for determining A2 mating type.

**Important:** Tubers showing late blight infection at harvest may be discarded and only apparently healthy tubers sufficient to plant 0.3 ha next year to be cold stored.

**PATH.2: SURVEILLANCE OF IMPORTANT POTATO PESTS IN THE REGION (PEST CAPTURE PLOTS) [Nodal Scientist-Dr Ravinder Kumar, CPRI, Shimla]**

Locations: All centers (except Kufri and Ranichauri).

**Experimental details:** Plant two sets on an area of 10 m<sup>2</sup> in hills and 20 m<sup>2</sup> in plains of each variety. Use 4-5 commercial varieties of the region. One set is not to be sprayed with any pesticide. Another set may be sprayed against late blight or prevalent devastating pest of the area for allowing the crop to remain green till maturity so that appearance of other pests can be recorded. These plots are used to monitor the appearance of new disease or pest, if any, over the years. Besides, nearby areas should also be visited to record the incidence of pests and diseases.

#### **Observations to be recorded**

1. Incidence and intensity of diseases and insect pests (all foliar diseases/wilts/insect pests etc.) occurring on standing crop.
2. Incidence of soil and tuber borne diseases recorded at harvest.
3. Incidence of individual virus may be recorded. The infected leaf samples embedded in blotting sheets may be sent to Head, Plant Protection, ICAR-CPRI, Shimla. While recording the viruses the source of seed should be noted.
4. The common scab incidence should be separated as russet and pitted types.

**PATH.3: SCHEDULING OF FUNGICIDE APPLICATION FOR THE MANAGEMENT OF LATE BLIGHT**  
**[Nodal Scientist-Dr Sanjeev Sharma, CPRI, Shimla]**

Locations : Dholi, Faizabad, Hassan, Jalandhar, Kanpur, Kalyani, Pantnagar, Patna, Pune, Shillong and Srinagar.

Replications : 5 (Five)

Treatments

- T1\* : Prophylactic spray (just at the time of canopy closure) with mancozeb @ 0.25% followed by cymoxanil/dimethomorph/fenamidone + mancozeb @ 0.3% and one more spray with mancozeb @ 0.25%.
- T2 : Prophylactic spray (just at the time of canopy closure) with mancozeb @0.25% followed by ametoctradin+dimethomorph (0.2%) followed by one more spray with mancozeb.
- T3 : Prophylactic spray (just at the time of canopy closure) with mancozeb @0.25% followed by azoxystrobin + tebuconazol (0.1%) followed by one more spray with mancozeb.
- T4 : Control.

\* Choose best fungicide as per the recommendation for particular location

Varieties: Use one resistant and one susceptible variety of the region.

**Note:** If disease pressure is high, additional sprays may be given as per treatment to achieve the desired control and number of sprays may be communicated in the results.

**Observations to be recorded**

1. First appearance of late blight.
2. Further, disease build up (severity) at weekly intervals.
3. Yield t/ha.
4. Late blight in tubers (replication-wise no. of tubers and weight, percent incidence) at harvest.

**PATH.4: ORGANIC MANAGEMENT OF LATE BLIGHT USING COPPER COMPOUNDS**  
**[Nodal Scientist-Dr Sanjeev Sharma, CPRI, Shimla]**

Locations : Jorhat and Pasighat

Replications : 5 (Five)

Treatments

- T1\* : 10 nos of spray with copper oxychloride (Blitox 50 @0.2%) at 4 days interval starting from canopy closure (40 DAS)
- T2 : 10 nos of spray with copper hydroxide (Kocide @0.2%) at 4 days interval starting from canopy closure (40 DAS)
- T3 : 8 nos of spray with copper oxychloride (Blitox 50 @0.2%) at 5 days interval starting from canopy closure (40 DAS)
- T4 : 8 nos of spray with copper copper hydroxide (Kocide @0.2%) at 5 days interval starting from canopy closure (40 DAS)
- T5 : Control (Unsprayed)

Varieties: Use one resistant and one susceptible variety of the region.

**Note:** If disease pressure is high, additional sprays may be given as per treatment to achieve the desired control and number of sprays may be communicated in the results.

### Observations to be recorded

1. First appearance of late blight.
2. Further, disease build up (severity) at weekly intervals.
3. Yield t/ha.
4. Late blight in tubers (replication-wise no. of tubers and weight, percent incidence) at harvest.

### **PATH.5: STUDIES ON SEED DEGENERATION [Nodal Scientist-Dr Baswaraj Raigond,CPRI, Shimla]**

Locations : Deesa, Raipur, Hassan, Hisar, Kalyani, and Pune

Replications : 5

Design : RBD

Viruses : PLRV, PVY, PALCV, Mild and Severe Mosaic

Half acre is to be planted with breeder's seed of predominant variety of the region under low aphid periods following "Seed Plot Technique", whereas in another plot seed is to be produced without seed plot technique. The produce is to be cold stored and planted in next season. However, one plots to be planted with fresh breeder seed every year. Observations are to be recorded on degeneration. This is to be continued for 3-4 years as given below:

### Varieties

Deesa	:	Kufri Badshah, Kufri Khyati*
Raipur	:	Kufri Surya, Kufri Khyati
Hassan	:	Kufri Surya, Kufri Khyati
Hisar	:	Kufri Bahar, Kufri Khyati
Kalyani	:	Kufri Jyoti, Kufri Khyati
Pune	:	Kufri Surya, Kufri Khyati

\* Kufri Khyati is a common variety in all the locations for comparison.

### **Treatments**

- T1 : Fresh breeder seed every year. Cold store the produce  
T2 : Previous seed produce using seed plot techniques. Cold store the produce  
T3 : Previous seed produce without seed plot techniques. Cold store the produce

### Observations to be recorded

1. Initial source of seed should be same for all centers—virus free seed materials & seed with primary infection.
2. Plant emergence after 30 days and 40 days.
3. Experiments should be carried out without insecticides spray in all the centers.
4. Observation should be made uniformly at 45, 60 & 75 days after planting in all the centers visually and also through further confirmation using lab diagnostic techniques.
5. Sampling for virus testing – uniform number of random samples covering the whole plot should be tested in all the centers. Example: ten samples from each variety/each plot.

6. Information on other tuber borne pathogens and late blight incidence. Proper management practice for late blight incidence (Fungicide spray etc.,)
7. Information on temperature, rainfall and vector incidence (whiteflies, aphids and thrips etc) should be recorded in all the centers.
8. The rate of increase in virus incidence and reduction in yield should be compared with previous years i.e. results should be presented always in comparison to previous years and comparison should also be made between the AICRP centers.
9. The infected leaf samples embedded in blotting sheets may be sent to Head, Plant Protection, CPRI, Shimla.
10. Dates of planting/haulm cutting/harvest.

**PATH.6: DEMONSTRATION ON MANAGEMENT OF COMMON SCAB**  
**[Nodal Scientist-Dr Vinay Sagar, CPRI, Shimla]**

Locations	:	Kanpur
No. of demonstration	:	5
Design	:	RBD
Replications	:	Four (4)
Plot size	:	3m x 2m (5 rows of 10 tubers each)

**Treatments**

- T1 : Untreated diseased tubers (Control)  
T2 : Tuber dip treatment with 3% boric acid for 20 minutes before storage

**Varieties: Most common variety of the region**

**Note:** Common scab infected (adequately infected) tubers to be used in the experiment.

**Observations to be recorded**

1. Percent disease incidence (number of tubers infected by common scab).
2. Percent disease index (tuber surface area covered by common scab) following standard methods.

## ENTOMOLOGY

### **ENT 1.: MONITORING OF APHIDS, WHITEFLIES, THRIPS, HOPPERS AND MITES IN UNSPRAYED CROP [Nodal Scientist-Dr Md Abbas Shah CPRS, Jalandhar]**

Aphid species : *Myzus persicae* and *Aphis gossypii*  
Whiteflies : *Bemisia tabaci*  
Thrips : *Thrips palmi*  
Hoppers : *Empoasca devastans*  
Mites : *Polyphagotarsonemus latus*

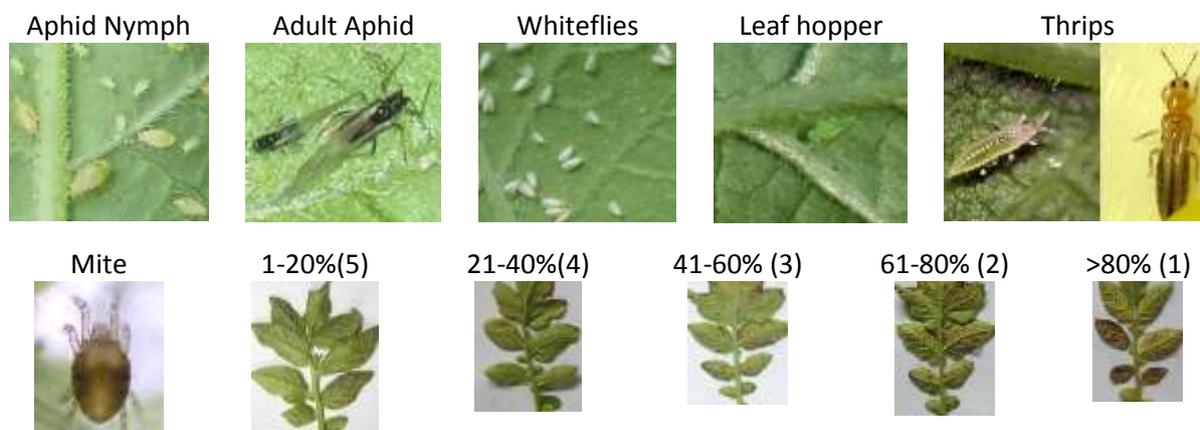
Locations : All AICRP centers (except Ranichauri)  
Plot size : 4.0 X 5.0 m<sup>2</sup> (6 plots)  
Variety : Recommended for the region

#### **Observations to be recorded**

1. Aphid population to be recorded per 100 compound leaves (top, middle and bottom leaves of 34 plants) at weekly intervals soon after plant emergence till harvest.
2. Whiteflies and leafhoppers populations may be counted on three fully expanded compound leaves (top, middle and bottom) per plant in 10 fixed plants in each plot at weekly intervals. Data on whiteflies may preferably be recorded in the early morning hours when the whitefly activity is very low.
3. Thrips population may be recorded and counted at weekly intervals by shaking 10 fixed (tagged) plants/plot so that the thrips fall onto sticky traps.
4. First appearance of mites and buildup of infestation over a period of time is to be recorded (Scale for mite damage is presented below).
5. Meteorological data to be recorded during crop period.
6. Incidence of viruses (no. of plants with viral symptoms/ total no. of plants observed).

#### **Note:**

Insect samples (aphids, whiteflies, leaf hoppers, thrips and mites) may be collected into cryo-vials containing 70% alcohol separately using fine camel hair brush (cryo-vials shall be provided). The vials may be packed carefully and sent to Head, Division Plant Protection, ICAR-CPRI, Shimla for their identification at species level and also to determine their viruliferous nature under intimation to Project Coordinator (Potato). The insect photographs are presented below for their visual identification. The observations on insect population at weekly intervals may be recorded as per standard week (Data sheet will be provided).



**Scale for rating mite infestation:** 5- Low infestation; 1- Severe infestation

**ENT 2: EFFICACY OF FLONICAMID AGAINST APHIDS**  
**[Nodal Scientist-Dr Kamlesh Malik, CPRS, Modipuram]**

Locations : All AICRP centres (except Kufri & Ranichauri)  
Replications : Five  
Plot size : 3 m X 2 m (5 rows of 10 tubers each)  
Design : RBD

**Treatments**

T1 : Control (no pesticide).  
T2 : Foliar sprays of imidacloprid@3ml/10lit + repeat at 7 days  
T3 : Single foliar spray of flonicamid@ 3gm/10 lits  
T4 : Foliar spray of flonicamid@ 3gm/10 lits + repeat at 15 days

**Observations to be recorded**

1. Date of planting should match with date of planting of seed crop
2. Spray the test chemical when number of aphids is more than 50 on 5 tagged plants
3. Observations will be taken on aphid numbers before the foliar spray and on mortality after 2<sup>nd</sup>, 4<sup>th</sup> and 6<sup>th</sup> day of the spray on 5 tagged plants (3 leaves lower, middle and upper)
4. Data will be collected on temperature and other abiotic factors
5. No other chemical except test chemical should be applied to the crop/soil

**ENT 3: MANAGEMENT OF HOPPERBURN IN WARMER AREAS**  
**[Nodal Scientist-Dr Kamlesh Malik, CPRS, Modipuram]**

Locations : Pune, Hassan, Raipur, Chhindwara, Deesa, Bhubaneshwar  
Replications : Five  
Plot size : 3 m X 2 m (5 rows of 10 tubers each)  
Design : RBD

**Treatments**

T1 : Control (no pesticide).  
T2 : Foliar sprays of oxydemeton methyl @2ml/lit + repeat at 7 days  
T3 : Foliar spray of thiamethoxam @ 2 gml/10 lits + repeat at 7 days  
T4 : Foliar spray of thiamethoxam @ 3 gml/10 lits + repeat at 7 days

**Observations to be recorded**

1. Spray the crop when leafhopper number is 1-2 adult/plant
2. Observations will be taken on leafhopper number before the foliar spray and on mortality after 24, 48 and 72 hrs of the spray on 5 tagged plants (3 leaves lower, middle and upper)
3. Data will be collected on temperature and other abiotic factors.
4. No othe chemical except test chemicals should be applied to the crop/soil.

**ENT 4: BIOLOGICAL CONTROL OF SOIL PESTS IN POTATO**  
**[Nodal Scientist-Dr Priyank Mahatre, CPRS, Ooty]**

Locations : Shillong and Ooty  
Design : RBD

Replications : Five  
Plot size : 4.0 m X 4.8 m (8 rows of 20 tubers each)  
Date of planting : Planting date recommended for the region  
Variety : Recommended variety of the area (Breeders' Seed)

### **Treatments**

T1 : Untreated control  
T2 : EPN formulation  
T3 : *Metarhizium anisopliae*  
T4 : Chlorpyrifos20EC@0.02% (standard control)

**Note:** Two applications in total crop period. First application at the time of sowing and second application during weeding time (30 days after sowing).

### **Observations to be recorded**

1. Incidences of healthy root grubs in different treatments at monthly intervals during trial period.
2. Percent tuber and plant damage due to white grubs and cutworms respectively in different treatments. Weight of infected tubers may be recorded.
3. Yield to be recorded in different treatments.

## **ENT 5: MANAGEMENT OF POTATO TUBER MOTH USING BIOLOGICAL CONTROL AGENTS IN STORES [Nodal Scientist-Dr Anuj Bhatnagar, CPRIC, Modipuram]**

Locations : Hassan, Pune and Ooty  
Design : CRD  
Replications : Five  
Plot size : 4.0 m X 4.8 m (8 rows of 20 tubers each)  
Variety : Recommended variety of the area  
Date of planting : Planting date recommended for the region  
Method : The tubers will be dipped in insecticidal solution for 20 minutes and shade dried before storage. These treated tubers will be kept in stores and observed for tuber moth infestation and damage (per cent) over a period of time.

### **Treatments**

T1 : Untreated control  
T2 : Dip treatment of tubers with neem oil @1%  
T3 : Dip treatment of tubers with neem oil @2%  
T4 : Dip treatment of tubers with Bt formulation @1%  
T5 : Dip treatment of tubers with Bt formulation @2%  
T6 : Dip treatment of tubers with CSR bio formulation

### **Observations to be recorded**

1. Tuber damage due to PTM larvae over a period of time to be recorded.
2. Meteorological data to be recorded.

**ALL INDIA COORDINATED RESEARCH PROJECT ON POTATO****35<sup>th</sup> GROUP MEETING OF AICRP (Potato)**

September 15-18, 2017

VENUE: BCKV, Kalyani, West Bengal

**PROGRAMME OF THE MEETING**

<b>SEPTEMBER 15, 2017</b>		
08.30-9.30 hrs	Registration	
<b>INAUGURATION SESSION</b>		
<b>President</b>	Dr DD Patra, Hon'ble VC, BCKV, Kalyani	
<b>Chief Guest</b>	Sh PK Majumdar, Advisor, CM, Govt. of West Bengal	
<b>Guests of honour</b>	Dr Tapas Mondal, Member of Parliament, West Bengal Dr T Janakiram, ADG, Horticultural Science, ICAR, New Delhi Dr Jurgen Kroschel, CIP, New Delhi Prof Sri Kumar Pal, Director Research, BCKV, Kalyani	
<b>Rapporteurs</b>	Dr Vinod Kumar (CPRI, Shimla)	
10.00 to 11.30 hrs	ICAR Song	
	Lighting the lamp	All dignitaries
	Welcome	Prof Sri Kumar Pal, Director Research, BCKV, Kalyani
	Introductory remarks	Dr SK Chakrabarti, Director & PC (Potato), ICAR-CPRI, Shimla
	Release of Publications	
	Best Center Award of AICRP (Potato)	
	Remarks of the Guests of Honour	Prof Sri Kumar Pal, Director Research, BCKV, Kalyani
		Dr Jurgen Kroschel, CIP, New Delhi
		Dr T Janakiram, ADG (HS), ICAR, New Delhi
		Dr Tapas Mondal, Member of Parliament, West Bengal
	Address by Chief Guest	Dr PK Majumdar, Advisor, CM, Govt. of West Bengal
	Presidential Address	Dr DD Patra, Hon'ble VC, BCKV, Kalyani
	Vote of Thanks	Dr VK Dua, Head, Crop Production, ICAR-CPRI, Shimla
	National Anthem	
High Tea		

<b>SEPTEMBER 16, 2017</b>		
<b>TECHNICAL SESSION I: ACTION TAKEN REPORT</b>		
<b>Chairman</b>	Dr T Janakiram, ADG, Horticultural Science, ICAR, New Delhi	
<b>Co-Chairman</b>	Dr Srikumar Pal, Director Research, BCKV, Kalyani	
<b>Rapporteurs</b>	Drs VK Gupta (CPRIRS, Modipuram Campus) and EP Venkatasalam (CPRS, Ooty)	
10.00 hrs	Action Taken Report	Dr Vinod Kumar
<b>TECHNICAL SESSION II: CROP IMPROVEMENT</b>		
<b>Chairman</b>	Dr PS Naik, Former Director, IIVR, Varanasi (UP)	
<b>Co-Chairman</b>	Dr Pranab Hajra, Dept. of Vegetable Crop, BCKV, Kalyani Dr Subrata Maity, Retd Professor, BCKV, Kalyani	
<b>Rapporteurs</b>	Drs Vinod Kumar (CPRI, Shimla) and VK Gupta (CPRIRS, Modipuram Campus)	
11.30-13.30 hrs	Summary presentation, Discussions and finalization of Technical Programme	Dr Vinay Bhardwaj, Actg Head, Crop Improvement
	Discussion of results and clarification of each center viz. Bhubaneswar, Chhindwara, Deesa, Dharwad, Dholi, Faizabad, Gwalior, Hassan, Hisar, Jalandhar, Jorhat, Kalyani, Kanpur, Kota, Modipuram, Ooty, Pantnagar, Pasighat, Patna, Pune, Raipur, Shilong, Srinagar	PI & Scientists from different AICRP centers
13.30-14.30 hrs	Lunch Break	
14.30 -16.00 hrs	Prsentation of hybrids propsed for release	Dr SK Luthra, Dr Vinay Bhardwaj, Dr SK Luthra, Dr VK Gupta, Dr Shambhu Kumar and Dr EP Venkatasalam
16.00-16.15 hrs	Tea Break	
16.15-19.00 hrs	Prsentation of hybrids propsed for release (continued)	
<b>SEPTEMBER 17, 2017</b>		
<b>TECHNICAL SESSION III: CROP PRODUCTION</b>		
<b>Chairman</b>	Dr PM Govindakrishnan, Former PC (Potato), ICAR-CPRI, Shimla	
<b>Co-Chairman</b>	Prof SK Mukhopadhaya, AICRP on Integrated farming system, BCKV, Kalyani Dr Shyam Sunder Mondal, Retd Professor, BCKV, Kalyani	
<b>Rapporteurs</b>	Dr Sanjay Rawal (CPRIRS, Modipuram Campus), Dr SP Singh (CPRS, Gwalior) and Dr RK Singh (CPRS, Patna)	
09.30-13.00 hrs	Summary presentation, Discussions and finalization of Technical Programme	Dr VK Dua, Head, Crop Production
	Discussion of results and clarification of each center viz. Bhubaneswar, Chhindwara, Deesa, Dharwad, Dholi, Faizabad, Gwalior, Hassan, Hisar, Jalandhar, Jorhat, Kalyani, Kanpur, Kota, Modipuram, Ooty, Pantnagar, Pasighat, Patna, Pune, Raipur, Shilong, Srinagar	PI & Scientists from different AICRP centers
11.00-11.15 hrs	Tea break	
11.15-13.00 hrs	Prsentation of technologies propsed for recommendation	Dr VK Dua, Head, Crop Production
13.00 hr	Lunch Break	

<b>TECHNICAL SESSION IV: CROP PROTECTION</b>		
<b>Chairman</b>	Dr BP Singh, Former Director, ICAR-CPRI, Shimla	
<b>Co-Chairman</b>	Prof A Basu, Head, Dept. of Plant Pathology, BCKV, Kalyani Dr S Roy, Head, ICAR-CPRS, Gwalior.	
<b>Rapporteurs</b>	Dr Kamlesh Malik (CPRIRS, Modipuram Campus), Dr RP Singh (Pantnagar) and Dr JK Patel (Deesa)	
14.00-16.00 hrs	Summary presentation, Discussions and finalization of Technical Programme	Dr Sanjeev Sharma, Actg. Head, Crop Protection
	Discussion of results and clarification of each center viz. Bhubaneswar, Chhindwara, Deesa, Dharwad, Dholi, Faizabad, Gwalior, Hassan, Hisar, Jalandhar, Jorhat, Kalyani, Kanpur, Kota, Modipuram, Ooty, Pantnagar, Pasighat, Patna, Pune, Raipur, Shilong, Srinagar	Scientists from different AICRP centers.
16.00-16.15 hrs	Tea break	
11.15-13.00 hrs	Prsentation of technologies propsed for recommendation	Dr Sanjeev Sharma, Actg. Head, Crop Protection
16.15-18.00	Discussions and finalization of Technical Programme of all disciplines	PI & Scientists from different AICRP centers
<b>SEPTEMBER 18, 2017</b>		
<b>TECHNICAL SESSION IV: PLENARY SESSION</b>		
<b>Chairman</b>	Dr Jitesh Hore, Dean, Horticulture, BCKV, Kalyani	
<b>Co-Chairman</b>	Dr Manoj Kumar, Joint Director, ICAR-CPRIRS, Modipuram Campus	
<b>Rapporteurs</b>	Dr's Sanjay Rawal and SK Luthra (ICAR-CPRIRS, Modipuram Campus)	
10.00 -11.30 hrs	Presentation of recommendations by the PI's of the respective sessions	
11.30 -12.30 hrs	Discussions and finalization of Proceedings.	
12.30-12.45 hrs	Concluding remarks by the Chairman & Co-Chairman	
12.50 hrs	Vote of thanks by Dr Vinod Kumar	
13.00 hrs	Lunch Break	

**ALL INDIA COORDINATED RESEARCH PROJECT ON POTATO****35<sup>th</sup> GROUP MEETING OF AICRP (Potato)**

September 15-18, 2017

VENUE: BCKV, Kalyani (West Bengal)

**LIST OF PARTICIPANTS**

Sl. No.	Name of Institute/ Organization	Name of participant	Designation
1.	Indian Council of Agricultural Research, New Delhi	1. Dr T Janakiram	Assistant Director General (Horticultural Science)
2.	Central Potato Research Institute, <b>SHIMLA</b> (HP)	2. Dr SK Chakrabarti	Director
		3. Dr VK Dua (PI)	Head, Crop Production
		4. Dr Vinay Bhardwaj (PI)	Actg. Head, Crop Improvement
		5. Dr Sanjeev Sharma (PI)	Actg. Head, Plant Protection
		6. Dr NK Pandey	Head, Social Sciences
		7. Dr RK Singh	Head, Seed Technology
		8. Mr Girish Thakur	Steno Gr-III, Crop Production
		3.	All India Coordinated Research Project on Potato [AICRP (Potato)], CPRI, <b>SHIMLA</b> (HP)
10. Mr Dharminder Verma	Assistant Chief Technical Officer		
11. Mrs Nirmala Chauhan	UDC		
12. Mr Sita Ram	Sr Technician		
4.	International Potato Center (CIP) SW&CA Region, New Delhi	13. Dr Jurgen Kroschel	Regional Leader
		14. Dr MS Kadian	Agronomist
5.	Central Potato Research Institute, Regional Station, <b>MODIPURAM CAMPUS</b> , (UP)	15. Dr Manoj Kumar	Joint Director
		16. Dr (Mrs) Kamlesh Malik	Principal Scientist
		17. Dr Name Singh	Principal Scientist
		18. Dr Sanjay Rawal	Principal Scientist
		19. Dr SK Luthra	Principal Scientist
		20. Dr VK Gupta	Principal Scientist
6.	Central Potato Research Station, <b>JALANDHAR</b> (Punjab)	21. Dr Raj Kumar	Actg. Head & Principal Scientist
		22. Dr Prince Kumar	Scientist (Veg Science)
		23. Dr Mohd Abbas Shah	Scientist
7.	Central Potato Research Station, <b>PATNA</b> (Bihar)	24. Dr Shambhu Kumar	Actg. Head & Principal Scientist
		25. Dr RK Singh	Sr Scientist
8.	Central Potato Research Station, <b>GWALIOR</b> (MP)	26. Dr Satyajit Roy	Head
		27. Dr SP Singh	PS, Agronomy
		28. Dr Murlidhar Sadawarti	Scientist (SS)
9.	Central Potato Research Station, <b>SHILLONG</b> (Meghalaya)	29. Dr Clarissa Challam	Actg. Head
		30. Sh Bapi Das	Scientist (Veg Science)
10.	Central Potato Research Station <b>OOTACAMUND</b> (Tamil Nadu)	31. Dr EP Venkataslam	Actg. Head

11.	Orissa University of Agriculture and Technology, <b>BHUBANESHWAR</b> (Odisha)	32. Dr Ashok Kumar Mishra	Potato Breeder
		33. Mr Debasis Ghosal	Junior Agronomist
12.	JNKVV Regional Agricultural Research Station, <b>CHHINDWARA</b> (MP)	34. Dr DN Nandekar	Senior Scientist
13.	Potato Research Station, Sardarkrushinagar Dantiwada Agriculture University, <b>DEESA</b> (Gujarat)	35. Dr RN Patel	Plant Breeder
		36. Dr Sunil Kumar Chongtham	Agronomist
		37. Sh JK Patel	Plant Pathologist
14.	University of Agricultural Sciences, <b>DHARWAD</b> (Karnataka)	38. Dr PR Dharmatti	Professor
		39. Dr Kushal	Assistant Professor
15.	Dr Rajendra Prasad Central Agricultural University, TCA Campus, <b>DHOLI</b> (Bihar)	40. Dr LM Yadav	Chief Scientist
		41. Dr DK Dewedi	Senior Scientist
		42. Dr Birendra Kumar	Senior Scientist
16.	ND University of Agriculture and Technology, <b>FAIZABAD</b> (UP)	43. Dr AP Singh	Scientist
		44. Dr Srivastava	Technical Assistant
17.	UHS, Bagalkot, Argil Research Station, <b>HASSAN</b> (Karnataka)	45. Dr H Amarananjundeswara	Associate Professor
		46. Dr PS Prasad	Associate Professor
18.	CCS Haryana Agricultural University, <b>HISAR</b> (Haryana)	47. Dr AK Bhatia	Professor
		48. Dr VPS Panghal	Scientist
19.	Assam Agricultural University <b>JORHAT</b> (Assam)	49. Dr PC Bhagawati	Principal Scientist
		50. Dr Md Zafar Ullah	Senior Scientist
		51. Dr Mitul Kumar Saikia	Senior Scientist
20.	BC Krishi Vishwa Vidyalaya <b>KALYANI</b> (West Bengal)	52. Dr Ashis Chakraborty	Associate Professor
		53. Dr Anirban Sarkar	Assistant Professor
		54. Dr Sanjib Kumar Das	Asstt. Professor (Agronomy)
21.	CSA University of Agriculture and Technology, <b>KANPUR</b> (UP)	55. Dr AK Dubey	Professor
		56. Dr Ramesh Singh	Assistant Professor
22.	Agriculture University, <b>KOTA</b> (Rajasthan)	57. Dr BL Nagar	Assistant Professor
23.	GB Pant University of Agriculture and Technology, <b>PANTNAGAR</b> (Uttarakhand)	58. Dr Manoj Raghav	Professor
		59. Dr RP Singh	Professor
		60. Dr Dhirender Singh	Professor
24.	College of Horticulture and Forestry, <b>PASIGHAT</b> under CAU, (Imphal)	61. Dr Pranabjyoti Sarma	Associate Professor
25.	NARP, Ganesh Khind, <b>PUNE</b> under MPKV (Rahuri)	62. Dr MR Deshmukh	Scientist
		63. Dr GM Bansode	Scientist
26.	IG Krishi Vishwavidhyalaya, <b>RAIPUR</b> (Chhattisgarh)	64. Dr PK Joshi	Principal Scientist
		65. Dr Pravin Kumar Sharma	Scientist
27.	GB Pant University of Agriculture and Technology (Hill Campus), <b>RANICHAURI</b> (Uttarakhand)	66. Dr Tej Pal Singh Bisht	Associate Professor
28.	SK University of Agricultural Sciences and Technology, <b>SRINAGAR</b> (J&K)	67. Dr Kouser Praveen	Associate Professor
		68. Dr MA Chattoo	Associate Professor
		69. Dr Faheema Mustaq	Potato Agronomist
30	<b>SPECIAL INVITEES</b>	70. Dr BP Singh	Former Director, CPRI, Shimla
		71. Dr PS Naik	Former Director, IIVR, Varanasi & Ex PC, Potato, CPRI, Shimla
		72. Dr PM Govindakrishnan	Former PC, Potato, CPRI, Shimla
31	<b>Representatives from private sector</b>	73. 8-10 representatives	