



# ICAR-Central Potato Research Institute

## Newsletter



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### Research Highlights

#### Kufri Chipsona IV: A better performer under aeroponics in hills

Refinement in various production technologies under aeroponics particularly on date of planting, method of planting and nutrient solution standardization are under process since 2012, to take round the year production of aeroponic minituber of important varieties under long day as well as short day conditions. Various planting dates for different varieties have been standardized. The exceptional behavior of variety Kufri Chipsona-IV was observed in relation to photoperiodism. Experiments were carried out with several varieties in different planting



Kufri Jyoti

Kufri Chipsona-III



Kufri Chipsona-IV

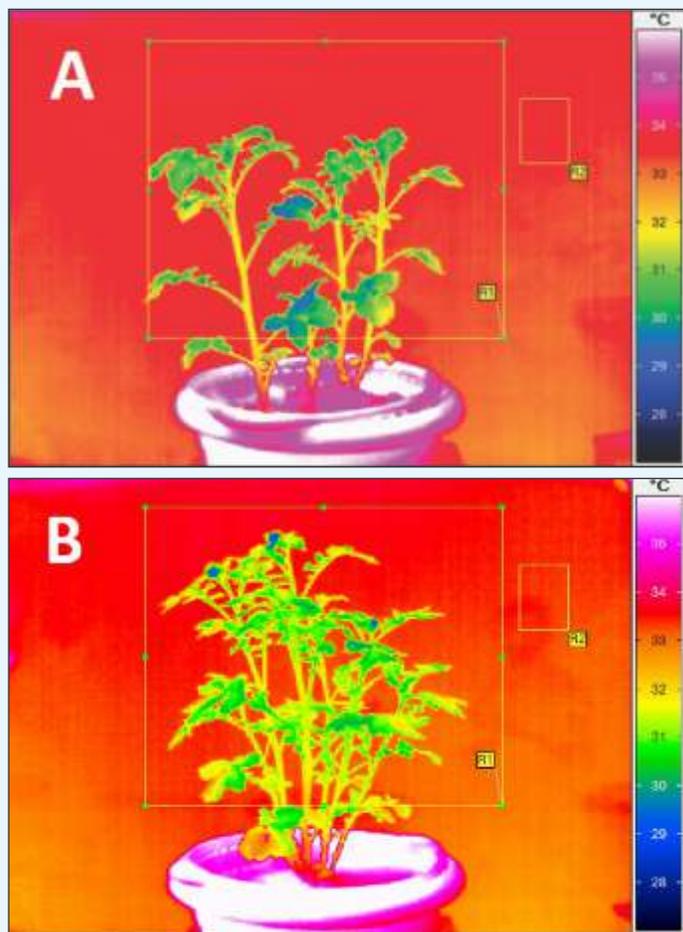
Varietal behaviour under aeroponics

dates during 2012-2015. Planting of four varieties viz., Kufri Bahar, Kufri Ashoka, Kufri Chipsona-IV and Kufri Jyoti in between Jan-Mid February 2014 have shown maximum survival of Kufri Chipsona-4 (84.2%) in comparison to other test varieties. The maximum minituber production per plant was obtained in Kufri Chipsona-4 (36) with average wt. of 3.45 g. Remaining three varieties did not perform well and developed long, thick succulent stolon with leaf primordia. During February 2015 planting, there was 100% microplant establishment in Kufri Chipsona-IV, where 45 tubers/plant were harvested with 2.14 g/tuber weight. Mid-March planting resulted almost negligible tuberization in Kufri Jyoti, Kufri Chipsona-3 and Kufri Girdhari. Long day variety (Kufri Girdhari) and day neutral variety (Kufri Jyoti) also did not tuberize. The tall indeterminate vegetative growth and long thick stolon status was same in all varieties except Kufri Chipsona-IV in mid-March planting whereas, during September planting, also Chip-IV performed well with 33 minitubers/plant. The average number of minituber production in Kufri Chipsona-4 was significantly high in both the planting date in comparison to the remaining test varieties. Considering the rooting behaviour, vegetative growth, crop canopy and yield performance during summer season under long day conditions, Kufri Chipsona-IV may be considered as a day neutral and photo insensitive variety for hill aeroponic.

Tanuja Buckseth, RK Singh & SK Chakrabarti

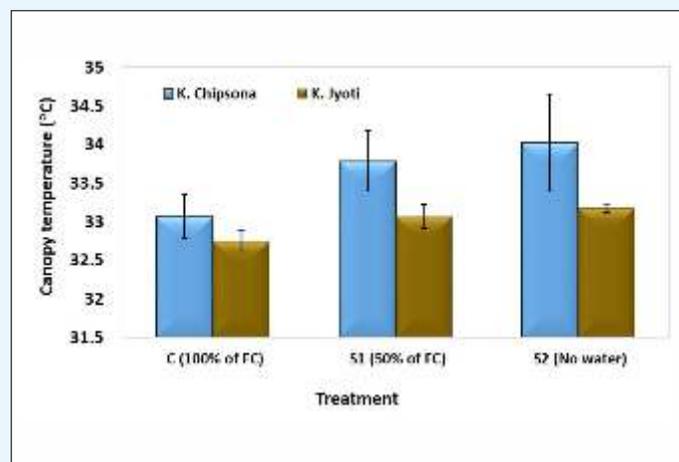
## Canopy temperature: a reliable water deficit stress indicator in potato

Canopy temperature indicates the actual energy released by a plant. Analyzed by infrared imaging, canopy temperature provides information on water status, water use and level of stress condition of a plant. As water status of plant is reduced, the correlation between canopy temperature and plant water status becomes stronger. Relatively lower canopy temperature in drought stressed crop plants show a relatively better ability of maintaining plant water status by various plant adaptations. The present work on analysis of canopy temperature in potato under water deficit stress has been undertaken at ICAR-NIASM, Baramati (MH) using Plant Phenomics facility. The infrared camera VarioCAM® High Definition was used for capturing IR images of the plants. IRBIS®3 analysis software used for analysis



IR images of K. Jyoti (A) and K. Chipsona (B).

of thermographic image data and for comfortably drafting thermographic reports. Canopy temperature can be a much more reliable indicator to determine



Canopy temperature under water deficit stress

water deficit stress. Two potato genotypes K. Jyoti (drought tolerant) and K. Chipsona-3 (drought susceptible) were subjected to water deficit stress i.e. control (100% of Field Capacity), S1 (50% of FC) and S2 (No water). Canopy temperature was analysed using Infrared (IR) imaging. Canopy temperature was found to be increasing as intensity of water deficit stress increased in both genotypes. It was observed that canopy temperature was significantly higher in K. Chipsona-3 as compared to K. Jyoti genotype. It suggests that K. Jyoti genotype has the ability to keep canopy temperature lower under severe drought stress. Thus, this parameter will be helpful in screening/identifying the drought tolerant potato genotypes.

- Sushil S. Changan, Brajesh Singh, Jagadish Rane, Som Dutt, Pinky Raigond, Mahesh Kumar, Anant Mali & Vidyadhar Konde

## Consumers' preferences for potato variety attributes in Shimla, HP

Despite being the most popular vegetable consumed in India, little is known about consumers' preferences for potato variety attributes. Attributes like taste, color, texture, aroma, etc. play an important role in consumers' decision for purchasing fresh potato in the market.

Knowledge on consumer preferences helps farmers to decide which varieties to be grown that will simultaneously satisfy their preferences as well as the preferences of consumers/traders. It is evident that even after the release of many varieties in India, farmers still continue to adopt local varieties or very



Consumers' preferences for potato attributes in Shimla

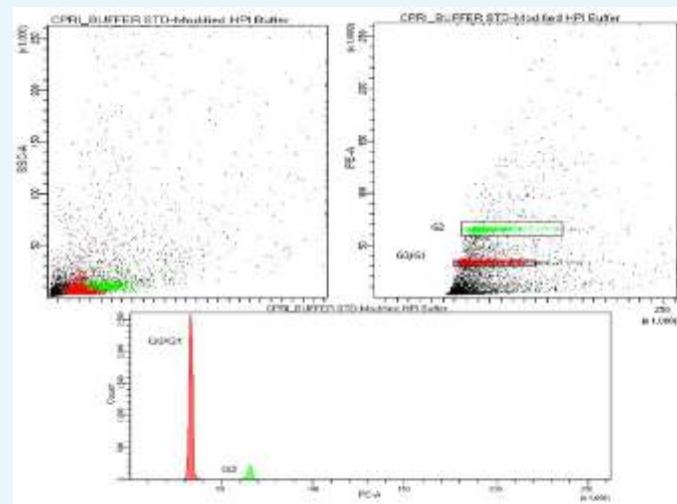
old improved varieties because of, *inter alia*, higher market demands. Therefore, the knowledge of consumers' preferences for potato variety attributes is very important for researchers in developing new potato varieties and for ensuring remunerative prices for the farmers.

This study aimed to investigate consumers' preferences by interviewing 55 potato consumers of Shimla district by asking them to rate the importance of each attribute (11 in total) while purchasing fresh potato on a five point continuum Likert type scale [from very important (score=5) to not important (score=1)]. The ranking of selected attributes was done based on weighted mean score (WMS). The study revealed that taste (WMS=4.67) stood as the most important attribute for consumers' potato purchase decisions, which was subsequently followed by tuber size (4.58) and skin color (4.4). Based on WMS, the ranks of attributes in order of importance were: taste > tuber size > skin color > aroma > cooking time > texture > shape > skin smoothness > shelf life > flesh color > eye's depth. The findings of the study may be helpful for breeders in their breeding programme as well as farmers in selection of potato varieties.

P Kharumnuid, NK Pandey,  
Dhiraj K Singh & Shilpa Attri

## Development of modified and rapid protocol for estimation of DNA content and ploidy analysis in potato

Understanding the ploidy level and 2C DNA content in the potato clones has prime importance. We have developed and tested the protocol for determining the ploidy level and 2C DNA content of potato by testing various nuclei isolation buffers with modifications to the available methodologies. Our results clearly showed that modified HPI buffer is the most suitable buffer followed by modified Galbraith's buffer for FACS analysis of potato leaf samples.



Dot plot showing the FSC-A Vs SSC-A for KG tested with the modified HPI buffer. B. G0/G1 and G2 population plotted on the dot plot of PE-W Vs PE-A. C. Histograms showing the G0/G1 and G2 peak

Hemant Kardile, Nirmal Kant Sharma,  
Vinay Bhardwaj & SK Chakrabarti

## Transfer of Technology

### ICAR-CPRI organized first ever National Potato Day

ICAR-Central Potato Research Institute organized a one day-long "National Potato Day" on February 15, 2018 at ICAR-CPRI, Regional Station, Modipuram, Meerut (UP). The purpose of this event was to disseminate awareness for increasing consumption and popularizing nutritional values of potatoes. Potato Recipe Competition, Kisan Goshthi, Krishi Pradarshani and Prize distribution ceremony were the main highlights of the event. Shri Rajendra Aggarwal, MP, Meerut-Hapur Lok Sabha was the Chief Guest in the inaugural session. The Chief Guest praised the constant efforts and contribution of the

Central Potato Research Institute in development of potato technology resulting into phenomenal increase in its production. The "Potato Recipe Competition" was one of the main attraction on the National Potato Day, in which about 100 participants from 17 institutions presented various dishes made from potato in five categories. About 26 public and private organizations displayed their latest technology and information in the exhibition stalls.



### Training program on scientific potato cultivation

A three days training programme on "Scientific potato cultivation" was organized for 16 potato growers of Nainital district, Dehradun during 15<sup>th</sup> - 17<sup>th</sup> March, 2018 at Shimla. The training programme was sponsored by Agricultural Produce Market Committee (APMC), Nainital. Different aspects of potato cultivation like planting, irrigation, insects and diseases management, nutrient management, post-harvest management, etc. were delivered to the



trainees by the expert scientists from the institute. Lecture-cum-discussion, video shows, demonstrations, practical exercises, field and lab visit, etc. were the modes for imparting training to the participants. Trainees were provided with certificates.

### Farmers' training program on scientific potato cultivation and diseases management

ICAR-CPRI, Shimla organized a three days training programme on "Potato seed production and plant protection" during 21<sup>st</sup>-23<sup>rd</sup> March, 2018.



The training was sponsored by ATMA, Begusarai, Bihar in which 19 progressive potato farmers from Begusarai district, Bihar participated. In this training programme, different aspects of potato seed production like planting, irrigation, insect and disease pest management, nutrient management, etc. were imparted to the trainees by the scientists of the institute. A variety of training methods, viz., lecture, discussion, video shows, practical exercises, field and lab visits, etc. were used during the training.

### Live broadcast on the occasion of Kisan Unnati Mela 2018

live broadcast of the speech of Honorable Prime Minister was arranged on the occasion Kisan Unnati Mela 2018 (16-18 March, 2018) at CPRS, Modipuram. On 17<sup>th</sup> March, 2018, Professor Gaya Prasad, Vice Chancellor, Sardar Vallabh Bhai Patel University of Agriculture and Technology, Meerut was the Chief Guest. On this occasion, about 400 farmers and students participated in the program. All the queries of the farmers on different aspects of crop production were satisfactorily answered by the scientists of the station.



### ICAR-CPRI Shimla participated in *Kisan mela* at Darlaghat

ICAR-CPRI Shimla participated and put up an exhibition stall during *Kisan mela* at Darlaghat on January 16, 2018 organised by Ambuja Cement Foundation. Various technologies of the institute like live sample of potato varieties, processed products, True Potato Seeds (TPS), minitubers from net house, microtubers from aeroponic system, virus testing kits, etc. were displayed during the exhibition. A large number of farmers, scientists, students, companies, NGO members and other stakeholders visited the CPRI stall and they were made aware about various technologies of the institute. The visitors were also provided with technical bulletins, folders, etc free of cost.



### Live Phone-in Programme at Doordarshan

Scientists from ICAR-CPRI, Shimla participated in the Live-phone programmes on different subjects on Doordarshan from Jan. to March, 2018. The details of the topics along with experts are given below.

Month	Topics	Name of the Expert
January	Potato varieties, sowing and fertilizer management in higher hills of Himachal Pradesh.	Dr. Rajesh Kumar Singh Dr. Vinod Kumar
February	Potato cultivation, harvesting and storage in lower hills of Himachal Pradesh.	Dr. Brajesh Singh Dr. Jagdev Sharma
March	Management of potato diseases and pests in mid-hills of Himachal Pradesh	Dr. Ravinder Kumar Dr. Aarti Bairwa

### Important Meetings, Events & Visitors

#### Rajbhashan Hindi Workshop organized at ICAR-Central Potato Research Institute, Shimla

4<sup>th</sup> quarterly workshop of Rajbhasha Hindi was organized at ICAR-CPRI, Shimla for skilled supporting staff on 14 March, 2018. This workshop was organized on the topic “Rajbhasha ka Prayog evam Rojmarra Karyon men Istemaal Hone wale Hindi Proformas ko Bharneka Abhayaas” with the aim to promote the usage of Rajbhasha Hindi among the skilled staff in their day to day official work. Mr. Praveen Chandla, Ex-Assistant Director, (Official Language), ICAR-CPRI, Shimla was the Chief Speaker on this occasion. Director, ICAR-CPRI, Shimla welcomed the all the participants and thanked Mr. Praveen Chandla for accepting the invitation of being Chief Speaker.



Mr. Praveen Chandla in his lecture focused on different Rajbhashaniyam, adhiniyam to let the participants be educated of these niyam, adhiniyam besides difficulties in use thereof in day to day official work. He also provided hands on training to the participants in filling the different proformas being used in day to day disposal of government duties, form which participants got immense benefit.

At the end participants were honoured with award of certificate of participation in the workshop. Mr. Chandla expressed his thanks to the Director, ICAR-CPRI, Shimla for inviting him as Chief Speaker. In continuation, Dr. Rakesh Mani Sharma, Incharge (Official Language) thanked Mr. Praveen Chandla and the participants for their active participation. In *toto* this workshop was a grand success in imparting knowledge of Rajbhasha niyam, adhiniyam and developing interest among the skilled supporting staff in use thereof.

## Human Resource

### Scientific Promotions

1. Dr. Babita Chaudhary, Senior Scientist, ICAR-CPRI, Regional Station, Modipuram promoted to the next higher grade of PS (RGP Rs. 10,000/-) under CAS w.e.f. 30.12.2016
2. Dr.(Ms.) Dalamu, Scientist (RGP Rs. 6,000), ICAR-CPRI, Shimla promoted to the next higher grade of Scientist (RGP Rs. 7,000/-) under CAS w.e.f. 27.04.2015
3. Dr. Ravinder Kumar, Scientist (RGP Rs.6,000), ICAR-CPRI, Shimla promoted to the next higher grade of Scientist (RGP Rs. 7,000/-) under CAS w.e.f. 02.05.2015
4. Dr. (Mrs.) Ratna Preeti Kaur, Scientist (RGP Rs.6,000), ICAR-CPRI, Regional Station, Jalandhar promoted to the next higher grade of Scientist (RGP Rs. 7,000/-) under CAS w.e.f. 15.12.2015
5. Dr. (Ms.) Aarti Bairwa, Scientist (RGP Rs.6,000), ICAR-CPRI, Shimla promoted to the next higher grade of Scientist (RGP Rs. 7,000/-) under CAS w.e.f. 01.01.2017

6. Dr. Raj Kumar Singh, Sr. Scientist (RGP Rs.8,000), ICAR-CPRI, Regional Station, Patna promoted to the next higher grade of Sr. Scientist (RGP Rs. 9,000) under CAS w.e.f. 23.10.2015
7. Dr. Jagesh Kumar Tiwari, Scientist, ICAR-CPRI, Shimla promoted to the next higher grade of Sr. Scientist (RGP Rs. 8,000/-) under CAS w.e.f. 07.01.2017

### Technical Promotions

1. Sh. Vinod Kumar, Tech. Officer, ICAR-CPRI, Shimla promoted to Sr. Tech. Officer w.e.f. 14.07.2016
2. Sh. Yogesh, Tech. Officer, ICAR-CPRI, Shimla promoted to Sr. Tech. Officer w.e.f. 01.02.2007 (on review)
3. Sh. Udaivir Singh, Tech. Officer, ICAR-CPRI, Regional Station, Modipuram, promoted to Sr. Tech. Officer w.e.f. 16.02.2017
4. Dr. Rakesh Mani Sharma, ACTO, ICAR-CPRI, Shimla promoted to Chief Tech. Officer w.e.f. 17.03.2017

### Transfers

1. Sh. Syed Danish Abbas Rizvi, Tech. Asstt. ICAR-CPRI, Regional Station, Patna transferred to ICAR-CPRI, Regional Station,, Modipuram

### Retirement

1. Sh. Vinod Gir, Technician, ICAR-CPRI, Regional Station, Patna, took VRS on 01.01.2018
2. Sh. Parkash Ram, Tractor Driver, ICAR-CPRI, Regional Station, Gwalior compulsory retired on 16.01.2018
3. Sh. Bosterwill Langestiech, Sr. Tech. Asstt, ICAR-CPRI, Regional Station, Shillong retired on 28.02.2018

### Administrative Grant of MACP Benefit

1. Sh. Ramesh Kumar Gupta, UDC, ICAR-CPRI, Regional Station, Patna, granted 2nd MACP w.e.f 12.03.2017 (on review)
2. Sh. Sukh Pal Sharma, Asstt. ICAR-CPRI, Regional Station, Jalandhar, granted 3rd MACP

w.e.f. 31.10.2017

3. Sh. Jagdish Chand, Asstt. ICAR-CPRI, Shimla, granted 3rd MACP w.e.f. 28.10.2017
4. Sh. Tej Singh, UDC, ICAR-CPRI, Shimla, granted 2nd MACP w.e.f. 16.09.2017
5. Sh. Rakesh Negi, LDC, ICAR-CPRI, Shimla, granted 2nd MACP w.e.f. 18.10.2017
6. Sh. Raghubir Singh, LDC, ICAR-CPRI, Shimla, granted 2nd MACP w.e.f. 19.11.2017
7. Sh. Naresh Kumar, LDC, ICAR-CPRI, Regional Station, Jalandhar, granted 2nd MACP w.e.f. 27.12.2010

### Skilled Supporting Staff

#### Grant of MACP Benefit

1. Sh. Tapan Burman, SSS, ICAR-CPRI, Regional Station, Patna, granted 3rd MACP w.e.f. 10.03.2017
2. Sh. Roshan Lal, SSS, ICAR-CPRI, Shimla, granted 3rd MACP w.e.f. 17.11.2017
3. Sh. Kanhiya Prasad, SSS, ICAR-CPRI, Shimla, granted 3rd MACP w.e.f. 27.11.2017
4. Sh. Bir Bahadur, SSS, ICAR-CPRI, Shimla, granted 3rd MACP w.e.f. 27.11.2017
5. Sh. Sita Ram, SSS, ICAR-CPRI, Regional Station, Kufri, granted 1st MACP w.e.f. 19.07.2017
6. Sh. Madan Lal, SSS, ICAR-CPRI, Regional Station, Kufri, granted 1st MACP w.e.f. 19.07.2017
7. Sh. Jia Lal, SSS, ICAR-CPRI, Regional Station, Kufri, granted 1st MACP w.e.f. 19.07.2017
8. Sh. Roop Singh, SSS, ICAR-CPRI, Regional Station, Kufri, granted 1st MACP w.e.f. 19.07.2017
9. Sh. Hira Singh, SSS, ICAR-CPRI, Shimla, granted 1st MACP w.e.f. 20.07.2017
10. Sh. Mani Ram, SSS, ICAR-CPRI, Regional Station, Modipuram, granted 1st MACP w.e.f. 21.07.2017
11. Sh. Raj Pal, SSS, ICAR-CPRI, Regional Station, Modipuram, granted 1st MACP w.e.f. 22.07.2017

12. Sh. Parsu Ram, SSS, ICAR-CPRI, Regional Station, Gwalior, granted 1st MACP w.e.f. 24.07.2017
13. Sh. Bharat Singh, SSS, ICAR-CPRI, Regional Station, Gwalior, granted 1st MACP w.e.f. 24.07.2017
14. Sh. Punjab Singh, SSS, ICAR-CPRI, Regional Station, Gwalior, granted 1st MACP w.e.f. 24.07.2017
15. Sh. Ram Prakash, SSS, ICAR-CPRI, Regional Station, Gwalior, granted 1st MACP w.e.f. 24.07.2017
16. Sh. Manu Singh, SSS, ICAR-CPRI, Regional Station, Gwalior, granted 1st MACP w.e.f. 24.07.2017
17. Sh. J. Bhojan, SSS, ICAR-CPRI, Regional Station, Muthorai, granted 1st MACP w.e.f. 25.07.2017
18. Smt. S. Pankjam, SSS, ICAR-CPRI, Regional Station, Muthorai, granted 1st MACP w.e.f. 25.07.2017
19. Sh. K. Ramasamy, SSS, ICAR-CPRI, Regional Station, Muthorai, granted 1st MACP w.e.f. 25.07.2017
20. Sh. Bishnu Rai, SSS, ICAR-CPRI, Regional Station, Patna, granted 1st MACP w.e.f. 27.07.2017
21. Sh. Ram Nath, SSS, ICAR-CPRI, Regional Station, Jalandhar, granted 1st MACP w.e.f. 03.08.2017
22. Sh. Jagnan Nath, SSS, ICAR-CPRI, Regional Station, Jalandhar, granted 1st MACP w.e.f. 03.08.2017

#### Retirement

1. Sh. Mangtey, SSS, ICAR-CPRI, Regional Station, Modipuram, retired on 31.01.2018
2. Sh. Ram Rattan, SSS, ICAR-CPRI, Regional Station, Gwalior, retired on 31.01.2018
3. Sh. Khem Chand, SSS, ICAR-CPRI, Shimla, retired on 28.02.2018
4. Sh. Ramji Lal, SSS, ICAR-CPRI, Regional Station, Gwalior, retired on 28.02.2018
5. Ms. Niranjana Kaur, SSS, ICAR-CPRI, Regional Station, Jalandhar, retired on 28.02.2018



# Message

Imbalanced use of fertilizers overtime not only degrades soil health but also causes environmental pollution. Due to imbalanced use of fertilizers yield of many crops including potato has stagnated over time. Maximizing input use efficiency will enhance the soil productivity in a sustainable manner from the limited non-renewable natural resources with minimal adverse impact on soil health and environment. In order to make right fertilizer applications, a field specific soil health report is required. In this direction Government of India has initiated Soil Health Card (SHC) scheme promoted by the Department of Agriculture and Co-operation



under the Ministry of Agriculture and Farmers' Welfare. Soil Health card (SHC) is a printed report card issued to farmers in once in three years indicating the status of their soils. For issuing soil health cards, soil samples are taken after harvesting of crop respectively or when there is no standing crop in the field. Soil health card is a field-specific detailed report of soil fertility status which includes soil pH (acidity / alkalinity of the soil), EC (dissolved salts in soil), organic carbon, and status of primary secondary and micronutrients and other important soil parameters that affect crop productivity. It includes advice regarding soil fertility, dosage of fertilizer application in crops and information on soil amendments needed for a particular field. SHC is field-specific detailed report of soil fertility status and other important soil parameters that affect crop productivity. Promotion of integrated nutrient system is expected to reduce the consumption of chemical fertilizers by about 20% thereby easing the fiscal strain on government since fertiliser sector accounts for a significant percentage of the total subsidies and power consumption in the country. SHC is issued once in a cycle of 3 years and will be able to record the changes in the soil health over a period of time that are affected by land management. SHC will ensure that farmers do not spend money unnecessarily on purchase of fertilizers by adding more than what is required. The Institute is regularly collecting soil samples from farmers' fields in this director for achieving judicious use of fertilizers.

**Complied and edited by :** Brajesh Singh, Ravinder Kumar, Pynbianglang Kharumnuid, Aarti Bairwa & Rakesh Mani Sharma

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