

IEC Component

Capacity Building

Hands-on training on machines



ICAR-Agricultural Technology Application Research Institute
Zone-I, PAU Campus, Ludhiana-141004, Punjab

IEC Component

Capacity Building

Hands-on training on machines



**ICAR-Agricultural Technology Application Research Institute (ATARI)
PAU Campus, Ludhiana-141004**

Citation : Singh, R., Mahal, J.S., Rana, R.K., Kumar, A., Murai, A.S., Sadawarti, K. and Dhaliwal, P.S. (2019) Capacity Building: Hands-on training on machines. ICAR-ATARI, Ludhiana, Punjab, India. P 1-40.

Guidance : Dr. Baldev Singh Dhillon, VC, PAU, Ludhiana
Dr. A.K. Singh, DDG (Agri. Ext.), ICAR, New Delhi

Published by : Director
ICAR-Agricultural Technology Application Research Institute
Zone-I, PAU Campus, Ludhiana-141004
0161-2401018, 2401092
Email: atari.ludhiana@icar.gov.in, zcu1ldh@gmail.com
Website: www.atari.licar.res.in

Compiled and Edited by : Rajbir Singh
Jaskaran Singh Mahal
Rajesh Kumar Rana
Arvind Kumar
Ashish Santosh Murai
Kanav Sadawarti
Parteek Singh Dhaliwal

Year of Publication : 2019

Printed at : Printing Service Company
3801/1, Pritam Nagar, Model Town, Ludhiana-141001
Ph: 0161-2410896, 09888021624
Email: decentpublish@gmail.com

IEC activities of Central Sector Scheme on “Promotion of Agricultural Mechanization for *In-situ* Management of Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi” are funded by DAC&FW, New Delhi



त्रिलोचन महापात्र, पीएच.डी.

एफ एन ए, एफ एन ए एस सी, एफ एन ए ए एस

सचिव एवं महानिदेशक

TRILOCHAN MOHAPATRA, Ph.D.

FNA, FNAsc, FNAAS

SECRETARY & DIRECTOR GENERAL

भारत सरकार
कृषि अनुसंधान और शिक्षा विभाग एवं
भारतीय कृषि अनुसंधान परिषद
कृषि एवं किसान कल्याण मंत्रालय, कृषि भवन, नई दिल्ली-110 001

GOVERNMENT OF INDIA
DEPARTMENT OF AGRICULTURAL RESEARCH & EDUCATION
AND

INDIAN COUNCIL OF AGRICULTURAL RESEARCH
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
KRISHI BHAVAN, NEW DELHI-110 001

Tel.: 233822629; 23386711 Fax: 91-11-23384773

E-mail: dg.icar@nic.in

FOREWORD

Paddy residue burning is posing a serious threat to the environment and deleting nutrients from the soil. There are many solutions available but recycling the residue in soil seems to be the most promising way towards sustainability of the eco-system. Considering the huge volume of crop residue, machines have a vital role to play for effective *in-situ* management of paddy residues. Therefore, skill development of farmers and machine operators is the most important requirement not only for the effective use of machines but also for effective mulching on the surface. Hands-on training of these machines will not only build confidence among the stakeholders but will also help in using these machines to their fullest capacity.

The Central Sector Scheme on “Promotion of Agricultural Mechanization for *In-situ* Management of Crop Residue in the State of Punjab, Haryana, Uttar Pradesh and NCT of Delhi” has capacity development as an integral part. Krishi Vigyan Kendras (KVKs) of Punjab organized skill development programs on machines for residue management involving farmers, rural youth, tractor operators, owners of CHCs etc. Imparting training on machine operation was instrumental in making this scheme successful. These training programs were very useful for trainees in getting acquainted to the use of machines and knowing various aspects of machine operation, calibration, maintenance and handy tips.

ICAR-ATARI, Ludhiana has published a document “Capacity Building: Hands-on Training on Machines” which covers the details of specially customized capacity development programmes organized by the KVKs of Punjab. I appreciate the Team KVK and ATARI for accomplishing given targets and also for compiling the information in a lucid manner. The document clearly depicts the efforts of the KVKs and would be a ready reference on activities organized under the Information, Education and Communication (IEC) component of the Central Sector Scheme.


T. Mohapatra

PREFACE

In-situ management of crop residues through machines is the most practical way towards handling enormous volume of residue in a short period. Machines like happy seeder, zero-till drill, roto-drill, chopper, mulcher etc. are very effective but need capacity development of every stakeholder for effective management of residues. Therefore, ICAR-ATARI, Ludhiana has taken lead and organized Training of Trainers in association with Department of Farm Machinery and Power Engineering (DoFM&PE), PAU, Ludhiana, which is pioneer in developing the machines and has all the necessary expertise and experience in managing crop residues. This has helped not only in updating the knowledge of the participants but also developed a common understanding on KVK's role while implementing the Central Sector Scheme. In turn, KVKs trained groups of farmers and machines operators on aspects like operating machines, their calibration, maintenance, etc. At the same time, participants were motivated to encourage other farmers to adopt improved technologies for *in-situ* residue management.

ICAR-ATARI, Ludhiana has published this document to recognize the efforts taken by the KVKs of Punjab and all other stakeholders in popularizing *in-situ* residue management. We are grateful to Dr. T. Mohapatra, Secretary DARE & DG, ICAR for his constant motivation, encouragement and monitoring. We are also thankful to Dr. B.S. Dhillon, VC, PAU, Ludhiana for his unconditional support and motivation. We express our heartfelt gratitude to Dr. A.K. Singh, DDG (Extn.) and Dr. K. Alagusundaram, DDG (Engg.) for their guidance and support while implementing the project. We would like to thank Sh. Ashwani Kumar, JS (M&T) and Sh. Arvind Meshram, DC (M&T), DAC&FW, New Delhi for providing funds and guidance under the scheme. We are also thankful to Dr. V. P. Chahal, ADG (Extn.) and Dr. K. K. Singh, ADG (Engg.), ICAR for their assistance and support. Besides, we also thank DoFM&PE, PAU, Ludhiana for their technical and logistic support.

We congratulate the KVKs to meet all the targets and accomplish objectives of the trainings. We realize and appreciate the support of the scientists and staff of ICAR-ATARI, Ludhiana while implementing the project and bringing out this publication. We appreciate the contributions of farmers, societies, custom hiring centres, media personnel and everyone who have directly or indirectly helped us in successfully implementing the scheme.

Authors

Preamble

It is estimated that approximately 20 million tons of paddy crop residue is produced every year in the state of Punjab. This crop residue can be used for animal feeding, soil mulching, bio-manuring, fuel for industrial use etc., thus the crop residue has tremendous value for farmers. However; unfortunately, 15-17 million tons of the residue is burnt on farm to clear the field for the succeeding crop. Therefore, residue management has emerged as a challenge to the sustainability of the contemporary agriculture in Punjab. Convincing farmers through field days, result demonstrations and farmer to farmer cross learning are effective pathways towards mass scale adoption of residue management technologies. However, capacity building of farmers through trainings on machines, their calibration, maintenance and remedies if any problem arises are essential for effective functioning of machines for residue management.

Dr. T. Mohapatra, Secretary, DARE & DG, ICAR has time and again expressed that skill up-gradation of farmers and machine operators is fundamental for effective *in-situ* residue management. It will not only ensure the timely operation and efficiency in machine usage but also the confidence building of farmers with respect to the technology. Thus, Krishi Vigyan Kendras (KVKs) of Punjab organized training programs for the farmers and machine operators on the management of crop residue in general and operating machines in particular. Moreover, they were made aware about the multi-benefits of combo technology of Super Straw Management System (Super-SMS) and Happy Seeder and other optional machines for *in-situ* residue management. The trainings helped the participants in getting acquainted to the improved machines and knowing various aspects of machine operation and maintenance. In the states of Punjab, as many as 226 training courses were organized by the KVKs till February 2019 in which 7313 farmers were imparted hand-on training to operate machines.

These trainings for farmers covered topics such as basic information about the machines, their effective usage in the field, their maintenance, tips for efficient use of machines, do's and don'ts etc. Hands-on training was an integral part of the trainings as the farmers were to use residue management machines practically in the field. Farmers posed numerous questions about use and effectiveness of these machines, which were thoroughly answered by the trained KVK scientists to their satisfaction. These trainings specifically focused on removing all kinds of doubts from the minds of farmers since they would be further expected to train their peers.

KVK Scientists brace-up for *in-situ* residue management

ICAR-ATARI, Ludhiana has developed several literatures for the ready reference of KVK Scientists and farmers. One such publication was “Manual on Happy Seeder”, which was in English, Hindi and Punjabi languages to know the details of the Happy Seeder machine. This



was supported with “Evidences from Ground Zero: Up-Scaling of Happy Seeder Technology”, which is the compilation of results of demonstrations conducted by the KVKs in Punjab on wheat sown with Happy Seeder. Similarly, the booklet “*Praali ka machino dwara prabhand*” in

both Hindi and Punjabi was specially meant for distribution among farmers to popularize various technological options available for management of crop residues. Pamphlets were also prepared on the highlights of Central Sector Scheme on residue management for the benefit of the farmers. These publications were distributed among KVK Scientists for their information as well as for multiplication and distribution among the stakeholders.

A capacity building programme on “*In-situ* paddy residue management through machinery” in collaboration with Agricultural Technology Application Research Institute (ICAR-ATARI), Ludhiana was organized by the Department of Farm Machinery and Power Engineering, PAU, Ludhiana. The training was meant to technically empower scientists of *Krishi Vigyan Kendras* (KVKs) from Punjab, Haryana and Uttar Pradesh regarding the technical know-how of the effective technologies of residue management for the implementation of centrally sponsored scheme “Promotion of Agricultural Mechanization for *In-situ* Management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi”. During these trainings, live operations of the machines were shown and visits to the machine manufacturers have also been organized.

Department of Farm Machinery and Power Engineering, PAU, Ludhiana is the seat of development of machines of crop residue management; therefore, the Department was purposefully selected as the venue for conducting these training. Further, the department has all the necessary machines, expertise and experience for conducting live demonstrations and trainings on residue management.

Training for KVK scientists of Haryana

The training for KVKs of Haryana was organized during 6-7 August 2018. During the training, Dr. Jaskaran Singh Mahal, Director Extension Education, PAU, Ludhiana mentioned about the problem of residue burning and urgency shown by the central government in curbing it. He also gave a brief review of the efforts of research system in developing effective technologies and their regular improvement. He urged KVK scientists



to clear all their doubts during the training about use of machines and provisions in the project and share their learnings from the field with fellow participants.

Dr. Rajbir Singh, Director, ICAR-ATARI, Ludhiana said “KVK scientists have been working relentlessly to aware farmers and other stakeholders about the ill-effects of residue burning. Now, the support from central government for the cause will give huge boost to the movement started by the KVKs and would yield better results.” Similarly, Dr. Gursahib Singh Manes, Former Head, expressed his concerns about the residue management in paddy-wheat cropping system and asked the participants to keep in constant touch with the research system by providing timely feedback. Likewise, Dr. Manjeet Singh, Head DoFMPE, PAU, Ludhiana assured the participants of all the technical support and back stopping needed for handling the machines of residue management. He gave details about the training which would impart knowledge and skills through lectures, hands-on-training, visits to custom hiring centres etc.

Training for KVK scientists of Uttar Pradesh

A capacity building programme for the scientists of *Krishi Vigyan Kendras* (KVKs) from Uttar Pradesh was organized during August 9-10, 2018. While interacting with the participants, Dr. Jaskaran Singh Mahal, Director Extension Education, PAU, Ludhiana, highlighted the concept of “in-situ residue management” and urged every participant not to leave any doubt in their minds about the technologies of residue management. He also motivated participants to team up with respective stakeholders for successful implementation of the scheme and achieving desired results. Er. Manmohan Kalia, Joint Director (Agricultural Engineering), State Dept. of Agriculture and Farmers Welfare, Punjab, shared his experiences of convincing farmers about adopting resource conservation technologies. He encouraged the participants to



develop enough self-confidence through this training so as to build the same confidence in the field among farmers and other stakeholder.

Dr. Rajbir Singh, Director, ICAR-ATARI, Ludhiana talked about the importance of convergence while successfully implementing schemes and transforming the way agriculture is progressing. He emphasized the significance of KVKs at the grass-root level in practicing and developing sustainable agricultural systems. Further, Dr. Gursahib Singh Manes, Former Head emphasized the importance of training while performing an activity and invited participants to pose as many questions as possible for effective learning and sharing. Dr. Manjeet Singh, Head DoFMPE, PAU, Ludhiana encouraged the participants to share their experiences from the field and contribute to the shared learning that the training is going to provide. He also shared the details of the training to add to the knowledge and skills of the participants through lectures, hands-on-training, visits to custom hiring centres etc.

Training for KVK scientists of Punjab

The training on “*In-situ* paddy residue management through machinery” for the scientists of Krishi Vigyan Kendras (KVKs) of Punjab was organized during 13-14 August 2018. Dr. Jaskaran Singh Mahal, Director Extension Education, PAU, Ludhiana, emphasized “*in-situ* residue management” for the sustainability of agriculture in the state and motivated participants to act in coordination with all the stakeholders to meet the stated objectives of the scheme. He invited all the doubts that any participant may have to be clarified before proceeding in to the field.

Dr. Harish Verma, DEE, GADVASU, Ludhiana, talked about the need of adopting resource conservation technologies in the states agriculture. He encouraged participants to work with a missionary zeal while dealing with farming community to obtain desired results. He also



mentioned about the use of crop residue in animal feed and shelter management.

Dr. Rajbir Singh, Director, ICAR-ATARI, Ludhiana talked about changing the course of agricultural development through climate resilient and sustainable practices. He highlighted some of the salient achievements that KVKs have accomplished and expressed his self-belief in KVK scientists to

pull off given task in stipulate time frame. Similarly, Dr. Gursahib Singh Manes, Former Head emphasized the role of capacity building in updating knowledge and skills field extension workers. He also highlighted significance of interaction between field level scientists and scientists of research system for effectively serving the farming community. Dr. Manjeet Singh, Head DoFMPE, PAU, Ludhiana shared the details of the training programme viz. lectures, hands-on-training, industrial visit etc. and urged everyone to actively participate. He assured constant technical backstopping to the KVKs for the success of the scheme on residue management.

Outcomes:

- 1) Capacity development of KVK scientists on all the available technological options of *in-situ* crop residue management.
- 2) All the participants developed a common understanding on their and KVK's role and expectations out of them while implementing the project.
- 3) The participants got equipped with necessary literature for their reference and to answer all the queries raised by the farmers and other stakeholders.
- 4) KVK Scientists got resolved all their doubts about the operation, maintenance, storage and use of machineries.
- 5) All the participants got motivated to put an end to the practice of residue burning in their respective districts.

Efforts of KVK for capacity building in Amritsar district

Krishi Vigyan Kendra, Amritsar organized various training programs on crop residue management in which different issues and topics were dealt with such as sowing wheat with happy seeder and its benefits. Five day training programs on Crop Residue Management were conducted in adopted villages in district Amritsar in which 125 farmers participated. The first program was held at the premises of KVK during 24-28 August 2018. Five farmers from each adopted village participated in the program and they motivated other farmers from their respective villages to participate in such training programs. The second training program was conducted at KVK Amritsar for the farmers of village Mallu Nangal during 24- 28 September 2018 and demonstrations were organized in village Mallu Nangal for the benefit of entire village. The next program was held during 8-12 October 2018 for the farmers of village Miglani Kot. The demonstration of machineries was again held at the village Miglani Kot. Next training program was organized at village Kotli Sakian wali during 15-22 October 2018, while the last training program was organized at village Ranaewali from 29 October to 2 November 2018.

The programs were held to demonstrate to the farmers about the effective methods of crop residue management with minimum damage to the environment and saving of soil nutrients. These villages are adjoining to each other and are growing Basmati variety PB-1121 and were incorporating straw with partial burning and dry mixing in the soil. The cost of cultivation of these operations was much more and they were willing and impressed with the technologies



shared which resulted in considerable cost reduction with limited operations. In the training program, experts from the KVK imparted training to the farmers and demonstrated various technologies. Dr. Raminder Kaur discussed with farmers regarding crop residue management in an effective manner. Farmers were appraised about machinery, implements and equipment like happy seeder, chopper, mulcher, super SMS for combine harvesters, bailer technology, biogas plants, bricks from paddy straw etc, and were given live demonstrations of the machineries being used for this purpose. Farmers were encouraged to not only stop the practice of straw burning, but were also told to extend knowledge gained during trainings to the fellow farmers. Major emphasis was given to harvest the crop with Combine Harvester fitted with Super Straw Management System (SMS), which initially cuts the crop into small pieces and other operations can be performed easily in the field. In these villages, most of the crop was harvested manually and the paddy straw is being used for fodder. Dr. Sukhjinderjit Singh told the farmers about better utilization of paddy straw as a fodder for dairy animals by different additions to increase its nutritive value. Farmers were provided relevant literature regarding better management of straw. Farmers felt very delighted and enthusiastic at the end of trainings. Dr. Bhupinder Singh Dhillon thanked farmers for their full cooperation during the training and for assurance by the farmers to follow instructions of the scientists and government to shun the practice of stubble burning. Farmers attended the training at Amritsar where they were familiarized with machines like Happy Seeder and Super-SMS. All the participating farmers took pledge that in future, they will not burn straw in fields.



(Contributors: Raminder Kaur Hundal, B S Dhillon, Astha & Parvinder Singh)

Efforts of KVK for capacity building in Barnala district

KVK, Barnala organized a total of 7 trainings on *In-situ* Crop Residue Management in which 173 participants took part. The first 5 days training was conducted during 29.8.2018-5.09.2018 for the farmers of village Wahegurupura. The second training was organized during 26.09.2018 to 3.10.2018 for the farmers of village Rureke Kalan and the third one was for the farmers of village Rureke Khurd during 9.10.2018 -15.10.2018. One day trainings were also organized for extension functionaries of district Barnala and for the farmers at village Wahegurupura. In these trainings, participants were trained for *in-situ* paddy straw management on practical aspects as well as hands-on-training on machinery at Department of Farm Machinery and Power Engineering, PAU, Ludhiana. Literature related to crop residue management were distributed and T-shirts and bags (with slogans on paddy straw management printed) were also given to the trainees and other farmers.

During these trainings, farmers were administered oath on not to burn crop residue in open fields. Dr. Parhalad Singh Tanwar, Program coordinator, urged farmers not to burn crop residue and made aware the participants about new scheme declared by government for panchayats and farmers who do not wish to burn their crop residue. He persuaded farmers to use the innovations which are recommended by the university. Dr. Surendra Singh demonstrated the machines in training programmes which are used for crop residue management and encouraged the farmers using them and not to burn paddy straw. He also mentioned about the steps and precaution to be taken care while using the machines. Farmers were motivated to use the machines and get acquainted with them.



(Contributors: P.S. Tanwar, Surinder Singh, Kamaldeep Singh, Harjot Singh & Khushvir Singh)

Efforts of KVK for capacity building in Bathinda district

Krishi Vigyan Kendra, Bathinda organized total 21 trainings on crop residue management. Out of these, five trainings were of five days duration. The remaining 16 were of short duration (one day). Five days duration trainings were conducted in villages named *Kothe Ratherian, Bath, Poohla* and *Jaid*. One such training was also organized at *Krishi Vigyan Kendra, Bathinda* from 15/10/2018 to 19/10/2018. Total 125 numbers of people got benefitted through these trainings (each training consisting 25 trainees). Out of 16 short duration (one day) trainings three were conducted at *KVK Bathinda*, three at *Jaid*, two at *Mehraj*, three at *Poohla*, three at *Bath* and two at *Kothe Ratherian*. More than 400 farmers attended and gained valuable knowledge through these short duration trainings. Various machineries pertaining to rice residue management were demonstrated and their operations were well explained to the end users.

The trainees were facilitated with training kits along with supporting and relevant literature. The trainees were encouraged to adopt eco-friendly methods of *in-situ* crop residue management. Experts from KVK explained in detail about the ill-effects of paddy residue burning on health and environment. They also made the trainees aware of various methods of paddy residue management. Machinery like happy seeder, rotavator, chopper cum spreader, mulcher, zero till drill, disc harrows etc. were also demonstrated to the trainees. For motivation of the trainees, progressive farmers who are already managing crop residue especially paddy straw for few years were also invited in the trainings.



In-situ Management of Crop Residues

During the trainings, the main emphasis was to popularize the happy seeder technology among the fellow farmers. The farmers were sensitized about the ill effects of burning crop residues and motivated for in-situ management of paddy straw. Dr. J.S. Brar, Program Coordinator gave a brief overview of activities of KVK in training programmes. He also explained about the ill effects of burning of wheat and paddy straw and benefits of in-situ crop residue management. He requested farmers to adopt the PAU recommended innovations and technologies to manage the wheat and paddy straw. Dr. A.P.S. Dhaliwal persuaded farmers to engage in diverse agriculture and allied sector occupations like dairying, poultry, piggery and goat farming. He also urged farmers to come out of rice-wheat crop rotation and adopt subsidiary occupations to increase farm income.

Dr. G.S. Dhillon informed the farmers about the benefits of adopting happy seeder technology like less weed infestation, lesser cost of cultivation and timely sowing of wheat crop after paddy harvesting. He also shared the result of FLDs on wheat crop sown with happy seeder. Dr. Amandeep Kaur further sensitized the farmers about the need for soil testing and sampling procedures and cultivation practices for summer vegetables and many more lectures in different issues and topics were dealt in regarding *in-situ* crop residue management. The farmers assured that they will not burn the wheat and paddy straw and will incorporate the straw residue in the field itself. Farmers were familiarized with the machines of *in-situ* crop residue.



(Contributors: J.S. Brar, G.S. Dhillon & Parkash Singh Sidhu)

Efforts of KVK for capacity building in Faridkot district

Krishi Vigyan Kendra Faridkot organised training for the farmers on machineries for *in-situ* crop residue management under the project “Promotion of Agricultural Technologies for *in-situ* crop residue management”. Participants from different villages of the district participated. During the inaugural session of training, Dr Jagdish Grover, Associate Director (Trg) KVK Faridkot apprised the participants about the functioning of KVK. He laid emphasis on vocational courses being organized by KVK for rural youth. He acquainted the trainees with various technologies which are available for *in-situ* crop residue management. Dr Rakesh Kumar (Assoc. Prof. Agril Engg) discussed about all the possible combinations available for straw management among the participants, like harvesting of paddy with combine with SMS and then sowing of wheat with Happy Seeder. If farmers intend to sow vegetable after paddy, he should harvest paddy with combine with SMS, then incorporate the straw using reversible MB plough, followed by rotavator, followed by sowing of vegetable. If farmers have time between sowing of wheat and harvesting of paddy, then wet mixing technologies were also shared among the participants. Dr Gurdarshan Singh, Assistant Professor (Horticulture) shared information about the use of paddy straw for cultivation of mushroom and other uses like straw mulching in orchards and for protection of fruits plants and vegetables during winter. Dr. Sukhwinder Singh, Assistant Professor (Soil Sci.) urged the farmers that incorporating the straw into soil not only helps in reducing the pollution but improves the soil health, if practised for longer period. He also briefed about the nutrient and monetary losses and due to burning of straw. Dr Sukhwinder also discussed in detail the methods of making phospho compost and bio char. Dr Gurlal Singh Gill, Assistant Professor (Animal Science) shared his views on the use of straw as animal feed and other uses like bedding for animals etc. Dr Rajwinder Kaur, Assistant Professor (Plant Protection) shared her views regarding



In-situ Management of Crop Residues

management of rats in fields. On the last day, all the possible machineries were exhibited during exposure visit to Dhaliwal Agro Industries at village Tehna. During the concluding session, Dr Jagdish Grover responded to the queries of participants and thanked them for sparing their precious time in making this program a successful one. Total number of trainings were 4 and 125 participants.



(Contributors: Jagdish Grover, Rakesh Kumar, Gurdarshan Singh & Sh Dharamjit Singh)

Efforts of KVK for capacity building in Fatehgarh Sahib district

Krishi Vigyan Kendra, Fatehgarh Sahib conducted five one day training programmes for the farmers of the adopted villages namely Noganwan, Kalondi, Ganduan Kalan and Thabla as well as for the district level extension functionaries under the CRM project during the months of July and August. A total of 127 participants were trained about different technologies of paddy residue management. During the months of August and September, five training programmes of five day duration each were organized by KVK in the adopted villages as well as at KVK. A total of 150 farmers participated in the training programmes. Similarly, four farmer-scientist interfaces were also organized in Sirhind, Badhoushi Kalan and Thabla villages in which 420 farmers participated and discussed various issues related to paddy straw management techniques. During these programmes, the importance of paddy residue as bio-resource to improve physical, chemical and biological properties of the soil was discussed in details. Scientists from Department of Farm Machinery & Power Engineering (FM&PE), PAU practically explained the use of various machineries like happy seeder, SMS combine and chopper to manage crop- residue which can be adopted by the farmers to manage paddy straw. Demonstrations on paddy straw management machinery i.e. happy seeder, mulcher and reversible plough were also given during this training programme. The apprehensions and various issues raised by the farmers in adopting various technologies were discussed in details and the farmers were motivated to use the technology and discontinue with the practice of



In-situ Management of Crop Residues

paddy straw burning. KVK scientists discussed the use of paddy straw for animal and cultivation of mushrooms in detail. PAU recommended practices on rodent control in happy seeder sown wheat were also discussed during the training programmes.

During the trainings, Dr. Vipin Rampal briefed about various activities of the KVK and urged the farmers not to burn their crop residue. Dr Arvindpreet Kaur, Assistant Professor explained the farmers about the different options available for in-situ management of paddy straw. She further explained about the scheme being started by the central government for the management of paddy straw in his lecture. Likewise, Dr. Manisha Bhatia explained about adverse effects of burning of wheat and paddy straw on the insects as well as human beings. Moreover, the importance of green manuring for the improvement of soil health was also explained to the participant farmers. Dr. Ajay Singh discussed the use of urea treated paddy straw for the feeding to dairy animals. Many progressive farmers shared their experiences about the sowing of wheat crop with happy seeder. Extension literature developed by the KVK regarding paddy straw management was also distributed to the participants of training programme.



(Contributors: Reet Verma, Arvindpreet Kaur, Manisha Bhatia, Ajay Singh Godara & Vipin Kumar Rampal)

Efforts of KVK for capacity building in Fazilka district

A five day farmer's training programme on in-situ crop residue management was conducted by Krishi Vigyan Kendra, Fazilka during 11-15 September 2018. In this training program, 25 farmers from adopted village Dharanghwala and surrounding villages have taken part. Topics like CRM machinery, methodology, increase in soil fertility, information about availability of CRM machinery and alternate uses of paddy straw have been taken up. Dr. Manpreet Singh, Scientist, PAU; Dr. Jagdish Arora, Distt. Extension Specialist; Dr. Rajbir Kaur, Scientist, PAU and Dr. Monga, Ex. Director RRS, PAU, Abohar were among the guest lecturers during this training. During the programme, Dr. R. K. Singh Director, ICAR-CIPHET, Ludhiana urged the farmers to completely stop the straw burning and to plough the straw in soil to increase in soil fertility.

A Farmers-scientist Interaction Meet in Village Kera Khera was conducted by Krishi Vigyan Kendra, ICAR-CIPHET on 29 August 2018. In this programme, Dr. Vinod Saharan (CTO& PC, KVK), Dr. Jagdish Arora, Dr. Rajvir Kaur Scientist PAU, Dr. Harpreet Kaur APPO (Block Abohar), Sh. Vijay Singh (Agril. Development Officer), Sh. Vijay Pal (Agril. Development Officer), Sh. Rajesh Kumar and Sh. Prithvi Raj and 200 farmers participated. Dr. Vinod Saharan discussed in detail about *in-situ* crop residue management to the farmers and told not to burn paddy residue. Dr. Jagdish Arora discussed detail package of practices of paddy crop and quality parameters of the export quality of rice. Dr. Rajbir Kaur discussed disadvantages of crop residue burning and how to manage crop residue in the field. Dr. Vijay Singh discussed



***In-situ* Management of Crop Residues**

about cotton crop diseases and their management. Dr. Harpreet Kaur discussed about different schemes in detail that are being run by Govt. for the farmers.

One such programme was organized in Village Dharanghwala on 1 September 2018. In this programme, Dr. Rajbir Singh, Director, ICAR-ATARI, Ludhiana in his address urged the farmers to take benefit of government schemes on in-situ crop residue management and to stop straw burning to save the environment. He also urged progressive farmers of area to be an icon in the field of *in-situ* crop residue management. Dr. Vinod Saharan, Dr. Jagdish Arora, Dr. Manpreet, Sh. Vijay Singh, Sh. Vijay Pal and Sh Prithvi Raj and 250 farmers participated in the programme. An exhibition of in-situ crop residue management (Combine harvester with SMS, Happy Seeder etc.) implements were also organised.

An interaction meet in Village Mammu Khera was conducted on 24 October 2018. In this programme, Dr. Ramesh Kumar urged the farmers to take benefit of Govt, schemes on IN-SITU Crop Residue Management. Dr. Sunil Kumar, Dr. Vinod Saharan Dr. Ajinath Dukare, Dr. Pankaj Kumar Kannaujia, Dr. Jagdish Arora, Sh. Vijay Singh, Sh. Nageen Kumar, Sh. Rajesh Kumar and Sh Prithvi Raj and 200 farmers participated. Dr. Ajinath Dukare and Dr. Pankaj Kannaujia discussed the method of decomposition of paddy straw and its uses in vegetable mulching.



(Contributors: Vinod Saharan)

Efforts of KVK for capacity building in Ferozpur district

Krishi Vigyan Kendra, Ferozpur organized five trainings of five days each for farmers and stakeholders on crop residue management under the project, “Promotion of Agricultural Mechanization for *In-Situ* Management of Crop Residue in Punjab”. All five trainings had a participation of 25 farmers each. These trainings took place in various adopted villages such as Bukkan Khan Wala, Jhok Hari Har, Saide Ke Rohela, Dhira Patra etc. These trainings were being organised by the KVK to promote new technologies and methods that can avoid the burning of crop residues.

Moreover, scientists urged the farmers that incorporating the straw into soil not only helps in reducing the pollution but improves the soil health by increasing the soil organic carbon, if practised for longer period. Farmers were also briefed about the nutrient and monetary losses due to burning of straw. In these trainings, experts from the KVK and agriculture and allied Departments imparted training to the farmers and demonstrated various technologies of crop residue management. They also discussed other ways to use the straw and more alternatives to the burning problem that can help cause lesser or no air pollution.



In-situ Management of Crop Residues

Five trainings were conducted under CRM for adopted 4 villages under CRM. The detail is as follows:

S. No.	Date of training	No. of participants	Place of training	Tentative Expenditure (Rs)
1	31 Aug to 7 Sept 2018	25	Bukkan Khan Wala	1.5 Lac
2	11 to 18 Sept 2018	25	Jhok Hari har	1.5 Lac
3	25 to 29 Sept 2018	25	Saide Ke Rohela	1.5 Lac
4	3 to 7 Oct 2018	25	Dhira Patra	1.5 Lac
5	9 to 18 Oct 2018	25	Bukkan Khan Wala, Jhok Hari har, Dhira Patra, Saide Ke Rohela	1.5 Lac



(Contributors: GS Aulakh, Vicky Singh & Balwinder Kaur)

Efforts of KVK for capacity building in Gurdaspur district

Krishi Vigyan Kendra, Gurdaspur conducted five training courses of five day duration in which 125 farmers were trained on theoretical as well as practical aspects of CRM machinery. The trainees were told about the operation, adjustments as well as maintenance of CRM Machinery. They were also made aware about the latest techniques in crop production, protection and post harvest management of rabi crops. The progressive farmers, who are doing excellent job in CRM, interacted and discussed their success as well as the problems they faced while adopting the paddy straw management techniques. One day training course each for secretaries of co-operative societies (17), ATMA field functionaries (19) and the owners of custom hiring centers (22) were also conducted at KVK, Gurdaspur.

Dr. R.S Chhina briefed about various activities of the KVK and urged the farmers not to burn their crop residue. He explained the farmers about the different options available for *in-situ* management of paddy straw. He further explained about the various schemes being started by the central government for the management of paddy straw in his lecture. Dr. R.S. Aulakh explained about adverse effects of burning of wheat and paddy straw on the insects as well as human beings. Dr. (Mrs) Mandeep kaur explained about the importance about green manuring for the improvement of soil health. Dr. R. K. Dhullar discussed the use of urea treated paddy straw for the feeding purposes in dairy animals. Many progressive farmers shared their experiences about the sowing of wheat crop with happy seeder. Extension literature developed by KVK regarding paddy straw management was also distributed to the participants of training programme.



(Contributors: Ravinder Singh Chhina, Sarbjit Singh Aulakh, Satwinderjit Kaur & Mandeep Kaur Saini)

Efforts of KVK for capacity building in Hoshiarpur district

Krishi Vigyan Kendra, Hoshiarpur organized 25 training programmes on paddy residue management technologies for 625 farmers and custom hiring centres in different blocks of Hoshiarpur district. Nine trainings were organised in collaboration with Department of Agriculture and Farmers Welfare, Hoshiarpur and one training programme was organised in collaboration with NABARD, Hoshiarpur. Nine training programmes were organised at KVK campus while the rest of training programmes were organised in the different villages of the district. The details of the training programme are given in the Table.

Details of training programmes on paddy residue management technologies

S. No.	Date of training	No. of participants	Place of training	Collaboration
1	4 July 18	30	KVK	-
2	18 July 18	20	KVK	-
3	19 July 18	25	Village: Sakruli	-
4	26 July 18	25	KVK	-
5	2 Aug 18	25	KVK	Deptt. Of Agriculture & Farmers Welfare, Hoshiarpur
6	3 Aug 18	25	KVK	
7	9 Aug 18	25	KVK	
8	10 Aug 18	25	KVK	
9	16 Aug 18	25	Village: Madda	
10	20 Aug 18	25	Village: Chaggran	-
11	22 Aug 18	25	Village: Kukran	-
12	23 Aug 18	25	Citrus Estate, Bhunga	Deptt. Of Agriculture & Farmers Welfare, Hoshiarpur
13	24 Aug 18	25	<i>Kheti Bhawan, Mukerian</i>	
14	27 Aug 18	25	Village: Gujjarpur	-
15	28 Aug 18	25	Village: Pandori Ganga Singh	-
16	29 Aug 18	25	KVK	-
17	30 Aug 18	25	<i>Kheti Bhawan, Dasuya</i>	Deptt. Of Agriculture & Farmers Welfare, Hoshiarpur
18	31 Aug 18	25	Village: Panj Dher Kalan	
19	4 Sept 18	25	Village: Kotla	-
20	10 Sept 18	25	Village: Panjoura	-
21	11 Sept 18	25	Village: Todarpur	-
22	12 Sept 18	25	Village: Makhsoospur	-
23	21 Sept 18	25	Village: Mukhomazara	-
24	24 Sept 18	25	Village: Mahilpur	-
25	25 Sept 18	25	KVK	NABARD, Hoshiarpur

During these training programmes, experts from KVK shared various technological options for paddy residue management in detail and also informed the farmers about the benefits of adopting paddy residue management techniques. They gave detailed information about the problems faced and their solution, while working with paddy residue management machinery in their fields. Working principles of the paddy residue management machineries were explained to the farmers.



(Contributors: Maninder Singh Bons & Ajaib Singh)

Efforts of KVK for capacity building in Jalandhar district

Various short and long duration training programmes (17) were organized by KVK Jalandhar to make aware farmers about ill effects of burning of paddy residue and advantages of retaining the left over straw in the field. Five five-day training programme on *In-situ* crop residue management technologies were conducted by KVK Jalandhar for farmers/custom operators of various villages. In this training programme, farmers were told about various straw management machines like Happy Seeder, Chopper/Mulcher, Reversible Mould Board Plough, Spatial no till drill etc. and other technologies like Biochar making, Biogas plant (based on paddy straw and cattle dung) etc. The various paddy straw management machines were also demonstrated to them during this training. The detail of five day training programmes conducted by KVK is as follows.

S. No.	Date of training	No. of participants	Place of training
1	27 to 31 Aug 2018	25	KVK, Jalandhar
2	4 to 10 Sept 2018	25	KVK, Jalandhar
3.	11 to 17 Sept 2018	25	KVK, Jalandhar
4.	15 to 22 Oct 2018	25	Adopted village Kara Ram Singh
5.	22 to 29 Oct 2018	25	Adopted village Bhadma



(Contributors: Kuldeep Singh, Arpandeep Kaur, Balvir Kaur, Rupinder Chandel, Ritu Raj, Rohit Gupta & Kanchan Sandhu)

Efforts of KVK for capacity building in Kapurthala district

Under the CRM project sponsored by Govt. of India; Krishi Vigyan Kendra , Kapurthala organized five training programmes at its campus. Messages regarding the conduct of these programmes were sent to the farmers through SMS and newspapers for its wide publicity. Progressive farmers from far and near by places participated in these five day training programme . One training was exclusively organized for the officials of cooperative societies to familiarize them with the facilities available at KVK regarding crop residue management techniques.

S. No.	Date	No of participants	Type of participants
1.	20-24 Aug 2018	25	Farmers
2.	27-31 Aug 2018	25	Members from co operative societies
3.	4-10 Sept 2018	25	Doots, Progressive farmers
4.	17-21 Sept 2018	25	Farmers, Tractor/Machine Operators
5.	24-28. Sept 2018	25	Farmers, CHC Owners

In the morning session, lecture regarding straw management techniques were delivered by the experts of KVK and allied departments, while in the evening session, demonstrations on machinery were given and participants had hands-on training on machinery which enriched their experience and enhanced their confidence. A tour was also arranged to local manufactures for installation of SMS for the existing combine harvesters during each training programme.



(Contributors: Bindu Marwaha & Jugraj Singh)

Efforts of KVK for capacity building in Ludhiana district

Krishi Vigyan Kendra, Samrala under the guidance of Dr. S C Sharma, Associate Director (Trg.) organized five training cum demonstration programmes each of five days on crop residue management (CRM) technologies for farmers of adopted villages and stakeholders at its premises. One-day trainings were also conducted for secretaries of different societies & stakeholders for updating them regarding CRM technologies. During training programmes, CRM activities of KVK were highlighted among the participants and they were urged to create awareness regarding no residue burning. Trainees were advised to adopt recommended technologies to manage crop residue. KVK Scientists delivered lectures on crop residue management technologies during training programmes. Various methods and techniques were discussed for managing the crop residue and detailed the working of *in-situ* residue management during the training programmes. During the training programme, progressive farmers from different villages shared their experiences regarding residue management with participants and adoption of *in-situ* management technologies such as cutter-cum-spreader happy seeder, mulcher/chopper, MB plough etc. Interactive sessions were organized where experts and farmers shared their experiences on crop residue management. Participants were exposed to different paddy straw management machineries, displayed at KVK. Farm Scientist discussed in detail the working of different machines like Happy Seeder (precaution during the operation of happy seeder, detailed calibration of the machine, field requirements during happy seeder operation, field adjustments etc.) mulcher, baler, seed drill etc. along with practical demonstrations for efficient management of paddy straw. Literature regarding machinery for residue management such as Happy Seeder Manuals and Pamphlets about CRM technologies were distributed among the farmers during the event. Participants were well trained & motivated to train more farmers of their respective villages to shun away the residue burning by adopting the recommended CRM technologies.



(Contributors: S.C. Sharma, Devinder Tiwari, Karun Sharma, Shivani Rana, Avneet Kaur, Harshneet Singh & Amarjeet Kaur)

Efforts of KVK for capacity building in Mansa district

Krishi Vigyan Kendra, Mansa organised five trainings of five days each at its adopted villages viz. Makha, Burj Dhillwan, Sadda Singh Wala, Khiali Chelahawali and Khokhar Khurd. In each training, 25 farmers were selected and were given technical knowledge on different crop residue management technologies. During these trainings, hands-on training on the use of the different agri-machinery was also given. Moreover, an interactive session was also organized in which trainees interacted with the farmers who were using machinery such as happy seeder for last few years. Farmers were also given training related to use of rice straw for preparation of compost, use of rice straw for preparation of *Paralichar*, use of rice straw for mushroom production and in biomass geysers.

The KVK experts shared their views regarding the benefits of straw management with farmers. They persuaded the farmers to opt for the innovations in agriculture and to have interest in subsidiary occupations like dairy farming, poultry farming, goatry, bee keeping etc for economic growth and nutritional benefit of their family. Similarly, recommended varieties of paddy specifically the short duration varieties were also advocated to the farmers. Lecture on the benefits of zero tillage and happy seeder sown wheat over the conventional sowing in terms of economic returns, weed control and environment safety were also delivered. Likewise, improved agronomic practices were also discussed and method demonstrations on machines were also conducted in the training programme.



(Contributors: Pritpal Singh, Gurdeep Singh & GPS Sodhi)

Efforts of KVK for capacity building in Moga district

Five trainings of five day each on “Machinery of paddy straw management” were organized by the Krishi Vigyan Kendra, Budh Singh Wala, Moga during the month of September and October 2018. 125 farmers from Budh Singh Wala, Purane Wala, Ransih Khurd, Khosa Pando, Sandhua Wala, Charik and Chupkiti participated in these training programmes. Farmers were trained about various farm machinery recommended by PAU for the management



of paddy straw. They were made aware about the happy seeder, mulcher, reversible mould board Plough, Super SMS, Baler, Spatial drill, Zero drill technology. Live demonstrations and hands. on trainings of these technologies were also given to the participants during the trainings. Farmers were made aware about the ill effects of paddy straw burning and benefits of non-burning of paddy straw. Farmers were made aware about the various information technologies related to farming community. During the training programmes, participants were also made aware about other resource conservation technologies, various subsidiary occupation, importance of soil and water testing and other new farm technologies. Technical lectures from various experts were also delivered to the trainees. Lectures from the various progressive farmers, in which they shared their experience about non-burning of paddy residue and technology used for management of paddy straw, were also conducted during the training event. Literature regarding the ill effects of straw burning and benefits of non-burning of paddy straw were also provided to the participants.



(Contributors: Ankit Sharma & Amandeep Singh Brar)

Efforts of KVK for capacity building in Mohali district

Krishi Vigyan Kendra, SAS Nagar of Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana organized three vocational trainings on crop residue management under the project "Promotion of Agricultural Mechanization and Machinery for *In-situ* Management of Crop Residue" in adopted villages Shahpur (27.09.2018-03.10.2018), Badanpur (03.10.2018-08.10.2018) and at KVK, campus (08.11.2018-12.11.2018). About 75 farmers participated in these training programmes. Dr. Yashwant Singh, Deputy Director (Training) of KVK gave overview of status of crop residue burning on Punjab and emphasized on management of *In-situ* paddy straw management. Dr. Priyanka Suryavanshi, Assistant Professor (Agronomy) delivered lecture on importance and use of Happy Seeder. Dr. Opinder Singh, Assistant Professor (Soil Science) of KVK, Ropar talked in detail about various techniques of paddy straw management and machinery. Dr. Suryendra Singh, Assistant Professor (Agronomy) of KVK, Barnala discussed about alternative uses of paddy straw. Dr. Munish Sharma, Assistant Professor (Horticulture) delivered detailed lecture on techniques of paddy straw management in horticultural crops. Dr. Harmeet Kaur, Assistant Professor (Plant Protection) discussed about insect pest management in wheat sown after in-situ crop residue management. Dr. Shashipal told farmers about paddy straw as bedding material in livestock shed. Mr. Sucha Singh, Agriculture Extension Officer briefed about various schemes of Department of Agriculture related to paddy straw management. Progressive farmer S. Sewa Singh shared his experiences with the farmers. Dr. Harish Kumar Verma, Director of Extension



***In-situ* Management of Crop Residues**

Education, GADVASU motivated the farmers not to burn crop residue and to manage it efficiently with the help of latest technology and machines developed by Punjab Agriculture University. He also discussed about the uses of crop residue in livestock farming, exposure visits of farmers to Department of Farm Machinery and Power Engineering (Punjab agricultural university, Ludhiana) and progressive farmer's field in Chamkaur Sahib, Rupnagar. Extension literature related to residue burning was also distributed to the farmers. All the farmers assured that they will disseminate message of KVK of not to burn paddy straw to every farmer of district SAS Nagar and will put their whole effort for residue management. The total number of events were 3 in which about 75 farmers participated.



(Contributors: Yashwant Singh, Dr. Priyanka Suryavanshi, Harmeet Kaur, Munish Sharma & Shashi Pal)

Efforts of KVK for capacity building in Muktsar district

KVK, Muktsar conducted five trainings on “*In-situ* Management of Crop Residue” of 5 days duration. Out of five trainings, four trainings were conducted for farmers from adopted villages i.e. Butter Shrin, Mehrajwala, Lohara and Jandwala and one training programme was conducted for the progressive farmers of Muktsar district. In each training, 25 farmers were trained and provided with all the information regarding management of crop residue along with the live demonstration of different machineries at KVK farm. After completion of trainings, a farmer-scientist interface was organized in all the four adopted villages with the main objective to aware all the farmers of these particulars village regarding CRM project. Farmer-Scientist interface was held on 1 September 2018 in village Butter shrihn. Dr. Rajbir Singh, Director, ICAR-ATARI, Ludhiana, as the chief guest of this programme, told the farmers about the scheme and facilities given by the Central Govt. regarding crop residue management.



The Programme Coordinator of the KVK shared his views regarding the benefits of straw management with farmers. He persuaded the farmers to opt the innovations of Punjab Agricultural University and to have interest in subsidiary occupations like dairy farming, poultry farming, goatry, bee keeping etc for economic growth and nutritional benefit of their family. He also emphasized the farmers to adopt the PAU recommended varieties of paddy and basmati. Mr. Balkarn Singh talked about the benefits of zero tillage and happy seeder sown wheat over the conventional sowing in terms of economic returns, weed control and environment safety. He also discussed about the improved agronomic practices for Kharif crops.



(Contributors: Nirmaljit Singh Dhaliwal, Karamjit Sharma, Balkaran Singh Sandhu & Chetak Bishnoi)

Efforts of KVK for capacity building in Nawanshahar district

KVK, Nawanshahar organized five trainings under crop residue management. One training was organized at KVK campus and other four trainings were organized in adopted villages namely Kajla, Sahungra, Begumpur and Renewal tapperian, in which about 125 farmers participated. These programmes were focused to promote crop residue management by adopting different machineries. KVK stressed upon the need of crop residue management on mass level by farmers by adopting various technologies and machineries like happy seeder, Super SMS with combine harvester, paddy straw chopper, mulcher, baler and other measures for paddy straw management. Major stress was given on every possible option for *in-situ* crop residue management by all the experts.

During these programmes, exposure visits to PAU were also organized for participants to show them the machineries used for effective straw management than burning. Farmers discussed major issue of stubble burning with the experts. Farmers were encouraged to shun paddy cultivation and opt for various other crops under crop diversification which not only improves soil health and daily needs of a farming family but also helps to curb paddy straw burning in fields. Under exposure visit, Dr. Mahesh Narang explained to the farmers the working of various machines and technologies available to farmers for paddy straw management. As the harvesting season of paddy crop was starting shortly, the farmers were told about significance, need, legal abiding and other aspects of managing paddy straw.



In-situ Management of Crop Residues

Farmers showed keen interest in various latest and efficient technologies and machinery which is available in the market for sale or available on custom hiring basis. Farmers were encouraged to pool the machinery to avoid heavy financial liabilities. The farmers were told about machines like Super SMS for combine harvester, Happy Seeder, Mulcher, Paddy Straw Chopper cum Shredder, Stubble Shaver, Baler, Zero Till Drill, Spatial Drill etc. Farmers also visited Department of Renewable Energy Engg., PAU, Ludhiana where Dr. Varinder Sembhi explained the working of paddy bail geyser, biogas plant using paddy straw, Deenbandhu biogas plant, electric generator using biogas etc. Dr. Gurnaz Singh Gill exhibited the working and demonstration of pilot plant rice mill and wheat flour mill to farmers at Department of Processing and Food Engg., PAU, Ludhiana. Processing of turmeric was explained to the farmers in detail and they were encouraged to adopt turmeric processing as a business venture. In addition, working of pulse milling, mini rice mill and individual quick freezing unit were also explained to the farmers. Dr. Arshdeep Singh Randhawa explained various food processing machinery for dairy, fruits and vegetables at Food Industry Business Incubation Centre, PAU, Ludhiana.

Under CRM project farmer-scientist interactions, group discussions, campaigns and kisan goshtis were also organized to motivate farmers for zero burning goal of KVK. About 360 villages of the district were declared burn free in this season which is great achievement for the farmers of the district.



(Contributors: Manoj Sharma & Manpreet Jaidka)

Efforts of KVK for capacity building in Pathankot district

In the project “Promotion of Agricultural Mechanization for *in-situ* management of crop residue in the state of Punjab” total 3 trainings were proposed in the district and all the trainings were successfully completed. First training on crop residue management was organized in village Bharyal Larhi from 27-8-2018 to 31-8-2018), second in Ladhpalwan (1-10-2018 to 5-10-2018) and third in village Sherpur from (8-10-2018 to 12-10-2018). In these trainings all aspects of *in-situ* residue management were covered. Farmers were educated on different types of machineries which they can use in their fields for incorporation of paddy residue. Farmers of the district showed keen interest in zero seed drill and happy seeder as power point presentations on the same were shown to them. The training had power point presentation on soil health in which farmers were taught about the importance of health for our environment and for higher yields. The KVK scientists urged the farmers to use paddy residue for mushroom cultivation so that they can have a good source of protein at very cheap prices as they have their own paddy residue which cuts the cost of cultivation. Farmers were guided on all aspects of mushroom cultivation and lectures on use of paddy straw for animal feed and bedding were also delivered. Farmers were also guided on insect pest management and rodent management in residue incorporated fields. Farmers were motivated and admitted an oath that they will not burn paddy residue in future and incorporate it in their fields. Videos of all the machines were also shown to the farmers so that they get to know about these machines very well before the operation.



(Contributors: Amit Kaul & Bikramjit Singh)

Efforts of KVK for capacity building in Patiala district

KVK, Patiala had organized a five-day training programme on “Paddy Residue Management” in different adopted Villages under CRM Project (Dugal, Burar, Kheri Gandian, Dhindsa). The programme was attended by 125 trainees. Dr Jasvinder Singh, AD (Trg.) explained the objective of the training, said that open burning of paddy residue not only cause air pollution but it also deteriorates soil health, causes several health hazards and accidents. Through different scientific technologies advised by the experts, this important bio-resource can either be incorporated into the soil for improving its fertility or can it be managed to be used as input for different farm or livestock enterprises. Therefore, it is important to make aware the farmers about various technological options for its appropriate management. The training was meant for disseminating different scientific methods for appropriate *in-situ* or off the situ management of paddy residue. During the training programme, the economics of different technological options for *in-situ* paddy straw management were also discussed. Trainings were coordinated by KVK and FASC scientists. During the sessions, faculty from KVK and FASC explained the ill effects of open burning of paddy residue, the use of various technologies for *in-situ* management of paddy straw, use of paddy straw for mushroom cultivation and for livestock feed or bedding. Later on, a visit at field of KVK were also organized where the machinery and implements were shown and explained the functioning of machinery and answered the queries by the participants. Training concluded with the feedback from the participants. Trainees said that the technologies advocated through the programme were well understood by them and will be implemented in true letter and spirit in the field.



(Contributors: Jasvinder Singh, Gurpreet Kaur, Gurupdesh Kaur Rajni Goel, Parminder Singh, Rachna Singla, Jashanjot Kaur, Jasreet Kaur & Gurnaz Singh Gill)

Efforts of KVK for capacity building in Ropar district

Krishi Vigyan Kendra, Ropar organized five trainings of five days each for farmers and stakeholders on crop residue management under the project, “Promotion of Agricultural Mechanization for *In-Situ* Management of Crop Residue in Punjab”. In four trainings, 25 farmers from each adopted village i.e. Mukarabpur, Balrampur, Khanpur and Fatehpur participated. One training was organised for the stakeholders i.e. secretaries of cooperative societies in which 25 secretaries participated from different societies of district Ropar.

In these training, experts from the KVK and Agriculture and Allied Departments imparted training to the farmers and demonstrated various technologies of crop residue management. Scientists urged the farmers that incorporating the straw into soil not only helps in reducing the pollution but improves the soil health by increasing the soil organic carbon, if practised for longer period. Farmers were also briefed about the nutrient and monetary losses due to burning of straw. Farmers were made aware about all the possible combinations available for straw management like harvesting of paddy with combine with SMS and then sowing of wheat with Happy Seeder. Use of other machines like chopper, mulcher, bailer technology, biogas plants, biochar and compost preparation from paddy straw etc. were also discussed in detail.

Lectures of progressive farmers who are doing crop residue management in their fields were also organised during the trainings. Visit to custom hiring centre was also organised at village Mukarabpur where the machinery and equipments were shown by Sh. Charanjit Singh Kang, who explained the functioning of machinery and answered the queries by the participants. Farmers were encouraged not only to stop the practice of straw burning, but were also told to extend knowledge gained during trainings to the fellow farmers. Bags and literature were also distributed among the trainee farmers. Trainings were concluded with the feedback from the participants. Farmers said that the technologies advocated through the programme were well understood by them and will be implemented in true letter and spirit in the field.



*(Contributors: Aparna, Sanjeev Ahuja, Ashok Kumar,
Ankurdeep Preety & Opinder Singh)*

Efforts of KVK for capacity building in Sangrur district

The Krishi Vigyan Kendra, Sangrur under the guidance of Dr. Mandeep Singh, Programme Coordinator had organized five training-cum-demonstration programmes each of five days on *in-situ* crop residue management (CRM) technologies for the farmers of adopted villages and various stakeholders of the district at its premises during the months of September and October, 2018. Besides long duration training programmes, short duration trainings were also organized at village level to acquaint the maximum number of farmers regarding efficient crop residue management techniques recommended by Punjab Agricultural University, Ludhiana. During training programmes, the participants were made aware about the ill effects of crop residue burning as well as various *in-situ* crop residue management techniques and farm machineries. They were urged to create awareness regarding no residue burning amongst their fellow farmers and to adopt recommended technologies to manage crop residue themselves. The Subject Matter Specialists of KVK delivered lectures on crop residue management technologies and benefits of retaining crop residue in the field during all the training programmes. Various methods and techniques were explained for managing the crop residue and also detailed about the working of *in-situ* residue management machineries. The



In-situ Management of Crop Residues

progressive farmers from different villages who were practicing crop residue management technologies for the past few years had shared their experiences whole heartedly with the participants regarding use of cutter-cum-spreader, happy seeder, mulcher/chopper, RMB plough etc. and clarified the doubts raised by them. They also motivated them to adopt such techniques and assured them of any help on their part while adopting these technologies in their own fields. Officers from Department of Agriculture and Farmers Welfare also shared details regarding availability of subsidies on different farm machineries at individual and group level. Interactive sessions were organized where experts and farmers shared their sweet and bitter experiences on crop residue management. The participants were exposed to different paddy straw management machineries, displayed at the KVK farm wherein the experts discussed in detail the working of different machines like Happy Seeder (precaution during the operation of happy seeder, detailed calibration of the machine, field requirements during happy seeder operation, field adjustments etc.), Mulcher, Baler, Zero till drill etc. along with practical demonstration for efficient management of paddy straw. Literatures regarding machinery for residue management, Happy Seeder manuals and pamphlets about CRM technologies were distributed amongst the farmers during the event. The participants were motivated to spread the message further amongst farmers of their respective villages to bring more and more area under recommended CRM technologies. The total number of events were five in which 125 farmers participated.



(Contributors: Mandeep Singh, Ravinder Kaur & Shiva Bhambota)

Efforts of KVK for capacity building in Tarn Taran district

Krishi Vigyan Kendra, Tarn Taran organized forty six (46) one-day trainings on management of crop residue at the KVK Campus and in villages namely Booh Havelian, Jauneke, Sohawa, Mundapind, Nabipur, Dhunda, Mari Kamboke, Chohla Sahib and Rahal Chahal. About 995 farmers of different villages attended these programmes and experts demonstrated the functioning of happy seeder to the farmers at KVK and at their villages. During these programmes, group discussions on crop residue management especially paddy straw were held among KVK experts and farmers of the villages. Dr. Balwinder Kumar appealed to the farmers to make a commitment to avoid residue burning. He also briefed about various proposed activities like trainings, awareness camps, kisan melas, farmer-scientist interfaces etc. that were being conducted to popularize *in-situ* residue management. Besides, Dr. Kumar fascinated the farmers/villagers to coordinate and cooperate during these events so that their village can be made residue burning free. S. Navjot Singh Brar discussed the various negative effects of residue burning on environment.

Three vocational training programmes on “New Techniques for *In-Situ* crop residue management” were organized at Krishi Vigyan Kendra, Tarn Taran. Total seventy five (75) farmers participated in these training programmes. Dr. Balwinder Kumar stressed the importance of *in-situ* paddy straw management among the farmers for the protection of the environment. S. Navjot Singh Brar provided insight on importance of cultivation of short duration rice varieties for saving of the water and time for next crop sowing. Further, he also



***In-situ* Management of Crop Residues**

discussed about sowing of wheat with happy seeder in paddy field harvested with Super SMS attached combine harvester. Dr. Anil Kumar discussed the importance of *in-situ* crop residue management in maintaining soil fertility. Sh. Nirmal Singh discussed the various implements available for the cultivation of vegetables without burning of paddy straw. Dr. Amandeep Singh Brar and Er. Ankit Sharma, Dr. Parminder Kaur, Sh. J.P. Singh, Assistant Register Cooperate Society Patti, Dr. Harinderjeet Singh, Chief Agriculture Officer, Tarn Taran and S. Gurbachan Singh, progressive farmer also informed the farmers on different topics on crop residue management. Dr Parminder Kaur told farmer about insect pest management and rat control in the happy seeder sown wheat. Moreover, an exposure visit to GADVASU, Ludhiana and Department of Farm Machinery and Power Engineering, PAU, Ludhiana was made. During this visit, Dr. H.K Verma gave detailed information about importance of paddy straw in feeding of dairy animals and to cut down the feeding cost. He said paddy straw can be treated with urea for better utilization in livestock feeding. Moreover, Dr. Mahesh Kumar Narang, Dr. S.S Thakur and Dr. Baldev Dogra gave hands-on-training to the farmers regarding use of various implements for paddy straw management. All the farmers assured that they will disseminate message of KVK for not to burn paddy straw to every farmer of district Tarn Taran and will put their whole effort for residue management.



(Contributors: Balwinder Kumar, Navjot Singh Brar & Anil Kumar)

GLIMPSES OF HANDS-ON TRAINING ON MACHINES



GLIMPSES OF HANDS-ON TRAINING ON MACHINES



MEDIA APPEARANCE

ट्रेनिंग कैंप

पाराली की संभाल संबंधी पांच दिवसीय सिखलाई कोर्स में किसानों को किया जागरूक

चार गांवों को पाराली की संभाल के लिए गोद लिया

संवाद सूत्र, श्री मुक्तसर साहिब : कृषि विज्ञान केंद्र गोनियाना द्वारा धान की पाराली की संभाल संबंधी पांच दिवसीय सिखलाई कोर्स संपन्न हो गया। सिखलाई कोर्स के अंतिम दिन गांव लोहारा के 25 किसानों ने भाग लिया। इस सिखलाई कोर्स में डॉ. पनपस चालीवाल, एसोसिएट डायरेक्टर केंवो ने बताया कि जिले भर में चार गांवों को पाराली की संभाल संबंधी गोद लिया गया है। जिसके तहत यह सिखलाई कोर्स का आयोजन किया गया।

उन्होंने हैपी सोड मशीन के प्रयोग से औसतन 400-500 रुपये प्रति एकड़



श्री मुक्तसर साहिब के गांव गोनियाना के कृषि विभाग के दफ्तर में किसानों को पाराली संबंधी जानकारी देते कृषि अधिकारी • जागरूक

पाराली जलाने से मिट्टी को नुकसान

किसानों को पाराली नहीं जलाने के लिए किया जागरूक

आमन साहसकर, प्रमोदकुमार : पाराली जलाने से मिट्टी का पोषण घटता है। पाराली जलाने से मिट्टी में नाइट्रोजन, फॉस्फोरस और पोटैशियम की मात्रा घटती है। इससे मिट्टी की उर्वरता घटती है। किसानों को पाराली जलाने से बचना चाहिए।

डॉ. अशोक ने बताया कि पाराली को जलाने से मिट्टी की उर्वरता घटती है। पाराली जलाने से मिट्टी में नाइट्रोजन, फॉस्फोरस और पोटैशियम की मात्रा घटती है। इससे मिट्टी की उर्वरता घटती है। किसानों को पाराली जलाने से बचना चाहिए।



डॉ. अशोक ने बताया कि पाराली को जलाने से मिट्टी की उर्वरता घटती है। पाराली जलाने से मिट्टी में नाइट्रोजन, फॉस्फोरस और पोटैशियम की मात्रा घटती है। इससे मिट्टी की उर्वरता घटती है। किसानों को पाराली जलाने से बचना चाहिए।

कलानौर में सेरआम चल रही ब्लेड लगी कंबाइनेज

कलानौर में सेरआम चल रही ब्लेड लगी कंबाइनेज

श्री मुक्तसर साहिब : कलानौर में सेरआम चल रही ब्लेड लगी कंबाइनेज। इससे किसानों को पाराली जलाने से बचना चाहिए।

डॉ. अशोक ने बताया कि पाराली को जलाने से मिट्टी की उर्वरता घटती है। पाराली जलाने से मिट्टी में नाइट्रोजन, फॉस्फोरस और पोटैशियम की मात्रा घटती है। इससे मिट्टी की उर्वरता घटती है। किसानों को पाराली जलाने से बचना चाहिए।

पूज्जावाल में पाराली प्रबंधन पर गोष्ठी

कृषि विभाग के विशेषज्ञों ने हैपी सीडर से गहू बीजने को किया प्रेरित

पाराली को आग न लगाने पर भी जोर दिया



पाराली प्रबंधन पर गोष्ठी में किसानों को बताया कि पाराली जलाने से मिट्टी की उर्वरता घटती है। पाराली जलाने से मिट्टी में नाइट्रोजन, फॉस्फोरस और पोटैशियम की मात्रा घटती है। इससे मिट्टी की उर्वरता घटती है। किसानों को पाराली जलाने से बचना चाहिए।

किसानों को धान की पाराली को आग न लगाने के लिए किया प्रेरित

गोद, 10 अक्टूबर (पट्टी): कृषि विज्ञान केंद्र, गोद को राफ से डा. एस. सी. राय, महापंचक एसोसिएट डायरेक्टर (प्रशासन) के नेतृत्व में किसानों को अनाज खाने के संपादन के लिए गोद लिए गए।

डॉ. अशोक ने बताया कि पाराली को जलाने से मिट्टी की उर्वरता घटती है। पाराली जलाने से मिट्टी में नाइट्रोजन, फॉस्फोरस और पोटैशियम की मात्रा घटती है। इससे मिट्टी की उर्वरता घटती है। किसानों को पाराली जलाने से बचना चाहिए।



किसानों को धान की पाराली को आग न लगाने के लिए किया प्रेरित

डॉ. अशोक ने बताया कि पाराली को जलाने से मिट्टी की उर्वरता घटती है। पाराली जलाने से मिट्टी में नाइट्रोजन, फॉस्फोरस और पोटैशियम की मात्रा घटती है। इससे मिट्टी की उर्वरता घटती है। किसानों को पाराली जलाने से बचना चाहिए।

कृषि विभाग के विशेषज्ञों ने हैपी सीडर से गहू बीजने को किया प्रेरित

श्री मुक्तसर साहिब : कृषि विभाग के विशेषज्ञों ने हैपी सीडर से गहू बीजने को किया प्रेरित।

डॉ. अशोक ने बताया कि हैपी सीडर से गहू बीजने से मिट्टी की उर्वरता बढ़ती है। हैपी सीडर से गहू बीजने से मिट्टी में नाइट्रोजन, फॉस्फोरस और पोटैशियम की मात्रा बढ़ती है। इससे मिट्टी की उर्वरता बढ़ती है। किसानों को हैपी सीडर से गहू बीजने को प्रेरित किया गया।

MEDIA APPEARANCE

घुट रहा आसमां, मर रही जमीं

पसाली में आग लगाने से वातावरण व मित्र क्रीटा भी मर रही है, कृषि वैज्ञानिकों ने दी जानकारी

राज्य गहनभी, अक्षय - युधि विज्ञान केंद्र को अंतर से पसाली को संभालने के उपाय के लिए नियम पूर्वक...

गांधी में 100 किसानों ने लिया भाग... कृषि विज्ञान केंद्र के अध्यक्ष डॉ. जयशंकर...

पसाली नहीं जलाएंगे... पसाली जलाने से वातावरण व मित्र क्रीटा भी मर रही है...



अक्षय के साथ कृषि विज्ञान केंद्र के अध्यक्ष डॉ. जयशंकर प्रसाद सिंह (बाएं) और किसानों के साथ गांधी में 100 किसानों ने लिया भाग...

गांव गुनावाल के किसानों ने पराली नहीं जलाने का लिया संकल्प

दैनिक जागरण पसाली नहीं जलाएंगे... गांव गुनावाल के किसानों ने पराली नहीं जलाने का लिया संकल्प...

पसाली जलाने का क्या है अर्थ... पसाली जलाने से वातावरण व मित्र क्रीटा भी मर रही है...

गांधी में किसानों को विज्ञान केंद्र... गांधी में किसानों को विज्ञान केंद्र के अध्यक्ष डॉ. जयशंकर...

पसाली जलाने वाले सरकारी मजालिमों पर होगी कार्रवाई... पसाली जलाने वाले सरकारी मजालिमों पर होगी कार्रवाई...



गांधी में किसानों को विज्ञान केंद्र के अध्यक्ष डॉ. जयशंकर प्रसाद सिंह (बाएं) और किसानों के साथ गांधी में 100 किसानों ने लिया भाग...

विमानों की उड़ान पराली ना साइन दापूट

पसाली ना साइन लड़ी पंजाबी नागरिक उड़ने के लिए नागरिकों का संघर्ष

पंजाबी नागरिकों का संघर्ष... पंजाबी नागरिकों का संघर्ष...

विमानों की उड़ान पराली ना साइन दापूट... विमानों की उड़ान पराली ना साइन दापूट...

पंजाबी नागरिकों का संघर्ष... पंजाबी नागरिकों का संघर्ष...

पंजाबी नागरिकों का संघर्ष... पंजाबी नागरिकों का संघर्ष...

विमानों की उड़ान पराली ना साइन दापूट... विमानों की उड़ान पराली ना साइन दापूट...

पंजाबी नागरिकों का संघर्ष... पंजाबी नागरिकों का संघर्ष...

पसाली को खेतों में मिलाएं धरती का प्रदूषण से बचाएं

सकल गांव में कृषि विज्ञान केंद्र ने लगाई प्रदर्शनी, किसानों को किया जागरूक

पसाली को खेतों में मिलाएं... पसाली को खेतों में मिलाएं...

धरती का प्रदूषण से बचाएं... धरती का प्रदूषण से बचाएं...

सकल गांव में कृषि विज्ञान केंद्र ने लगाई प्रदर्शनी... सकल गांव में कृषि विज्ञान केंद्र ने लगाई प्रदर्शनी...

पसाली नहीं जलाएंगे... पसाली नहीं जलाएंगे...

किसानों के लिए जागरूकता कैंप लगाया... किसानों के लिए जागरूकता कैंप लगाया...

पसाली को खेतों में मिलाएं... पसाली को खेतों में मिलाएं...



किसानों के लिए जागरूकता कैंप लगाया... किसानों के लिए जागरूकता कैंप लगाया...

हैप्पी सीडर देगी प्रदूषण से मुक्ति

एसोसिएट डायरेक्टर ने किसानों को दी पराली निस्तारण वाले कृषि यंत्रों की जानकारी

हैप्पी सीडर देगी प्रदूषण से मुक्ति... हैप्पी सीडर देगी प्रदूषण से मुक्ति...

एसोसिएट डायरेक्टर ने किसानों को दी पराली निस्तारण वाले कृषि यंत्रों की जानकारी... एसोसिएट डायरेक्टर ने किसानों को दी पराली निस्तारण वाले कृषि यंत्रों की जानकारी...

हैप्पी सीडर देगी प्रदूषण से मुक्ति... हैप्पी सीडर देगी प्रदूषण से मुक्ति...

एसोसिएट डायरेक्टर ने किसानों को दी पराली निस्तारण वाले कृषि यंत्रों की जानकारी... एसोसिएट डायरेक्टर ने किसानों को दी पराली निस्तारण वाले कृषि यंत्रों की जानकारी...



हैप्पी सीडर देगी प्रदूषण से मुक्ति... हैप्पी सीडर देगी प्रदूषण से मुक्ति...

हैप्पी सीडर दे ढाट्टिदे घाबरे नाहकवारी सिंटी

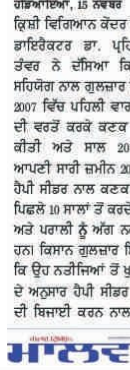
पंख पख गंधियालियां, 15 लक्षहर

हैप्पी सीडर दे ढाट्टिदे घाबरे नाहकवारी सिंटी... हैप्पी सीडर दे ढाट्टिदे घाबरे नाहकवारी सिंटी...

पंख पख गंधियालियां, 15 लक्षहर... पंख पख गंधियालियां, 15 लक्षहर...

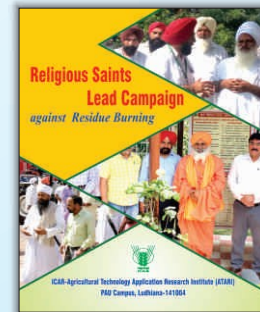
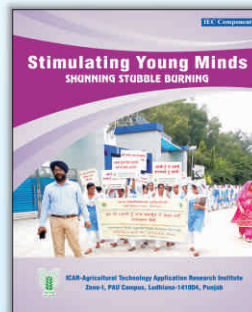
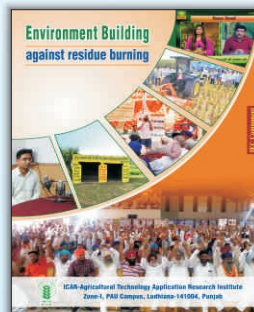
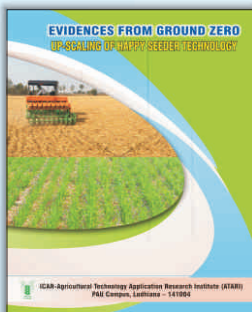
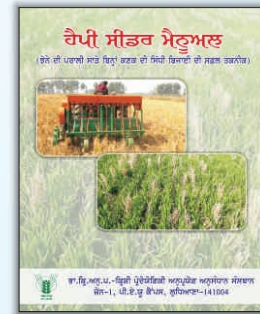
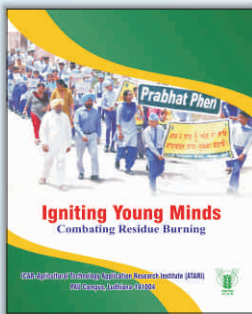
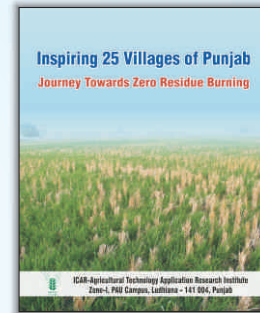
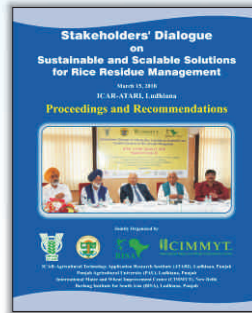
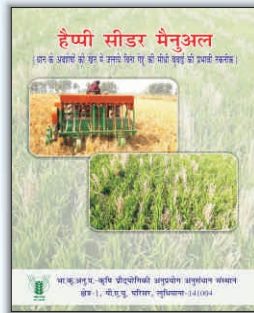
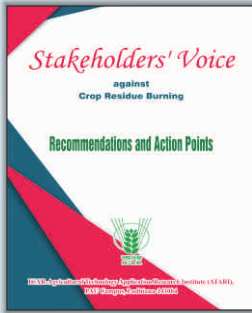
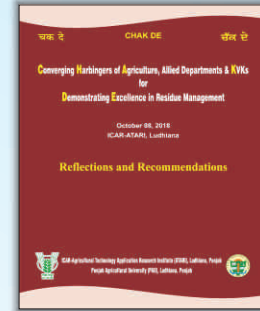
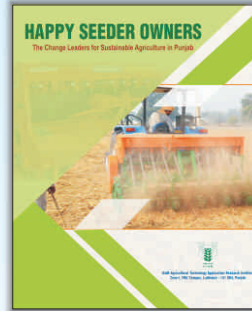
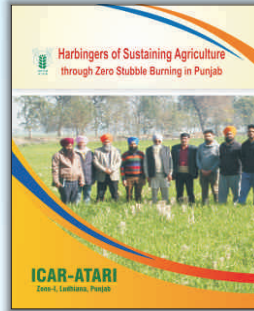
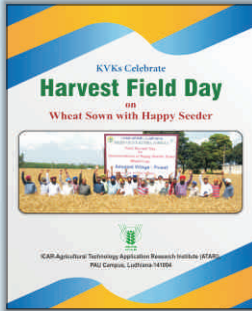
हैप्पी सीडर दे ढाट्टिदे घाबरे नाहकवारी सिंटी... हैप्पी सीडर दे ढाट्टिदे घाबरे नाहकवारी सिंटी...

पंख पख गंधियालियां, 15 लक्षहर... पंख पख गंधियालियां, 15 लक्षहर...



हैप्पी सीडर दे ढाट्टिदे घाबरे नाहकवारी सिंटी... हैप्पी सीडर दे ढाट्टिदे घाबरे नाहकवारी सिंटी...

Other Publications by ICAR-ATARI, Ludhiana





हर कदम, हर डगर
किसानों का हगसफर
भारतीय कृषि अनुसंधान परिषद

AgriSearch with a human touch