Pollution Free Environment through Crop Residue Management in Haryana and Delhi

ICAR-Agricultural Technology Application Research Institute, Zone-II

भाकृअनुप–कृषि तकनीकी अनुप्रयोग संस्थान, क्षेत्र–II

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Published by
Dr. S. K. Singh
Director

Compiled and edited by
Dr. H.N. Meena, Senior Scientist (Agronomy)
Dr. S.K. Singh, Director
Dr. M.S. Meena, Principal Scientist (Agricultural Extension)
Mahendra Sewaliya, Senior Research Fellow
Bhanu Pratap Singh, Young Professional

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1. Introduction

Pollution prevention is a major global concern because of the harmful effects of pollution on a persons' health and on the environment. Environmental pollution comes in various forms, such as, air pollution, water pollution, soil pollution, etc.

Everyone is a stakeholder as we all are inhabitants of this earth. Each person can contribute something to advance the environmental pollution mitigation measures. Environmental protection means caring for our resources and subsequently for ourselves and ensuring a sustainable future for generations to come will have a better environment.

Therefore, we all should accept personal responsibility for the success of the environmental protection programmes of our respective community by cooperating collaborating, contributing for making the atmosphere pollution free. Although on an individual basis, we can help in combating the pollution in our own immediate environment, efficient control can be best institutionalized through legislation or many more ways.

Burning the crop residue causes phenomenal pollution problem in the atmosphere and a huge nutritional loss and physical health deterioration to the soil. Burning of one ton of paddy straw release 3 kg particulate matter, 1460 kg CO_2, 199 kg ash and 2 kg SO_2. These gases affect human health due to the general degradation in air quality, resulting in aggravation of eye and skin diseases. Fine particles can also aggravate chronic lung diseases. One ton of paddy straw contains approximately, 5.5 kg N, 2.3 kg P_2O_5, 25 kg K_2O, 1.2 kg S, 50-70% of micronutrients absorbed by rice and 400 kg of carbon, which are lost due to burning of paddy straw. Apart from loss of nutrients, some of the soil properties like soil temperature, pH, moisture, available phosphorus and soil organic matter are greatly affected due to burning. Nonetheless, time available between the rice harvesting and wheat sowing is very narrow (in the range of 20-30 days). It is envisaged that appropriate strategies for *In-situ* crop residue management are planned for effective implementation to enable zero burning. Various equipment/machines such as super straw management system, happy seeder, zero till drill, straw chopper/mulcher, rotary slasher, reversible MB plough etc. have been developed and successfully demonstrated in the farmers' fields. In pursuance to the orders of National Green Tribunal (NGT), fund have been released from within sanctioned budget for “Sub-Mission on Agricultural Mechanization (SMAM)”. Therefore, in view of separate above fact and in pursuance to the budget 2018 announcement regarding a special scheme to support the efforts of the governments of Haryana and the NCT of Delhi to address air pollution and to subsidize machinery required for in-situ management of crop residue, a new central sector scheme on

"Promotion of Agricultural Mechanization for In-situ Management of crop residue in the states of Haryana and NCT of Delhi" for the period from 2018-19 to 2019-20 have been approved.

1.1 Objectives:

- Protecting environment from air pollution and preventing loss of nutrients and soil micro-organisms caused by burning of crop residue.
- Promoting in-situ management of crop residue by retention and incorporation into the soil using appropriate mechanization inputs.
- Promoting farm machinery banks for custom hiring of in-situ crop residue management machinery to offset the adverse economies of scale arising due to small land holdings and high cost of individual ownership, and
- Creating awareness among stakeholders through demonstration, capacity building activities and differentiated information education and communication strategies for effective utilization and management of crop residue.

1.2 Major components of the Scheme

- Establish farm machinery banks or custom hiring centers of in-situ crop residue management machinery.
- Procurement of agriculture machinery and equipment for in-situ crop residue management.
- Information, education and communication for awareness on in-situ crop residue management.

The project not only aims to mitigate climate change impacts and enhance adaptive capacity, but will also counter the adverse environmental impacts that arise from burning. The project is being implemented following a phased approach. Initially, awareness generation and capacity building activities undertaken to encourage farmers to adopt alternate practices which would also help diversify livelihood options and enhance farmers' income. A slew of technological interventions is being undertaken for timely management of crop residue in addition to effective utilisation of existing machineries. Implementable and sustainable entrepreneurship models will be created in rural areas through upscaling successful initiatives and innovative ideas. "Based upon the performance in the first phase, the scope could be enhanced and more activities can be supported subsequently. The problem of crop residue burning has been intensifying over the years in. Punjab, Haryana, Uttar Pradesh and Delhi. Increased mechanization, declining number of livestock, long period required for composting and no economically viable alternate use of residues are some of the reasons for residues being burnt in field. This not only has implications for global warming, but also has an adverse impact on air quality, soil health and human health.

Various programmes were organized by taking different stakeholders in the loop including KVKs, SAUs, ICAR institutes, state agricultural departments, cooperative societies, farmer's groups, NGOs, schools etc. KVKs organized awareness programmes on residue management in close association with District Agriculture Department, ATMA and ICAR Institutes. KVKs and ICAR institutes have sensitized the issue of residue burning through literature distribution, use of smart phones in communication, release of advisories through SMSs, meeting with village *panchayats, kisan ghosthi,* use of community radio, wall paintings, poster/banner/hoardings, conducting competition among children of rural school and college students, newspapers, radio jingles and discussion on television etc. KVKs organized a 'Village *Pheri* or 'Village *Jagran'* or 'Village *Sandhya Pheri* or 'Scientists in evening *Chaupals'* in one village by involving *panchayats,* farmers and officials from agriculture department and stay in the village. Other activities included organizing slogan and essay writing competitions in rural schools on the issue, uploading slogans on residue burning/management at KVKs/institute websites and highlighting the issue in local newspapers, FM radios and local TVs etc. Mobile Apps has also been developed to create confidence towards effectiveness, feasibility, applicability, usefulness etc. of mechanization.

2. Efforts of Krishi Vigyan Kendras of Haryana in Building Pollution Free Environment

2.1 KVK, Ambala

KVK, Ambala organized Kisan Mela at KVK campus on 2nd November, 2018, in which more than 2000 farmers from this region participated. Hon'ble S.D.M of Ambala cantt. Sh Subash Sihag was the Chief guest. Other dignitaries were Dr. Hawa Singh, DHO, Ambala; Dr. Kamlesh Rani, Principal, RGG College, Saha; Dr. G.S. Bajwa, district youth coordinator, Ambala; Dr. Ravi Bathla, DFO, Ambala; Sh. Jagat Singh, KVIC-Ambala; and Smt. Subhneet Kaur, Sarpanch, Tepla. In the welcome address, Senior Scientist & Head KVK, Ambala, urged the farmers to opt for *In-situ* management of paddy straw. Nodal officer Er. Guru Prem stated that this is not only curb straw burning but also improve soil health. He also apprised the farmers about available straw management technologies viz, Super SMS, Happy Seeder, Mulcher, Reversible MB plough, Rotavator and Zero Till Drill. CRM team member stressed upon the need for setting up of more custom hiring centres so that requirement for various straw management machineries can be full filled. Team encouraged the vegetable farmers to sow the vegetable without crop residue burning. An impressive exhibition depicting various straw management technologies was also put up during the occasion. A social cultural programme "Sabhyacharik" centred on safe environment was also point of attraction. Special arrangements were made for distribution of quality seed of major crops. In the mela, more than 25 agriculture based companies put their stalls and actively participated during event. A question answer session was also organised provide concrete answer on queries regarding efficacy of various crop residue management technologies. At the end, farmers were trained on the use of CRM machinery by putting live demonstration at the KVK farm.

A total of 43 wall paintings on 1725 sq ft wall area were made in adopted villages named Sapeda, Landa and Khuda Kalan. In these paintings, catchy and attracting slogans were painted on a light white background for clear visibility. Hindi language was used for writing the slogans for wider spread of the message. Public places like road side walls of rural buildings, schools, college, farm building, road diversions, bus stands and other farmers welfare related institutions like PACs, co-operative societies and panchayat offices etc. were selected for writing the slogans. The slogans were highly appreciated by the local people and also became popular amongst local children/youth. The posters were self-explanatory and easy to understand by rural people. Besides this, 200 small posters/banners of size 2'x3' were prepared for widespread publicity of the project through slogans. Similarly, 10 big hoardings of size 10'x10' were got prepared for wider spreading of the no-burning methods of CRM. These were written in clear and bold font on light coloured background for clear vision. Benefits of various machinery used in paddy straw management viz. Happy Seeder, Zero till drill, Rotavator, Disc harrow, Mulcher, Cutter cum spreader etc. were also explained. Other innovative methods for wider publicity of the project we used to print the message on note pad, file folder, T-shirts etc. and 1000, 1000 & 200 numbers each of these were distributed among the farmers during different events of the project. The leaflets were also distributed during farmers' scientists' interface, campaigns, kisan mela, trainings etc. Besides these, the leaflets were distributed while performing frequent and regular farm visits. The high visibility of these posters have been making good impression in the printed and joined villages.

एसडीएम सिहाग की अपील, किसान पराली न जलाकर अपनी आय बढ़ाएं

पराली नहीं जलाएंगे
पर्यावरण बचाएंगे

अमरजीत को किया सम्मानित

फसल अवशेष के बेहतर प्रबंधन पर उप कृषि निदेशक डॉ. नागपाल किए गए सम्मानित

सराहनीय

Leaflet on different CRM Machinery like “Machino dwara prali ka parbhandhan” which tells farmers about the various machineries available for management of crop residue in an environment friendly manner. “Happy Seeder Manual” narrates the safe operation of the Happy Seeder which was exclusively printed and distributed among farmers during trainings, farmer scientist interface and kisan mela, field visits. 50 number of Package of Practices named Rabi faslo ki samgar sifarse was also distributed among the trainee farmers. School Bag among the school and college students and trainee farmers were also distributed in which slogans were displayed.

For mass awareness among the farming community and domain we also managed broadcasting of messages through FM radio, DD-Kisan and other media channels were done Social Media-WhatsApp, Facebook, you tube, KVK portal and KVK website, were used to provide real scenario of a total of 2 Radio jingles (innovative approach) were broadcast for one month each on FM radio Mind Tree broadcast at frequency of 91.2 Mhz. Furthermore, 2 TV talks were also delivered, which were later telecast on DD Kisan on dated 27.08.2018, 25.09.18. Here, the farmers received need based queries related to the machines and other alternatives while could prevent the paddy stubble burning. Dr. Rajbir Singh, Director, ICAR-ATARI, Zone-I was the chief guest on the coverage of DD Kisan channel programme at KVK campus. Other scientists of CRM team were also stated that residue not only helps save water where as it further increases the soil fertility.

2.2 KVK, Bhiwani

Creating awareness about the environment for school and college students is very necessary. Keeping in view the present situation of environment pollution and its quality degradation, different awareness campaigns were also organised for school and college students. Students showed their creativity through posters, slogan writings, debate and essay competitions. School programmes were organized at villages Jhinjar and Misri of District Charkhi Dadri. College programmes were organized at Govt. colleges of District Bhiwani and Baund. Students were also encouraged by distributing them

prizes and refreshment. Head KVK Bhiwani told the need of green and clean environment. The idea of planting at least 20 trees in one's life was found very interesting to the students. Students and all the staff took pledge to clean their environment, growing more and more tree in future.

In each farmers training, farmers were also trained on about the environment pollution, ways to minimize pollution.

36 wall paintings were done in adopted villages and at main locations of Bhiwani. 10 hoardings were installed at adopted villages and at main spots of Bhiwani to create awareness among the people about harmful effects of straw burning. 10 banners were prepared under this project. Jingle was also composed about CRM by in local language of Haryana:

ना जला तू धान पराली,
क्यों धुमे न ठावह सै,
मर ज्यांगे सब कीट पतंगे
जो माटी न भावह सै।
ले मदद तू कृषि यंत्र की
जो सीधी बीजाई करवावे सै।
बात मान ले प्यारे तू क्यूँ धूमे नै ठावे सै।
मिला खेत मै धान पराली
बात मेरी या मान ले,
होगी फसल खुशहाल रै इस्तह
बात मेरी या जान ले।
जला जला की धान पराली क्यों सेहत न गीरावै सै,
इसते होज्या मिट्टी नाश क्यों धूमे न ठावे सै।

कार्यक्रम दैनिक जागरण और कृषि विज्ञान केंद्र ने पराली न जलाने के लिए किया जागरूक

पर्यावरण को बचाएंगे, पराली नहीं जलाएंगे

दैनिक जागरण हिसार, 21 अक्टूबर 2018

पर्यावरण बचाएंगे

जागरण संवाददाता, भिवानी : दैनिक जागरण और कृषि विज्ञान केंद्र की टीम ने पराली जलाने से होने वाले नुकसान के बारे में किसानों को जागरूक किया। विशेषज्ञों ने किसानों को समझाया कि समय रहते हमने पराली को जलाना बंद नहीं किया तो आने वाली पीढ़ियों को इसका भारी नुकसान भुगतना होगा। पराली जलाने से कैंसर जैसी बीमारी से लोग शिकार हो रहे हैं। वह जमीन की उर्वरा शक्ति को भी कमजोर कर रही है। पराली जलाना किसानों के लिए सबसे खतरनाक साबित हो रहा है। इसलिए किसानों को समय रहते सावधान होना होगा।

रविवार को गांव मालवेष में किसानों को संबोधित करते हुए कृषि विज्ञान केंद्र के वरिष्ठ संयोजक प्रोफेसर वेदप्रकाश लुहाच ने कहा कि पराली जला कर हम पर्यावरण को तो नुकसान पहुंचा ही रहे हैं साथ में हमारी धरती मां की उपजाऊ शक्ति को भी कमजोर किया जा रहा है। ऐसे में जब वातावरण जहरीला हो जाएगा और धरती मां उपजाऊ शक्ति ही कमजोर हो जाएगी तो हम कैसे जीवित रह पाएंगे। इसलिए आइये यह संकल्प लें कि भविष्य में पराली नहीं जलाएंगे। इस दौरान किसानों ने अपनी समस्याएं भी रखी और प्रो. लुहाच ने उनकी समस्याओं का समाधान भी किया। किसानों को उत्तम खेती के गुर भी बताए। इस मौके पर किसानी को सम्मानित भी किया गया। इस मौके पर किसानों और अधिकारियों ने दैनिक जागरण की भी सराहना की और कहा कि जागरण लगातार लोगों के बीच रहता है। इस दौरान कृषि विज्ञान केंद्र के वरिष्ठ संयोजक प्रोफेसर वेदप्रकाश लुहाच, डा. योगिता बाली, सस्य विज्ञान विभाग, डा. मीनू कौर, विज्ञान विभाग, इंजीनियर स्वदीनल चौधरी, फार्म पावर मशीनरी विभाग से, चरण सिंह हरियाणा कृषि विश्वविद्यालय हिसार, रामचंद्र तकनीशियन ने गांव मालवेष में किसानों को पराली से होने वाले नुकसान के बारे में बताया।

भिवानी केसरी

जिला स्तरीय किसान मेले में कृषि विशेषज्ञों ने दी जानकारी

फसल अवशेष न जलाने के लिए किया किसानों को प्रेरित

Hello jagran programme was also organized under this project. During this programme, Sr. Coordinator staff of KVK listen the problems of the farmers on telephone and created awareness among the farmers. This programme was of one-hour duration. All these trainings, awareness programmes, school and college programmes were covered in newspapers.

2.3 KVK, Fatehabad

KVK has been in the fore front in sensitizing the farmers and other stakeholders about the ill effects of residue burning. KVK organized different awareness programmes to motivate farmers not burn the residues themselves and to motivate others too as well as to opt for alternative residue management techniques. KVKs actively collaborated with the State Department of Agriculture and other government and non-government institutions and organizations to convince farmers to quit the practice of crop residue burning. KVK organized activities throughout the year and more specifically

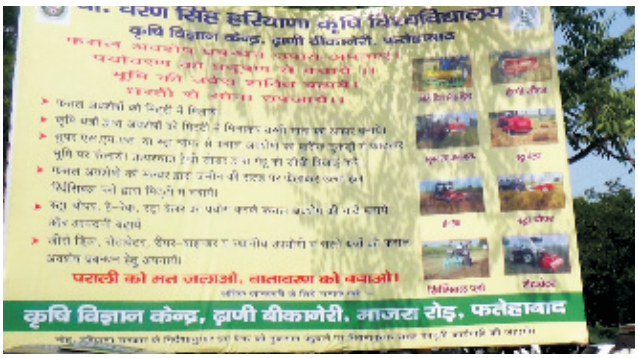
during the harvesting seasons of wheat and paddy crops with the objectives to create awareness about the ill effects of residue burning on environmental, soil and human health and to demonstrate available residue management technologies. KVK displayed hoardings at prominent places in the district and slogans were written on walls to sensitize farmers about this burning issue. KVK also conducted demonstrations, trainings, awareness camps, TV talks, field visits, kisan sammelans, kisan gosthis, farmer-scientist interactions, etc. to meet stated objectives. The mass movement initiated by the KVK in collaboration with agriculture and farmer's welfare department Fatehabad at the grass root level against crop residue burning has received wider attention. Similarly, advisories on CRM were provided & literature were distributed. Highlights of efforts undertaken by KVK, Fatehabad for environment building against residue burning and to motivate farmers for adoption of CRM has been detailed.

2.3.1 Awareness camps on CRM

KVK, Fatehabad organized activities throughout the year and more specifically during the harvesting seasons of wheat and paddy crops with the objectives to create awareness about the ill effects of residue burning on environmental, soil and human health. Interactive lectures were delivered on CRM in various block, district level programmes organized by other line departments.

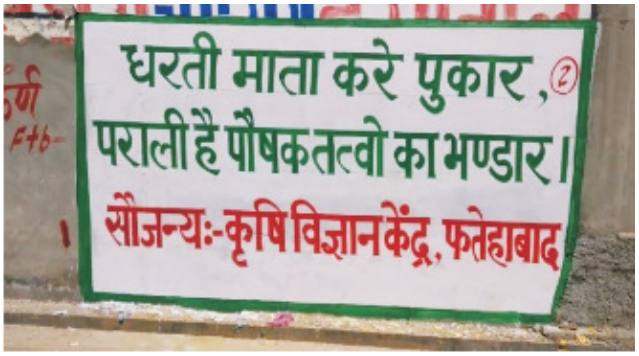
2.3.2 Display of hoardings:

To create awareness about CRM among farming community, hoardings on CRM were displayed at prominent places in Fatehabad City and adopted villages *i.e.* Dangra & Haroli.



2.3.3 Message writing on walls at villages:

To change attitude against paddy residue burning, number of emotional slogans like "dharti maata kre pukaar parali hai popshak tatvo ka bhandar", "parali ki khad babayenge mitti ka jaivik shakti badhayenge" etc. were written on walls at different prominent locations to sensitize farmers about this burning issue.



2.3.4 Conductance of farmer-scientist interface

KVK organised farmers- scientist interface programmes in the adopted villages to create awareness and to provide related need based information of the queries regarding CRM in paddy. Participating farmers were also provided literature on "*In-situ* CRM through mechanization." In these farmers–scientist interfaces, more than 160 farmers participated and get benefitted. Farmer- scientist interface on CRM was also organised at village Dhani Maggawali on 7th November 2018. Dr. R. S. Hudda, DEE, CCS HAU Hisar and Dr. Rajbir Singh Director, ICAR-ATARI, Zone-I interacted with farmers and resolved their issues regarding paddy residue management.

2.3.5 Kisan prashan manch programme on DD kisan channal:

Scientists of KVK, Fatehabad participated in DD Kisan *Parshan Manch* programme on "*fasal avesesh prabandhan*" which was telecast on 30th August, 2018 on DD Kisan, in which a detailed discussion was held on the seriousness of the residue burning problem and road map for effective and efficient management of crop residues.

2.3.6 Organisation of Kisan Mela

Kisan Melas is one of the important show activities to pass on information among the farmers. Keeping this in view, Kisan Mela on CRM was organised in the adopted village Haroli on 28th December, 2018. All the machineries used in paddy residue management like Happy Seeder, ZT seed drill, Mulcher, Rotavator, MB Plough etc. were exhibited in the mela. The attractive feature of this Kisan Mela was question–answer session about

CRM besides technical session where the resource person from the CCS HAU delivered interactive lectures on CRM and current issues of rabi crops particularly wheat. At this occasion, 20 farmers who have adopted CRM and acted as a role model in CRM were felicitated. In this Kisan Mela, 400 farmers & farm women and 21 extension officers of other line department participated. Some of the glimpses of this Kisan Mela are highlighted below have in.

2.3.7 Demonstrations on CRM

Demonstrations on CRM were conducted by KVK based on principle "seeing is believing". The purpose of creation of applicability of technology *i.e.* paddy straw management by use of combine with super SMS followed by sowing of wheat through happy seeder, incorporation of paddy residue into the soil using straw chopper, MB plough etc. This was done with cooperation and participation of farmers and under the guidance of KVK scientists. KVK conducted 140 such demonstrations at farmers' fields in adopted villages on proper use of Happy Seeder in wheat sowing.

2.4 KVK, Jhajjar

It is well known that technology alone does not drive any development. A supporting environment of enabling institutional factors is necessary to permit the use and the derivation of benefits from a new technology before widespread adoption and transformation of a technology can take place. Farmers at district level were made aware about the ill effects of paddy straw burning for soil health, environment and human health. For this purpose, 20 hoardings and 50 wall paintings were displayed at public places viz. Bus Stand, Anaj Mandi, Sabji Mandi, District secretariat, Public parks and also in operational villages for creating awareness at mass level among the public. In five blocks, one day farmers training was also conducted by KVK, in which 269 farmers participated and got motivated. Total 15 villages awareness programme were organized in collaboration with Department of Agriculture & Farmer's Welfare, Jhajjar.

Method demonstrations were also conducted at farmers' fields on different farm machineries viz. Happy seeder, Zero-Till Drill, Paddy straw chopper, Cutter-cum spreader etc. Farmers made a group of active and progressive farmers in their village and by their efforts they started the sale of paddy straw. Also started preparing the chara (fodder) by cutting the paddy straw for their animals. A district level Kisan Mela was organized in operational village. Farmers were motivated by delivering expert lectures on paddy straw management through farm machineries. Exhibitions have been installed by KVK and all allied departments during the Kisan-Mela.

2.5 KVK, Jind

2.5.1 Hoardings and banner installation

A farmer group of Durana was not ready to opt the CRM instead of rally of school children at the village. This was the mindset of the farmers of village Durana. The same group now view that it was due to ignorance regarding facilities and exposure to Happy Seeder, SMS, Cutter like machines. W a l l paintings were done at least more than dozen places in both villages. Hoardings were raised, meetings were conducted in Gurudwara and places like Chaupal of the village. Hoardings were also raised at Jind Railway Station, Bus Stand, Mini Secretariat for creating an environment of CRM. Nobody raised objections as this was the special programme of Government of India.

In district Jind, 174 CHCs were established for CRM and resource person from this center were member of Joint team of AAE, DHO, DDA etc. This team worked from morning to late evening for three months for effective function of 174 CHCs.

हरिभूमि

जींद भूमि

अवशेष जलाने से बढ़ता प्रदूषण

दैनिक जागरण

पिछले साल पराली जलाने के 83 केस, इस सीजन में अब तक नौ

फसल अवशेष

पराली नहीं जलाएंगे पर्यावरण बचाएंगे

पराली के समाधान पर आज फोन पर लें जानकारी

हैलो जागरण

2.6 KVK, Hisar

As burning of crop residues is a common practice in Hisar district, Hence, in-situ CRM is a novel approach for paddy growers, so efforts for proper environment development is required to stimulate the farmers.

2.6.1 Organised awareness programmes with state department of agriculture

To change the negative thought and attitude of farmers, KVK scientists started awareness programmes from the month of May, 2018. Initially KVK scientists creation of participated in the programmes organized by State Department of Agriculture. These programmes were organized block wise and covered almost each village of the district where rice-wheat is major crop rotation. There were mainly focused on discussion with the paddy growers regarding pros and cons of In-Situ CRM. In collaboration with team of grass level extension functionaries, KVK scientists participated in these awareness programmes and positively convinced the farmers towards in-situ CRM.

2.6.2 Awareness programmes organised in selected village

KVK scientists organized awareness programmes in the selected villages viz. Khokha and Ghirai. In these villages, kisan ghosthis, meetings and FSI were organized to change the mind-set of farmers and to analyse the challenges and opportunities towards the approach of In-Situ CRM. In all these programmes, KVK team, interacted with the farmers and analysed the challenges and opportunities in the way of in-situ CRM. Through lectures in these programmes, they created awareness among farmers on hazardous effects of straw burning and govt. schemes on in-situ CRM.

2.6.3 Installation of hoardings and banner

Wall paintings, hoardings and banners were installed at prominent places in the selected villages to promulgate the idea of In-Situ CRM to the highest possible numbers of villagers. The message or information on these hoardings include the harmful effects of residue burning on soil, air, biodiversity and human health and with the suggestive possible ways to manage this problem in an eco-friendly and fruitful manner.

2.6.4 Mass awareness through newspaper advertisement

All the activities undertaken by KVK, Sadalpur under this project were properly submitted to leading newspapers to publish with most priority. This type of advertisements, created mass awareness among framers committee on *In-Situ* Crop Residue Management.


हिसार केसरी

शनिवार SATURDAY 29 दिसम्बर 2018

फसल अवशेषों के प्रबंधन बारे दी जानकारी

2.6.5 Organization of kisan mela

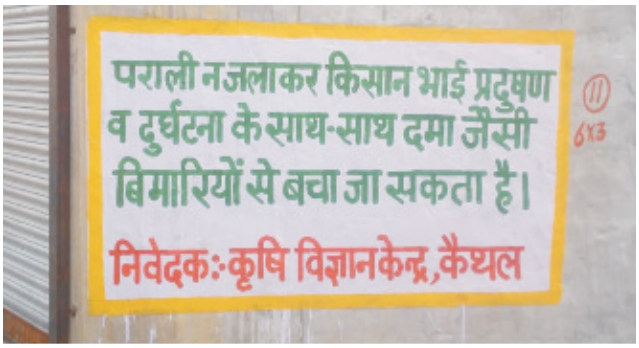
KVK, sadalpur also organized a kisan mela on In-Situ CRM at selected village Khokha on 27th December, 2018. In this kisan mela, 400 farmers from selected as well as nearby villages participated and got complete information about In-Situ CRM under Rice-Wheat cropping system. Different resource persons from State Department of Agriculture, State Department of Animal Husbandry, State Department of Horticulture, Soil Conservation Officer, Scientists from HAU, etc. took part and deliver interactive lectures and encouraged the farmers towards in-situ crop residue management.

2.7 KVK, Kaithal

2.7.1 Installation of hoardings and banner

A farmer group of Hajwana was not agreed with CRM activities. Now the same farmers view that it was due to ignorance regarding facilities and lack of exposure to Happy Seeder, SMS, Cutter like machines. Wall paintings were done at least more than dozen places in District Kaithal. Hoardings were raised, meetings were conducted in places like Chaupal of the villages. Hoardings were also raised at Kaithal Railway Station, Bus Stand, Mini Secretariat for creating an environment of CRM. Farmers do not raise objections on this in special programme of Government of India.

In district Kaithal, more than 130 CHCs have been established for CRM and resource person from this center was member of Joint team of AAE, DHO, DDA etc.



2.7.2 Mass awareness through Newspaper advertisement:


HTSPOTLIGHT FIGHTING POLLUTION, AGENTS OF CHANG

5 Haryana villages show the way with zero stubble burning

EXAMPLES TO EMULATE At a time when stubble burning in Haryana, Punjab is seen as primary cause for pollution in NCR, farmers of five villages share how they opted for innovative ways to dispose of the crop residue

STATUS CHECK


प्रदेश के किसान अब नहीं जलाते पराली

रंग लाए दैनिक जागरण और राज्य सरकार के मिले-जुले प्रयास


जागरण सिटी

फसल अवशेष जलाने वाले किसानों पर निगरानी रखें अधिकारी : डीसी

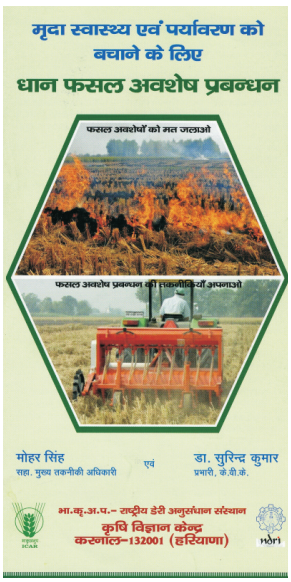
2.8 KVK, Karnal

2.8.1 Organisation of trainings and demonstrations

KVK, Karnal demonstrated the sowing of wheat in 84.0 acres' at 31 farmers' fields with happy seeder. Zero tillage was demonstrated in 224.0 acres' field of 42 farmers. Hence a total of 308 acres were covered under demonstration in all the three adopted villages. KVK organized three training progammes, each of three days' duration on In-Situ CRM. Total 90 farmers were participated from the adopted three villages. The resource person in soil conservation and crop residue management from ICAR institutes and farmers who had already doing conservation agriculture were invited to deliver interactive lectures and share their experiences.

KVK also organized 16 on and off campus awareness programmes and Kisan Goshti during 2018-19. However, in every training programme farmers were sensitized on subtle burning.

2.8.2 Mass awareness through newspaper



2.9 KVK, Kurukshetra

Clean environment is paramount importance for healthy and quality human, animal, plant life. Now a day there is hue and cry over north India on burning of crop stubbles and emission of harmful gases. One of the major causes of this problem specifically during the months of October-November is due to paddy crop residue burning. This polluted air further travels to distant places spreading the illness. Hence various programmes were organized by the KVK along with various stakeholders including Department of Agriculture and Farmer Welfare, School, Colleges, Village Panchayats, NABARD, Cooperative Societies, farmer groups and NGOs etc. with the purpose to create awareness programmes on crop residue management.

2.9.1 Installation of hoardings, banner and wall painting

Wall painting with different types of slogans related to CRM were done at KVK, Kurushetra and in adopted villages of Kurushetra district *i.e.* Barna and Kamoda. The paintings were done at almost all the prominent places like bus stop, choupal, boundary of school villages, village entrance, gurudwara and even at cremation places. The advertisement technique used by wall paintings has helped in reminding the farmers on a continuous basis the importance of non-burning crop residue. Children of the villages are becoming aware of the importance of this due to catchy slogans painted on the walls. As much as 40 banners and 20 hoardings were installed among the major roads in the target areas from where farmers and other stakeholders visit pass. It was intended to create the attention of viewers and give them a clear message about not burning the crop residue in local language.

2.9.2 Publication and distribution of Leaflet/Manuals/Bulletin/Booklets/Stickers

Different type of manual's, leaflets and bulletins on working of CRM machinery and effect of burning on soil and human health entitled “Fasal Avshesh Na Jalayein, Bhumi ki upjaau Shakti Badhayein va Paryavaran Bachayein” has been published in Hindi and widely distributed among the farming community of district Kurushetra. The news bulletins published quarterly by this KVK from July-September and October-December 2018 also published articles on various techniques of CRM and

several other articles on this aspect have also been published by the scientists of this centre in Haryana Kheti, Kheti Duniya, Krishi Samvad and Haryana Sehkari Parkash etc. as well. A booklet containing latest and environment friendly techniques of CRM has also been prep and published soon.


फसलों के अवशेष को जलाकर अपने ही पांव पर कुल्हाड़ी मार रहे किसान

पाठक पैनल

अभियान

- दैनिक जागरण के फैक्ट डिटेक्शन में कृषि विशेषज्ञों ने किसानों को दिए सुझाव
- खाने खेत में ही मिलाने पर बढ़ती है मिट्टी की उपजाऊ क्षमता

बहुत कम डालना पड़ा खाद

गांव में खुले हैं कस्टम हायरिंग सेंटर

खेत में आग लगाने से नष्ट हो रहे मित्र कीट

आलू उत्पादन में हुई बढ़ोतरी

मशीनों की कमी, सरकार भेजे उपलब्ध मशीनें


कुरुक्षेत्र

किसान मेला व प्रदर्शनी में कृषि विशेषज्ञों ने वैज्ञानिक तरीके से खेती करने को किया जागरूक


अमर उजाला

30 लाख की लागत से फसल अवशेषों का खेतों में ही होगा प्रबंध

2.9.3 Media coverage

Similarly, Kisan Mela coverage and other activities viz. training on CRM, demonstration on CRM, Kisan Gosthi, Fasal Avshesh Paricharcha were also telecast by DD Kisan and other private channels. As much as 5 TV talks were delivered to the national and private channels by the scientists of this centre. As much as 50 press coverage with regards to CRM were appeared in different newspaper and spread specific messages to reduce stop burning and adopt effective in-situ residue management options.

2.9.4 Release of advisories

This centre has also released time to time advisories with regards to CRM techniques to the farmers of district Kurushetra. As much as 7 SMS were sent where benefited 55000 farmers on this aspect.

2.10 KVK, Panipat

Regarding literature, KVK published leaflets/pamphlets, manual on Happy Seeder and on paddy straw management through mechanization (2600 in numbers) were distributed amongst the stakeholders.

Wheat Sowing by Happy Seeder: Field visit by Dr H N Meena, Senior Scientist, ICAR-ATARI, Jodhpur

KVK Panipat organized 2 farmers-scientists' interactions where 150 farmers (75 from village Kaith and 75 from village Urlana) participated.

All these capacity building efforts translated in good adoption of Residue Management Technologies in district Panipat. Despite the combine harvesting of paddy in about 25000 ha out of total paddy area of 78000 ha, residue burning incidents were very few and District Panipat has been rated as number 1 in the domain of residue management in the state of Haryana. This is corroborated by the HARSAC data providing the satellite-based data (25th Sept. 2018 to 2nd Dec. 2018) for paddy growing

areas. Only 37 fire incidents were reported in district Panipat in comparison to 10286 fire incidents reported for the whole state of Haryana. It is submitted that District Panipat accounts for almost 6.0% of the Paddy are in the state of Haryana (Panipat- Approx. 78000 ha, State of Haryana- 1320000 ha).

फसल अवशेष प्रबंधन पर जागरूकता अभियान

संसू, बापौली :ऊझा गांव स्थित राजकीय वरिष्ठ माध्यमिक विद्यालय में वृहस्पतिवार को फसल अवशेष प्रबंधन जागरूकता अभियान चलाया गया। कृषि विज्ञान केंद्र के वैज्ञानिकों ने विद्यार्थियों को फसल अवशेष प्रबंधन के फायदों बारे बताया। डॉ. देवराज ने बताया कि फसल अवशेष जलाने से वायू प्रदूषण को बढ़ावा मिलता है। इसके अलावा भूमि के लाभदायक मित्र कीट भी जलकर नष्ट हो जाते है। वहीं भूमि की उर्वरता शक्ति भी कम हो जाती है। डॉ. संदीप अंतिल ने बताया कि बताया कि फसल अवशेष जलाने से श्वास संबंधी रोग उत्पन्न होते है, इससे बचना चाहिए। फसल अवशेषों को स्ट्राचोपर, मल्चर, नीरो टिलेज और हैप्पीसीडर जैसी मशीनों से भूमि में भी समायोजित किया जा सकता है। डॉ. सतपाल ने बताया कि फसल अवशेष प्रबंधन से भूमि की उर्वरता शक्ति बढ़ती है। विद्यार्थियों ने फसल अवशेष प्रबंधन पर चित्रकला और निबंध लेखन प्रतियोगिता में हिस्सा लिया। निबंध लेखन प्रतियोगिता में तमन्ना, काजल व सेजल ने क्रमश: प्रथम, द्वितीय और तृतीय स्थान हासिल किया। चित्रकला प्रतियोगिता में एकता, अनु, वीनू, की टीम प्रथम, मनीष, अमन द्वितीय और रीनू, पूजा ने तृतीय स्थान हासिल किया।

2.11 KVK, Rohtak

Open field burning of crop stubble results in the emission of many harmful gases in the atmosphere, like carbon monoxide, N_2O, NO_2, SO_2, CH_4 along with particulate matter and hydrocarbons. These trace gases have adverse implications not only on the atmosphere but also on human and animal health. Different efforts made by KVK, Rohtak for environment building by preventing residue burning.

2.11.1 Organisation of awareness programmes at KVK

KVK, Rohtak scientists organized various awareness programs and rallies for farmers and youth of Rohtak district to stimulate their mind regarding ill effects of crop residue burning and benefits of sustainable CRM. Total 274 participants participated in these programs.

2.11.2 Organisation of awareness programmes in selected villages

KVK scientists organized awareness programmes in the selected villages viz. Sanghi and Bainsi. Group meetings, trainings and kisan ghosthis were organized to sensitize rice growing farmers about the challenges and opportunities towards the noval approach of *In-Situ* CRM. In all these programmes, Head along with KVK team, interacted with the farmers and advised them for sustainable residue management by avoiding straw burning.

2.11.3 Organisation of awareness programmes with state department of agriculture

KVK, Rohtak collaborated in various awareness programs organized by State Agriculture Department to aware Rohtak district farmers about ill effects of crop residue burning and to change the mind set of farmers. Interactive lectures were delivered by KVK scientists in various village and block level programmes which covered almost each village of the district where rice-wheat is major crop rotation and participated in State Level Kisan Mela. More than 1209 participants were made aware about pros and cons of crop residue issue.

2.11.4 Installation of hoardings, banner and wall paintings

Wall paintings, hoardings and banners were installed at prominent places in the selected villages to disseminate the pros and cons of In-Situ CRM to the farmers. The useful information was provided on

these hoardings *i.e.* the ill effects of residue burning on environment, soil health, air quality, and living entities and possible and easiest ways to manage crop residue in an environment friendly and sustainable way.

2.11.5 Mass awareness through newspaper

Activities related to participates on as well as conductance by KVK Rohtak under this project have been submitted to leading newspapers of district to publish with most priority.

2.12 KVK, Sirsa

All of us know that due to residue burning large amount of smoke is generated from the burnt residue which results in environment pollution. The soil environment and microbe's habitats are also adversely affected by increase in upper layer temperature of the soil. Due to this the uptake of soil nutrients and minerals elements is adversely affected. To curtail this problem and to make aware the farmers about this, meetings and kisan gosthis were organised in the village and the adverse effect of residue burning in terms of environment pollution was told at length to the farmers. Farmers were told

that the smoke as a result of residue burning not only causes environment hazards, but it also causes health hazard to human being and animals. The only solution to this problem is no residue burning. Hence, farmers were told about the residue management practices such as use of happy seeder and zero tillage machine so that the residues can be managed in the field. It increases the crop yield and soil nutrient content availability and ultimately supporting conservation agriculture. In addition to organising farmer meeting, essay competition, story writing, and painting regarding harmful effects of residue burning were organised in the schools. Gram panchayats took oath for making the village free from residue burning. Announcements, campaigns and other extension activities were organised in the village leading to zero percent residue burning in the village.

2.13 KVK, Sonipat

During implementation of the project concerted each and every effort was done by KVK to aware the farmers of the district. KVK, Sonipat prepared 44 hoardings 13 wall paintings, 8000 leaflets to aware the farmers about the ill effect of paddy straw burning on environment. Main offices at district Head Quarter, Sub Division, Block & Tehsil level offices were covered by fixing these hoardings. Hoardings and banners were also displayed in two selected villages; 10 wall paintings were done written in two villages beside three on prominent places on National Highay-1.

Farmers of the district made aware about the harmful effects of crop residue burning.

KVK, also conducted 15 trainings sponsored by State Agriculture Department Haryana in which 753 progressive farmers participated. Every farmer took oath to save environment and to adopt technologies of paddy straw management. 250 front line demonstrations were conducted in two selected villages to show the real effect of CRM machinery through learning by doing principle.

2.14 KVK, Yamunanagar

2.14.1 Wheat sowing through Happy Seeder

In the extensive rice-wheat system of Yamunanagar, harvesting is done by large combines. The rice residues are normally burnt after harvest, followed by irrigation and intensive tillage prior to sowing wheat. While in-fields, retention of crop residues can play an important role in replenishing soil quality and reducing environmental pollution from stubble burning. To demonstrate the technologies, KVK Yamunanagar under central sponsored scheme, "Promotion of Agricultural Mechanization for In-situ Management of Crop Residue" has adopted two villages viz. Dhouli and Alhar in which around 95 ha area has been brought under conservation agriculture using Happy Seeder/ZT machines. It has resulted in saving of precious water, diesel, time along with reduced environmental pollution and are now burning free. The results till now have been encouraging and farmers are coming forward to accept this technology with open hands. Some glimpses of the technology demonstration in farmers' fields are depicted in field photographs.

2.14.2 Celebration of world environment day

World Environment Day was celebrated at the campus of KVK Yamunanagar on 5th June, 2018. On this day, Sr. Coodinator, emphasized on the importance of this day and the need to find solutions to plastic waste. Head of KVK informed that use of plastic in daily life is increasing day by day, which not only pollutes our environment but also poses secondary risks of degrading soil quality, clogged water channels etc. He requested all the farmers present on this occasion to take pledge to use plastic and allied products to the minimum and instead use cloth/paper bags. Head insisted on using those agricultural practices which have minimum environment impact.

On this occasion, Dr. N. K. Goel insisted farmers to apply fertilizer on the soil test basis only so that minimum residues remain in the soil and its fertility can be maintained for longer duration. A team of scientist advocated seed treatment to minimize pesticide application on later stages which will go a long way in preserving natural biodiversity and quality of environment.

2.15 KVK, Delhi

2.15.1 Technology disseminated

Technology disseminated (Happy Seeder, Zero Seed Cum Fertilizer Drill for wheat sowing) to farmers and the benefits from conservation Agriculture are given below:

- Saving of precious soil and environmental resources through sustainable crop residue management.
- Reduction in environmental pollution due to burning of residues and adopt new conservation technology by mechanization.
- Saving of diesel, time and energy
- Protecting Natural Resources (Water, Minimum Cultivation, and low chemical use)
- Improvement Organic content, soil moisture and Nutrients in soil health
- Improved yield owing to reduced terminal heat stress
- Reduce Cost of Cultivation
- Higher economic returns

2.15.2 Awareness creation

Awareness created amongst the farmers about the economic loss suffered due to stubble burning / Crop Residue.

Created Awareness about the different alternatives of utilizing the crop residue and making it economically feasible.

Farmers prepared fodder from Paddy Stubble Residue

Wheat Sowing by Happy Seeder: Field visits by Dr H N Meena, Senior Scientist, ICAR-ATARI, Jodhpur

2.15.3 Establishment of a market place for crop residue

Efforts were made to increase avenues for the alternate usage of paddy straw/crop residue in adopted village. For instance, paddy straw has a considerable calorific value, making it suitable for use as a fuel in biomass-based power plants. Similarly, it can be utilised for the preparation of fodder for animals and sale for bio-fuels, cardboard making industries.

2.15.4 Organised demonstration

KVK conducted demonstrations by Happy Seeder, Zero-till Seed Cum Fertilizer Drill, Shrub master and Mulcher. During rabi (2018) season, 90 ha. Wheat cultivation has been done through mechanization.