IMPACT OF RKVY PROJECTS IMPLEMENTED/IMPLEMENTING IN CCSHAU, HISAR

PROJECT SANCTIONED 2009-10

1. **Title:** Strengthening of Soil Testing Services for secondary and micro nutrients.
2. **Category:** Agriculture, under the project RKVY Department Soil Science purchased the latest instruments required for the analysis of Soil and water samples.
3. **Challenge:** The degradation of soil and water along with nutritional imbalance are the most focused problems of the State. Nutritional deficiencies may enter in to food chain and consequently affects the human and animals health. To overcome these problems integrated nutrients management and balanced use of fertilizers is necessary. For the balanced use of fertilizer and proper selection of crops soil and water testing is must.
4. **Initiative:** To overcome the above said problems Department of Soil Science CCSHAU, Hisar purchased the latest instruments required for the analysis of Soil and water samples such as atomic absorption spectrophotometer, nitrogen auto-analyzer, spectrophotometer, flame photometer etc. of latest technology. Under this project soil testing laboratory starts analyzing the soil samples for micronutrients (zinc, copper manganese and iron) in addition to macronutrients. Implementation of the project was done within the given time.
5. **Key results:** After the implementation of this project soil testing laboratory, Department of soil Science, CCSHAU, Hisar analyzed a total of 31348 soil and 19721 water samples received from the farmers and other agencies were analyzed for the different parameters of soil and water. Out of total of 31348 soil samples 2035 samples were analyzed for micronutrients. After the analysis of soil and water samples all the reports sent to the farmers and other agencies (Govt. and privet institute) with a proper interpretation of results and recommendations based on the reports for the use of different fertilizers, plantation of orchard/garden and use of underground tube- well water for irrigation in different crops and soil types.
6. **Impact:** After the implementation of this project farmers come to know about the analysis of soil samples for secondary and micronutrients and this has helped in increasing the awareness of farmers regarding soil health. Now more and more farmers are coming to get their soil samples tested for secondary and micronutrients. Farmers are directly benefited by the detail and quick analysis of soil and water samples received from their fields. As a consequence by concerted approach of the Soil Scientists, many farmers have adopted balanced use of fertilizers, use of organic manures, soil and water testing before planning the plantation of fruit trees , soil reclamation etc. in a big way".

   At last, these facilities of soil testing certainly helped in maintaining soil health and increasing agricultural production specially of Haryana state and in general of adjoin states.

7. **Lessons:** Since the instruments purchasing procedure of CCSHAU, Hisar is very time consuming therefore, it takes a lot of time for implement the purchasing of instruments etc.
8. **Supporting Quotes and Images:** Since soil and water testing facilities are not for any specific cast but it is open for all farmers and other agencies. So all the farmers got benefit of these soil and water testing services.
9. **Additional information:**
    1. Principal Investigator : Dr. B. S. Duhan, (Professor and Head Rtd) , Department of Soil Science, CCSHAU, Hisar
    2. Collaborator : None
    3. Contact person : None
    4. Other information : Nil

PROJECT SANCTIONED 2010-11

1. Title	Development of Lab. Facilities for Organic Food Analysis
2.Category	Agriculture(Agri-infrastructure development)
3.Challenge	Food security, nutritional quality and safety vary widely around the world. Reaching these three goals is one of the major challenges for the near future. The industrialized production methods have severe limitations such as a worldwide contamination of the food chain and water by persistent pesticide residues, reduced nutrient and flavour contents through low-cost intensive food production. About half of the total pesticides used in Haryana are consumed in cottons and vegetables with herbicides being prominent for controlling weeds in rice-wheat system. The reports of pesticide contamination in soils, plants and waters are well known. In addition to this, sewage sludge containing both, beneficial as well as toxic ions are produced by different sewage treatment plants located in different towns of Haryana and could be potent source of nutrients in crop production. Due care is required while using such wastes as these may result in the simultaneous addition of hazards metal ions. Regular application of such materials may result in their build up in soils and subsequently transferred to the crops especially the vegetable and animal fodder grown in the vicinities of urban areas. There is need to regularly monitor the quality of the farm produce to detect the entry of toxic ions in the food chain.
4.Initiative	There is need to regularly monitor the quality of the farm produce to detect the pesticide residues, nitrates in vegetables, mycotoxins and toxic metals. Much of the debate concerns the merits of organic agriculture which is often seen by the public as producing food free of chemicals and being more environmentally friendly. In view of this, CCS Haryana Agricultural University, has taken the initative of creating laboratory facilities for testing, training and research in "organic food" production. The laboratory must be equipped with high precision equipments under one roof. Certification requirements also demand that the sample preparation unit should also be attached with analytical laboratory. In view of the above, there was need to create laboratory facilities for the analysis of food/feed/cereals and other crop samples grown organically. To create this type of facilities-

a). The laboratory has been modified/constructed as per NABL requirement
b). Infrastructure of the laboratory has been created.
c). Major equipments such as GC, GC-MS/MS, HPLC and other small equipments under RKVY Project, have been installed. The costly equipments such as LC-MS/MS, ICP will be added in near future.
d). Facilities for sample storage, separate gas chamber and power back-up through Gen set have been created.
e). Facilities for processing of samples have been created.

5.Key result	A large number of samples for herbicide residues have been analyzed and attempts have been made to get aware of the farmers of its contamination of soil and water to prevent the indiscriminate use of the herbicides.
6.Impact	The indiscriminate use of pesticides will be decreased.
7.Lessons Learned	To do the farmer's sample for the pesticide residues Staff as well as contingent grant for chemicals etc. Will be required.

8. Supporting Quotes and Images

GC MS/MS System

9.Additional information NIL

PROJECT SANCTIONED 2010-11 AND 2012-13

1. Title: Establishment of Farm Machinery Testing Centre & Strengthening of Farm Machinery Testing Centre
2. Category: Agricultural Mechanization
3. Challenge:

The Govt. is giving subsidy on the purchase of farm machines which are tested at the four farm machinery training and testing institutes established by Govt. of India at Budni, Hisar, Anatapur and Biswanath Chariali. But it was not possible for the four institutes to test all the tractors and farm machines in short duration with the result, the manufacturers had to wait for longer duration to get their machines tested by the above said four institutes. Keeping in this view, the Department of Farm Machinery and Power Engineering, CCS HAU, Hisar expressed its willingness to shoulder the responsibility of testing of farm machines as per the BIS codes. Accordingly,

Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India vide letter No. F.No.8-1/2004-My (I&P) dated 14th September, 2010 had approved the College of Agricultural Engineering and Technology, CCSHAU, Hisar for testing and certifying Agricultural Machinery and Equipments. However no budget was provided. Thus, the Department submitted a proposal for funding the project on Establishment of Farm Machinery Testing Centre at CCSHAU, Hisar.

During 2010-12, a project entitled "Establishment of Farm Machinery Testing Facility" was approved for a total cost of Rs. 83.52 lakh. With this amount the farm machinery testing centre was set-up and started to test the farm machinery received from the manufacturers. However, the infrastructure and instrumentation was not sufficient. Therefore, a project entitled "Strengthening of Farm Machinery Testing Centre" was submitted for the strengthening the testing centre with more infrastructure and instrumentation amounting Rs.100 lakhs.

4. Initiative:

The basic infrastructure needed for testing of farm machinery was developed by procuring four nos. of prime movers, PTO torque sensor, data acquisition system, vibrationmeter with accelerometer, renovation/strengthening of sheds, measuring gadgets, patternator, seed drill calibration rig, etc. Necessary guidelines needed for the testing of agricultural machinery was formulated and the applications were invited for testing of farm machinery w.e.f. 08.08.2011. The Department has received 1887 applications from various manufacturers for the testing of various farm machinery as on 31.03.2017 and approximately 1428 applications have been disposed off and more numbers of applications are being received every day. Till date, approximately 500 test reports of different agricultural machinery have been released. Thus, the Deptt. has enough work to continue the scheme, as it is essential to ensure that quality products are available for the farmers.

5. Key result/ insight/ interesting fact:

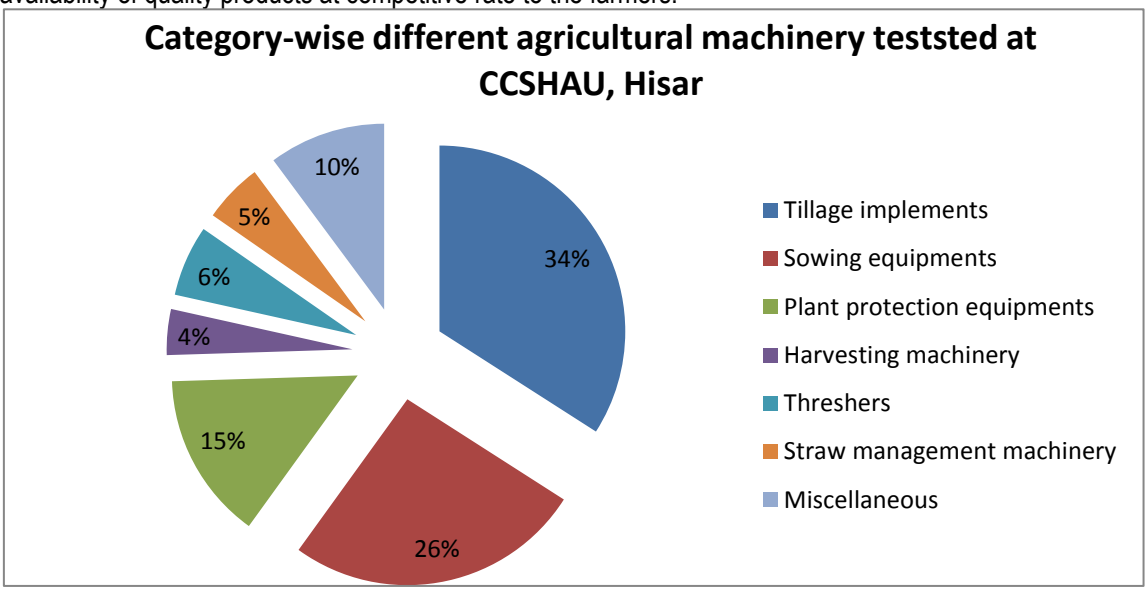
The establishment of testing facility for farm machinery in the Department of Farm Machinery and Power Engineering has helped in testing of more agricultural equipments that are favourable for the state of Haryana. This has also helped in the availability of quality agricultural machines to the farmers of the State. Till date, approximately 500 numbers of different agricultural machinery fabricated by different manufacturers have been tested.

A view of the Farm Machinery Testing Centre established under RKVY

Hon'ble Governor of Haryana Sh. Kaptan Singh Solanki having a glance at the test reports released by Farm Machinery Testing Centre

6. Impact:

In order to achieve maximum returns, agricultural machinery need to be designed and developed efficiently and tested thoroughly to ascertain their field performance before they reach to the farmers. Many of the farm machines being made lack quality, precision and fail in the field. Moreover, it is an established fact that when more manufacturers are encouraged to manufacture a particular equipment, a sought of competition prevails amongst them resulting in a better quality of product thus favouring the farmers. As on 31.03.2017, 502 nos. of different agricultural machinery has been tested at CCSHAU, Hisar as depicted in the pie-chart which is ensuring availability of quality products at competitive rate to the farmers.



7. Lessons Learned:

As the funds were given for the development of infrastructural facilities, it becomes difficult to meet out the recurring expenditure for successful operation of any project. Thus, provision of recurring expenditure in the initial years of project will help in the smooth functioning of the project. At CCSHAU, Hisar recurring expenditure is being met out from a self-financing project.

8. Supporting Quotes and Images:

"Establishment of farm machinery testing centre at CCSHAU, Hisar has really reduced the long waiting period to get our machinery tested."

Sh. Ranjit Singh, M/s. Sadhu Agro Industry, Fatehabad

"The testing procedure and suggestions of testing authority helps us in the quality management and product upgradation for the benefit of farmers."
Sh. Sanjay Garg, M/s. VSM International (P) Ltd., New Delhi

"We got our machines tested at CCSHAU, Hisar. Now, our firm has been included in the list of approved fabricators by various States for the disbursement of subsidy to the farmers for the supply of different agricultural machinery"
Sh. Mahavir Jangra, M/s. Aman Viswakarma Engg. Works, Hisar

Manufacturers receiving the test reports of their product during different occasions

9. Additional information:
Project partners/donors: Nil
News Items

Farm machinery testing centre opens at HAU

Devendra Uppal
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HISAR: The Farm Machinery Testing Centre, established recently at Haryana Agricultural University (HAU), was inaugurated on Monday.

A meeting of the farm machinery manufacturers was also organised at the university on the occasion. More than 200 participants including agricultural scientists and members and office-bearers of the Haryana Farm Machinery Manufacturer's Association took part in the meeting.

Inaugurating the centre, HAU vice chancellor Dr KS Khokhar said that agricultural machinery industry should be provided with incentive and support, as it lacked in infrastructure and expertise. He said that agriculture sector, which was contributing nearly 16% per cent to the gross domestic product (GDP) of the country, depended heavily on the support of farm machinery industry.

HAU vice chancellor Dr KS Khokhar inaugurates Farm Machinery Testing Centre and Farm Machinery Manufacturer's Meet.
DEVENDRA UPPAL/HT PHOTO

Highlighting the importance of farm mechanisation, the vice chancellor said that it helped in effective utilisation of inputs to increase the productivity of land and labour besides reducing the drudgery of farm operations.

Speaking on the occasion, HAU director of research Dr RP Narwal said that farmers have realised the importance of farm machinery and implements in augmenting the productivity.

In order to achieve maximum returns, Dr Narwal advocated that before these implements reach the farmers, majority of whom are illiterate or semi-illiterate, it was imperative that their designing and efficiency be tested thoroughly to ascetain their field performance.

पंजाब केसरी
09.08.2011

कृषि मशीनरी उद्योग को बढ़ावा दिया जाए : खोखर

हकृवि में कृषि संयंत्र परीक्षण केंद्र का उद्घाटन

हिसार, 8 अगस्त (ब्यूरो): हरियाणा कृषि विश्वविद्यालय में नव स्थापित कृषि संयंत्र परीक्षण केंद्र के उद्घाटन के उपलक्ष्य में आज विश्वविद्यालय में कृषि मशीनरी निर्माताओं की बैठक आयोजित की गई। विश्वविद्यालय के कृषि अभियंत्रण व टैक्नोलॉजी कालेज के फार्म मशीनरी एंड पावर इंजीनियरिंग विभाग द्वारा आयोजित करवाई गई उक्त बैठक में कृषि औजार निर्माताओं, संयंत्र उद्योगों के प्रतिनिधियों व कृषि वैज्ञानिकों सहित करीब 250 प्रतिभागियों ने हिस्सा लिया। विश्वविद्यालय के कुलपति डा. के.एस. खोखर ने उक्त केंद्र का उद्घाटन किया। इस दौरान कुलपति ने कहा कि आज के तीव्र विकास के युग में कृषि मशीनरी उद्योग को बढ़ावा देने की नितांत आवश्यकता है। आज जब हर क्षेत्र में तीव्र विकास हो रहा है, ऐसे में जरूरी है कि कृषि कार्यों में उपयोग होने वाले समय, श्रम व पैसा बचत के उन्नत कृषि औजारों एवं संयंत्रों की पहुंच सीमांत एवं मध्यम दर्जे के किसानों तक हो। उन्होंने केंद्रीय कृषि मंत्रालय के प्रति कृतज्ञता व्यक्त की जिसने अब देश के 21 कृषि विश्वविद्यालयों में संयंत्र परीक्षण केंद्रों की स्थापना की है। इस अवसर पर विश्वविद्यालय के अनुसंधान निदेशक डा. आर.पी. नरवाल ने कहा कि अब किसानों में उन्नत कृषि औजारों के प्रति जागरूकता आई है।

कृषि अभियांत्रिकी कालेज के डीन डा. एम.के. गर्ग ने कहा कि इस केंद्र की स्थापना राज्य कृषि विकास योजना के माध्यम से केंद्रीय कृषि व सहकारिता विभाग से प्राप्त करीब एक करोड़ रुपए के अनुदान से की गई है। उन्होंने बताया कि कृषि उपकरणों के परीक्षण का हरियाणा में यह दूसरा केंद्र है।

हकृवि कुलपति डा. के.एस. खोखर कृषि मशीनरी निर्माताओं की बैठक को संबोधित करते हुए। (नारंग)

Farm Machinery Manufactuers Association Meet held at CCS HAU, Hisar

गांव डाबड़ा में किसानों को पराली प्रबंधन की जानकारी देते एचएयू के विशेषज्ञ।

फसल अवशेषों के प्रबंधन के लिए उपकरणों को बढ़ावा दें : विजया

विभाग अध्यक्ष बोले-स्ट्रा बेलर मशीन उपयुक्त, मिल रही है सब्सिडी

भास्कर न्यूज | हिसार

हरियाणा कृषि विश्वविद्यालय के फार्म मशीनरी एवं ऊर्जा अभियान्त्रिकी विभाग के विशेषज्ञों ने धान की पराली जलाने की समस्या से निजात दिलाने के लिए डाबड़ा गांव में एक कार्यक्रम आयोजित करके किसानों को पराली प्रबंधन के लिए जानकारी दी। उपरोक्त विभाग की अध्यक्ष डॉ. विजया रानी ने कहा कि पराली के प्रबंधन के लिए स्ट्रा बेलर नामक मशीन बहुत उपयुक्त मशीन है और राज्य सरकार द्वारा किसानों को इस मशीन पर सब्सिडी भी दी जा रही है। उन्होंने बताया कि इस मौके पर पैडी स्ट्रा चपर-कम-स्प्रेडर के बाद रोटावेटर के प्रयोग का प्रदर्शन भी किया गया। विशेषज्ञों ने जीरो टिल सीड ड्रिल तथा हैप्पी सीडर के प्रयोग के लिए बल दिया है। उत्तरी क्षेत्र फार्म मशीनरी प्रशिक्षण एवं परीक्षण संस्थान के सहयोग से आयोजित किया गया था।

Dainik Bhaskar 18.11.21016

ISO certification for the established Farm Machinery Testing Centre

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PROJECT SANCTIONED 2011-12

1. **Title** - Strengthening and Development of Agrochemicals Residue Laboratory for Environmental Components and Food Commodities, Department of Agronomy, CCS Haryana Agricultural University Hisar

2. **Category**- Agriculture

Most significant achievement/success story

People of Haryana are facing the sever health hazardous due the persistence of the pesticides/herbicides residues in soil, water and the edibles. Reports from Health Department of Haryana during 2008-2009 clearly indicated that the number of cancer and heart patients increased to 12% in last one and half decade. Similarly the early pubitory attainment in children, early menopause cases in women (even in the age of 35), increased miscarriage cases and problems related to mental disorders in infants has been increased to surprising level in last two decade. Though there is not much research to support the reason of pesticide/herbicide residues behind all these health problems. But we can't forget the case of Endosulfan ban in India on the ground that it is playing with the health of the peoples. The best example is from Kasargod, Kerala where lot of genetic deformation has been observed after the spray of Endosulfan on cashew nut trees in early nineties. So there is a need of proper monitoring of the persistence, dissipation behavior and safe waiting period of various pesticides/herbicides (in special reference to newly introduced molecules) in various agricultural produces and environmental components. With the aim to develop and strengthen the infrastructural and research facilities for testing of agrochemicals residues, the project 'Strengthening and Development of Agrochemicals Residues Laboratory for Environmental Components and Food Commodities' was sanctioned during 2011-12 for Rs. 63.80 lacs by the state level sanctioning committee RKVY. The project has been implemented in time and the Agrochemical Residue Laboratory was established in 2013 and working satisfactory. In 204-15 with the another RKVY sponsored project on 'Strengthening of Agrochemicals Residues Laboratory using state of the art analytical instruments' the research facilities were upgraded by purchase of new analytical instrument GCMS/MS which is very much required for confirmation of tested molecules along with trace level analysis of agrochemicals residues in various food commodities and environmental components. Today Agrochemicals Residues Laboratory is well equipped with state of the art analytical instruments facility for research purpose and providing excellent results in the research area and serving the farmers'. This has become possible only due to the funding provided under RKVY schemes.

3. Challenge

1. To develop new analytical methods for detection of agrochemicals residues from soil and crop produce will be standardized following 'green chemistry'.

2. Studies on persistence and residue estimation of agrochemicals in long term trials.

3. Estimation of residues of new molecules, in crop produce and soil and their residual effects on succeeding crops may be investigated.

4. Regular monitoring of agrochemicals residues in underground water, crop produce and soil at farmer's field as a mandatory practice.

5. Studies of agrochemicals metabolite and the factors governing these metabolites formation may be studied.

4. Imitative:

1. Standardization/validation of analytical methods was done for residues estimation of various herbicides using HPLC and GCMS/MS.

2. Optimization of new analytical techniques for various herbicides was performed.

3. Evaluation of pesticides residues in *Kharif* and *Rabi* crops, soil and water samples collected at farmers' field from various rice-wheat growing regions of Haryana so as to generate basic information of the persistence of herbicides residues in soil and food commodities.

4. Evaluation of the $t_{1/2,}$ safe waiting period, persistence, dissipation, adsorption, desorption, leaching behaviour of various agrochemicals.

5. Metabolic study of various agrochemicals in environment.

6. Herbicides residues study in long term CA, DSR experiments and other high value crops like turmeric, sugarcane etc.

7. Residual effect of long term application of various herbicides in rice-wheat cropping sequence.

8. Formulation of various safety measures of the pesticides/herbicides and to provide future guidelines to the research and extension workers along with the policy makers.

9. Testing of new pesticides for their residue level in agricultural products and various environmental matrices so as to include these pesticides in University Package of Practices.

10. Research project entitled 'Bio-efficacy, phyto-toxicity, persistence and dissipation study of different herbicides for the control of *Orobanche aegyptiaca*, a parasitic weed of tomato (*Lycopersicon esculentum* Mill)' was implemented.

11. Research project entitled 'Genetic Improvement of Indian-mustard and Sunflower for Nutritional Quality using Induced Mutation Techniques (BRNS, in collaboration with Department of Genetics and Plant Breeding)' is under implementation.

5. Key result

Weed management in crops always remain a big challenge for farmers and scientific community. This challenge is becoming more and more difficult even when newer technology is developing along with availability of a number of herbicides and new molecules in the market day by day. The reason may be the climatic change due to which weed shift and emergence of new weeds are very prominent. Development of herbicide resistance in weeds is another big challenge which resulted in increase of herbicide consumption to drastic level in last decade. A report says that in Orissa, there is big hike of about 40 percent in herbicide consumption during last two years. But, it is important to realize, however, that inappropriate and indiscriminate use of herbicides may also affect soil health, can cause many environmental hazards and significant risks to human health. Therefore, herbicide residues in soil, crop produce at harvest and underground water (through leaching) are of great concern not only because of health point of view but also because of their sensitivity to succeeding crops. Hence, the

knowledge of the potential of herbicides residues to persist in crop produce, contamination in soil and underground water is important while developing weeds management strategies and recommendation of these herbicides.

Persistence of herbicides residues in long term herbicidal trials on rice-wheat cropping system revealed that the residues of herbicide after continuous application for years at recommended dose, in soil at harvest were below the detectable limit and considered safe to succeeding crop. The harvest time residues in soil and crop produce in controlled experiment were below the MRLs set by EPA and FSSAI.

In persistence and dissipation study of different herbicides, it is concluded that initially the concentration of herbicides in soil and crop remain high which degrade with time and become below MRL at harvest time. Different soil properties like pH, soil texture, moisture, temperature and other climatic conditions affect the herbicides degradation, leaching, adsorption and desorption in soil. Incorporation of green manure increase the herbicide degradation and soil fertility profile. Occurrence of residues in ground water only in the area where water table is shallow is a not a matter of concern as residues found in these areas are near MRL. But occurrence of herbicides residues in food grains and straw at farmer's field should be taken seriously. It may be due to ignorance of recommended spray practices/dose or use of local branded herbicides as under controlled experiments with recommended practices, these herbicides do not show any residues problem either in crop produce, soil and underground water. Hence application of herbicide for weed management at recommended doses in different crops under subtropical humid climatic conditions of Haryana can be considered safe to food, environment, human health and succeeding crop.

6. Impact

i. Upto date information about the residues level in environmental matrix and agricultural produce has been tried to maintain so as to provide guidelines to research and extension workers.
ii. Farmers are motivated for the production of residue free agricultural produce and safe and judicious use of agrochemicals.

iii. Testing of new Agrochemicals for residues in various agricultural components and produces, to include them in University Packages of Practices so as to make their safe and sustainable use.

7. Supporting images

A

B

C

D

A,B: View of Agrochemicals Residues Testing Laboratory; C,D: Delegates from Afghanistan visited the lab and reviewed the work

PROJECT SANCTIONED 2011-12

1. Title — Popularization of machinery identified for conservation of crop residue through front line demonstrations to avoid burning and also to assess the adoption status among farmers
2. Category — Farm Machinery
3. **Challenge:**

India has predominantly agrarian economy which thrives mainly on the natural resources. The demand for food grains in India will be 268.8 million tones respectively by 2020. In the projected food demand by 2020, the combined share of rice (41.07 %) and wheat (33.89 %) will be 75.96 %, which covers about 87.5 % of the irrigated area of the country. This shows that the productivity growth of the crops has been mainly attributed to the varietals breakthrough coupled with irrigation and over exploitation of natural resource base. For further productivity growth of crops and keeping pace with natural resource base, more emphasis is needed on crop residue conservation technologies. Rice-wheat is the major cropping system of Haryana and is the backbone of country's food security with a yield potential of 7.5 t/ha/yr. It is estimated that more than 50 % area under rice is combine harvested and it is increasing continuously due to shortage of farm labour and the majority of rice straw is burnt in the field as this is a rapid and cheap management option, allowing for quick turn around between crops. Rice straw burning results in huge loss of plant nutrients, organic matter and degradation of soil properties due to wastage of residue. Straw burning results in almost complete loss of nitrogen while about 25, 20 and 60 % loss of phosphorous, potassium and sulphur respectively. In addition to these burning causes severe air pollution with very bad effects on human and animal health. It has been estimated that one tons of straw on burning release 3 kg particulate matter, 60 kg CO, 1460 kg CO_2, 199 kg ash and 2 kg SO_2. This can affect regional environment which also has linkage with global climate change. With the advancement of new technologies, the farmers can incorporate crop residues results in improving soil health. A perceptible advantage in saving of irrigation water, seed, fertilizer, energy and cost of production of crops have been recorded with crop residue conservation technologies but the adoption of these technologies at farm level is knowledge intensive. Therefore popularization of crop residue conservation technologies at farm level and development and evaluation of new resource conserving technologies needs concentrated efforts of researchers through farmers' participatory approach of technology evaluation and dissemination.

4. **Initiative:**

A lot of crop residue management machineries were available in the market, but the farmers were not aware about their uses, repair, maintenance, etc. The University had taken the initiative and submitted a project on popularization the machinery identified for conservation of crop residue through front line demonstrations to avoid burning and also to assess the adoption status among farmers. In this project we have purchased advanced machineries and conduct location specific on-farm demonstrations on different crop residue conservation technologies. Developed linkages with the machine manufacturers regarding incorporation of required modification in the machines as per feedback from participating farmers. Adoption, problems, socially acceptable or not, economic feasibility were also carried out. Technology was also dissemination through farmers meet, field days and trainings.

5. **Key result/ insight/ interesting fact:**

The front line demonstrations of happy seeder in combine harvested rice fields were done at farmer's field on around 100 ha area in Kaithal, Karnal and Fatehabad districts of Haryana State. The grain yield of happy seeder was found to be 8.7 per cent more than conventional drill. The cost of production was found to be Rs 38500and Rs. 40000 per hectare under happy seeder and conventional drill, respectively. The happy seeder gives 23.76 per cent higher return then conventional sowing. The Benefit: Cost ratio was 2.07 and 1.83 for happy seeder and conventional drill respectively. The effective field capacity of happy seeder and conventional drill was found to be 0.33, and 0.49 ha/h with field efficiency of 65and 78 %. Sowing of wheat with Happy seeder was time (72%), fuel (66.5%), labour (76.9%), sowing (72.3-%), energy (70.9%) saving compared to conventional sowing.

The front line demonstrations of straw bailer in combine harvested rice fields were done at farmer's field on around 90 ha. area in Kurukshetra, Ambala, Karnal and Fatehabad districts of Haryana State . The average height of stubbles in the field was 28 cm in paddy of variety Pusa 1121. A straw chopper was first operated in the field. The total straw available in the field was 385 g/m^2 and the moisture content of the straw was 18 % on wet basis. The straw baler was then operated in the field to make baler out of the chopped straw. The field capacity of the straw baler was found to be 1.0 ha/h, with forward speed was 2.5 km/h and width of the cutter bar was 1.87 m. The efficiency of the straw baler was 80 % and wheel slip was found to be 7.3 %. The fuel consumption was found to be 4.0 l/h. The baling efficiency and the size of each bale was 80 % and 90 × 42 × 35 cm, respectively and the average weight of one bale was 20 kg. The total number of bales per hectare was 150. The cost of operation was found to be Rs. 2120 ha (including straw chopping + hay rake). The net return from one hectare of paddy straw was Rs. 1790 when the rate of bales was Rs. 125/q. The benefit cost ratio was found to be 1.88 and payback period of the machine was 1.4 years if operated for 500 hrs per year. The energy requirement was 650 MJ/ha.

The front line demonstrations of head feed paddy combine harvester (DSM 72) were done at farmer's field on around 100 ha. area in Fatehabad and Kaithal district of Haryana State. The theoretical field capacity of the combine harvester was found to be 0.48 – 0.50 ha/h, with forward speed was 3.7 – 4.0 km/h and width of the cutter bar was 1.25 m under different paddy varieties. The efficiency of the combine was 60 - 90 % under different varieties. The fuel consumption was found to be 9.5 - 13 l/h under different varieties. The total losses under different varieties vary from 2.58 – 4.62 %. The cost of operation was around Rs. 1350/-. The B:C ratio was found to be 2.22 and payback period of the combine was 3 year if operated for 500 h per year. The total losses with head feed paddy combine was found to be 3.74 per cent as compared to 8.30 per cent with traditional axial flow paddy combine in Basmati 1121 variety.

An experiment was conducted at farmer's field in village Kalvehri at Karnal district for the preparation of compost from paddy straw. Rice straw was carried out in windrows of 1 m high, 1 m wide and 5 m long. The bundles of rice straw were dipped into a solution containing 0.01 % urea solution, 1 % cattle dung and consortia of Fungi (T. viridae and a. awamori) of the compostable material. The turning of compostable material was carried out after 15 and 30 days of composting. The moisture content of the compostable material was maintained to 50- 60% throughout the composting by covering it with a polythene sheet and sprinkling with water. Compost samples were analyzed at and after one, two and three months of composting for organic carbon and total N. the C/N of the compostable material dropped down from 71 to 19 after 90 days composting in the material which was prepared from rice straw bundles. However the C/N ratio was higher in the compost prepared from without bundles as it was 26 after 90 days of composting.

Frontline demonstrations of paddy transplanter (Kubota make) were conducted at farmers field on around 100 ha area in Karnal, Kaithal and Fatehabad district of Haryana State. The average yield was 33.81 q/ha which was around 10 % higher than manual transplanting. The field capacity of transplanter was 0.4 ha/h with the efficiency of 80 %. The number of hills/m^2 was 27 with 2 seedlings per hill. The percentage of missing hills was 3.3 as compared to 5 % in manual transplanting. The cost of operation was found to be Rs. 2500/ha. The payback period of the transplanter was 4 years when operated for 250 hours per year. The percent saving in labour and cost were 95, and 55, respectively in transplanting as compared to manual transplanting. Mechanical puddled transplanting gave significant higher net return of Rs. 36825 ha^{-1}, which was almost 37 per cent higher than manual transplanting. B: C ratio was highest in mechanical transplanting with 1.77 as compared to1.54 in manual transplanting. Energy output: input ratio of mechanical transplanting was 4.09 as compared to 3.72 of manual transplanting.

Knowledge level of farmers regarding crop residue conservation (CRC) technologies in Haryana was found low level to medium about the uses and benefits of CRC technologies. **Adoption level** of the farmers regarding CRC technologies such as 'plant disease and insect/pest attacks more or less' (2.90), 'decreases fertilizers requirement' with mean score (2.86), 'soil organic matter improved or not' (2.80) and 'CRC technologies increases or decreases number of irrigation' (2.76) were found fully adopted by the farmers on the basis of mean score. Farmers' encountered many **constraints** in adoption of CRC technologies were as 'lack of faith in CRC technologies' (2.44), 'no clear understanding of CRC technologies objectives among the farmers' (1.80), 'low level of awareness regarding benefits of CRC technologies' (2.18), 'local political interference' (2.24) and 'lack of

dedication in adoption of CRC technologies' (2.32) were encountered as **general constraints** on the basis of mean scores. The results presented highlight that 'non availability of inputs' (2.30), 'high cost of CRC technologies' (2.12) and 'lack of finance to purchase of CRC technologies' (1.96) were encountered as **economic constraints** on the basis of mean score. O**rganizational constraints** encountered were 'insufficient staff to carry out the project successfully' (2.28), 'lack of co-operation from higher authority staff on the awareness to adopt the CRC technologies' (2.16), 'problems of decisions were made at higher level without consulting to the farmers' (2.20), 'lack of encouragement for good work and lack of timely' (2.06), and 'lack of timely and appropriate transfer of technology by the extension functionaries' (2.22) on the basis of their mean scores. Constraints such as 'lack of effective communication between field functionaries (2.36), 'farmers' lack of interest in learning new skill' (2.10), 'lack of co-operation among the farmers to adoption of new technologies' (2.42) and 'lack of demonstration/training' (2.06) were encountered as **communicational constraints** on the basis of mean score. Machine is too heavy and requires 45-50 hp tractor' (2.52), 'machine not works in heavy moisture conditions' (2.26) and 'chance of fire hazard due to less space between side flails of shaft and the frame' (2.46) were encountered as **technical constraints** on the basis of mean scores calculation.

6. **Impact:**

The adoption level of farmers regarding crop residue conservation (CRC) technologies in Haryana was found low level to medium about the uses and benefits of CRC technologies mainly due to lack of awareness and technical guidance. The adoption of crop residue conservation technologies were results in saving of time, labour, cost in term of inputs, effective utilization of inputs. These technologies were also resulted in improvement of soil health, saving of natural resources and keeps environment clean. The adoption of these technologies was also resulted in increased production and productivity of crops. It also provides feed to the animals. This project enhanced the farm profitability with long-term sustainability of the natural resources.

7. **Lessons Learned:**

As the funds were given for the purchase of machineries, it becomes difficult to meet out the recurring expenditure for successful operation of the project. Thus, provision of recurring expenditure in the project will help in the smooth functioning of the project.

8. **Supporting Quotes and Images:**

Happy seeder in operation and succeeding wheat crop

Different types of hay rake in operation

Different types of straw baler in operation

Fields after operating the rectangular and round straw baler

Rear and front view of half feed paddy combine

Mat type nursery and paddy transplanter in the field


Field day on Demonstration of Paddy combine harvester


Field day on Demonstration of Paddy transplanter

9. Additional information:

Project partners/donors: Nil
News items:

गांव डाबड़ा में किसानों को पराली प्रबंधन की जानकारी देते एचएयू के विशेषज्ञ।

फसल अवशेषों के प्रबंधन के लिए उपकरणों को बढ़ावा दें : विजया

विभाग अध्यक्ष बोले-स्ट्रा बेलर मशीन उपयुक्त, मिल रही है सब्सिडी

भास्कर न्यूज | हिसार

हरियाणा कृषि विश्वविद्यालय के फार्म मशीनरी एवं ऊर्जा अभियान्त्रिकी विभाग के विशेषज्ञों ने धान की पराली जलाने की समस्या से निजात दिलाने के लिए डाबड़ा गांव में एक कार्यक्रम आयोजित करके किसानों को पराली प्रबंधन के लिए जानकारी दी। उपरोक्त विभाग की अध्यक्ष डॉ. विजया रानी ने कहा कि पराली के प्रबंधन के लिए स्ट्रा बेलर नामक मशीन बहुत उपयुक्त मशीन है और राज्य सरकार द्वारा किसानों को इस मशीन पर सब्सिडी भी दी जा रही है। उन्होंने बताया कि इस मौके पर पैडी स्ट्रा चपर-कम-स्प्रेडर के बाद रोटावेटर के प्रयोग का प्रदर्शन भी किया गया। विशेषज्ञों ने जीरो टिल सीड ड्रिल तथा हैप्पी सीडर के प्रयोग के लिए बल दिया है। उत्तरी क्षेत्र फार्म मशीनरी प्रशिक्षण एवं परीक्षण संस्थान के सहयोग से आयोजित किया गया था।

Organised Field day on **"Demonstration of Paddy combine harvester"** on October 10, 2013 in collaboration with M/s Escorts Ltd., Faridabad in village Himmatpura, Tohana district Fatehabad.
Organised 2 days training programme on **"Machinery for straw management"** on 11-12, March, 2013 for the scientists of different KVK's of CCS HAU, Hisar in the department of Farm Machinery and Power Engineering, College of Agricultural Engineering and Technology, CCS Haryana Agricultural University, Hisar.
Organised Field day on "**Paddy transplanter**" on July 9, 2014 in village Himmatpura, Tohana district Fatehabad.
Organised one day training programme on "**Preparation of mat type nursery for transplanting of paddy by paddy transplanter**" on June 3, 2014 for the farmers in village Himmatpura, Tohana district Fatehabad.

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PROJECT SANCTIONED 2013-14

Impacts of Projects sanctioned during 2013-14

Promotion of castor based cropping system for raising farm income in South West Haryana

Castor (*Ricinus communis* L.) is an important non-edible oilseed crop of India and the country holds a premier and dominant position in its production and supplies. Being hardy crop, it can be grown under rainfed conditions and thrives well on a variety of soils and climatic conditions. However, it responds positively to irrigation and fertile soils also. Castor can find respectable place even in non-traditional areas of the country including parts of Haryana state (Hisar, Bhiwani, Sirsa, Mahendergarh, Mewat and Rewari districts) because of consistently increasing cost of cultivation and decreasing water availability under other cropping systems. Sole castor has not only potential to compete with traditional cropping system in south western Haryana but have edge due to additional income from the intercrops in it. If vegetables, that too that of early season are taken as inter crops then additional income may be received. Results have shown that castor performed better under irrigated conditions in leveled field having reasonable fertility rather than undulating field with sandy and poor soils under rainfed conditions.

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On the basis of results achieved at Regional Research Station and farmers fields through demonstrations it has been observed that castor with intercrops gave higher monetary returns than sole crops under irrigated conditions. Farmer are adopting wider row spacing to adjust the requirement of intercrop of his choice and the economics of the system shall be comparable or even better than sole castor and any other existing cropping system of the region. In district Mewat, near Tauru, the vegetables like methi (leaf), Palak and mustard (sarson saag) were taken as intercrop with castor. The temperature was high at normal sowing time (last week / second fortnight of September). Therefore, these vegetables grown as sole crop by other farmers either failed (due to unusual higher temperature) or yielded poor quality produce not fit for marketable or fetched less price. However, the intercropped vegetables with castor not only survived but performed better and fetched higher rates due to good quality and early harvesting. This was due to favorable microclimatic conditions in castor fields. Farmers are quite happy and enthusiastic and see scopes for other vegetables like coriander (leaf), raddish and carrot as well in this system.

A very good crop of methi grown for vegetable (Leaf) purpose is ready for harvest and to be sent in the market.

Farmers sharing their experiences and happiness after harvesting and selling the methi crop at village Kaliyaki in Mewat. The methi crop fetched very good price (upto Rs 65/- kg).

Promotion of Zero tillage technology for wheat (*Triticum aestivum*) crop in Rewari district of South- West Haryana

Wheat crop was sown with zero tillage (ZT) on 42 and 80 ha at fields of 105 and 200 farmers of 12 and 17 villages in 2013-14 and 2014-15, respectively of Bawal and Khol blocks of Rewari district. The quantum of increase in grain yield of wheat by adoption of zero tillage technology ranged from 1-2.5 q/ha during 2013-14 and 1-3.0 q/ha during 2014-15 at different locations in comparison to conventional tillage.

Besides this the technology resulted in net savings of Rs.3500/- per ha to be incurred on different field preparation operations. Thus the zero tillage technology proved very efficient in reduction of cost of cultivation and thereby increasing net returns to the farmers of Rewari district of Haryana state. During 2014-15, Trainings and Field Days could not be organized; and only few inputs were provided to farmers to encourage them for adoption of ZT as installment of 14.70 lacs was not released as per draft for 2014-15 (2nd year).

Strengthening of Seed Production Programme at CCSHAURRS, Bawal

Infrastructure and facilities have been created/strengthen at RRS, Bawal for quality seed production. Five hundred quintals of quality seed of different *Rabi* and *Kharif* crops like wheat, mustard, barley, moog bean and cluster bean is being produced at RRS, Bawal and distributed to 2500-3000 farmers of the south west Haryana and adjoining Rajasthan. The productivity has been increased due to availability of quality seed.

Impacts of Projects sanctioned during 2016-17

Promotion of castor for crop diversification and higher system productivity in South- West Haryana

We have provided them with best of Hybrids with scientic knowhow and recommended package of practices through literature, demos , trainings, field days and Kisan Mela etc and 15 castor threshers have been given to the farmers in new areas through our KVKs. The farmers were also being guided for marketing of their produce. As such there is no cash crop in southern Haryana which can give more returns than guar and mustard. Cotton some times give good returns that too in very less area in southern Haryana. Whereas, Castor has given good returns over few years in the demonstrations conducted under RKVY project. During 2016-17 castor has crossed the barrier of gross income of Rupees 1.0 lac per acre. Sh Raj Kumar of village Jadthal, Distt Rewari harvested 24 qtl castor seed from one acre and sold it Rs 4325 per quintal.

In Sirsa and Hisar districts farmers have realized that castor can be grown under irrigated conditions in pace of guar and little area of cotton may be given to castor. Sh Shiv Kumar from village Choudhariwali has sown castor in 11 acres and mungbean was was taken as inter crop. He has got more than 60 qtls of mung from these 11 acres at an average of about 11qtls/ha and he is expecting very good harvest of castor too. In Sirsa and Hisar the farmers are now following most of the recommended package of pracises and this is the result of RKVY project under which a number of trainings and Kisan Mela/Field days were conducted for transfer of improved technologies of castor production involving Scientists from KVKs and officers from Deptt of Agriculture in 7-8 districts for South West Haryana.

Castor +mung at farm of Shiv Kumar Vill – Choudhariwali Distt Hisar 2017

PROJECT SANCTIONED 2014-15

1. Title — Development of ergonomics and temperature controlled engine test labs

2. Category — Agricultural Mechanization

3. **Challenge:**

The project envisages augmenting the infrastructural facilities needed for the establishment of ergonomics laboratory for conducting ergonomic assessment of agricultural machinery manufactured in India for the safety and comfort of operators. The engine test lab will help to conduct testing of self propelled agricultural machinery as per the BIS codes preferably for the implements manufactured in Haryana. The test data will help in further improvement of agricultural machinery and to provide R&D consultancy. After the testing of agricultural machinery, more manufacturers will be available in the market for manufacturing similar type of product which will create competition in the market and thus, the farmers will get better quality product at cheaper rates.

4. **Initiative:**

Fully automatic dynamometer (suitable for small horse power as well as high horse power range) with digital control panel with data acquisition software, engine test bed with accessories etc. were purchased for equipping the engine test lab. Purchase of different ergonomic instruments which includes tread mill, polar heart rate monitor, anthropometry equipments, bicylce ergometer, flicker fusion apparatus, spirometer, breath by breath metabolic analyzer (K5), aerosol spectrometer etc. were also purchased to establish Ergonomics lab.

5. **Key result/ insight/ interesting fact:**

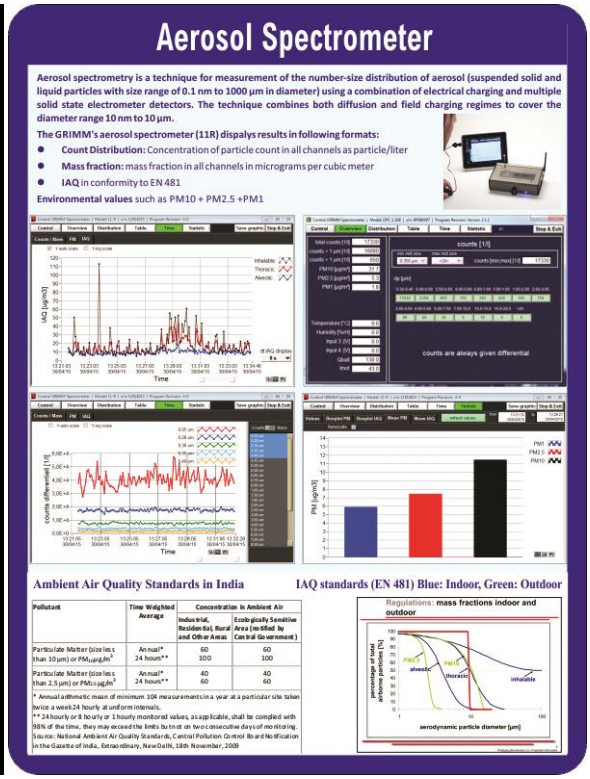
Full fledged state of the art “Engine Test Lab” was established. The engine test lab houses two nos. of eddy current dynamometers capable of testing internal combustion engines of upto 20 kW and 80 kW. The engine test lab is equipped with automatic data acquisition system, shut-down actuators, fuel flow meters etc. for conducting performance tests of internal combustion engines as per the BIS standards. Ergonomics lab with sophisticated instrumentation to conduct ergonomic studies on different agricultural machinery was also established.

Hon'ble Governor of Haryana Sh. Kaptan Singh Solanki inaugurating the Engine Test Lab at CCSHAU, Hisar

20 kW Dynamometer

Dynamometer control room

80 kW Dynamometer



Equipments purchased for the establishment of Ergonomics lab

6. **Impact:**

Presently, CCSHAU, Hisar is augmented with sophisticated instrumentation for the testing of self propelled agricultural machinery upto 80 kW. Now, the manufacturers can get their machines tested without waiting for longer duration. The farmers who are the end-users of farm machinery will be benefited by getting cheap, efficient and quality agricultural machinery and thus helping in enhanced growth of production agriculture.

7. **Lessons Learned:**

As the funds were given for the development of infrastructural facilities, it becomes difficult to meet out the recurring expenditure for successful operation of any project. Thus, provision of recurring expenditure in the initial years of project will help in the smooth functioning of the project.

8. **Supporting Quotes and Images:**

"The Engine Test Lab and Ergonomics lab will help us in R&D activities, product upgradation and enhanced reliability, safety and comfort of our products"

Sh. Vinay Garg, M/s. VSM International (P) Ltd., New Delhi

9. Additional information: Project partners/donors: Nil

1. Title **Development and testing of carrot digger**

2. Category Agricultural Mechanization

3. **Challenge:**

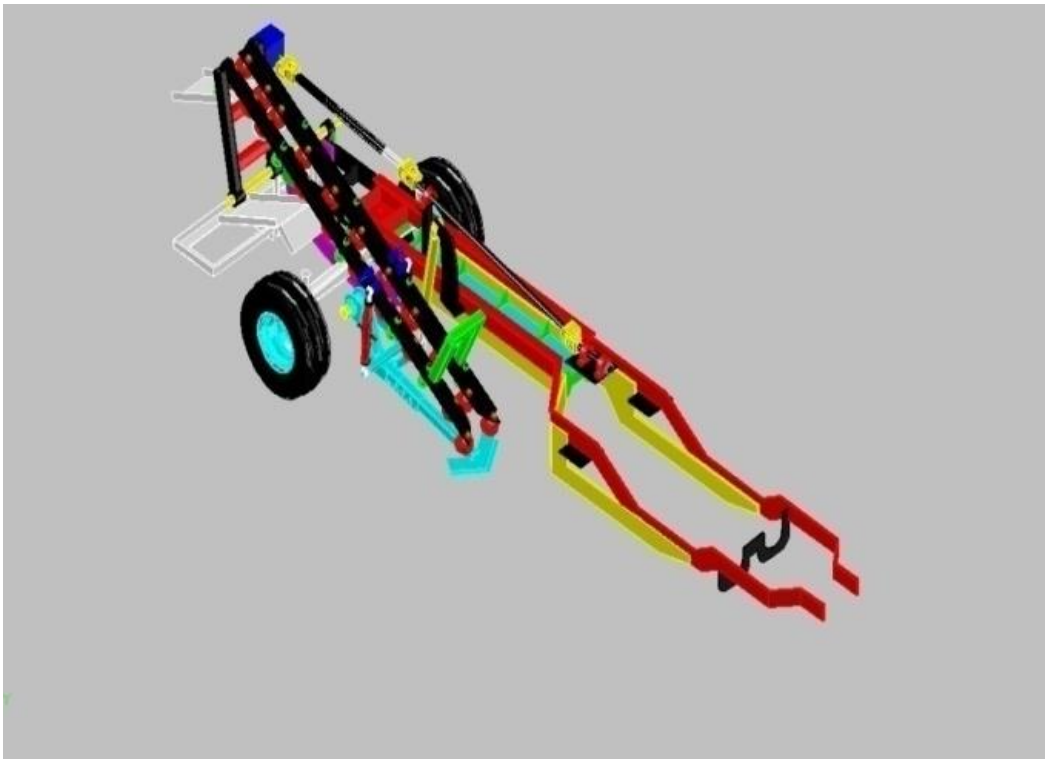
Harvesting is one of the most critical operations for carrot production. Carrot crop is grown below the surface of the ground, therefore it requires specially designed machines to dig and separate them from the soil. One of the main bottlenecks in increasing the area under root crops like carrot has been higher labour requirement for planting and harvesting. The crop is cultivated on small scale and is totally labour dependent. The large scale diversification which is only possible through mechanized carrot digger. Most of the root crops are harvested/dug manually or with some local tools. To reduce the cost of cultivation of carrot crop there was need to develop a carrot digging machine that can harvest the crop.

4. **Initiative:**

Carrot Digger was designed developed and then tested

5. **Key result/ insight/ interesting fact:**

Full fledged state of the art "Engine Test Lab" was established. The engine test lab houses two nos. of eddy current dynamometers capable of testing internal combustion engines of upto 20 kW and 80 kW. The engine test lab is equipped with automatic data acquisition system, shut-down actuators, fuel flow meters etc. for conducting performance tests of internal combustion engines as per the BIS standards. Ergonomics lab with sophisticated instrumentation to conduct ergonomic studies on different agricultural machinery was also established.



3-D model of developed carrot digger

Developed carrot digger

Tractor operated single row carrot digger in operation

6. **Impact:**

   The machine will reduce the drudgery involved in digging carrot and will reduce the labour requirement

7. **Lessons Learned:**

   The machine will operate properly if the carrots are sown in single row on bed

8. **Supporting Quotes and Images:**

   Sowing of carrot crop by bed planter in row increases yield and the carrot digger can then be operated with success

9. Additional information:
   Project partners/donors: Nil

Title : Empowerment of Farm women through skill development based promotion of Diversified Jute Products in Mewat Region.

Category: Rural Women Empowerment.

Challenges: Nuh district of Haryana state is predominated by rural area with a few small towns. The percentage of rural households living below poverty line in the district is almost double to that of all other districts of the state. The literacy rate in Mewat in general is appallingly low, specifically in case of females. Women in Mewat are among the most deprived groups in the state living in abject poverty and ignorance. They are mainly involved in agriculture, dairy production and household chores. Other problems include low literacy, unequal sex ratio, high infant mortality rate, poor maternal health with large families and lack of basic services such as potable drinking water, proper roads, hospitals and schools etc.

Although, agriculture is the main source of income of this area, productivity of agriculture sector is low due to water scarcity and small size of land holding. The women of this social and economical backward region are dependent on men hence their control on resources and decision making ability is limited.

Mrs. Pista Devi W/o late Sh. Sube Singh, resident of Village Akbarpur Natol of Hathin block belong to schedule caste. She is facing hardship for survival of her family as her husband is died and there is no earning hand in her family. She belongs to nuclear family having five children (Two boys and three girls) without any agricultural land. In this situation she has no means of earnings other than the labour.

Initiatives: During the identification of target groups for training under RKVY project, she was contacted by KVK Mandkola and motivated for training of Diversified Jute products for income generation as there is great demand of these products in market. She was trained for making different types of jute bags, bottle covers, mats, magazine holder, fashion jewellery during the 5 days vocational training programme. After identification of technical gap skills were imparted by conducting do it yourself session with technical inputs of designing, painting, embellishment, colour combination, finishing, trimming of different products. A trip was arranged for the trainees at Delhi Hatt, INA, New Delhi. Adequate exposure was given during the visits. The benefits of trip was very well reflected in feedback provided by her in term of confidence building and readiness to change for self and family

On last day of training the technical input were invited from the participant for mobilization, display their products along with the distribution of incentives to every participant. The distribution of the incentives in form of tools and accessories required for development of skill based products of jute like sewing machine, scissor, iron, jute bags, bottle covers etc. So these incentives acted as source of critical input for helping the rural women to carry out these activities at their own household level to sharpen their skill and minimise the limitation of non availability of resources to them.

During the process of training the target beneficiaries were mobilised to form SHG to undertake these activities. They were imparted information regarding the benefits and limitations of SHG working. Mrs. Pista Devi

W/o Late Sh. Sube Singh has form the Self help group and worked as group leader and started producing the products of Jutes.

Key results/insight/interesting facts:

She got the training in the year 2016-17 and started the manufacturing of jute products after forming the self help group recently.

Cutting of Jute bags with her SHG Group

Receiving honour from Director Extension, CCSHAU Hisar on International women day

Impact:

She improved her status in the society and developed the leadership/managerial quality. The impact of the activity will be assessed after some time.

Lesson learned:

She developed self confidence which would help in her financial independence and argumentation of house hold income.

Details of contact person of the story:

Name : Mrs. Pista Devi

Husband name : Late Sh. Sube Singh

Age : 44 years

Qualification : Illiterate

Phone No. : 9992257952 (PP)

Address : Village Akbarpur Natol, Teh. Hathin, Distt. Palwal (Haryana)

PROJECT SANCTIONED 2015-16

RKVY project: **Establishment of Agro-Geo-informatics lab for research and application purposes**

1. **Title:** Agro-Geo-informatics Laboratory established
2. **Category:** Agriculture and all other spatial sciences. The lab is first of its own kind in the university to cater needs of spatial analysis (i.e. Remote Sensing and Geographical Information System applications) in agriculture and allied sciences with the help of latest techniques of space born data and its interpretations using high end software. It would be a central lab for university where scholars of all discipline can carry out their research which will further improve the practice of interdisciplinary research.
3. **Challenge:** In changing scenario of technical aspects in research, more emphasis is going towards digital and spatial analysis. Globally, most of the universities/research centers have their own setup for Geo-informatics studies; and leading in spatial researches in agriculture. In India too, many universities have established this facility in their domain. HAU also keenly desired to have such facility so that this technique can be utilized in different researches going on in the university.
4. **Initiative:** The items / instruments necessary in the lab were not only costly but their availability was also not possible at local level. Being different kind of data used in the lab i.e. digital imageries acquired by satellites and other digital data needed in GIS, special kind of software and hardware were required. To meet out this, Two University Lab Kit (2 licenses) of GIS software (ESRI ArcGIS), One University Mini Lab Kit (5 licenses) for digital image processing software (ENVI), one Global Positioning System device, Aerial photographs and eight workstations along with peripherals like printers, scanners were purchased. As soon the lab started, we call for application from university researchers/scientists for training and got positive response. Ten faculty members registered themselves for learning this new field of Geoinformaitcs. The training was conducted from 13th to 19th September 2016 covering different aspects of Geographical Information System and its applications in agricultural research. For better understanding and developing skills among trainee, the training was more focused on practical aspects i.e. hands on software. The trainees were trained to import different format of data, their interpretation, classification, making and editing data in GIS, mapping etc. by assigning exercises.
5. **Key result/insight/interesting fact:**University has now successfully established the Agro-Geoinformatics Laboratory which can be used by all faculty members of the university. This facility will also provide a new dimension of spatial analysis to research which was not possible in university premises earlier.
6. **Impact:**Under Graduate, Post Graduate and Diploma students of the university utilized the Lab facility for their practical exercises and research. Faculty members also carried out their research using RS GIS software. Participants (from different states) in training programmes in this department also utilized the geo-informatics lab facilities.

7. Lesson Learned:

1. What did you learn in this process? What was difficult of challenging?
   Availability of resources of lab attracted the concerned scientist to use it in their field. Recently, Deptt. of Soil Science carried out soil sample interpretation for five research stations/KVKs.
2. How did you overcome the challenges faced? NA
3. If you were to do all over again, what would you do differently? NA

8. Supporting Quotes and Images:

During the above said training, feedback provided by trainees is as under:

- *Training was extremely good for its applicability in the near future for strategic management of agriculture.*

  …Dr. Bharat Singh Ghanghas, Asstt. Scientist (Extn. Edu)
- *The training was really good for us& it will be helpful for agricultural research.*

  …Dr. Narender Singh, Asstt. Plant Pathologist (GPB)
- *GIS with Remote Sensing helps a lot in understanding agriculture in different aspect. Training helps us in a systematic way to understand its appellations in agriculture and allied fields.*

  …Anuradha, SRF (GPB)
- *Very useful training and should be updated through such trainings time to time.*

  …Dr. C.S. Dagar, Asstt. Scientist, RRS Kaul

Photographs of Training:

Photographs during training Course: Understanding Geographical Information System (GIS) and its applications in Agricultural research' (September 13-19, 2016)

9. Additional Information:

1. List of all project partners and/or donors who supported the work. NA
2. Links to supporting material, such as news items, photos on Flicker and presentations of slide share. NA
3. Contact person for this story

   PI of Project: Dr. Anurag, Asstt. Scientist, Deptt. of Agricultural Meteorology, CCS HAU Hisar, email: anurag.airon@gmail.com

   Co-PI of Project: Dr. Raj Singh, Prof. & Head, Deptt. of Agricultural Meteorology, CCS HAU Hisar, email: headagmet@gmail.com
4. Other information you want to add: Nil

Title of the Project: **Strengthening and development of rodentology lab. for catering services to the farmers in Haryana.**

The department was allotted a project entitled "Strengthening and development of rodentology lab for catering services to the farmers in Haryana" Rashtriya Krishi Vikas Yojna DR Endst. 3575-C (g) Zool-24-OA (RKVY) No. CAUH/B.III/2016/3575/3365-68 dated 05.12.2016. As per the mandate of the project, department has to organize a two days training for thirty Farmers at Kurukshetra and Mohindergarh at university KVKs.

- In the first year the farmers of both districts were aware with audio- visual clues at university KVKs.
- The various techniques/ methods were discussed with farmer community for rodents species identification.
- In the rodent control program IPM based various techniques were discussed for their management.
- Experts told about the various methods for rodent management in fields, orchards, stores, granaries and houses.
- Some new indigenous methods were also discussed to aware the farmers about rodent management.
- In these training scientists from various departments told about the prejudice use of rodenticides to the participants.

- In the second year the training program were organised at same places and found that the IPM strategies were best in rodent management in fields as well as stores.
- Simultaneously various lab equipments were purchased for the rodentology lab development in department of zoology.