

Best Practice 2:

Title of the practice: "Crop Residue Management"

Objectives of the practice

- Promotion of in-situ management of crop residue to prevent environmental degradation and loss of soil nutrients and minerals
- Diversified use of crop residue for various purposes such as power generation, packing material, paper/board/panel industry and compost production
- To use the crop residues in sustainable crop production and nutrient sources for next crop
- To promote the organic and natural farming
- To maintain the soil biodiversity including soil flora and fauna

The context

Large quantities of residues from a wide variety of crops are left behind both on and off the farm after harvest. According to the Ministry of New and Renewable Energy, about 500 million metric tons per year of crop residues are produced. Uttar Pradesh produces 60 metric tons (Mt) of crop leftovers annually, followed by Punjab with 51 Mt and Maharashtra with 46 Mt. The majority of crop leftovers (352 Mt) come from cereals, followed by fibers (66 Mt), oilseeds (29 Mt), pulses (13 Mt), and sugarcane (12 Mt). Cereal crops (rice, wheat, maize, millets) account for 70% of the crop leftovers, with the rice crop accounting for 34% of the total. Twelve million metric tons, or two percent of India's total crop waste, come from sugarcane top and leaves.

The issue of "on-farm" burning of crop residues has become increasingly prominent in recent years due to several factors. The combustion of crop leftovers has a detrimental impact on soil biodiversity. Crop residue burning is well recognized as a significant contributor to the exacerbation of air pollution, hence leading to the manifestation of various respiratory ailments such as asthma, coughing, and other related respiratory complications. Challenges of crop residue management are as follows:

- Huge volume of crop residue
- Collection & Storage.
- Time window between harvesting and sowing of two(next)crops.
- Utilization of crop residue.

- Cost-effective mechanization, awareness and availability of appropriate machinery.

The practice

Keeping in view of increase in pollution due to stubble burning, the university has taken an initiative to aware the farmers about the disadvantages on the human as well as soil health. The university started the crop residue management (CRM) practices since 2018 with the budgetary allocation of Rs. 90.45 lac, 152.7 lac, 245.95 lac and 166.46 lac in 2018-19, 2019-20 and 2021-22, respectively. The university procured CRM farm machineries such as happy seeder (14), reversible MB plough (12), paddy straw chopper/shredder/mulcher (16), zero till drill (15), rotavator (9) and tractor (5) during 2018-2022.

Demonstrations at farmer's field were conducted by the university KVKs in which 9, 18, 29, 27 and 32 villages were covered, and 150, 862, 887, 1055 and 1175 demonstrations were conducted in 2018-19, 2019-20, 2020-21, 2021-22 and 2022-23, respectively. The university organized training programmes on CRM at school/college level in which 796, 4823, 3974, 4554 and 5378 students participated in 2018-19, 2019-20, 2020-21, 2021-22 and 2022-23, respectively. The university organized live training programmes on CRM at block/district level in which 1340, 3438, 2541, 3425 and 4384 farmers actively participated in 2018-19, 2019-20, 2020-21, 2021-22 and 2022-23, respectively. Awareness programmes on CRM have also been organized in 2018-19, 2019-20, 2020-21, 2021-22 and 2022-23 in which 685, 4345, 6310, 7185 and 10294 farmers, respectively, participated in the programme.

The university is also practicing crop residue management by using biodecomposers. The recycling of crop residues has the great potential to return a considerable amount of plant nutrients to the soil. The university is utilizing residues of different crops as mulch on the surface of the soil to conserve the soil biodiversity and moisture content which reduces the water requirement of the crop. The university is also practicing and promoting utilization of crop residues for organic and natural farming and extending this practice to the farmers for doubling the farmer's income and reducing the input costs in the form of chemical fertilizers as well as reducing the atmospheric pollution. The university is carrying out the CRM practice in eastern Uttar Pradesh through its 8 Krishi Vigyan Kendras (KVKs) and managed 150 ha, 862 ha, 887 ha, 1055 ha and 1175 ha land in 2018-19, 2019-20, 2020-21, 2021-22 and 2022-23, respectively.

Evidence of success

The university started the CRM practices in 2018 through its eight KVKs viz., Varanasi, Chandauli, Mahrajganj, Azamgarh-1, Jaunpur-1, Bahraih-1, Barabanki and Siddharthnagar. More than 15,000 farmers are using crop residue management technology with the support of KVKs, and taking benefits of farm machinery bank and custom hire services. Government of UP is also promoting crop residue management practices through centrally funded Farm Machinery Bank Scheme to the farmers.

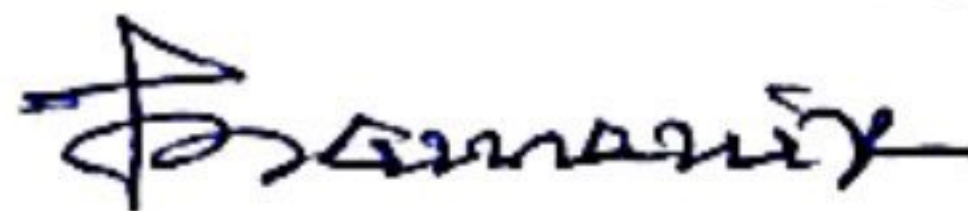
With the efforts of the university the farmers become aware about benefits of CRM practices which resulted into a rapid decline in the crop residue burning incidences. In CRM districts, total 1836, 495, 324, 601 and 28 crop residue burning incidences have been observed in 2017-18, 2018-19, 2019-20, 2020-21 and 2021-22, respectively. Due to implementation of this practice, 43.62%, 72.69%, 47.53% and 90.08% crop residue burning control has been observed in 2018-19, 2019-20, 2020-21 and 2021-22, respectively.

By adopting this practice, the university is generating employment and imparting in doubling the farmers income. As a result of significant contribution of the university in the area of "Crop Residue Management", the unit of the university: KVK, Kotwa, Azamgarh (U.P.) conferred Appreciation/Award from the ICAR in 2020.

Front line demonstration of crop residue management on farmer's field was conducted on 4129 hectare land during 20-22. Keeping in view of this valuable practice, 90% farmers have adopted and further recognized as reduction of atmospheric pollution occurring due to burning of crop residue in the field and conservation of soil biodiversity. Research work conducted by the M.Sc. (Ag.) and PhD. students of the university on in-situ crop residue management found that the application of 30 kg per hectare additional nitrogen at the time of preparation of land resulted into enhanced decomposition process.

Problems encountered and resources required

High initial investment cost is required for purchase of mechanized equipment.



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