



# Agri-Business Supplement

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### WHEAT STRAW CHOPPER

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#### Introduction

Wheat is the major staple food crop of Pakistan and was grown on an area of 9.224 million hectares during the year 2015-16. Combine harvesters are gaining popularity in Pakistan for timely harvesting of wheat. These harvesters are however, concerned with the grains only and leave high stubbles and machine-ejected straw in the field. Due to non-availability of proper technology, farmers generally burn this leftover straw to clear their fields for subsequent crop sowing. This phenomenon has given rise to three major issues:

- i) Environmental pollution associated with fire hazards at farm level;
- ii) Burning of rich soil organic matter; and
- iii) Loss of valuable commodity i.e. properly chopped wheat straw (*bhoosa*) which is a common cattle-feed and has good market value.

Therefore, a technology which could process leftover wheat straw into bhoosa to feed livestock throughout the year and earn a reasonable amount of money through its sale was highly demanded by the farmers.

#### Technology Development, Demonstration, and Commercialization

Keeping in view the farmers' demand and issues related to the environmental pollution, Agricultural and Biological Engineering Institute (ABEI) formally called Farm Machinery Institute (FMI) at National Agricultural Research Centre (NARC Islamabad) of Pakistan Agricultural Research Council (PARC) identified and acquired a tractor mounted wheat straw chopper machine through Rice-Wheat Consortium. The machine was commissioned at ABEI workshop and tested at NARC fields during wheat harvest 2001.

The machine performance was encouraging.

Primarily the machine was successfully introduced through field demonstrations in rice-wheat cropping zone. The joint efforts of ABEI/PARC and selected potential agricultural machinery manufacturers for refinement of this existing wheat straw chopper were continued. Hence, further extensive field testing and demonstrations were conducted at farmers' fields during subsequent wheat harvests. The machine performance parameters such as effective field capacity, field efficiency, fuel consumption, operational cost and *bhoosa* recovery were ascertained to be 0.33 ha/h, 60 %, 5-6 L/h, Rs. 750/h and 400-600 kg/h, respectively.

The machine became very much popular in central Punjab mainly through rental machinery service providers. Technical assistance was provided to PARC/ABEI collaborating machinery manufactures for its indigenization in target areas i.e. Daska, Gujranwala, Hafizabad, Lahore, Faisalabad, and Multan.

Gradually the use of combine harvesters increased in Southern Punjab due to the shortage of labour during wheat harvests. Resultantly the demand of wheat straw chopper for making bhoosa from the leftover stalk from combine harvester grew up. Keeping in view the success of this machine in rice-wheat zone and growing demand in southern Punjab, PARC/ABEI made efforts in coordination with Agricultural Mechanization Research Institute (AMRI), Multan and potential agricultural machinery manufacturer to evaluate and demonstrate an improved version of wheat straw chopper at farmers' fields during wheat harvest 2014 in Multan area. The results were quite encouraging. Hence, further extensive field testing and demonstration was conducted at farmer's fields. The machine performance parameters such as effective field capacity, field efficiency, fuel consumption, operational cost, *bhoosa* recovery and net benefit from bhoosa were ascertained as 0.40 ha/h, 68 %, 5.6 L/h, Rs. 5,262/h, 61% and Rs. 18,780/ha, respectively. Further awareness among the end-users, potential machinery manufacturers, and rental service providers was also created through holding field days/seminars.

At present, more than fifteen (15) manufacturers are producing this machine and over five thousand (5000) operating units of the machine are available with the farmers. The farming community has benefited worth

Rs. 4.5 billion. Furthermore, the extensive use of wheat straw chopper would help in conserving the natural environment to a considerable extent besides complementing the efficient operation of modern combine harvesters in Pakistan.

#### The Technology

Wheat Straw Chopper is a trailed-behind machine having both modes for transport and field operation. It harvests the stubbles as well as picks up the combine-ejected straw from the field, chops it into bhoosa and blows it into a trolley hooked at its rear. It is operated with a 75 hp tractor with 2.2 m width of cut. The sale price of machine ranges between Rupees 500,000 to 700,000 depending upon manufacturing quality of the machine.

#### Way Forward

1. The technology has already been commercialized through agricultural machinery manufacturing industry in Central Punjab. Efforts are in progress to commercialize this popular machine in Southern Punjab.
2. A complete package of Ispaghool processing technology is being finalized by Pakistan Agricultural Research Council (PARC). It will soon be demonstrated to the Ispaghool growers and small & medium entrepreneurs in the target area.
3. An improved version of sugarcane crusher has been developed and successfully demonstrated at farm level in Islamabad and Khyber Pakhtunkhwa. Efforts are underway to commercialize this promising technology through agricultural machinery manufacturing industry.

Sources: Zafar, A.W., G. Shahzad and N. Amjad (2002). *Management of straw in combine harvested wheat fields: issue and its solution. Paper presented at the National Workshop on Rice-Wheat Cropping System Management, NARC, Islamabad, December 11-12.*

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