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Fodder Chopper for Livestock Producers: A Case Study of Commercialization of Machinery for Smallholders in Bangladesh

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Introduction

Farmers in Bangladesh are very interested to produce more milk products and beef to meet rising consumer demand. Small and medium livestock farmers have between 10 and 30 cows or beef cattle. A major constraint to the expansion of dairy holdings and beef production in Bangladesh is the scarcity of quality fodder, especially during the dry winter season (Haque et al., 2008). Straw from paddy rice is the main source of fodder for livestock in Bangladesh, but has being abundant and low quality (Haque et al., 2008). Napier grass, fodder maize, para, jambo grass, triticale and lathyrus are all grown as higher quality fresh fodder supplements to rice straw. These fodders are normally fed to cattle in the form of whole fresh or dried stems and leaves, and commonly 15 to 20 per cent of the material is refused and wasted. To reduce wastage, some farmers are trying to chop straw and other fodders by hand for their cattle but this is slow, laborious and costly. To overcome the problem, the Power Straw and Fodder Chopper (PSFC) was developed in 2006 and commercialized. This short paper describes the PSFC, its uses, initial experiences with its promotion and marketing by the Pilot Program on Increasing the Availability of Quality Fodder for Dairy Production in Bangladesh (PPIAQFDP) funded by DANIDA.

Materials and methods

The PSFC was fabricated with locally available materials and can be powered a 4 hp diesel engine or single phase electric motor. The main functional parts of the PSFC were: the toolbar frame, cutter blades, safety cover, power transmission pulley, feeding rollers and feeding tray (Figure 1). As far as possible, it was fabricated using locally available materials including M.S. angle, solid bar, M.S. sheet, cutter blades, ball bearings, and feeding tray. Performance evaluation of the PSFC has been done through various laboratory tests and on- farm monitoring. Several rounds of improvements were made based on feedback from farmers, operators and manufacturers. Data were also collected to determine the labour requirement and costs of chopping various straws and fodder types by the conventional methods and using the PSFC. From the beginning, Modern Engineering Workshop (MEW) was engaged to fabricate the first prototype of the PSFC with the condition that once the prototype was shown to be successful MEW would produce and market it commercially. It was also agreed that the project would initially support MEW with demonstration. The PPIAQFDP supported MEW in demonstrations and other promotional activities with the PSFC in several districts where the PPIAQFDP was working. To create demand, PPIAQFDP
procured 6 PSFC and demonstrated them in the project working districts its use in 2006 through the network of the Department of Livestock Services (DLS). Since 2008, the ACIAR funded projects (LWR LWR-2005-001 and LWR-2010-080) has been provided technical support to MEW for improvement and commercialization of PSFC.

**Results and Discussions**

The PSFC could chop 480 kg of rice or wheat straw per hour and 1150 kg of fresh napier or maize fodder plants per hour into pieces 4 to 6 cm long. The operational cost of the chopper was Tk 105 (US$ 1.35) per hour. Tk 840 (US$ 10.77) was required to chop the same amount of straw or fresh fodder manually by hand. Depending on farmer’s buying capacity, MEW has released new models (Table 1). The MEW demonstrated the chopper through project support, attending various agricultural fair, etc. Until April 2014, MEW was able to sell 610 units of various models with a pricing range of Tk. 24,000-55,000 (Table 1). To create demand initially, the project provided 50% of the purchase cost as a promotional price to 12 small dairy farmers in six districts of Bangladesh. At the beginning, MEW tried to involve local level agricultural machinery marketing dealers to sell the chopper. However, until 2010, demand was not sufficient to attract dealers to sell MEW choppers through their network. Project-led various promotional efforts with MEW e.g., operation, repair and maintenance training; demonstrating the PSFC at local agricultural fairs; PSFC demonstration during cattle farmers’ training programs at Bangladesh Livestock Research Institute (BLRI) and Department of Livestock Services (DLS); awareness raising; etc were the major interventions to boost-up commercial sale of PSFC in Bangladesh. Since 2011, ten local dealers (one each in Thakurgaon, Dinajpur, Rangpur, Satkhira, and Bogra districts; and five in Nilphamari district) have been sold about 40% of MEW choppers; the rest were sold by MEW directly to the dairy farmers based on information support from BLRI, DLS, etc. There is no simple, shortcut approach to commercialize small-scale agricultural machineries in the smallholder community (Haque et. al., 2013), however, a multi-dimensional approach e.g., initial price support; demand creation and technical support by project staffs, stakeholder institutions (BLRI and DLS) helped to commercialize the PSFC.

**Table 1.** Capacity, price and number of unit sold of fodder chopper upto end of April, 2014.

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity (kg/hr)</th>
<th>Unit price (Tk)</th>
<th>Unit sold</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSFC</td>
<td>480</td>
<td>47,500**</td>
<td>80</td>
<td>Original model developed by senior author</td>
</tr>
<tr>
<td>Fixed 86</td>
<td>350</td>
<td>24,000*</td>
<td>120</td>
<td>Modified version by MEW without safety cover</td>
</tr>
<tr>
<td>01Spring</td>
<td>350</td>
<td>26,000*</td>
<td>300</td>
<td>Modified version by MEW without safety cover</td>
</tr>
<tr>
<td>011Mobile</td>
<td>450</td>
<td>35,500*</td>
<td>50</td>
<td>Modified version by MEW without safety cover</td>
</tr>
<tr>
<td>014MC</td>
<td>600</td>
<td>55,000***</td>
<td>60</td>
<td>Modified version by MEW with safety cover</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>610</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*=without power engine; **=with 4 hp diesel engine; ***= with 3 hp single phase electric motor. Cost of 4 hp diesel engine Tk. 12,000; and 4 hp electric motor Tk. 10,000 per set. Tk. 78=US$ 1.00.

**References**
