TIME AND MOTION STUDIES ON FORAGE FARM OPERATIONS FOR IMPORTANT FODDER CROPS*

S. Sreedhar, M. Ranganadham1
Department of Livestock Production and Management,
College of Veterinary Science, Tirupati-517 502, India

ABSTRACT

A time study was undertaken to establish time requirements for important forage farm operations. Among the various forage crop operations harvesting required more labour followed by irrigation and loading of fodder into the transport vehicles. Land preparation consumed less time among the operations. On comparison of total time requirement paragrass required more time than the other crops owing to the difference in sowing method and more number of cuttings obtained during a given period of time. Lower total time requirement for jowar crop may be attributed to simple sowing and harvesting methods.

Key words : C

Organisation of work on Forage Production Farm is a major factor in determining the efficiency level of overall management and profitability of dairy farm. Green fodder is generally an economical feed item when it is farm grown and is fed to high yielding animals, endowed with high feed conversion efficiency into milk (Gupta, 2003). Farming and operation of most appropriate cropping schemes suitably incorporating the different fodder varieties with an optimum level of cropping intensity is all time warranted. There is indeed plenty of scope in raising the fodder cropping intensity from the present 112% to over 200%, and there by bringing more land acreage under fodder cultivation on overall basis. In over all farm production a considerable amount of labour is being contributed by farm women in agriculture and other allied activities (Gosh, 2000). Hence there is a need for proper utilization of labour on agricultural farm to obtain good results from the increased fodder cropping intensity. Since fodder production is the main component of animal husbandry activities and is labour oriented, the time motion and labour utilization for different forage farm operations play a vital role for successful maintenance of a farm enterprise. The labour be optimally utilized with proper assigned works as per their expected capacity. Thus the idle labour cost/ utilization be avoided and the efficiency of labour may be increased to the maximum for economic progress of the farm enterprise. Hence the present study was conducted to carry out the time and motion studies on different forage farm operations for various fodder crops cultivated under irrigated conditions.

The Forage Production Farm was spread over 52.20 ha of land and out of which 10 ha has irrigation facility utilizing the water supply from the 6 bore wells and 3 open wells for cultivating the fodder crops. The fodder crops cultivated in Forage Production Farm included multicut variety of jowar (M.P.Chari) and berseem (Pusa Giant), singlecut variety of maize (African Tall) and perennials of napier (APBN-1) and paragrass (Local variety). The first cutting was taken on 60th day and subsequent cuttings were taken at monthly intervals. The important forage farm

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1 Corresponding author : Sri Venkateswara Veterinary University, Tirupati.
E-mail : ranganadham3@rediffimail.com
operations studied during the investigation included land preparation, sowing, fertilizer application, irrigation, harvesting and loading of fodder for different crops. The total time was obtained by summing up of the time required for land preparation, sowing, fertilizer application, irrigation, harvesting and loading of fodder into trucks for transportation of different crops. The expenditure for various farm operations was arrived at and cost of production of different fodders was worked out per acre of land for the period of cultivation and harvesting. Basing on this, the cost benefit ratios were calculated for different crops.

The data obtained from the study was analysed by using the statistical tools as per the procedures laid down by Snedecor and Cochran (1994).

The average time required for land preparation, sowing fertilizer application, irrigation, harvesting and loading of fodder for different crops on Forage Production Farm is presented in Table 1 and its analysis of variance in Table 2. The time taken for land preparation by tractor ploughing for jowar, maize, napier, paragass and berseem was 2.5±0.28, 2.5±0.28, 4.0±0.28, 2.5±0.28 and 5.5±0.28 hours / acre respectively. Juned Akhter et al (2002) and Suman (2008) observed similar findings regarding land preparation of different fodder crops cultivated by various categories of farmers.

The time taken for land preparation was significantly different between crops (P<0.01). The time required for land preparation for jowar, maize and paragass was similar, whereas napier and berseem required more time. The higher time requirement for land preparation in Napier crop cultivation is due to the additional operation of making ridges in addition to common practices like ploughing, disc harrowing for other crops. Among all the crops berseem required higher time because of the additional operation of leveling and making the plots.

The time taken for sowing jowar, maize, napier, paragass and berseem crops was 14.0±1.15, 20.6±1.76, 23.0±1.52, 23.0±1.52 and 6.0±0.57 hours / acre respectively and significantly different (P<0.01) between crops. Govardhan Reddy (1970) reported the average time spent for sowing of different crops as 1 hour 3 minutes and 16 seconds. Suman (2008) reported that 3-10 working hours were spent by farm women for sowing of forage crops. Berseem required less time for sowing because of simple broadcasting. The higher time required for maize sowing is due to dibbling compared to jowar which is sown behind the plough without maintaining inter plant spacing. Napier and paragass required higher sowing time because of transplanting the stem cuttings and in particular paragass required more time for transplanting cuttings at a denser level.

The time taken for fertilizer application was 12.33±0.88, 12.0±1.15, 12.33±0.33, 5.0±0.57 and 8.0±0.57 hours / acre respectively. The fertilizer application took the same time for jowar, maize, napier, paragass and berseem crops respectively. The fertilizer application took the same time for jowar, maize, napier, paragass and berseem crops respectively.

The time required for irrigation of jowar, maize, napier, paragass and berseem crops was 60.0±6.92, 90.0±6.92, 51.0±10.81, 60.0±3.46, 4.0±2.0 hours / acre respectively. The time taken for irrigation was highest for maize crop because the quantum of water requirement is higher than that of other forage crops studied. Because berseem

<table>
<thead>
<tr>
<th>Name of the fodder crop</th>
<th>Land preparation Mean±SE</th>
<th>Sowing Mean±SE</th>
<th>Fertilizer application Mean±SE</th>
<th>Irrigation Mean±SE</th>
<th>Harvesting Mean±SE</th>
<th>Loading Mean±SE</th>
<th>Total time Mean±SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jowar</td>
<td>2.5±0.28</td>
<td>14.0±1.15</td>
<td>12.33±0.88</td>
<td>60.0±6.92</td>
<td>74.67±2.66</td>
<td>39.0±7.93</td>
<td>202.50±5.39</td>
</tr>
<tr>
<td>Maize</td>
<td>2.5±0.28</td>
<td>20.6±1.76</td>
<td>12.00±1.15</td>
<td>90.0±6.92</td>
<td>86.67±10.91</td>
<td>42.0±6.00</td>
<td>253.77±11.65</td>
</tr>
<tr>
<td>Napier</td>
<td>4.0±0.28</td>
<td>23.0±1.52</td>
<td>12.33±0.33</td>
<td>51.0±10.81</td>
<td>86.67±10.91</td>
<td>72.00±10.39</td>
<td>249.00±8.03</td>
</tr>
<tr>
<td>Paragass</td>
<td>2.5±0.28</td>
<td>48.0±1.15</td>
<td>5.0±0.57</td>
<td>60.0±3.46</td>
<td>144.0±20.78</td>
<td>54.0±10.39</td>
<td>313.50±15.17</td>
</tr>
<tr>
<td>Berseem</td>
<td>5.5±0.28</td>
<td>6.0±0.57</td>
<td>8.0±0.57</td>
<td>40.0±2.0</td>
<td>144.0±20.78</td>
<td>72.0±10.39</td>
<td>275.50±30.86</td>
</tr>
</tbody>
</table>

SE : Standard Error
is generally grown in winter which requires less watering.

The harvesting time for jowar, maize, napier, paragrass and berseem crops was 74.67+2.66, 88.67+10.91, 144.0+20.78, 144.0+20.78 hours/acre respectively and significantly different (P<0.01) between crops. Jowar, maize and napier grass were highly accessible for cutting and hence they took less time. The higher time requirement for harvesting paragrass is due to the fact that more number of cuttings are obtained in a given period over the other crops. Because of close spacing and dense population more time was also spent in harvesting berseem crop. Juned Akhter et al. (2002) while studying the pattern of labour utilization in rural animal husbandry practices observed that 1.0 - 1.78 hours time was required by various categories of farmers to harvest and chaff the fodder each day. The fodder yield of jowar, maize, napier, paragrass and berseem crops was 10.0, 9.0, 23.0, 13.5 and 7.5 tones/acre respectively.

The loading time for harvested Jowar, Maize, Napier, Paragrass and Berseem crops was observed to be 39.0+7.93, 42.0+6.0, 72.0+10.39, 54.0+10.39 and 72.0+10.39 hours/acre respectively. The time taken for loading the harvested crops into transport vehicle varied among the forage crops studied. Higher time consumption in loading of napier grass is due to higher yield over the rest of the crops. More time was also consumed in loading Berseem owing to the more time spent on bundling process and handling of small plants. The total expenditure incurred on labourer for various farm operations and cost of cultivation of jowar, maize, napier, paragrass and berseem crops was Rs. 5,795/-, Rs.5,625/-, Rs.8,300/-, Rs. 5,275/- and Rs. 3,625/- respectively. The gross income received by sale of jowar, maize, napier, paragrass and berseem crops was Rs.7,000/-, Rs.6,300/-, Rs.16,100/-, Rs.9,450/-, Rs.7,500/- respectively. The cost benefit ratios for jowar, maize, napier, paragrass and berseem crops were 1.20, 1.12, 1.93, 1.79 and 2.06 respectively. The cost benefit ratio was highest in berseem owing to its higher cost per kg. of fodder. This is followed by napier and paragass because of their higher yields for a given area of land. Almost similar cost benefit ratios were observed incase of jowar and maize.

**CONCLUSION**

From the study it is concluded that berseem required higher time among all the fodder crops regarding land preparation because of additional operation of leveling and making the plots. Napier and paragrass required higher sowing time because of transplanting the stem cuttings where as berseem required less time. Berseem and paragrass required less time in fertilizer application owing to the basal application and broadcasting. The harvesting time for paragrass and berseem was higher due to more number of cuttings and denser population respectively. Higher time consumption in loading of napier grass is observed due to higher yield over the rest of the crops. The cost benefit ratio was highest in berseem owing to its high market cost per kg. of fodder.

**REFERENCES**


