Introduction

To enhance the livelihood security of marginal and landless farmers, mushroom farming is better option along with other agricultural activities. Total mushroom production of India was 1,13,315 tons (2010) and of Uttarakhand was 8000 tons (Singh et al., 2011). Mushroom is highly perishable commodity and requires proper post harvest and value addition techniques. The aim of present study was to analyze the economic impact of mushroom production and value addition.

Objectives

- Cost benefit analysis of mushroom production and value addition.
- To analyse the annual income of farmers before and after adopting the technology.
- Assessment of pre and post impact of mushroom production and value addition technology, and
- To evaluate socio-economic constraints faced by farmers in adoption of technology.

Methodology

- Present investigation was carried out in Hawalbagh, Dhanlaev, Takula and Dadimkhola blocks of Almora district in Uttarakhand.
- Pretested interview schedule was used for data collection on inputs and necessary raw materials used by farmers.
- Various constraints being faced by farmers were categorised under different socio economic groups.
- Capital budgeting technique was used to analyze the economic impact of adopted technology and following analytical tools were applied for data analysis-

\[
\text{B:C} = \frac{\text{Gross return and benefit}}{\text{Total cost}}
\]

\[
\text{NPV} = \sum_{t=1}^{n} \frac{C_t}{(1+r)^t} - \text{TC}
\]

\[
\text{IRR} = \left(1 + \frac{\text{NPV}}{\text{TC}}\right)^{\frac{1}{\text{t}}} - 1
\]

\[
\text{RoI} = \frac{\text{Return on investment}}{\text{Total cost}}
\]

\[
\text{TC} = \text{Total cost}
\]

\[
\text{GR} = \text{Gross return and benefit}
\]

\[
\text{Net return} = \text{GR} - \text{TC}
\]

Results and Discussion

Analytical tools

Sample table:

<table>
<thead>
<tr>
<th>Enterprises</th>
<th>Total Cost (Rs.)</th>
<th>Average productivity (Qtl.)</th>
<th>Average sale price (Rs./Qtl.)</th>
<th>Gross return (Rs./Qtl.)</th>
<th>Net return (Rs./Qtl.)</th>
<th>B:C Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture (Rs. 6234)</td>
<td>47284</td>
<td>24.7</td>
<td>3000</td>
<td>74100</td>
<td>26016</td>
<td>1.6</td>
</tr>
<tr>
<td>Animal Husbndry (Rs. 2 cattle)</td>
<td>35734</td>
<td>20</td>
<td>2400</td>
<td>48000</td>
<td>12266</td>
<td>1.5</td>
</tr>
<tr>
<td>Oyster Mushroom (Rs.qtl. compost used)</td>
<td>3138</td>
<td>15</td>
<td>4755</td>
<td>26352</td>
<td>1572</td>
<td>1.3</td>
</tr>
<tr>
<td>button Mushroom (Rs.qtl. compost used)</td>
<td>4495</td>
<td>19</td>
<td>9857</td>
<td>4855</td>
<td>2241</td>
<td>1.2</td>
</tr>
<tr>
<td>Value addition (Rs.qtl. of button mushroom)</td>
<td>13092</td>
<td>1</td>
<td>22413</td>
<td>22413</td>
<td>9321</td>
<td>1.7</td>
</tr>
<tr>
<td>Total (Rs. annum)</td>
<td>107517</td>
<td>-</td>
<td>-</td>
<td>572007</td>
<td>50008</td>
<td>5.5</td>
</tr>
</tbody>
</table>

- Button mushroom production gave the highest B:C ratio (2.2) followed by value addition (1.7) which increases annual net return up to Rs. 50008 after adopting these technologies.

Income and employment impact after adoption of mushroom production and value addition technology

<table>
<thead>
<tr>
<th>Enterprises</th>
<th>Annual Income (Rs.)</th>
<th>Income distribution (%)</th>
<th>Annual employment generation (Days)</th>
<th>Employment generation (%)</th>
<th>NPV</th>
<th>IRR (%)</th>
<th>RoI (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>26816</td>
<td>48</td>
<td>180</td>
<td>55.2</td>
<td>117498.7</td>
<td>42</td>
<td>56.7</td>
</tr>
<tr>
<td>Animal Husbndry</td>
<td>12266</td>
<td>22</td>
<td>199</td>
<td>36.5</td>
<td>59635.3</td>
<td>20</td>
<td>34.3</td>
</tr>
<tr>
<td>Oyster Mushroom</td>
<td>1572</td>
<td>3.1</td>
<td>10</td>
<td>3.1</td>
<td>6476.5</td>
<td>35</td>
<td>81.3</td>
</tr>
<tr>
<td>button Mushroom</td>
<td>5404</td>
<td>10.8</td>
<td>13</td>
<td>4</td>
<td>28752.2</td>
<td>104</td>
<td>86.1</td>
</tr>
<tr>
<td>Value addition</td>
<td>9321</td>
<td>17</td>
<td>4</td>
<td>1.2</td>
<td>44181.5</td>
<td>55</td>
<td>71.2</td>
</tr>
<tr>
<td>Total (Rs. annum)</td>
<td>50008</td>
<td>-</td>
<td>326</td>
<td>100.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- By adopting the technology, farmers are able to increase there annual income up to 17% by value addition in button mushroom followed by button mushroom (10.8 %) and oyster mushroom production (3.1%).
- Technology showed visible impact on annual employment generation (27 days) for marginal farmers and young youths of the hills.
- Economic indicators like net present value, internal rate of return and return on investment showed positive impact.

Conclusion

- Mushroom production enhanced the livelihood security of marginal farmers through generating average annual income of Rs. 18000 and 7% employment generation for hill farmers.
- Value addition technology can reduce the post harvest losses and increase shelf life of this most demanded nutritionally rich commodity.
- Good marketing infrastructure, timely availability of necessary inputs, technological know how and financial support to the farmers may encourage to adopt the technology in large scale and increased production and productivity of the mushrooms.

References