MARKETING SUPPLY CHAIN MANAGEMENT OF BRINJAL: CHALLENGES AND OPPORTUNITIES

Hena Imtiyaz and Peeyush Soni
School of Environment, Resource and Development, Asian Institute of Technology, P.O. Box 4, Klong Luang, Pathumthani 12120, Bangkok, Thailand

ABSTRACT

The study was carried out in Allahabad district, India from November, 2011 to March, 2012 to examine the existing four marketing supply chains (SC1: Producer → Consumer; SC2: Producer → Retailer → Consumer; SC3: Producer → Commission agent → Retailer → Consumer and SC4: Producer → Commission agent → Wholesaler → Retailer → Consumer) for brinjal. The marketing supply chains had significant effect on net marketing price of producer, net profit of producer, total marketing cost, total marketing loss, total net marketing margin, marketing efficiency, producer share in consumer price and consumer purchase price for brinjal. The net price of producer, net profit of producer, marketing efficiency and producer share in consumer price were significantly higher in marketing supply chain SC1 followed by SC2, SC3 and SC4. The total marketing cost, total marketing loss, total net marketing margin and consumer purchase price for brinjal were significantly lower in marketing supply chain SC4 followed by SC3, SC2 and SC1. The standardized beta coefficient indicates that commission charges for marketing of brinjal was most dominant factor which influenced the marketing cost. The results revealed that net profit of producer, marketing efficiency and producer share in consumer price decreased significantly as well as marketing cost, marketing loss, marketing margin and consumer purchase price increased significantly with the increase of number of intermediaries in marketing supply chain. The most challenging issues in existing marketing supply chains for fresh vegetables in Allahabad district are high marketing cost, high marketing loss, low net profit of producer and low marketing efficiency caused by high number of intermediaries, poor logistics, lack of coordination between chain partners and poor linkage of producer to potential market. In order to improve socio-economic condition of small and marginal farmers / producers and provide competitive price to consumer in Allahabad district, it is feasible to introduce cooperative marketing supply chain as well as to improve transportation storage, and marketing facilities and provide accurate marketing information, technical knowledge and financial support to producers and intermediaries.
Keywords: Supply Chain, Marketing Cost, Marketing Loss, Marketing Margin, Marketing Efficiency, Brinjal

INTRODUCTION

India is the second largest producer of fruits and vegetables in the world. India’s production of fruits and vegetables currently stands at 64 million tons and 126 million tons respectively, making up for around 12% of fruits and 14% of vegetables world production. The major fruits and vegetables export from India are Mango, Guava, Onion, Potatoes, Okra, Bitter Gourd and Green Chillies. Fruits and Vegetables are highly perishable and cannot be stored for long periods without proper arrangement of post harvest facilities. The trading of fresh vegetables and fruits is very complicated due to its high perishability and therefore, it is a great challenge for the producers, supplier, processers, exporters and traders to maintain the desirable quality for domestic consumption and export. Apart from perishable nature of fruits and vegetables, the desired quality assurance, competitive global environment, stringent quality standards, etc. add to the vulnerability and complexity of business. Uttar Pradesh (U.P.) in India is fifth largest and most populous state, located in the North Western part of the country. The share of U.P. in total horticultural production of the country is 26%, second largest in the country after West Bengal. The major vegetables grown in U.P. are peas, chillies, okra, tomato, brinjal, cauliflower, cabbage, spinach, melon, radish, carrot, turnip and cucurbits. The State Government of Uttar Pradesh has brought forward various schemes and policies in order to facilitate the production and marketing of horticultural crops. However, even after measures taken by the state government, the economic condition of majority of the marginal and small-scale farmers has not improved significantly due to poor unevolved marketing systems, large numbers of intermediaries in supply chain, poor logistics and storage facilities, lack of food processing industries, inconsistency and high fluctuation in price, etc. In the present scenario, the farmer is most exploited due to lack of proper marketing supply chain system and linkage between farmer to potential market (Berdegue et al. 2008; Cavatassi et al. 2009).

Supply chain management is a wide business process encompassing planning, implementing and controlling the operations of the supply chain which aims at providing the consumers with desirable goods and commodities. Supply chain management includes movement and storage of raw materials, inventory and finished goods from producers to consumers. Supply chain management can be explained as the flow of plans, materials and services from the supplier to the consumer including the close cooperation between the various entities in supply chain. An efficient supply chain management contributes to improve efficiency in production, value additions, storage, transportation and marketing which in turn maximize the profitability of the chain partners and minimize the cost for consumers. The major issues in existing marketing supply chain of fresh vegetables in India are high marketing cost, high marketing loss, low marketing efficiency and producer’s share in consumer price as well as high consumer price (Chauhan et al. 1998; Ladaniya et al. 2005; Pawar and Pawar 2005; Talathi et al. 2005; Zulfiqar et al. 2005; Murthy et al. 2007; Gangwar et al. 2007; Sidhu et al. 2010; Emam 2011; Pandey et al. 2011). The marketing cost, marketing loss and marketing efficiency of fresh vegetable in India is largely affected by the poor infrastructure and lack of linkages between producer and intermediaries in the supply chain. The marketing efficiency of fresh vegetables is also affected by the substantial amount of wastage, deterioration in quality, mismatch in supply and demand and fluctuation in price. High perishability, seasonal in nature and bulkiness make the marketing of fresh vegetables extremely complex (Anil and Arora 1999; Gupta and Rathore, 1999; More 1999; Begum and Raha 2002; Sudha et al., 2002; Murthy et al., 2002; Singh and Chauhan 2004; Bala 2006; Lu 2006; Murthy et al., 2007; Rupali and Gyan 2010; Barakade et al. 2011).

The brinjal is an economically and forth most important vegetable grown in India. The brinjal crop is primarily grown by small and marginal farmers in Uttar Pradesh. The brinjal is an important
source of income for marginal and small scale farmers. Approximately 1.4 million small scale farmers in India grow brinjal crop, which provide them regular income (Chaudhary and Gaur, 2009). The major producing state in India for brinjal are West Bengal, Orissa, Andhra Pradesh, Gujrat, Bihar, Madhya Pradesh, Maharashtra, Chhattisgarh, Karnataka, Haryana, Jharkhand, Assam, Tamil Nadu and Uttar Pradesh. The marketing supply chain for brinjal in Uttar Pradesh involves large number of intermediaries which results in high marketing cost, high marketing loss, low marketing efficiency, low producers share in consumer price and high consumer price (Chauhan et al. 1998; Ladaniya et al. 2005; Pawar and Pawar 2005; Talathi et al. 2005; Zulfiqar et al. 2005; Murthy et al. 2007; Gangwar et al. 2007; Sidhu et al. 2010; Emam2011; Pandey et al. 2011). Inspite of economic importance of brinjal production in Allahabad district, Uttar Pradesh, little information is available on marketing supply chain management. Therefore the objectives of the study were to evaluate existing marketing supply chains of brinjal in relation to producer net marketing price, net profit of producer, marketing cost, marketing loss, marketing margin, marketing efficiency, producer share in consumer price and consumer purchase price in order to identify major constraints and opportunities to develop efficient marketing system.

MATERIALS AND METHODS

The marketing supply chain of brinjal consist of various intermediaries such as commission agents, wholesalers and retailers who move the fresh produce from producer / farmer to consumer. The following marketing supply chains were analysed in the present study because these are commonly used supply chain for brinjal in Allahabad district, India.

i. SC1: Producer→Consumer
ii. SC2: Producer→Retailer→Consumer
iii. SC3: Producer→Commission Agent→Retailer→Consumer
iv. SC4: Producer→Commission Agent→Wholesaler→Retailer→Consumer

The primary data for evaluation of four marketing supply chains of brinjal in relation to transportation, packaging and marketing costs, spoilage during transportation and marketing, loading, unloading and commission charges, cleaning, washing and grading charges, sale price, problems faced and expectations of producers, commission agents, wholesalers, retailers and consumers were collected by using well structured questionnaires. During the survey ten producers, ten commission agents, ten wholesalers, ten retailers and twenty consumers for each marketing supply chain were interviewed and data were collected.

The producer net marketing price (NMP_p), net profit of producer (NP_p), net marketing margin of wholesaler (NMM_W), net marketing margin of retailer (NMM_r), total net marketing margin (TNMM), total marketing cost (TMC), total marketing loss (TML), marketing efficiency (ME as estimated by Shepherd 1965, Murthy et al. 2007 and Acharya and Agarwal 2011) and producer share in consumer price (PSCP) for four marketing supply chains of brinjal were estimated by the following methods:

\[ NMP_p = GMP_p - [MC_p + PL_p \times GMP_p] \]  \( \ldots (1) \)

\[ NP_p = GMP_p - (CP + MC_p + PL_p \times GMP_p) \]  \( \ldots (2) \)

\[ NMM_W = SP_W - PP_W - (MC_W + PL_W \times PP_W) \]  \( \ldots (3) \)

\[ NMM_r = SP_r - PP_r - (MC_r + PL_r \times PP_r) \]  \( \ldots (4) \)
TNMM = NMM_W + NMM_r …(5)
TMC = MC_p + MC_W + MC_r …(6)
TML = (PL_p x GMP_p) + (PL_W x PR_W) + (PL_r x PP_r) …(7)

Shepherd, 1965 : ME = \[ \frac{CP}{TMC} - 1 \] …(8)

Murthy et al., 2007: ME = \[ \frac{NMP_p}{TNMM + TMC + TML} \] …(9)

Acharya and Agarwal, 2011 : ME = \[ \frac{NMP_p}{TNMM + TMC} \] …(10)
PSCP = \[ \frac{NMP_p}{CP} \times 100 \] …(11)

Where,

NMP_p = net marketing price received by producer (Rs/kg); GMP_p = gross marketing price received by producer (Rs/kg); MC_p = marketing cost of producer for transportation, packaging, loading and unloading and commission (Rs/kg); PL_p = physical loss of brinjal by producer during transportation and marketing (kg/kg); NP_p = net profit of producer (Rs/kg), CP = cost of production (Rs/kg); NMM_w = net marketing margin of wholesaler (Rs/Kg); SP_w = wholesaler sale price (Rs/kg); PP_w = purchase price of the wholesaler (Rs/kg); MC_w = marketing cost of wholesaler for transportation, packaging, loading and unloading, commission, rent, electricity and labour, etc (Rs/kg); PL_w = physical loss of brinjal by wholesaler during transportation and marketing (kg/kg); NMM_r = net marketing margin of retailer (Rs/Kg); SP_r = retailer sale price (Rs/kg); PP_r = purchase price of retailer (Rs/kg); MC_r = marketing cost of retailer for transportation, packaging, loading and unloading and commission, rent, electricity and labour etc. (Rs/kg); PL_r = physical loss of brinjal by retailer during transportation and marketing (Kg/kg); TNMM = total net marketing margin (Rs/kg); TMC = total marketing Cost (Rs/kg); TML = total marketing loss of brinjal (Rs/kg) ; ME = marketing efficiency; Cp = consumer price (Rs/kg) and PSCP = producer share in consumer price (%).

The descriptive statistics, analysis of variance, post hoc tests for multiple comparisons of means and multiple regression were used to analyse the data. The analysis was performed with SPSS version 20.

RESULTS AND DISCUSSION

Gross marketing price, net marketing price and net profit of producer and consumer price between different marketing supply chains SC_1 (Producer \rightarrow \text{Consumer}), SC_2 (Producer \rightarrow \text{Retailer} \rightarrow \text{Consumer}), SC_3 (Producer \rightarrow \text{Commission agent} \rightarrow \text{Retailer} \rightarrow \text{Consumer}), SC_4 (Producer \rightarrow \text{Commission agent} \rightarrow \text{Wholesaler} \rightarrow \text{Retailer} \rightarrow \text{Consumer}) were highly significant. The gross marketing price of producer (Rs. 8.00 / Kg), net marketing price of producer (Rs. 7.35 / Kg) and net profit of producer (Rs. 5.21 / Kg) were significantly higher in marketing supply chain SC_1, followed by SC_2, SC_3 and SC_4 due to involvement of commission agent, retailer and wholesaler in trading of brinjal. The consumer purchase price for brinjal was significantly minimum in marketing supply chain SC_1 (Rs. 8.00 / Kg), because consumer purchased the brinjal directly from producer /
The consumer purchase price for brinjal increased significantly in marketing supply chain SC2, SC3 and SC4 due to the involvement of intermediaries in marketing supply chain. Furthermore, the consumer purchase price was significantly higher in marketing supply chain SC4 (Rs. 10.80 / Kg) compared with SC1, SC2 and SC3, because in marketing supply chain SC4 maximum number of intermediaries such as commission agent, wholesaler and retailer were involved in trading of brinjal (Table 1).

Table 1. Gross marketing price, net marketing price and net profit of producer and consumer price of brinjal in different marketing supply chains

<table>
<thead>
<tr>
<th>Marketing supply chains</th>
<th>Gross marketing price of producer (GMPp) Rs/kg</th>
<th>Net marketing price of producer (NMPp) Rs/kg</th>
<th>Net profit of producer (NPp) Rs/kg</th>
<th>Consumer price (Cp) Rs/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC1</td>
<td>8.00&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.35&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5.21&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.00&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>SC2</td>
<td>6.75&lt;sup&gt;b&lt;/sup&gt;</td>
<td>6.14&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.00&lt;sup&gt;b&lt;/sup&gt;</td>
<td>10.00&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>SC3</td>
<td>5.95&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4.57&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2.43&lt;sup&gt;c&lt;/sup&gt;</td>
<td>10.00&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>SC4</td>
<td>5.25&lt;sup&gt;d&lt;/sup&gt;</td>
<td>4.16&lt;sup&gt;d&lt;/sup&gt;</td>
<td>2.02&lt;sup&gt;d&lt;/sup&gt;</td>
<td>10.80&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Values followed by same letter in superscript have no significant difference (p < 0.05)

The overall results revealed that for gross marketing price of producer (15.6 to 34.4%), net marketing price of producer (16.5 to 43.4%) and profit of producer (23.2 to 61.2%) decreased as well as purchase price of consumer (25 to 35%) increased considerably with increased in number intermediaries in marketing supply chain of brinjal. In Allahabad as well as in Uttar Pradesh the major portion of fresh vegetables including brinjal are sold through marketing supply chain SC2, SC3 and SC4. In order to improve net profit of producer / farmer and provide competitive price to consumer for brinjal, it is necessary to reduce number of intermediaries in marketing supply chain by introducing cooperative marketing supply chain which does not exist in Allahabad district as well as strengthening local / village market for direct sale of fresh vegetables particularly brinjal by producer to consumer. Similar results were reported by many researchers for wide variety of vegetables / fruits and marketing supply chains (Chauhan et al. 1998; Radha and Prasad, 2001; Pawar and Pawar 2005; Murthy et al. 2007; Sidhu et al. 2010; Hena and Soni, 2013).

Total marketing cost, total marketing loss and total net marketing margin between marketing supply chain SC1 (Producer→Consumer), SC2 (Producer→Retailer→Consumer), SC3 (Producer→Commission agent→Retailer→Consumer) and SC4 (Producer→Commission agent→Wholesaler→Retailer→Consumer) were highly significant. The total marketing cost, which includes the expenses for transportation, commission by commission agent, packaging loading and unloading, rent, electricity and labour was significantly lower in marketing supply chain SC1 (Rs. 0.42 / Kg) and it increased significantly in marketing supply chain SC2 (Rs. 1.64 / Kg), SC3 (Rs. 2.56 / Kg) and SC4 (Rs. 3.07 / Kg). The total marketing cost which includes the marketing cost of producer and intermediaries (Commission agent, wholesaler and retailer) increased considerably with the increase in number of intermediaries in marketing supply chain for example the number of intermediaries in marketing supply chain SC1, SC2, SC3 and SC4 were none, one, two and three respectively (Table 2). The total marketing loss, which includes physical loss during transportation, loading unloading and marketing by producer, wholesaler and retailer was significantly minimum in marketing supply chain SC1 (Rs. 0.23 / Kg) and it increased significantly in marketing supply chain SC2 (Rs. 0.56 / Kg), SC3 (Rs. 0.74 / Kg) and SC4 (Rs. 0.85 / Kg). This is due to fact that the total marketing loss of brinjal increased considerably with increase in number of intermediaries in marketing supply chain, because producer, wholesaler and retailer perform the transportation and marketing process separately (Table 2). The total net marketing margin, which includes net
marketing margin of wholesaler and retailer, was significantly higher in marketing supply chain SC4, because both wholesaler and retailer were involved in marketing of brinjal (Rs. 2.72 / kg). However, no significant difference in net marketing margin between marketing supply chain SC2 and SC3 was found because in these supply chains only retailer was involved in marketing of brinjal (Table 2).

### Table 2. Marketing cost, marketing loss and net marketing margin of brinjal in different marketing supply chains

<table>
<thead>
<tr>
<th>Marketing supply chains</th>
<th>Total marketing cost (TMC) Rs/kg</th>
<th>Total marketing loss (TML) Rs/kg</th>
<th>Total net marketing margin (TNMM) Rs/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC1</td>
<td>0.42(^a)</td>
<td>0.23(^a)</td>
<td>0.00(^a)</td>
</tr>
<tr>
<td>SC2</td>
<td>1.64(^b)</td>
<td>0.56(^b)</td>
<td>1.66(^b)</td>
</tr>
<tr>
<td>SC3</td>
<td>2.56(^c)</td>
<td>0.74(^c)</td>
<td>2.14(^c)</td>
</tr>
<tr>
<td>SC4</td>
<td>3.07(^d)</td>
<td>0.85(^d)</td>
<td>2.72(^d)</td>
</tr>
</tbody>
</table>

*Values followed by same letter in superscript have no significant difference (p < 0.05)*

The packaging, transportation, loading, unloading, commission, rent, electricity and labour expenses had significant effect on marketing cost of brinjal. The multiple regression analysis for standardized Beta co-efficient indicate that commission charges (0.388) paid by producer and wholesaler / retailer to commission agent was the most dominant factor, which influenced the marketing cost of brinjal, followed by transportation (0.286), rent, electricity, and labour (0.265), packaging (0.082) and loading and unloading (0.075) charges (Table 3). The results clearly revealed that in order to reduce the marketing cost of brinjal, it is necessary to minimized expenses for transportation, commission, packaging, loading and unloading, rent, electricity and labour by providing appropriate and effective logistic system to producer and intermediaries.

The overall results revealed that marketing cost, marketing loss and marketing margin increased significantly (p < 0.05) with the increase in number of intermediaries in marketing supply chain, which in turn significantly reduced the net profit of producer as well as increased the consumer purchase price of brinjal. The results further revealed that transportation cost, commission charges and rent, electricity and labour expenses were the important factors, which influenced the marketing cost of brinjal. The lack of appropriate and efficient transportation, storage, grading, packaging, marketing facilities, mismatch
between supply and demand as well as poor coordination between producer and intermediaries resulted in considerable physical loss of brinjal. The similar results were reported by many researches for fresh vegetables and fruits under wide range of marketing supply chains (Sudha et al. 2002, Zulfiqar et al. 2005, Murthy et al. 2007, Gangwar et al. 2007, Sidhu et al. 2010 and Pandey et al. 2011).

The marketing supply chains had significant effect on marketing efficiency and producer share in consumer price of brinjal. The marketing efficiency estimated by Shepherd (1965), Murthy et al. (2007) and Acharya and Agarwal (2011) were significantly higher (p < 0.05) in marketing supply chain SC1 (Producer→Consumer), SC2 (Producer→Retailer→Consumer), SC3 (Producer→Commission agent→Retailer→Consumer) and SC4 (Producer→Commission agent→Wholesaler→Retailer→Consumer). The results revealed that marketing efficiency of brinjal decreased significantly with the increase in number of intermediaries in marketing supply chains. This is due to fact that marketing cost, marketing loss, marketing margin and consumer purchase price increased significantly as well as net marketing price of producer decreased significantly with increase in number of intermediaries in marketing supply chains, which in turn decreased the marketing efficiency of brinjal (Table 4). The producer share in consumer price for brinjal was significantly higher (p < 0.05) in marketing supply chain SC1 (91.85%) due to significantly higher net marketing price of producer and lower consumer purchase price, followed by marketing supply chain SC2 (61.42%), SC3 (45.65%) and SC4 (38.54%). The results revealed that producer share in consumer price decreased significantly (91.85% to 38.54%) with increase in number of intermediaries (0 to 3) in marketing supply chain due to significant decrease in net marketing price of producer (Table 4).

### Table 4. Marketing efficiency and producer share in consumer price for brinjal in different marketing supply chains

<table>
<thead>
<tr>
<th>Marketing supply chains</th>
<th>Marketing efficiency</th>
<th>Producer share in consumer price, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC1</td>
<td>18.22&lt;sup&gt;a&lt;/sup&gt;</td>
<td>11.31&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>SC2</td>
<td>5.12&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.60&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>SC3</td>
<td>2.90&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.84&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>SC4</td>
<td>2.52&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.63&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*Values followed by same letter in superscript have no significant difference (p < 0.05)*

The overall results revealed that marketing efficiency and producer share in consumer price decreased considerably as the number of intermediaries increases in marketing supply chain due considerably increase in marketing cost, marketing loss, marketing margin and consumer purchase price as well as significant decrease in net marketing price of producer and net profit of producer. The results clearly indicate that marketing supply chain SC1 was most efficient in terms of marketing efficiency and producer share in consumer price because no intermediaries were involved in trading of brinjal. Therefore, in order to improve the marketing efficiency and producer share in consumer price, it is necessary to reduce the number of intermediaries in marketing supply chain as well as to reduce marketing cost and marketing loss by providing appropriate and efficient logistic and marketing facilities to supply chain partners. Similar results were reported by many researches for wide varieties of fresh vegetables and fruits and marketing supply chains (Ladaniya et al. 2005; Murthy et al. 2007; Gangwar et al. 2007; Emam, 2011; Pandey et al. 2011; Gaurav, 2011).
CONCLUSION

The present study evaluated four existing marketing supply chains in relation to marketing cost, marketing loss, net marketing price of producer, net profit of producer, net marketing margin of intermediaries, marketing efficiency, consumer purchase price and producer share in consumer price, in order to develop policies and strategies for efficient marketing system for brinjal in Allahabad district, India. The net marketing price of producer, net profit of producer, marketing efficiency and producer share in consumer price for brinjal decreased significantly with the increase in number of intermediaries in marketing supply chain. Furthermore, the marketing cost, marketing loss, net marketing margin and consumer purchase price increased significantly with increase in number of intermediaries in marketing supply chain. The marketing cost was most important factor which influenced the marketing efficiency and producer share in consumer price. The commission paid by producer and retailer / wholesaler was the most dominant factor influencing marketing cost.

In order to improve net profit of producer and provide competitive price to consumer, it is necessary to reduce number of intermediaries in marketing supply chain which can be achieved by forming cooperative marketing supply chain system for brinjal. The cooperative marketing supply chain may be helpful to improve marketing efficiency and producer share in consumer price. To improve marketing efficiency and net profit of producer and to provide good quality and competitive price to consumer under existing marketing supply chain system, where large number of intermediaries are involved for marketing of brinjal in Allahabad district, it is important to provide accurate market information regarding supply and demand, proper grading, storage, packaging, transportation, credit and insurance facilities to producer, retailer and wholesaler.

REFERENCES


[34] Prof. Manisha Shinde-Pawar and Prof. Chandrashekhar Suryawanshi, “Integrating Gis and Knowledge Management Resources in Indian Agriculture: Social and National Concern for Information Sharing”, International Journal of Management (IJM), Volume 4, Issue 1, 2013, pp. 258 - 265, ISSN Print: 0976-6502, ISSN Online: 0976-6510.