CHAPTER FIVE

INVENTORY MANAGEMENT

The pivotal role of inventory management in ensuring the solvency and successful perpetuation of an enterprise is widely accepted. Inventories have been rightly described as the "graveyard" of many an industry. Efficient inventory management implies the right amount of stock at the right place and at the right time, which in turn may lead to

1. "The term inventory embraces goods awaiting sale (the merchandise of a trading concern and the finished goods of a manufacturer), goods in the course of production (work in process) and goods to be consumed directly or indirectly in production (raw materials and supplies)." Accountants International Study Group, "Accounting and Auditing Approaches to Inventory in Three Nations", Jan. 1969, p. 3. Further, an inventory is an idle resource of any kind, provided that such resource has economic value. Fred Henzman, 'A Survey of Inventory Theory From the Operations Research viewpoint' in Russell J. Ackoff (ed.) Progress in Operation Research, John Wiley and Sons, Inc., New York, 1961, p. 65.

2. Uncontrolled inventory, the industrial cancer, is as dangerous as cancer in the human body, and that is why inventories have sometimes been described to be the graveyard of business. R.S. Chadda, Inventory Management in India, Allied Publishers Private Ltd., New Delhi, 1974, p. 26.
releasing the capital so scarce and also conserving valuable foreign exchange. Inventories apart from its own cost costs a good deal by way of interest charges, cost of storage and handling, deterioration and obsolescence costs, etc. To the extent there are shortages or surplus inventories, the efficiency of an enterprise is adversely affected. Since both inadequate and excess of inventory could be costly (Table 5.1) to an organization it is necessary to balance one against the other. Arriving at the happy medium between 'too much' and 'too little' of stocks constitutes the kernel of inventory management.

In the light of the above, the process of inventory management as practised in the Corporation may be evaluated. The discussion has been organised under the following heads:

1. Inventory position
2. Inventory control
3. Storage facility location

5.1 Inventory position

INPUTS-WISE inventory position of AIC at the end of each fiscal year is depicted in Table 5.2. The data

Table 5.1: Impact of excessive and insufficient inventory on costs

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Area of Cost</th>
<th>Excessive Inventory</th>
<th>Insufficient Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Material costs (purchase)</td>
<td>1. Greater risk of loss due to a) Fluctuations in market trends b) Shelf losses owing to shrinkages c) Redundancy and obsolescence</td>
<td>1. Higher prices because of emergency purchases</td>
</tr>
<tr>
<td>2.</td>
<td>Factory costs (storage)</td>
<td>1. Increase in factory costs owing to a) Lesser space for storing leading to crowded floor and working conditions b) Haphazard storage and handling resulting in breakages etc.</td>
<td>1. Increase in factory costs owing to a) Retrenchment of staff and consequent expenses in training and new personnel c) Extra shifts owing to emergency type of operations</td>
</tr>
<tr>
<td>3.</td>
<td>Overhead costs</td>
<td>1. Increased overhead expenses owing to a) Additional insurance cost b) Additional rent of hired godowns c) Payment of extra charges on borrowed capital d) Loss of available fund for other income producing investments</td>
<td>1. Increased overhead expenses owing to a) Extra costs in purchasing, receiving, inspecting and accounting as a result of piece meal purchases b) Increased material handling charges owing to crash purchases</td>
</tr>
</tbody>
</table>

Table 5.2: Inventory position of various INPUTS as on
Mid-July 1965-66 to 1979-80

(amount in '000 $)

<table>
<thead>
<tr>
<th>Years</th>
<th>Chemical fertilizers</th>
<th>Improved seeds</th>
<th>Tools and implements</th>
<th>Plant protection materials</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965-66</td>
<td>343</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>343</td>
</tr>
<tr>
<td>1966-67</td>
<td>1492</td>
<td>82</td>
<td>19</td>
<td>178</td>
<td>1771</td>
</tr>
<tr>
<td>1967-68</td>
<td>6140</td>
<td>392</td>
<td>NA</td>
<td>302</td>
<td>6034</td>
</tr>
<tr>
<td>1968-69</td>
<td>7624</td>
<td>145</td>
<td>220</td>
<td>456</td>
<td>8445</td>
</tr>
<tr>
<td>1969-70</td>
<td>12218</td>
<td>491</td>
<td>220</td>
<td>456</td>
<td>13385</td>
</tr>
<tr>
<td>1970-71</td>
<td>11776</td>
<td>395</td>
<td>819</td>
<td>344</td>
<td>13334</td>
</tr>
<tr>
<td>1971-72</td>
<td>13312</td>
<td>2</td>
<td>49</td>
<td>779</td>
<td>14142</td>
</tr>
<tr>
<td>1972-73</td>
<td>46477</td>
<td>1035</td>
<td>NA</td>
<td>650</td>
<td>48162</td>
</tr>
<tr>
<td>1973-74</td>
<td>63049</td>
<td>1391</td>
<td>5536</td>
<td>812</td>
<td>70788</td>
</tr>
<tr>
<td>1974-75</td>
<td>132725</td>
<td>3027</td>
<td>13391</td>
<td>1883</td>
<td>151026</td>
</tr>
<tr>
<td>1975-76</td>
<td>80789</td>
<td>4844</td>
<td>12506</td>
<td>2044</td>
<td>106183</td>
</tr>
<tr>
<td>1976-77</td>
<td>69103</td>
<td>4759</td>
<td>4456</td>
<td>1721</td>
<td>80039</td>
</tr>
<tr>
<td>1977-78</td>
<td>50056</td>
<td>4734</td>
<td>4252</td>
<td>1318</td>
<td>60360</td>
</tr>
<tr>
<td>1978-79</td>
<td>24552</td>
<td>7036</td>
<td>2428</td>
<td>2303</td>
<td>36319</td>
</tr>
<tr>
<td>1979-80</td>
<td>8806</td>
<td>9946</td>
<td>4612</td>
<td>2214</td>
<td>25578</td>
</tr>
</tbody>
</table>

Source: AIC
reveals that overall inventory position of AIC has fluctuated from Rs.343 thousands to Rs.151026 thousands. Of the 15 years period, inventory position was increasing each year for the first ten years excepting one year (1971), but from 1975-76 it has started declining and at the end of 1979-80 the inventory position stood at Rs.25578 thousands.

The share of different INFUS in the total inventory position is shown in Table 5.3. The data reveals that of all the INFUS the share of chemical fertilizers is the largest followed by improved seeds. In all the years the share of chemical fertilizers in the total inventory was more than 80 percent excepting 1978-79 and 1979-80 during which its share stood at 67.6 and 34.4 percent respectively.

Now the question is: Whether the above inventory position is adequate? Since on the basis of absolute value of inventory alone it is difficult to say about the adequacy of inventory position, therefore, it is compared with the sales volume. INFUS-wise inventory position at the end of each fiscal year as a percentages of sales has been presented in Table 5.4, which reveals that in aggregate, inventory position as a percentage of sales volume has ranged in the region of 20 to 188. For the first 10 years there has been erratic fluctuations in percentage figures within the range of 48 to 188 percentage and thereafter the percentage figures have started declining; the inventory position as a percentage of sales volume was only 20 percent at the end of 1979-80.
Table 5.3: Share of various INPUTS in total inventory
(In percentages)

<table>
<thead>
<tr>
<th>Years</th>
<th>Chemical fertilizers</th>
<th>Improved seeds</th>
<th>Tools and implements</th>
<th>Plant protection material</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965-66</td>
<td>10.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>1966-67</td>
<td>84.2</td>
<td>4.6</td>
<td>1.1</td>
<td>10.1</td>
<td>100</td>
</tr>
<tr>
<td>1967-68</td>
<td>85.8</td>
<td>5.7</td>
<td>-</td>
<td>4.5</td>
<td>100</td>
</tr>
<tr>
<td>1968-69</td>
<td>90.3</td>
<td>1.7</td>
<td>2.8</td>
<td>5.4</td>
<td>100</td>
</tr>
<tr>
<td>1969-70</td>
<td>91.3</td>
<td>3.7</td>
<td>1.6</td>
<td>3.4</td>
<td>100</td>
</tr>
<tr>
<td>1970-71</td>
<td>88.3</td>
<td>3.0</td>
<td>6.1</td>
<td>2.6</td>
<td>100</td>
</tr>
<tr>
<td>1971-72</td>
<td>94.1</td>
<td>...</td>
<td>0.4</td>
<td>5.5</td>
<td>100</td>
</tr>
<tr>
<td>1972-73</td>
<td>96.5</td>
<td>2.1</td>
<td>-</td>
<td>1.4</td>
<td>100</td>
</tr>
<tr>
<td>1973-74</td>
<td>89.1</td>
<td>2.0</td>
<td>7.8</td>
<td>1.1</td>
<td>100</td>
</tr>
<tr>
<td>1974-75</td>
<td>87.9</td>
<td>2.0</td>
<td>8.9</td>
<td>1.2</td>
<td>100</td>
</tr>
<tr>
<td>1975-76</td>
<td>80.6</td>
<td>4.8</td>
<td>12.5</td>
<td>2.1</td>
<td>100</td>
</tr>
<tr>
<td>1976-77</td>
<td>96.3</td>
<td>5.9</td>
<td>8.6</td>
<td>2.2</td>
<td>100</td>
</tr>
<tr>
<td>1977-78</td>
<td>82.9</td>
<td>7.8</td>
<td>7.1</td>
<td>2.2</td>
<td>100</td>
</tr>
<tr>
<td>1978-79</td>
<td>67.6</td>
<td>19.4</td>
<td>6.7</td>
<td>6.3</td>
<td>100</td>
</tr>
<tr>
<td>1979-80</td>
<td>34.4</td>
<td>38.9</td>
<td>18.0</td>
<td>8.7</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: ... indicates negligible percentage
Table 5.4: INHUT-WISE inventory position as a percentage of sales volume during 1965-66 to 1970-80

<table>
<thead>
<tr>
<th>Years</th>
<th>Chemical fertilizers</th>
<th>Improved seeds</th>
<th>Tools and implements</th>
<th>Plant protection materials</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965-66</td>
<td>53</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>53</td>
</tr>
<tr>
<td>1966-67</td>
<td>47</td>
<td>17</td>
<td>83</td>
<td>848</td>
<td>48</td>
</tr>
<tr>
<td>1967-68</td>
<td>73</td>
<td>42</td>
<td>-</td>
<td>347</td>
<td>75</td>
</tr>
<tr>
<td>1968-69</td>
<td>77</td>
<td>15</td>
<td>72</td>
<td>496</td>
<td>75</td>
</tr>
<tr>
<td>1969-70</td>
<td>84</td>
<td>52</td>
<td>19</td>
<td>209</td>
<td>79</td>
</tr>
<tr>
<td>1970-71</td>
<td>70</td>
<td>54</td>
<td>84</td>
<td>168</td>
<td>71</td>
</tr>
<tr>
<td>1971-72</td>
<td>55</td>
<td>...</td>
<td>4</td>
<td>154</td>
<td>50</td>
</tr>
<tr>
<td>1972-73</td>
<td>124</td>
<td>24</td>
<td>-</td>
<td>20</td>
<td>106</td>
</tr>
<tr>
<td>1973-74</td>
<td>109</td>
<td>37</td>
<td>26</td>
<td>334</td>
<td>86</td>
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<tr>
<td>1974-75</td>
<td>185</td>
<td>50</td>
<td>720</td>
<td>309</td>
<td>188</td>
</tr>
<tr>
<td>1975-76</td>
<td>109</td>
<td>83</td>
<td>265</td>
<td>235</td>
<td>117</td>
</tr>
<tr>
<td>1976-77</td>
<td>82</td>
<td>71</td>
<td>138</td>
<td>130</td>
<td>84</td>
</tr>
<tr>
<td>1977-78</td>
<td>52</td>
<td>64</td>
<td>210</td>
<td>48</td>
<td>55</td>
</tr>
<tr>
<td>1978-79</td>
<td>24</td>
<td>100</td>
<td>133</td>
<td>124</td>
<td>32</td>
</tr>
<tr>
<td>1979-80</td>
<td>7</td>
<td>122</td>
<td>355</td>
<td>138</td>
<td>20</td>
</tr>
</tbody>
</table>

Note: ... indicates negligible percentage
Among the various INPUTS the inventory position of fertilizers has shown the trend similar to aggregate trend, but the inventory position of other INPUTS has been fluctuating.

From the above analysis it becomes quite clear that the Corporation has not been following any scientific policy in regard to inventorying: sometimes it has carried excessive inventory i.e. about 2 years supply (1974-75) and sometimes the inventory position has not been adequate even to meet 2½ months demand (1979-80). The Corporation has so far not fixed any inventory levels so essential for inventory control. It is very necessary to fix essential limits of inventory levels keeping in view the procurement time and the rate of consumption. A system of periodical review of such limits should also be instituted because the assumptions in which these limits are based, procurement time and rate of consumption, are subject to frequent changes.

5.2 Inventory control

Inventory control which aims at minimising costs, enables an organization to put to the best use of one important resource, the stock. Effective inventory control chalks out the inventory system, weighs the cost of maintaining stocks against the advantages which they confer so as to arrive at a set of target inventory which minimizes total costs, provides the means for bringing the system to the target level, and the means for revising the targets in view of the changing conditions.
Why control inventory

In the light of the foregoing the need for instituting inventory control system becomes fairly clear. Scientific management of inventories will help an organisation like AIC in: (i) conserving valuable foreign exchange, (ii) releasing capital, so scarce in a developing country like Nepal, and (iii) reducing costs associated with both shortages and possession of surplus inventories and thus increase the overall efficiency of the Corporation.

The repercussions of inventory management on investment operations and results are too obvious to be delineated. While some of the advanced countries have been "plunging into the healthful waters of the ocean of scientific inventory control", some or how the public enterprises in Nepal, including AIC are still slotted on the shore contemplating whether 'to wet their toes'. In spite of the various tools and techniques of inventory management such as Economic Order Quantity, ABC analysis etc. available to a today's manager none of these has been used by the managers/officers of the Corporation. In fact the inventory control system is non-existent in AIC: non-existent because the system there does not use any tools and techniques, and further it lacks the essential core—a target or objective which is to be achieved and so remains a mere inventory recording system, 'a nervous system without a guiding brain'. With the result the Corporation was faced with the twin problems of excesses as well as shortages.
5.2.1 Reasons for high/low inventory in AIC

The following factors were found to be responsible for the high/low inventory in the Corporation.

a) Variation in demand forecast and actual consumption

In any system of inventory control, it is essential that forecasts of demand are as accurate as possible, otherwise, both excesses and shortages are inevitable. There are two factors which cause uncertainty and lead both to excesses and stock outs; these subsume (i) variability of procurement leadtime, and (ii) variations between forecasts and actual consumption. At AIC, the variability of procurement leadtime was comparatively small, but the variations between forecasts of demand and actual consumption were very large. As stated earlier, of the various inputs handled by AIC, fertilizers constituted the largest. The consumption of fertilizers against the sales forecast of the Corporation over two plans period (1970-71 to 1979-80) was only 74 percent, ranging from 53 percent to 88 percent (Table 5.5).

Naturally, there were heavy stocks at the end of every year.

Table 5.5: Sales forecast and consumption of fertilizers over two plans period

<table>
<thead>
<tr>
<th>Plans</th>
<th>Sales forecast of AIC</th>
<th>Actual sales</th>
<th>Sales as a percentage of forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fourth Plan (1970-75)</td>
<td>72980</td>
<td>39020</td>
<td>53</td>
</tr>
<tr>
<td>Fifth Plan (1975-80)</td>
<td>109274</td>
<td>96491</td>
<td>88</td>
</tr>
<tr>
<td>Total</td>
<td>182254</td>
<td>135511</td>
<td>74</td>
</tr>
</tbody>
</table>
b. **No consideration for inventory and consumption trend at the time of procurement**

Generally the procurement of INPUTS for a particular year should be made on the basis of demand estimation for that year and inventory position at the beginning of the year. In the light of this when procurement activities of the Corporation regarding chemical fertilizers is viewed for the last 8 years, it is found that every year there has been excess procurement (Table 5.6). In the year 1974-75 the excess procurement was made to the extent of 144 percent of the demand estimation of that year; with the result the Corporation had to carry an inventory of more than ₹15 crores of which the share of chemical fertilizers was more than ₹13 crores. The vulnerability of the Corporation's activity regarding procurement of fertilizers was found in the subsequent year 1975-76 when the Corporation's beginning inventory position was 11 percent more than the demand estimation for that year, even then the Corporation made procurement of fertilizers in that year. It should be mentioned here also that the sales of fertilizers has always been less than the demand estimation of the Corporation and the analysis made here has shown that the procurement has exceeded the difference between demand estimation and inventory position. As a cumulative effect of these, there has been excessive inventory.

One of the factors responsible for the excess inventory in AIC has been fertilizers received through multilateral and
Table 5.6: Excess procurement of fertilizers in plant nutrient during 1970-71 to 1977-78 in MT

<table>
<thead>
<tr>
<th>Year</th>
<th>Beginning inventory</th>
<th>Demand estimates</th>
<th>Balance to be procured</th>
<th>Actual procurement</th>
<th>Excess procurement in a particular year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(a)</td>
<td>(b)</td>
<td>(c)</td>
<td>(d) (b-c)</td>
<td>(e)</td>
</tr>
<tr>
<td>1970-71</td>
<td>3853</td>
<td>8140</td>
<td>4287</td>
<td>5331</td>
<td>1044</td>
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<td>1971-72</td>
<td>3778</td>
<td>10280</td>
<td>6502</td>
<td>8546</td>
<td>2044</td>
</tr>
<tr>
<td>1972-73</td>
<td>4356</td>
<td>18100</td>
<td>13744</td>
<td>22252</td>
<td>8508</td>
</tr>
<tr>
<td>1973-74</td>
<td>14708</td>
<td>21700</td>
<td>6992</td>
<td>12680</td>
<td>5688</td>
</tr>
<tr>
<td>1974-75</td>
<td>14300</td>
<td>14760</td>
<td>460</td>
<td>21758</td>
<td>21298</td>
</tr>
<tr>
<td>1975-76</td>
<td>23400</td>
<td>21075</td>
<td>-2325</td>
<td>2180</td>
<td>2180*</td>
</tr>
<tr>
<td>1976-77</td>
<td>13314</td>
<td>20000</td>
<td>6686</td>
<td>13853</td>
<td>7167</td>
</tr>
<tr>
<td>1977-78</td>
<td>12274</td>
<td>20500</td>
<td>8226</td>
<td>14218</td>
<td>5992</td>
</tr>
</tbody>
</table>

Note: *In 1975-76 fertilizers were procured even when the stock position of the Corporation was in excess of the demand estimates for the year.
bilateral aid. The Corporation does not get timely information concerning special shipments of fertilizers under aid arrangements. Often AIC did not know about such shipments until the very arrival at the Calcutta port. Further the shipments have not been in conformity with the requirement of the Corporation. For example, in the beginning of the fiscal year 1975-76, the inventory position of AIC was more than the Corporation's fertilizer demand estimates for that year, even then the Corporation had to receive 2180 MT of fertilizer (5000 MT in gross quantity) from West Germany (3000 MT urea) and Britain (2000 MT complex). Such type of cases has not only contributed greatly to overstraining AIC storage capacity but also frequently burdening the Corporation with excessive inventories and storage cost. Thus the inventory problem of AIC had been unique. It had to face not only universalised problem but also a peculiar problem of its own kind. Generally the inventory problem in an enterprise stems from the variation in sales as several factors affecting sales are beyond its control. This type of common problem is already there in the Corporation. In addition to this, uncertainty about the arrival of aided fertilizers had been another problem to the Corporation. It needs to be mentioned here that according to the Corporation

fertilizers received under bilateral agreements were not a cost free donation to the Corporation excepting few cases. The sale proceeds of such fertilizers were to be credited in the counterpart funds established for the implementation of technical assistance projects like GADP, JADP and so on. Usually the amount that had to be deposited were higher than the sales proceeds of fertilizers because they were not valued at domestic sales price rather at F.O.B. donor country. In certain cases the cost of aided fertilizers to the Corporation had been higher than its own procurement through global tender. These facts indicate that inventory problems created by aided fertilizers cannot be underscored. The problems were created mainly due to the lack of coordination between the Finance Ministry (who negotiates aid) and the Agriculture Ministry (the administrative ministry of the Corporation) at the time of negotiating aid.

5.3 Storage facility location

Storage of INPUTS is an integral part of the process by which AIC maintains a flow of supply of INPUTS from their points of origin outside the organization/country to their point of use in various parts of the country. It needs to be mentioned here that stores is not a dumping ground but part of the economy of the business and one of the main link in supply of INPUTS.

In arriving at the location, size, design etc. of the store house, various factors are generally taken into consideration including:

i. volume of stock transaction

ii. type of stock

iii. volume of stocks to be held at any one time

iv. amount of handling, re-handling and extent of transport involved

v. security

vi. safety requirement, etc.

In the light of above storage facility built up by AIC may be discussed.

5.3.1 Construction of store-houses during different plans period

One of the objective of AIC in each plan period has been to construct storehouses at different parts of the country because it has to store INPUTS in different centres from where INPUTS are routed to farmers through different channels of distribution. Besides the Corporation has to store INPUTS for certain period at the places adjoining different railheads from where INPUTS are despatched to other parts of the country far from railheads. Further, INPUTS have to be stored in relay stations at foot hills from where these are transported to different delivering centres of hill and uphill areas through mules and human porters. These requirements necessitate the building up of additional storhouses at the places from where such services are handled.

In view of the requirements of additional storehouses, the Corporation had a target of constructing storehouses at 3 places with a capacity of 5500 MT during the Third Plan. As stated earlier in chapter 4 the consumption of INPUTS during those days were very limited and mainly confined to Kathmandu Valley and in some parts of Terai, the construction of store-houses was also planned accordingly. But as the transaction of INPUTS went on increasing the need for more storehouses were felt and accordingly in the fourth plan period the construction of some more storehouses at different districts of the country were planned. Since the target of the Third Plan Period were not achieved during that plan itself, it was planned in the Fourth Plan to complete the previous uncompleted construction and also to construct additional store-houses with a capacity of 24250 MT. The Corporation could achieve not only planned target but also an additional storage facility of 1000 MT was built up and by the end of the Fourth Plan period the Corporation had a storage capacity of 30750 MT. The need for additional store houses was again realised and during the Fifth Plan period the Corporation constructed the storing capacity of 24650 MT. Thus by the end of 1979-80 the Corporation had a total storing capacity of 55400 MT. Store-houses of 5050 MT capacity were under construction. A complete list of the storing capacity of AIC is shown in Table 5.7.
<table>
<thead>
<tr>
<th>Location</th>
<th>Number of storehouses</th>
<th>Capacity</th>
<th>Location</th>
<th>Number of storehouses</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jhapa</td>
<td>1</td>
<td>500</td>
<td>Damauli</td>
<td>1</td>
<td>250</td>
</tr>
<tr>
<td>Biratnagar</td>
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<td>2600</td>
<td>Garkha</td>
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<td>250</td>
</tr>
<tr>
<td>Itahari</td>
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<td>4000</td>
<td>Perbat</td>
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<td>500</td>
<td>Lamjung</td>
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<td>Pokhara</td>
<td>2</td>
<td>1600</td>
</tr>
<tr>
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<td>500</td>
<td>Baglung</td>
<td>1</td>
<td>250</td>
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<tr>
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<td>Myagdi</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Dhankutta</td>
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<td>500</td>
<td>Gulsid</td>
<td>1</td>
<td>250</td>
</tr>
<tr>
<td>Ditcel</td>
<td>1</td>
<td>250</td>
<td>Bhairahawa</td>
<td>5</td>
<td>6600**</td>
</tr>
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<td>250*</td>
<td>Parasi</td>
<td>1</td>
<td>1000</td>
</tr>
<tr>
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<td>1</td>
<td>100*</td>
<td>Tauliharva</td>
<td>2</td>
<td>1450</td>
</tr>
<tr>
<td>Lamak</td>
<td>1</td>
<td>500*</td>
<td>Krishnanagar</td>
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<td>500*</td>
</tr>
<tr>
<td>Janakpur</td>
<td>5</td>
<td>4900</td>
<td>Syangja</td>
<td>1</td>
<td>500*</td>
</tr>
<tr>
<td>Sarlahi</td>
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<td>500</td>
<td>Falpa</td>
<td>1</td>
<td>250*</td>
</tr>
<tr>
<td>Sinduli</td>
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<td>250</td>
<td>Tulsipur</td>
<td>1</td>
<td>500</td>
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<tr>
<td>Gaur</td>
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<td>500</td>
<td>Cheurjahari</td>
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<td>250</td>
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<td>Birgunj</td>
<td>6</td>
<td>15300</td>
<td>Nepalgunj</td>
<td>3</td>
<td>2500</td>
</tr>
<tr>
<td>Bharatpur</td>
<td>2</td>
<td>1100</td>
<td>Surkhet</td>
<td>1</td>
<td>500</td>
</tr>
<tr>
<td>Kathmandu</td>
<td>3</td>
<td>5200</td>
<td>Doti</td>
<td>2</td>
<td>500</td>
</tr>
<tr>
<td>Nuwakot</td>
<td>8</td>
<td>950</td>
<td>Kailali</td>
<td>1</td>
<td>1000</td>
</tr>
<tr>
<td>Kamechep</td>
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<td>100*</td>
<td>Mahendranagar</td>
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<td>500</td>
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<td>Dolakha</td>
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<td>100*</td>
<td>Gularia</td>
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<td>1</td>
<td>500</td>
<td>Rajapur</td>
<td>1</td>
<td>250*</td>
</tr>
<tr>
<td>Gajuri</td>
<td>1</td>
<td>250*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * indicates store-houses under construction
** includes 1 store house of 2000 MT under construction

Source: Construction section of AIC
5.3.2 **Regional distribution of storehouses**

Distribution of storehouses in different development region is set out in Table 5.8. The Table reveals that in aggregate highest number of storehouses (38 percent) with maximum capacity (41%) has been built up in Central Development Region, it is followed by Western Development Region where 25 percent of total number and 22 percent of total capacity has been built up. The share of Eastern Development Region in the storehouses of AIC has been 22 percent in number and 19 percent in capacity. The storehouses of smallest number (15%) with lowest capacity (10%) has been constructed in Far Western Region. Although distribution of storehouses in different development region is not exactly in the proportion of volume of transaction as reported earlier in chapter 4, but it has followed the pattern of distribution of volume of transaction. For example, the maximum and minimum volume of transaction has been in Central and Far Western Development Region respectively and similarly maximum and minimum capacity of storehouses has been built up in these regions.

5.3.3 **Topographical distribution of storehouses**

Topographical (attitudenally arranged regionwise) distribution of storehouses is given in Table 5.9. The Table reveals that in aggregate highest number of storehouses (56 percent) with maximum capacity (75 percent) has been built up in Terai region, it is followed by Hills where 35 percent of total number and 16 percent of total capacity
<table>
<thead>
<tr>
<th>Development region</th>
<th>Existing storehouses</th>
<th>Storehouses under construction</th>
<th>Total storehouses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>number</td>
<td>capacity</td>
<td>number</td>
</tr>
<tr>
<td>Eastern</td>
<td>15 (22)</td>
<td>10250 (19)</td>
<td>18 (22)</td>
</tr>
<tr>
<td>Central</td>
<td>28 (41)</td>
<td>29200 (53)</td>
<td>31 (38)</td>
</tr>
<tr>
<td>Western</td>
<td>16 (23)</td>
<td>10200 (19)</td>
<td>20 (25)</td>
</tr>
<tr>
<td>Far Western</td>
<td>10 (14)</td>
<td>5750 (10)</td>
<td>12 (15)</td>
</tr>
<tr>
<td>Total</td>
<td>69(100)</td>
<td>55400(100)</td>
<td>81(100)</td>
</tr>
</tbody>
</table>

Table 5.8: Development region-wise distribution of storehouses

(Capacity in MT)
Table 5.9: Topographical distribution of storehouses

<table>
<thead>
<tr>
<th>Topographical region</th>
<th>Existing storehouses</th>
<th>Storehouses under construction</th>
<th>Total storehouses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Capacity</td>
<td>Number</td>
</tr>
<tr>
<td>Up-hills</td>
<td>1 (2)</td>
<td>250(...)</td>
<td>1 (8)</td>
</tr>
<tr>
<td>Hills</td>
<td>25 (36)</td>
<td>8100 (15)</td>
<td>6 (50)</td>
</tr>
<tr>
<td>Kathmandu valley</td>
<td>3 (4)</td>
<td>5200 (9)</td>
<td>-</td>
</tr>
<tr>
<td>Terai</td>
<td>40 (58)</td>
<td>41850 (76)</td>
<td>5 (42)</td>
</tr>
<tr>
<td>Total</td>
<td>69 (100)</td>
<td>55400 (100)</td>
<td>12 (100)</td>
</tr>
</tbody>
</table>
has been built up. The share of Kathmandu Valley in the
storehouses of AIC has been 3 percent in number and 9
percent in capacity. The storehouses of smallest number
with lowest capacity (350 MT capacity, the percentage of
which in terms of total capacity is negligible) has been
constructed in up-hills area. Here again, although the
distribution of storehouses in different topographical
region is not exactly in the proportion of volume of
transaction as reported earlier in chapter 4, but it has
followed the pattern of distribution of volume of transac-
tion in certain cases. For example, the maximum and
minimum volume of transaction has been in Terai and uphills
region respectively and similarly maximum and minimum
capacity of store-houses has been built up in these regions.
The capacity of storehouses constructed in Hills and
Kathmandu Valley has, however, shown an inverse relation-
ship with the pattern of volume of transaction. For example,
the consumption of INPUTS (Chemical fertilizers and seeds
taken together) in Kathmandu Valley has exceeded the total
consumption of these INPUTS in all the hill areas but while
constructing storehouses more in number as well as in
capacity, has been constructed in Hills than in Kathmandu
Valley.

5.3.4 Construction cost of storehouses

AIC did not have information to provide regarding
the amount so far involved in constructing storehouses,
however, from the allocation made in national plans for constructing storehouses for the Corporation it is revealed that about ₹ 35 million (₹ 8 million in Fourth Plan and ₹ 27 million in Fifth Plan) is so far involved in constructing storehouses. Costs of construction vary as per size and location of storehouses (Table 5.10). It is seen that higher is the capacity lower is the per unit.

Table 5.10: Estimated cost of construction for various capacity of storehouses.

<table>
<thead>
<tr>
<th>Capacity of storehouses in MT</th>
<th>Estimated cost of construction in Terai region in '000 ₹</th>
<th>Additional cost of construction in (as a percentage of cost involved in Terai)</th>
<th>Kathmandu</th>
<th>Hills</th>
<th>Up-hills</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>60</td>
<td>10</td>
<td>35 to 50</td>
<td>50 to 250</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>110</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
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<td>250</td>
<td>250</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
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</tr>
<tr>
<td>500</td>
<td>480</td>
<td>&quot;</td>
<td>&quot;</td>
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</tr>
<tr>
<td>2000</td>
<td>1400</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Note: Estimation is based on 1976-77 prices.

Source: Construction section of AIC Head Office.

additional construction cost and vice versa. The Table also reveals that the cost of construction in Kathmandu Valley, Hills and Up-Hills areas is more than the Terai region and the additional cost of construction in these areas vary from 10 to 250 percent. While the variation in
construction cost according to the size of storehouses is explained by the economy of scale, the variation according to the location of storehouses is mainly because of variation in transportation cost of construction materials such as cement, rod etc. As one moves up altitudenally, per unit/per km cost of transportation also goes on increasing and these costs are exceptionally high in the areas where only mules and human porters are used as means of transportation. Besides transportation, high labour cost in hills and up-hills areas is also responsible for increasing construction cost in these areas.

5.3.5 An appraisal of storage facility of AIC

The analysis made in the earlier pages regarding storage facility built up by AIC has shown that the Corporation has built-up reasonable capacity of storage overtime. In aggregate, the storing capacity (including under construction) of the Corporation now is 139 percent of the average per year sales volume of INPUTS (Chemical fertilizers and seeds sold on average during the Fifth Plan period was 43613 MT per year). This indicates that the Corporation can now store about 17 month's supply requirement based on present level of consumption at a time. In spite of such situation the storage congestion of AIC does not seem to ease. It is because of unplanned distribution of storage facilities. This is illustrated by the following typical example.
On Mid-July 1977 the Corporation had a total inventory of 40125 MT (Fertilizers 38500 MT and improved seeds 1625 MT) which depleted to 13562 MT due to 5 months sales (monthly sales pattern of various inputs is given in Table 3.10 of Chapter 3). In December 1977 there was fresh arrival of stocks equivalent to 19000 MT (Fertilizers 18316 MT, seeds 684 MT) which raised the inventory position to 32562 MT. It again started declining till the arrival of another consignments of 19000 MT fertilizers and 1866 MT seeds in the months of April/May.

The stock position on Mid-May 1978 was thus, 40589 MT. Thereafter it again started declining due to monthly sales till the fresh stock arrival in the month of December 1978. Thus the maximum quantity that the Corporation had to store in 1977-78 was 40589 MT and the capacity of the storehouses available to the Corporation during that year was 42100 MT, indicating excess storing capacity with the Corporation. Inspite of such excess capacity the Corporation had hired storehouses of 34285 MT capacity at the rate of Rs 5.63 per MT/per month indicating a monthly rent of hired storehouses as Rs 1,93,025. This shows that while at some places storehouses are underutilised, at others they are not in a position to meet the requirements.

Briefly stated, efficient inventory management is invariably behind the success of any enterprise. However, the inventory management of the Corporation is not sound.
It had suffered with the twin problems of excess/as well as shortages. It had happened mainly because of absence of any inventory control system. The uncertainty both in terms of quantity and time about the arrival of aided fertilizers had created additional inventory problem to the Corporation. Further the location of storehouses has not been geared to the requirements of different places. with the result: despite the sufficient storing capacity at the disposal of the Corporation it had to frequently hire godowns at exorbitant rents.

There is no doubt, both internal and external impinged factors have . . . upon inventory decisions in AIC. The external facts such as international/national market conditions, government policy and decisions especially with regard to credit guarantee and aided fertilizers have created problems which require action from appropriate agencies. The internal factors such as prognostication of requirements, fixing inventory levels, building up adequate storage capacity at required places etc. needs to be cogently taken up by the Corporation. In the light of these some of areas where action is warranted follow.

The action areas

1. Organisation planning: The first and primary task before the Corporation in this regard is to completely revamp the existing structure of organisation for inventory. Hitherto the diverse aspects of inventory management distributed over different officers have to be brought under the
umbrella of a senior officer reporting at least to the Deputy General Manager, who should be expected to look after all facets of inventory management including the controlling of inventory position at field offices. Equally important is the fact that the functionaries of the departments are properly trained and developed.

ii. Storage facility location: Another area that should draw the attention of the Corporation is in the field of storage facility location in future. While the present facility in aggregate is adequate to meet the current requirements but due to inappropriate location there has been situations of inadequate space at some places and underutilisation of facility at another. In view of this adequate care should be devoted to the creation of proper storage facility in the neighbourhood future.

iii. Adoption and adaption of modern management tools and techniques: It is high time that the Corporation should make full utilisation of the latest tools and techniques available in the modern management kit which have so far not attracted the attention of its officers. It is true that the use of tools and techniques is not that simple; requires expert handling; but these can be appropriately adapted to suit the ingenuity and environment of the Corporation. Adoption of techniques such as Economic Order quantity (EOQ), Always Better Control (ABC), value analysis, Vendor analysis etc. can be made with convenience and economic advantage.