CHAPTER- 4

POTATO ACREAGE, RELATIVE PRICE MOVEMENTS AND INFRASTRUCTURE DEVELOPMENT

4.1 Introduction:

Analysis in chapter- 3 has revealed that the area, production and productivity of potato in Assam have had a positive growth trend over the years. In the recent years, the share of potato in total cropped area has also been rising. These results are the inducement to explore the factors encouraging the farmers to allocate higher share of their crop acreage to potato. The present chapter is aim that identifying or understanding the factors contributing to growth in acreage of production of potato in Assam.

The farmers’ allocation of area to a particular crop, specially a one not primarily for home consumption but for the market, is influenced by expected returns from its cultivation compared to the expected returns of the competing crops. The rate of return depends on cost of cultivation, output realization and price realization of marketable output. The cost of cultivation part of the competing crops may not of the very much in the short run. The main factors affecting cost of cultivation, such as inputs and factors of production are mostly common for all the competing crops.

Output realization may be crop specific as different competing crops may be influenced differently by biotic and abiotic conditions, such as incidence of pest attacks, crop diseases, weather conditions of temperature and perspiration during the crop season. These factors are however not foreseeable for the farmers at the point of sowing. Hence, influence of these factors on acreage allocation decisions may not be significant. This
leaves us with the relative price movements among the competing crops as a main influencing factor of acreage allocating decision of the farmers. The prices to be realized in post harvest are also not known perfectly foreseeable to the farmers. The literatures suggest that the farmers form price expectations on the basis of their past experiences.

Assuming that the small farmers are typically risk averters. The farmers will be concerned not only with the trend of relative price movements but also variability of the price of the crop concerned. Accordingly, in the present chapter, the price movements of potato in comparison with some of the competing crops like cabbage and green chilli have been investigated as probable explanatory factors for potato acreage trend in Assam. The other two factors which are also explored are infrastructure improvement in terms of improved road connectivity, market development, cold storage facilities and irrigation. Potato in Assam being dry season crop, improved irrigation infrastructures can contribute to increase in area of dry season crops including potato. Again, potato being a semi-storable commercial crop, improved infrastructure related factors mentioned above can facilitate better marketing at higher price realization by the potato farmers.

**4.2 Trends in the Prices of Potato and its Competing Crops in Assam:**

Trends in the prices of potato and its competing crops like cabbage and green chilli have been examined for the different markets throughout the state of Assam. Howly market from the district of Barpeta, Uparhali (Guwahati) market from the Kamrup (Metro) district and Cachar market from the Cachar (hilly) district have been selected for studying the relative price movements of potato and its competing crops.
4.2.1 Price Movement in Howly Market:

The figure no. 4.1 represents the trends in the prices of potato and its competing crops in Howly market during January 2005 to March 2014. It has been observed from the figure [Refer figure 4.1]; the prices of potato, cabbage and green chilli have the increasing trends during January 2005 to March 2014. But, the patterns of trends of prices of the crops are different. The price of potato has minimum fluctuations in its trend during the study period in comparison to the other two crops. Again, from January 2005 to April 2009, price of potato has less fluctuation in comparison the later part of the period under study. An important nature of price fluctuation of potato crop is that during the months of January to March, that is the harvesting season, price of potatoes remain very low. But, during the months of August to October, price of potato reached the peak level in that particular year.

Due to the perishable nature of vegetable crops such as cabbage, the price falls drastically when gluts created in the market during harvesting period. Since, potato is a semi-perishable in nature; hence the crop can be stored for a few months. Regarding the price fluctuations of potatoes, it is supposed that due to storability of the crop, its price has the lesser degree of fluctuations. Because, during the months of harvesting, due to bulk supply of potato, its price becomes very low level. The big farmers and traders store a good amount of potatoes in different cold stores. Thus, during the off season that is in the pre-seedling season supply of potato could be increased as prices go up. Besides, a considerable quantity of potato come to the markets in Assam from the state of West Bengal which has been established itself as the second largest potato producing state in the country. Therefore, the risks of price uncertainties are comparatively lesser in case of potato crop compared to its competing crops such as cabbage and green chilli.
Trends in the Prices of Potato and its Competing Crops in Howly Market during 2005 to 2014

Figure 4.1
Similarly, as observed in the figure [Refer figure 4.1], price of cabbage in Howly market of Barpeta district has more fluctuations in comparison to potato. Similar to potato, price of cabbage has less fluctuation during January 2005 to January 2010. Thereafter, the price of potato, in Howly market becomes more fluctuations. Again, during months of January to March; that is during the months of harvesting of the crop, price becomes very low. And during the months of September to October, price of cabbage in the market of Howly was very high.

It is remarkable that during the months of harvesting, prices of both potato and cabbage remained very low, but, price of cabbage was lower than the price potato. Again, during the months September to October prices of both potato and cabbage became high, but the price of cabbage was higher than the price of potato. This was due to comparatively less elasticity of supply of cabbage in comparison to potato.

In the howly market of Barpeta district, price of green chilli has highly fluctuations in nature during January 2005 to March 2014. Price of green chilli always remained higher level all along the study period except the month January 2008. Moreover, price of green chilli had been increasing at a higher rate in comparison to potato and cabbage. During the months of September to October 2013, price of green chilli was abnormally very high.

4.2.2 Price Movements in Uparhali (Guwahati) Market:

The figure no. 4.2 represents the trends in prices of potato and its competing crops such as cabbage and green chilli in Uparhali (Guwahati) market during January 2007 to March 2014. As found in the Howly market of Barpeta district, trends in prices of potato, cabbage and green chilli have an increasing trend in Uparhali (Guwahati) market.
also during January 2007 to March 2014. But, the pattern of trends in the prices of each of the crops is different. The actual trend in the price of potato has least fluctuations among the three crops. Again, in the latter years, price trend of potato has more fluctuations in comparison to the early years under study.

The actual trend in the price of cabbage has more fluctuations in comparison to the price trend of potato but less than the price trend of green chilli. During the months of January to March when the crops like potato and cabbage are harvested, then price of both the crops declined but the price of cabbage remained lower than the price of potato. Again, during the months of September to October, price of both potato and cabbage increased but price of cabbage remained higher than the price of potato. This is because the supply of cabbage is less elastic than the supply of potatoes. The cabbage and green chilli can not be stored for long time without damage. As a result the growers are compelled to sale at whatevver low prices are available in the markets immediately after harvest.

The actual trend in the price of green chilli is highly fluctuating in nature as observed in the figure [Refer figure 4.2]. During January 2007 to March 2014, the trend in the price of green chilli has been found to be increasing. Moreover, it has been observed that price of green chilli has been increasing at higher rate in comparison to the trends in prices of potato and cabbage. Besides, during the months of January to March, when the crops are harvested, prices of potato, cabbage and green chilli fall, but price of green chilli still remained higher than the price of potato and cabbage. It is remarkable that farmers can partially remove the problems of drastic price falls of the perishable crops like cabbage and green chilli by increasing area acreage under potato crop which is a semi-perishable crop and can be stored for a few months.
Trends in Prices of Potato and its Competing Crops in Uparhali (Guwahati) Market during 2007 to 2014

Figure 4.2

- Potato
- Cabbage
- Green Chilly
4.2.3 Price Movements in Cachar Market:

The trends in the prices of potato and its competing crops such as cabbage and green chilli in Cachar market (Cachar district) have been examined. The figure no. 4.3 represents the trends in prices of potato, cabbage and green chilli in Cachar market from January 2005 to March 2014. Similar to Howly and Uparhali (Guwahati) markets, in Cachar market also, the prices of potato, cabbage and green chilli have the increasing trends during the periods under study. Price of potato has been fluctuating throughout the period under study, but from January 2005 to January 2009, it has minimum price fluctuations. But, from January 2009 to March 2014, price of potatoes has been observed to be comparatively higher fluctuations in the Cachar market in Cachar district.

Similarly, price of cabbage has the increasing trend during the period under study. But, the trend in the price of cabbage has more fluctuations in comparison to the price trend of potato in Cachar market. Similar to Howly and Uparhali (Guwahati) market, in cachar market also, during the months of harvesting, that is, during January to March, price of both potato and cabbage declined, but the price of cabbage remained below the price of potato. Again, during the months September to October, prices of both potato and cabbage increased, but the price of cabbage remained higher than the price of potato.

Price of green chilli has been observed to be increasing from January 2005 to March 2014 in Cachar market as observed in the figure [Refer figure 4.3]. In comparison to the other two crops, price of green chilli has been increasing at a higher rate during the study period.
Trends in Prices of Potato and its Competing Crops in Cachar Market during 2005 to 2014

Figure 4.3
Moreover, the trend in price of green chilli has higher fluctuations in comparison to prices of cabbage and potato. During the months of July to August 2013, price of green chilli remained abnormally high in Cachar market in Cachar district.

One important feature observed in Cachar market is that the average difference between the prices of potato and cabbage is lesser in comparison to Howly and Uparhali (Guwahati) markets during the period under study.

4.3 Trends in the Relative Price of Potato in Relation to the Prices of its Competing Crops:

To have a better understanding about potato sector of Assam, it is imperative to have analysis of the trends in the relative prices of potato and its competing crops such as cabbage and green chilli in the state of Assam. This also clears the comparative marketing patterns of potato output. The trends in relative prices of potato with its competing corps such as cabbage and green chilli may have the impact on the area acreage under potato crop. Accordingly, three major potato markets such as Howly, Guwahati and Kharupetia markets have been selected. This has been done in the following sections.

The trends in the relative prices of potato in relation to its competing crops such as cabbage and green chilli in Howly market of Barpeta district during the months of January/2005 to December/2016 has been represented by the figure 4.4. As shown in the figure [refer figure- 4.4], the trends of relative prices of potato both in relation to cabbage and green chilli have been increasing during the study period, but relative price of potato in relation to cabbage price has been increasing at a faster rate.
Trends in Relative Prices of Potato in Relation to Cabbage and Green Chilli in Howly Market during Month of January/2005 to December/2016

Figure 4.4
Trends in the Relative Prices of Potato in Relation to Cabbage and Green Chilli in Guwahati Market during the Month of January/2007 to December/2016

Figure 4.5
Trends of Relative Prices of Potato in Relation to Cabbage and Green Chilli in Kharupetia Market during the Month of January/2005 to December/2016

Figure 4.6

Relative Price of Potato in Relation to Cabbage (RPPC)

Relative Price of Potato in Relation to Green Chilli (RPPGC)
Similar to Howly market, the trends in the relative prices of potato in relation to the prices of its competing crops such as cabbage and green chilli in Guwahati market during the months of January/2007 to December/2016 have been represented in figure 4.5. As observed in the figure, there is an increasing trend in the relative prices of potato both in relation to cabbage and green chilli during the period under study. Importantly, it is remarkable that the relative price of potato in relation to cabbage has been increasing at a higher rate.

The trends in the relative prices of potato in relation to the prices of cabbage and green chilli have been studied for the Kharupetia market of Darrang district during the months of January/2005 to December/2016 as shown in the figure 4.6. As observed in the figure [refer figure 4.6], the relative price of potato in relation to the cabbage price has been increasing as a faster rate in comparison the relative price of potato in relation to price of green chilli during period under study.

4.4 Prices of Potato and its Competing Crops in Different Markets of Assam:

For better understanding the marketing and relative prices of potato in the state of Assam, relative prices of potato and its competing crops have been studied in the different markets of Assam in different years. Prices of potato and the other competing crops are different in different markets in the various years and months. This is mainly because some markets are located near the production centre while other markets located far away from the production centers. Moreover, cost of production per unit of the crops varies in different areas. Therefore, differences of transport cost is very important factor leading price differentials of potato and its competing crops in different
markets in the state of Assam. In the following sections, effort has been made for a comparative study of relative prices of potato and its competing crops in different markets of Assam.

**4.4.1 Comparison of Prices of Potato and its Competing Crops in the Different Markets in Assam in 2010:**

The figure no. 4.7 represents the comparison of prices of potato and its competing crops in the month of January 2010 in the markets of Howly, Uparhali (Guwahati), Cacher and Golaghat. It has been observed from the figure [refer figure 4.7] that in January 2010, price of potato was higher than the prices of cabbage and green chilli in Howly market. But, price of cabbage was lower than both the potato and the green chilli.

**Comparison of Prices of Potato and its Competing Crops in different Markets in Assam in January 2010 (Price in Rs. per kg)**

![Comparison of Prices of Potato and its Competing Crops in different Markets in Assam in January 2010](image)

**Figure 4.7**

Similarly, in Uparhali (Guwahati) market, prices of all the three crops were higher in comparison to Howly market in the same year and month. But, in Uparhali market itself
price of green chilli was higher than the prices of cabbage and potato. Similar to the Howly market, price of cabbage was lowest among the prices of the three crops. Again in Cacher market, price of green chilli was higher than the other two crops. Price of cabbage was lower than the prices of both potato and green chilli. Lastly, as observed in the figure [refer figure 4.7], in Golaghat market price of green chilli was highest among the three crops. Similar to the other markets under study, price of cabbage was remained below the prices of potato and green chilli in Goplaghat.

If we compare prices of potato and its competitive crops among all the four markets, then it has been found that price of potato was highest in Uparhali (Guwahati) market in January 2010 in comparison to Howly, Cacher and Golaghat markets. In case of the price of cabbage, Golaghat market has the highest price of cabbage in comparison to Howly, Uparhali and Cacher markets in the same year and month. But, price of green chilli was highest in Cacher market in comparison to the other three markets under study. It is remarkable that prices of all the three crops comparatively lower in Howly market in comparison to Uparhali, Cacher and Golaghat markets in January 2010.

4.4.2 Comparison of Prices of Potato and its Competing Crops in the Different Markets in Assam in 2014:

The figure no. 4.8 represents the comparison of prices of potato and its competing crops in the month of January 2014 in the markets of Howly, Uparhali (Guwahati), Cacher and Golaghat. Similar to January 2010, in January 2014 also, price potato was higher than the price of cabbage but lower than the price of green chilli in Howly market. In Uparhali (Guwahati) market, price of cabbage was lowest while price of green chilli was highest in January 2014. Similarly, in Cacher market price structures of these three
commodities remained same as was found in Howly and Uparhali markets. That is, price of potato was higher than the price of cabbage but less than the price of green chilli. But it is mention worthy that difference of chilli price and the prices of other two crops in Cacher market was more in comparison to Howly and Uparhali markets. From the figure [refer figure 4.8], it has been observed that in Golaghat market; price of green chilli was far greater than the price of potato and cabbage in January 2014. Price of potato crop was slightly higher than the price of cabbage.

A comparative study of the prices of potato and its competing crops among the markets under study has revealed that prices of all the three crops remained higher in Golaghat market in comparison to the other three markets in January 2014. In Howly market, prices of potato and cabbage remained lower in comparison to Uparhali (Guwahati), Cacher and Golaghat markets in the same time.

**Comparison of Prices of Potato and its Competing Crops in Different Markets in Assam in January 2014 (Price in Rs per Kg)**

![Figure 4.8](image-url)
But, one peculiarity has been found that price of green chilli was higher in Howly market (which is near to production centre) in comparison to Uparhali (Guwahati) market which is a city market. Again, in Golaghat market, difference between the prices of potato and cabbage was lesser in comparison to the other three markets as observed in the figure [refer figure 4.8].

4.5 Trends in the Prices of Potato in Harvesting (February) and Seedling (November) Seasons in the Different Markets in Assam:

Prices of potato in the different months and in the different seasons are also different in Assam and even in the country as a whole. Generally, prices of potatoes remain low during the harvesting season in comparison to the non-harvesting season. When potatoes are harvested during the months of February-March in every year, potato becomes very cheap. Price of the crop fall drastically, such that it is difficult to recover the cost of production for some of the farmers in the state. But, over the years of time, prices of potato during the harvesting months have been increasing.

Similarly, prices of potato remain high in non-harvesting season in the state. Generally, in the month of October- November, prices of potatoes reach the peak level in that particular year. This fact is true not only in the state of Assam but in the country as a whole. During the seedling season, prices of the crop rise so high that it becomes very difficult for the common people to consume potato. It is noted that prices of potato in seedling season in different markets remain different in the state of Assam. Moreover, the peak prices of the crop in seedling seasons have maintained an increasing trend over the years of time. Relative price movements of potato during harvesting and seedling seasons have been examined for different markets in the following sections.
4.5.1 Trends in the Prices of Potato in the Months of February and November in Howly Market from 2005 to 2014:

The trends in the prices of potato in the months of February (harvesting) and November (seedling) of Howly market of Assam has been examined. It has been observed from the figure [refer figure 4.9] prices of potatoes both in the months of February and November in Howly market have maintained an increasing trends. During 2005 to 2014, prices of potato in the months of February has shown increasing trend. Generally, potatoes are harvested in February-March in every year in Assam. During this season, price remains at the low level. It is found from the figure [figure 4.9] that prices of potato in the months of February has an increasing trend in Howly market over the period under study but, rate of increase is comparatively lower. In the recent years, price in the harvesting season, in Howly market has been increasing at a higher rate.

*Trends in Prices of Potato in the Months of February and November in Howly Market from 2005 to 2014*

![Graph showing trends in potato prices](image)

*Figure 4.9*
Prices of potato in the months of November (seedling season) in Howly market has also maintained increasing trend during 2005 to 2014. But, it is remarkable that price in the months of November has higher rate of increasing trend in comparison to the trend in the price in February months during the same period. Moreover, it is noted that actual trend line in the price in the months of November has more fluctuations in comparison to the actual trend line in the price of harvesting seasons during period under study in Howly market.

4.5.2 Trends in the Prices of Potato in the Months of February and November in Uparhali (Guwahati) Market from 2005 to 2014:

Trends in the prices of potato in the months of February (harvesting season) and November (seedling season) in Uparhali (Guwahati) market from 2005 to 2014 has been examined. Similar to the Howly market in Barpeta district, the prices of potato in the months of February and November have the increasing trends over the periods under study as observed in the figure [refer figure 4.10]. It has been found that price of potato in the months of February in Uparhali (Guwahati) market has been increasing from 2005 to 2014, but the increasing rate is lower in comparison to the prices in November months. Moreover, prices of potato in harvesting seasons in Uparhali market have lesser fluctuations than the prices in seedling seasons. Prices of potato in Uparhali market always remain higher than the price in harvesting seasons. It is remarkable that actual trend in the prices of potato in the months of November in Uparhali market is highly fluctuating over the periods under study. Similar to Howly market, prices both in the months of February and November in Uparhali marker have the increasing trends in the current years.
Trends in the Prices of Potato in the Months of February and November in Uparhali (Guwahati) Market from 2005 to 2014

Figure 4.10

4.5.3 Trends in the Prices of Potato in the Months of February and November in Cacher Market from 2005 to 2014:

Trends in the prices of potato in the months of February and November in Cacher market from 2005 to 2014 have been examined. Similar to Howly and Uparhali markets, prices in Cacher market both in the months of February and November have the increasing trends from during the study period as observed in the figure [refer figure 4.11]. Prices in the harvesting seasons (February) have shown increasing trend. But the rate of increase is comparatively lower than the increase in prices in the months of November. Similar to the other two markets, the trend in the prices of potato in November months has maintained more fluctuations in Cacher market. It is remarkable that actual prices of potato both in harvesting and seedling seasons in Cacher market remained higher than Howly and Uparhali market. In the recent years, prices of both February and November months in Cacher market have the increasing trends.
4.6 Coefficient of Variation in the Trends in Prices of Potato in Harvesting and Seedling Seasons Assam:

To understand clearly the degree of fluctuations of prices of potato in the different markets both in the months of February and November, coefficient of variation of the trends in prices have been estimated. It has been found from table no. 4.1 that in the months of February (in the harvesting season), coefficient of variation is highest in the trends in the prices of potato in Howly market during 2005 to 2014. This indicates that actual trend in prices of potato in Howly market has higher degree of fluctuations in comparison to the other two markets in the months of November during the period under study.
Table No. 4.1: Coefficients of Variations in the Trends of Prices of Potato in the Months of February and November from 2005 to 2014

<table>
<thead>
<tr>
<th>Name of Markets</th>
<th>Co-efficient of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>February (Harvesting Season)</td>
</tr>
<tr>
<td>Howly</td>
<td>28.91</td>
</tr>
<tr>
<td>Uparhali (Guwahati)</td>
<td>22.54</td>
</tr>
<tr>
<td>Cacher</td>
<td>21.55</td>
</tr>
</tbody>
</table>

Source: Author’s self estimation based on the various published issues of the Directorate of Economics and Statistics, Government of Assam.

Similarly, it has been found from the table [refer table no. 4.1] that coefficient of variation is highest in Howly market in the trend of prices of potato in the months of November (seedling season). This indicates that actual trend in prices of potato in Howly market has higher degree of fluctuations in the months of November from 2005 to 2014 in comparison to Uparhali (Guwahati) and Cacher market in Assam.

It is remarkable that coefficients of variations in the trends in the prices of potatoes in the months of February in all the three markets is lower in February months but higher in November months during the period under study. In other words, there are higher degrees of fluctuations in the trends of prices in the months of November than in the months of February in all the markets under study. This is mainly because; most of the potatoes come in the markets of Assam from outside the state during the months of November. Sometimes, the regular flows of potato into the state of Assam are disturbed. As a result price of potato fast rises in the state.

4.7 Trends in the Mean Prices of Potato and their Coefficients of Variation in Assam during 2005 to 2014:

Mean price of potato is the average price of potatoes which is estimated by averaging the prices of the crops prevailed in the different markets in Assam. Trend in mean price
signifies the increase or decrease in the average prices of potato of the different markets over the periods of time. The trends in the average price of potato shows the overall position in prices of potato in different years. But, it is remarkable that prices of potato do not remain same in different months in the different regions and markets. Similarly, mean prices of potato also varies in different months in different markets and regions. Thus, mean prices of potato both in the months of February (harvesting season) and November (seedling season) have been estimated and their trend lines have been fitted separately in the following sections.

Similarly, coefficient of variation shows the relative measures of average deviation of prices from their mean price. This indicates the degree of fluctuations of the actual trend in the mean price of potato. Coefficients of variation of mean prices both in the months of February and November have been estimated for the period of 2005 to 2014.

4.7.1 Trend in the Mean Price of Potato in the Months of February in Assam from 2005 to 2014:

Mean price of potato in the months of February has been estimated during 2005 to 2014 by including the wholesale prices of potato in Howly, Uparhali (Guwahati), Cacher, Bohorihat, Jorhat, Lanka, Bongaigaon and Kharupetia markets. Trend line of the mean price in the months of February during 2005 to 2014 has been fitted in figure no. 4.12].

It has been observed from the figure [refer figure 4.12] that the mean price of potato in the months of February has the increasing trend in Assam from the year of 2005 to 2014. It is noted that actual trend in the mean price in harvesting season has the fluctuations in its trend. From 2012 onwards mean price of potato has been increasing at a higher rate in comparison to the increasing rate prior to 2012.
4.7.2 Trend in the Coefficients of Variation in the Mean Prices of Potato in the Months of February in Assam from 2005 to 2014

Coefficient of variation of the mean prices of potato in the months of February in Assam has been estimated and its trend is represented in the figure no. 4.13. It has been observed from the figure [refer figure 4.13] that the coefficient of variation in the mean prices of potato in the months of February has the decreasing trend from 2005 to 2014. This signifies that over the periods of time the relative measures of the average deviation in the actual prices from their mean price has been decreasing during the study period. In other words, the differences in the mean prices among the different markets in Assam have been found to be declining during the period under study.

The actual trend in the coefficient of variation in the mean price of potato in the months of February has some fluctuations around the fitted linear trend line. The coefficient of
variation in the mean price in the month of February has the increasing trend in the recent years.

**Trend in Coefficient of Variation in the Mean Price of Potato in Assam in the Months of February from 2005 to 2014**

![Graph showing trend in coefficient of variation](image)

**Figure 4.13**

### 4.7.3 Trend in the Mean Price of Potato in the Months of November in Assam from 2005 to 2014

Mean prices of potato during the months of October to December remain higher in comparison to harvesting season in Assam. Thus, to understand the trend in the mean price of potato more clearly in different seasons, trend in the mean price has been estimated for the months of November during the same period in Assam as shown in figure no. 4.14.

By using the wholesale prices of potatoes in Howly, Uparhali (Guwahati), Cacher, Bohorihat, Golaghat, Lanka, Bongaigaon and Kharupetia markets, mean price and its trend has been estimated during 2005 to 2014. Similar to the months of February, mean prices of potato in the months of November in Assam has also maintained an increasing trend during the period under study [refer figure 4.14]. It is remarkable that actual trend
in the mean prices in the months of November has the fluctuations of higher degree in comparison the fluctuations in the trend in mean price in the months of February in Assam during the study period.

**Trend in the Mean Price of Potato in the Months of November in Assam From 2005 to 2014**

![Graph showing trend in mean price of potato](image)

**Figure 4.14**

### 4.7.4 Trend in the Coefficient of Variation in the Mean Price of Potato in the Months of November in Assam from 2005 to 2014

Coefficient of variation in the mean price of potato in the months of November has been estimated and its trend is presented in the figure no. 4.15. It has been found from the figure [refer figure 4.15] that the coefficient of variation in the mean prices of potato in the months of November has the decreasing trend from 2005 to 2014. This refers that similar to the harvesting season, in the seedling season also, the average differences of the prices of potato from their mean price have been decreasing over the period under study. Therefore, it can be ensured that the risks in potato production and marketing
caused by price fluctuations have been decreasing over time periods in the area under study.

It is remarkable that the actual trend in the coefficient of variation in the mean price of potato in the months of November has higher fluctuations than the actual trend in the coefficient of variation of mean price in the months of February during 2005 to 2014.

**Trend in Coefficient of Variation in the Mean Price of Potato in the Months November in Assam from 2005 to 2014**

![Graph of Trend in Coefficient of Variation](image)

**Figure 4.15**

**4.7.5 Trend in Relative Gap in the Mean Price in February Compared to November During 2005 to 2014**

It is found from the above analyses that mean price of potato has the increasing trend in the state of Assam both in the months of February and in November during the period under study. But, it is revealed from the analyses that mean price of potato in the month of November has been increasing at a higher rate in comparison to the mean price in the
month of February. This leads an increasing gap in the trends in mean prices of potato between February and November months during 2005 to 2014.

The trend in the relative gap of mean prices of potato in Assam between the months of February and November from 2005 to 2014 is represented in figure no. 4.16. It has been observed from the figure [refer figure 4.16] that the linear trend line has an increasing trend during the periods under study. Actual trend in the relative gap of mean prices has higher degree of fluctuations as observed in the figure [refer figure 4.16]

**Trend in Relative Gap (in Percentage) in the Mean Price in February Compared to November During 2005 to 2014**

![Graph showing trend in relative gap of mean price](image)

**Figure 4.16**

**4.8 Development of Cold Storage Facilities in Assam:**

Development of cold storage and cold chain facilities is very important for efficient marketing of potato crops in Assam. By nature, potatoes are harvested during a short duration of time. This creates gluts in the markets of potato. Due to unavailability or inaccessibility of cold storage and cold chain facilities, farmers make a distress sale of
potato just after harvesting at a poor price in the state of Assam. Moreover, due to lack of scientific storage facilities a considerable percentage of potato is wasted in every year in Assam. This further increases the unit cost of production and marketing of potato in the state. Because of the shortage and inaccessibility of cold storage facilities, farmers are not getting reasonable prices of their products as well as consumers had to purchase potatoes comparatively at the higher prices.

In the state of Assam, every year huge amount of potato comes from the states of West Bengal, Uttar Pradesh and Punjab in to the markets of Assam. In the lean season particularly during the month of June-July to November-December, potato markets of Assam are dominantly captured by the potatoes of other states. Due to transportation problems and even due to sudden ban of transporting the crop to Assam by the government of neighboring states results unexpected price hike of potatoes in the markets of Assam. This creates hurdles for the consumers in the state.

Therefore, development of cold storage and cold chain facilities in the state of Assam is imperative for efficient marketing of potato. Moreover, the crop will be available round the year at the reasonable price. Thus, to make the markets more efficient of potato and other horticultural crops, number of cold stores has been increased during the years of time in Assam.

4.8.1 Development of Cold Storage in Assam till 2009:

Potato is the semi perishable crop. Its preservation in cold storages is very essential for its efficient marketing and supply the crop at reasonable price to the customers whole the year. The district wise number of cold storage along with their storage capacity, till 2009 have been given in the table no. 4.2.
As observed in the table [refer table no.4.2], total number of cold storage for preserving potato and some other horticultural crops were 30 in Assam in 2009. But it is remarkable that the public sector is lacking behind the private sector in the development of cold storage in the state of Assam. The Public authority should undertake appropriate strategies to establish more of cold storages particularly in the production centers with accessible by the farmers. This will definitely encourage potato production and efficient marketing of the crop with enabling the consumers to purchase potatoes whole the year in reasonable prices. Development of sufficient number of cold storages in Assam will also encourage the potato processing industries to establish and expand their units in the state of Assam.

Table No. 4.2: District Wise Cold Storages in Assam till 2009.

<table>
<thead>
<tr>
<th>Districts</th>
<th>Number of Cold Storage</th>
<th>Capacity (in ‘000 MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barpeta</td>
<td>1</td>
<td>3.00</td>
</tr>
<tr>
<td>North Cacher</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>Dhubri</td>
<td>3</td>
<td>2.12</td>
</tr>
<tr>
<td>Golaghat</td>
<td>1</td>
<td>3.60</td>
</tr>
<tr>
<td>Kamrup</td>
<td>12</td>
<td>21.96</td>
</tr>
<tr>
<td>Nalbari</td>
<td>1</td>
<td>4.00</td>
</tr>
<tr>
<td>Tinsukia</td>
<td>2</td>
<td>9.20</td>
</tr>
<tr>
<td>Hailakandhi</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>Sonitpur</td>
<td>1</td>
<td>4.00</td>
</tr>
<tr>
<td>Karimganj</td>
<td>2</td>
<td>7.40</td>
</tr>
<tr>
<td>Nagaon</td>
<td>3</td>
<td>11.50</td>
</tr>
<tr>
<td>Assam</td>
<td>30</td>
<td>86.78</td>
</tr>
</tbody>
</table>

Source: Assam Small Farmers’ Agri-business Consortium, 2009
4.8.2 Development of Cold Storages in Assam till 2013:

It is very essential to understand the trend in infrastructure development in regard to potato production and marketing in the state of Assam. Development of the number of cold storage along with cold storage capacity is an important infrastructural development for efficient production and marketing of perishable and semi-perishable vegetable and horticultural crops. Thus, establishment of more cold storages of potato both in the public and private sectors is very essential.

Table No. 4.3: District Wise Number of Cold Storages in Assam till 2013

<table>
<thead>
<tr>
<th>Districts</th>
<th>Number of Cold Stores</th>
<th>Capacity (in '000MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barpeta</td>
<td>3</td>
<td>5.50</td>
</tr>
<tr>
<td>Cacher</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>Dhubri</td>
<td>4</td>
<td>4.52</td>
</tr>
<tr>
<td>Golaghat</td>
<td>2</td>
<td>0.36</td>
</tr>
<tr>
<td>Kamrup (M)</td>
<td>9</td>
<td>13.29</td>
</tr>
<tr>
<td>Kamrup (R)</td>
<td>6</td>
<td>12.98</td>
</tr>
<tr>
<td>Nalbari</td>
<td>1</td>
<td>4.00</td>
</tr>
<tr>
<td>Tinsukia</td>
<td>5</td>
<td>24.49</td>
</tr>
<tr>
<td>Hailakandi</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>Sonitpur</td>
<td>2</td>
<td>9.30</td>
</tr>
<tr>
<td>Karimganj</td>
<td>1</td>
<td>5.00</td>
</tr>
<tr>
<td>Nagaon</td>
<td>5</td>
<td>21.72</td>
</tr>
<tr>
<td>Goalpara</td>
<td>1</td>
<td>4.42</td>
</tr>
<tr>
<td>Jorhat</td>
<td>3</td>
<td>12.00</td>
</tr>
<tr>
<td>Chirang</td>
<td>1</td>
<td>7.50</td>
</tr>
<tr>
<td>Kokrajhar</td>
<td>2</td>
<td>3.00</td>
</tr>
<tr>
<td>Udalguri</td>
<td>1</td>
<td>1.00</td>
</tr>
<tr>
<td>Baksa</td>
<td>1</td>
<td>1.00</td>
</tr>
<tr>
<td>Assam</td>
<td>51</td>
<td>1,50.10</td>
</tr>
</tbody>
</table>

Source: Assam Small Farmers’ Agri-business Consortium, 2013

With the increase in production of potatoes and other horticultural crops in Assam, marketing infrastructures like cold stores have been farther increased in Assam in the
recent years. Some more cold storages were established near the production centers and around the marketing area. District wise number of cold storages till 2013, along with their capacity is stated in the table no. 4.3.

It has been observed from the table no. 4.3 that in comparison to 2009, number of cold storage along with their storage capacity has increased in the state of Assam. The number of cold storage in Assam has increased from 30 in 2009 to 51 in 2013. Thus, during 2009 to 2013, number of cold storage has been increased by 70 percent. Similarly, total storage capacity of the cold storages in Assam has increased from 86,776 metric tones in 2009 to 1,50,076 metric tones in 2013. Thus, during 2009 to 2013 total storage capacity in the cold storages in Assam has increased by 73 percent. This increase in the storage capacity is very encouraging in the state agriculture in general and potato production and marketing in particular. With the increase in cold storages and cold chain facilities in the state, the surplus production of potatoes could be stored for a few months to get a remunerative price by the farmers.

It is remarkable that contribution of public sector in the development of cold storage facilities in the state of Assam is not adequate in consideration of requirement. Moreover, easy accessible by the farmers to store their produce in the cold storages will help in increasing the storage quantity.

4.8.3 Increase in the Number and Capacity of Cold Storage in Assam During 2009 to 2013:

The number of cold storage as well as the total cold storage capacity in Assam has been increasing in Assam over the years as found in the study. Total number of cold storage has increased by 70 percent during 2009 to 2013. But, during the same period of time,
total cold storage capacity has increased by 73 percent in the state of Assam. The figure [refer figure 4.17] represents graphically the total number cold storage as well as total cold storage capacity in 2009 and in 2013 in the state.

**Number of Cold Storage and Capacity of Cold Storage in Assam During 2009 to 2013**

![Graphs showing number and capacity of cold storage from 2009 to 2013](image)

*Part (A): Number of Cold Storage  
Part (B): Capacity of Cold Storage*  

**Figure 4.17**

Most of the cold storages are comparatively small size with their limited capacity. Small sizes of cold storages sometimes create diseconomies of scale.

### 4.8.4 Cold Storage Map of Assam:

To understand the infrastructure development for encouraging potato production and efficient marketing with controlled price fluctuations in Assam, it is very important to examine the distribution of cold storages in the different parts of the state. Establishment of cold storages in the production centers and in and around the marketing area is essential for transport advantages and easy accessible of the farmers.
and the potato dealers. In the map no. 4.1 represents the locations of cold storage in the different parts of Assam.

In the district of Barpeta, the major potato producing district in Assam, there is 3 cold storages. Barpeta town, Shorbhog and Howly each market has one cold storage. In Silchar, there are 2 cold storages and one is in Ramnagar. The Dhubri district has altogether 4 cold storages. The markets like Gouripur, Hatsingimari (Mankachar), Dhubri and Golakganj have one cold storage each. Similarly, in Golaghat district there are 2 cold storages. One is in Dergaon and another in Bokakhat market. In the district of Kamrup (Metro), there are altogether 9 cold storages. These are located in Khanapara, Zoo Road (Guwahati) and Lokhra market area. Again in Kamrup (Rural), there are 6 cold storages. These are mostly located in Chiangsari, Singimari Burnihat and Azara marketing area. One cold storage is located in Nalbari whereas 5 cold storages are there in Tinsukia. These are located in Tinsukia, Makum Road and in Laipuli. Two cold storages located in Hailakandi. In Sonitpur district, Tezpur and Bihali have one cold storage each. In Nagaon district, cold storages are established in Kaliabor, Dimaruguri, Raui and in Nagaon. Similarly, one cold storage is located in Bapuji nagar of Goalpara district. Markets like Mariani and Chenijian have one cold storage each in Jorhat district. In Chirang district one cold storage is located in Kajalgaon the district head quarter and weakly market area. Gossaigaon and Patgaon markets of Kokrajharp district. Markets like Mariani and Chenijian have one cold storage each in Jorhat district. From the map [refer map no. 4.1], it has been observed that the cold storages in Assam are not evenly distributed. The middle and the lower Assam comparatively have more number of cold storages than the other parts of the state.
Locations of Cold Storages in the different Districts of Assam in the year 2013

Source: www.mapsofindia.com. Note: The cube symbols represent the cold storage location area.
**4.9 Marketing Facilities Created by the Government of Assam:**

The government of Assam has created different types of marketing facilities to achieve more efficient marketing of agricultural crops including potatoes in the state of Assam. For a long period of time, the marketing system of Assam was unregulated type. Farmers mutually negotiated with the buyers about the prices, but there was lacking of auction marketing system. Thus, actual producers were highly exploited in determining prices of their products.

The government of Assam has enacted laws so as to achieve more efficient marketing of agricultural crops. Different types of marketing infrastructures have been developed for efficient marketing system. This helps the farmers to get remunerative prices of their products. Marketing facilities so far created by the government of Assam till 2013 have been summerised.

It has been reported by the Directorate of Agriculture, Government of Assam that there are altogether 405 wholesale markets and 735 rural primary markets till 2013. Similarly, the government has arranged 24 regulated market committees in the state. Moreover, there are 143 traders’ shops and 534 auction platforms which help in marketing of crops including potatoes in an efficient manner. Thus, with the development of different types of marketing infrastructures, farmers are getting some relieves from the exploitative behavior of the cunning buyers particularly from the middle men in determining prices.

**4.10 Development of Irrigation in Assam:**

Irrigation plays a very important role in the growth of agricultural crops including potato cultivation in the economy of Assam. Availability of assured irrigation facilities is the important prerequisite for sustainable agricultural development in Assam. But,
agriculture of Assam is primarily rain fed. Since rain water is not evenly distributed in all the regions and in all the seasons, hence cultivation of the crops are affected due to shortage of water to wet the land. Cultivation of crops particularly in the Rabi season partly depends on irrigation. During the production of potato, about 6 to 7 times the land are to be irrigated in one production season. The quantity and quality of potato production depends on proper irrigation of the land. Moreover, some lands are drier than the others. Thus, totally depending on the uncertain rain water definitely reduce the cultivation of crops including potato in Assam.

4.10.1 Irrigation Facilities Provided by the Government in Assam:

Like other developed states in India, irrigation development programmes have been launched in the state of Assam under the heads of Major, Medium and Minor irrigation schemes. The Government of Assam has emphasized on the development of irrigation facilities in the recent years. The different irrigation schemes have been implemented in Assam. The schemes like Assam Rural Infrastructure for Agricultural Services Project (ARIASP), Non Lapsable Central Pool of Resources (NLCPR), Accelerated Irrigation Benefit Program (AIBP), Rural Infrastructure Development Fund (RIDF) etc have been implemented in Assam in enhancing irrigation facilities in the state. The government of Assam has installed or distributed the shallow tube wells, deep tube wells, low lift pumps, flow irrigation facilities, micro watershed drainage etc. All these irrigation facilities have resulted increase in agricultural production including potato output in the state of Assam. The irrigation facilities provided by the government of Assam till January, 2013 have been summerised.
It has been reported by the Directorate of Economics and Statistics, Government of Assam that till January 2013, the government of Assam has either installed or distributed around 4 lakhs shallow tube wells and 38,522 numbers of low lift pump sets to in Assam. Moreover, 44 numbers of deep tube wells and 2,244 numbers of sprinkler or drip irrigation sets have installed or distributed to the farmers. Similarly, flow irrigation has increased to 5,250 hectares and micro watershed drainage has been increased to 15,915 hectares till January 2013. This increase in irrigation facilities in the agricultural sector in Assam has resulted increase in agricultural output including potato production in the state. Since, potato crops are cultivated during the dry winter season particularly in the plains area of Assam, hence development of irrigation facilities play very important role for increase production and productivity of potato.

4.10.2 Trend in Gross Area Irrigated in Assam:

To understand the development of irrigation in the state of Assam, trend in the gross area irrigated has been examined. By following the semi log linear trend equation, Compound Annual Growth Rate has been estimated of the gross area irrigated in Assam during 2001 to 2013. The table no. 4.4 represents the compound annual growth rate in gross area irrigated in Assam from 2001 to 2013.

Table No. 4.4: Compound Annual Growth Rate in Gross Area Irrigated in Assam during 2001 to 2013

<table>
<thead>
<tr>
<th>Variable</th>
<th>Constant ($\beta_0$)</th>
<th>Coefficient ($\beta_1$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Area Irrigated</td>
<td>11.177 (63.491)</td>
<td>0.055* (2.493)</td>
</tr>
<tr>
<td>(in hectare)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Self estimates based on various published issues of the Directorate of Economics and Statistics, Government of Assam Note: * refers to significant at 10 percent level, figure in the parenthesis refers t values.
It has been observed from the table [refer table no. 4.4] that compound annual growth rate in gross area irrigated in Assam is 5.5 percent during 2001 to 2013. But, it is remarkable that compound annual growth rate in gross area irrigated in Assam is not highly significant. It is moderately significant at 10 percent level. This shows that the increase in irrigation in Assam is not very encouraging. Large area of agricultural fields still depends on rain water for cultivation. With the rapid increase in irrigation, agricultural production including potatoes will increase in the economy of Assam.

**4.11 Development of Rural Roads in Assam:**

Rural road communication plays an important role in the growth and development in agriculture in the country as a whole. For the development of efficient agricultural crops marketing, development of rural roads is the pre-requisite condition. Agricultural commodities can be transported to urban market to sale at relevant prices only if the road communication in that particular region is developed. Similarly, industrial output necessary to use in agricultural fields to get higher yields are also easily transported in the villages if and only if conditions of rural road communication is developed. This is also applicable in cultivation of potato and other vegetable crops in the rural area in the state of Assam.

Government has implemented different schemes in connection with the development of rural roads in Assam. Due to the implementation of different rural road development schemes, the length of rural roads has increased in Assam. In the year of 2005-06, total rural road length was 26,907 kms which has increased to 36,544 kms in 2012-13. Similarly, rural road per 100 square kms and rural road per one lakh of population in Assam has also been increasing over different years. This has caused in increase in agricultural production in the state including potato production. Moreover, road
communication is the only communication system in the rural areas. The transportation of agricultural commodities to urban markets where prices are high is possible if the condition of road is well. The commission agents will enter in to the villages to purchase crops at farm gate price if the road communication system in that particular rural area is developed. Thus, the potato farmers will get encouragement to cultivate if the road communication in all weather is good.

4.11.1 District Wise Length of Rural Road:
The absolute length of rural road has been increased in Assam over planning periods, but the distribution of rural roads in all the regions and in all the districts of Assam are not the same. Some of the districts have occupying more of the rural roads in comparison to the other districts. Moreover, the rural areas in different districts of Assam are not equal. Thus, distribution of rural roads in the different districts depends on social, economic and geographical factors. The figure [refer figure 4.18] represents the district wise length of rural roads per 100 square km in Assam in 2013.

District Wise Rural Road per 100 Square Km. in Assam in 2013

Figure 4.18
It has been observed from the figure [refer figure 4.18] that districts like Goalpara, Barpeta, Sivasagar, Kamrup (Rural) and Udalguri districts have comparatively higher rural road length per 100 sq. km in comparison to the other districts in the state of Assam. On the other hand, districts like Karbi Anglong, Dima Hasao, Cacher, Hailakandi and Chirang have lower level of rural road per 100 sq. km in comparison to some other districts in the state in the year of 2013.

4.12 Area Acreage of Potato in Assam:

Area Acreage of potato refers to the percentage share of area under potato out of gross cropped area in Assam. From the analysis in the last chapter, we have found that area, production and productivity of potato in Assam have maintained the increasing trends during the last few decades. The increased in area harvested, production and productivity of potato in Assam may be caused by some factors like price of the potato, prices of its competing crops, infrastructure development such as increasing irrigation, expansion of rural roads, storage facilities, improvement of marketing facilities etc. In the above sections, development of cold storage facilities, improvement of marketing facilities by the government, trends in gross area irrigated and expansion in rural roads in Assam have been analysed.

Since adequate data on trends in irrigation of area under potato and trends in storage and marketing facilities are not found available as required in this study, hence afford has been made to examine the impact of relative prices of potato with its competing crops on the area acreage of the crop across the different districts in Assam by fitting a multiple lagged linear regression model in the following section.
4.12.1 Impact of Relative Prices of Potato with its Competing Crops on the Potato Acreage:

The variations in the relative prices of potato with its competing crops are the plausible causing factors for the variations in the area acreage under potato crop. Thus, an effort has been made to understand the Impact of relative prices of potato with its competing crops such as cabbage and green chilli on the area acreage of potato crop across the different districts in Assam.

After performing stationary test, it has been found that none of the variables has the non-stationary problem. Since dependent as well as the independent variables were stationary at level, hence following regression model has been formulated to examine the impact of relative price of potato with cabbage and relative price of potato with green chilli on potato acreage across the six districts during nine years period under consideration. It is noted that one year time lagged values of the independent variables have been considered to estimate the model.

**Model-**

\[ \ln\text{Potato Acreage}_{it} = \beta_0 + \beta_1 \ln\text{RPPC}_{it-1} + \beta_2 \ln\text{RPPGC}_{it-1} + U_{it} \]

Where,  \textit{RPPC stands for Relative Price of Potato with Cabbage}  
\textit{RPPGC stands for Relative Price of Potato with Green Chilli and U is the error term}  
i- stands for the six districts [Barpeta, Cachar, Darrang, Nagaon, Kamrup (M) and Jorhat] under consideration  
\textit{t- Stands for the period under consideration that is 2005, 2006, ….., 2013}  
The results of Panel Unit Root Test of the series of potato acreage and the relative prices are presented in the table no. 4.5.
Table No. 4.5: Results of Panel Unit Root Test (Levin, Lin & Chu t*)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Level/ Difference</th>
<th>Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potato acreage</td>
<td>Level</td>
<td>-3.94206***</td>
<td>0.0000</td>
</tr>
<tr>
<td>Relative Price of Potato with Cabbage</td>
<td>Level</td>
<td>-2.68396***</td>
<td>0.0036</td>
</tr>
<tr>
<td>Relative Price of Potato with Green Chilli</td>
<td>Level</td>
<td>-8.13741***</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Source: Self Estimates based on data collected from the Directorate of Economics and Statistics, Govt. of Assam, Directorate of Marketing and Inspection, Govt. of Assam. Note: *** stands for significant at 1 percent level.

The Johansen Co integration test has been applied to check the whether there is co-integration or long term association of the variables considered in the model. The results of Johansen Co integration test are presented in the table no. 4.6. It has been observed in the table [refer table 4.6] that majority of the statistics are insignificant. Thus, there is no any co integration among the variables under consideration.

Table No. 4.6 Results of Johansen Cointegration Test:

<table>
<thead>
<tr>
<th>Series: Potato Acrage; Relative Price of Potato with Cabbage; Relative Price of Potato with Green Chilli</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Null Hypothesis:</strong> No co integration,</td>
<td><strong>Alt. hypothesis:</strong> common AR coefs. (within-dimension)</td>
</tr>
<tr>
<td><strong>Statistic</strong></td>
<td><strong>Prob.</strong></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Panel v-Statistic</td>
<td>-0.154076</td>
</tr>
<tr>
<td>Panel rho-Statistic</td>
<td>0.690508</td>
</tr>
<tr>
<td>Panel PP-Statistic</td>
<td>-2.011576**</td>
</tr>
<tr>
<td>Panel ADF-tatistic</td>
<td>-2.020067**</td>
</tr>
<tr>
<td>Alternative hypothesis: individual AR coefs. (between-dimension)</td>
<td></td>
</tr>
<tr>
<td>Group rho-Statistic</td>
<td>1.609712</td>
</tr>
<tr>
<td>Group PP-Statistic</td>
<td>-1.316718</td>
</tr>
<tr>
<td>Group ADF-Statistic</td>
<td>-1.297625</td>
</tr>
</tbody>
</table>

Source: Self Estimates based on data collected from Directorate of Economics and Statistics and Directorate of Marketing and Inspection, Govt. of Assam.
The panel pooled regression model has been applied to the data set. The results of the estimated pooled lagged model have been presented in the table no. 4.7.

**Table No. 4.7: Impact of the Relative Prices of Potato with its Competing Crops on the Area Acreage of Potato in Assam.**

<table>
<thead>
<tr>
<th>Dependent Variable: <strong>Potato Acreage</strong></th>
<th>Bruesch-Pagan Test for Heteroscedasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chi$^2[1] = 0.01$</td>
</tr>
<tr>
<td></td>
<td>Prob. = 0.9033</td>
</tr>
<tr>
<td></td>
<td>Result: Absence of Heteroscedasticity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Coefficients/Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPPC</td>
<td>0.0024608</td>
</tr>
<tr>
<td></td>
<td>(0.0020384)</td>
</tr>
<tr>
<td>RPPGC</td>
<td>0.012837***</td>
</tr>
<tr>
<td></td>
<td>(0.0039898)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.206148</td>
</tr>
<tr>
<td></td>
<td>(0.3471309)</td>
</tr>
</tbody>
</table>

Source: Author’s self estimates based on the data of the different published issues of Directorate of Economics and Statistics, Govt. of Assam, Directorate of Marketing and Inspections, Govt. of Assam. Note: *** refers significant at 1 percent level. Figures in the parenthesis refer standard errors.

It has been observed in the table no.4.7, that there is no any heteroscedasticity problem with the data set. Moreover, the coefficient of relative price of potato with green chilli (RPPGC) is positive and highly significant at 1 percent level. This means that the increased in the relative price of potato with green chilli has positive and significant impact on the area acreage under potato crop within the area under study. With 0.013 percent increase in the relative price of potato with green chilli results 1 percent increase in the area acreage of potato.

**4.13 Conclusion:**

From the analysis of price movements of potato and its competing crops in the state of Assam, it is revealed that price of potato both in the harvesting and seedling seasons has the increasing trends over the period under study. But, the price variability of potato particularly during the harvesting season has been found decreasing during the study.
period. Mean price of potato of the different markets has shown an increasing trend but, the coefficient of variation of the mean price has the decreasing trend.

Infrastructures related to potato production and marketing have been increasing in the state but it is still lacking in comparison to the requirements. Significantly, potato acreage has been increasing in the area under study. The relative price of potato and its competing crops have the significant impact on the area increase of potato in the state.