CHAPTER III

SUPPLY OF AND DEMAND FOR ARECANUT
SUPPLY OF AND DEMAND FOR ARECANUT

A detailed and separate study is required to understand the various aspects of supply and demand behaviour of arecanut. In this section, a brief account of the macro view of the trends in supply and demand is attempted. This is a prelude for the analysis of the working of the AMS.

3.01 THE COMMODITY AND ITS IMPORTANCE

Arecanut (Areca catechu Linn) or Betelunt is a commodity which has a pride of place in the social lives of people of Asian countries from time immemorial. The commodity has engaged 5.35 million people. As many as twenty two markets are performing distribution function in India fulfilling the needs of all classes of consumers belonging to various socio-economic hierarchies.

The economic importance of the commodity can be adjudged by the fact that it contributed Rs 253 crores to Gross National product (GNP) at constant prices in 1986-87.

India was an exporter of arecanut before independence and turned an importer after as about half of the arecanut producing area went to Bangladesh (erstwhile East Pakistan) due to partition. The quantum of import was 50,650 MTs in 1950's. Due to import discouragement policy and production growth oriented policies of the GOI, India has become a marginal exporter. India has exported 748 MTs of arecanut valued at Rs 203 lakhs to Maldives, United Kingdom, Singapore and the Gulf countries in 1987-88.
3.02 ALTERNATE USES

An arecanut tree has broadly three parts:

(1) the root, (ii) the stem, and (iii) the Palm.

The palm contains leaves, leaf sheaths and the arecanut. An arecanut garden measuring about one hectare contains about 1600 palms and yields 600 sheaths. The leaf sheaths can be used for making caps, hats, picture mounts, decorative veneer panels, plates, ply boards, throwaway cups and gin washers. Also, leaf sheaths are used for cultivation of oyster mushrooms. On an average, an areca garden of size one hectare yields 3800 kgs of leaf sheaths annually.

Arecanut contains an outercover called husk, which is fibrous and an endosperm (or the inner kernel). The arecanut which is not dried is supposed to contain 65 percent husk and 35 percent kernel in weight. The dried husk can be used to prepare activated charcoal [contains 25 to 28 percent - a decolouring agent], thick boards, fluffy cushions, non-woven fabrics and hand boards. XYclose and XYclitol can also be extracted from the husk which are used as sweetening agents in diabetic food instead of sugar.

The endosperm (or the inner kernel) consists of two parts:

(1) hard part or the outer surface spread all over, and

(11) pith or the inner surface which is white or yellow in colour. The inner kernel consists of 11.2 to 15 percent of tannins if fully ripe and about 20 percent in tender kernels. The kernel contains 10 to 12
percent edible fats which hardens due to presence of myristic acids (44%). The endosperm has alkaloids (0.35%) which is a surfactant. The endosperm is a vermifuge and a dentifrice. It contains proteins (7%) and vitamins (B and C).

The kernel has its use in the preparation of chewing gums and tooth pastes. The defatted, detanned arecanut is used in compound feed formulations and fertilizer manufacture. The chief use of arecanut is as masticatory with betel leaves and lime by the adults in the age group 15-49. The habitual chewing of raw tendernuts is carcinogenic, while it is not so for matured (or ripened) nuts - unboiled or boiled - masticated with betel leaves and lime (Diagram 3).

3.03 COMMODITY CHARACTERISTICS

Arecanut is a tropical crop which can be grown in all types of soils except sandy and alkaline ones. It requires hot and humid climate and assured irrigation. The crop needs shady trees and is grown in slopy areas. The above factors make it a location specific crop.

Well ripened seeds are selected for sowing in separate nurseries for about twenty months which later on would be transferred to gardens during rainy season. The arecanut gardens need meticulous cultural operations for longevity and better productivity. Weeds have to be cleared, shady trees pruned to appropriate heights and drainage needs to be
Diagram - 3
THE ARECANUT TREE

TREE

ROOT

STEM

PALM

LEAF

LEAF SHEATH

ARECANUT

HUSK (65%)

XYLOSE 2-3%

XYCLITOL

ACTIVATED CARBON/CHARCOAL

ENDOSPERM (35%)

HARD PART

PITH (WHITE OR YELLOW IN COLOUR)

FATS (10-12%)

TANINS (11.2-15%)

ALKALOIDS (0.35%)

ARECOLINE

MYRISTIC & LAURIC ACIDS (44%)

PROTEINS (7%)

Source: Report on the scheme on Investigations on alternate uses of Areca nut; CPCRI, op cit.
maintained without soil erosion. The fertilizers and pesticides should be administered in recommended doses before and after rains. The arecanut palms are highly prone to various diseases. The common ones are Fruit-Rot (or koleroga or Mahali) and the Yellow Leaf disease. The producers use Bordeaux mixture regularly along with recommended dosage of other pesticides.

An arecanut garden is interspersed with intercrops such as Banana, Pepper, Pineapple, Betelvine, Yam, Cocoa, Arrow root and Paddy. On an average about 1600 arecanut trees are planted per hectare of arecanut garden.

As many as thirty six varieties of arecanut palms have been identified. The important ones are, (I) Areca catechu, (II) Areca triandra, (III) Areca macrocalyx, (IV) Areca normenbie, (V) Saigon - 4, (VI) Areca nagensis, (VII) Pinanga gracilis and, (VIII) Actinorlytis callaporia.

The Areca catechu is grown in southern States of India i.e., in Karnataka and Kerala, while in Assam and other eastern parts Areca catechu, Areca nagensis and Pinanga gracilis are grown. The harvesting of arecanut begins in June in Assam, while it will be during September - October in Karnataka and Kerala. It continues for about five to eight months. About three fourth's of the areca palms(trees) yield in an areca garden. The average age of yielding palms is 28 years in India.
The Central Plantation Crops Research Institute (CPCRI) have discovered three high yielding varieties viz., Mangala, Sumangala and Sreemangala which yield 6.23 percent, 62.89 percent and 47.59 percent more than the local variety respectively. The average cost for setting an arecanut garden of one hectare is found to be Rs 67,000 for the first five years, while atleast Rs 16,000 is estimated to be required annually at current prices (in 1988-89).

3.04 TRENDS IN AREA, PRODUCTION AND PRODUCTIVITY

India has area under arecanut 2,04,000 hectares and produces 2,46,000 MTs annually. The average productivity is 1205 Kgs per hectare. The major producing States are Assam, Karnataka and Kerala which account for about 90 percent of the area as well as production. The minor producing States are Meghalaya, Goa, Diu and Daman, Maharashtra, Tamil Nadu, West Bengal and Andhra Pradesh. The shares in area and production of arecanut in Karnataka State has changed from 29 percent and 39 percent in 1962-63 to 30 percent and 36 percent in 1988-89 to the total production. In the case of Assam the shares of area and production has switched from 18 percent and 13 percent in 1962-63 to 29 percent and 32 percent in 1988-89 to the All India total. It is in respect of Kerala State that area and production have relatively changed from 48 percent and 41 percent in 1962-63 to 31 percent and 23 percent in 1988-89 respectively thereby suggesting that arecanut as a commodity of prime importance in Kerala State gradually lost it for reasons attributed to high rate of incidence of
diseases such as Yellow Leaf and Mahali. The shares of minor producing States in area and production have changed from 5 percent and 6 percent in 1962-63 to 10 percent each in 1988-89 thereby indicating the shift in area and production from major producing States to the minor ones.

The Table 3.01 presents compound growth rates of area, production and productivity of arecanut from 1962-63 to 1988-89 for all India and State level. The compound growth rates are computed using semilog method.

**TABLE 3.01**

<table>
<thead>
<tr>
<th>State</th>
<th>Area</th>
<th>Production</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andra Pradesh</td>
<td>0.28</td>
<td>0.02</td>
<td>-0.28</td>
</tr>
<tr>
<td>Assam</td>
<td>0.35</td>
<td>2.10</td>
<td>0.44</td>
</tr>
<tr>
<td>Karnataka</td>
<td>1.07</td>
<td>1.45</td>
<td>0.40</td>
</tr>
<tr>
<td>Kerala</td>
<td>-0.41</td>
<td>-0.17</td>
<td>-0.55</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>-0.21</td>
<td>-0.43</td>
<td>-0.20</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>1.02</td>
<td>0.88</td>
<td>-0.11</td>
</tr>
<tr>
<td>West Bengal</td>
<td>0.83</td>
<td>1.83</td>
<td>-0.77</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>0.82*</td>
<td>2.49*</td>
<td>8.42*</td>
</tr>
<tr>
<td>Others @</td>
<td>5.23*</td>
<td>5.76*</td>
<td>3.96*</td>
</tr>
<tr>
<td>All India</td>
<td>0.69</td>
<td>1.25</td>
<td>0.58</td>
</tr>
</tbody>
</table>

* Data available from 1970-71.
@ Others include Goa, Diu, and Daman, Mizoram and Tripura.

**Source:**
1. Various issues of Agricultural Situation in India (ASI) from 1965-66 to 1989-90.
It could be seen that area, production and productivity of arecanut in India has grown at the rate of 0.69 percent, 1.25 percent and 0.58 percent per annum respectively. The major producing States, Karnataka and Assam, have registered positive growth rates in area, production and productivity, while Kerala State had negative growth rates in area and productivity. The growth rates of area, production and productivity for Karnataka are found to be 1.0 percent, 1.45 percent and 0.40 percent, while that for Assam are 0.35 percent, 2.10 percent and 0.44 percent respectively. The area, production and productivity for Kerala State have declined at the rate of -0.41 percent, -0.17 percent and -0.55 percent per annum respectively during the period 1962-88. Amongst minor producing States, Meghalaya has registered growth in area, production and productivity at 0.82 percent, 2.49 percent and 8.42 percent, while other States have shown a significant increase at 5.23 percent, 5.76 percent and 3.96 percent respectively. Thus, arecanut plantations have registered growth in Karnataka, Assam and amongst minor producing States, while it has declined in Kerala.
TABLE 3.02
Quinquennial Average of Area, Production and Productivity of Arecanut in India
from 1962-63 to 1986-87

<table>
<thead>
<tr>
<th>YEAR</th>
<th>KARNATAKA</th>
<th>ASSAM</th>
<th>KERALA</th>
<th>M.P.S</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A; Pn; Pt</td>
<td>A; Pn; Pt</td>
<td>A; Pn; Pt</td>
<td>A; Pn; Pt</td>
</tr>
<tr>
<td>1962-1966</td>
<td>36.42</td>
<td>118.13</td>
<td>25.22</td>
<td>876.62</td>
</tr>
<tr>
<td>1967-1971</td>
<td>39.55</td>
<td>141.15</td>
<td>26.27</td>
<td>1032.83</td>
</tr>
<tr>
<td>1972-1976</td>
<td>17.64</td>
<td>137.39</td>
<td>32.33</td>
<td>1029.88</td>
</tr>
<tr>
<td>1977-1981</td>
<td>52.74</td>
<td>140.09</td>
<td>46.46</td>
<td>993.63</td>
</tr>
<tr>
<td>1982-1986</td>
<td>58.85</td>
<td>146.63</td>
<td>51.56</td>
<td>1086.55</td>
</tr>
</tbody>
</table>

Note: 1. Statistics are for Agricultural Years.
2. Area in '000 Hectares; Production in '000 MTs; Productivity in kgs per Hectare.
Source: Agricultural Situation in India (ASI), 1965-66 to 1989-90.

The Table 3.02 presents quinquennial averages of area, production and productivity of arecanut in major and minor producing States in India from 1962-63 to 1986-87. It is observed that area and production have consistently increased in all the States with the exception of the Kerala State. In the Kerala State, the area under arecanut has reduced after 1975 which is reflected in the decline in production. Despite reduction in area in Kerala over years, the efforts of the producers to maintain production levels are noticed. The productivity has consistently increased in Karnataka State, and has maintained its lead over other States during the reference period. There is dwindling of productivity levels in respect of other States.
TABLE 3.03

Compound Growth Rates of Area, Production and Productivity of Arecanut in the Selected Districts in Karnataka from 1965-66 to 1986-87

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>AREA</th>
<th>PRODUCTION</th>
<th>PRODUCTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dakshina Kannada</td>
<td>2.04</td>
<td>3.12</td>
<td>1.11</td>
</tr>
<tr>
<td>Shimoga</td>
<td>1.08</td>
<td>0.79</td>
<td>-0.29</td>
</tr>
<tr>
<td>Uttara Kannada</td>
<td>0.31</td>
<td>0.32</td>
<td>0.02</td>
</tr>
</tbody>
</table>

It is in Table 3.03 compound growth rates of area, production and productivity of arecanut in the selected Districts in Karnataka are presented from 1965-66 to 1986-87. There is expansion of area under arecanut in all the three Districts with Dakshina Kannada leading at 2.04 percent followed by Shimoga (at 1.08%) and Uttara Kannada (at 0.31%) Districts respectively. It is further noted that productivity has increased at 1.11 percent in Dakshina Kannada District, marginally increased at 0.02 percent in Uttara Kannada District followed by decline at -0.29 percent in Shimoga District. In all, the production has increased at 3.12 percent, 0.79 percent and 0.32 percent in Dakshina Kannada, Shimoga and Uttara Kannada Districts respectively.
Table 3.04

Quinquennial Average of Area, Production and Productivity of Areca nut in the Selected Districts in Karnataka from 1965-66 to 1984-85

<table>
<thead>
<tr>
<th>YEAR</th>
<th>DAKSHINA KANNADA</th>
<th>SHIMOGA</th>
<th>UTTARA KANNADA</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pn</td>
<td>Pt</td>
<td>A</td>
</tr>
<tr>
<td>1965-1969</td>
<td>79</td>
<td>97</td>
<td>1225</td>
</tr>
<tr>
<td>1970-1974</td>
<td>107</td>
<td>156</td>
<td>1455</td>
</tr>
<tr>
<td>1975-1979</td>
<td>128</td>
<td>211</td>
<td>1610</td>
</tr>
<tr>
<td>1980-1984</td>
<td>165</td>
<td>292</td>
<td>1776</td>
</tr>
</tbody>
</table>

Note: 1. Statistics are for Agricultural Years.
2. Area in '00 Hectares; Production in '00 MTs; Productivity in kgs per Hectare.

Source: Agricultural Situation in India (ASI), 1965-66 to 1989-90.

The Table 3.04 summarises Quinquennial Averages of area, production and Productivity in the selected Districts in Karnataka from 1965-66 to 1984-85. While the area increased in all the Districts, production has increased consistently in Dakshina Kannada and Shimoga Districts whereas it was marginal in the Uttara Kannada District. Although the productivity levels are generally high in the study area as compared to the all India level, it is more consistent in Dakshina Kannada and almost constant in Uttara Kannada followed by declining trend in Shimoga District.

3.05 SUPPLY RESPONSE ANALYSIS

It is known that Koyek's distributed lag models are incomplete and insufficient although an improvement over...
earlier dynamic models. It considers, inter alia, the spread effects of lagged regressors over time in geometric proportions. The question is one of expectations, especially in the Agricultural Sector, that determine the responses. Thus, the adaptive expectation is more akin to reality than distributed lags. Nerlove revolutionised the area of supply responses in agriculture with his adaptive expectation models which subsequently found application in many areas all over. The researchers in the later years have remodelled the Nerlovian model in their studies.

It is noticed that the studies conducted so far did not consider the impact of the marketing system on response variables, such as area, yield, or production. Any temporal change in the marketing system should reflect in the changes in the response variables. The changes in the commodity sector are not just due to change in technology or in the natural factors such as rainfall but also because of the changes that take place in the marketing system. Thus, any supply response model which does not consider changes in the marketing system is not complete. Producers respond to changes in price, rainfall and also to structural changes in the marketing system over time.

An attempt is also made to explain the changes in the arecanut area with the help of relevant explanatory variables.

*Studies of Rajkrishna, Cummings, Nowshirvani, Jhala, and Narappanavar testify this.*
ASSUMPTIONS

It is needed to make certain assumptions in respect of the AMS before embarking upon the construction of the supply response model. First, it is assumed that the marketing environment for AMS is not beyond Indian geographical territory. This assumption is realistic in the sense that there is no competitive export market for arecanut outside Indian boundary. Despite so many changes during the last four decades hardly 748 MTs of arecanut had been exported.

Secondly, there is no import of arecanut from the countries outside India. This is also another assumption which is realistic. India was importing arecanut from neighbouring countries - Bangladesh (erstwhile East Pakistan) and Burma - after independence. This import continued for a decade which was gradually reduced by passive import policy measures of the Government of India. Since the beginning of 1970's, import of arecanut is practically nil.

Thirdly, the location specificity of the production of arecanut continues to exist. This is true of the commodity.

3.06 AREA RESPONSE MODEL

The following area response equation has been estimated to explain the changes in the area under arecanut in response to the price, the yield, weather conditions, price risks, intra-year price variations and time trend at the District level,
They are presented below

\[ PA = b_0 + b_1 A_{t-1} + b_2 P_{t-1} + b_3 Y_{t-2} + b_4 W_t + b_5 S_{t-1} + b_6 D_{t-1} + b_7 T + V_t \]

where, \( A_t \) = area under arecanut at time "t",
\( A_{t-1} \) = lagged area under arecanut,
\( P_{t-1} \) = the price per quintal of arecanut in the year "t-1",
\( Y_{t-2} \) = the yield of arecanut per hectare in the year "t-2",
\( W_t \) = the average annual rainfall (in mms) at time "t"
\( S_{t-1} \) = price risk represented by sd of prices measured over three preceding years
\( D_{t-1} \) = the CVs of monthly average prices of arecanut in the year "t-1" is considered as proxy for measuring the structural change in the AMS,
\( T_t \) = the "time trend" taking values 1962=1, 1963=2, ..., 1988-89=27 and
\( V_t \) = the error component at time "t".

The above area response model is estimated in linear form for Dakshina Kannada, Shimoga and Uttara Kannada Districts using the time series data for the period 1962-88 by ordinary least squares method.
Table 3.05

Estimates of Supply Response Model in the Study Area

<table>
<thead>
<tr>
<th>District</th>
<th>Functional Form</th>
<th>Constant</th>
<th>$A_{t-1}$</th>
<th>$P_{t-1}$</th>
<th>$Y_{t-1}$</th>
<th>$W_t$</th>
<th>$S_{P_{t-1}}$</th>
<th>$D_{t-1}$</th>
<th>$T_t$</th>
<th>$R^2$</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dakshina</td>
<td>Linear</td>
<td>1561.93</td>
<td>0.33*</td>
<td>0.67</td>
<td>125.64**</td>
<td>0.18</td>
<td>0.36</td>
<td>-35.71</td>
<td>268.72***</td>
<td>0.945</td>
<td>46.64</td>
</tr>
<tr>
<td>Kannada</td>
<td></td>
<td>(296.14)</td>
<td>(0.22)</td>
<td>(1.20)</td>
<td>(64.82)</td>
<td>(0.32)</td>
<td>(9.87)</td>
<td>(57.21)</td>
<td>(86.86)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shinogra</td>
<td>Linear</td>
<td>2072.41</td>
<td>0.60***</td>
<td>-0.04</td>
<td>-6.21</td>
<td>-0.16</td>
<td>0.04</td>
<td>2.29</td>
<td>91.65</td>
<td>0.973</td>
<td>97.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(259.12)</td>
<td>(0.17)</td>
<td>(0.23)</td>
<td>(8.10)</td>
<td>(0.24)</td>
<td>(1.83)</td>
<td>(18.28)</td>
<td>(41.55)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ut'ara</td>
<td>Linear</td>
<td>772.20</td>
<td>-0.16**</td>
<td>-0.06*</td>
<td>0.72</td>
<td>0.04*</td>
<td>-0.76*</td>
<td>-1.28</td>
<td>85.06***</td>
<td>0.986</td>
<td>191.16</td>
</tr>
<tr>
<td>Kannada</td>
<td></td>
<td>(71.92)</td>
<td>(0.23)</td>
<td>(0.04)</td>
<td>(2.72)</td>
<td>(0.03)</td>
<td>(0.54)</td>
<td>(3.22)</td>
<td>(13.68)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Figures in the parentheses indicate standard errors
* Significant at 10 percent level
** Significant at 5 percent level
*** Significant at 1 percent level
The estimated model explains changes in area by about 94.5 percent in case of Dakshina Kannada, 97.3 percent in case of Shimoga and 98.6 percent in case of Uttara Kannada Districts. Most of the coefficients have expected signs. The producers in Dakshina Kannada District are responding positively to price whereas the producers in Shimoga and Uttara Kannada Districts are responding negatively to price. However, the coefficient of price is found to be not significant in Dakshina Kannada and Shimoga Districts while it is negatively significant at 10 percent level in Uttara Kannada District. The yield coefficient has positive and significant influence in Dakshina Kannada District at 5 percent level whereas in other two Districts it is insignificant. The coefficient of $D_{t-1}$ has negative expected sign in the case of Dakshina Kannada and Uttara Kannada Districts showing that as the variation of intra-year prices increases the area under arecanut decreases. The variable time trend is found to be significant in all the Districts. The joint explanatory power (i.e. F value) of the estimated equations is found to be very high. Although the individual coefficients are found to be not significant (which is not encouraging) the joint explanatory power is found to be very high as indicated by the values of F statistics.

3.07 DEMAND ANALYSIS CONSUMPTION PATTERN

It is well known that the production of arecanut is concentrated in three States - two in southern and one in
eastern part of India, while the consumption is widespread all over the country. In addition to this, the demand for a specific type—unboiled or boiled or raw and for a specific variety is concentrated over a wide space at far distant places stretching towards North, West and far East in India. The nature of the commodity is that it can be stored for a long time under normal ecological conditions. The uses of arecanut are multifarious and are recognized as a social necessity. The consumption of arecanut is in various forms, from raw to processed, along with betel leaves and lime. Given the above features, it was beyond our ability to conduct a survey to estimate the demand for arecanut. The spread of consumers—both rural and urban associated with diversities in the social habits, customs, and forms of uses of arecanut which account for high coefficient of variation, it was thought fit to conduct a macro analysis using data available from secondary sources.

It is known that consumption of arecanut is widespread in India. Its use is mainly as masticatory with betel leaves and lime by the people mainly in the age group 15 to 49. The people in this age group are considered as eligible population for consumption of arecanut. The conventional acceptance of the commodity in the Asian scene, India in particular, is the principal determinant for its demand. There are certain other factors which have contributed to the widening of the consumption base of arecanut. First, is the increase in the household income over years. Secondly, increase in population.
The annual growth rate of population before 1951 (from 1901 to 1951) was at 0.88 percent, while it has increased at 2.37 percent after 1951 (upto 1991). The phenomenon of higher annual growth rate after 1951 has resulted in boom in the population. Thus the population of India has increased from 439.23 millions in 1961 to 843.93 millions in 1990-91.

Thirdly, urbanisation is a post independence phenomenon in India. The urban population has grown at 3.70 percent per annum, while the rural population has grown at 2.07 percent during the period 1951-91. Thus consequent to increase in population at such a high rate after 1951, the adult population in the age group 15 to 49 years has increased from 216.55 millions in 1962 to 398.68 millions in 1989. Further, the proportion of adult population to the total has increased from 48.11 percent in 1962 to 49.57 percent in 1989. The Table 3.07 gives the details of domestic availability, per capita consumption of arecanut from 1962 to 1989 in India.
### Table 3.06

**Domestic Availability and Per Capita Consumption of Arecanut in India During 1962 - 1989**

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic Availability (in MTs)</th>
<th>Population (in Millions)</th>
<th>Effective Population Proportion</th>
<th>Effective Population (in Millions)</th>
<th>Percapita Consumption (in grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>1,22,147</td>
<td>450.12</td>
<td>0.4811</td>
<td>216.55</td>
<td>564</td>
</tr>
<tr>
<td>1966</td>
<td>1,30,370</td>
<td>493.69</td>
<td>0.4811</td>
<td>237.51</td>
<td>550</td>
</tr>
<tr>
<td>1971</td>
<td>1,50,798</td>
<td>548.16</td>
<td>0.4641</td>
<td>254.40</td>
<td>593</td>
</tr>
<tr>
<td>1976</td>
<td>1,63,597</td>
<td>616.67</td>
<td>0.4641</td>
<td>286.20</td>
<td>572</td>
</tr>
<tr>
<td>1981</td>
<td>1,93,961</td>
<td>685.18</td>
<td>0.4957</td>
<td>339.64</td>
<td>571</td>
</tr>
<tr>
<td>1985</td>
<td>2,14,694</td>
<td>748.68</td>
<td>0.4957</td>
<td>371.12</td>
<td>579</td>
</tr>
<tr>
<td>1989</td>
<td>2,45,352</td>
<td>804.27</td>
<td>0.4957</td>
<td>398.68</td>
<td>615</td>
</tr>
</tbody>
</table>

The domestic availability is considered as a residue of the domestic supply after making necessary adjustments in production for exports, imports, seeds, and wastage. The effective population is considered as that part of the population in the age group 15 to 49 years as has been presented in the Census Reports of the Government of India. Both forward and backward interpolations have been done to estimate population from 1962 to 1989. It is estimated that the supply of arecanut (domestic availability) has increased at 0.87 percent per annum from 1,22,147 MTs in 1962 to 2,45,352 MTs in 1989, while the effective population has grown at 3.00 percent per annum during the same period. The average per capita availability is 578 grams with sd of 21.05 grams.
and a CV of 3.64 percent during the period 1962-89. The per capita availability per eligible adult per day works out to 1.58 grams. The consumption base has been expanding annually by 6.50 million adult consumers. An annual additional demand of 4,428 MTs is created by eligible adults. The net result of such a situation is that overall availability/consumption has remained almost constant around 600 grams per year per adult over three decades. The expanding consumption base is further explained by illustrating a case study of pan business and a note on panwala industry.

3.08 THE PAN BUSINESS - A CASE STUDY

The last two decades have witnessed tremendous growth in population and migration from rural to urban sector leading to expansion of towns and cities. One of the features of urbanisation is the growth of Hotel/Bar industry. The concomitant growth is of panwala shops. One may find panwalas everywhere attached to exit of Hotels/Bars. The panwala is a demand inflator for arecanut. The panwalas prepare different varieties of pan using arecanut, betel leaves, lime and/or tobacco. The pans are widely consumed by the people in the age group 15-49. In this case study, the features of a panshop are portrayed. The investment and returns as also the future are discussed.
THE AREA

The panwala whom we interviewed is in tiny town, *Patalinagara*, on Bangalore - Kanakapura Road towards South of Bangalore city. There are a good number of commuters towards South and North on either side. Besides, from the East people from their villages come to the town for local shopping. The town has two hotels and one bar. There are two panwalas who sit on either side of hotel/bar. Our panwala is one amongst the two, pan business is his subsidiary occupation.

THE SHOP

The panwala sits on the adjacent wall of hotel/bar with his own wooden stand. The panshop attracts commuters on Bangalore - Kanakapura Road as also from the villagers of the East. The panshop has a table with a frame measuring 1' x 2' x 3' dimension and a chair to sit on and carry out business. The panwala has seven bronze boxes to fill in areca, sweet and masala items. In addition, the panwala owns a small bucket made of steel to rinse betel leaves. The shop was set up in September 1988.

INVESTMENT

It is revealed that to establish a panshop Rs 1000 is required to purchase the above mentioned capital items.

* The names of the town and the panwala are concealed.
The shop needs about Rs 200 as working capital to be rotated once a week for pan business only.

THE INPUT

The following are the inputs required to make different varieties of pan in a week:

1. Betel leaves [Madras & Calcutta varieties] 300
2. Areca nut 2 kgs
3. Sweet/scented Areca nut 1/2 kg
4. Zarda Items:
   (Tobacco Products)
   a Teen sow One
   b Char sow -do-
   c Chetna -do-
   d Baba -do-
5. Sweetner-Gulkan -do-
6. Masala -do-

BUSINESS HOURS

The panwala runs his business from 8.am to 10.pm - for 14 hours on all days.

THE OUTPUT

The panwala prepares twelve types of pan and charges the following prices (per pan). The pre-budget and post-budget prices (recent July 1991) are enumerated below.
<table>
<thead>
<tr>
<th>Item</th>
<th>Variety</th>
<th>Pre-Budget Price</th>
<th>Post-Budget Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madras Sada</td>
<td>-</td>
<td>0.80</td>
<td>1.00</td>
</tr>
<tr>
<td>Madras Zarda</td>
<td>300</td>
<td>0.80</td>
<td>1.00</td>
</tr>
<tr>
<td>Madras Zarda</td>
<td>chetna</td>
<td>0.80</td>
<td>1.00</td>
</tr>
<tr>
<td>Madras Zarda</td>
<td>420</td>
<td>1.00</td>
<td>1.25</td>
</tr>
<tr>
<td>Madras Baba</td>
<td>100</td>
<td>1.00</td>
<td>1.25</td>
</tr>
<tr>
<td>Calcutta Sada</td>
<td>-</td>
<td>1.00</td>
<td>1.25</td>
</tr>
<tr>
<td>Calcutta Zarda</td>
<td>300</td>
<td>1.25</td>
<td>1.50</td>
</tr>
<tr>
<td>Calcutta Zarda</td>
<td>420</td>
<td>1.25</td>
<td>1.50</td>
</tr>
<tr>
<td>Calcutta Zarda</td>
<td>chetna</td>
<td>1.00</td>
<td>1.25</td>
</tr>
<tr>
<td>Calcutta Sada</td>
<td>120</td>
<td>1.25</td>
<td>1.50</td>
</tr>
<tr>
<td>Sweet Beeda madras</td>
<td>-</td>
<td>0.80</td>
<td>1.00</td>
</tr>
<tr>
<td>Sweet Beeda Calcutta</td>
<td>-</td>
<td>0.80</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*1991 - 92 Budget of the Govt of India.

On an average, the panwala sells about 200 pans in six days and 100 on Sunday in a week. The panwala sells 200 pans @ Re 1.00 and 100 @ Rs 1.25. The gross earning of the panwala is estimated at Rs 325 per week. The panwala uses eight grams of arecanut / scented nut per pan i.e, with one kg of arecanut around 125 pans are prepared. Due to soaring prices of arecanut it is hardly used in the preparation of pan. After the budget, the panwala has reduced the arecanut content in the pan and he prepares around 250 pans per one kg of arecanut.

The itemised requirement and their cost for one week is presented below:
1. Betel leaves (325 @ Rs 15/100 leaves including transportation cost) Rs. 48.75
2. Arecanut (unboiled) 1 kg of arecanut at Rs.60 per kg and 1/4 kg of sweet/scented nuts at Rs.75 per kg Rs. 78.75
3. Other items * Rs. 20.00

Total Rs. 147.50

* Other items are purchased once in a month and spends about Rs.80/- on this head per month.

The profit is gross income less total cost. Thus the profit works out to Rs.325 – 147.50 which equals Rs.177.50. The profit for a month works out to be Rs.710. The cost-profit ratio works out to be 120.34 percent. Thus for an investment of every rupee in pan business, on an average, the profit earned is Rs.1.20. It can be concluded that the pan business is a low investment and high profit oriented enterprise.

THE PANWALA INDUSTRY

It is apparent that urbanization is a post independent phenomenon in India. The result of urbanization is the growth of hotel industry. The hotel industry has given rise to the establishment of panwala – one man – shops during the last decade (1980-90) in the country. The pan business is slowly spreading towards rural areas, especially taluk and hobli head quarters. It is observed that panwala network has been spreading over years as it has proved to be small investment. -
high return business. The estimated demand for arecanut created by panwalas is discussed in this section. The economic census, 1980 of the DES of Government of Karnataka provides data on number of restaurants and hotels in the State - Districtwise. It is assumed that panwalas exist wherever there are hotels and restaurants. There are 21,583 hotels and restaurants in the State. The average number hotel/restaurants per District works out to 1135.95 with sd of 682.02 and cv at 60.04 percent. There is wide dispersal of hotels and restaurants in the State as indicated by the cv. It is estimated that there are about 1.35 million panshops / panwalas in the country during 1991. On the basis of the results of the case study assuming that each panwala requires two kgs per week, the quantity demanded by panwalas works out to 1,40,648 MTs per year which is about 47.17 percent of the total supply in India in 1991. The density of panwalas works out to one panwala for 344 effective adult population in India during 1991. It is certain that panwalas demand about 47 percent of the total supply and hence are demand pushers for arecanut. Incidentally, panwala business has generated employment to 1.35 million people and have an estimated annual turnover of Rs 228.55 million.

PANMASALA INDUSTRY

The details are not available about panmasala industries, although panmasalas are increasingly becoming popular among urban consumers. There are twenty panmasala companies in India.
with a turnover of over Rs 3000 million during 1991. The 11 panmasala companies manufacture 255 types of panmasalas. These companies are estimated to demand about 9,400 MTs every year which is roughly 3.8 percent of the total supply. These estimates are worked out on the basis of the results of the case study presented earlier.

3.09 CONCLUSIONS

The following conclusions emerge from the discussions made:

1. Arecanut (or Betel nut) is a commodity having conventional, commercial and economic importance. The commodity has generated employment to about 5.35 million people including 1.35 million panwalas and contributes Rs 253 crores to GNP at constant prices.

2. The area, production and productivity of arecanut in India are found to be 2,04,000 hectares, 2,46,000 MTs and 1,205 Kgs during 1988-89. The States of Assam, Karnataka and Kerala have accounted for 90 percent of area and production of arecanut in India. The minor producing States Meghalaya, Goa, Diu and Daman, Maharashtra, Tamil Nadu, West Bengal and Andhra Pradesh have together accounted for 10 percent of area and production in India. Karnataka stands first in production followed by Assam and Kerala.
3. The compound growth rates of area, production, and productivity of arecanut in India are found to be 0.69 percent, 1.25 percent and 0.58 percent respectively. Karnataka and Assam have registered positive growth rates in area, production and productivity, while Kerala has registered negative growth rate in area, production and productivity. The minor producing States have registered higher positive growth rates than the major ones.

4. The explanatory powers of the estimated area response equations are found to be fairly high although some of the coefficients are not statistically significant. However, most of the coefficients have expected signs.

5. The pan business is a low investment high profit oriented enterprise. Consequent to growth of the Hotel/Bar industry, the panwalas have created additional demand for arecanuts.

6. The effective population or eligible population in the age group 15 - 49 years has increased from 216.55 millions in 1962 to 398.68 millions in 1989 at a growth rate of 3.00 percent per annum. They form about 49.57 percent of the total population. The consumption base has been expanding over years with 6.5 million eligible adults every year. An annual additional demand of 4,428 MTs is created by eligible adults. The supply of arecanut has been increasing at 0.87 percent per annum from 1962. It has increased in absolute terms from 1,22,147 MTs in 1962 to
2,45,352 in 1989. The per capita availability of arecanut is 578 gms per year per adult with sd of 21.05 gms and cv at 3.64 percent. The per capita availability ranged between 550 gms and 615 grams during 1962 to 1989.

7. The pan business is an offshoot of post independent India. Urbanization coupled with the growth of Hotel/Bar industry concomitantly led to the growth of pan business and hence panwalas. It is estimated that 1.35 million panshops / panwalas exist and demand 1,40,648 MTs of arecanut annually. Their share in total consumption is estimated at 47.17 percent. The ratio of panwala to eligible population works out to be 1 : 344 as per 1989 estimated population. There are twenty panmasala industries with an annual turnover of Rs 3000 million. Panmasala industries demand 9400 MTs annually which is 3.8 percent of the total supply.
3.10 REFERENCES


