

Price behaviour in coconut and its derivatives in India

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Abstract

Remunerative and stable price for any agricultural produce helps in increasing the production of that commodity. The coconut-based industry in India revolves around the price of coconut oil, which is influenced by the price and overall availability of other vegetable oils. It is against this background that the study aims at segregating the secular trend, seasonal, cyclical and irregular components in the price of coconut and major coconut products like copra and coconut oil in India using the classical time series analysis (Croxtton *et al.*, 1979; Spiegel, 1992). The study is based on month wise price data for the period from 1976-77 to 2004-05. The prices showed an increasing secular trend. The domestic price of copra and coconut oil were found to be higher than the international price. It was also found that the domestic markets were well integrated among themselves and with the international market. There were marked seasonal variations in the prices of coconut and its products, with coconut prices remaining low during the months of peak production in March to April; and high when production was low during July to August. Price cycles of three to four years were observed

for all the considered products. Widespread irregular movements were found to contribute to higher price fluctuations.

Introduction

Coconut is grown in more than 93 countries across the world in 12.24 million hectares, with a production of 11.04 million tonnes of copra equivalent. Indonesia is the largest producer (26.25%) followed by India (25.46%). Philippines ranks third in world production of coconut with a share of 21.29%. Countries of the Asia-Pacific region produce 87.9 per cent of the coconut in the world (APCC Statistical Year Book 2007).

Coconut is an important commercial crop to a vast majority of Indian coconut growers, playing a dominant role in their socio-economic and cultural life. Coconut farming is more a way of life to millions of Indian cultivators and a major source of employment to millions in the rural areas. In India, the crop covers an area of 1.9 million ha with an estimated annual production of 14.74 billion nuts.

Remunerative and steady price for any agricultural produce plays a crucial role in increasing production of that commodity. Wide price fluctuations, on the other hand,

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Table 1. State wise area, production and productivity of coconut in India

(A-area in '000 ha, P- production in million nuts and Y- yield in nuts per ha)

| | KERALA | | | TAMIL NADU | | | KARNATAKA | | | ANDHRA PRADESH | | | INDIA | | |
|---------|-----------------|----------------|------|------------------|------------------|-------|-----------------|-------------------|------|----------------|------------------|-------|--------|---------|------|
| | A | P | Y | A | P | Y | A | P | Y | A | P | Y | A | P | Y |
| 1950-51 | 409.4 (65.3) | 2025 (61.7) | 4948 | 66 (10.5) | 462.6 (14.1) | 7009 | 93.2 (14.9) | 369.4 (11.3) | 3964 | 33.2 (5.3) | 306.1 (9.3) | 9220 | 626.5 | 3281.7 | 5238 |
| 1955-56 | 448 (69.1) | 3099 (73.4) | 6917 | 51.5 (8.0) | 417.3 (9.9) | 8103 | 88.3 (13.6) | 355.3 (8.4) | 4024 | 35.6 (5.5) | 233 (5.5) | 6545 | 647.6 | 4224.4 | 6523 |
| 1960-61 | 501 (69.8) | 3220 (69.4) | 6427 | 55 (7.7) | 445.3 (9.6) | 8096 | 96 (13.4) | 497.7 (10.7) | 5184 | 33 (4.6) | 297.4 (6.4) | 9012 | 717.0 | 4639.1 | 6470 |
| 1965-66 | 586.3 (66.3) | 3293 (65.4) | 5617 | 90.2 (10.2) | 843.6 (16.8) | 9353 | 115.4 (13.0) | 361.6 (7.2) | 3133 | 33.3 (3.8) | 287.9 (5.7) | 8646 | 883.7 | 5035.4 | 5698 |
| 1970-71 | 719.1 (68.7) | 3981 (65.5) | 5536 | 95.1 (9.1) | 941.5 (15.5) | 9900 | 130.3 (12.5) | 731.8 (12.0) | 5616 | 37.1 (3.5) | 157 (2.6) | 4232 | 1045.5 | 6078.0 | 5813 |
| 1975-76 | 692.9 (64.7) | 3439 (59) | 4964 | 109.9 (10.3) | 1098.6 (18.9) | 9996 | 151.1 (14.1) | 766.6 (13.2) | 5073 | 40.5 (3.8) | 167.4 (2.9) | 4133 | 1069.9 | 5829.4 | 5449 |
| 1980-81 | 666.2 (61.5) | 3036 (51.1) | 4558 | 116 (10.7) | 1354.4 (22.8) | 11676 | 171.5 (15.8) | 890 (15.0) | 5190 | 42.4 (3.9) | 175.3 (3.0) | 4134 | 1083.3 | 5942.0 | 5485 |
| 1985-86 | 704.7 (57.5) | 3377 (49.9) | 4792 | 149.6 (12.0) | 1494.5 (22.0) | 9990 | 205.6 (16.8) | 1062 (15.7) | 5165 | 47.4 (3.9) | 195.8 (2.9) | 4131 | 1225.6 | 6770.0 | 5524 |
| 1990-91 | 864.1 (57.1) | 4527 (46.7) | 5239 | 226.4 (15.0) | 2358.3 (24.3) | 10417 | 232.9 (15.4) | 1201.6 (12.4) | 5159 | 61.2 (4.0) | 730.6 (7.5) | 11938 | 1513.9 | 9700.2 | 6407 |
| 1995-96 | 982.1 (53.6) | 5905 (45.6) | 6013 | 298.6 (16.3) | 4345.7 (33.6) | 14554 | 269.4 (14.7) | 1406.5 (10.9) | 5221 | 90 (4.9) | 1231.4 (9.50) | 13682 | 1830.9 | 12952.3 | 7074 |
| 1999-00 | 899.1 (50.6) | 5167 (42.1) | 5747 | 304 (17.0) | 3222 (26.3) | 10599 | 320.6 (18.0) | 1670.3 (13.6) | 5210 | 101.7 (5.7) | 1051.8 (8.6) | 10342 | 1777.7 | 12251.6 | 6892 |
| 2003-04 | 902.8 (47.5) | 5347 (44.6) | 5923 | 358.14 (18.9) | 2780.6 (23.2) | 7764 | 374.5 (19.7) | 1576.05 (13.1) | 4208 | 104.3 (5.5) | 1277.1 (10.7) | 12244 | 1899.4 | 11988.8 | 6312 |
| 2004-05 | 886.9 (46.3) | 5300 (45.2) | 5976 | 379.2 (19.8) | 2572.7 (21.9) | 6785 | 390.1 (20.4) | 1546 (13.2) | 3963 | 102.6 (5.4) | 1328.3 (11.3) | 12946 | 1916.8 | 11728.3 | 6119 |

Source: Coconut Development Board, 2005

Figures in parentheses indicate percentage to the respective totals

discourage farmers from taking up large-scale investment to improve productivity. Moreover, coconut being a perennial crop, which involves high investment when compared to seasonal and annual crops, price and price stability assumes more significance. The study of price behaviour will provide valuable information about the different components of the price and their interplay that will be of interest to millions of growers and the processing industry, which is heavily dependent on the commodity. It was against this background that the paper attempts to study the secular trend, seasonal,

cyclical and irregular movements in the price of coconut and major coconut products in India.

Materials and Methods

The price behaviour of the three major forms of coconut viz., coconut, copra and coconut oil were considered for the analysis. Kochi, Alappuzha and Kozhikode markets were identified as the major market centres, as these are the leading domestic markets where bulk of the transaction in coconut and its products are taking place, and thereby provides a basis for price quotations in other market centres in the country. The domestic price behaviour was

compared with the international prices also. Monthly price data were collected from the Coconut Development Board pertaining to the three reference market centres for the period from 1977-78 to 2004-05. The international price of copra and coconut oil was collected for the period from 1983 to 2005. The Cost Insurance Freight (c.i.f) price from Indonesia/Philippines to Europe was considered as the reference international price as these countries are the leading producers and exporters of copra in the world. In the case of coconut oil, the c.i.f. price prevailing at Rotterdam was considered as the international price.

2.1 Analysis of price behaviour

Price behaviour of coconut and coconut products were studied using the techniques of classical time series analysis (Croxtton *et al.*, 1979; Spiegel, 1992). Any time series can be decomposed into four essential components, viz., trend, seasonal, cyclic and irregular components. A multiplicative model of the following form was used to study the components of the time series:

$$Y(P) = T \times C \times S \times I$$

Where, Y (P) = Monthly average price of coconut, copra or coconut oil

T= Secular trend

C= Cyclical movement

S= Seasonal index

I= Irregular movement

2.1.1 Estimation of Trend Values

Trend analysis carried out using the method of least squares and functional forms were chosen based on R² values, standard errors and outlier values. Fitted trend lines were examined for secular price movements and the original data was compared with the predicted data. Trend lines were fitted separately for the pre WTO period and post WTO period and the two patterns were observed for significant change of trend. All the estimations were carried out using SPSS version 9.0.

2.1.2 Estimation of Seasonal Variation

The variations, which occur within the span of a year with regular periodicity, are the seasonal variations. Seasonal indices were worked out to capture the pattern of seasonal variations. Ratio to moving

average was employed to work out the seasonal index (Croxtton *et al.*, 1979; Spiegel, 1992).

2.1.3 Estimation of Cyclical Components

Cyclical movements are of longer duration, usually extending a few years and are of different periodicity. Residue method (Croxtton *et al.*, 1979; Spiegel, 1992) was employed for the estimation of cyclical components. The secular trend is removed from the time series data by dividing each of the original values by the corresponding trend values and expressing the same in percentage. This trend eliminated data for each month was divided by the corresponding seasonal index, which left mix up of cyclical and irregular components. As the irregular movements are highly entangled with cyclical movements, the latter can completely be eliminated only at the risk of over smoothening. The cyclical variations were netted out by using 12-month moving averages.

2.1.4 Estimation of Irregular Variation

The irregular movements are of two types, episodic and accidental variations. The episodic variations are readily identifiable movements due to specific events. On the other hand, accidental variations are minor fluctuations not attributable to specific events and are too small to merit individual consideration. The accidental variations will normally be random in nature. Irregular indices were obtained by dividing the cyclical-irregular indices by the cyclical indices, which when expressed in percentage gave the irregular index.

2.2 Market intergration studies

An inter correlation matrix was developed for understanding the degree of market integration among the domestic markets and also with the international market during the pre WTO as well as post WTO periods.

2.3 Competitive advantages

The export competitiveness of Indian coconut sector was studied using the Nominal Protection Coefficient (NPC), which measures the actual divergences or distortions between any given commodity's domestic price and international (border) price. The underlying rationale is that such divergence represents the presence of market interventions such as taxes, subsidies, government controlled prices and other policy instruments (Appleyard, 1987). NPC can be calculated under both exportable and importable hypothesis. As the objective was to evaluate the export potential of the domestic coconut produced, the NPC was calculated under exportable hypothesis.

The NPC was calculated as indicated below (Appleyard, 1987; Tweeten, 1992; Gulati *et al.*, 1994 and Datta, 2001):

$$NPC = P_D / P_B$$

where,

NPC = Nominal Protection Coefficient of the commodity under consideration

P_d = Domestic price of the commodity

P_b = Border price or reference price of the commodity after taking care of transportation and marketing expenses.

Table 2. Trend Models for the price of Coconut, Copra and Coconut oil

| Variable | Region | Period | Model | AdjustedR ² value |
|-----------|-------------|----------|--|------------------------------|
| Kochi | Coconut | Pre WTO | $Y = 1459.14 * t^{0.34}$ | 0.57 |
| | | Post WTO | $Y = 2259.6 + 1557.22t - 230.75t^2$ | 0.28 |
| | Copra | Pre WTO | $Y = 711.09 * 1.08^t$ | 0.79 |
| | | Post WTO | $Y = 1524.57 + 1371.15t - 337.09t^2 - 23.30 t^3$ | 0.66 |
| | Coconut oil | Pre WTO | $Y = 1082.0 * 1.08^t$ | 0.75 |
| | | Post WTO | $Y = 2204.04 + 2137.4t - 520.86t^2 + 35.77t^3$ | 0.61 |
| Alappuzha | Coconut | Pre WTO | $Y = 951.52 * 1.09^t$ | 0.81 |
| | | Post WTO | $Y = 3007.33 + 565.32t + 53.89t^2 - 22.29t^3$ | 0.60 |
| | Copra | Pre WTO | $Y = 716.10 * 1.08^t$ | 0.80 |
| | | Post WTO | $Y = 1465.39 + 1451.9t - 342.58t^2 + 23.12t^3$ | 0.60 |
| | Coconut oil | Pre WTO | $Y = 1070.05 * 1.08^t$ | 0.79 |
| | | Post WTO | $Y = 2251.68 + 2091.55t - 509.25t^2 + 35.01 t^3$ | 0.61 |
| Kozhikode | Coconut | Pre WTO | $Y = 930.02 * 1.08^t$ | 0.77 |
| | | Post WTO | $Y = 639.18 + 2337.32t - 522.21t^2 + 33.24 t^3$ | 0.50 |
| | Copra | Pre WTO | $Y = 712.09 * 1.08^t$ | 0.79 |
| | | Post WTO | $Y = 1336.04 + 1511.10t - 354.78t^2 + 23.93t^3$ | 0.63 |
| | Coconut oil | Pre WTO | $Y = 1060.78 * 1.08^t$ | 0.81 |
| | | Post WTO | $Y = 2355.53 + 2116.88t - 509.7t^2 + 34.76 t^3$ | 0.61 |

Value of NPC less than unity confirms export competitiveness, while value greater than unity confirms competitive weaknesses.

3. Results and Discussion

3.1 Analysis of price behaviour

The results of the time series analysis are described in the following sections under appropriate headings.

3.1. 1. Trend Analysis of Price of Coconut and Coconut Products

The out put of the trend analysis is outlined in Table 2. The pre WTO situation was explained by a power function for Kochi where as the compound function explained the trend for Alappuzha and Kozhikode. The results showed that in spite of tremendous fluctuation, coconut price in the long run had shown an increasing trend in all the three markets considered during the pre-WTO period. The post WTO

situation was explained by quadratic function in the case of Kochi market where as cubic function found to give better fit in the case of the other two markets viz., Kozhikode and Alappuzha. During the post WTO period considered, the Kochi and Alappuzha markets showed a declining price trend while Kozhikode market behaved differently during the period from 2002 to 2005. As far as copra prices were concerned, an increasing trend was exhibited by all the three markets during the pre and post WTO periods. It suggested that the copra price in the main market centres moved in close association with each other indicating mutual dependencies of the three major copra markets in the state. The secular price movement of coconut oil was remarkably similar to that of copra. This is understandable as the price of copra and coconut in the country are derived from the

prevailing prices of coconut oil, thus suggesting the presence of a coconut oil driven market, with the fortune of millions of small and marginal farmers cultivating coconut depending on the price of a single commodity viz., coconut oil. This situation underlines the need for product diversification in coconut.

3.1.2 Seasonal Variation

Coconut, copra and coconut oil exhibited considerable seasonality in their price in the domestic market in spite of the fact that coconut is a perennial crop and its production takes place round the year. The peak price for coconut in the Kochi market during the pre WTO period was observed in October, while the trough price was during July. The period from October to March was a buoyant phase where as the period from May to September was found to be the depressed phase (Table 3 and 4). In the post WTO period,

Table 3. Seasonal indices for coconut, copra and coconut oil along with the coefficient of variation during pre WTO period

| Month | Coconut | | | Copra | | | Coconut oil | | |
|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Kochi | Alappuzha | Kozhikode | Kochi | Alappuzha | Kozhikode | Kochi | Alappuzha | Kozhikode |
| April | 97.12 | 93.49 | 95.38 | 94.63 | 93.92 | 93.44 | 94.87 | 95.00 | 94.55 |
| May | 91.99 | 95.40 | 95.06 | 93.69 | 93.30 | 91.81 | 91.21 | 91.31 | 92.30 |
| June | 90.96 | 94.25 | 98.49 | 95.07 | 92.96 | 91.46 | 94.85 | 95.50 | 96.58 |
| July | 89.02 | 96.13 | 101.86 | 95.65 | 94.26 | 95.29 | 95.96 | 95.72 | 98.09 |
| August | 90.16 | 94.76 | 100.15 | 98.36 | 96.95 | 97.27 | 99.20 | 99.27 | 98.66 |
| September | 90.48 | 94.74 | 105.83 | 96.43 | 97.63 | 95.53 | 96.96 | 96.13 | 96.39 |
| October | 113.24 | 103.15 | 100.84 | 102.47 | 103.13 | 100.94 | 101.33 | 102.11 | 103.66 |
| November | 102.94 | 108.77 | 102.56 | 109.83 | 110.95 | 110.55 | 109.49 | 109.27 | 108.79 |
| December | 109.77 | 109.74 | 100.33 | 108.13 | 107.48 | 114.01 | 108.37 | 108.34 | 107.82 |
| January | 107.35 | 105.20 | 97.65 | 104.61 | 105.50 | 106.02 | 104.82 | 105.06 | 105.51 |
| February | 106.96 | 102.98 | 102.05 | 100.98 | 103.23 | 101.53 | 102.01 | 101.41 | 101.49 |
| March | 110.01 | 101.37 | 99.79 | 100.16 | 100.63 | 102.16 | 100.90 | 100.88 | 96.16 |
| CV | 9.27 | 5.93 | 3.06 | 5.38 | 6.08 | 7.29 | 5.61 | 5.58 | 5.38 |

though a major shift in seasonality is not discernible, the price peak was found to have shifted to December where as the trough continued to be during July. A more or less similar seasonality was observed for the Alappuzha market and Kochi markets also. In the post WTO period, an entirely different seasonal behaviour emerged for coconut in the Kozhikode market with the price peaking up during February and the period from January to May was the buoyant phase. The lowest prices were observed during August. Thus, it can be found that even though the Kochi, Alappuzha and Kozhikode markets were highly integrated, the seasonal price behaviour was more similar for Kochi and Alappuzha markets while it was distinctly different for the Kozhikode market. The similarity exhibited by the Kochi and Alappuzha market was due to their vicinity with each other and also due to similar market arrivals from the erstwhile *Travancore* region. The Kozhikode market is a far-flung market from these two and the market arrivals are from the *Malabar* region. The market arrival pattern in Kozhikode market is distinctly different from

that of the other two markets. The farmers in northern Kerala harvest coconut less frequently than their southern counterparts. It has been noted that while the coconut farmers in southern Kerala take six to seven harvests a year, the farmers in *Malabar* region take only three to four harvests.

For copra prices, market buoyancy and depressions were noted during October-February and April-September respectively during the pre WTO period. Peak prices were observed in November in both Kochi and Alappuzha markets where as in Kozhikode market the price peaked up in December thereby one month lag is observed with respect to Kochi and Alappuzha markets. Kochi approached trough price in May, where as it was lagging by one month in the other two markets. In the post WTO period, price peaks were observed in November in all the markets. It is interesting to note that in the post WTO period, the price peaking in Kozhikode market advanced by one month from December to November. Thus all the three markets are now more synchronized showing signs of better market integration during the

post WTO period for primary processed commodity.

The seasonal variation in coconut oil prices was found to be moving in close association with that of copra in the three major markets considered. This is understandable as the prices of copra and coconut oil influence each other. Both during the pre WTO period and post WTO period, prices were found to peak up during November in the markets studied. October to February was observed as the buoyant phase during the former period where as during the latter period buoyant phase was found to commence early. The period from April to September was the depressed phase with trough price occurring in May in all the markets. But the post WTO period witnessed advance commencement of depressed phase with the prices approaching trough in March in all the markets.

Analysis of the seasonal variation in copra and coconut oil prices in the international market showed that, the buoyant period from September to February is visible in the international market also, but with a time lag of two months from



November to February. However, another price peak is also visible around June, which was absent in the domestic market. Depressed price was visible around August to October, both in the pre and post WTO period. The domestic price in this period is characterized by a buoyant phase. Thus, it may be concluded that in spite of a fair level of integration between the domestic and international markets, the seasonality in the prices in the two markets were distinctly different.

3.1.3. Cyclical Variation

The prices of coconut and its products showed highly pronounced cyclical variations during both the pre WTO period and post WTO period of the study. But it was interesting to note that there was marked similarity in the cyclical variation not only among the three commodities under consideration but also among the different market situation considered and the cycle which was visible in one market was identical in the other market centres also. The price cycle fluctuated about 70 percent above and 25

percent below the average price. It was observed that during the pre WTO period, there existed four complete cycles in the prices of all the three commodities, with the length of the cycle being three to four years. It can therefore be inferred that the price of coconut, copra and coconut oil may be subjected to oscillations of high and low prices in three to four years.

During the post WTO part of the study, there were three complete cycles but the spread of the cycle was found to be increasing with years. The cycle length was two years during the initial years, where as it increased to more than four years by the latter period. The price cycles were found to fluctuate about 24 percent above and 44 percent below the average prices in the case of copra and coconut oil. This observation along with the increased spread of the cycle is suggestive of the fact that in the post WTO period, the amplitude of cyclical fluctuation was wanting.

The cyclical fluctuation in copra and coconut oil prices in the

international market were found to be moving in close association with each other as observed in the domestic market. The price cycle was found to fluctuate about 58 percent above and 43 percent below the average price during the pre WTO period and about 30 percent above and 25 percent below during the post WTO period. It took two to four years to complete one cycle during the pre WTO period where as it became less frequent in the post WTO period suggesting that in the latter period, the amplitude of cyclical fluctuation has subdued considerably in the international market also. Thus, it is evident that the cyclical price behavior in the domestic market was similar to that observed in the international market. As the volume of domestic market is too small to influence the international market, it is obvious that the cyclical price behavior of copra and coconut oil in the global markets are influencing the Indian market. Thus, the fluctuations in the international market in the bullish and bearish form are evident in the domestic market also.

Table 4. Seasonal indices for coconut, copra and coconut oil along with the coefficient of variation during post WTO period

| Month | Coconut | | | Copra | | | Coconut oil | | |
|-----------|---------|-----------|-----------|--------|-----------|-----------|-------------|-----------|-----------|
| | Kochi | Alappuzha | Kozhikode | Kochi | Alappuzha | Kozhikode | Kochi | Alappuzha | Kozhikode |
| April | 96.50 | 94.98 | 107.10 | 93.72 | 92.90 | 93.45 | 94.91 | 94.42 | 93.93 |
| May | 96.10 | 95.34 | 104.07 | 93.50 | 94.42 | 94.20 | 93.89 | 93.67 | 94.10 |
| June | 95.00 | 97.59 | 100.65 | 95.75 | 96.16 | 95.75 | 96.11 | 97.09 | 97.03 |
| July | 94.02 | 96.13 | 94.35 | 96.21 | 96.20 | 95.15 | 97.09 | 96.55 | 96.88 |
| August | 97.90 | 97.71 | 91.44 | 97.79 | 99.36 | 99.72 | 99.47 | 100.96 | 100.58 |
| September | 102.14 | 102.36 | 93.35 | 103.67 | 104.12 | 103.91 | 102.43 | 104.36 | 104.67 |
| October | 103.29 | 104.01 | 95.05 | 104.97 | 103.74 | 103.04 | 104.58 | 104.18 | 103.66 |
| November | 105.95 | 106.56 | 94.25 | 111.97 | 111.17 | 110.36 | 109.88 | 110.32 | 108.93 |
| December | 109.53 | 103.88 | 94.88 | 106.20 | 105.42 | 104.25 | 105.66 | 104.32 | 103.99 |
| January | 104.01 | 104.49 | 105.40 | 103.88 | 103.83 | 104.85 | 103.70 | 102.75 | 103.18 |
| February | 100.84 | 100.67 | 110.60 | 99.36 | 99.66 | 101.89 | 99.35 | 98.53 | 99.93 |
| March | 94.71 | 96.27 | 108.90 | 92.98 | 93.03 | 93.38 | 92.91 | 92.84 | 93.12 |
| CV | 5.04 | 4.13 | 6.88 | 6.06 | 5.72 | 5.55 | 5.29 | 5.35 | 5.03 |



3.1.4. Irregular Variation

The indices of irregular variations show that coconut, copra and coconut oil prices were subjected to highly irregular variations during the period considered. Though the random variations differed considerably among different markets trading in the three forms of coconut and its derivatives under reference, the episodic variations of larger proportion were similar.

It was interesting to note that the extent of irregular variation was found to reduce with the level of product development. The intensity of irregular variation was more visible in the case of coconut than either in copra or coconut oil. This is expected also because coconut is a primary produce characterized by bulkiness and lesser storage life and also because of the reason that coconut being a small holders crops, farmers do not retain the produce for long once harvested. But contrary to this, copra and coconut oil are handled by big traders who store it for comparatively longer period with an eye on profit. Consequently in the case of copra and coconut oil prices are determining the supply rather than supply determining the price.

3.2 Market integration

The inter correlation matrix developed for market integration is as depicted in Table 6. All the correlation coefficients were significant at one percent level. A perusal of the table revealed that the major forms of coconut considered in the study in the major domestic market centres were highly correlated. This was suggestive of the high level of market integration

Table 5. Seasonal indices for copra and coconut oil prices in the international market

| Months | Copra | | Coconut oil | |
|-----------|---------|----------|-------------|----------|
| | Pre WTO | Post WTO | Pre WTO | Post WTO |
| April | 96.64 | 98.17 | 95.57 | 102.76 |
| May | 98.99 | 99.85 | 100.52 | 96.48 |
| June | 102.40 | 108.07 | 102.33 | 101.16 |
| July | 102.47 | 99.13 | 102.82 | 98.75 |
| August | 96.58 | 98.64 | 98.29 | 96.01 |
| September | 96.00 | 94.97 | 95.95 | 97.41 |
| October | 98.98 | 95.41 | 101.36 | 95.61 |
| November | 101.28 | 101.21 | 101.00 | 103.59 |
| December | 101.17 | 103.95 | 100.66 | 103.02 |
| January | 104.90 | 100.49 | 103.29 | 102.06 |
| February | 101.18 | 103.29 | 98.65 | 104.47 |
| March | 99.42 | 96.82 | 99.58 | 98.67 |

existing in the domestic markets for coconut, copra and coconut oil.

A similar exercise was carried out between the domestic and international prices of copra and coconut oil and it was found that the domestic prices were also correlated with the international price of copra and coconut oil, but the level of association was low.

3.3 Export competitiveness

The export competitiveness of coconut was calculated using the nominal protection coefficient (NPC) under exportable hypothesis. A perusal of figure shows that the domestic prices of copra and coconut oil have been consistently higher than the international prices, indicating lack of global competitiveness. The NPC ranged well over two in most years except during the second half of the nineties. This indicated that Indian copra and coconut oil were not competitive internationally under the exportable hypothesis (Table 7).

The minimum support price (MSP) is intended to provide a guarantee to purchase copra at a pre-announced price when the market

prices crashed beyond a point. This way, the government wanted to provide a minimum price guarantee to the producers. The Government of India started declaring minimum support price for copra from 1986 onwards. It may be observed that in years when the domestic prices were low, the MSP remained above the market price, giving an impression that price stabilization measures initiated by the government provided a cushion to coconut growers at times of crisis. However, the reality is just the reverse. During the years of crisis, the declaration of MSP was not accompanied by prompt procurement by government agencies like NAFED, leaving the farmers disillusioned. However, the MSP has remained well above the international price during the entire period.

4. Conclusion and policy implications

The foregoing analysis reveal that the secular trend, seasonal variation, cyclical variation and irregular variations were present in the price of coconut, copra and coconut oil. The price of coconut was largely influenced by the price

Table 6. Inter-correlation matrix of coconut, copra and coconut oil prices in the domestic markets during the pre WTO and post WTO periods

| Commodity | Market | Pre WTO period | | | Post WTO period | | |
|-------------|-----------|----------------|-----------|-----------|-----------------|-----------|-----------|
| | | Kochi | Alappuzha | Kozhikode | Kochi | Alappuzha | Kozhikode |
| Coconut | Kochi | 1.000 | 0.972 | 0.908 | 1.000 | 0.940 | 0.768 |
| | Alappuzha | 0.972 | 1.000 | 0.939 | 0.940 | 1.000 | 0.901 |
| | Kozhikode | 0.908 | 0.939 | 1.000 | 0.768 | 0.901 | 1.000 |
| Copra | Kochi | 1.000 | 0.998 | 0.999 | 1.000 | 0.995 | 0.997 |
| | Alappuzha | 0.998 | 1.000 | 0.999 | 0.995 | 1.000 | 0.998 |
| | Kozhikode | 0.999 | 0.999 | 1.000 | 0.997 | 0.998 | 1.000 |
| Coconut oil | Kochi | 1.000 | 0.996 | 0.996 | 1.000 | 1.000 | 0.990 |
| | Alappuzha | 0.996 | 1.000 | 0.999 | 1.000 | 1.000 | 0.999 |
| | Kozhikode | 0.996 | 0.999 | 1.000 | 0.999 | 0.999 | 1.000 |

of copra and coconut oil. All the components of the time series had a distinctly different behaviour during the pre and post WTO periods. The market integration increased during the post WTO period. The prices of copra and coconut oil were found to be higher than the international price, indicating that they were not globally competitive under the exportable hypothesis. The seasonality and irregular variations

were more pronounced in the primary commodity than the processed derived commodities like copra and coconut oil.

The coconut economy in India is linked with the demand for and price of coconut oil. This also encourages the speculative activities of wholesale traders, oil millers and extractors, affecting the future of millions of small and marginal farmers who are cultivating coconut

for their livelihood. This calls for the need to de-link coconut prices from coconut oil driven market by more product development and product diversification. This will reduce the seasonal, cyclical as well as irregular fluctuations in the prices of copra and coconut oil. At present coconut is mostly disposed off as green, un-husked raw nut without any processing or value addition at the producers' level. As coconut is essentially a small holders crop in the traditional pockets, individual processing and value addition may not be feasible. Hence efforts are needed to encourage group processing at farm level by Coconut Development Board along the lines of group latex processing encouraged by the Rubber Board. There are a wide array of value added coconut products like packed tender coconut water, desiccated

(Contd. on page 25)

Table 7. International prices and Nominal Protection Coefficients for copra and coconut oil

(Price in Rs/Ql)

| Year | Copra | | | | Coconut oil | | |
|------|----------------|---------------------|---------|------|----------------|---------------------|------|
| | Domestic price | International price | MSP | NPC | Domestic price | International price | NPC |
| 1983 | 1374 | 503 | ND | 2.73 | 2074 | 741 | 2.80 |
| 1984 | 2198 | 803 | ND | 2.74 | 3319 | 1308 | 2.54 |
| 1985 | 1300 | 479 | ND | 2.71 | 1977 | 733 | 2.70 |
| 1986 | 1422 | 249 | ND | 5.70 | 2149 | 374 | 5.74 |
| 1987 | 1991 | 397 | ND | 5.02 | 3054 | 573 | 5.33 |
| 1988 | 2104 | 554 | ND | 3.80 | 3160 | 787 | 4.02 |
| 1989 | 1605 | 562 | ND | 2.85 | 2415 | 836 | 2.89 |
| 1990 | 1802 | 403 | 1600.00 | 4.47 | 2727 | 588 | 4.64 |
| 1991 | 2660 | 667 | N.D. | 3.99 | 4060 | 1012 | 4.01 |
| 1992 | 2985 | 1066 | N.D. | 2.80 | 4543 | 1620 | 2.81 |
| 1993 | 2580 | 924 | 2150.00 | 2.79 | 3915 | 1407 | 2.78 |
| 1994 | 2165 | 1310 | 2360.00 | 1.65 | 3234 | 1907 | 1.70 |
| 1995 | 2316 | 1425 | 2500.00 | 1.63 | 3460 | 2177 | 1.59 |
| 1996 | 2967 | 1736 | 2500.00 | 1.71 | 4456 | 2669 | 1.67 |
| 1997 | 3484 | 1573 | 2700.00 | 2.21 | 5258 | 2386 | 2.20 |
| 1998 | 2928 | 1702 | 2900.00 | 1.72 | 4404 | 2726 | 1.62 |
| 1999 | 3506 | 1991 | 3100.00 | 1.76 | 5446 | 3181 | 1.71 |
| 2000 | 2324 | 1404 | 3250.00 | 1.66 | 3430 | 2014 | 1.70 |
| 2001 | 2046 | 950 | 3300.00 | 2.15 | 3101 | 1500 | 2.07 |
| 2002 | 2871 | 1294 | 3300.00 | 2.22 | 4328 | 1937 | 2.23 |
| 2003 | 3861 | 1397 | 3320.00 | 2.76 | 5867 | 2176 | 2.70 |
| 2004 | 4267 | 2045 | 3500.00 | 2.09 | 6479 | 3015 | 2.15 |

ND- Not Declared

Food Pro 2009

Coconut Development Participated in the 8th Indian Food Processing and Food Technology (FOODPRO) Fair hosted by the Confederation of the Indian Industry held at the Chennai Trade Centre from 29th October 2009 to 1st November 2009. Shri. K. Govindan, Executive Director, Tamil Nadu Small Farmers Consortium, Chennai. The four day event provided an interface between the food technology sector and the food industry which focused on current trends in food processing. The Board displayed coconut products, handicraft items and publications of the Board. M/s. Sakthi Coco Products, Pollachi and M/s. Sriram Coco Products had their sales counters in the Board's stall.



Shri. K. Govindan, Executive Director, Tamil Nadu Small Farmers Consortium, Chennai inaugurating the Board's stall

(Contd. from page 22)

coconut, defatted coconut powder, spray dried coconut milk, coconut chips and biscuits, coconut burfi, yoghurt, paneer, coconut vinegar etc. However, large-scale commercial production of these non-traditional products and their innovating marketing in quality packaging at easily accessible locations is conspicuously absent. Finding new uses for coconut oil like automobile lubricant and large-scale industrial uses will also reduce the seasonal price fluctuations in prices.

At present the coconut productivity in the country is very low when compared to the productivity in the competing countries like Philippines and Indonesia. To add to the woes, the domestic prices of copra and coconut oil have been consistently higher than that of the

international prices. This renders the Indian coconut economy non competitive at the global level. In order to provide more trade competitiveness to coconut products from India, productivity enhancement measures such as adopting scientific package of practices for nutrient supply, soil and water management measures, timely plant protection operations etc are needed. This only will render Indian coconut industry cost effective in the long run.

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