CHAPTER I

INTRODUCTION

1.1 Forecasting – General

Forecasting involves the preparation of a statement concerning uncertain or unknown events. In most cases the events lie in the future. The main purpose of making forecasts is to gain knowledge about uncertain events that are important to our present decision. A sound understanding of the forecasting problem in addition to the rational study and analysis of available data and experts opinion are prerequisite to the preparation of a forecast.

The importance of forecasting can be seen in numerous ways. A good forecasting is becoming more and more necessary to the survival and prosperity of business firms. Successful forecasting has its pay off in making additional profits as well as reducing risk.

True forecasting is a blend of science and art that defies precise definition for successful application. Preparation of a forecast entails more than just using historical data and mathematical formula to project into the future. The key to realistic forecasting is the inclusion of informed Judgements and intuition into the methodological framework being employed in order to minimize uncertainty associated with the future development, or event, in question.
1.2 Characteristics of forecasts:

There are several basic characteristics of practical forecasting that we should understand before we begin describing them.

**Forecasts are usually incorrect:**

Everyone knows it and hence the error involved in it is also attached to it.

**Forecasts should be two numbers:**

Since single forecasts are more likely to be incorrect a range may reduce the risk eg. 2500-2800; ± 1590 etc.

**Forecasts are more accurate for families of items:**

Few items might have error more than five percent still it suits the purpose for the group as a whole by making unobserved adjustments.

**Forecasts are less accurate far in the future:**

There is frequently a belief that long-term forecasts could not be any worse than forecasts for a closer time period. Thus, we should Endeavour to minimize forecast lead times to minimize forecast error.

Different forecasters define the time horizons differently. Normally short-term refers to three months into the future, medium term as three months to two years in future and long-term as over two years into the future.
1.3 How to make forecasting successful:

(i) The analyst should know his field. Statistical analysis of available data is only a tool. The researcher must have an adequate knowledge of the facts of his field, both technical and otherwise.

(ii) All forecasts are based on assumptions. The forecaster should know and be prepared to state his assumptions. These assumptions should cover both internal and external factors.

(iii) The objective of the forecast must be clearly stated in terms of the questions or questions to be answered. The more collection of statistics and their analysis are of no use unless they are done with a purpose in mind.

(iv) Having his data on hand, the forecaster should develop a hypothesis, or tentative solution, to be tested in the course of the study. This hypothesis should arise out of the theoretical and practical training of the analyst, literature searching, pilot studies etc.

(v) Data pertaining to the hypothesis should be gathered refined and carefully checked. A well-defined and complete hypothesis expedites the gathering of pertinent numerical data completely and economically.

(vi) If possible, apparent relationships between the quantity being forecasted and influencing factors should be tested by simple graphical analysis. The graphical scatter chart is an essential prelude to mathematical manipulation.

(vii) A simple hypothesis is both useful and practical. It should explain most of the changes in the quantity being forecasted but it cannot explain all the data. In every forecast, the analyst should consider not only the effects of
the main controlling factors included in his hypothesis but also other possibilities.

(viii) No forecast should be accepted as final. All forecasts should be constantly reviewed in the light of the latest data. Each new datum contributes to the hypothesis and demonstrates the reliability or unreliability of the hypothesis used.

1.3.1 Steps involved in forecasting.

(a) There are three fundamental steps in forecasting

(i) gathering and evaluating the data

(ii) preparing the forecast

(iii) monitoring the performance of the forecasting system.

(b) Execution program

(i) Defining the purpose for which it is attempted

(ii) Collect the analyze historical data

(iii) Develop and refine the forecast model

(iv) Evaluate internal factors

(v) Evaluate external factors

1.3.2 Selection of appropriate techniques for implementing a forecasting strategy.

A conscious forecaster will follow a logical step-by-step procedure in developing and revising forecasts. The first step is to decide what response, or quantity, to forecast. Then pertinent numerical data are to be collected and summarized in graphical form, whenever possible.
The next step of the forecasting process is to apply expert Judgement to forecasting obtained by utilizing casual relationships.

One of the most effective forecasting strategies is to use mathematical techniques to routinely forecast demands. By combining mathematical techniques with informed Judgement, they conserve checks on each other and tend to eliminate gross errors.

Formulation strategy is an art that involves the selection, co-ordination, application, and interpretation of objective and subjective procedures.

Selection of the proper method depends on many factors the context of the forecast, the relevance and availability of historical data, the degree of accuracy desirable, the time period to be forecasted, the cost/benefit (or value) of the forecast to the company and the time available for making the analysis.

1.4 Time series

A time series is a sequence of observations, usually ordered in time, although in some cases the ordering may be according to another dimension. The feature of time series analysis which distinguishes it from other statistical analysis is the explicit recognition of the importance of the order in which the observations are made. While in many problems the observations are statistically independent, in time series successive observations may be dependent, and the dependence may depend on the positions in the sequence. The nature of a series and the structure of its generating process also may involve in other ways the sequence in which the observations are taken.
In almost every area there are phenomenon whose development and variation with the passing of time are interest and importance. In daily life one is interested in aspects of the weather, in prices that one pays, and in features of one’s health; these change in time. There are characteristics of a nation, affecting many individuals, such as economic conditions and population, that evolve and fluctuate over time. The activity of a business, the condition of an industrial process the level of a person’s sleep, and the reception of a television program vary chronologically. The measure of some particular characteristic over a period of time constitutes a time series. It may be an hourly record of temperature at a given place or the annual rainfall at a meteorological station. It may be a quarterly record of gross national product; an electro-cardiogram may compose several time series.

There are various purposes for using time series. The objective may be prediction of the future passed on knowledge of the past; the goal may be the control of the process producing the series; it may be to obtain an understanding of the mechanism generating the series; or simply a succinct description of the salient features of the series may be desired. As statisticians we shall be interested in statistical inference; on the basis of a limited amount of information available out of a source.

1.5 Agriculture Price forecasting

Agriculture, the main occupation for majority of the people in most of the developing countries is a source of livelihood and sustenance and its growth provides the greatest hope for improving their living standards. In India about 64 percent of the population mostly in poorer deprived rural areas are dependent on this sector for their livelihood. “The developing countries in which farm workers constitute two thirds of the
labour price and 40 percent of its population lives in poverty have more difficult task of balancing the producer’s and consumer’s interests”.

Agriculture produces food stuff and raw materials. The demand for which in the aggregate is relatively stable in the short run. But the farmers who are the back bones of agriculture are put to lot of hardships due to the imbalance in the price of agricultural commodities. They cannot predict as when there will be a hike in price or when there will be a downfall. The fluctuation in agricultural prices is due to the fluctuations in the supply of agricultural products, which in turn varies due to (i) seasonal and weather conditions (ii) deliberate variations arising out of conditions of marketing and the fluctuations in the price of agricultural products are the greatest handle in the way of agricultural development, for they bring pain to many. According to Sir Roger Thomas, “next to rain, price changes have been the greatest enemy of the farmer” Farming is a biological process and there is a greater time – lag between the changes in the prices and adjustments in production. The entire cost structure in agriculture is relatively rigid and moves more slowly than the level of prices, especially in times of falling prices, and it is necessary to resort to corrective measures for arresting the fall in prices not only for securing stable price to the farmers but also for securing some stability for the entire Indian economy of which agriculture forms the very base, as about 70 percent of the total population is still engaged in agriculture. The hike or fall in the price of agricultural commodities sometimes occur seasonally and cyclically also and an indepth study on price analysis of agricultural commodities will help both the farming group and the decision making group.
1.6 The need

Price policy is an important instrument of planning. The government can influence the allocation of resources, distribution of incomes and capital formation through price manipulation. Prices give signals to reallocate the resources between sectors and even within a sector (mellor, 1968). Within the agricultural sector, prices of individual commodities determine the relative profitability of different crops and hence shape the cropping patterns. The uncertain trend in the movement of price of agricultural commodities has hindered the success of the agricultural development for want of stabilized agricultural prices. The famine enquiry commission observed, “give price stability, much can be done by linking up credit, agricultural improvements and marketing so as to supply the facilities needed for agriculture, whether water or manure or seed or machinery or organization. Without it we are building on sand”. Prize stabilization aims at the prevention of violent fluctuation in the prices of both sides. It consists of measures that the government might take to prevent a fall or rise in prices if and when it occurs. Price stabilization is to be clearly distinguished from various forms of farm relief and legislative measures which are introduced with the ideas of raising domestic price deficits as promised by the commission of 1927 on Agriculture in U.S.A. “Real price stabilization would affect a mitigation in price fluctuation, but this would involve scaling down of the heights of prices as well as elimination of debts”. Though this would not make our incompetent producer rich, it would prevent the ruin of reasonably efficient farmers whose production is really needed and who tends to be replaced by new comers liable to suffer from the same fate. Price stabilization of agriculture, would thus enter into the wider field of stabilized income and stabilized ways of not only those engaged in the field of
Agriculture but also the mass of non-agricultural workers as well. It would also further raise the productivity of the soil. To raise the standard of living of the masses it is important to fix fair prices for agricultural products.

Since Coimbatore district is a rain shadow region, majority of the farmers rely on the rainfed crops which are now the vital food for the animal husbandry sector. Hence this study concerned itself in the time series analysis of the prices of the rain fed crops: Cholam, Cumbu, Ragi, Maize, Gingelly, Castor seed, Samai, Redgram, Bengalgram, Black gram, Green Gram, Horse gram, Ground nut, Cotton and Turmeric.

**Hypothesis**

With the above problem focusing in mind the following hypothesis were set for the study.

(i) There is scope for selecting appropriate forecasting techniques for the price of the fifteen commodities with great accuracy of forecasting.

(ii) Fractional differencing may improve the forecasting efficiency of the agricultural prices.

**Objectives**

The objectives of a price policy in a country at any time are defined by the nature of the problems that the country is facing. In USA and other developed countries the chief objects of the price policy is to prevent any drastic fall in agricultural incomes resulting from the surplus production and decline in prices. In developing countries like India, its
concern is to increase agricultural production. The objectives of the present study will help to select the best model, which would suit the price policy.

The overall objective of the study is to provide a clear perspective of the time path of the fifteen commodities viz: Cholam, Cumbu, Ragi, Maize, Gingelly, Castor seed, Samai, Red gram, Bengal gram, Black gram, Green gram, Horse gram, Ground nut, Cotton and Turmeric for successful planning. The specific objectives are:

(i) Perfection of the method that suits relatively the best in forecasting the prices.
(ii) To compare the efficiency of the models using the last five years data.
(iii) Using the best model to forecast the probable prices for a few forthcoming years.

Scope of the study:

The study with the help of time series approach tries to predict the price for a few agricultural commodities. It further enhances the study of fluctuations of prices that occur some times cyclically and seasonally, which in turn stress the need for stabilization of prices. It also tries to strike a balance between the interests of producers and consumers and helps both the farming group and the decision making group.

Limitations of the study:

The study has all the limitations of Time series models based on time series data recorded for different crops in Coimbatore: Cholam, Cumbu, Ragi, Maize, Gingelly, Castor seed, Samai, Red gram, Bengal gram, Black gram, Green Gram, Horse gram, Ground nut, Cotton and Turmeric cultivated in Coimbatore District. Price analysis by time
series approach for different purposes is carefully done to arrive at better results. The limited time liable for an individual researcher working on part-time basis has restricted analysis to only rainfed crops. The time series ended with the cropping year 2010-2011 because of the non-availability of data for more recent years, however these limitations are not serious as evidenced by the validity of the model and the usefulness of the results of the analysis.

The methodology and specific models in this study can also be used to other crops with similar characters.

1.7 Organization of the thesis

Chapter I of this thesis provides general Introduction, problem setting, characteristics of forecasts, steps involved in forecasting, selection of appropriate techniques for implementing a forecasting strategy, hypothesis, objectives, the scope and limitations of the study are presented.

Chapter II deals with Review of Literature contains chronologically presented, spectral distribution function and the spectral density, Fractional Brownian motion, Fractional White noise and its properties, Fractional co-integration, Estimation and testing and long memory volatility processes.

Chapter III of this thesis gives Methodology contains full description of the type of models used earlier and in the present study, the method of calculating the parameters are also discussed.
Chapter IV deals with complete details of analysis, and the results obtained and comparative achievement of each model with all others are presented. The forecasts for the next five years are also given for all the crops used in the analysis. In the last part of the thesis includes the summary and conclusions, suggestion for future work are also presented. The answer to the objectives and the agreement with the Hypothesis proposed are also discussed.