Vegetable growers are in real need of timely, accurate and relevant information about new varieties, scientific cultivation practices, and proper soil management at their doorstep. Although some extension efforts have been made by various agriculture universities, NGO’s and private sectors to fulfill the need in discrete manner, the ICT based Expert-System on vegetables addressing the location specific issues has not been developed yet. Keeping this point in view, the present work is taken up with the objective of developing a need based statistical packages of Expert-System for major vegetables grown in West Bengal.

Basically the Expert-System developed in this research work has covered the following aspects:

i) The system developed forecasts price of particular vegetable based on monthly price data of last 10 years and using Triple exponential smoothing (Holt-Winters) method.

ii) The system has developed an interactive way to calculate and suggest fertilizer requirement for specific area of land based on input parameters set by any user.

iii) The system developed provides the scientific knowledge about variety, season, cultivation practice and important diseases and pest management for major vegetables of West Bengal.
Summary & Conclusion

The present study has been conducted in seven districts from northern and southern part of West Bengal on the basis of highest density of area under vegetable cultivation. A sample of 210 farmers was selected from different blocks of the seven districts. After need analysis of the respondents the Expert-System has been designed and developed in Windows platform. Microsoft Visual Basic, MS Excel, MS Word and Adobe Photoshop have been used in the development phase. The final produce is an .exe file along with some supporting files. The system can be installed in any Windows based Operating System and can detect the screen resolution of the native system to open it in full screen mode. Therefore it can be installed in touch-screen kiosk also.

It has been observed that the primary occupation of 78.10% respondents is agriculture. Therefore it is assumed that the real field level problems have been reported by the respondents and need analysis shows the actual need of the farming community.

The education level of the respondents’ shows the following: Higher Secondary pass 53.81% and 25.1% Graduate. The study also shows that 21.43% respondents are using computer and 14.76% are using internet service, which is very much favorable to adopt ICT tools as they are already accustomed with the modern technologies. So far the educational background is concerned, we hope, there is no problem to adopt this Expert-System as a new technology.

The study has revealed that the Price forecasting is very much needed to farming community for proper crop planning. Triple Exponential Smoothing technique (Holt-
Summary & Conclusion

Winters Method) has been used to develop the forecasting module because of the presence of seasonality in the time series data.

Fertilizer dose calculation is another much needed information for the respondents. The result shows that, nearly half of the respondents (43.81%) get their recommendation from Fertilizer Shop, which promotes their business motive. The result also shows that second major category (34.28%) of respondents apply fertilizer as per their ‘Own Calculation’ without having the knowledge of fertilizer dose calculation.

Therefore, as per the requirement of respondents this module is capable to alter the soil pH by using various alkaline and acidic materials, to suggest range of micro-nutrients for selected vegetables and to calculate various combination of straight, binary and mixed fertilizer dose to meet up the NPK deficiency in soil.

Scientific cultivation practice is another important aspect to increase productivity of vegetable. Study has also revealed that many farmers follow their indigenous methods of vegetable cultivation. This module developed guides the farmers regarding proper seed rate, seed treatment before sowing, irrigation and intercultural operations during the cropping period.

The need analysis also reveals that information about crop protection from various pests and diseases is very essential component for the farming community. After getting farmers’ feedback thirty most frequently occurred disease-pest have been identified and incorporated in the Expert-System for their management. This system guides them to identify their problem through high resolution photographs and printout of its solution can be taken as prescription.
Season and Variety selection component ranked 5th in the rank table of various modules. This module guides user regarding various suitable varieties and their sowing time for West Bengal, along with its physiological characters, average weight, crop duration and yield per unit area.

The Human Nutrition module has been developed to dynamically calculate macro and micro nutrients along with the calorie requirement for individual beneficiary based on the recommendation of National Institute of Nutrition, India. It interprets the health status based on Body Mass Index (BMI). Using dynamic diet plan an user can make their own diet plan based on the caloric recommendation made by the Expert-System.

The recipe module in the Expert-System is facilitating user to know how India’s enriched diversified recipe of food dishes can be prepared using different vegetables. The recipes of renowned cook of India for different vegetables have been added to give a complete picture from production to consumption of vegetable under single window.

In order to make an impact analysis of this Expert-System, some case studies have been done. Case studies show that by using the system farmers have economically benefited. The input cost reduced and production increased. Therefore, wider dissemination of the system will give benefit to more number of farmers in the state.
Suggestions for future research

- Impact of knowledge gain from the Expert-System in terms of adoption by the Farming community can be analyzed in future.

- Detail study on impact of Expert-System on economic gain of farmers can be made.

- Comparative studies can be carried out among vegetable cultivators who have adopted the Expert-System and who have not adopted the system.

- The Expert-System can be enriched by incorporating more crops under its coverage and incorporating video documentary of scientific cultivation practices.

- The Expert-System can be developed in different local languages and similar studies can be conducted in other states of India.