



Decision Support System for Establishment of Agro-Processing Enterprises



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Abstract

The decision support system (DSS) was developed to address the special characteristics of agro-processing related enterprise in the production catchment. A process flow diagram for a decision support system was developed to facilitate organizing the technical and economic information needed to assess financial feasibility to make business decisions easy. The system is an "information application". The typical information that a decision support application might gather and present would be comparative sales figures between one week and the next, projected revenue figures based on new product sales assumptions, the consequences of different decision alternatives and given past experience. The developed system is useful for State government bodies, village level workers, NGO's, SHGs, etc. who deal with information on post-harvest agro-processing activity and related technologies/projects. This paper basically focuses on concept and development of a Decision Support System on agro-processing project preparation and evaluation at production Catchments.

Introduction

In order to assess the feasibility of an agro-industrial enterprise (food, livestock and dairy), a potential investor must consider number of issues ranging from marketing strategies to technological, financial, and organizational concerns [1-4]. The proper formulation and analysis becomes necessary for the success of any agro-industrial development programme [1,5]. Decision Support System (DSS) can serve as an effective means to minimise difficulties associated with preparing and evaluating an investment project proposal. Software systems to support preparation and evaluation tasks, such as computer model for feasibility analysis and reporting (COMFAR); from the United Nations Industrial Development Organization (UNIDO) and others specifically developed by donors and financing institutes, are known to exist. However, none of these is distinctively designed to deal with the specific characteristics of agro-processing projects. In fact, the agro-processing industry operates under a set of special constraints primarily related to the biological nature of their raw materials [6]. These are largely perishable, inconsistent in quality characteristics and seasonality based supply. Agro-industries also have a wide range of product mix alternatives, a feature that imposes unique challenges to production planning and control [5,7]. Hence, in view of the importance of agro-processing projects, a decision support system (DSS) addressing the issues of project planning and evaluation has been an excellent alternative [6,8].

Thus, the need was felt for development of DSS to provide a simple tool for initial feasibility assessments on agro-processing related projects for related entrepreneurs in the country. This paper discusses the concept and development of decision support system and illustrates its application.

Materials and Methods

Decision support system (DSS)

A decision support system presents information graphically and include an expert system or artificial intelligence. Furthermore, it automates the estimation of costs, investments and revenues, and generates the financial cash flows and associated financial feasibility indicators for Agro-processing industries. The logistic process flow diagram for a decision support system was formulated to assist in the preparation and evaluation of project related to agro-processing center at production catchments. The flowchart is a schematic representation of an algorithm or a process and one of the basic tools of quality control and commonly used in business/economic presentations to help the entrepreneur visualize the content better to find flaws in the process Figure 1.

System structure and operation

It was built for the WINDOWS environment with the Microsoft Excel spread sheet. The software composed of a user interface, a

database and a model base, which are seamlessly integrated in an independent programme. The interfaces have number of icons, pull down menus, dialog boxes, text boxes, grids and other means of interaction with the user. The database also stores and allows

the manipulation of all information entered, while the model base offers the means to perform financial and sensitivity analysis of the project.

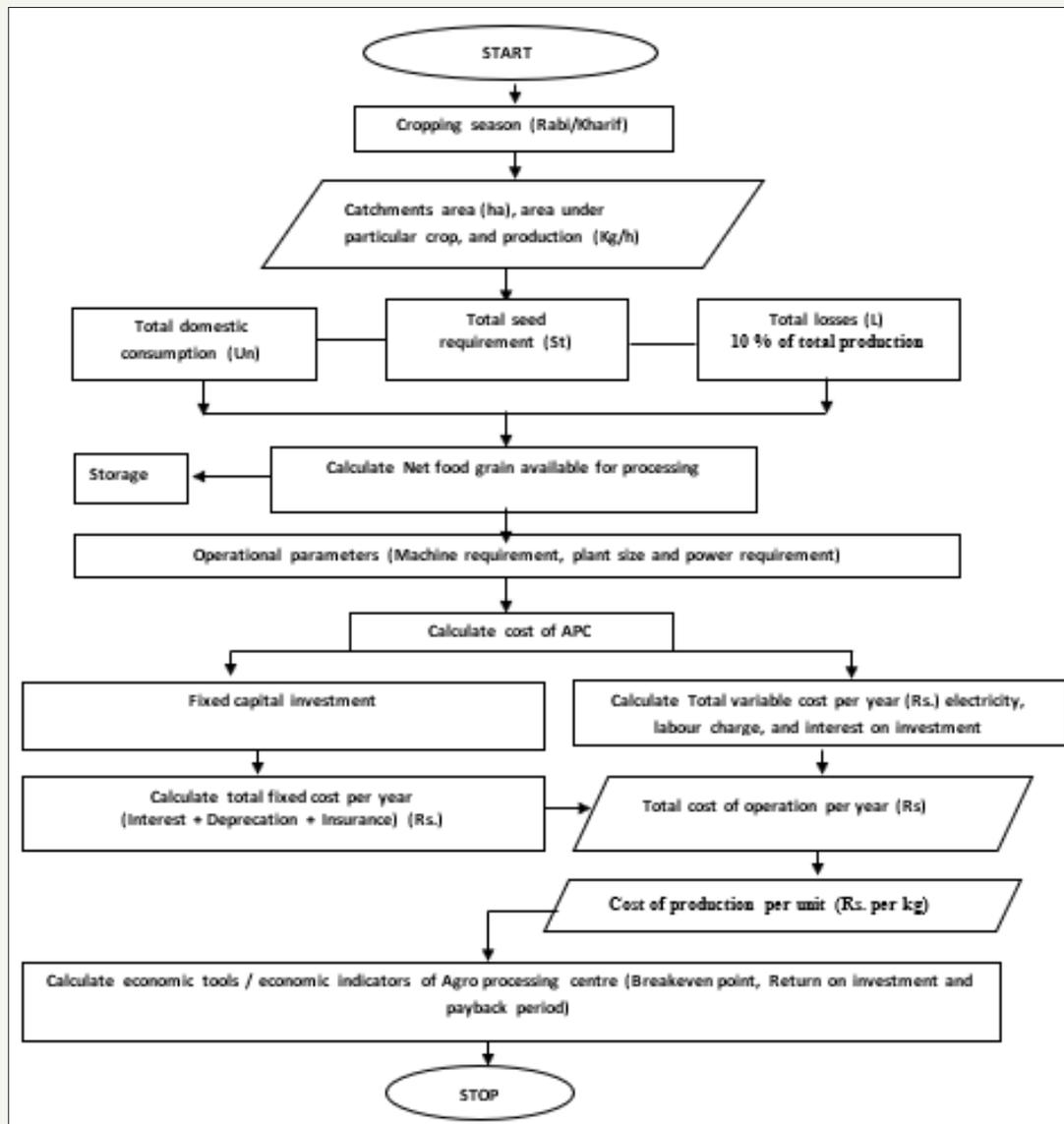


Figure 1: Logistic flow chart for the decision support system.

Home page and project preparation system

At the Home page, users have the option of receiving information on the general procedures used for preparing and evaluating a project. The “Guidelines” for project preparation and evaluation are displayed in PDF files, which can either be printed out or read on-screen.

The main information category of DSS on Agro Processing Centre (APC) or enterprise is the Project, which must have a unique title. Each project encompasses all the necessary data for the performance of its financial evaluation. Users can have better

options to utilize previously saved information to create new projects or they can start a new project. A Check list detailing the data needed to create a new project is provided. The information entered is organized as a group of related tables for each project.

Product input system

The initial information category for a project is group of products. After clicking the “products” icon, users can enter data on the product mix (types and quantities produced yearly). For each product in the mix, a new screen is opened, allowing the detailing of its technical and marketing features which include the measurement

unit (kg, litres, etc.), the processing and storage duration, selling prices, sales taxes and other sales costs. Furthermore, information on the raw materials and other inputs that go into each product should be entered, along with the respective technical coefficients (input/output ratios), unit costs and average storage duration. These data would be used later to compute raw material needs, costs and in the estimation of working capital requirements.

Information inputs in the Product category are used by Agripro-C to generate a yearly revenue schedule throughout the life cycle of the project. Users have the option of providing additional revenue sources from non-operational activities (e.g., rents, subsidies, etc.). The Revenue icon leads to a screen displaying a grid for this specific data entry purpose. Following the data entry sequence, users should enter the investment needs, which are categorized by major items such as land, civil works, engineering costs and most importantly, equipment costs. Equipment items must be discriminated piecewise and for each piece of equipment, the related life cycle, investment estimate and year of disbursement must be entered. Depreciation costs are then automatically calculated.

Results/Output system

The software requires very minimal information, like cultivable land in hectares, hours and days of operation, etc. to arrive at appropriate number and machine capacity.

Results and Discussion

In this study the processing equipment, namely, flour mill, dal mill, burr mill and multi purpose grain mill have been considered for the establishment of agro processing centre. Also, the supporting machines namely pedal cum power operated grain cleaner and grader, weighing balance, packaging and sealing machine, etc. were included for processing of wheat, pulses (pigeon pea, green gram, lentil, chickpea) and spice (turmeric, coriander and chili). The overall cost-economics was calculated considering investment cost, capacity and time of operation, etc., to ascertain the economic feasibility in establishing APC in the rural areas of India [1]. The overall cost-economics and economic tools were calculated considering cost, capacity and time of operation, etc. for economic feasibility of establishing agro processing centre in the production catchment. The fixed investment, variable cost, working capital, total cost, cost of production of the products, revenue, Break Even Point, return on investment, pay back period etc. was generated by the decision support system precisely.

Additionally, details about the financing plans are presented for the project, including information on the total loan amount, equity capital requirement, interest rates, the grace period and the total disbursement period. All these information are employed in the financial analysis part of Agri-venture, where the cash flow and liquidity analysis of the project are computed. The internal rate of return, payback period and net present value of the project are calculated from the cash flow information. A final resource offered by DSS is the ability to compare the results of several different Agro based enterprises. The function "Compare Projects" is also useful when different versions of the same project are created to represent different plant scales, product mixes, sales schedules or any other change in the original project plans.

Conclusion

The DSS software requires very minimal inputs like population of village, size of land holding, cropping pattern, cultivable land under crop; hectares, hours and days of operation, etc. to be given to arrive at appropriate number and capacity of machines. State government bodies, village level workers, NGO's, SHG's and entrepreneur would be benefited by estimating the project feasibility. The DSS primarily meets the needs of extension agents, agro-processing experts and other professionals involved in feasibility studies and in the design and development of agro-processing industry and enterprises.

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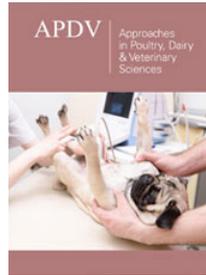
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