MARKETING INFORMATION SYSTEM
FOR FRUITS AND VEGETABLES
IN JORDAN

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CHAPTER I
INTRODUCTION

The partial or complete failure of agricultural development programs in developing countries is often due to the lack of understanding by decision makers at all levels of the marketing links. Marketing is often conceptualized and understood only as a process of assembling produce in rural or wholesale markets. Other aspects and roles of marketing mainly as incentives for production are often not well understood. Thus, the process of improving development policies often depends on trial and error, and can be generally enhanced with more accurate information. On the other hand, notions about marketing that are wrong or based on half-truths are accumulated over the years and passed on from generation to generation as facts. The lack of market research results and information can be a major problem facing the augmentation of marketing efficiency because poor information increases market imperfection and results in inefficient and ineffective policies.

The rapid growth in agricultural production and increased food system specialization in developing countries increases the demand for a more efficient marketing system. Bonnen\(^1\) has

\(^1\) Bonnen, James T. (1975) "Improving Information on Agriculture and Rural Life. American Journal of Agricultural Economics 57(5):753-763
observed that the need for information increases with development and industrialization. Development leads to a specialization of functions and organization, which greatly increases the need for coordination and, thus, the social returns and demands for information.

Development and industrialization, along with the high degree of uncertainty in the agricultural sector, increases the complexity of problems, required analysis and analytical procedures which increases the demand for information. Thus, it becomes necessary to establish a marketing information system (MIS) with the ability and qualified staff to collect and analyze data to derive useful information that can be used to formulate sound recommendations to policy makers.

MIS's are designed and operated to help either public or private decision makers or both. In the context of food and agricultural systems in developing countries, private decision makers need different kinds of information, depending on the kind of decision to be made. Farmers need information to deal with various problems confronting their farm operations: they need to decide what to produce and how much, and where to market in order to maximize their profits. Market intermediaries, like middlemen and commission agents, need information to divert supplies from one market to another and to adjust their services and selling practices in order to maximize their returns. In addition, exporters need information about both domestic and foreign markets in order
to decide where to buy and sell. Governments often find it necessary to investigate and monitor the behavior of market participants in order to take action whenever it is necessary either to make corrections or to administer market facilitating policies and regulations.

The focus of this paper is descriptive—describing from reviews of the literature the nature of market information, the design of information systems and the process of managing the flow of information. The goal is to shed more light on the likely problems facing decision makers in Jordan in the process of designing an improved marketing information system. The first section is an overview, offering background information; the second focuses on the nature of information; the third section discusses key features of the design of an electronic information system; and the last section focuses on policy implications and recommendations.

II. BACKGROUND.

II-1. PROBLEM SETTINGS.

During the last three decades, the government of Jordan has been expending considerable efforts in the agricultural sector to increase the production and contributions of this sector to the national economy. This was achieved by investing in the necessary infrastructure, and facilitating and providing new technology to the farmers through government
institutions, organizations and ministries. The government recognized the importance of the role of agriculture in Jordan’s development and agriculture’s potential contribution to the economy as a major exporting sector. In value terms, production increased significantly, from JD 15.6 million in 1970 to JD 127.2 million in 1987 (in current prices).

However, agriculture’s contribution to the gross domestic product (GDP) has been declining due to two factors. First, the government also invested in other sectors at the same time, and those sectors grew rapidly. Second, and more important, not much attention was given to the development of an efficient agricultural marketing system. All investments in this area went into current problem solving resolutions. Little attention was given to long-range marketing development plans.

This rapid growth in agricultural production and increased specialization, along with other problems, escalated the demand for a more efficient marketing system. Increased income from a production increase is necessary for farmers to sustain the second stage of agricultural development. That is, this strongly depends on individual innovation and improvements to expand production through reinvestment in modernization and efficiency increasing non-land resources^2. Unfortunately, it appears that Jordan’s inefficient marketing

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system frequently resulted in low returns to all market participants and to the economy as a whole.

Marketing is important, not only because it is the only mean of transferring ownership of agricultural products to the final consumer, but also because efficient marketing methods and practices affect the quality, quantity and prices of the produce. In addition, it highly affects financial returns to farmers. Without access to markets and/or low returns due to market imperfection, there is little incentive for the farmers to expand production, or to improve the quality of their products. Economic development efforts need to emphasize and pay more attention to the vertical coordination of production and marketing in order to achieve the country’s development objectives.

The existing marketing system in Jordan appears to be inefficient in distributing products. In addition to other major problems, a lack of effective marketing information and market news service, is one of the most important problems. The available market related data are generally limited, either in scope, accuracy or both which makes it extremely difficult to make sound decisions. This lack of information may mean that policies and development plans at both the government and individual levels, must operate by trial and error, or with data of doubtful authenticity. The alternative is to delay taking action to solve a particular problem while a waiting for the necessary data to be collected. Such
information should be available and ready for all purposes on a timely basis.

The available data represent only the quantities sold in the central markets, wholesale price, retail price, exports and imports. Generally, these data are collected for policy makers. But the lack of skilled personnel to verify and analyze the data, and obtain useful information, increases the social cost of collecting such data through the resulting inefficient use of the data. On the other hand, data dissemination lacks the proper methods of distribution on a timely basis among those who are interested in such data. Harrison° reported that there is a serious lack of objective and accurate information on supplies available or expected in the market and on prices.

Most government organizations involved with the agricultural sector prepare monthly and yearly reports, but these reports rarely, if ever, find their way to interested market participants outside the government. Any market participant interested in such data must travel at his expense, either to the central market or the nearest governmental agency to obtain the necessary data. The additional time and costs have two effects: first, the market


° Harisson et. al. op. cit.
participants might not make the effort to get the data, and will make their decisions based on their own judgements. Second, it delays responses and adjustments to new trends and opportunities.

On the other hand, there is evidence that large scale operators have the capability and access to data. Even medium- and small-scale operators are more capable than farmers in obtaining some of the data they need to make decisions. They obtain the data either through direct participation in the market or through alliances in other markets. This leads to the potential for unfair treatment of poorly-informed farmers by other market participants. This mistreatment evolved from the structure of the agricultural markets, which is characterized by the dominance of wholesale markets located near the major consumption area in the country. Farmers sell their products either directly to a middleman or consign it to a commission agent for sale. Farmers depend on middlemen and commission agents as their major source of information. But the credibility of the information obtained from those market participants is sometimes doubtful and often misleading, which creates mistrust and conflict between participants.

Improved marketing information can reduce costs by more efficiently matching supply and demand, and reducing product losses through the marketing channels. If market participants are to operate efficiently and lower their costs so that consumers pay less without a parallel reduction in farm
prices, a number of issues must be addressed and examined:
1) accurate understanding of the existing system and its effectiveness; 2) the need for a public information system; 3) financial backing for the system; 4) whether and how should the government invest in this system; and 5) the extent to which government should actually be involved in operating the system.

According to the last survey undertaken by the department of statistics, farmers in the Jordan Valley area received more data than other farmers in the country. Farmers in the Amman area received virtually no information at all. Less than half the farmers reported that they received prevailing wholesale prices of the previous day. One-fourth reported they received the figures of quantities sold in wholesale markets. Those who received export data constituted less than one-fourth. The overall percentage of farmers receiving data was less than half of the farmers interviewed. It was also found that only half of the farmers used the data they received to decide what to produce, but less than one-fourth used the data in their marketing decisions. The most important finding of the survey was that farmers were willing and eager to receive information about prices, export trends, quality and variety needed. Another important finding was that the commission agent, who is considered an active channel leader in the improvement of the marketing system's efficiency through providing farmers with regular and necessary information, was not the main
source of information for farmers. This was due to the farmers' mistrust of these commission agents.

II-2. Importance of Fresh Fruits and Vegetables.

Fresh fruits and vegetables are high-value cash crops that require specialized handling, grading, packaging and marketing techniques to secure financial returns for the farmers. National production of fresh fruits and vegetables constitutes an average of 25 percent and 45 percent of total agricultural production respectively. Production depends on irrigated lands in the Jordan valley, which has a climactic comparative advantage in production. The warm winter and hot summer, along with the high-yielding technologies introduced in the early 1980s, enables farmers to produce those cash crops year-round. Jordan is a major exporter of fruits and vegetables. Exports of fruits and vegetables constitute an average of 87 percent of all agricultural exports and 19 percent of total exports during 1979-81, but declined to an average of 59 percent of agricultural exports and 8 percent of the total exports in 1986-88. This decline, was due in part to the lack of information and marketing research results on foreign markets.

\[5\] Harisson et. all. op. cit.
II-2-1. PRODUCTION.

Despite the small size of the country (89206 Sqr. KM.), Jordan has five different ecological zones: 1) Semi-desert area; 2) Marginal-agricultural lands; 3) Semi-arid area; 4) Semi-humid area (high lands); 4) Ghores and Jordan valley.

Fruits are grown mainly in the semi-arid and semi-humid area’s where the average rainfall is 400 mm. and 600 mm. respectively, except for Citrus fruits and Bananas that requires a tropical climate like the Ghores and Jordan valley. The area planted to fruits increased significantly, from 406 thousand donums in 1980/1981 season to 660.8 thousand donums in 87/88 season. Production doubled over this period, from 172.6 thousand tons to 346.6 thousand tons.

Vegetables are grown in the semi-humid and Ghore area’s. The planted area increased from 428.8 thousand donums in 80/81 season to 571.5 thousand donums in 82/83 then declined to 373.7 thousand donums in 87/88 season. This decline was due to the cropping pattern program imposed by the government in the late 1982 to reduce the production of some kinds of vegetables that are being over produced. The production increased from 762.6 thousand tons to 1068.2 thousand tons and declined to 862.6 thousand tons7.

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6 One Donum equals about 1/4 Acre.

7 Source: Ministry of agriculture - "Agricultural statistics". Amman, December 1989
II-2-2. MARKETING CHANNELS.

Figure II-1 depicts the different marketing channels in Jordan. Farmers send large proportion of their products to the central wholesale markets (CWSM) to be sold directly to wholesalers or to consign it to commission agent. Relatively small proportions go directly to processing or to exporters workshop and packaging houses.

FIGURE II-1: FRUITS AND VEGETABLE MARKETING CHANNELS IN JORDAN.

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8 Mahmmod Hiari et. all. "marketing fresh fruits and vegetables-five years development plan". agric. marketing organization and FAO. Amman, december 1987. pp 40.
II-2-3. EXPORTS.

The Arab Gulf States are the main export markets. An average of 96% of the total exports of fruits and vegetables are exported to these countries. The remainder is exported to other countries, of which less than one percent is exported to European countries.

Exports of fruits declined from 152.4 thousand tons in 80/81 to 66.8 thousand in 87/88. This drop was due to the political disengagement by Jordan from the West bank and Gaza strip where most of the exports of citrus (Lemons and Oranges) and Grapes come from.9 (Further explanation of this decline without a more thorough investigation is not possible).

Exports of vegetables increased over the period 1980-1984 and has been decreasing thereafter. Exports increased from 312.8 thousand tons in 80/81 to 359.6 thousand tons in 84/85 and then declined to 303.3 thousand tons in 87/88. This decline is believed to be due to a lack of information about foreign markets in term of local production, required varieties, quantities and lack of information about Jordan’s competitors in those markets.10 This lack of information and results of marketing research led to the over production of

9 Agric. statistics op. cit.

some vegetables, which in turn led to gluts and congestions of produce through the marketing channels. This resulted in big losses to the economy and in reduced returns to the farmers. Under these circumstances, the government initiated a cropping pattern program which will be discussed later on in this chapter.

II-2-4. IMPORTS.

Jordan has been importing some fruits and vegetables of which the local production is insufficient to meet local consumption needs. The quantity and varieties of imports are restricted by the government. Recently, Jordan agricultural marketing and processing company, which is a public company monopolized the importation of these fruits and vegetables. Imports of fruits declined from 62.5 thousand tons in 84/85 to 14.5 thousand tons in 87/88. An average of 86% are apples and the reminder are Lemons, Apricots and Pears. Imports of vegetables has been declining since 80/81 season, from 71.7 thousand tons to 9 thousand tons in 87/88, of which 90% are Onions and Potatoes.

II-3. INSTITUTIONAL ENVIRONMENT.

Several government agencies are dealing with the marketing of fresh fruits and vegetables. The Ministry of Agriculture is responsible for preparing and implementing the cropping pattern policy. It collects several kinds of
agricultural data like seasonally-planted areas and production, quantities and value of imports and exports and the wholesale prices. Annual figures are published in the ministry’s annual report.

The department of statistics is another source for data which are collected through infrequent agricultural sampling surveys beside its periodical general surveys. The data include areas of production and agricultural inputs except wholesale price data. It also collects export and import data and publishes it on an annual basis.

The Jordan Agricultural Marketing and Processing Company (JAMPCO) which is a governmental company is responsible for signing trade contracts with other countries. It owns most of the tomato processing plants and grading and storage facilities. It is also responsible for locating new markets. It collects some data concerning foreign markets but it has no information dissemination activities.

The Agricultural Marketing Organization (AMO) is concerned with organizing the marketing system. It collects data concerning exports, imports, wholesale and retail prices. It publishes weekly, monthly and yearly summaries in local newspapers. In addition, it collects the prices of several fruits and vegetables from different European countries, and distribute them upon request.

These various governmental agencies use different methods of collecting, sorting, storing and publishing techniques,
which explains the differences in collected data. None of the agencies analyze and disseminate the data for private use on a regular basis. The data are used only by policy makers.

II-4. MARKET CONDITIONS.

II-4-1. Types of existing markets.

There are three kinds of wholesale markets (WSM)\textsuperscript{11}:

1) Central WSM. The only central wholesale market is in Amman. It provides different kinds of services and receives data on quantities sold. Prices are systematically collected and transmitted to the AMO by means of telephone in its offices in those markets.

2) Secondary WSM. This market is located in the Jordan Valley where wholesalers, processors and exporters usually buy their supplies. Recently, AMO began collecting data about prices and quantities sold in this market.

3) Jobbing Markets. These markets are located in small cities and are characterized by a few merchants offering few or no marketing services and facilities. Data concerning prices and quantities are collected on a daily basis by AMO employees in these markets.

\textsuperscript{11} Shafi'i, Mahmood et. al. "Introduction to Agricultural Economics" Dar Al Aqsa Amman 1986.
Harrison\textsuperscript{12} and the research team observed that, beside other operational problems, there has been a failure to organize and coordinate the exchange process (buying and selling) in the markets in accordance with effective market regulations. This situation along with the obvious shortage of inspectors, who collect the data in these markets, make the collection of valid and accurate data a very difficult task to accomplish. Hence, this will affect the decision making process of all market participants. In addition, market participants who are willing to formulate long term strategies are unable to do so because of the lack of accurate information.

\section*{II-4-2. MARKET STRUCTURE\textsuperscript{13}}

Fruits and vegetables are produced under competitive conditions. Several thousand farmers, who are considered price takers, compete in marketing their products through the marketing channels.

Commission Agents(CA) are concentrated in central wholesale markets(CWSM). There are 55 CA's in Amman CWSM, 28 in Irbid and fourteen in Zarqua. Some of those CA's have offices in one or more of these markets. The market administration assign them the responsibility of collecting a total of 4\% of the produce value sold in the market as market

\textsuperscript{12}Harrison et. al. op. cit.

\textsuperscript{13}This part is based on Harrison et. al. pp. 54-57.
user fees, these are collected from both buyers and sellers equally. The research team found that the market share of the four largest CAs in Amman CWSM is one-fifth, and that of the largest eight is one-third, which they describe as oligopoly and classify it according to Bain standards as "Low moderate" economic concentration indicating the potential for less competitive pricing behavior. According to Marion\(^1\), depending on the concentration ratio of four (CR4) the most popular concentration measure, a CR4 less than 35% is considered as an non-concentrated market. Also Connor\(^2\) noticed that numerous studies strongly suggested that CR4 between 40-60% is the critical level and that when CR4 reaches 80% pricing can be maintained at monopoly levels.

Overall, and taking other factors into consideration such as the relative concentration of wholesalers and commission agents versus retailers, high barriers to entry and the fact that some of the commission agents are exporters, the CR8 of one-third might suggest the possible existence of less competitive behavior. The fact that some of the commission agents are involved in exporting, as well as farming indicates that CA/ exporters have the incentives to keep market prices down. The reason being that, they don't sell their farm


products in the wholesale markets. They sort their products to two grades, exportable quality and those of lower quality sold the wholesale markets.

Some of the one hundred exporters in Jordan, are specialized in either exporting to Arab Gulf states or to Europe. Exporters to Europe are more specialized and perform different activities like sorting, grading and packaging. The study reported, depending on Jabarin\textsuperscript{16}, that the largest four exporters' share of the total exports is 36\% and that of the largest eight is 51\%, which they described as an oligopolistic situation.

The research team found also that there are significant barriers to entry for new commission agents (CA) and exporters. Specifically, location and CWSM regulation are the most important barriers. CAS' are to operate in the CWSM which has limited location for such operators. The law allows the automatic renewal of the rental contract as long as the tenant wishes to do so.

On the retail side, thousands of retailers who are either "Specialized" or "Groceries"\textsuperscript{17}, buy their supplies of fresh produce mainly from central wholesale markets (CWSM).

\textsuperscript{16} Jabarin, Amer "the role of marketing boards in the marketing system of fruits and vegetables in Jordan" Masters thesis-University of Jordan. Amman 1989.

\textsuperscript{17} 1. "Specialized" sells fruits and vegetables only with a wide variety.
2. "Groceries" sells limited range of Fruits and vegetables in addition to other grocery items.
and sell it according to the published retail prices. No evidence of a potential monopoly or oligopoly among retailers has been found.

The designer and manager of the Marketing Information System (MIS) should be aware of the structural conditions which can cause distortions in the data to be collected. It is important to note that corrections should be made on the governmental level to smooth the CWSM operations. Meanwhile, data collected should go through a thorough investigation before making any recommendations and disseminating information. The manager of the system should be aware of the importance of timeliness dissemination of the data and make trade off between the timeliness and accuracy whenever it is necessary.

II-4-3. MARKET CONDUCT."
its capability in terms of facilities, space and staff. All markets lack the adequate facilities and space necessary to specify one concentrated selling period. Due to this fact, the management of the CWSM’s allows the selling of products as soon as they arrive to the market, which might affect the prices compared with prices under one period auction. Other sources are behavioral in nature and violate the markets’ regulations. These issues relate to the auction procedure, selling periods, reselling products in the market, collusion among buyers and price discrimination where tested. The following results where found:

1- Auction procedures do not assure fair and open price formation in response to true supply and demand conditions.

2- Selling periods are structured so as to scatter sales over a longer period of time each day giving CA's and wholesalers an advantage over other market participants.

3- Overt or tacit collusion exists between some exporters, commission agents (CA) and wholesalers.

4- Among other consequences of the mentioned conditions there is discriminatory pricing.

The above prevailing which include tacit sales by auctioneers to a friend or relative, scattered sales and collusion suggests the potential presence of price distortions
and illegal practices which might affect the long-term quality of information collected from these markets.

II-4-4. MARKET PERFORMANCE

From the previous discussion of structure and conduct, one can draw conclusions concerning the performance of the wholesale markets.

The concentration ratio of Commission Agents (CA) and Exporters suggests the existence of the potential for less competitive behavior and discrimination against farmers and retailers who lack relevant information to make sound decisions. Hence, it can be concluded that there is a potential problem of lack of market transparency and market inefficiency. The reason being, lack of coordination of buying and selling process in the market, poor organization and inadequate market facilities and staff.

II-5. POLICY ENVIRONMENT.

Many governments frequently try to protect both producers and consumers at the same time through direct and indirect interventions in the market place and/or through market regulations. These often leads to ineffective policies because of the contradictory interests of different market participants. Policies that serve the interest of some

\[19\text{This part is based on Harrison et. al. op. cit.}\]
market participants are usually followed by one or more policies to relieve or eliminate its hampering effect on other parties.

In Jordan, policies governing or affecting the marketing system can be summarized into three major categories:

1- Retail Price Fixing.
2- Import - Export Policy.
3- Cropping Pattern Program.

II-5-1. Retail Price Fixing.

Retail price fixing is one of the earliest government direct interventions in market operations. This policy was first initiated in 1968 under extraordinary post war conditions, which were followed by the immigration of large numbers of Palestinians to Jordan. This unexpected surge in the population increased the demand for agricultural products and put upward pressure on prices because of the time lag required for supply to adjust and match the increased demand. As a result, increased prices for agricultural products and prices in general worsened the living conditions of the new immigrants as well as the general standard of living.

The above situation instigated a policy which aimed at controlling prices by controlling the gross margin at the retail level. Based on observations, a Governmental
pricing committee summarizes daily wholesale prices (which prevailed the previous day) and subsequently announces what they believe should be upper and lower retail prices. These prices are announced in the local newspapers and enforced by the Ministry of Supply. But neither the enforcement procedure nor the proposed policy was successful in achieving its objectives. This mechanism has had major impacts on fruits and vegetables marketing in the following ways:

1) The obstruction of the development of a well defined system of quality grades and standards, affecting both the quality and the range of commodities available to the consumer.

2) The distortion of prices at both the wholesale and retail levels of the marketing chain, through the lack of an effective price discovery mechanism and the existence of market manipulation.

In addition, this situation created what can be described as a parallel market. Given that retailers in high income areas hide good quality products in their stores and sell them to those customers who are willing to pay more, the representativeness of the published retail prices is questionable. There are other problems which have been

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escalated by this policy as well, which might be considered among the major obstacles facing the development of the marketing system. Such problems include production practices, handling, sorting, grading, transportation and selling practices.

The signals the producers receive from the market thus discourage them from adopting improved production and marketing practices. The reason being that without improved returns for additional services, producers will not be motivated to invest in improvements and changes. In addition, retailers are not willing to pay higher prices for better services or quality as long as they are restricted to fixed prices. Instead, they consider the published retail prices that day, which was based on the previous day’s wholesale price, when buying new produce to be sold in the same or the following day.

The net results of this price fixing mechanism are exactly opposite of those intended\(^\text{21}\). While consumers are suppose to have good variety and quality to choose from at a low price, they have less variety to choose from, and pay more. Thus, the retail price control results, among other things, in farmers receiving relatively lower prices and providing less quality products to the market. Also, Quezada and Brown reported that wholesalers and exporters are

\[^{21}\text{Quezada and Brown op. cit. pp. III}\]
permitted to manipulate the market to their advantage", but they didn’t give specific examples of such manipulations. Moreover, the policy was not successfully enforced on the retail level as mentioned earlier.

II-5-2. Import/ Export Policies.

With the increases in production during the late seventies and early eighties, and in order to save scarce foreign currency, the government implemented the import/export policy. The main objectives of this policy includes:

1) Promote fruit and vegetable exports to insure higher returns to the producers and to procure enough foreign currency to support the balance of payments.
2) Reduce imports to prevent those imports from competing with local production.
3) Promote the gradual substitution of imports with locally produced products.
4) Maintain specific consumption patterns that fit people’s capabilities and the country’s production capabilities.

In order to achieve these goals, the government authorized the Jordan Agricultural Marketing and Processing Company (JAMPCO) to import products that are in deficit and

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22 Hiarri et. al. op. cit.
off the local production season. Other non-traditional products were not allowed to promote the production locally.

II-5-3. Cropping Patterns.

Because of the rapid growth of the agricultural sector during the late seventies and early eighties, production of fruits and vegetables has increased significantly with the horizontal expansion in both the irrigated high lands, Ghores and the Jordan Valley. Vertical expansion and adoption of new production techniques also increased the productivity of input factors. This expansion was not equally distributed over all kinds of fruits and vegetables. Rather, the production of four kinds (tomatoes, cucumbers, squash and eggplant) rose dramatically with neither the domestic nor the international markets capable of absorbing all of the additional qualities being produced. It is believed that this relative increase in supply during the early eighties outraged the increase in demand and thus lowered the prices of these commodities. Under the belief that lowering production (by restricting the planted area) would rise the prices of these commodities, the government initiated this program in the summer of 1985. Another reason was to encourage farmers to grow non-traditional crops. In this program, the area planted decreased by 36 percent whereas production fell by only 20
percent. A study\textsuperscript{23} conducted to assess the economic impact of the cropping pattern program showed that the prices of the four major vegetables did not increase with the severe reduction in production. The reason being because of the elastic demand for vegetables in the export markets and Jordan's insignificant effect on prices in those countries due to several competitors in the region. They also showed that the costs of this program were heavy for both farmers and the economy.

It can be concluded from the previous discussion of production, marketing conditions and market structure that there is a severe problem facing the agricultural sector in Jordan. Lack of research results and information clearly are significant components of this dilemma. Simply put, producers don't have enough information to make sound production and marketing decisions--resulting in the over-production of several commodities that lead to lower returns to farmers and higher losses to the economy. In addition, because of inaccurate data and in adequate information derived from the data, government policies have been relatively ineffective, having unintended effects on the farmers and economy.

\textsuperscript{23}Bessler, David and McCarl, Bruce "An assessment of the economic impact of the Jordanian cropping pattern program" AMO-US. AID. AMMAN Nov 1989 pp. I
CHAPTER III

NATURE OF MARKETING INFORMATION

III-1. Definition and characteristics of information.

III-1-A. Definition.

To design an effective marketing information system (MIS), the nature of information and data on the one hand, and the operations to be performed, on the other hand, must be clearly understood. In MIS, the focus is on the informational aspects. It is important to understand the needs and goals of decision-makers. Who is expected to deal with which problem should be carefully identified.

Data must first be distinguished from information. There is often a failure to differentiate between the two\textsuperscript{24}. This is the problem with most so-called "information systems." They are treated as data systems rather than information systems. The reason for this distinction is to make sure that decision-makers are provided with information, not raw data. Davis\textsuperscript{25} defined data as a group of non-random symbols which represent quantities, actions and things, whereas information was defined as data that were processed into a form that was meaningful to the recipient and of real or perceived value in current or perspective decisions.

\textsuperscript{24} Bonnen, James T. op. cit.

Bonen26 defined data as symbolic representations of concepts that must be developed to reduce the nearly infinite complexities of the real world in a manner that can be grasped by the human mind. McDonough27 defined information as the net value obtained from the process of matching the elements of a present problem with the appropriate elements of data.

Data are subsets of information which represent measured raw unprocessed facts that require editing, analysis and summarization to become information. Hence, information is a part of evaluated data that suit users' needs in the decision-making process. Therefore, handling data is unjustified unless it can be transformed to a usable form. Providing information without regard to its use serves no purpose. Information is not useful for its own sake; it must be relevant to the decision-makers and answer the right questions. However, data can be viewed as the lowest level of information and the result of analysis and summarization as higher levels of information. It is not necessary to alter the data to become useful—it may simply be a matter of making it available at the right time and place. Most of the problem is often one of communication because data collection and the reporting process do not always take place at the point where it is

26 Bonnen, J. T. op. cit.

needed. The means of transmission is a very important component of MIS.

Information has the public goods attributes of indivisibility, uncertainty and non-appropriability. Indivisibility refers to the issue that cost of information is not affected by number of users. Hence, if the information is to be collected individually, large firms will have an advantage over small firms. Uncertainty refers to the users inability to assess the usefulness and value of information until they use the information in the decision making process. If the users to pay directly, then we might create risk avers users to buy information. Non-appropriability refers to the fact that once the information is released to users it cant be limited to that user. Private suppliers will have difficulty recovering the cost of information.

III-1-B. Characteristic of Information

How can we be sure that we have information, not superfluous or misleading data? It is not always true that all knowledge is useful. Only the relevant use of data and information justify the cost of collection, analysis and dissemination. While the activities of market participants must be relevant to their objectives, the cost of information which serves no useful purpose would be incompatible with any likely objectives. There are several characteristics of
information that both designers and managers of marketing information systems should be aware of.

III-1-B-1. Purpose

There should be a purpose for collecting data and disseminating information, otherwise it will simply add "noise" and unnecessary costs to the system. Information is needed for a wide variety of reasons: to inform, evaluate, persuade and organize. Information has a central role in every stage of the decision-maker's process of problem identification, data gathering, analysis, evaluating options, decision making, implementation, evaluation of results and feedback.

III-1-B-2. Format And Redundancy

Information can be represented and transmitted in many forms and by different means. Selecting the most appropriate and understandable format is a very important measure of effectiveness of the system. The format must be considered carefully because different users prefer and understand different kinds of formats. Tables and charts may be understood by researchers and some market participants, but verbal contact may be the most appropriate form for farmers.

On the other hand, redundancy may be a safeguard against errors in the communication process or analytical procedures and machine failures.
III-1-B-3. Rate of Transmission (Frequency)

Human beings can be easily overloaded with information if the transmission rate is very high. This should be kept in mind when designing the system. The rate of information should be a function of the operational needs. Policy makers require less frequent information because their decisions are long-term. Other market participants may require more frequent information because of the tactical nature of their decisions.

III-1-B-4. Deterministic-Probabilistic

Unlike information concerning the future, historical data are known with a high degree of certainty. When transmitting probabilistic information, one should be aware of the characteristics of target groups and their abilities to take all variables into consideration when using such information. Probabilistic information should be distributed less frequently than deterministic information.

III-1-B-5. Cost-value

Collection, analysis and dissemination of information involves considerable costs. The value of specific information is too complex to estimate because the decision-making process utilizes a great deal of information. Also the value of information to be used in the decision-making process cannot be estimated until the information is used and the results are compared with a decision made without the information. What
makes measurement of the information's value difficult is the fact that it is highly dependent on other characteristics of information. Yet, the overall expected value of information can be determined and the cost of uncertainty calculated. Designers and managers of information systems must evaluate or trade off the value of the information against its costs.

III-1-B-6. Authenticity

The reliability and validity of information are very important. Reliability is the degree of confidence decision-makers place on information. While reliability involves some costs, it can be traded off against value and cost of information. Validity is related to the representativeness of the information to what is intended to be represented. Often a good quality of information might be obtained if one is willing to pay the cost. The cost is not only in terms of money but also must be evaluated in terms of time and the relative importance of decision outcomes.

These are some important characteristics of information that should be considered during the design and operation of a marketing information system, if the system is to be efficient and useful.

III-2. INFORMATION LIFE CYCLE.

Data have life cycles that should be understood by designers when developing effective systems, and by the
manager to make the MIS's operation smoother. Both the designer and, more importantly, the manager, should be aware of new data generated, manipulated, processed, analyzed and transmitted to make necessary corrections and solve any problems that might arise during the design and operation of an MIS.

Although generating data is the first stage, it can be undertaken at any stage of the cycle if additional data are found to be essential for other stages. The second stage is verification, classification and destruction or storage in a specific form (usually documentation). Conversion and reproduction of data to a different form that is more convenient for analysis or interpretation, is the third stage. This stage may involve transmission of data to another computer or to economic analysis. The fourth stage is the aggregation and manipulation of data in which different kinds of information are aggregated and manipulated to a more meaningful form for the purpose of analysis. Analysis and interpretation is the final stage in the cycle followed by destruction if the information is no longer required.

Probably the most difficult task is deciding which information to store and retrieve and in a form that facilitates quick access to the information when it is needed.

III-3. Consequences of the Lack of Information
Information is a valuable resource for private and public sectors. Although it is the end result of processing and analysis, it is the most important aspect of the decision-making process. The quality, quantity, rate of flow and timing are critical issues that should be kept in mind. Quality of information was discussed earlier in this chapter. With regard to quantity, there is a misconception that the more information disseminated, the better the decision-making results will be. But what the human mind can handle is limited, and overloading decision-makers with too much information can result in poor decisions (Murdick 71). On the other hand, the costs of collecting, analyzing and dissemination increases usually if there are time constraints. Timing and rate are of special importance. Information transmitted too soon or too late is of little use to the user. If information is sent early, the users might forget it. Information sent too late is of little or no use to the decision-maker who has already made the decision.

Unfortunately, the decision-making process in agriculture is often infested with problems rising from the complexity and uncertainty which are unavoidable facts of life. Complexity arises with economic growth, specialization and increased interdependence between sectors. Uncertainty, on the other hand, rises from the nature of agricultural production and prices. Production is affected by biological factors which make the estimation of supply and prices a difficult task.
Demand is affected by several, often difficult to predict, factors like demographics, geographies, tastes and preferences and prices. Decision-makers in agriculture are usually risk-averse, as are the information suppliers. Their is a natural tendency and fear of sending incomplete or inaccurate information. Working with the difficulties of estimation under uncertain conditions, information suppliers take more time to check the quality and verify the results of their analysis which increases the time span of the collecting-disseminating process. This implies that there should be a mutual understanding between information suppliers and decision-makers on the degree of risk of faulty information because unverified information received on time may be much better than verified information received too late.

The overall effect of the lack of information is that it increases the market imperfection and may allow monopolistic practices by those with more information. It weakens market transparency, which in turn prevents the open signalling of market opportunities to producers and other participants. In addition to lowering the degree of competition, it increases the erratic price variations, and risk and uncertainty. On the policy maker side, policies will be ineffective and may cause a reverse effect. Planning for future developments may follow the less-effective trial and error procedure.
III-4. Target Groups and Their Needs.

Information requirements and needs vary from one group to another. Moreover, these needs are affected by the degree of industrialization, specialization and market integration. The infrastructure, distance from the market, educational level and type of production are among other important determinants of the target group needs.

Requirements can be identified by working down through the market structure and the participants. Requirements should be determined according to causal factors or motivations of different groups which will depend to a large extent on the type of decision to be made in order to achieve objectives and goals. This in turn determines the systematic procedure of data collection and dissemination of information process. Some information is needed for no other reason than to meet day-to-day decision making requirements. Producers need to know prices in different markets near urban and rural centers in order to decide where to sell their products. Exporters need to know prices in foreign markets.

Future developments are important, especially to producers. Farmers are interested in future developments of prices of the product(s) they are growing, but no one can possess such information. The best thing that can be done is to provide users with information that is helpful in estimating potential future developments, along with other kinds of market information necessary to draw educated,
informed conclusions. However, the majority of market participants are not always capable of using sophisticated analytical procedures to determine the kinds of variations (seasonal, cyclical or erratic trends), the driving forces behind the variations (supply, demand) and the connections between demand, supply and prices (elasticity).

Government needs are historical in nature (Wigton et al., 1985). Generally, a government's major concern is over the market's degree of perfection. It needs the information to monitor the behavior of market participants in order to administer its policies and laws to insure market transparency and efficiency. The government's overall goals generally are growth, equity and stability. Those goals apply equally to all sectors of the economy. Examples from the agricultural sector are: growth of agricultural production, value added, labor efficiency, rate of return, costs of inputs. Equity is concerned with farm/ non-farm income ratio, nutritional status, distribution of income, unemployment rate and the costs of agricultural subsidies and incentives. Stability is concerned with year-to-year fluctuations in production, prices and income.

Another potential MIS interests group is other market participants, such as commission agents, middlemen and private traders. Usually, the attitude of civil servants and politicians towards this group is prejudicial. They often are accused of exploitation, which leads to the ignorance of this
group as a target group. Other groups of importance are consumers and market researchers.

The needs of various target groups, if investigated, will turn out to be never ending, since few of these groups think of costs associated with the process of providing information against its value. The information systems designer and manager should always evaluate the importance of any kind of information and set priorities within the context of available resources.

Another possible method of determining needs is to distinguish between decision-making and problem-solving. These two terms are often used interchangeably without recognizing the differences. They are interwoven. Problem-solving involves making decisions like assumptions, data to be used and evaluation criteria. For the purpose of this paper, decision-making refers to the regular decisions to be made by users, while problems are those arising on an irregular basis which need specific information to make the decisions. Eventually the first method should be used to determine the needs for regular decision-making process.

III-5. Sources of Information.

Important information is likely to aide major decisions properly if information collection and flow is designed to suit user needs. As a result, defining user needs are very important to the process, particularly in
defining type and sources of needed information. Overall, most of the needed data can be divided into two broad categories: official and non-official sources. Censuses, surveys and regular visits to farmers are among the most important sources of data. Other official sources include data collected through government offices in the central and rural secondary wholesale markets and customs offices. Moreover, experimental and research stations are good sources of information.

Non-official sources include universities, private corporations, the press, cooperatives, retailers, wholesalers, exporters and consumer groups. These non-official sources offer the perspectives of different interest groups, which supplement official sources and can be used to check on official sources. It is important not to overlook these sources, however, because they are legitimate and helpful in identifying the problems of communications.
CHAPTER IV
DESIGN AND REQUIREMENTS OF ELECTRONIC INFORMATION SYSTEM

Most developing countries have market information data systems which serve as data gathering instruments for policy formulation and sometimes interventions by government buying and selling agencies. Usually, such systems are often departments or divisions in different governmental bodies or agencies. Such data gathering sub-systems are frequently operated inefficiently and ineffectively, however, because of the lack of coordination between different sub-systems, lack of qualified personnel and financial resources in addition to the lack of an effective conceptual framework relating data and information.

Recently, increased awareness of the importance of marketing information was reflected in the establishment of more specialized services in many developing countries. The past problems with these organizations include poorly trained staff for both data collection and analysis purposes, limited resources and poor management. Lack of coordination between agencies that perform economic analysis and planning offices is another problem. Moreover, and of special importance to the successful and effective continuation of any information system, most of the services were established with foreign assistance or loans without taking into consideration the
countries own long-term financial resources. Services established this way are frequently discontinued after a short term period of the end of the assistance program.

Designers of the marketing information system should be more aware of this problem. In specific, both designers and managers of the system should take into account available resources and avoid exaggerated investment in technology and staff that requires large financial support in the long run. Also manager of the system should keep track of the operational cost and keep them as low as possible.

IV-1. SYSTEM DEFINITION.

A system can be defined in various ways and from different points of view. According to McDonough28, "A ..................... system is a logical configuration of the significant element in a selected problem area." This definition is broad and the key factor is the blank space where the field of interest will fit in. In addition, Anderson29 defined a system as a "group of associated activities which will usually contain a common purpose, identified objective established sequence of procedures and


data flows, feedback of information, defined boundary of activities and specified data."

These two definitions emphasize that a system is a collection of elements or procedures. These elements are the components which perform a function or functions through the interaction between these components. The linkage and interaction will determine the specific structure of the system, as well as its openness and adaptiveness. The system has inputs coming from, and outputs going to, the surrounding environment which react to the changes in the environment positively or negatively.

The information system, being an organization with a specific structure. Such structure include personnel, data base and statistical analysis programs, budget and supporting services that can be described as a dynamic process of data collection, analysis and information dissemination to support the decision making process undertaken by different decision makers.

IV-2. CONSIDERATIONS.

The designer and manager of the system should keep in mind and take into consideration several issues which influence the effectiveness of the system.
IV-2-1. Feed-Back Loop.

The feedback loop is an important and special element of any efficient information system. This concept includes some kind of data flow, processing and output, either to the system itself, to the users or both. Output of the feedback to the system is very important for the system’s flexibility in which adjustments or changes are made to rectify the system’s faults. In short, feedback functions as a linkage between different components, and is very important because different components in the agricultural system have an impact on each other. If agricultural production increases or grows faster than demand, it will result in a reduction in prices. As a result, this reduction in prices will signal a to reduce production in the following period. Of course, this will most probably happen within a time lag, because of the biological nature of the agricultural sector and the fact that it is time consuming. Nevertheless, the feedback gives the system its dynamic behavior.


The stability of the system is connected with the feedback loop. Two kinds of feedback loops (negative and positive) affect the stability of the system because of their reinforcing nature.

An increase in agricultural production subsequently increases employment and rural incomes, which allow the
farmers to reinvest in production. This is considered as a positive feedback loop or growth-inducing loop. The sign here is a positive one, but this sign does not indicate the direction of the change. The loop might be growth-discouraging and still considered as a positive loop. In contrast, the negative feedback loop (or what is called self correcting loop), is closed by an offsetting effect. A supply-demand system searching for equilibrium is a good example of negative feedback.

In order to have a stable system, however, there should be a negative feedback loop. It is important to note that positive loops are important to stimulate growth, though, which in turn complicate the management process. Given the nature of the agricultural sector, information should be available to help the loops take effect.

IV-2-3. Input-Output

In order to avoid the "GIGO" (Garbage In-Garbage Out) effect, the emphasis should be on outputs first. The desired output for both public and private decision making should thus be identified explicitly in terms of content, format and timing of distribution. Both regular and special reports should also be identified. For instance, annual reports, monthly reports, commodity outlook trends and so forth. The exact mix will be determined by public and private needs, however. Inputs, then, can be identified precisely
along with the necessary analytical procedures. But this is not the end, for even with a well defined input-output system, one can get undesirable outputs. High costs are an example of an undesirable output. Hence, greater emphasis must be given to the cost of the collecting-reporting process if the government is to finance such systems--especially if the country has limited resources.

Other undesirable outputs are possible as well. For instance, concern about maintaining relevance, accuracy, consistency, timeliness and accessibility should also be kept in mind when designing the system. In specific, accuracy depends on the technical capabilities of employees, while both relevancy and consistency depend on communication between different components of the system, employees and flexibility of the system. Hence, a good communication system should exist between data collectors, analysts and decision makers. The system should also be flexible enough to adopt and adjust whenever it is necessary to cope with the changing environment. Since the organizational structure affects the timeliness and accessibility of information, hence, the system should not be under the influence of any single party participating in the market.

IV-2-4. Endowments

Ability to obtain and sustain human and financial resources are some of the most important considerations for
developing countries. Hence, while every country has a specific or limited natural resource which can be allocated over all sectors of the economy, it is important to keep both overhead and operational cost in mind. This is especially so during both the designing and functioning stages of a marketing information system.

It is important to note, however, that reduction in the general budget of any developing country often subsequently results in the reductions of the department responsible for statistics. This reduction is also reflected in a reduction of the budgets of different governmental bodies, which usually results in a reduction in the budgets of data gathering divisions. Thus good design and management of an information systems must take this problem into account and rely on the minimal needs of people and capital which can be obtained on a permanent basis.

IV 2-5. Coordination\textsuperscript{30}.

Inadequate capacity of existing marketing information services in developing countries begins with conceptual issues. Services are often integrated into larger governmental bodies like the Ministry of Agriculture. However, the function of generating information is frequently perceived as a data procurement process for administrative and

\textsuperscript{30} This part is based on FAO.-Market Information Service Bulletin No. 57 pp.5.
statistical purposes alone. Other market participants can be easily considered secondary target groups and hardly have access to the published and unpublished information by these institutions. In addition, the available data are often out-of-date and of little relevance to the decision making process. Even if there is conceptual orientation to provide such services, the implementation can be faced with institutional difficulties both internally and externally. Overlap in functions and authorities between various government offices can be one of the most important difficulties. The reason being that this overlapping often leads to conflict and confusion among different agencies concerning who will do what. Moreover, it sometimes results in paralyzing efforts or in not providing the necessary services at all when each agency think that providing specific service is the duty of another agency. If specialization in providing service is not possible, though, integration and/or coordination is very important in generating reliable information and gaining the trust of users.

IV-2-6. Grades and Standards.

Grades refer to the usefulness, desirability and value of the product, depending on its subjective properties.\(^{31}\)

Standards, on the other hand, are referred to as commonly agreed upon yardsticks of measurement\textsuperscript{32}.

In short, grades and standards are a facilitating market function. More specifically, they simplify's the marketing process and reduces the costs of each transaction. In addition, they also speed up the exchange process between buyers and sellers. The reason being that without grades and standards, buyers spend longer periods of time inspecting the product, which can create confusion and unfairness as well as unnecessary costs. Moreover, it is important to note that the standardization of weight units and containers are as important as quality.

Hence, the existence of grades and standards is a very important key factor in the success of the information system. The system can collect data more accurately with reference to each grade, container and weight. Furthermore, it facilitates the communication of information with market participants and speeds up the flow of information between the system and information users. Without well defined and known grades, therefore, both buyers and sellers will be confused and might not be able to relate their produce to certain prices.

IV-3. Electronic Information Systems.

In some countries, computers and other electronic equipments are not used at all, and often, when they are used,

\textsuperscript{32}Kohls and Uhl, op.cit
different kinds of information are still processed by hand. Such problems are frequently the result of poor management, coordination and planning. Because tracking efficiency and performance is an important component of the managerial process of, both, profit and non-profit organizations. For instance, substituting machinery for manual operations is one of the potential sources of increasing efficiency. In specific, electronic information systems have some advantages as well as disadvantages that should be taken into account when designing an information systems.

**IV-3-1. Advantages and disadvantages of Electronic Information Systems.**

Electronic systems have some advantages as well as disadvantages in the sense that they are sophisticated equipments. They speed up the processing time, reduce the required storage space, increase the precision and improve the management process. In contrast, they requires highly trained personnel and high initial investment and replacement cost. In the following sections each of those advantages and disadvantages is discussed separately.

**IV-3-1-a. Advantages.**

1-Time.

Transmission, storage, analysis and dissemination of information via electronic means reduces significantly the
amount of time required to complete such task. This allows
decision makers to respond faster to changes in the market
place by adjusting their practices to new trends and
opportunities.

2-Space.

Electronic devices, such as computers, reduce the amount
of required paperwork and storage facilities required to house
huge piles of papers that have accumulated over the years. It
also facilitates retrieval updates, as well as the analysis of
historical data.

3-Precision.

Electronic systems allow the handling and analysis of
historical data, with a minimum amount of errors, along with
detailed information like charts, maps and graphs.

4-Management.

Networking systems allow and speed up the process of
passing orders and requests back and forth between management
and personnel. It also facilitates quick reporting to top
management and policy makers.

IV-3-1-b. Disadvantages.

1-Costs

Costs can be divided into three major categories:

A- Overhead costs. These include the acquisition of
hardware (computers, printers, etc.), software and other
machines necessary to accompany such delicate equipment as
power supply stabilizers, air filters and so forth. Moreover,
training the staff or hiring new staff contributes to this category’s costs.

B - Operational costs. These include the costs of having a technical staff, stationary, diskets and telephone lines.

C - Replacement and depreciation. Complete or partial replacement of equipment or parts are necessary from time to time in order to maintain an efficient system. Replacement in this context includes updating the system and introducing new technologies. Replacement costs are often ignored, but by doing so we ignore loss in efficiency. Of course, knowledge and experience are essential components, which will be disrupted by any changes in the system because of the required learning period. In addition, maintenance costs should be taken seriously.

2-Complexity.

Introducing electronic systems adds some complexity to the system. Specifically, complexity is added to the managerial process and to staff duties and functions. To start with, the planning of the system is a complex procedure in itself. Operating and managing the system is another source of complexity because the manager and staff might find it difficult to understand and apply the utility programs. The operation of computers and communication equipments, the control of the system and handling of output, solving data
problems and other various supporting facilities require a qualified staff (either by training the old staff or by hiring new skilled staff).

IV-5. The System Components.

Realistic planning is needed so that the information system operates efficiently and effectively. The potential framework, both operational and institutional, as well as potential constraints should be assessed and identified clearly. This includes identification of various components and parts of the information system and the position of the information system with the overall economic system. The position of the information system, whether it is a separate and independent organization or whether it is within another administrative structure, affects its operations and effectiveness a great deal. As is often the case, however, different departments or divisions in an administrative structure compete for scarce resources (such as budgets and employees) within the structure it is attached to. This is very important because it is usually necessary to increase the financial requirement and/or personnel to provide either better or more services. Another potential problem pertains to the authority and its hierarchy within the structure. Not having enough staff or moving staff from one department to another can greatly influence the effectiveness of the system. In addition, top management in the administrative structure
may influence the type of information generated, especially if it affects his/her management position image. Furthermore, if the information system happens to be within an administrative structure, the real power and authority of the structure influences the success or failure of the information system.

The information system has five components or processes:

1- Conceptualization.

Conceptualization refers to the process of formulating concepts which allow the measurement of parts of reality of interest to the users of information.

In order to carry out a meaningful analysis to extract and provide useful information, concepts must be identified or operationalized in a way that best suits or describes its reality. For instance, what is a market commission agent, middleman and so forth. In addition, ways of measurement and units should be identified precisely. By doing so, we lay down the operational framework that will help in identifying ways of data collection and analysis.

2- Operationalization.

This process refers to identifying the measurable variables, units and ways of measurement. Developing a

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classification or coding scheme for different variables, therefore, is a very important step that should be identified prior to collection and analysis in the decision making process. It is also important to define and standardize the classification schemes for information of all governmental bodies serving the agricultural sector in order to avoid confusion among information users.

3- Measurement.

This process includes data collection and processing. This process can’t be initialized before the proper identification of variables to be measured, however, because it should be specific and serve the decision maker’s needs. Rather, this process involves the proper measurement of actual variables through data collection, which should be fast enough to generate the required information where and when it is needed.

The above three processes define the data system, which should be distinguished from an information system which involves more processes than those involved in the data system\(^{34}\).

4- Interpretation and Analysis.

In this process, the data acquires some meaning that makes it more useful to decision makers. Thus, the manager

\(^{34}\) Bonnen. 1975. op.cit.
and staff of the system should be qualified and have both a statistical and agricultural background in order to understand different relationships between variables. In addition, they should also be able to derive significant findings and communicate well with the information users.

Data presentation is more complicated than any other function or activity of the system, however, because of the wide range of information and users. As a result, differences among users in background, level of education and ability to understand findings are some of the difficulties that system management should overcome. Findings, therefore, should be presented in a simplistic manner and be fully explained to the users (which includes any assumptions made, as well as data manipulations and so forth). In specific, a typical solution to presentation might be a partitioned report that consists of a summary of the results and detailed tables in the appendix.

5- Decision Making.

The decision making process consists of two parts. The first part is within the system, and is concerned with testing and identifying the analytical framework. The second part, in contrast, is outside the system and is considered to be a cyclical process of problem realization, definition and observing different alternatives. In addition, it also analyzes alternatives, evaluates them and executes them, while, as a last step, identifies new problems.
It is important to notice, however, that information should not and does not make decisions or dictate actions for decision makers. Rather, the role of information is to help decision makers make inference and choose the best alternative that serves their interests and objectives. It is also important that, both the manager of the system and information users keep in mind that uncertainty in the agricultural sector can't be eliminated completely. Instead, information serves as a suggester of the consequences of the choices of action to be taken. Actual decisions, therefore, should be based on all available facts, experience, training and background of the decision maker, depending on his or her own judgment.
The specification of information needs is a key factor in the success of an information system. Accurate definition of users and their needs is highly important and one of the most difficult tasks of the designer and manager of an information system. Unfortunately, this step frequently receives too little or sometimes no attention in developing countries. The assessment and continuous adjustment to changes in user needs is important to avoid the conceptual obsolescence of the system. Specification of information serves two purposes: First, it allows the inclusion of the most necessary and highly valued information; second, it allows the exclusion of worthless information and elimination of redundancy.

Setting priorities is another important aspect that must be considered carefully during the process of identification of needs. Information that feeds into major decision, like those related to long-term decisions such as planting, should be of relatively a higher priority than those feeding into short-term marketing decisions. Once long-term decisions such as planting has been made and an action has been undertaken it is not easy and very costly to change plans and reverse action. On the other hand, changing short-term marketing decisions such as where to sell, when and how much can be involves less cost.
Information can be classified to three major categories or levels of importance\(^{35}\): 1) absolutely essential information; 2) valuable information; 3) supportive information. Essential information are those that feed into major decision like policies and investment decisions. Valuable information are to assist the decisions that has to be made more frequently like harvesting (when and how much) and point of selling. In addition, government monitoring of market participant behavior requires such information that are valuable. Supportive information enhances the understanding of decision makers of the different relationships between various variables affecting decisions they must make.

V-1. Data Collection.

The basic objective of data collection is to collect essential data which is applicable and valuable, while keeping in mind the limited resources and time required to collect, analyze and disseminate the information.

Data collection can’t be initiated before answering some basic questions, however, such as "What data should be collected?" and "How should we collect it?." In short, data can be collected either periodically like prices, quantities available in the market, production, exports and so forth or

\(^{35}\) Alreck, Pamela L. and Settle, Robert B. "The survey Research hand book" 1985 pp. 36
occasionally, which are required less frequently and required in most of the cases to formulate policies or major decisions.

The choice of a data collection method depends on the type of information needed, priority and available resources, as well as time. Overall, however, there are several methods of data collection that can be gathered directly from the field or indirectly from other agencies and governmental bodies.

The direct method implies direct contact with market participants, either on a permanent basis or upon the need to collect specific data and information. Direct contact on a permanent basis serves two purposes, including: 1) collecting data which are needed on a regular or periodic basis like prices and quantities; and 2) to serve as a feedback loop to evaluate the efficiency of the system.

The indirect method, on the other hand, includes collecting data from other sources involved in data collection, either on a periodic or non-periodic basis. Such sources include the Department of Statistics, the Ministry of Agriculture, the Ministry of Trade and the Central Bank of Jordan. On an international level, there are also several sources such as the Food and Agricultural Organization (FAO), World Bank, Publications of the European Community and other agencies/organizations of the United Nations.

Finally, it is important to adopt and maintain one classification and coding scheme in order to eliminate
difficulties in matching codes prior to data aggregation. It is also recommended that this classification scheme is standardized with other countries (mainly trading partners) to facilitate cross-country comparisons.

The identification and classification of data thus provide guidance to the specification of scope and frequency of collection and dissemination as well as analytical procedures. Furthermore, it allows the analysts and researchers to trace specific crops from production to consumption through different marketing channels and help check the quality of data. Because people are not infallible, though, one of the most important responsibilities of the system manager is to check the quality of data on a regular basis during the data collection and analyzing process. Not surprisingly, errors usually appear at various stages of this process. Hence, it is important to note that checking for errors at later stages is not sufficient for ensuring accuracy. Instead, error checking should be done as quickly as possible at every stage. This checking procedure can be done by applying various ex post techniques such as checking the consistency of the data by comparing with other sources or past data.


After checking the reliability and validity of the data and correcting errors that might occur during its collection,
the data in this process might go through different procedures. In particular, the route depends on the type and level of required analysis, including: 1) transmission; 2) accumulation; and 3) aggregation.

First of all, transmission conceptually means the flow of data (either vertically or horizontally) from one level to another or from one person to another. This process requires previously determined and identified needs of different levels throughout the organization.

Secondly, the accumulation process refers to the storage of data over time to acquire time series data. This process is very demanding in terms of required data base software as well as the storage capacity of hardware used to facilitate the quick retrieval of data upon request. Hence, depending on the defined procedure and any new needs, the manager is to decide which data to store, what format to store it in and which data to destroy. Some data and information that is accumulated by the manager through experience can’t be quantified, but it is important to document such information to be accessible by other users nonetheless.

Lastly, aggregation is the process of collapsing many data points into a smaller data set, which is more relevant. This process serves two functions, including: 1) it speeds up the analysis of data; and 2) it reduces storage needs. This is a vital process, given the amount of data that might be collected over time and the limited time of information
users to review all data. This is also the first stage where data might acquire some useful meaning.

V-3. Manipulation and analysis.

Data analysis and the choice of analytical procedure depend on the decisions to be made, as is the case with most of the system activities. The reason being, if the system is to be successful and effective, it should be customer oriented. Usually, the analytical procedure is formal and draw heavily on mathematics and statistics to find and measure relations among variables, some times ignoring un-quantifiable variables like risk. The reason for this is that intuition can be appropriate only by well informed and experienced analysts, and under severe constraints like limited analytical resources or time.

Since the final objective of the system is to produce information that is useful to decision makers. Two distinct final users should be recognized. Those are the Government officials and other market participants like farmers, commission agents, and so forth. As discussed earlier, the needs of the two groups vary in purpose and nature.

Overall, the analysis might be carried out to produce one of the following kinds of information; descriptive, predictive and prescriptive information.

Descriptive information focuses on describing and reporting the prevailing conditions in both the local and
foreign markets. Predictive information is aimed at providing the decision makers with the possible future outcomes and events that might affect their decisions whether those events are problems or opportunities. Prescriptive information is to help decision makers to overcome potential problems by suggesting some possible alternative actions to take into consideration when making their decisions.

The analysis, in term of complexity, might be as simple as arranging the data in a tabular or graphical form that makes it easier to understand and be more informative. In addition, this tabulation gives the analyst more insight and quick overview of the data which help in identifying the proper analytical procedure to follow. Further analysis might include price analysis, calculating gross margins, trends, cyclical and seasonal indexes. Also it might include more complicated analysis like forecasting future trends and estimating supply and demand.

V-4. Reporting and dissemination.

The choice of communication media as well as the format and content of the message depend on the users and their ability to understand what is being communicated. The system manager should assess the educational level among users and base the report content and media on the average user abilities. Further, the manager should frequently update any changes to make the necessary adjustments. It might be
necessary to plan special educational campaign in the early stages of information dissemination or associate an educational program with extension services provided by the ministry of agriculture in order to reduce costs of special programs. Furthermore, the manager should assess the most popular media by which the potential users get information. Candidate medias are television, radio, newspapers, magazines and extension services. Upon deciding about the media, the manager should keep in mind the time issue, that is, the information should be prepared and transmitted as fast as possible because information loses its value over time. While the available technology offers a wide range of ways, the speed will also depend on the organization and technical abilities of the system staff. The establishment and effective implementation of a good communication system is the basis for transmitting correct market signals to users. This will permit all activities like production, marketing and consumers activities to operate at maximum efficiency. Cost and available resources are important issues to be considered and think of at all stages of producing information. Finally, enough attention should be paid to the uniformity and clarity of the report and its contents, with the goal of maximizing understandability for users.
CHAPTER VI

CONCLUSIONS, RECOMMENDATIONS AND POLICY IMPLICATIONS

Rapid economic growth during the late seventies and early eighties in Jordan, (that is, its increased specialization in functions, activities and industrialization) was accompanied by high population growth, rapid urbanization, dramatic expansion in fruit and vegetable production and growing exports, which created the need for a more efficient marketing system. The existing marketing system is no longer adequate to operate and perform as efficiently as it should.

An efficient, effective marketing system is one that is, among other things, highly transparent, where all market participants have equal access to accurate and timely information that allows them to adjust their practices and behaviors to new trends and opportunities as fast as possible.

The highly variable supply of several kinds of vegetables suggests that either farmers lack information or receive wrong signals from the market place. The poor quality products that farmers deliver to the market is also an evidence of lack of feedback and information about consumer preferences and needs. In addition, declining exports to traditional markets suggests lack of information about quality and quantities, as well as variety needed in these markets.
The studies from which this paper draws its conclusions about policies and market conditions were conducted by the Agricultural Marketing Development Project (AMO-USAID). These studies focused on the performance of central wholesale markets, economic impacts of cropping patterns and evaluations of the impact of price regulations on fruit and vegetable marketing in Jordan. These studies also provided some recommendations concerning markets and general agricultural policy. Although the discussion of the specific recommendations of these reports is beyond the scope of this paper, it is useful to stress the need for effective implementation of these recommendations to improve the marketing system. Implementation of these studies’ results will improve the quality of data available for analysis. Yet, while the paper draw on these studies it is inevitably important to repeat some of these conclusions and recommendations because of their direct impact on the quality of data being collected.

Existing markets lack adequate facilities and space. Therefore they provide the minimum expected services to market participants. For instance, storage facilities and space to properly display the produce. In addition, all markets, except the Amman Central Wholesale Market, lack the appropriate regulations to organize and coordinate the buying and selling process. Laws and regulations in Amman CWSM are
also in need of revisions and amendments. Yet, Amman CWSM regulations are not enforced completely and effectively.

In short, there is a lack of agricultural marketing development plans on the national level, in spite of the gluts and congestion of produce through marketing channels. Hence, except for the last five year development plan for 1986-90 (which suggested four projects to help resolve the marketing problems), other national development plans lack any general or specific plans for marketing. Three of these projects are concerned with agricultural manufacturing. The fourth is concerned with the establishment of assembly markets in three regions of Jordan.

Agricultural policies like price fixing and cropping patterns resulted in an adverse impact on the economy and lower returns to the market participants. The price fixing mechanism is also a major factor inhibiting the development of modern quality grades and standards. Lack of coordination between governmental bodies dealing with the agricultural sector resulted in either fragmented or overlapping responsibilities, and is among one of the major problems inhibiting the marketing development process.

Moreover, the lack of a conceptual marketing information framework, identifying the nature of information needs and their life cycles, are major obstacles facing the development
of the marketing information system. Hence, the so called information unit within the Agricultural Marketing Organization is mostly a data gathering unit. As a result, currently collected, tabulated data are used internally for description purposes with minimum attention given to the analytical procedures that will make such data useful to private as well as public decision makers. A major reason for this is due to shortages in the personnel qualified to carry on complex, analytical procedures. Public access to gathered data is also very limited, however. The potential reasons for this are that a considerable number of users don't know where or how to get the data. Consequently, information received from formal sources (such as published prices and quantities in the newspaper on a weekly and/or monthly basis) or informal sources (such as commission agents, other farmers and so forth) are used by producers to decide when and how much to harvest, while only a small number of users use the information to decide where to sell. Using such data in planting decisions was not reported by producers.

Improving marketing information can be achieved by improving and expanding the existing marketing information unit within the Agricultural Marketing Organization. The existing unit currently has some of the required electronic equipment needed to speed up and handle large amounts of data. The system does have some shortcoming that might affect the
effectiveness of the system, though. The following steps appear to be necessary to insure improved effectiveness of the system:

1-Training.

Both data collection personnel at the wholesale markets, border centers and main unit staff need special statistical training programs to enhance their capabilities in this field. In particular, the main unit staff needs a training program that will focus on using statistical software packages (such as SAS) to improve their capabilities. It is also recommended for the manager and other members of the main unit staff to visit similar information systems in a country with similar characteristics to Jordan to gain more insight in a real world market information setting.

2-Organization of the unit.

It is recommended that the system be independent from any other institutions or organizations to insure unbiasness and availability of staff and financial resources. While the likelihood of establishing an independent information system is very low, it is recommended that this unit be directly connected to the top management office of the administrative body it lies within(not within any other division or department). The reason for this suggestion is that it will possibly help reduce bureaucratic procedures to the minimum necessary to carry on its function efficiently. Moreover, the
manager of the system should have the authority to release information upon request within the laws and regulations governing the functioning of the system and the organization.

3-Equipment and Logistics.

The unit must be provided with more equipment to speed up its data entry, storage and dissemination. Such equipment includes modems and scanners, along with telephone lines, which are necessary to speed up the data and information flow to and from the system, as well as minimize the required personnel to perform those functions. In addition, the central wholesale markets should be provided with electronic equipments such as electronic boards to display prices of commodities being sold at that day. This board should be connected with the computer to speed up the updating process. Also all markets should be provided with bulletin boards so they can be used to display the reports generated by the information unit.
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<td>8</td>
<td>Bain, Joe S.&quot;Industrial Organization&quot;University of California, Berkeley 2nd Ed. 1968.</td>
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<td>12</td>
<td>Boisot, Max &quot;Information and Organization: The manager as anthropologist&quot;. 1987.</td>
</tr>
</tbody>
</table>


44. Montgomery, David B. and Weinberg, Charles B. "Toward Strategic Intelligence Systems." Marketing Classics--A Selection of Influential Articles. 7th Ed. 1991


