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# THE "HORIZONTAL" SUBSYSTEMS OF THE "ISOLATED" FARM FIRM: II

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## 1. INTRODUCTION

The organization system of the farm firm can be conceptualized in a "vertical" direction, i.e., in a teleological and temporal sequence (Seuster & Oosthuizen, 1983) as well as in a "horizontal" direction, i.e., with regard to the different farm enterprises.

The purpose of this paper is to demonstrate how two basic "horizontal" subsystems of the isolated farm firm can be conceptualized. The same methodology and definition of terms apply as in Seuster and Oosthuizen (1983).

## 2. PROCEDURE

As is well-known, depending on the individual case the number of horizontal subsystems differs considerably because the number of farm enterprises vary from firm to firm. In practice the number varies from multi-enterprise firms to firms with only a few enterprises to mono-enterprise firms. Basically it is thus possible to divide each farm firm into as many horizontal subsystems as there are enterprises.

However, within the framework of a general study of the horizontal subsystems of the farm firm, it is neither feasible nor desirable to insist on completeness. It is sufficient if a few horizontal subsystems typical of many farm firms are described. Seuster (1966, pp. 95-102) describes six farm enterprises: grain, forage, horticulture, dairy, swine and egg production. The general applicability of systems theoretical concepts for farm management purposes can be illustrated by conceptualizing the farm firm as a "two-stage multi-enterprise firm" and describing one horizontal subsystem from each of the two major components of the agricultural production process - namely plant and animal production. Grain and swine production are used as examples.

### 2.1 The grain production subsystem

It is assumed that the techniques and methods of the grain production process are known and need no description. However, if a precise description and analysis of the processes is required it can be carried out within the proposed framework. The relationships of the grain production subsystem are illustrated in Diagram 1.

The grain production subsystem consists of the intermediate systems of procurement, production and marketing. In addition, components of the management and finance subsystems are integral parts of it. The grain enterprise in a farm firm supplies feed grain and forage so that on the marketing side there exist direct relationships with the animal production subsystem (livestock, swine, poultry). By contrast, on the procurement side the grain production subsystem usually has no direct relationships with other subsystems of the farm firm. Then there is also an internal relationship with the intermediate system of family labour. In general the grain production subsystem has an average number of relationships with other enterprises of the farm firm and thus could be described as a system with mediocre connectivity. Usually, root and forage production as well as the animal production systems have more pronounced relationships with other enterprises of the farm firm.

On the other hand, the internal relationships in poultry production are less marked than in grain production.

As far as the environmental suprasystem is concerned, the grain production subsystem has direct relationships with the procurement market, the labour market, sales market and the household. With this, the relationships of the grain production subsystem with its environment are conceptualized for an isolated farm firm. However, particularly within the framework of crop production, many relationships with auxiliary systems are established as in the case of the "integrated" farm firm. To simplify the analysis these relationships are not illustrated in Diagram 1; but for simulation purposes the model should be extended in this direction.

A characteristic of the grain production subsystem is the relatively great importance of the route of later selling (selling after storage). This is

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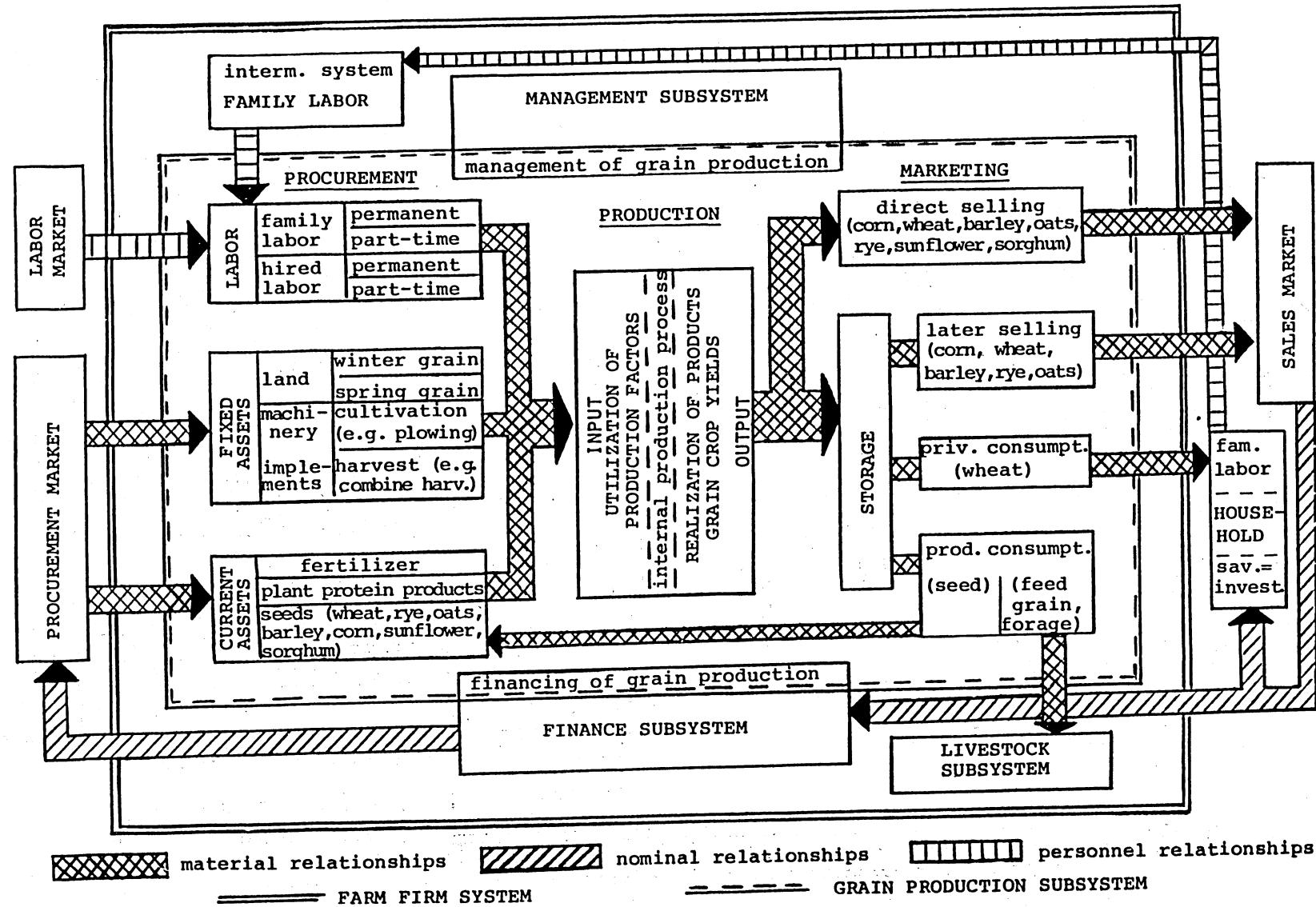


DIAGRAM 1 - The relationships of the grain production subsystem

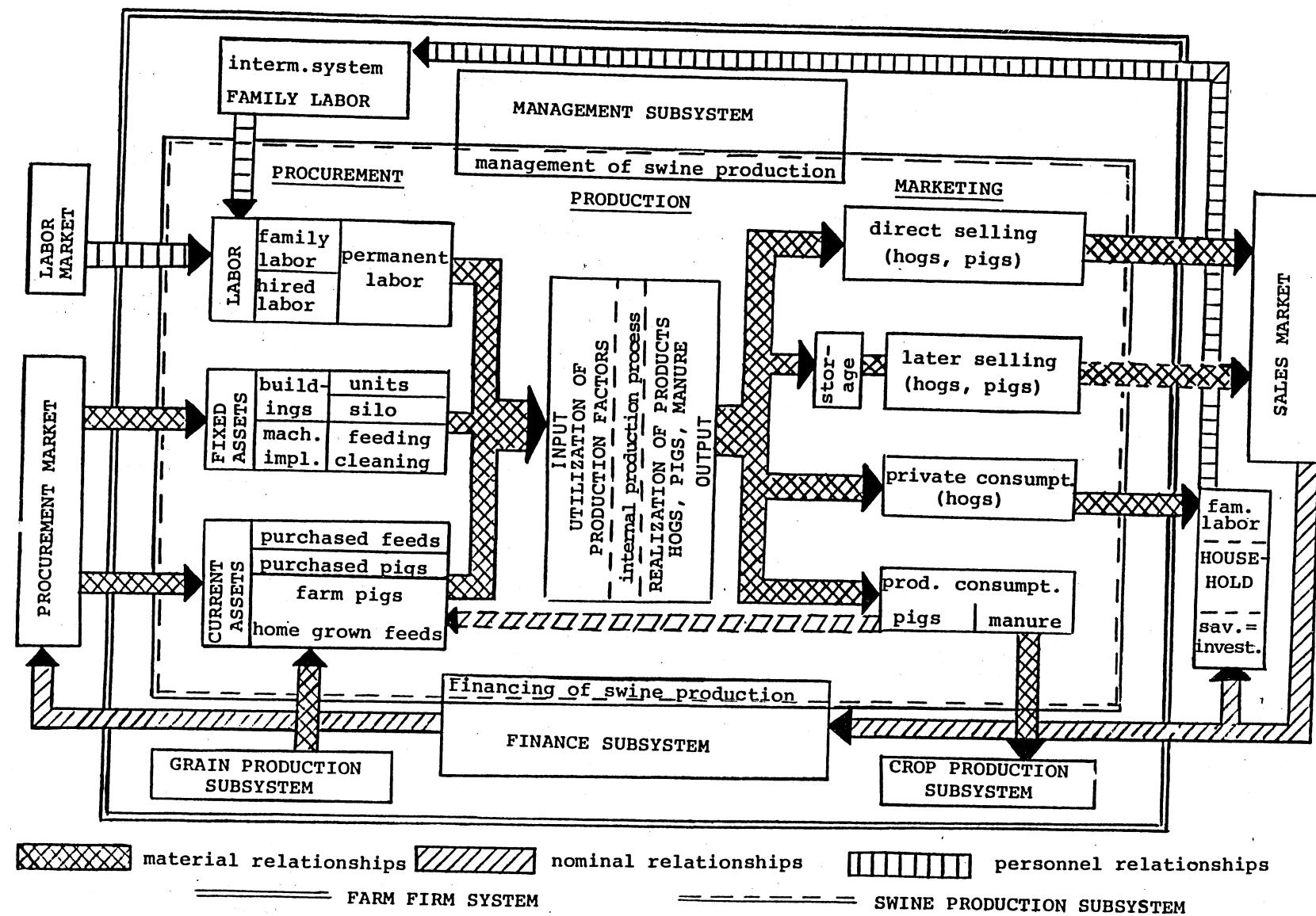


DIAGRAM 2 - Relationships of the swine production subsystem

done as part of a marketing strategy. If the storage function is not carried out by the individual firm, it is taken care of by auxiliary systems which may enjoy economies of size. In this case, too, the advantages resulting from the market strategy also benefit the individual firm.

Another characteristic of the grain production subsystem is the utilization of home grown products for production purposes. In this case, a significant relationship exists between the intermediate systems of marketing and procurement. Thus, there is an internal product/production factor cycle within the grain production subsystem. Although this cycle is typical of many agricultural production processes, they are not equally developed in all enterprises.

A marked characteristic of agricultural processes is that some activities are inactive during some time periods. For example, current assets are procured periodically while fixed assets are purchased sporadically. Seuster (1966) provides further details with respect to this problem of periodicity or aperiodicity respectively.

## 2.2 The swine production subsystem

The swine production subsystem is presented as an example of the animal production subsystem, which is a horizontal subsystem of the farm firm. The relationships of the swine production subsystem are illustrated in Diagram 2.

The technical swine production process also starts with the procurement of production factors (goods and services). As distinct from grain production, the animal production subsystems are largely dependent on permanent labor as these processes are relatively continuous in nature. The swine building complex is an example of fixed assets which must be procured for swine production. Current assets consist of such things as market livestock, feeds, etc. The procurement of pigs and/or feeds can occur by means of purchasing or own production.

All of the four possible selling routes are applicable, although to a different extent and with respect to differences as to the products yielded. In practice most of the output in swine production is directly sold. Later selling may be used to take advantage of better markets. Such a strategy involves keeping the stock for a short period of time after it has reached an acceptable market weight. The fact that later selling is only an exception is indicated by a dotted line in Diagram 2. Even today a certain number of hogs goes for private consumption, i.e., to the households of the farm personnel. The route of own production consumption also occurs to a lesser extent when pigs are used for production purposes. This relationship between production consumption (on the marketing side) and current assets (on the procurement side) is indicated by a dotted line in

Diagram 2. Another output from the swine system, manure, is used by the crop production subsystems.

In systems analytic terms the swine production subsystem also consists of the corresponding intermediate systems of procurement, production and marketing as well as of the components of the management and finance subsystems. Thus, at this level of analysis, there is no difference between it and the grain production subsystem. Only with further study can differences be seen. For example, the procurement side of the swine production system is directly connected to the grain production subsystem. On the other hand, i.e., with reference to output, there also exists a relationship with the crop production subsystems by means of manure. Thus the swine production subsystem is bilaterally connected to other enterprises of the firm.

With regard to the relationships with the environmental suprasystem no differences are established between the swine and grain production subsystems. The swine production subsystem also has relationships with the procurement market, the labour market, the sales market and the household. In general the swine production subsystem can also be described as a system with mediocre connectivity with other enterprises in the firm.

In the context of the "integrated" farm firm a set of relationships between the swine production subsystem and corresponding auxiliary systems in the environmental suprasystem can be defined. To simplify the analysis these relationships are not illustrated in Diagram 2. However, it is noteworthy that swine production is particularly suited for operation as an independent system - in the form of swine producers co-operatives - with well defined relationships with the enterprises which support them.

## 3. SUMMARY AND CONCLUSION

This study demonstrates how systems theory is applied to conceptualize the horizontal subsystems of the farm firm. The theoretical model is illustrated by means of two examples: the grain and swine production subsystems.

The systematic conceptualization of the horizontal subsystems of the farm firm can be regarded as a preliminary study which may result in practical application especially in the field of systems simulation.

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