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## DECISION MAKING IN AGRICULTURE--DISCUSSION

W.J. Anderson\*

These are five excellent papers on the theme. They cover significant aspects of decision making for agriculture including motivation, resource constraints, risk and management training. All papers eventually focus on decision making at the farm level. Together they make a valuable contribution to understanding the decision making process in the farm sector.

Common features of decision making which emerge are:

i. The complexity of the process in any policy, social or economic setting. The papers show that management involves resolving resource constraints, risk and market assessment into decisions which will maximize the objective function which reflects the farmer's set of values.

ii. That farmers' decision making is economically rational. I am pleased that economists no longer feel they have to defend that point against contrary beliefs held by some laymen and some other scientists.

I will attempt to comment on what strike me as unique features of each of these papers.

Significant features facing the African small holder affecting management which stand out in Cleave's paper are:

i. The dominance of labor as a factor of production. Labor is the most complex of all factors to manage because its productivity depends on biological factors, e.g. age and sex, technological factors, e.g. amount of training, and economic factors e.g. opportunity costs. Cleave's excellent account of how African farmers resolve these factors in a labor intensive farm organization engenders great respect for the level of management skills actually attained.

ii. The sophistication of production strategy.

iii. The merging into one unit of farm, household and family.

At first glance one might say that, where the market is mostly generated within the same unit that decision making in production takes place, most of the risk associated with the market place is avoided. In point of fact, planning to achieve a reasonable balance between supply and demand is more difficult than when decisions are motivated by outside markets. This, coupled with seasonal pressures on the use of labor and yield uncertainty, have led to the adoption of a sophisticated

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production strategy. For these reasons also the system sets into a fairly stable equilibrium which is not readily changed. This points up the origin of difficulties in raising the level of the production function, because numerous elements are involved in the process and none are readily changed independently of the other. Cleave notes that knowledge of the determinants of the response of farmers to new technology, incentives and change agents is limited.

Longworth and Menz deal with a problem at the other end of the technological spectrum, namely, management of low labor intensity farm operations. Their course can serve a two-fold pedagogical purpose. One is to put the management techniques, arising out of decision theory and the theory of the firm, aided by a computer, into a complex management situation for purposes of training managers; the other is to permit the future extension man or consultant to face the consequences of the whole complex of management decisions before he faces them in the field. Simulation is the answer to both pedagogical objectives and permits the instructors to combine decision theory, firm analysis and programming with traditional case study methods. The emphasis on the allocative effect of education is sound because management is essentially one of finding the optimum spot on the production function.

I could raise three questions: - "At what stage in the training of agriculture graduates is the course offered?" My opinion is that it should be offered before the final year to give students the over-all view of the farm firm. Another question is, "What combination of courses in management is this course a part?" I presume that the course would not supplant the courses on technical management of specific resources which have more of the worker pedagogical effect. Finally, what has been the response of students who have taken the course?

The paper by Professor Salmi presents a neat piece of research on the economics of the application of a herbicide where weather is a major determinant of the result. While such research serves to transform uncertainty into probability, the farmer is still faced with the prospects of large losses in the short run even when he knows the probability. I expect that the smaller the farmer's resources, the more reluctant he will be to apply herbicide at the optimal level. I venture to suggest that under those conditions, decisions taken which involve a cash outlay are almost certain to be sub-optimal. I wonder if Professor Salmi would comment on that hypothesis.

Brossier is seeking for a farm typology that will assist the development process. He is concerned about the fact that a single approach to transmit research results to farmers fails to reach many potential users. He finds that farm types determined by fixed factors - land, labor or value of sales give no help in isolating those groups of responsive from the unresponsive farmers. He therefore applies

decision theory to an economic framework in which he classifies the factors of production into those not subject to change as a consequence of past decisions and those which can be changed in the short run and the long run.

Testing this method in the field, Brossier discovers eight categories of farmers based on their relations with the main development institutions. These farm types encompass a range of family composition and size, and one non-family type. The analysis reveals striking differences in the relations of various types with institutions which offer development services such as credit, extension, cooperatives and private agribusiness. The large size non-family exploitations are independent of all services except those of the private agribusiness sector. The bachelor and older farmers are not large users of any services; neither are those with small holdings or without improvements. This leaves only the farmer with land improvement and father/son associations which are available. Most startling results pertain to the extension service to which only 19 percent of the farmers feel they have a strong affinity. Overall, every institution might well reflect on how to revise so that it does have a greater impact on farmer's decision making.

The results also suggest that there is considerable instability in the structure of the family farm as it develops and declines over the life of the owner. Thus family farms tend to be undercapitalized in the early stage of development and over-capitalized later on relative to the labor supply. This probably is in contrast to the African farms in Cleave's paper which are also family units but with a merging of generations which give it a continuing life analogous to that of a corporation.

The paper by Mr. Herer deals with another dimension of decision making arising out of greater emphasis on central planning than is in the economic setting for the other papers. Herer's paper gives a good insight into the various markets which are involved and the part which each plays in farm decision making. The farm sector in Poland is made up of two main structural types: state farms and private farms. The state farms produce in response to prices announced in advance by the Central authority and must sell to government owned industrial and retailing establishments and purchase inputs from government owned enterprises. The private farms likewise purchase inputs from government owned enterprises but they have the choice of selling directly to consumers or to the government industrial-retailing enterprises. All production decisions can therefore be taken on the basis of forward prices for output with known prices for inputs. The private farmer also has the possibility of selling some of his output directly to consumers if he can obtain a higher price than from the central authority.

Herer notes correctly that prices in the private market will not be higher than the government price if the government's offer is the equilibrium price. He notes that surpluses never occur in the government market which means that the planning authority either hits the equilibrium price or sets one that is lower than the equilibrium price. A planning authority with even the best research facilities and analytical capability knows that errors in achieving equilibrium through forward pricing are certain to occur. Therefore if the authority sets a no surplus objective it will be careful to err on the low side in setting prices. Private market prices should therefore tend to run higher than the government prices. More generally, it seems to me that to meet the no surplus condition, the tendency will be for the terms of trade for agriculture to be less favourable and conducive to development than they should be in the light of the demand for agricultural commodities. This conclusion seems to be consistent with agricultural strategy in the context of the Comecon which was discussed in one of the groups last week.

A point of definition may be worth mentioning. Herer distinguishes between peasant farms and capitalistic farms - the latter being those which employ labor. I would classify peasant farmers who own their land and make private production decisions as capitalists. Nevertheless private farms which employ labor will not develop as Herer says because the ratio of agricultural wages to industrial wages is kept low. Since workers are free to select employment, this must mean that state farms are left with the least skilled of the labor force.