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Forms of Multi-farm Use of Machinery in West German Agriculture. An Analytical View

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THE RELEVANT ENVIRONMENT

Agriculture is part of the economy as a whole. It must, therefore, be able to adapt itself to general economic changes. In Western Germany, wages and salaries in the non-agricultural sectors of the economy have been continuosly rising. On the basis of the socio-economic institution of the family farm, the following possibilities for increasing real income are open to those active in agriculture today:

(1) Expansion of the holding through acreage.

(2) Enlargement of the business through expansion of animal production, independent of acreage.

(3) Realization of existing potential for efficiency.

(4) Reducing costs through multi-farm use of agricultural machinery.

It is my intention to discuss the fourth of these possibilities: multi-farm use of machinery as it applies to West German agriculture. I shall attempt to present an analytical concept for determining the forces and their interrelationships which play a decisive role in the acceptance or rejection of this multi-farm use. From the economic point of view, it aims at such an arrangement of production factors as will lead to the highest possible income, given a certain technological level, cost structure, and farm structure. But because management, is nowhere an autonomous constituent of social life (H. Kötter), because it serves individual and social goals, and because cooperation between individuals is itself a social process (K. Hage), it is necessary to view multi-farm use of agricultural machinery as a complex of economic, social, and psychological factors.

FORCES WHICH DETERMINE BEHAVIOUR

Studies of multi-farm use of machinery up to now have been based for the most part on economic concepts alone. A study which is to make clear the consequences of the social and psychological factors as well must

proceed from behavioural concepts. Within the objective limitations of such factors as climate, type of soil, size of farm, state of technology, cost-price relationships, judicially (legally) and socially admissible behaviour, etc., the actual behaviour of the individuals concerned is determined by: their subjective goals; and by the possibilities they perceive for attaining these goals in their respective situations.

The behavioural forces relevant to multi-farm use of agricultural machinery can be differentiated into (1) forces which lead to or encourage it, i.e. driving forces and (2) forces which stand in the way of or hinder it, i.e. restraining forces.

Its acceptance then, is attainable basically through the addition of driving forces and/or the removal of restraining forces.

Driving Forces

According to pertinent literature and extension experience, the following seven driving forces deserve attention: (Nos. 1-3 characterize such forces as result from the attempt to achieve or avoid something, and mainly take the form of goals).

(1) *Striving for higher income,* especially that available for consumption (purchasing). This is intensified through observing increased consumption possibilities in other strata of the population giving a feeling of relative retardation or backwardness in comparison with others.

(2) *Economic pressure.* This becomes especially significant when other opportunities for increasing income seem difficult to attain. Such could be, for example, lowering labour costs by reducing the number of farm workers, or realizing untapped potential, or expanding farm acreage, etc. in connectio nwith No. 4.

(3) *The attractiveness and practicality of technical solutions* as well as their prestige value within the social environment. These are significant as incentives for accepting multi-farm use of machinery, especially if these technical solutions are not available to the individual farms. Important here is the elimination of such pronouncedly unpleasant tasks as working in wetness and dirt, bending, repeated loading and unloading, etc., which, through mechanization, could be combined into single-operation procedures. The possibility of organizing conveyor-belt field work on a high technical level (aided by the temporary pooling of machinery and workers from several farms), and the resultant accelerated pace of work, exert a positive psychological effect and, at the same time, tend to reduce objective risks (the inability to complete urgent jobs within the mandatory time limit).

(No. 4 characterizes such forces as result from the perception of possibilities for achieving set goals):

(4) *Insight into economic relationships,* the realization that through multi-farm use of machinery, it is possible to reduce fixed costs *pro rata,* and to regain invested capital more quickly.

(Nos. 5-7 characterize such forces as result from helpful environment conditions):

(5) *Availability of free (idle) capacities.* This is especially significant on farms which are over-mechanized, or which have labour forces which are irreducible although too large for the size of the farm. Through multi-farm use of machinery, these farms can win back their invested capital more quickly, and gain additional (outside) wage-income as well.

(6) Temporary demand for (only partially divisible) production factors (workers and machines). Especially on larger farms, peak periods occur, for which the employment of permanent workers is economically unreasonable. Such farms are interested in the temporary use of the free (idle) capacities (machines and workers) of other (smaller) farms (see No. 5).

(7) *Subsidies, cheap credit, exemption from taxes and other financial incentives* whether granted by the state for multi-farm use of machinery or by other institutions which grant similar supports, cooperatives (associations) and local banks pay subsidies, in part, for the salary of the managers of machine circles, or offer services free of charge (management, accounting, etc).

The enumeration of driving forces does not point up the interrelationships of these forces. Some forces become effective only when connected with others. Thus, for instance, the desire for higher income (No. 1), economic pressure (No. 2), and the attractiveness of technological solutions (No. 3), can lead to multi-farm use of machinery only if a minimum of economic understanding (No. 4) is available to facilitate the perception of a possible way to attain the goal. Development of economic understanding is, then, an important instrument in agricultural policy for transforming latent needs into directed action.

Restraining Forces

The following restraining forces demand attention:

(1) *The general hesitation concerning innovations* the consequences of which the farmer is not completely sure of, and which cannot be reversed without disadvantage or discomfort.

(2) *The subjective need for independence* and personal freedom of decision. The independence of the farmer is doubtless part of an image which has only limited possibilities for realization in a developed economy (here freedom of decision and freedom of action must be weighed against economic freedom). On the other hand, in the very experience of dependence, the attainment of a certain degree of personal freedom of de-

cision is psychologically significant. As a rule, therefore, a farmer does not engage in those kinds of cooperation under which every-day activities would become dependent on collective decision.

(3) *Fear of arguments (and imposition) under a programme of multi-farm use of machinery.* Typical sensative points (especially when joint ownership of machines is involved) are: the question of regular upkeep, of responsibility for and division of costs for replacement and repair of machines, the order of machinery use (especially when a certain job must be completed within a limited time). Characteristic of this situation is the well-known saying: "Kumpanei ist Lumpanei". This cannot be translated properly into English, but the meaning is approximately: "Companionship in work leads to shabby trickery". Formal precautions against arguments (such as written aggreements and regulations) can easily lead to inhibitions against engaging in such obligatory relationships, especially when a man cannot "see through" the agreements and feels insecure in regard to their nature and to the personalities behind them.

(4) *Hesitation to risk neighbourly relations and friendships* with exchange agreements which amount to more than a common favour, but which are no help in time of emergency. Such hesitation appears especially when the help does not lead to a balanced relationship but, rather to one side mostly giving while the other mostly receives. The recipient in such a situation tends to feel under an obligation to compensate financially for the help of the giver. Then all neighbourly and friendly help is necessarily seen as an exchange agreement, and complications arise because of the difficulty of appraising and evaluating the help objectively. The custom of not taking or demanding money for neighbourly help must be dropped.

(5) *Uncertainty as to whether work of the desired quality will be available* at the proper time. This arises whenever a farmer does not control the required machinery himself.

ANALYTICAL CONSIDERATION OF SEVERAL FORMS OF MULTI-FARM USE OF MACHINERY

Trustworthy statements about the analytical applicability of the theoretical concept used can be made only when it has been employed to analyse actual situations. The resultant findings can then be compared with the results and conclusions from other studies with different theoretical orientations. Because this has yet to be done with the concept of multi-farm use of machinery as a complex of sociological and psychological as well as economic factors, we must be content with observations of important organizational forms of multi-farm use of machinery, on the basis of this concept.

Since the currency reform of 1948, the economic, technical and social developments in West Germany have steadily tended to intensify: striving for higher income (driving force No. 1); economic pressure (driving force No. 2), and the attractiveness of technological solutions (driving force No. 3). Owing to some rather sobering experiences with durability and repair costs, and to more extensive agricultural advisory work in the field of farm economics, knowledge and understanding of economic relationships has so grown, that multi-farm use of machinery has come to be generally viewed as a means of lowering costs and increasing income. There still exist, however, significant restraining forces concerning this solution to problems of income. In part, such forces are based on a doubt whether the economic goals striven for can really be achieved (restraining forces Nos. 1 and 5) partly in the expectation that non-economic goals (personal independence (restraining force No. 2) and avoidance of social conflicts (restraining forces Nos. 3 and 4) will be adversely affected. Also, farmers naturally hesitate to enter into arrangements on a permanent basis without first determining the possible gains and risks of doing so. For these reasons, the type of multi-farm machinery utilization offered is of decisive importance.

The rapid spread of contractor work is probably best explained by the fact that the users' freedom of decision is scarcely limited (restraining force No. 2) and that long-term commitments (restraining force No. 1) and debatable factors (up-keep and repairs (restraining force No. 3) are avoided. Although from the point of view of labour attractive and economic solutions are available (e.g. large harvesting machines, especially the combine), contract work has by no means taken over all multi-farm use of machinery. This is so because the contractor's aim to use his machinery to the fullest extent often subjects some farmers to relatively long waiting periods (restraining force No. 5). Also, operational expenses are naturally lower for the farmers if they can eliminate the additional costs demanded by the contractor to cover his profit. This they can do by working directly with one another in a programme of multi-farm use of machinery.

JOINT-OWNERSHIP OF MACHINERY

Joint-ownership of machinery has also spread, especially among small-scale farms, despite the fact that relatively strong restraining forces must be reckoned with (restraining force No. 3). Upon closer inspection, though, we find meaningful explanations of this phenomenon. First, multi-farm use of machinery which actually functions on the basis of joint ownership is probably much less widespread than statistics would suggest. The appreciation of financial incentives for the use of jointly-owned machinery

has led to the formation of numerous farmers' associations some of which exist in name only. The increase in number of such associations may also be explained by the fact that many of those which actually function have adopted rules which largely eliminate restraining forces. In such associations, one seeks partners whom one knows well, and with whom one gets along well. In this way, one guards against unwelcome surprises. Written contracts are rare. The problem of the care and upkeep of the machines is settled through preliminary agreements (most often, the responsibility for machine care is assumed by one of the participants, whereas the repair costs are divided among them all). Experience has shown that a small number of members (2-5, because of the personal relationship of mutual trust, and the close proximity of the farm involved, is particularly advantageous for the planning and execution of joint labour. There result, in turn, for certain tasks, labour economy and efficiency which are scarcely practicable under the contractor system (e.g. cooperative silage making on dairy farms makes possible conveyor-belt work in the field, through the simultaneous use of several tractors and a power-driven field chopper).

Recently, another form of organization for multi-farm use of machinery has gained ground in West Germany, especially in Bavaria and Lower Saxony. Here, the machinery remains private property (thereby cancelling out the problem of machinery care and division of overhead costs (restraining force No. 3), and the interested farmers offer their "idle capacities" to others for a fee (Machine Circles). Specified rates of exchange are determined on the basis of cost calculations; the accounting among the farms generally follows a non-cash basis. Acknowledged records of work performed are treated as checks by local monetary institutions. This represents a very elegant form of recording, valuing and accounting for services exchanged (restraining force No. 4).

MACHINE CIRCLES

There are two main types of Machine Circles:

(1) *Large Circles* with up to 300 members; large area of operation; professional business manager permanently employed.

(2) *Small Circles* with about 2-6 members; very small area of operation; no salaried manager.

Large Circles

The business manager keeps a central card catalogue of all available "idle capacities" offered by the member farms for use by others. He passes incoming requests to member farms whose offers could best meet the

cases. This procedure depends upon an extensive telephone network as the distances involved in the area of operation are great. The salary of the business manager and the payment of secondary costs is covered by members' dues and or the fees for bringing the parties together (about a 5% addition to the value of the work). Because the amount of the fee is limited by the competition of other organizations (especially contractors), a Circle with a full-time manager must presently attain at least a 300,000 DM turnover each year, in order to become financially independent. For the requester, however, this plan still offers no guarantee that the needed services will be of the right quality and amount, and available on time (restraining force No. 5). He strives, therefore, for a relatively early agreement with the offerers. Later, he can make contact with them without going through the central organization, thereby avoiding the need to pay the fees. The tendency to by-pass the Circle is prevalent among the farmers, while the business managers of the Circles of course strive for just the opposite. Here, then are built-in conflicts of interest. Inspite of the fact that the Large Circles, during the initial period of their development (4 years), are subsidized by the state, a solid turnover of 300,000 DM is achieved by only a few, and the question arises whether this form of organization will endure. There is the problem of decline when the government support is taken away, as wellas the undermining through the avoidance of dues and fees.

Small Circles

These differ from the Large Circles mainly in that there are no large areas nor professional business managers. They are run by the farmers themselves in small, easily handled areas, seldom extending beyond one or two villages. Here, then, the interested organizational ability of the farmers themselves comes into play. Accounting is done on the basis of cost calculations, mostly worked out by the official advisory service, though it can be altered by the Circles. They cannot provide so easily for seldom-used machinery as can the Large Circles. As in the case of the small association, however, advantageous conditions exist for joint execution of important field work (driving force No. 3). The securing at the right time of the necessary services of the right quality and quantity is guaranteed by the close personal relationships between the members (restraining force No. 5). Nor do they have to face the problem of decline connected with the falling away of government support. On the other hand so-called outsiders, farmers having weak contacts with their colleagues, find it difficult to gain access to this organizational form. They have to try to achieve multi-farm use of machinery through contract work or through Large Circles.

In Lower Saxony, the form of Small Circle just described has been tested up to now in one school district without the stimulus of outside financial support. Only advisory encouragement, the calculation of machine costs and the printing of local machine lists was provided by the official advisory service. This form of organization established itself in this particular district in a very short period of time. It demonstrates how quickly multi-farm use of machinery can develop when organizational forms are offered which widely eliminate restraining forces (see Table).

The Development of Multi Farm Use of Machinery Under Two Different Organizational Forms of Machine Circles

(The areas compared lie a good 100 km apart, under similar agricultural conditions)

Year	Large Circle[a] Flottwedel		Small Circles[b] in the Bremervörde School District	
	membership	turnover, DM	number of circles	turnover, DM
1961	141	72,000	8	12,000
1962	191	165,000	12	48,000
1963	222	212,000	45	240,000
1964	250	290,000	68	361,000
1965	285	335,000	73	443,000
1966			67	364,000[c]
1967			79	

[a] Successful Large Circle in Lower Saxony with professional business manager; initial period financed by state.

[b] Small Circles without salaried management; without financial aid during the initial development period.

[c] The decline in total turnover is largely due to the reduction of the rates for the use of (jointly-owned) combines which were already fully depreciated, but still in good working condition.

NOTES

The following discussion is based on Kurt Lewin's concept about methods of changing levels of conduct (see Lewin K., Group decision and social change, in: Readings in Social Psychology (Th. M. Newcomb and E. L. Hartley, Eds), pp. 340-344, Rinehart and Winston, Inc. (1947).

For this concept see especially:

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